Conducting Assessments for Public Health Infrastructure and Capacity Building International Humanitarian Assistance Missions

A Guide for U.S. Public Health Service Engineer Officers

Version 1: October 2010
Version 2: August 2017

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This Guide was developed by the EPAC Readiness Subcommittee to assist and promote the effective use of PHS Engineer Officers in public health missions, assist them with deployment opportunities, and communicate desired skill sets to Engineer Officers and the Commissioned Corps' Readiness and Deployment Operations Group (RedDOG). This Guide represents the knowledge and experience of its developers and provides general guidance to PHS Engineer Officers who conduct initial assessments during RedDOG missions.

Website: https://dcp.psc.gov/osg/engineer/

Procedures for Updating this Guide

This Guide shall be revised based on lessons learned and comments provided by users of the document. Therefore, it is highly encouraged that PHS Engineer Officers and other users of this Guide provide feedback so that an updated version can be developed to make it a more useful and effective tool. Comments should be directed to the Chair of the EPAC Readiness Subcommittee.

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1 Background

1.1 Introduction

Assessments are a critical element to the program planning process as they provide the basis for subsequent decisions. In particular, for an international humanitarian assistance mission (and especially for emergency response), rapid assessments are essential for obtaining solid baseline information and understanding public health concerns. The results of the assessment have an important impact on operational orientation and help to ensure that the interventions and activities correspond to the needs of the affected population. Without accurate information, officials may make decisions based on impressions or opinions, which may not reflect the actual needs of the specific community in the host nation.

This document titled *Conducting Assessments for Public Health Infrastructure and Capacity Building* (referred to as 'Guide') was developed as a standard reference tool to conduct assessments of public health infrastructure and opportunities for capacity building in support of international humanitarian assistance missions, and in particular for U.S. Navy (USN) Pre-Deployment Site Survey (PDSS) missions. This Guide contains separate chapters on general responsibilities of the Assessors, sample forms, and other general reference information. This Guide is intended for use by U.S. Public Health Service (PHS) Engineer Officers or others conducting assessments of public health infrastructure.

Throughout this Guide, several terms will be used for consistency, which include:

- **Activity, project, or intervention:** The process of developing infrastructure, from planning through design and construction or implementation to operation. Additionally, the term will include subject matter exchanges, trainings, and overall capacity building.
- **Assessor:** The PHS Officer or individual conducting the assessment.
- **Assessment:** The activities and process for an initial assessment, rapid needs assessment, or reconnaissance for a PDSS. It is not intended to describe a more thorough detailed assessment that may follow the initial assessment.
- **Stakeholder:** The people, groups, or agencies with an interest in a project and are likely to be affected by the proposed intervention, primary stakeholders with direct impacts and interests (e.g. local communities, vulnerable groups within the community), secondary stakeholders (e.g. partner nations, NGOs), and external stakeholders (e.g. soap companies).

This Guide needs to be adopted to each context as each host nation, community, and situation has its own characteristics and presents specific constraints and opportunities. The specific knowledge, experience, and initiative of the Assessor will be of major importance in completing the assessments. This Guide does not explain every activity for every assessment, but provides a general framework for conducting assessments of the major public health infrastructure sectors (i.e. water, sanitation, solid waste, health, capacity building, and construction). Depending on the specific situation, some sector assessment information will be more useful than others. The sample forms should be adopted and modified to suit the particular situation, including applications for both residential dwellings and institutional buildings (e.g. medical centers, schools).

Many of the references utilized are for international emergency response primarily because of the large emphasis placed on conducting initial assessments to develop an outline plan for intervention. This Guide has adopted this information with a focus on the primary priority being long-term and sustainable objectives for international humanitarian assistance and to support the strengthening of public health infrastructure. However, this Guide could be adopted for international emergency response with priorities established for survival or short-term needs.

1.2 Purpose

A critical objective of international humanitarian assistance missions is the provision of sustained, long-term environmental and public health. Therefore, the primary purpose of this Guide is to provide a framework to effectively identify, analyze, and prioritize projects that would have the greatest sustained and measurable public health impacts and outcomes for the host nation. *The focus of this Guide is to support the development of projects and activities centered on public health infrastructure, from water and sanitation facilities to health and hygiene promotion, trainings, and knowledge exchange.*

The concepts from this Guide are intended to provide the Assessor with basic knowledge and tools to conduct initial assessments utilizing a consistent and standardized approach in an international humanitarian context. The framework provided by this Guide should be further developed through discussion and collaboration with stakeholders (i.e. host nation, international partners, etc.) in order to ultimately reach final decisions of proposed projects for missions.

Since each host nation, region, community, and facility assessed has unique constraints and requirements, the collection of additional information and/or deviation from this Guide may be necessary to accurately evaluate the situation and plan solutions accordingly. Such elaborations on this Guide should be based on the best judgment of the Assessor.

This Guide provides assessment information on international public health infrastructure and associated capacity building for the major sectors listed below:

Table 1.1: Summary table of primary sectors/focus areas for public health infrastructure

Water-related sectors and focus areas	Sanitation-related sectors and focus areas	Capacity building-related sectors and focus areas
▪ Water quantity ▪ Water access ▪ Water quality ▪ Water use ▪ Water collection & storage ▪ Water management	▪ Excreta disposal ▪ Solid waste management ▪ Grey water and surface water drainage ▪ Vector control	▪ Subject matter expert exchange (SMEE) ▪ Water, sanitation, health, & hygiene promotion ▪ Operation & maintenance training

1.3 Format and References

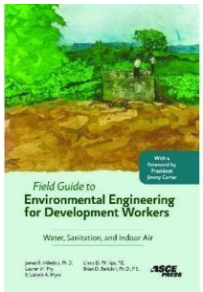
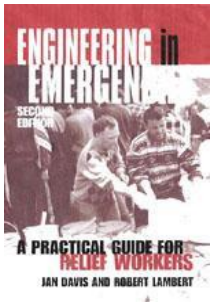
The general format of this Guide is modeled on the U.S. Agency for International Development (USAID) Field Operations Guide (FOG). This Guide provides the basics for self-care and preparation of the Accessor followed by an overview of the public health infrastructure the Assessor will encounter, the stakeholders involved, and the elements of a complete assessment. Finally, the included forms provide the Assessor a framework for planning, formatting, and conducting an initial assessment.

The development of this Guide has drawn on several references for information, which are listed in the Appendix. Although many of the references are primarily for emergency and disaster response, the information utilized is taken primarily from the perspective of long-term sustainability for international humanitarian assistance. However, much of this Guide could be adopted for international emergency response with survival or short-term needs becoming the primary objective and with the measures seen as a step toward long-term public health infrastructure development.

Throughout this Guide, suggested readings from the four primary companion references listed

below are provided for additional information and further guidance. The Assessor should utilize this Guide along with these references to conduct the assessments.

Table 1.2: Primary companion references

Mihelcic, et al. (2009) *Field Guide to Environmental Engineering for Development Workers*	Davis and Lambert (2002) *Engineering in Emergencies*	MSF (1994) *Public Health Engineering in Emergency Situation*	Sphere (2004) *The Sphere Project*
			

1.4 USN Humanitarian Mission and PDSS Background

Since 2004, PHS Commissioned Corps Officers (PHS Officers) have become part of the U.S. military's increased involvement with international humanitarian missions, such as the 2004 Asian Tsunami and 2005 Sumatra Earthquake relief efforts, the USN Continuing Promise and Pacific Partnership missions between 2007 and 2010, and the West Africa Ebola Outbreak Response in 2015. These missions have brought together stakeholders that include the U.S. military, partner government agencies and military forces, host nation agencies and military forces, non-governmental organizations (NGOs), and the broader humanitarian community to provide medical, dental, construction, public health infrastructure, preventive medicine, veterinary, education support, and other humanitarian assistance programs both ashore and shipboard.

The USN operational mission concept statement indicates that *in conjunction with partner nations, the U.S. interagency, and International Humanitarian Community (IHC) volunteers, the USN will conduct combined and joint Humanitarian and Civic Assistance (HCA) activities and coordinate training in order to strengthen alliances, promote multilateral security cooperation during peace, and improve U.S. military and partner capacity in Humanitarian Assistance and Disaster Relief (HADR).* The USN mission has a primary focus of effort on the host nation as indicated in "by-with-through", which means:

- *By*: By invitation of the host nation.
- *With*: With host nation personnel, including military and civilian (government, humanitarian community, and private sector).
- *Through*: Through the host nation government at the national, regional, and local level.

Generally, the USN host nation partnership missions' primary objectives are to:

- Conduct health-related activities in cooperation with the host nation and other stakeholders.
- Provide shipboard and shore health-related services at selected locations agreed upon by the host nation and other stakeholders.
- Conduct discussions and subject matter expert exchange (SMEE) of ideas on public health topics and humanitarian concepts.
- Conduct community relations (COMREL) including dedication ceremonies, music, and sports activities with host nation local communities.

USN mission projects could range from technical assistance and SMEE to the construction and rehabilitation of structures or water system facilities with Seabee units. The mission activities identified usually relate to the USN metrics used to monitor and evaluate the mission. Normally, projects will be identified under the following sector leads:

- BMET: Biomedical Equipment Technician
- CBMU: Construction Battalion Maintenance Unit (Seabees)
- DENCAP: Dental Civic Assistance Program
- ENCAP: Engineer Civic Assistance Program
- MEDCAP: Medical Civic Assistance Program
- VETCAP: Veterinary Civic Assistance Program

In preparation for the scheduled humanitarian assistance mission, the USN conducts a Pre-Deployment Site Survey (PDSS). For the PDSS, the Assessor's role in early planning activities is a critical component to the mission as the involvement and collaboration between the host nation and the team can result in a higher likelihood of high-impact and sustainable projects that address identified public health deficiencies and needs. A simplified sequence of planning and operational events and activities includes the following:

1. Pre-deployment activities include the PDSS and development of the concept of operations (CONOPS).
2. Advanced operations units (ADVON) to host nation a few weeks prior to the mission.
3. Mission with host nations.
4. Follow-up and evaluation.

The results of the PDSS are documented in a CONOPS for the mission. In general, the objectives of the PDSS are to:

- Develop CONOPS for host nations with identified sites, priority activities, and detailed tasks.
- Meet critical host nation local government officials and humanitarian community members.
- Visit proposed sites.
- Initiate logistics coordination.

Typically, the PDSS occurs 5 to 7 months prior to the mission. The duration of the PDSS mission is usually 3 to 4 months with participation by the PHS Officer at 2 to 4 week durations. The PDSS activities occur over a 1 to 2-week period in each host nation.

A few weeks prior to the actual mission, an ADVON will deploy to the host nations to confirm and complete any follow-up activities and logistics.

Normally, the overall humanitarian assistance mission ranges from 4 to 5 months with operations in 8 to 12 countries. The duration in each host nation is usually 1 to 2 weeks with projects in several communities. Participation on the missions by PHS Officers has usually occurred in 3 to 4-week team rotations.

Throughout this Guide, terms specific to USN missions such as PDSS and ADVON will be utilized as general references for the same activities regardless if the mission sponsor is the USN or another entity.

1.5 General Assessor Responsibilities

In general, the objectives of the Assessor, as part of the assessment team, are to:

- Establish, develop, and strengthen partnerships with host nations.
- Dialogue with stakeholders' to understand public health infrastructure goals and objectives.
- Increase the mission perspective and focus on community-based and long-term/sustainable public health infrastructure activities.

- Assess the public health infrastructure needs of the host nations' community/site.
- Report on identified needs and recommend actions and activities to address the needs.
- Identify opportunities to provide broader public health interactions with host nations.
- Foster and encourage mission collaborations between stakeholders.

The assessment team findings and recommendations must be clear, concise, timely, practical, and operational. In part, they contribute to the agency's (e.g. USN) decisions and planning for the mission to the host nation. The Assessor is expected to fully carryout the duties for the success of the mission.

In general, expectations of the Assessor on an assessment mission are as follows:

- **Conduct:** Represent the PHS Commissioned Corps with the highest level of values and standards of conduct.
- **Cultural Sensitivity:** Be culturally aware and sensitive while working in a host nation and understand that you are a guest.
- **Diplomacy:** Be politically aware and sensitive to a host nation's political situation when conversing with host nation officials.
- **Teamwork:** Demonstrate personal commitment to the mission and work well and cooperatively with fellow team members to accomplish tasks effectively.
- **Technical Capacity:** Be resourceful and technically competent in the area of public health practice in order to provide a thorough and complete assessment and recommendations providing a public health infrastructure focus to the PDSS; and as necessary, seeks participation and assistance from appropriately qualified subject matter experts.
- **Communication:** Keep fellow assessment team members informed in language and formats that meet the needs of the mission and keep all project stakeholders involved in communication.
- **Mission Objectives:** Follow the direction of the assessment team leader/officer-in-charge and have a broad understanding of agency policies, procedures, and resources and how they apply to the mission.

The PHS and RedDOG greatly appreciate the service of the PHS Engineer Officer on the assessment mission. The PHS Officer's knowledge, experience, dedication, and commitment directly result in successful and positive outcomes for the mission and the host nation.

2 General Personal Information

2.1 Introduction

This chapter provides general information for the Assessor that includes a list of personal and assessment-specific items, safety and security, and personal health.

2.2 Mission Information

Before departure, RedDOG will communicate the following items to deploying PHS Officers. If any of these items are not provided, then it is the responsibility of the Officer to request this information from RedDOG or the principle mission contact provided by RedDOG.

- Mission objectives
- Travel orders
- Itinerary and travel arrangements
- Official passport and visa requirements
- Disease prevalence for host nations
- Additional immunization requirements
- USN PDSS team lead contacts (if USN mission)
- Team rosters/structure
- Host nation contacts
- Special equipment needs

2.3 Personal Packing and Assessment Items Checklists

Typically, RedDOG will provide a packing checklist that is mission-specific with considerations that could include the following:

- Uniform requirements
- Equipment lists, including items required to pack and those available on-site
- Location, austerity/remoteness, and climate
- Length of mission
- Cultural sensitivities

See the Appendix for checklists with typical personal packing items and engineer-specific items to aid in conducting assessments.

Recommendation: It is highly recommended that PHS Officers pack at least one set of the Operational Dress Uniform (ODU) (or other approved uniform) and other critical items in a carry-on bag. The PHS Officer would be disadvantaged arriving at the mission site without the proper uniform and essential equipment if the luggage was misplaced or delayed.

2.4 Host Nation-Specific Information

Before departure, the Assessor should develop a general understanding and knowledge of the host nation and their existing public health infrastructure situation (e.g. water supply and sanitation coverage in urban and rural areas, and types of facilities). In addition to information supplied by RedDOG and military counterparts, consider the sources listed below for data.

Host nation-specific information

- *Culture Smart Card*, published by the U.S. Marine Corps Intelligence Activity (MCIA). A Host nation-specific card is a two-page guide for cultural awareness with sections including

religion, religious holidays, clothes/gestures, ethnic groups, cultural groups, cultural customs, cultural history, social structure, language, and dos and don'ts. The Cards are available by contacting MCIA at 703-784-6167. Additional information is found at http://www.hqmc.marines.mil/intelligence/Units/MCIA/

General host nation-specific and health-related information

- U.S. Department of State: https://travel.state.gov/content/passports/en/country.html
- World Health Organization: http://www.who.int/countries/en/

Drinking water and sanitation coverage – country information data sheets

- World Health Organization/UNICEF Joint Monitoring Programme country files: https://www.wssinfo.org/documents/?tx_displaycontroller%5Btype%5D=country_files

2.5 Safety and Security

Although the Assessor may have prior experience with international travel and work, it is critical to still emphasize the importance of personal safety and security. Being aware of personal and team safety and security is a part of everyone's job. The goal is to prevent accidents and protect the safety, health, and security of all team members on the mission. Typically, the Assessor will be part of an assessment team (e.g. USN), which has operational procedures for force protection. However, there may be occasions when the Assessor is travelling alone (e.g. on commercial air flights to the host nation) and should be aware of country-specific information and travel advisories from the sites listed under Section 2.4 above.

The Assessor should take all necessary precautions for safety and security not only for personal well-being and health, but also considering the effects if a team member becomes sick or injured and must be cared for or evacuated. Such a situation would diminish the ability of the team to deliver the highest level of assistance and service possible. Therefore, the safety, security, and well-being of all team members are an asset to the team and the host nation being served.

The assessment team leader and/or other host nation expert may provide up-to-date details on disease, sanitation, food and water safety, personal and property security, and other information to keep team members healthy and safe during the mission. Safety and security considerations during the mission include:

- Maintaining communication with the assessment team leader to stay up-to-date on all safety or security issues.
- Familiarization with general safety, security, and health information for the host nation.
- Awareness of personal surroundings, both in and around areas of force protection.
- Awareness of local food/drink concerns and precautions.
- Understanding the needs and use of personal protective equipment.
- Obtaining briefings from host nation contacts/experts.
- Knowledge of first aid and contacts and protocol for medical emergencies.
- Maintaining a list of critical points-of-contact; this could include home base, PDSS team, U.S. embassy, and host nation officials.

2.6 Cultural Awareness

Typically, missions to conduct assessments will be limited in duration and may involve several weeks in the host nation. The Assessor may experience some stress (culture shock) related to suddenly being placed in a new environment, which could include both the cultures of the deployment sponsor (e.g. USN) and the host nation. Therefore, the Assessor should be culturally aware and take proper care to adapt to the surroundings as quickly and best as possible. The inability to accept and be considerate of the cultural differences could affect the mission's success.

Upon arriving in the host nation, the Assessor may experience some cultural constraints and may become frustrated because of the inability to communicate with the local population; lack of understanding of local greetings; different body language and gestures; sense of time and punctuality; and other cultural sensitivities. Sometimes anxiety and frustration may erode someone's typical level of self-confidence and can result in withdrawal. At the onset, the Assessor should expect to be disoriented and confused and realize that this is natural and often happens to others in similar situations.

Furthermore, in some cases, host nations within the same geographic region may have very different cultures, levels of openness, and willingness to share ideas and goals, thereby affecting the assessment team's level of movement and communication.

Therefore, to acclimate to the surroundings and be prepared to be an effective team member, the Assessor should consider the following cultural awareness adaptations and coping strategies:

- Integrate into the mission and culture of the deployment sponsor (e.g. USN).
- Integrate into the host nation's culture, values, and priorities. Pay particular attention to the host nation counterparts and learn as much as you can from them.
- Be patient, listen, and observe experienced members of the team and the host nation counterparts.
- Adjust time to achieve goals accordingly (e.g. working through language translators may increase the time commitment to effectively communicate)
- Keep an open mind.
- Maintain flexibility and adapt to situations and the environment. Be fluid and dependable.
- Establish realistic expectations and learning objectives.
- Contribute and negotiate in good faith.
- Limit your expectations that the host nation counterparts will change their customs and habits to accommodate the mission.
- Maintain a sense of humor.

Additional information:

- Davis and Lambert (2002) *Engineering in Emergencies*: 25-58.

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3 Public Health Infrastructure

3.1 Introduction

Among the most important activities in international humanitarian assistance is the provision of public health infrastructure. **The term "public health infrastructure" in this Guide is intended to broadly reference public health interventions as related to water and sanitation with components including both infrastructure as well as capacity building and knowledge exchange.** The infrastructure component may involve water supply, sanitation, and solid waste facilities, while capacity building and knowledge exchange may include health and hygiene promotion, subject matter expert exchanges (SMEE), and field exercises and demonstrations. In many cases, capacity building can be independent of infrastructure. However, the reverse is not true. Many infrastructure projects constructed by development organizations and agencies in low-income countries have failed to achieve the desired health impacts due to the absence of an associated assessment of capacity and training needs, as well as the resources to address them.

While the assessment and implementation teams may target specific benefits when developing public health infrastructure interventions, the perceived benefits by the project's recipients may be very different. For example, in studies exploring the benefits of sanitation within low-income countries, disease prevention is one of the less commonly cited benefits while privacy, improved dignity and status, women's security, children's safety, and comfort are cited more frequently.

Additionally, the Assessor should be aware of the major elements that impact environmental health and apply these during the assessment. One of these elements is environmental and sanitation-related disease. These diseases are typically caused by inadequate public health infrastructure and practices as summarized in the table below:

Table 3.1: Summary table of environmental and sanitation-related diseases

Transmission route and disease	Causes of transmission	Prevention and control strategies
Water-borne ▪ Cholera ▪ Typhoid ▪ Hepatitis ▪ Diarrhea/dysentery	Person ingests water contaminated with the pathogen	▪ Improve drinking water quality ▪ Prevent casual use of unprotected sources of water
Water-washed ▪ Scabies ▪ Skin infections ▪ Louse-borne typhus	Inadequate amounts of water used for hygiene	▪ Increase water quantity ▪ Improve accessibility ▪ Improve reliability ▪ Improve hygiene
Water-based ▪ Schistosomiasis ▪ Guinea worm	Pathogens (parasitic worms) that spend part of its life cycle in a water snail or other aquatic animal	▪ Reduce contact with infected water ▪ Control snail populations ▪ Reduce contamination of surface waters
Insect-vector ▪ Malaria ▪ Yellow fever ▪ Dengue ▪ Typhus	Insects breeding or biting in or near water	▪ Improve surface water management ▪ Destroy breeding sites ▪ Reduce visitation to breeding sites ▪ Use mosquito netting

Soil-borne ▪ Hookworm ▪ Roundworm	Walking bare foot in pathogen-contaminated area from open defecation	▪ Improve sanitation facilities ▪ Personal hygiene
Food-borne ▪ Bacillus cereus ▪ Salmonella infection ▪ Gastroenteritis ▪ Giardiasis (also Water-borne) ▪ Tapeworm	Contamination from microbiological factors and lack of proper sanitation	▪ Improve sanitation practices ▪ Proper cooking temperatures ▪ Temperature controls ▪ Eliminate improper storage ▪ Prevent cross-contamination with raw foods or contaminated surfaces ▪ Food preparation planning
Shelter-related diseases ▪ Respiratory infection from particulate matter ▪ Pneumonia	From fuels that emit carbon monoxide and particulate matter. In cold climates people could become susceptible to infection	▪ Modify and improve cooking device/type, cooking method, cooking location, fuel type, cooking period, room layout, vents/windows, chimneys

Adequate public health infrastructure provides environmental controls to prevent and reduce the risk of disease by interrupting the routes of transmission. Additionally, technical training, health and hygiene promotion, and other capacity building measures coupled with improved infrastructure provide substantial improvements to public health.

3.2 Subject Matter Expert Exchange

Consistent with goals and objectives to provide sustainable public health infrastructure, subject matter expert exchange (SMEE) events with host nation officials and identified audiences are important activities. Many worthwhile projects and activities will not include the design or construction of infrastructure, but instead focus capacity-building on such topics as operation and maintenance (O&M) training, system management, and health and hygiene promotion regarding disease transmission and household water storage, treatment, and protection.

On previous missions, SMEE events has been provided as classroom-based activities and field exercises held at a variety of locations including host nation universities, schools, hospitals, local health departments, water/sewer facilities, and shipboard. Previous USN PDSS missions have identified opportunities to conduct SMEE events focused on topics such as water/wastewater/solid waste system management, vector control, food safety, disease prevention, industrial hygiene, occupational health, hazardous material and bio-waste management, environmental health, and emergency preparedness and response.

The Assessor should collaborate with project stakeholders, especially host nation counterparts and project beneficiaries, to identify opportunities for SMEE events that are consistent with the needs and priorities of the host nation. In many cases, the assessment team will identify and outline potential SMEE topics that could be finalized between the ADVON and the host nation during the ADVON mission.

3.3 Health and Hygiene Promotion

Access to improved water and sanitation facilities does not on its own lead to improved health. Instead, interventions that combine such facilities with shifts in health and hygiene practices result in significantly better long-term outcomes. For example, UNICEF reports that proper hand washing with soap is the single most effective water, sanitation, and hygiene (WASH) intervention for reducing the incidence of diarrheal diseases, as well as pneumonia and skin/eye infections.

Community awareness of the importance of certain health and hygiene practices (e.g. hand washing) can be quite high; however, the challenge is to establish these practices as routine. For example, how do we identify and implement interventions that are effective in integrating the practice of hand washing into local culture so that it becomes common in households, schools, and businesses in the community? The key to sustained health and hygiene practices (e.g. hand washing with soap) is to motivate behavioral change through a variety of processes. For instance, health and hygiene promotion activities could involve the following components:

- Multi-media campaigns.
- Social marketing.
- Community participation and facilitation.
- Peer-to-peer education and promotion techniques.
- School-based education and promotion (e.g. life skills, student demonstrations and outreach).

Caution should be taken when developing health and hygiene campaigns that promote multiple improved practices (e.g. hand washing with soap, food storage, and safe cooking), as these are less effective than campaigns that focus on addressing a single behavior change. Interventions advocating multiple behavior changes may be less effective as numerous messages dilute one another in the minds of the target audience.

Furthermore, studies suggest that the effects of water and sanitation interventions are independent, while health and hygiene promotion is a necessary component of either to ensure correct, consistent, and sustained use and maintenance.

3.4 Management, Operation, and Maintenance

Effective system management and operation and maintenance (O&M) training are critical components of the sustainable operation of community facilities. Without proper and thorough training, community facilities will not be managed or function appropriately and potentially fail and become public health hazards.

Typically, water and sanitation infrastructure is managed by a community-based organization (i.e. volunteer water committee) that performs organizational and system management, daily operations, preventive and corrective maintenance, and emergency repairs. Usually the organization has established rules, regulations, and enforcement procedures to sustain the facilities.

Each host nation and local community will likely have unique methods to manage the facilities, some of which may be based on traditional community social structures, beliefs, and norms. While acceptable and appropriate infrastructure must be selected by the community itself, the capacity to manage, operate, and maintain the facilities may not be pre-existing in the population. Opportunities to exchange ideas and provide trainings on a variety of management and O&M topics should be part of SMEE events with both host nation professionals (i.e. Ministry of Health representatives) and the leaders and members of the community to be served.

3.5 Water Supply

The provision of a potable water supply is a high priority with an aim to ensure the availability of sufficient water for consumption, cooking, hygiene, and personal use. When developing a potable water supply many factors must be examined, which include water sources, treatment, storage needs, distribution system, collection practices, personal and cultural water use, household water customs, community capacity and preferences, and locally available resources. All of these factors must be addressed to ensure adequate water quality, quantity, access, and to limit disruptions.

One of the most common issues facing a household or community's water supply is contamination. To avoid contamination, all water sources must have adequate separation from sanitation facilities, as well as other potential sources of contamination, which may originate from land use (e.g. farmland, businesses), community customs and practices (e.g. animal harvest, bathing, open defecation), and existing system deficiencies (e.g. poorly designed intake, cross connections, damaged piping). While in some situations the easiest solution to improve the water supply may appear to be water treatment, in reality water treatment may only complicate the situation for small communities. It may be more effective and sustainable to address the source of the contamination before proposing to introduce a new technology into the community. Effective interventions include adequate measures to not only protect the water from source to tap, but also in the watershed and until final use in the home. However, in some cases preventing contamination of the best available water sources is not practical and therefore potential interventions would include water treatment and disinfection, as well as contamination reduction, water source protection, and capacity building.

There are several basic factors to consider when improving a water supply. The effectiveness of the chosen intervention is enhanced when all of the factors are considered. An outline of these factors is as follows:

- **Source Selection:** As not every water source is created equal, it is important to thoroughly examine the water options available to each community.
  - Groundwater is typically less likely to be contaminated with fecal pathogens than surface water. Also, due to groundwater's low level of suspended solids, it requires less treatment than surface water. However, in some cases, groundwater may be inappropriate because of depth, cost of well construction, lack of an energy source to operate the pump, salinity, and presence of contaminates (e.g. inorganics, such as iron and arsenic).
  - Springs are an excellent water source that may provide a safe water supply in many tropical countries. Springboxes are often easier and less expensive to construct then wells and surface water intakes. In addition, springs often lack the fecal pathogens that infest surface waters and the salinity and inorganic issues of groundwater. Furthermore, their locations often allow gravity-fed water systems. For these reasons, springs are frequently the best available water source. However, springs are more susceptible to contamination from surface influences as well as use and ownership disputes.
  - Surface water may be abundant in some locations. Surface water may allow ease of access, abundant quantities, and reliability, but fecal contamination should always be assumed. Moreover, organic contaminates (e.g. fertilizers) may also be present. Furthermore, the type and level of contaminates might vary over time. For these reasons, water treatment at the community or household level is always required.
  - Rainwater is rarely a solution for community systems, but is regularly utilized at the household level. Many low-income countries have distinct rainy seasons, which result in variable rainwater availability throughout the year. Rainwater may serve as a supplemental water supply in households that have a limited or questionable water supply. For example, as a household's normal water supply becomes contaminated in the rainy season due to runoff, they may adapt by switching to rainwater during the rainy season.
- **Water Source Protection:** Many factors impact the quality and quantity of water available to a community. Land use and watershed management are critical components of maintaining a productive water source with minimal contamination. The basics of water source protection include:
  - Establishing water intakes upstream from potential sources of contamination.
  - Creating protective vegetative barriers.
  - Land use changes (e.g. relocating cattle).

    - Developing and enforcing a "radius of protection" in the area of influence.
    - Installing structural barriers (e.g. fences, surface runoff trenches, embankments, sanitary seals).
    - Controlling direct contact through collection platforms, well linings, intakes, etc.
- **Water Treatment:** Filtration and more advanced treatment methods are highly effective tools when implemented correctly. Water treatment can remove inorganic and organic contaminants, as well as improve the effectiveness of disinfection. Larger communities with outside support and ample revenue may be more successful in the implementation of water filtration into their systems, while small, rural communities may face difficultly operating similar treatment system. For smaller communities, it is more critical to build upon local water treatment knowledge, use local resources, and provide ample capacity building. While the use of water treatment, such as filtration, at the community-level may be preferred, water treatment at the household-level is an effective supplemental barrier, as well as a backup when community systems fail due to technical failure or neglect.
- **Water Disinfection:** Many different forms of disinfection have proven successful in eliminating water-borne pathogens. Some of the simplest forms of disinfection have been the most effective and economical in rural communities in low-income countries. As disinfection has not been historically a cultural practice in many rural communities, skepticism and misunderstandings around disinfection may still exist. For this reason, small scale trials and long-term capacity building may be required to successfully implement a disinfection system or practices in a community. However, when practical and applicable disinfection is recommended for all public drinking water systems, schools, and health clinics. Below are some considerations that must be taken for implementation of the more common forms of disinfection:
    - Chlorination is the most common method of disinfection and kills most pathogens. Combined with filtration, chlorination is highly effective. In addition, granular and liquid forms of chlorine are commonly found in rural areas and inexpensive. Generally speaking, chlorine-feed equipment can be purchased as well as built from locally obtained materials found in most hub cities. Having the water system operators build the chlorination system provides for ease and familiarity of design, construction, and use. However, on the other hand, households that are unfamiliar with the use of chlorine may distrust its use or dislike the taste. Rural communities may have simpler chlorine systems that do not respond to varying flowrates and contaminant levels, resulting in fluctuating chlorine levels at the taps. Also, communities with volunteer water system operators may suffer from irregular O&M, which can result in under/over dosing and equipment failure.
    - Solar disinfection (i.e. SODIS method; http://www.sodis.ch/methode/index_EN) can be reliable on sunny and overcast days as long as proper precautions are followed. This method is most effectively, while sporadically, implemented at the household level. Required materials are available within most communities (e.g. discarded soda bottles and jugs). Consideration must be given to house-to-house capacity building, time of solar exposure, dimensions and clarity of water container, and turbidity of water. For surface waters, sand or cloth filtration is necessary for proper solar disinfection. Solar disinfection can be used as a primary or secondary disinfection method at the household level. Training on the SODIS method works well as a field level SMEE event with community members and local health promotors.
    - Heat, involving boiling of water, is also a highly effective disinfection method at the household level. Many cultures boil water for infants, but do not implement this practice for older children or adults due to dislike of the boiled water's taste and high fuel consumption (e.g. propone and wood).
- **Water Storage and Transport:** Adequate system and household water storage helps to ensure that the daily water demands are met. While well thought out water storage solutions can minimize water-borne and water-washed disease, a poorly developed

solution can lead to water loss and contamination. Poorly built water tanks may leak and allow unrestricted access. Additionally, uncovered water containers used for collection, transport, and household storage may become a source of contamination if hygienic practices are not followed (i.e. sealing containers, scooping instead of pouring, container disinfection, etc.).

- **Capacity Building:** No water and sanitation intervention is complete without thorough capacity building developed from and focused on the community-identified needs and deficiencies. Effective capacity building is characterized by:
  - Focusing on long-term, sustained cultural and social change.
  - Utilizing local health promotors (region and community based).
  - Stakeholder motivation and ownership.
  - An adaptable education plan and environment.
  - The expertise and commitment of the technical experts and the local stakeholders.
  - The alignment of program goals with stakeholder needs.
  - Effective relationships.

The above factors emphasize not only community water systems, but also household-level interventions. Water and sanitation related public health interventions focused at the household should be considered as highly viable options during the assessment. Household interventions, or what is often called point-of-use interventions, could include individual sand filtration systems made with concrete vessels, 5-gallon buckets, or ceramic clay pots, as well as cloth filtration and disinfection using chlorination or solar disinfection. Point-of-use interventions at the household may significantly reduce diarrheal diseases and provide the following advantages:

- As community systems require a considerable organization and cost, point-of-use interventions provide economical, simple, and effective treatment until a community system can be constructed. Additionally, households can be prepared for in-home water treatment if a community system fails.
- Contamination of water between collection and use may occur and the knowledge and practice of water purification can eliminate risk.
- Knowledge of in-home water treatment creates personal responsibility and pride that may motivate people to maintain a household system.
- Households are empowered to safeguard their family's health and well-being through knowledge of water purification.

3.6 Sanitation

Sanitation is a critical issue as uncontrolled and indiscriminate disposal of human excreta and other waste (e.g. livestock, consumer) pose serious threats to the health of individuals and communities. Similar to the water supply concerns, sanitation deficiencies result from both infrastructure inadequacies and social practices (collectively referenced as sanitation systems in this Guide). While practices such as open defecation may cause obvious contamination concerns, severe public health concerns may also result from failures in controlled waste disposal systems that were poorly designed, implemented, operated, or maintained. A situation of concentrated waste often becomes more detrimental to public health than no system at all (i.e. pre-system conditions). Additionally, studies have found that effective sanitation systems have a more advantageous impact on public health than an improved water supply. Furthermore, many more people are without improved sanitation than improved water. As such, preferred public health interventions include the development and improvement of household and community sanitation systems.

Interventions that effectively eliminate sanitation deficiencies possess the following characteristics:

- Culturally sensitive disposal of human excreta, wastewater, and solid waste.
- Developed in cooperation with local counterparts and stakeholders.

- Locally sourced materials and infrastructure.
- Structural barriers, such as vector control (i.e. insect and rodent), site control, and drainage.
- Comprehensive operator training focused on the management, operation, and maintenance of the system. The term 'operator' may reference members of a household or community depending on the target level of the intervention. Sanitation system failure, even for properly designed and constructed facilities, is caused by inadequate O&M.
- Improved access to sanitation.
- Modification of social practices that build upon existing culture and customs.
- Extensive capacity building, such as health and hygiene promotion, developed and performed by local health promoters and community members. Any transition from one sanitation system to another in a given community will require long-term capacity building and acceptance to be successful. The link between excreta contamination and disease must be clearly understood by all.
- Behavioral and value based trainings.
- Aligned with public policy.

In all successful interventions, effective sanitation systems depend on the attitudes of the community and local stakeholders (e.g. the group which operates the system). Therefore, capacity building should not be an afterthought, but instead an integral part of each mission and be evaluated during the assessment. Without attention given to the capacity of the beneficiaries, the intervention would only focus on infrastructure needs of today and fail to create real and sustainable improvements in public health.

The infrastructure component of an effective sanitation intervention may take many forms, depending on the needs and capacity of the community being served. In most low-income countries onsite (i.e. individual household) sanitation systems have proven more economical and easier to operate and maintain than conventional community systems, which tend to be water intensive and require advanced wastewater treatment. The following are examples of improved sanitation infrastructure frequently encountered in low-income countries:

- **Simple Pit Latrine**: These latrines may be the most common form of improved excreta disposal in rural areas. Simple pit latrines are highly advantageous to households as they are relatively inexpensive and simple to construct and maintain, they allow for a wide range of cleansing customs, and they do not require water. However, insect-vectors and smells are common and groundwater contamination is likely if the pit is unlined. Simple pit latrines are suitable for rural communities with limited outside assistance and favorable environmental conditions (e.g. stable soils, limited rocky subsurface, deep groundwater).
- **Ventilated Improved Pit (VIP) Latrine**: VIP latrines are very similar to simple pit latrines with the exception that the design incorporates structural barriers to decrease insect-vectors and smells. While still inexpensive to construct and operate, costs are higher than simple pit latrines due to additional piping and materials.
- **Composting Toilets**: While commonplace in some countries, composting toilets may be unheard of in others. When introducing composting toilets into a community, it is critical to assess the knowledge and acceptance of the beneficiaries and plan for long-term capacity building. When properly used and managed, composting toilets are highly effective in eliminating pathogens and converting excreta into nutrient-rich compost. Composting toilets are most effective in rural communities and farming villages.
- **Conventional Systems**: Piped wastewater systems are water intensive and require a well-funded organization to manage the system and perform O&M. Advanced wastewater treatment is required, but may not exist on many conventional systems; thus, conventional systems may be a significant point of contamination. These systems are only suitable for the larger communities (i.e. cities) and may be designed for toilets in each household or with shared facilities for a block of homes or neighborhood.

- **Septic Systems**: Similar to conventional systems in design and implementation, but effluent disposal is onsite in the form of a septage pit or drainfield. Communities with existing septic systems may suffer from contamination from direct discharge from septic tanks. Septic systems are suitable for wealthier communities that have sufficient land for proper effluent disposal.
- **Aqua-Privy**: An aqua-privy is a cross between a pit latrine and a septic system. In this system, a concrete slab is constructed over a septic tank. The water level in the tank is maintained above the bottom of the drop-pipe, which creates a water seal that prevents vector and smell issues. An advantage of these systems is that they are cheaper and require less water than a conventional septic system. However, considerable health concerns exist if the water level in the tank drops below the drop-pipe or the effluent disposal system fails. Additionally, just like a septic system, regular operation costs include emptying the tank and an appropriate effluent disposal site is needed.

3.7 Public Health Infrastructure Priorities

Although each situation is unique, generally, the desired aim, purpose, and outcomes of public health infrastructure interventions are as follows:

- **Aim:** To ensure at a minimum that the short-term, and preferably long-term, standards of health for host nation population are achieved.
- **Purpose/Goal:** To reduce the water and sanitation-related disease burden and build local capacities of host nation.
- **Outcomes:** In order of priority, the provision of:
  1. Safe disposal of excreta.
  2. Adequate quantity and access to drinking water.
  3. Health and hygiene promotion (especially hand washing with soap).
  4. Acceptable quality of drinking water.
  5. Adequate shelter (for emergency response interventions).
  6. Vector controls.
  7. Solid waste disposal systems.
  8. Stormwater (i.e. run-off) management and drainage systems.

The information collected from assessment should be used to establish priorities, which in turn are used to develop the detailed interventions that may achieve the desired outcomes.

Additional information:

- Davis and Lambert (2002) *Engineering in Emergencies*: 138-154.
- Mihelcic, et al. (2009) *Field Guide to Environmental Engineering for Development Workers*: 14-27; 161-170.
- Sphere (2004) *The Sphere Project*: 51-99.

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4 Assessments

4.1 Introduction

The purpose of this chapter is to provide the Assessor a general framework for conducting an initial assessment of public health infrastructure for international humanitarian assistance missions. This Guide includes information on:

- The purpose, types, and sectors of an assessment.
- Collecting and analyzing the data.
- Preparing recommendations for the stakeholders (i.e. the USN, other U.S. Government departments/agencies, NGOs, and host nation and community leadership).

This Guide is not intended to be a complete reference for conducting comprehensive assessments of public health infrastructure, but instead provide a broad overview of the primary considerations for each major sector. Additionally, it is prudent to consult with sector experts, such as other PHS Officers or NGOs experienced in the host nation during or soon after the mission in order to clarify information, obtain additional knowledge, and assist in the development of preferred interventions.

4.2 Purpose of an Assessment

The overall purpose of an assessment is to provide information and recommendations to stakeholders in order to make appropriate and timely decisions. Specifically for the PDSS, the assessments provide this information to the USN in order to formulate the mission-specific activities and projects for the public health infrastructure in the host nations.

Assessments provide an understanding of the situation and an analysis of threats and deficiencies to public health in order to determine, in consultation with stakeholders, whether an intervention is required, and if so, the nature of the response. In most cases, an assessment is not an end in itself, but instead a first step in a continuous process of reviewing and updating existing knowledge as the situation evolves in order to reevaluate and reprioritize interventions. Also, on a broader scale, the assessment and subsequent analysis may take into account underlying structural, political, economic, environmental, and human capacity issues. Typically, other authorities from the host nation or foreign organizations (e.g. USAID), would perform additional follow-up assessments and relate the findings to broader host nation issues.

In general, assessments provide information and identify the following items:

- Overall condition of the water and sanitation facilities.
- Primary and secondary needs and deficiencies of the facilities.
- Capacity building needs pertaining to water, sanitation, and health/hygiene promotion.
- Potential methods and interventions to address the highest impact needs.
- Capacities and strategies of the host nation to address their needs.
- Understanding the host nation's perceptions, priorities, preferred strategies, and capacities.
- Takes into account the responsibility and ability of the relevant host nation authorities to assist the population, and also applicable host nation standards and guidelines.
- Recommendations that define and prioritize the interventions consistent with the capacities and timeframes of the host nation and future missions by foreign organizations.
- Additional comprehensive assessments that should be undertaken.
- Additional expertise or information required for the recommendations.
- Analysis of the operating environment and potential concerns or constraints in order to address the needs, which may include resources, equipment, time, and safety and security.
- Opportunities to develop long-term and sustainable public health infrastructure rather than short-term repairs.

The Assessor must be sensitive to the situation, social, and cultural norms of the host nation. The questions for the assessment and methodology to gather information should be structured so that unreasonable expectations are not created. Even though needs and deficiencies may be identified that necessitate a follow-up intervention during a future mission, decision makers may not ultimately prioritize those activities. On occasion, the assessment team may need to clarify or revise potential activities identified by the initial assessment because it may be infeasible to fully address those deficiencies during follow-up missions due to a variety of considerations and constraints (e.g. short duration missions). Additionally, the assessment may not identify needs or deficiencies for some sectors.

It is important to remember that in most cases the sites selected and overall direction given to the assessment team may be in support of broader U.S. Government diplomatic policy and priorities. In addition, in some cases, the information gathered during the assessments may be used by other U.S. Government departments/agencies such as USAID, which are responsible for international assistance and development.

4.3 Areas and Facilities for Assessment

Whenever possible, and with consideration to force protection issues, the physical area of the assessment should include as much of the community as possible (i.e. dwelling areas, medical centers, schools, and the entirety of the water and sanitation systems). Typically, the area identified for the assessment will be based on the directives of the team leader, with factors and considerations including time constraints, force protection, and strategies/priorities of the host nation.

The assessment will include several of the major public health infrastructure and capacity building sectors. In addition, the assessment may be for specific sectors that are community-wide (e.g. village water system) or at a specific location (e.g. water system for a medical center/health clinic). While this is not a complete list, the assessment team shall expect to engage in the following major public health infrastructure and capacity building sectors:

- **Capacity Building**:
  - SMEE, education, and technical assistance.
  - Health and hygiene promotion.
  - Management and organization of volunteer water committees.
  - O&M: technical aspects and management.
  - Vector control (i.e. educational and structural controls).
- **Water:**
  - Water quantity.
  - Water access.
  - Water quality.
  - Water use.
  - Water collection and storage.
  - Water management.
- **Sanitation:**
  - Domestic excreta disposal.
  - Public places excreta disposal (i.e. medical centers, schools).
  - Wastewater (greywater/runoff) management.
  - Domestic solid waste management (i.e. burning, on-site, off-site collection/disposal).
  - Medical center solid waste management – on-site pits/incinerator.

4.4 Assessment Timetable

The time to complete an assessment varies depending on the particular situation. Below are the typical durations expected:

- On-site assessment including data collection, interviews, and observations: 3-4 days
- Analysis and draft report: 1-2 days
- Finalize report with recommended interventions: 2-3 days

However, for emergencies, a rapid needs assessment is required and conducted in a fraction of the time with a focus on the highest priority public health infrastructure needs in order to provide the necessary interventions as rapidly as possible.

4.5 Assessment Team Composition

Typically, the assessment team consists of other U.S. Government employees, host nation officials, and community representatives. For a USN PDSS assessment mission, the team will primarily involve USN staff along with host nation officials. The assessment team may consist of sector experts from other U.S agencies, such as USAID, to assess specific sectors such as medical, health, nutrition, water, sanitation, construction, logistics/planning, and capacity building. Usually, the team consists of members that have knowledge of the host nation or region and/or previous experience of international humanitarian missions.

Generally, the PDSS team consists of 10 to 20 personnel with a structure composed of elements as listed in the table below. From the PDSS team, usually 3 to 5 personnel are selected for the ADVON, which occurs just prior to the USN ship-based mission in the host nation.

Table 4.1: PDSS Assessment team composition

Team element	Description (3-5 people each element)
Command	PDSS/ADVON lead; JAG augment; Operations planner
Logistics	Commodities specialist; contracting officer; logistics planner
Medical	Medical officer; medical planner; preventive medicine planner
Engineering	Lead planner; engineer planner
Misc	Host nation/community representative; USN fleet representative; public health planner; veterinary planner

The assessment team is under the command of a team leader. For a USN PDSS assessment mission, the team leader is typically selected from the USN. Team leaders are familiar with the assessment process and the typical follow-up mission services, activities, and capabilities. The scope of work for the assessment team is defined by the team leader.

PHS Officers have deployed on numerous international missions; however, team members (e.g. USN and other U.S. Government department/agency officials) may have limited knowledge and direct experience working with PHS. Therefore, part of the responsibilities of the Assessor will be to provide general information and awareness of PHS.

During the early stages of mission planning, the Assessor should discuss the following with the team leader:

- Specific assessment objectives or strategy.
- Known cultural sensitivities of the host nation.
- Known social practices of the host nation.
- Determination and outline of the stakeholders for the mission.
- Force protection issues.

- Need for an interpreter.
- Role of U.S. Government (e.g. USAID) officials during the assessment.
- Initial work assignments.
- Daily schedules.
- Assessment timelines.
- Type of documentation required.
- Agreement on methodologies for data collection.
- Reporting requirements by individual and/or team.
- Equipment needs.
- Policy on communicating and interacting with host nation officials and population.

4.6 Assessment Activities

It is important to coordinate the assessment activities with other technical sector experts and agencies to avoid duplication of work, enable pooling of resources, and add to the quality of information. Furthermore, encouraging host nation partners to participate in the assessment helps build ownership of the proposed interventions, overall capacity, and places the host nation in a better position to meet their population's public health needs in the future.

Assessment activities are divided into two categories: General and Sector-Specific. As a valuable team member, it is very important to understand what activities to expect and be ready to fill the role in which you were deployed. The General and Sector-Specific public health infrastructure assessment activities are as follows:

- **General Activities:** The Assessor shall contribute to the mission's success by:
  - Contributing to the assessment team's operational planning process.
  - Providing technical guidance and leadership as appropriate.
  - Timely communication with team leader regarding:
    - Work accomplishments.
    - Recommended solutions to resolve challenges to complete assessments.
    - Equipment needs.
    - Force protection and health issues.
  - Coordinate continuously as directed with the host nation and other U.S. Government officials.
  - Monitor team members for force protection, safety, and health concerns.
- **Sector Assessment Activities:** As the public health infrastructure sector lead, the Assessor should:
  - Conduct an initial assessment of all relevant and critical sectors for the public health infrastructure assessment, such as evaluating water, sanitation, solid waste, and capacity elements.
  - Discuss needs and priorities with the host nation's local Ministry of Health officials and any other U.S. Government officials with local expertise.
  - Discuss identified public health infrastructure deficiencies with other sector leads (e.g. health sector) on the assessment team to determine relevant linkages, correlations, and related findings.
  - Determine the needs for public health infrastructure to improve and sustain the health of host nation.
  - Develop priorities and recommendations to address the public health infrastructure needs with potential interventions.

4.7 Assessment Composition

The methods employed for each element of an assessment should be rapid, rigorous, precise, and provide reliable and representative information. The primary elements of an assessment are:

- Preparedness and planning.
- Survey and data collection.
- Analysis and interpretation.
- Prioritization and recommendations.
- Report of findings.

4.7.1 Preparedness and Planning

Thorough assessment preparation, planning, and design can substantially improve the success of a mission. As outlined in Chapter 2, the initial step is for the Assessor to develop an understanding and working knowledge of the host nation's people, customs and cultures, natural and political environments, and public health situation (i.e. documented health, hygiene, water, sanitation, and solid waste discrepancies, previous interventions, and impacted populations).

Furthermore, proper design and standardization of assessment activities can significantly increase the usefulness and accuracy of the initial assessment. Prior to conducting the initial assessment, the development and design of the assessment tools (i.e. questionnaires, forms, terminology) and methods and techniques to collect the data should be reviewed for standardization and conformity to the information collected on the host nation in the initial step. A primary goal of this Guide is to outline and standardize these elements. Prior to finalizing the assessment tools, the team leader may provide additional direction on what information is critical to collect, specific sectors to focus on, and level of detail.

4.7.2 Survey and Data Collection

The use of standardized assessment tools will help focus attention to the collection of the most appropriate data during the site survey. Data collection must proceed thoroughly and rapidly, utilizing local contacts and resources to the greatest extent possible. During reconnaissance, look for patterns and indicators of potential problems and thoroughly inspect major problem areas. In addition, utilize data collected from other sectors to help develop a clear, comprehensive understanding of deficiencies (i.e. community-wide prevalence of diarrheal diseases during the first several weeks of the rainy season may indicate contamination of a drinking water source from surface runoff).

For all assessments, a good language and cultural interpreter is critical for the successful completion of the site survey. Even where the official language of the host nation is a major international language, portions of the population may only speak local dialects and native/indigenous languages. For example, while the major language in Guatemala is Spanish, 24 indigenous languages (i.e. Q'eqchi) are widely spoken and may be the first language of many people. During pre-site coordination, ensure an interpreter is available. While an interpreter local to the assessment site is preferred, the availability of a local interpreter may be very limited.

While many effective data collection methods exist, no single method will provide all the necessary information. Therefore, the preferred approach is to apply a variety of methods to allow for cross-checking of information accuracy and reliability. Additionally, participatory approaches to data collection that directly involve community stakeholders, such as community mapping, semi-structured interviewing, and seasonal and daily activity calendars, will considerably improve the quality and accuracy of the data. An important consideration when engaging in participatory data collection is that unexpected information or culture and language barriers can alter the course of the assessment; usually for the better if the Assessor demonstrates flexibility, effective listening, and the ability to implement a variety of survey methods.

Survey methods should focus on obtaining no less than the minimum level of precise data that is good enough for decision-making. The Assessor should not end an investigation of an issue earlier than necessary just because s/he does not observe indicators. Often indicators are not obvious and require patience and skill to identify.

The employed survey methods should allow fast initial data collection and estimates. The assessment may require reasonably accurate estimates of needs (e.g. the percentage of the population using latrines) rather than seeking absolute numbers directly. In some cases, more extensive data may be required to complete a subsequent analysis for recommended follow-up activities, such as obtaining information for assessing additional water sources that may take considerably more time, effort, and insight than permitted during the initial assessment.

Random sampling is a method of collecting objective information from a minimum number of people, while ensuring it represents the full range of the population. Sample selection should be made from the whole community in a way that is likely to sample all types of people in the community. An approximate random sample size (households, groups, or individuals) is provided in the table below:

Table 4.2: Random sample sizes

Population size	Number of random samples
<100	30-50
100-300	50-70
300-1,000	70-90
>1,000	90-100

Where possible, analyze information as it is collected, which could help to ensure that important data is collected and avoids collection of information that is unnecessary. Data collection should stop when sufficient information has been obtained for planning purposes.

The Assessor should be aware of any potential factors that may influence the data gathered. A very important consideration during an assessment is the seasonal variability in public health concerns. For example, seasonal variation in employment (e.g. income) and weather (e.g. rainfall) could create repeating pockets of public health concerns that are very difficult to evaluate (or even learn about) if the site visit occurs during the part of the year in which it is not occurring. The Assessor must be familiar with seasonal variations of the region or able to learn about them while on site. Examples of seasonal variation and potential effects include:

- Community-wide spikes of water-borne disease tend to occur during the first rains of the rainy season due to contaminated runoff entering water supplies, and then again during the dry season when preferred water sources dry and less desirable sources are utilized. If the site visit occurs at times other than when illness spikes, then community members are less prone to report the incidence and the Assessor less likely to document it.
- A water supply may meet all water needs during the rainy season, but while providing water during the dry season, the flow may decrease enough to cause direct and indirect public health concerns. The Assessor may measure enough flow and if questions are structured poorly, then the community representatives may not relay the harmful water decline that occurs in the dry season and the Assessor will report an adequate water supply is present.

Therefore, local knowledge and input is critical for an accurate assessment. However, be aware of potential bias as communities are not homogenous and specific needs and deficiencies based on gender, age, and other social and vulnerability factors may exist. Additionally, the Assessor should be aware of trying to interrupt a bias without fully considering the information relayed from the community members.

Generally, the initial assessment will utilize the most common survey methods listed below:

- **Observation.** Visual inspection and survey of key infrastructure. For example, visual inspection for cracks on a concrete water well apron. During rapid initial assessments, direct observation is a primary survey method. Always take photographs, drawings/ sketches, and notes.
- **Exploratory/Transect Walks.** Observation of typical daily life through touring the community, preferably during dawn or dusk. For example, observations of use and practices at water sources, water collection, excreta disposal, and solid waste disposal.
- **Measurements.** Measurements related to quantity or quality of infrastructure or site. For example, distance between a water well and latrines, water measurements for chlorine residuals, topographical data, and soil permeability.
- **Community Mapping.** An exercise where community members create a map detailing key information from their perspective. Additionally, mapping may include local government officials, ministry of health staff, and NGOs that have worked in the community, but during the creation of the maps each group should develop their map with only their representative group and everyone should only be brought together during the discussion phase of the exercise. During the discussion phase, observe how each group has detailed map features and explains the resources and concerns of the community. Observe critical map features such as developed and undeveloped water sources, latrines, areas of poor drainage, solid waste facilities, areas suitable for latrines, vulnerable populations, medical centers, schools, social order and boundaries, as well as discrepancies between the different groups' maps. Community mapping is a relatively quick exercise that provides better results when broad community participation occurs. Additionally existing maps or aerial photos should be used when available to compare to the community developed maps. Even though community derived maps may not be spatially accurate, they can reveal much about the participants' perception of the community.
- **Semi-Structured Interviews.** Conduct interviews and discussions with the head of household, children, women, vulnerable groups, operators, local authorities, others who have a good perspective of their community and public health infrastructure. Interviews should be developed with a structured framework while allowing exploration of topics that may arise. Ensure that participants always understand the purpose of the assessment. Example interview topics include examining defecation practices in areas with limited infrastructure, community perspective of disease symptoms and trends, and water use practices. Remember to always share findings with members of the target group and invite and note their response. The Assessor must understand the most effective interview style, while the community understands the intent and is able to provide the information needed. Poorly developed questions often lead to the Assessor being given incomplete information that alters the assessment findings.
- **Community Meetings and Focus Group Discussions:** Community meetings and group discussions provide the opportunity for stakeholders to talk openly and freely about issues of concern. However, often discussing sensitive issues such as sanitation and hygiene practices many not be possible or appropriate in large or mixed groups. Community meetings could also provide an opportunity for community mapping.

4.7.3 Analysis and Interpretation

Data from each sector must be analyzed to develop and compare recommended long-term objectives for quality, quantity, and usage of facilities and practices in each public health sector. Thorough analysis of the information gathered during the assessment is critical. Those performing the analysis should be able to detect and recognize trends and indicators of problems and deficiencies, to interpret the information, and to link the information to appropriate interventions. Additional information on data analysis specific to the assessment forms is provided in Chapter 6.

Clearly identify the situation and control against preconceptions of what kind of interventions are needed (i.e. do not indicate that “the local community is in need of additional water supplies”, but rather “the local community currently uses five water wells that deliver x amount of water during y months of good or questionable quality”).

During the data analysis, try to identify gaps in information that need to be filled in order to enable the potential needs to be addressed by mission projects and activities.

4.7.4 Prioritization and Recommendations

Once the information is analyzed, mission projects and activities should be prioritized and recommended where interventions are most important for the health and well-being of the community. If possible, preliminary recommendations should be communicated to the PDSS team leader before departing from the host nation.

Most likely, it will not be possible and probably not desirable to give equal emphasis to solving all the identified problems simultaneously. Therefore, recommended actions should be in an order that gives priority to establishing minimum level of involvement to sustain maximum levels of health, while preferably meeting long-term standards. Additionally, prioritizing interventions should consider the lowest level of involvement/service that brings the greatest health improvement, while achieving long-term sustainability. This may likely be the common scenario for development work with minimal on-site time and limited post-intervention assessment. Generally, activities for the sectors will be prioritized based on:

- Needs and deficiencies in the sectors.
- Needs of vulnerable populations (e.g. children, elderly, disabled).
- Outcomes to improve or sustain public health.
- Mandates or strategies of host nation, region, and local community.
- Mandates, strategies, and logistical capacity of U.S. Government, partner nations, and NGOs.

It is critical that the recommended projects and activities are relevant, sustainable, and provide a high impact to improve the public health infrastructure. In addition, the recommended activities should consider the following factors:

- Simplicity and ease of use.
- Lead time for supplies and equipment.
- Time and resources required to develop, train, construct, and operate.
- Local availability of recommended resources, personnel, equipment, supplies, or technology.
- Sustainability and capacity for O&M (e.g. trained staff, affordable maintenance, available resources, and community ownership).
- Culturally and socially appropriate for host nation and specific local community.

Through the process of community participation, identification of needs, prioritization, and collaboration with stakeholders, the recommended interventions should be consistent with the developed objectives. Characteristics of successful community interventions include:

- Specific
- Measurable.
- Attainable.
- Realistic.
- Time-limited.
- Flexible.
- Outcome oriented.

Improvements to existing infrastructure may take substantial time, particularly if considerable capacity building and large-scale systems, such disinfection and treatment systems, will be constructed. However, other improvements such as distribution integrity, the addition of water sources, rainwater catchments, ventilated improved pit (VIP) latrines, wastewater soakaways, minor capacity building may take less time and result in significant advances in public health.

Although special equipment and services may be required to construct and address certain public health infrastructure deficiencies, the resources, methods, and technology should be locally obtained. The technology should be at a level that is appropriate for the host nation with full considerations to local resources and capacity. Generally, recommended technology should be simple and based on local knowledge and experience. Where pumps and other mechanical equipment are unavoidable, supplies should be standardized and repair expertise and fuel found locally. For the recommended facilities to become effective, they should be compatible and supported by the local resources and technical capacity. When necessary, supplemental technical training may be required to heighten the likelihood that the facilities will be properly operated and maintained.

Based on the analysis, the Assessor will be able to make one of the following recommendations for each sector or specific items within a sector:

- No action required.
- Action required, but it does not fall within the mandate of the agency.
- Immediate action is required in specific sectors and sub-sectors to ensure minimum levels of service.
- Action is required in specific sectors and sub-sectors to ensure that short-term levels of service are in place.
- Action is required in specific sectors and sub-sectors to ensure that long-term levels of service are in place.

Opportunities for Communication and Collaboration: The Prioritization and Recommendations Phase is also an opportunity to identify, and communicate potential opportunities for other sectors on the mission. Collaborative, cross-functional, or stand-alone projects could be identified for and with the following sectors:

- BMET: Biomedical Equipment Technician
- CBMU: Construction Battalion Maintenance Unit (Seabees)
- DENCAP: Dental Civic Assistance Program
- ENCAP: Engineer Civic Assistance Program
- MEDCAP: Medical Civic Assistance Program
- VETCAP: Veterinary Civic Assistance Program

Collaborative projects could include conducting a joint SMEE with MEDCAP personnel on such topics as water and wastewater system management related to disease prevention or proper site drainage related to vector control. Additionally, this could also include collaborative activities with an ENCAP/Seabee unit to include upgrades or repairs to the water and wastewater systems in conjunction with a project to rehabilitate a community health clinic.

ENCAP Opportunities and Constraints: Generally, ENCAP projects and activities tend to be more complex and require a higher level of logistical support and communication with the host nation and other stakeholders. On previous missions, ENCAP projects included renovation and repair of hospitals, clinics, and schools; small-scale construction and renovation; utilities upgrade; and water and sanitation facilities. The Assessor should be aware and consider the potential opportunities and constraints for ENCAP projects when developing proposed public health infrastructure activities. While each operation in a host nation will be unique, opportunities and constraints may include the following:

- **Host Nation Support:**
  - Provide volunteer workers as necessary to complete the projects.
  - Provide host nation engineer to work alongside U.S. engineers on projects.
  - Construction will not start prior to ENCAP arrival.
  - U.S. personnel participate in construction at all sites.
  - CONOPS will ensure a high level of participation from the host nation, increase the scope of the projects that can be undertaken, and increase buy-in by host nation.
- **Host Nation Requirements:**
  - All projects must be completed by a specified date.
  - PDSS team will address this proposal with U.S. Embassy Country Team to ensure this proposed method of completing projects is acceptable.
  - Design and material requirements:
    - Verification of the ability to land aircraft.
    - Designs must be submitted for all renovation, rehabilitation, and construction work to the host nation for review and approval. Designs must meet local building codes.
    - Host nation will participate and be involved in the design process.
    - Using the provided designs, the host nation will provide a Bill of Materials (BOM) (with English translation).
    - Deadline for designs and BOM. BOM cannot be finalized and sourced until designs are approved by host nation.
    - Once the USN planners have reviewed the BOM and quotes, the host nation will review to ensure fair pricing.
- **ENCAP Issues:**
  - Airlift/sealift to transport equipment, personnel (PAX), and gear is mission critical and must support the construction schedule. Always:
    - Verify ability to land aircraft.
    - Confirm method of embarkation for PAX and equipment.
  - Rental equipment and transportation assets required:
    - Availability, condition, and cost to rent equipment.
    - Need to contract for any rental items prior to team's arrival.
  - Host nation custom's approval for tools and equipment:
    - Detailed inventory of all tools and equipment, which will be embarked via air/sea and used on the ENCAP projects.
    - Cargo/PAX entering host nation must clear customs.
  - Host nation visa requirements: all personnel who fly in/out of host nation require a visa in advance.
  - Need at least one host nation translator per ENCAP site.
  - Partner and host nation engineer support, which influences type and size of projects.
  - Materials procurement challenges:
    - Material vendors in the area consist of small privately owned stores.
    - BOM procurement will require utilizing numerous sources.
    - Most vendors only accept cash for payment.
    - Contracting support required in advance to ensure materials are in place.
    - Sourcing for materials requires further coordination during PDSS.
    - If materials are unavailable or questions arise, purchasing agent shall discuss a suitable substitute.

4.7.5 Report of Findings

Once the needs and associated proposed interventions have been identified and prioritized, the results should be placed in a format that enables the key stakeholders and planners to make decisions and develop mission activities. Essential information should be presented and

structured so that the main patterns and trends are clear.

Generally, the Assessor's report should be short (less than 10 pages including appendices) and should contain the topics and items listed below:

- **Cover Sheet**: Title, authors, agencies, location, and date of assessment.
- **Executive Summary**: (1 page) Key recommendations, and resource requirements.
- **Introduction**: (<1 page) Assessment objectives, location and population profile, and methodology used.
- **Data and Findings**: (1 page) Key findings detailed by significant data type and source.
- **Recommendations**: (1-2 pages) Detailed recommendations including:
  - Intervention specific stakeholder involvement.
  - Anticipated outcomes.
  - Needs potentially addressed by other sector activities.
- **Resource Requirements**: (1 page) Implications including time requirements, personnel and skill sets (identifying ideal skill sets of PHS Officers for the follow-up missions), equipment, and materials.
- **Appendices**: Relevant analyses of data collected, maps, forms, and design drawings.
- Annotated photographs of proposed activity areas should be included throughout report as appropriate.

In addition, for USN missions, the Assessor may be requested by the team to contribute to the development of the in-country PDSS field report using the USN format in Microsoft Office PowerPoint. This information will support the CONOPS, which provides the framework of objectives and activities for the ADVON activities and ship-based mission. Generally, the CONOPS will consist of the topics and items listed in the table below.

Table 4.3: USN CONOPS Topics

Topics	
Mission statement	Command and control
Specified tasks	Concept of operations
Constraints	Acquisition logistics
Assumptions	Legal concerns
Implied tasks	Public affairs guidance
Force protection	ADVON plan
Emergency action plan	Concerns and action items
Force health protection	Conclusions

Additional information:

- Davis and Lambert (2002) *Engineering in Emergencies*: 59-64.
- Mihelcic, et al. (2009) *Field Guide to Environmental Engineering for Development Workers*: 31-56; 57-73.
- Sphere (2004) *The Sphere Project*: 21-47.

5 Assessment Forms

5.1 Introduction

The assessment forms are intended to assist the Assessor in planning, formatting, and conducting a complete initial assessment. The forms are divided into major public health infrastructure and capacity building sectors. They are intended to be inclusive of the types of information and data required for an assessment. Extensive reconnaissance may be required to fully complete the forms, which the assessment team may or may not have the capacity or time to achieve. However, in some cases the information may already exist, and therefore the assessment team may need only to compile the information and evaluate for accuracy and completeness. If no data is available for particular aspects of the assessment, estimates may be needed based on existing information and experience. Great care should be taken when developing assumptions based on similar populations or scenarios, and wherever possible accurate data should be collected for the specific situation. Items or questions that do not directly apply to the situation must be noted as such. The assessment forms are largely based on information in Harvey, Baghri, and Reed (2002: 217-255).

During the assessment, the primary data collection methods will be observation, measurement, and interviewing. The assessment forms are intended to cover the primary aspects of each sector, which include general description, quality, quantity, and usage. The Assessor should always clarify whether the collected data and indicators are for a specific "facility" (e.g. water well, latrine, bed nets) or a "practice" (e.g. hand washing with soap, use of bed nets). Additional information and definition of terms and technology can be located in the four primary references (See Table 1.2).

The Assessor may also find it necessary to modify, expand, or develop new assessment forms. The diverse adaptations and usages of the forms are highly recommended in order to gather information specific to the situation and site/facility and to report the findings consistent with stakeholder requirements.

Assessment forms are provided for each of the major public health infrastructure and capacity building sectors. **Adapt, modify, or expand the forms as necessary**. Forms are available after Chapter 5.2 and include the following sectors:

- Form A: Background information
- Form B: Subject matter expert exchange (SMEE)
- Form C: Health and hygiene promotion
- Form D: Operation and maintenance (O&M) organization
- Form E1: Water quantity
- Form E2: Water quality
- Form E3: Water use facilities and goods
- Form F1: Domestic excreta disposal
- Form F2: Public places excreta disposal – medical centers
- Form F3: Public places excreta disposal – schools
- Form G1: Domestic solid waste management – on-site pits
- Form G2: Domestic solid waste management – off-site collection/disposal
- Form G3: Medical center solid waste management – on-site pits/incinerator
- Form H: Wastewater (grey water/runoff) management
- Form I: Vector control

5.2 Assessment Information

Data collection and analysis for the assessments generally consists of the following items for general information and major sectors including water supply, sanitation, O&M, and SMEE.

General Data

- Population data and any critical disaggregation by vulnerable population, gender, age, etc.
  - Note past populations if known to help distinguish population trends.
- Indicators for current or potential water and sanitation related diseases.
- Equal access to water and sanitation facilities, especially vulnerable populations.
- Water and sanitation practices.
- Community's knowledge base related to water, sanitation, and disease.

Subject Matter Expert Exchange Data

- Water Related: quality and quantity analysis, system development and management.
- Wastewater Related: system development and management.
- Vector and rodent control.
- Food safety and surveys.
- Disease prevention, surveillance, outbreak, and response management.
- Health, hygiene, and Family wellness.
- Infection control.
- Industrial hygiene.
- Occupational health and safety.
- Hazardous material and bio-waste management.
- Capacity building techniques.
- General environmental health principles.
- Emergency preparedness and response.

Health and Hygiene Promotion Data

- Type of current or past health and hygiene promotion activities.
- Types of communication channels used and available (e.g. schools, posters, radio).
- Description of facilitators.
- Indication of cultural/social stigmas.
- Indication of general understanding of water and sanitation related diseases.
- Indication of current hygiene practices and usage among community (e.g. hand washing, use of soap, living areas free of stagnant water and waste).

Operation and Maintenance Data

- Type of organization.
- Rules and regulations.
- Position descriptions.
- Emergency operations plan.
- Annual budget (i.e. expense and revenue breakdowns).
- Customer fee schedule exists and billing and collection.
- Funds available for routine, corrective and long-term O&M.
- Water quality testing.
- Operators training needs.
- O&M tools and equipment.
- Spare part inventory.
- Routine O&M records on file.
- As-built/system drawings on file.
- Technical literature on file and in host nation language.
- Safety program policies and procedures and equipment available.

Water Supply Data

- Current quantity of water accessible and available by source (per person per day).
- Water use data for past and future (preferred).
- Time losses: time people wait or travel for water.
- Disruption of Service: hours of day or days of week when no water is available.
- Water collection points accessibility especially for vulnerable populations.
- Variations in service, water availability, and water issues across the community.
- Availability and use of household containers for collection and storage.
- Location and types of water sources (e.g. boreholes, river, spring, rain, etc.)
- Source capacity, reliability, and risk of contamination.
- Water quality, actual and local perception (e.g. clear, muddy, color, odors, chlorine residual, contamination, etc.).
- Regulatory treatment requirements (i.e. level or type local or nation government mandates).
- Current use and practices for community and household water treatment.
- Community acceptance of community or household water treatment.
- Type and material of water distribution (e.g. piped, self-hauling, vendor truck).
- Type, material, and volume of storage (e.g. X-liter community plastic tank or household containers).
- Locally available resources, equipment, and technology to address identified deficiencies.
- Potential locations of additional facilities (e.g. water sources, water tanks, tap stands).

Sanitation Data

- Current practices for excreta disposal, solid waste disposal, vector control, anal cleaning, sanitation privacy, segregation of gender, cultural taboos, social factors, hazardous land use (e.g. livestock places in/around water source).
- Existing Sanitation Systems: type, number, and overall condition of facilities (e.g. latrines, community or household systems, solid waste bins, incinerators, drainage channels, etc.).
- Effects of design and location on usage.
- Safe access to facilities for general populations and vulnerable groups.
- Public health risks (e.g. proximity of excreta disposal and solid waste areas to water sources and systems; vector-borne diseases and availability of individual protection; existing drainage system flooding dwellings, latrines, and vector breeding sites).
- Existing health and hygiene promotion programs, population served, and effectiveness.
- Local perception of service and effectiveness of existing sanitation systems and practices.
- Local materials and resources for construction of additional sanitation facilities.
- Possibility of changing local environment to reduce risks of sanitation-related diseases (e.g. drainage, scrub clearance, excreta disposal, refuse disposal, farming lands, etc.).
- Availability and suitability of land for additional facilities (e.g. slope of land, drainage patterns, soil type/permeability for disposal of effluent, depth to groundwater, etc.).

Emergency Response/Intervention Data

An assessment for emergency interventions may also require information on the following sectors:

- Safety evaluations of buildings after disasters (e.g. earthquake, storms, and floods) (see the Applied Technology Council (ATC) reference for additional information).
- Shelter requirements and needs including condition of existing shelter, resources for additional shelter (e.g. tents), and site selection for temporary shelter location.
- Disposal of dead bodies including cultural customs, method, and location.
- Status/contacts of the local leadership, NGOs, and other groups/actors including mandates, constraints, organizational structure, and present coordination arrangements.

Additional information:

- Sphere (2004) *The Sphere Project*: 89-92.

Checklist Form A
Background Information

Assessment for Public Health Infrastructure Facilities
International Humanitarian Assistance Missions

Location of Assessment: **Date:** **Assessor:**

Item	Collected data	Key Indicators
1		Provide general description, information, demographic data, and geographical information. Include photos and/or a sketch map with critical features and information. **General description:** Provide a general description of the situation, affected area, and population. Political structure of the community (i.e. who plans, carries out, and controls projects for the community). **General information:** Agency carrying out assessment Anticipated level of intervention (e.g. short-term, long-term) General location of site or area Resources available Seasonal/climatic implications **Demographic data:** Approximate number of affected people Approximate number of homes Past population changes: when, why, and how much Seasonal changes in population: when, why, and how much Critical breakdown of populations by gender and age Vulnerable groups (e.g. female, women, sick, disabled, elderly, etc.) Average family size Likely increase or decrease in population size Predominant occupations (e.g. farming, industry, business, etc.) **General resources and infrastructure description:** Location and types of existing water supply and sanitation facilities Estimates of distances from dwelling areas Location of key public buildings (e.g. schools, medical centers, etc.) Location and types of water sources Location and types of water storage and distribution points Location and type of excreta disposal facilities Pooling of wastewater Location and type of solid waste disposal facilities Groundwater levels Geological features; soil descriptions Slope directions and drainage patterns Dwelling indoor air quality (e.g. cooking habits, fuels, house vents, etc.) Description of industrial-type activities (e.g. use of chemicals, etc.) Community-wide environmental risks (e.g. industrial activities, chemical use, known/suspected chemical spills, etc.) **Community involvement:** Describe and list any established community groups, types of groups, activities currently in place, and who internally and externally supports these activities (e.g. NGO).

Checklist Form B
Subject Matter Expert Exchange (SMEE)

Assessment for Public Health Infrastructure Facilities
International Humanitarian Assistance Missions

Location of Assessment: **Date:** **Assessor:**

Item	Collected data	Key Indicators
1		Collect data for potential subject matter exchange events (SMEE) and anticipated audience and setting/forum. **Audience:** Officials — Local Organizations Students — General public Educators **Setting/forum:** Office — Field site Classroom — One-on-one

Item	Subject matter description and topics	Y/N	Item	Subject matter description and topics	Y/N
2	**Disease overview and control**		8	**Food protection**	
	General: definitions, control, environmental factors			General: personal hygiene, sanitary practices, food handling	
	Respiratory diseases			Temperature controls, food preservation, ice	
	Water-borne diseases			Microbiological and chemical standards	
	Food-borne diseases			Dry food storage	
	Insect-borne diseases and zoonosis			Milk source, transportation, processing, control tests	
	Miscellaneous diseases: ringworm, hookworm, lead poisoning, air pollution			Design: kitchen floor plans, ventilation, refrigeration, storage	
3	**Environmental planning**		9	**Air pollution and noise control**	
	Types of planning: regional, community, project			General: health effects, economic effects, climatic effects	
	Process: goals, objectives, studies, mapping, data, plan preparation			Sources: man-made, natural, types of pollutants	
	Comprehensive studies: water, wastewater, solid waste			Sampling/measurement of air pollution: ambient air, smoke	
	Environmental factors: topography, geology, soils, drainage, resources			Environmental factors: meteorology, topography	
	Other factors: growth, housing needs, stakeholder cooperation			Controls: source, emission equipment, particulate collectors	
				Noise control: properties, measurement, reduction, controls	
4	**Water supply**		10	**Other sanitation and environmental health**	
	General: Ground/surface water, water cycle, ground water flow, geology			Wastewater management: drains, soak pits	
	Water quality/quantity: quality indicators, sampling, water analysis			Hygiene promotion: information, communication	
	Source and protection: dug wells, drilled wells, spring, surface water			Indoor air quality: source, health effects, venting	
	Treatment: disinfection, sedimentation, filtration, tastes/odors			Industrial hygiene	
	Water system: intakes, storage, pumping, distribution, cross-connections			Occupational health and safety	
	Household water treatment, handling, and storage			Operation and maintenance (See Form D)	
	Other: system flushing, emergency water and treatment				
5	**Wastewater collection, treatment, and disposal**		11	**Emergency/Disaster Management**	
	General: wastewater characteristics, soil/site investigations, sewer flows			General: types of disasters, indicators	
	Small systems: latrines, septic tanks, leachfields, sand filters, composting			Hazards, vulnerability, and resilience assessments	
	Treatment plants: trickling filter, stabilization ponds, anaerobic ponds			Emergency stages and activities/operations	
	Sewage collection and pumping systems: sewer lines, lift stations			Types of assistance to affected populations	
	Final disposal: disinfection, land application, reuse, solids/sludge			Emergency operation planning	
	Industrial wastes: hazardous and toxic wastes, pretreatment			Contingency planning	
6	**Solid waste management**		12	**Other**	
	General: composition, weight, volume				
	Solid waste collection: type of bins, storage, transfer stations, compactors				
	Treatment and disposal: on-site pits, landfill, incineration				
	Special wastes: sharps, pathological, animal waste, tires, hazardous				
	Incineration: design, site selection, controls				
	Other: waste reduction, composting, tire recycling				
7	**Vector control**		13	**Comments**	
	General: types of vectors, vector-borne diseases				
	Principal control measures: environmental, water, chemical, traps				
	Pesticide program: types, application, controls, equipment				
	Individual dwelling protection: bednets, food protection, waste disposal				

Checklist Form C
Health and Hygiene Promotion

Assessment for Public Health Infrastructure Facilities
International Humanitarian Assistance Missions

Location of Assessment: **Date:** **Assessor:**

Classification: C1: Domestic/dwelling areas; C2: Medical center; C3: School

Item	Collected data	Key Indicators
1		Collect data for Facility Type (infrastructure and educational resources); Quality (technical appropriateness, social/cultural acceptability, potential health hazard, sustainability); Quantity (number of facilities/activities, capacity, distance to facilities); and Usage (accessibility and O&M). **Facility type:** No health or hygiene promotion Communal latrine attendants Recruitment and training of promotors On-going or routine assessment/monitoring/education Messaging used for health and hygiene promotion Communication channels used or available (e.g. markets, schools, clinics, house visits, posters, meetings, loud speakers, drama, music, radio, TV) **Quantity/Quality:** Approximate % of facilitators from same social background Approximate % of facilitators properly trained Approximate % of promotional messages are accurate Approximate % of promotional messages delivered that are compatible with socio-cultural aspects of population Approximate number of facilitators per 1,000 people Approximate % of area covered and sanitation sectors promoted Indication of cultural/social stigmas Current hygiene promotion activities/program; in-place, desired, needed Indication of general understanding of water/sanitation related disease Indication of lead for current hygiene promotion activities (e.g. local, NGO) Indication of any past promotion activities and level of success **Usage:** Approximate % population receiving message, understanding, and putting into action (implemented) by population Indicators of hygiene practices (e.g. handwashing, use of soap, living areas free of stagnant water and waste, basic knowledge of disease)

Item	Data	Analyzed data	A	Range 10	7	4	1	B	C
2	% of trained facilitators from the same social background			none	50%	75%	>95%	0.25	
3	% of messages accurate, appropriate, and complete			none	50%	75%	>95%	0.25	
4	% of messages delivered in a way that is socio-culturally acceptable			none	50%	75%	>95%	0.25	
5	Number of facilitators per thousand people			none	1	2	>2	0.25	
6	% of area covered by campaign			none	50%	75%	>95%	0.25	
7	% of relevant sanitation sectors of which appropriate use is promoted			none	50%	75%	>95%	0.25	
8	% of population receiving, understanding, and remembering promotional messages			none	50%	75%	>95%	0.50	
9	% of population putting messages into practice			none	50%	75%	>95%	0.50	
10	% of messages delivered that are implemented			none	50%	75%	>95%	0.50	
							Total:		

Checklist Form D
Operation and Maintenance (O&M)

Assessment for Public Health Infrastructure Facilities
International Humanitarian Assistance Missions

Location of Assessment: **Date:** **Assessor:**

Classification: D1: Water system; D2: Domestic excreta system; D3: Domestic solid waste system; D4: Other

Item	Collected data	Key Indicators
1		Collect data for indicators of operation and maintenance (O&M) for specified facilities with considerations for appropriateness, social/cultural acceptability, sustainability, and capacity. **Purpose:** Identify areas/topics for O&M SMEE and trainings. Not intended to provide a score due to high variability and social/cultural considerations. **Facility type:** General description of facility and O&M organization Approximate number of users and homes Description of current staffing related to facilities Operational Costs and user fees (e.g. flat rate or fee by volume) Method of delivery (e.g. piped, individual collection/system) Origin of organization (e.g. set-up by NGO, community leaders) Social/cultural considerations

Item	Data	Analyzed data	Indicator notes	Y	N
2	Organization		Formal O&M organization exists		
			Objectives and responsibilities identified		
			Written organizational structure		
			Written rules and regulations		
			Rules and regulations followed/enforced		
3	Administration		Ordinances exist		
			Position description in place for all staff		
			Personnel policies exist		
			Procedures in place to evaluate program progress		
			Annual report developed and provided leadership		
			Public education/relations performed		
			Emergency operations plan exists		
4	Facility testing and compliance		Quality testing is performed (e.g. bacteriological, chlorine)		
			Results are reported to appropriate agency		
			Copies of testing are maintained and on file		
5	Financial management		Annual budget prepared		
			Monthly income vs. expenses available		
			Annual balance sheet prepared		
			Annual audit conducted		
			Funds available for routine costs (e.g. pipe repair)		
			Funds available for long-term costs (e.g. equipment)		
			Funds available for program costs (e.g. office items)		
6	Operation		Principal and back-up operators identified		
			Sufficient staffing level exists		
			Defined work office		
			Preventive maintenance schedule exists for routine O&M		
			O&M manual(s) exists		
			Operators trained/certified		
			Operator training plan developed		
			O&M tools and equipment available		
			Spare parts inventory available		
7	Records		Customer records (e.g. connections, service, payment)		
			Routine operational records maintained		
			Preventive maintenance records maintained		
			Monthly reports prepared		
			As-built system drawings on file		
			Technical literature on file and in local language		
			Equipment/spare parts inventory method practiced		
			Work requests recorded and on file		
			Method exists to prioritize work		
8	Safety		Safety program policies in place and reviewed		
			Hazardous materials policy in place (e.g. chemicals)		
			Safety equipment available for all jobs		
9	Rates and fees		Customer fee schedule exists		
			Fee schedule based on residential and commercial users		
			Billing and collection according to regulations		
			Collection above 75%		
			Billing enforcement/incentives exists		

Checklist Form E1
Water Quantity

Assessment for Public Health Infrastructure Facilities
International Humanitarian Assistance Missions

Location of Assessment: **Date:** **Assessor:**

Classification: **E**1.1: Domestic/dwelling areas; E1.2: Medical center; E1.3: School

Item	Collected data	Key Indicators
1		Collect data for Quantity (number of facilities/activities, capacity, distance to facilities) and Usage (accessibility and O&M). **Facility type:** Describe if facility is developed or undeveloped No water — Tanker/hauling Surface water: stream, river, ponds, lake — Rainwater Ground water: borehole, dug well — Spring Surface water catchment **Description of facility:** General description of facility (e.g. hand-dug well 10 m deep) Method of delivery (e.g. individually collected, piped) **Description of cost of usage/volume:** Cost or user fee for use of facility (e.g. flat fee, by volume) **Quantity:** Approximate yield of source(s) at liters per minute or per day Seasonal yield changes; wet weather and dry weather Seasonal yield demands from crops, irrigation, livestock, cultural practices New proposed uses and past water uses that were abandoned **Usage:** Approximate % of population has access Population using source Typical distance, terrain, travel time to each water source Restrictions on usage

Item	Data	Analyzed data	A	Range 10	7	4	1	B	C
2	Water quantity: domestic			none	3 l/person per day	10 l/person per day	>15 l/person per day	0.75	
	Medical center			none	5 l/patient per day	15 l/patient per day	>20 l/patient per day		
	School			none	3 l/pupil per day	10 l/pupil per day	>10 l/pupil per day		
3	Sustainability of facilities			no facilities or in severe condition/not functional	facilities 1-4 yrs old or in poor condition	facilities 5-9 yrs old or in moderate conduction	facilities >10 yrs old or in good condition	0.50	
4	Maximum one-way walking distance to water point			>1000 m	1000 m	500 m	<500 m	0.25	
	Medical center			>100 m	100 m	50 m	<50 m		
5	Queuing time at water source			>30 minutes	30 minutes	15 minutes	<5 minutes	0.25	
6	Time to fill a 20-liter container (indicate source or tap)			>3 minutes	3 minutes	2 minutes	<1 minutes	0.25	
7	% of population with access to appropriate facilities			none	50%	75%	>95%	0.50	
8	% of population using appropriate facilities correctly			none	50%	75%	>95%	0.50	
							Total:		

Checklist Form E2
Water Quality

Assessment for Public Health Infrastructure Facilities
International Humanitarian Assistance Missions

Location of Assessment: **Date:** **Assessor:**

Classification: E2.1: Domestic/dwelling areas; E2.2: Medical center; E2.3: School

Item	Collected data	Key Indicators
1		Collect data for Quality (technical appropriateness, social/cultural acceptability, potential health hazard, sustainability) and Usage (accessibility and O&M). **Facility type:** Describe if facility is developed or undeveloped No water — Tanker/hauling Surface water: stream, river, ponds, lake — Rainwater Ground water: borehole, dug well — Spring catchment **Quality:** Risk of contamination (primarily fecal) at water source Water quality indicators for core tests Level of protection of areas where population access water Level of protection of post-delivery contamination Type of disinfection system (e.g. chlorine, UV) Level of chlorine residual Proper management of water treatment chemicals (e.g. chlorine) Indication of other contamination of water source (e.g. chemicals) Potential contamination of water source (e.g. fuel, chemicals, animals) Indication of desired treatment by the community or past attempts Types of treatment used in surrounding communities Indication of community treatment vs household treatment used **Usage:** Approximate % of water sources protected from contamination Approximate % of population with access to water that is of sufficient quality and palatable

Item	Data	Analyzed data	A	Range 10	7	4	1	B	C
2	Technical appropriateness			inappropriate	technically basic	appropriate	very appropriate	0.25	

Notes: Facilities for water intake (e.g. dug well, river inlet, spring catchment), means of water extraction (e.g. bucket/rope, handpump, electrical pump, gravity pipe), flowrates, % capture, % failure rates, and community program for O&M

3	Potential hazard to health			major hazard	basic protection	minimal hazard	no hazard	0.50	

Notes:
Major hazard: Majority of the criteria are not met and/or known contamination of source
Basic protection: Majority of the criteria are met, however suspected contamination of source (e.g. animals upstream from source, fuel/oil, chemicals)
Minimal hazard: All the criteria are met, no known or suspected sources of contamination, and proper management of water treatment chemicals
No hazard: All criteria are met and exceeded, no known or suspected sources of contamination, and community program for source water protection

Criteria:

Borehole or dug well	Surface water
No latrine within 10m	No human habitation upstream to pollute source
Latrine on higher ground and not within 30m	No animals or other waste upstream to pollute source
No other source of pollution (e.g. animal, solid waste) within 10m	No crop production or industrial activities upstream to pollute source
Adequate drainage preventing stagnant or pooling water within 2m	Limited risk of landslide, mudflow, or debris in catchment area
Structure around well prevents drainage or surface water to enter	Intake area is protected from uncontrolled access (e.g. fencing)
Concrete floor/apron around well approximately 1m wide and no cracks	Appropriate filtration (e.g. sand, gravel) and operational
Well seal extends 3m below ground	Means to control flow
Adequate and safe access to water (e.g. communal bucket not on ground)	
Handpump is secured to base to prevent surface water entry	
Adequate and secure cover for well	
Adequate and secure fencing around facility, as necessary	
Other sources of potential pollution (e.g. uncapped wells, refuse dumps) not within 100m	

4	Sustainability of facilities			no facilities or in severe condition/not functional	facilities 1-4 yrs old or in poor condition	facilities 5-9 yrs old or in moderate condition	facilities >10 yrs old or in good condition	0.25	
5	Water quality core tests			major hazard	basic protection	minimal hazard	no hazard	0.50	

Notes:

Major hazard: Majority of the time, water quality does not meet survival levels for core tests

Basic protection: Majority of the time, water quality meets survival levels for core tests

Minimal hazard: Majority of the time, water quality exceeds survival levels and frequently meet longer-term levels

No hazard: Majority of the time, water quality meets longer-term levels for core tests and secondary levels (e.g. fluoride, iron, manganese, arsenic)

Core tests:

Test	**Reason of concern**	**Survival**	**Longer-term**
Turbidity	acceptability to consumer and treatment requirements	20 NTU	5 NTU
Odor	acceptability and indicates other pollutants	no restriction	acceptable to consumer
Color	acceptability and indicates other pollutants	no restriction	15 TCU
Conductivity	acceptability and corrosion/encrustation	no restriction	1400 µS/cm
pH	effects treatment requirements	no restriction	6 to 8
E.coli	indicates possible presence of pathogens	<1000 E.coli/100 ml *	0 E.coli/100 ml *

* always aim to disinfect supplies

6	Water disinfection (e.g. chlorine residual, UV, etc.)			none	inappropriate	appropriate	very appropriate	0.50	

Notes:

None: Majority of the time, no program for disinfection to ensure disinfection of water source or water collection point

Inappropriate: Majority of the time, program for chlorination, but less than 0.4 mg/l entering distribution and less than 0.2 mg/l of free residual at collection points or other disinfection system (e.g. UV) does not operate

Appropriate: Majority of the time, program for disinfection (e.g. chlorination frequently at 0.4 mg/l entering distribution and 0.2 mg/l of free residual at collection points)

Very appropriate: Active program for disinfection (e.g. chlorination with consistent chlorination for 0.4 mg/l entering distribution and 0.2 mg/l of free residual at collection points)

7	% of facilities which provide safe water quality			none	50%	75%	>95%	0.50	
8	% of population with access to water that is of sufficient quality and palatable			none	50%	75%	>95%	0.50	
							Total:		

Checklist Form E3
Water Use Facilities and Goods

Assessment for Public Health Infrastructure Facilities
International Humanitarian Assistance Missions

Location of Assessment: **Date:** **Assessor:**

Classification: E3.1: Domestic/dwelling areas; E3.2: Medical center; E3.3: School

Item	Collected data	Key Indicators
1		Collect data for Quality (technical appropriateness, social/cultural acceptability, potential health hazard, sustainability); Quantity (number of facilities/activities, capacity, distance to facilities); and Usage (accessibility and O&M). **Facility type:** Household water collection containers Household water storage containers Private/communal bathing facilities Private/communal laundry facilities Personal hygiene soap Community water storage Rigid plastic tanks Flexible tanks Ferrocement tanks Earth berms with liner tanks Steel tanks **Quantity/Quality:** Number and volume of household collection and storage containers Household containers have appropriate design Appropriate facilities for bathing and laundry Type and volume of community water storage tanks **Usage:** Approximate % of population with appropriate water containers Approximate % of population with access to bathing and laundry facilities Approximate % of population with access to appropriate level of community water storage facilities

Item	Data	Analyzed data	A	Range 10	7	4	1	B	C
2	Household water collection containers			very unacceptable	unacceptable	acceptable	very acceptable	0.50	

Notes:
Very unacceptable: No household collection containers
Unacceptable: Each household has water containers, however not clean and/or less than 10-20 liters
Acceptable: Each household has two clean water collecting containers of 10-20 liters
Very acceptable: Each household has at least two clean water collecting containers of 10-20 liters or water service inhouse

3	Household water storage containers			very unacceptable	unacceptable	acceptable	very acceptable	0.50	

Notes:
Very unacceptable: No household storage containers
Unacceptable: Each household has water storage containers, however provides less than 4 liters/person/day and not safe storage (e.g. no cover, no tap, on ground)
Acceptable: Each household has a water storage container for approximately 4 liters/person/day and with safe means of storage, drawing, and handling
Very acceptable: Each household has a water storage container for at least 4 liters/person/day and with narrow neck and/or covers, or other means of storage and handling

4	Bathing and laundry facilities			very unacceptable	unacceptable	acceptable	very acceptable	0.25	

Notes:
Very unacceptable: No bathing or laundry facilities and no soap available
Unacceptable: Central/communal bathing and laundry facilities; however facility does not provide appropriate location, size, privacy, safety, and design; some soap
Acceptable: Central/communal bathing and laundry facilities and most of the location, size, privacy, safety, and design features are appropriate; soap available to all
Very acceptable: Bathing and laundry facilities at household or central/communal facilities and the location, size, privacy, safety, and design are all appropriate; soap

5	Community water storage facilities			very unacceptable	unacceptable	acceptable	very acceptable	0.50	

Notes:
Very unacceptable: No community water storage tanks
Unacceptable: Community water storage tanks; however technically inappropriate design; less than 1 day storage; no O&M
Acceptable: Community water storage tanks; technically appropriate design; between 1-2 days storage; limited O&M
Very acceptable: Community water storage tanks; technically very appropriate design; at least 2 days storage; well-managed O&M

6	% of population with appropriate water containers			none	50%	75%	>95%	0.50	
7	% of population with access to bathing and laundry facilities			none	50%	75%	>95%	0.25	
8	% of population with access to community water storage facilities			none	50%	75%	>95%	0.50	
								Total:	

Checklist Form F1
Domestic Excreta Disposal

Assessment for Public Health Infrastructure Facilities
International Humanitarian Assistance Missions

Location of Assessment: **Date:** **Assessor:**

Classification: F1.1: Single or shared family latrines; F1.2: Domestic communal latrines; F1.3: Special/vulnerable groups

Item	Collected data	Key Indicators
1		Collect data for Quality (technical appropriateness, social/cultural acceptability, potential health hazard, sustainability); Quantity (number of facilities/activities, capacity, distance to facilities); and Usage (accessibility and O&M). **Facility type:** Open field defecation Shallow trench latrines Deep trench latrines Composting latrines Storage tank latrines Chemical toilets Shallow family pit latrines VIP latrines Pour-flush latrines Over-hung latrines Lagoons Sewerage system **Quantity/Quality:** Typical ratio of one space/cubicle to number of people Typical maximum walking distance (one way) to facility Describe status (life) of the system; e.g. are the latrines full Indication of who paid for private household facilities **Usage:** Approximate % of population has access Approximate % of population using facilities correctly on a regular basis

Item	Data	Analyzed data	A	Range 10	7	4	1	B	C
2	Technical appropriateness			inappropriate	technically basic	appropriate	very appropriate	0.25	
	Notes: Keyhole size and shape in slab; foot rest position; minimum dimensions for inside latrine; superstructure provides necessary privacy and appropriate weather protection; drainage around facility; access path to facility; seasonal variation has minimum affect on access to facility; accessible and easy to use by all vulnerable groups (e.g. elderly and disabled); lit at night if necessary; and personal security for vulnerable groups (especially women)								
3	Social and cultural acceptability			very unacceptable	unacceptable	acceptable	very acceptable	0.25	
	Notes: Religious and cultural factors; methods of anal cleaning; preferred defecation position; need for privacy; segregation of genders or different groups for whom it is culturally unacceptable to share a latrine; provision for the disposal of women's sanitary protection or privacy for washing and drying sanitary protection cloths; cultural taboos; and special arrangements for children								
4	Potential hazard to health			major hazard	basic protection	minimal hazard	no hazard	0.25	
	Notes: **Major hazard:** Open/indiscriminate defecation; no anal cleaning material; no handwashing near latrines; potential for water source pollution; no O&M of structures **Basic protection:** Controlled defecation in designated locations; some anal cleaning materials; some hand washing available; possible water source pollution; some O&M **Minimal hazard:** One space per 50 people and not more than 50m away; anal cleaning materials available; handwashing near facilities; no water source pollution; O&M **No hazard:** One space per 20 people and not more than 25m away; anal cleaning materials available; handwashing near facilities; no water source pollution; O&M								
5	Sustainability of facilities			no facilities or in severe condition/not functional	facilities 1-4 yrs old or in poor condition	facilities 5-9 yrs old or in moderate condition	facilities >10 yrs old or in good condition	0.25	
6	Ratio of latrine spaces to population (or can be calculated per household)			none	1/100 or immediate responses	1/50	1/20	0.50	

7	Maximum one-way walking distance			>100 m	75 m	50 m	<25 m	0.50	
8	% of population with access to appropriate facilities			none	50%	75%	>95%	0.50	
9	% of population using appropriate facilities correctly			none	50%	75%	>95%	0.50	
								Total:	

Checklist Form F2
Public Places Excreta Disposal

Assessment for Public Health Infrastructure Facilities
International Humanitarian Assistance Missions

Location of Assessment: **Date:** **Assessor:**

Classification: F2.1: Medical centers

Item	Collected data	Key Indicators
1		Collect data for Quality (technical appropriateness, social/cultural acceptability, potential health hazard, sustainability); Quantity (number of facilities/activities, capacity, distance to facilities); and Usage (accessibility and O&M). **Facility type:** Open field defecation Shallow trench latrines Deep trench latrines Composting latrines Storage tank latrines Chemical toilets Shallow family pit latrines VIP latrines Pour-flush latrines Over-hung latrines Lagoons Sewerage system **Quantity/Quality:** Typical ratio of one space/cubicle to number of patients/beds Typical maximum walking distance (one way) to facility Describe status (life) of the system; e.g. are the latrines full Indication of who paid for community facility Indication of who manages/operates the facility and costs Location of public water taps or other water source to community facility **Usage:** Approximate % of population has access Approximate % of population using facilities correctly on a regular basis

Item	Data	Analyzed data	A	Range 10	7	4	1	B	C
2	Technical appropriateness			inappropriate	technically basic	appropriate	very appropriate	0.25	
	Notes: Keyhole size and shape in slab; foot rest position; minimum dimensions for inside latrine; superstructure provides necessary privacy and appropriate weather protection; drainage around facility; access path to facility; seasonal variation has minimum affect on access to facility; accessible and easy to use by all vulnerable groups (e.g. elderly and disabled); lit at night if necessary; and personal security for vulnerable groups (especially women)								
3	Social and cultural acceptability			very unacceptable	unacceptable	acceptable	very acceptable	0.25	
	Notes: Religious and cultural factors; methods of anal cleaning; preferred defecation position; need for privacy; segregation of genders or different groups for whom it is culturally unacceptable to share a latrine; provision for the disposal of women's sanitary protection or privacy for washing and drying sanitary protection cloths; cultural taboos; and special arrangements for children								
4	Potential hazard to health			major hazard	basic protection	minimal hazard	no hazard	0.25	
	Notes: **Major hazard:** Open/indiscriminate defecation; no anal cleaning material; no handwashing near latrines; potential for water source pollution; no O&M of structures **Basic protection:** Controlled defecation in designated locations; some anal cleaning materials; some hand washing available; possible water source pollution; some O&M **Minimal hazard:** One space per 20 beds and not more than 50m away; anal cleaning materials available; handwashing near facilities; no water source pollution; O&M **No hazard:** One space per 10 people and not more than 25m away; anal cleaning materials available; handwashing near facilities; no water source pollution; O&M								
5	Sustainability of facilities			no facilities or in severe condition/not functional	facilities 1-4 yrs old or in poor condition	facilities 5-9 yrs old or in moderate condition	facilities >10 yrs old or in good condition	0.25	

6	Ratio of latrine spaces to health center beds/patients			none	1/50 beds 1/100 outpatients	1/20 beds 1/50 outpatients	1/10 beds 1/20 outpatients	0.50	
7	Maximum one-way walking distance			>100 m	75 m	50 m	<25 m	0.50	
8	% of population with access to appropriate facilities			none	50%	75%	>95%	0.50	
9	% of population using appropriate facilities correctly			none	50%	75%	>95%	0.50	
								Total:	

Checklist Form F3
Public Places Excreta Disposal

Assessment for Public Health Infrastructure Facilities
International Humanitarian Assistance Missions

Location of Assessment: **Date:** **Assessor:**

Classification: F3.1: Schools

Item	Collected data	Key Indicators
1		Collect data for Quality (technical appropriateness, social/cultural acceptability, potential health hazard, sustainability); Quantity (number of facilities/activities, capacity, distance to facilities); and Usage (accessibility and O&M). **Facility type:** Open field defecation Shallow trench latrines Deep trench latrines Composting latrines Storage tank latrines Chemical toilets Shallow family pit latrines VIP latrines Pour-flush latrines Over-hung latrines Lagoons Sewerage system **Quantity/Quality:** Typical ratio of one space/cubicle to number of boy/girl students Typical maximum walking distance (one way) to facility Describe status (life) of the system; e.g. are the latrines full Indication of who paid for community facility Indication of who manages/operates the facility and costs Location of public water taps or other water source to community facility **Usage:** Approximate % of population has access Approximate % of population using facilities correctly on a regular basis

Item	Data	Collected data	A	Range 10	7	4	1	B	C
2	Technical appropriateness			inappropriate	technically basic	appropriate	very appropriate	0.25	
	Notes: Keyhole size and shape in slab; foot rest position; minimum dimensions for inside latrine; superstructure provides necessary privacy and appropriate weather protection; drainage around facility; access path to facility; seasonal variation has minimum affect on access to facility; accessible and easy to use by all vulnerable groups (e.g. elderly and disabled); lit at night if necessary; and personal security for vulnerable groups (especially women)								
3	Social and cultural acceptability			very unacceptable	unacceptable	acceptable	very acceptable	0.25	
	Notes: Religious and cultural factors; methods of anal cleaning; preferred defecation position; need for privacy; segregation of genders or different groups for whom it is culturally unacceptable to share a latrine; provision for the disposal of women's sanitary protection or privacy for washing and drying sanitary protection cloths; cultural taboos; and special arrangements for children								
4	Potential hazard to health			major hazard	basic protection	minimal hazard	no hazard	0.25	
	Notes: **Major hazard:** Open/indiscriminate defecation; no anal cleaning material; no handwashing near latrines; potential for water source pollution; no O&M of structures **Basic protection:** Controlled defecation in designated locations; some anal cleaning materials; some hand washing available; possible water source pollution; some O&M **Minimal hazard:** One space per 30 girls/60 boys and not more than 50m away; anal cleaning materials available; handwashing near facilities; no water source pollution; O&M **No hazard:** One space per 15 girls/30 boys and not more than 25m away; anal cleaning materials available; handwashing near facilities; no water source pollution; O&M								
5	Sustainability of facilities			no facilities or in severe condition/not functional	facilities 1-4 yrs old or in poor condition	facilities 5-9 yrs old or in moderate condition	facilities >10 yrs old or in good condition	0.25	

6	Ratio of latrine spaces to school pupils/students			none	1/50 girls 1/100 boys	1/30 girls 1/60 boys	1/15 girls 1/30 boys	0.50	
7	Maximum one-way walking distance			>100 m	75 m	50 m	<25 m	0.50	
8	% of population with access to appropriate facilities			none	50%	75%	>95%	0.50	
9	% of population using appropriate facilities correctly			none	50%	75%	>95%	0.50	
								Total:	

Checklist Form G1
Domestic Solid Waste Management - On-Site Pits

Assessment for Public Health Infrastructure Facilities
International Humanitarian Assistance Missions

Location of Assessment: **Date:** **Assessor:**

Classification: G1.1: Single or shared family/communal G1.2: School

Item	Collected data	Key Indicators
1		Collect data for Quality (technical appropriateness, social/cultural acceptability, potential health hazard, sustainability); Quantity (number of facilities/activities, capacity, distance to facilities); and Usage (accessibility and O&M). **Facility type:** Open ground disposal Burning on open ground Single family pit Multiple family/communal pit Single family bins Multiple family bins **Quantity/Quality:** Typical ratio of one bin to number of people Typical maximum walking distance to pit Typical volume of pit per persons Describe any accumulation of wastes by household or community Describe any composting activities Describe how different types of waste are handled (e.g. which wastes are saved, burned, composting, use of plastics, or metal wastes) **Usage:** Approximate % of population has access to facilities Approximate % of population using facilities correctly on a regular basis

Item	Data	Analyzed data	A	Range 10	7	4	1	B	C
2	Technical appropriateness			inappropriate	technically basic	appropriate	very appropriate	0.50	

Notes:
Inappropriate: Open and indiscriminate dumping; no storage, collection, transport, and disposal facilities; no management
Technically basic: Solid waste disposed in designated areas which are cleared at least every two weeks; controls of open dumping
Appropriate: On-site disposal facilities in place or basic containers provided and emptied at least every one-two weeks; off-site disposal in designated areas; basic O&M
Very appropriate: On-site disposal facilities in place and well-designed solid waste containers emptied weekly; O&M
Criteria for storage: One bin (100 liters) to 100 people (short-term) and 50 people (long-term) for domestic solid waste

3	Potential hazard to health			major hazard	basic protection	minimal hazard	no hazard	0.50	

Notes:
Major hazard: Pollution of food and water sources; high vector population close to dwellings; medical waste mixed with general waste; access uncontrolled
Basic protection: No pollution of food and water sources; some vectors; medical waste is separated from general waste; workers provided some tools and gloves
Minimal hazard: No pollution of food and water sources; medical waste is separated from general waste; access to disposal area by people and animals controlled
No hazard: No pollution of food and water sources; separation of wastes; access to disposal area controlled; no smoke or odor hazards; workers provided tools and gloves
Criteria for solid waste pits: Base 1.5m above wet seasonal water table and 30m from water source

4	Sustainability of facilities			no facilities or in severe condition/not functional	facilities 1-4 yrs old or in poor condition	facilities 5-9 yrs old or in moderate condition	facilities >10 yrs old or in good condition	0.25	
5	Ratio of pit volume to population			none	$6m^3/200$	$6m^3/100$	$6m^3/50$	0.25	
6	Maximum one-way walking distance to family or communal pit			>70 m family >250 m comm	45 m family 200 m comm	30 m family 150 m comm	15 m family 100 m comm	0.50	

7	% of population with access to appropriate facilities			none	50%	75%	>95%	0.50	
8	% of population using appropriate facilities correctly			none	50%	75%	>95%	0.50	
								Total:	

Checklist Form G2
Domestic Solid Waste Management - Off-site Col/Dis

Assessment for Public Health Infrastructure Facilities
International Humanitarian Assistance Missions

Location of Assessment: **Date:** **Assessor:**

Classification: G2.1: Single or shared family/communal; G2.2: School

Item	Collected data	Key Indicators
1		Collect data for Quality (technical appropriateness, social/cultural acceptability, potential health hazard, sustainability); Quantity (number of facilities/activities, capacity, distance to facilities); and Usage (accessibility and O&M). **Facility type:** Open ground disposal Burning on open ground Single family bins/containers Multiple family/communal containers/oil drums Collection vehicle Communal pits/landfill **Quantity/Quality:** Typical ratio of one bin to number of people Typical maximum walking distance to bin Typical volume of collection vehicle per person per day Approximate distance of final disposal site to nearest habitable building Volume of land for pit or landfill per person Describe any accumulation of wastes Describe any composting activities Describe how different types of waste are handled (e.g. which wastes are saved, burned, composting, use of plastics, or metal wastes) **Usage:** Approximate % of population has access and using facilities correctly on regular basis Approximate % of collected waste transported correctly Approximately % of collected waste disposed of correctly

Item	Data	Collected data	A	Range 10	7	4	1	B	C
2	Technical appropriateness			inappropriate	technically basic	appropriate	very appropriate	0.25	

Notes:
Inappropriate: Open and indiscriminate dumping; no storage, collection, transport, and disposal facilities; no management
Technically basic: Solid waste disposed in designated areas which are cleared at least every two weeks; controls of open dumping
Appropriate: Basic containers provided and emptied at least every one-two weeks; off-site disposal in designated areas; basic O&M
Very appropriate: Well-designed solid waste containers emptied weekly; suitable collection vehicle; well-designed pits or landfill; well-managed site with O&M
Criteria for storage: One bin (100 liters) to 100 people (short-term) and 50 people (long-term) for domestic solid waste

3	Potential hazard to health			major hazard	basic protection	minimal hazard	no hazard	0.35	

Notes:
Major hazard: Pollution of food and water sources; high vector population close to dwellings; medical waste mixed with general waste; access uncontrolled
Basic protection: No pollution of food and water sources; some vectors; medical waste is separated from general waste; workers provided some tools and gloves
Minimal hazard: No pollution of food and water sources; medical waste is separated from general waste; access to disposal area by people and animals controlled
No hazard: No pollution of food and water sources; separation of wastes; access to disposal area controlled; no smoke or odor hazards; workers provided tools and gloves
Criteria for solid waste pits: Base 1.5m above wet seasonal water table and 30m from water source

4	Sustainability of facilities			no facilities or in severe condition/not functional	facilities 1-4 yrs old or in poor condition	facilities 5-9 yrs old or in moderate condition	facilities >10 yrs old or in good condition	0.35	
5	Ratio of bin volume to population (domestic, school or feeding center)			none	0.5 l/person	1.0 l/person	2.0 l/person	0.20	

6	Maximum one-way walking distance to nearest bin			>70 m	45 m	30 m	15 m	0.20	
7	Ratio of collection vehicle volume (per day) to person			none	0.2 l/person	0.4 l/person	1.0 l/person	0.20	
8	Distance to final disposal site from nearest habitable building			<250 m	500 m	750 m	>1 km	0.20	
9	Land available for landfill per day OR ratio pit volume per population			none	$0.25m^3$/person $6m^3$/200	$0.50m^3$/person $6m^3$/100	$0.75m^3$/person $6m^3$/50	0.35	
10	% of population using appropriate collection facilities correctly			none	50%	75%	>95%	0.30	
11	% of collected solid waste transported correctly			none	50%	75%	>95%	0.30	
12	% of collected solid waste disposed of correctly			none	50%	75%	>95%	0.30	
								Total:	

Checklist Form G3
Medical Center Solid Waste Management

Assessment for Public Health Infrastructure Facilities
International Humanitarian Assistance Missions

Location of Assessment: **Date:** **Assessor:**

Classification: G3.1: Medical center with on-site pits G3.2. Medical center with on-site pits and incinerator

Item	Collected data	Key Indicators
1		Collect data for Quality (technical appropriateness, social/cultural acceptability, potential health hazard, sustainability); Quantity (number of facilities/activities, capacity, distance to facilities); and Usage (accessibility and O&M). **Facility type:** Open ground disposal Segregated containers (e.g. sharps) Use of disinfection Open pit with no controlled access Incinerator-temp (e.g. oil drum) Sealed sharps pit Incinerator-permanent Pit for incinerator ash Pit for pathological waste **Quantity/Quality:** Typical ratio of set of three segregated containers (sharps, pathological waste, general waste) per number of beds Typical walking distance to containers Original pit volume Capacity of incinerator Distance of pit and incinerator to nearest habitable building Describe any accumulation of wastes Describe any composting activities Describe how different types of waste are handled; e.g. which wastes are saved, burned, composting, use of plastics or metal wastes **Usage:** Approximate % of waste appropriately collected and sorted Approximate % of collected waste transported correctly Approximate % of collected waste disposed of correctly

Item	Data	Analyzed data	A	Range 10	7	4	1	B	C
2	Technical appropriateness			inappropriate	technically basic	appropriate	very appropriate	0.30	

Notes:
Inappropriate: No segregated medical waste management; medical waste indiscriminately disposed of with domestic waste; no storage, collection, or disposal systems
Technically basic: Very basic medical waste management; medical waste and general waste segregated but all medical waste disposed of together; burned at low temps
Appropriate: Medical waste management in place; general waste and different types of medical waste segregated in different containers; incinerated waste and ash in pits
Very appropriate: Medical waste management in place; general waste and different types of medical waste segregated in different containers; incinerated and sealed pits
Criteria for storage: One bin (100 liters) to 100 people (short-term) and 50 people (long-term) for domestic solid waste

3	Potential hazard to health			major hazard	basic protection	minimal hazard	no hazard	0.30	

Notes:
Major hazard: Pollution of food and water sources; high vector population close to dwellings; medical waste mixed with general waste; access uncontrolled; no disinfection
Basic protection: No pollution of food and water sources; some vectors; medical waste is separated from general waste; workers provided some tools and gloves; pits
Minimal hazard: No pollution of food and water sources; medical waste is separated from general waste in separate containers; incinerator; ash in deep pits
No hazard: No pollution of food and water sources; separation of medical wastes in separate containers; workers trained and provided w/equip; incinerator at correct temps
Criteria for medical waste pits: Base 1.5m above wet seasonal water table and 30m from water source

4	Sustainability of facilities			no facilities or in severe condition/not functional	facilities 1-4 yrs old or in poor condition	facilities 5-9 yrs old or in moderate condition	facilities >10 yrs old or in good condition	0.30	

5	No. of beds per set of segregated containers * *if no beds-2 outpatients equivalent to 1 bed			none	40 beds/set	30 beds/set	20 beds/set	0.20	
6	Average one-way walking distance to containers			>20 m	20 m	10 m	<5 m	0.20	
7	Volume of transport for segregated waste			none	insufficient	sufficient	ideal	0.20	
8	Original pit volume per bed * *if no beds, 2 outpatients equivalent to 1 bed			none	400 l/bed	800 l/bed	>1200 l/bed	0.15	
9	Capacity of incinerator			none or very insufficient	insufficient	sufficient	ideal	0.15	

Notes:
None or very insufficient: No incinerator or not properly incinerated; waste clearly visible after attempted incineration; incinerator unable to cope with medical waste per day
Insufficient: Incinerated at low temperatures; some waste visible after attempted incineration, but most rendered inert; able to cope with medical waste per day
Sufficient: All general medical waste successfully incinerated each day to produce residual ash
Ideal: All generated medical waste successfully incinerated each day at 1,000-degrees C or above and a uniform fine ash is produced
Criteria for an ideal incinerator should be able to incinerate 10kg of waste/10,000 people per day at a minimum of 1,000-degrees C (temp will not be obtained in open pit)

10	Distance of incinerator from nearest habitable building			0 m	5 m	15 m	>30 m	0.15	
11	Distance of pit from nearest habitable building			<25 m	50 m	75 m	>100 m	0.15	
12	% of waste appropriately collected and sorted			none	50%	75%	>95%	0.30	
13	% of collected medical waste safely transported			none	50%	75%	>95%	0.30	
14	% of collected medical waste safely disposed			none	50%	75%	>95%	0.30	
								Total:	

Checklist Form H
Wastewater (Grey Water/Runoff) Management

Assessment for Public Health Infrastructure Facilities
International Humanitarian Assistance Missions

Location of Assessment: **Date:** **Assessor:**

Classification: H1: Domestic/dwelling areas; H2: Medical center; H3: Schools

Item	Collected data	Key Indicators
1		Collect data for Quality (technical appropriateness, social/cultural acceptability, potential health hazard, sustainability); Quantity (number of facilities/activities, capacity, distance to facilities); and Usage (accessibility **Facility type:** No system-pools of stagnant water No drainage at water taps or bathing areas Soakaways or soak pits Diversion to natural drainage Diversion to man-made drainage Natural drainage Infiltration trenches Evaporation beds Irrigation use **Quantity/Quality:** Approximate % of places (water points, bathing areas, laundry places, hand washing areas, clinics) with appropriate disposal system **Usage:** Approximate % of wastewater disposed to designated sites

Item	Data	Analyzed data	A	Range 10	7	4	1	B	C
2	% of facilities technically appropriate to current purpose			none	50%	75%	>95%	0.35	
	Notes: System can cope with all wastewater produced without over-flowing; grease traps have been installed and working effectively as necessary; traps for food waste as necessary; water, shelter, buildings, and sanitation facilities are not flooded or eroded by wastewater; no standing water around facilities								
3	Potential hazard to health			major hazard	basic protection	minimal hazard	no hazard	0.35	
	Notes: **Major hazard:** No wastewater disposal system; high population of water-related vectors; potential water source pollution; standing/pooling water; slippery surfaces **Basic protection:** Immediate drainage measures are in place but cannot cope with wastewater produced; standing/pooling water still present in areas **Minimal hazard:** Appropriate facilities in place; vector populations under reasonable control; minimal standing/pooling water; community O&M of facilities **No hazard:** High quality facilities in place; vector populations under control; minimal standing/pooling water; community O&M of facilities								
4	% of wastewater facilities which are adequately maintained and managed			none	50%	75%	>95%	0.30	
5	% of facilities with functional wastewater disposal systems			none	50%	75%	>95%	1.00	
6	% of wastewater disposed of in appropriate designated sites			none	50%	75%	>95%	1.00	
							Total:		

Checklist Form I
Vector Control

Assessment for Public Health Infrastructure Facilities
International Humanitarian Assistance Missions

Location of Assessment: **Date:** **Assessor:**

Classification: I1: Domestic/dwelling areas; I2: Medical center; I3: Schools

Item	Collected data	Key Indicators
1		Collect data for Quality (technical appropriateness, social/cultural acceptability, potential health hazard, sustainability); Quantity (number of facilities/activities, capacity, distance to facilities); and Usage (accessibility and O&M). **Facility type:** Impregnated bednets, curtains Household screens Drainage of water; pits; ponds Hygiene practices; cover food; waste disposal Washing clothes, bedding Household fumigants Chemical spraying **Quantity/Quality:** Vector-borne risks in community and level of disease awareness Seasonal level of vector insects in community (e.g. mosquitoes; flies) Seasonal level of vector animals in community (e.g. rodents) Seasonal level of breeding sites for vectors (e.g. standing water; waste) Traditional practices or beliefs relating to vectors and diseases Level of protection for individuals in high-risk areas Level of protection of community by environmental measures Existing or past control program for control including by chemical means Level of risks from use and storage of vector-control chemicals Indication of who manages community-level vector control interventions Indication of origin of past or current promotor of control practices **Usage:** Approximate % of population with practice of individual protection Approximate % of population with access to community-wide environmental protection Indicators of knowledge of individual protection practices

Item	Data	Analyzed data	A	Range 10	7	4	1	B	C
2	Access to appropriate individual and family protection			major hazard	basic protection	minimal hazard	no hazard	0.50	

Notes:
Major hazard: No understanding of disease transmission; no access to bednets; no personal hygiene; food unprotected; no access to appropriate waste disposal with garbage nearby dwellings
Basic protection: Limited understanding of disease transmission; bednets without impregnation; infrequent washing of bedding and clothing; limited food protection; limited disposal of waste by burning or pits
Minimal hazard: General understanding of disease transmission; bednets with impregnation; frequent washing of bedding and clothing; frequent food protection; disposal of waste in pits
No hazard: Understanding of disease transmission; bednets with impregnation used appropriately; frequent washing of bedding and clothing; frequent food protection; disposal of waste in pits and/or communal collection

3	Appropriate physical, environmental, and chemical controls			major hazard	basic protection	minimal hazard	no hazard	0.50	

Notes:
Major hazard: High level of vectors within community; vector breeding/resting sites within or near community (less than 1-2km); no community program for waste disposal or limit standing/pooling water; no spraying program or program without proper management of vector-control chemicals
Basic protection: Vectors within community; vector breeding/resting sites 1-2km from community; community program for waste disposal and to limit standing/pooling water; limited/infrequent spraying program with some management/storage of vector-control chemicals
Minimal hazard: Minimal-level of vectors within community; vector breeding/resting sites greater than 2km from community; community program for waste disposal and to limit standing/pooling water; spraying program with management/storage for vector-control chemicals
No hazard: Limited or no vectors within community; vector breeding/resting sites greater than 2km from community; effective community program for waste disposal and to limit standing/pooling water; effective spraying program with proper management/storage of vector-control chemicals

4	% of population with access to appropriate individual protection			none	50%	75%	>95%	1.00	
5	% of population with access to appropriate community-wide protection			none	50%	75%	>95%	1.00	
								Total:	

6 Data Analysis

6.1 Introduction

This chapter provides information on the process to analyze the data collected on the assessment forms for each sector. The analysis should begin once all necessary data has been collected (or estimated) and entered on the assessment forms. The purpose of the analysis is to identify existing deficiencies, areas of concern, and to prioritize interventions. The analysis is primarily based on information in Harvey, Baghri, and Reed (2002: 217-255).

6.2 Analysis

The analysis process for all sectors should follow the procedure outlined below. Each **bold** heading represents a box on the assessment form.

Analyzed Data
For each item on the form, complete the column titled "**Analyzed data**" using relevant information collected in Item 1 of the form. This information should briefly summarize the collected data. Some of the data may have to be estimated and assumptions made due to a lack of information or time.

Column A
In column "**A"**, select a number between 1 and 10 that best reflects the collected data. Compare the data for each item with the values in the "**Range**" columns to assign a score. Critical notes pertaining to the range of values are provided for selected items to offer additional guidance. General definitions of the range scores are provided in the table below:

Table 6.1: Range score definitions

Score	Description
1	Better than long-term objectives
2	Equivalent to long-term objectives
3	Between short-term and long-term objectives
4	Equivalent to short-term objectives
5-6	Between immediate and short-term objectives
7	Equivalent to immediate objectives
8-9	Worse than immediate objectives
10	Much worse than immediate objectives

The recommended objectives used in the "**Range**" columns are generally based on *The Sphere Project* (2004). These have been expanded to incorporate the following elements:

- **Quality:** Technical appropriateness, social and cultural acceptability, potential health hazard, and sustainability.
- **Quantity:** Number of facilities/activities, capacity, and distance to facility.
- **Usage:** Accessibility and O&M.

In addition, objectives have been divided into the following intervention levels:

- **Immediate:** Very basic minimum standards (typically for the initial phase of emergency).
- **Short-term:** Basic minimum standards.
- **Long-term:** Standards for several years in duration or permanent community.

Column B
The column titled "**B**" is the multiplier and this weights the score so that aspects of the quality, quantity, and usage all are represented and have importance in the analysis.

Column C
This column titled "**C**" is the product of the score provided in column "**A**" multiplied by the multiplier in column "**B**."

Total
The total score will be used for comparison and prioritization between various water supply and sanitation sectors and also between different areas or sites assessed.

6.3 Interpretation of Results

The total score from each sector should be entered into a summary table for comparison. From this, the overall situation for each water supply and sanitation sector can be numerically assessed. Each total score can be compared to the ranges in the table below:

Table 6.2: Intervention levels

Score	Level	Situation	Priority
24-30	Unacceptable	Recommended minimum objectives have not been achieved and immediate action is needed	Very high
17-24	Immediate acceptable level	Recommended minimum immediate objectives or better are in place but action is needed to achieve the short-term objectives	High
10-17	Short-term acceptable level	Recommended minimum short-term objectives or better are in place but action is needed to achieve the long-term objectives	Medium
3-10	Long-term acceptable level	Recommended minimum long-term objectives or better are in place and no immediate actions are needed	Low

The desired intervention level is an important factor in determining priorities. For example, an assessment for a PDSS mission typically would be for long-term intervention and therefore the scores obtained need only be compared to the long-term acceptable levels. However, for an assessment for emergency intervention, an immediate or short-term level intervention level would be required and therefore the scores would be compared to those corresponding acceptable levels.

Generally, the highest priority is the sector with the highest score. However, action need only be taken if this score is above the appropriate intervention level score. Priorities may be considered in terms of sector or physical area or both. Additionally, in deciding on the appropriate priority level it is important to take into account the current situation, for example whether it is for a long-term program for an established community (or a new emergency) and the mandate of the agency.

7 Potential Projects and Activities

7.1 Introduction

This chapter provides potential projects and activities that could be recommended to address deficiencies identified in the initial assessment. The recommended facilities and capacity building activities should also incorporate considerations for vulnerable populations (e.g. children, older people, disabled people, and ostracized subpopulations); for example, latrines with door-widths and handrails suitable for access by older and disabled populations.

Reference and guidelines are listed for each general category of projects and activities to provide background on the potential scope of the project and required resources and skill sets during the mission. The references listed are the following:

- Davis and Lambert (2002) *Engineering in Emergencies*
- Mihelcic, et al. (2009) *Field Guide to Environmental Engineering for Development Workers*
- MSF (1994) *Public Health Engineering in Emergency Situation*

7.2 Subject Matter Expert Exchange (SMEE) (form B)

Potential projects/activities	Reference and guidelines
Train officials, staff, students, or general public in selected subject matter topics (e.g. disease overview; environmental planning; water supply; wastewater; solid waste; community vs household interventions, vector control; food protection; air pollution and noise control; capacity building techniques; general environmental health; emergency/ disaster management)	▪ See companion references for relevant sector information.

7.3 Health and Hygiene Promotion (form C)

Potential projects/activities	Reference and guidelines
Train facilitators in priority public health sectors (See companion references for relevant sector information)	▪ Davis and Lambert (2002: 152-154) ▪ Mihelcic, et al. (2009: 16-27; 41; 164-170)
Provide health and hygiene promotion in priority public health sector (see companion references for relevant sector information)	▪ Davis and Lambert (2002: 152-154) ▪ Mihelcic, et al. (2009: 16-27; 41; 164-170)

7.4 Operation and Maintenance (O&M) (form D)

Potential projects/activities	Reference and guidelines
Train community members in basic operation, maintenance, and management of selected facilities (e.g. organization, administration, testing, financial management, operation, records, and safety of water supply, wastewater treatment, and/or solid waste facilities)	▪ See companion references for relevant sector information.

7.5 Water Quantity (form E1)

Potential projects/activities	Reference and guidelines
Construct new or improve existing surface water source (e.g. stream, river, pond, lake)	▪ Davis and Lambert (2002: 214-226)
Construct new groundwater source (e.g. borehole, dug well)	▪ Davis and Lambert (2002: 236-284) ▪ Mihelcic, et al. (2009: 287-317) ▪ MSF (1994: I24-I25; I34-I35)
Construct new or improve existing spring catchment system	▪ Davis and Lambert (2002: 229-236) ▪ Mihelcic, et al. (2009: 276-286)
Construct new or improve rainwater catchment system	▪ Davis and Lambert (2002: 285-286) ▪ Mihelcic, et al. (2009: 318-330)
Increase capacity of existing gravity-fed water systems and/or construct new water collection points	▪ Davis and Lambert (2002: 355-357) ▪ Mihelcic, et al. (2009: 204-227; 228-240; 241-265) ▪ MSF (1994: I52-I53)

7.6 Water Quality (form E2)

Potential projects/activities	Reference and guidelines
Protection of surface water source (e.g. stream, river, pond, lake)	▪ Davis and Lambert (2002: 195-197)
Protection of groundwater source (e.g. borehole, dug well)	▪ Davis and Lambert (2002: 165-166; 252-254) ▪ Mihelcic, et al. (2009: 289-290; 298-300) ▪ MSF (1994: I26-I27)
Protection of spring catchment system	▪ Davis and Lambert (2002: 231-236) ▪ Mihelcic, et al. (2009: 276-279) ▪ MSF (1994: I28-I29)
Protection of rainwater catchment system	▪ Davis and Lambert (2002: 285-286) ▪ Mihelcic, et al. (2009: 324-326)
Construct water treatment system: ▪ Turbidity: infiltration; storage and sedimentation; filtration ▪ Fecal: slow sand filtration (with pre-chlorination and pre-treatment for high levels) ▪ Point-of-use treatment at individual households (e.g. sand or cloth filtration in concrete vessel or ceramic clay pots)	▪ Davis and Lambert (2002: 314-336) ▪ Mihelcic, et al. (2009: 331-371) ▪ MSF (1994: I18-I20; I38-I39; I40-I41)
Construct water disinfection system to prevent fecal contamination (e.g. chlorination; solar UV) ▪ At source for community system ▪ Point-of-use at individual households	▪ Davis and Lambert (2002: 336-342) ▪ Mihelcic, et al. (2009: 353-360) ▪ MSF (1994: I42-I45)

7.7 Water Use Facilities and Goods (form E3)

Potential projects/activities	Reference and guidelines
Provision of household water containers for collection	▪ Davis and Lambert (2002: 198)
Provision of point-of-use household water containers for treatment and/or storage	▪ Davis and Lambert (2002: 198; 315-316; 335-336) ▪ Mihelcic, et al. (2009: 353-360; 361-363) ▪ MSF (1994: I38-I39)
Construct new or improve existing bathing and laundry facilities	▪ MSF (1994: I30-I31)
Construct new or improve existing community water storage facilities	▪ Davis and Lambert (2002: 294-314) ▪ Mihelcic, et al. (2009: 266-275) ▪ MSF (1994: I48-I49; I50-I51)

7.8 Domestic and Public Places Excreta Disposal (form F1-F3)

Potential projects/activities	Reference and guidelines
Improvements to existing facility for technical appropriateness and/or social/cultural acceptability (e.g. design of slab; dimensions; superstructure; drainage; privacy; segregation of genders; access and use by vulnerable populations)	▪ Davis and Lambert (2002: 155-174) ▪ Mihelcic, et al. (2009: 375-408) ▪ MSF (1994: II18-II19; II20-II21; II22-II23; II24-II25; II26-II27; II28-II29; II42-II43; II44- II45; II50-II51)
Construct new or improve existing facilities (e.g. simple pit latrine; VIP latrine; pour- flush latrine; septic tank; infiltration trench; wastewater lagoon/stabilization pond)	▪ Davis and Lambert (2002: 155-174) ▪ Mihelcic, et al. (2009: 375-408; 416-426; 427-453) ▪ MSF (1994: II18-II19; II20-II21; II22-II23; II24-II25; II26-II27; II28-II29; II42-II43; II44- II45; II50-II51)

7.9 Domestic Solid Waste Management (form G1)

Potential projects/activities	Reference and guidelines
Construct new or improve existing facilities (e.g. single family pit; communal pit)	▪ Davis and Lambert (2002: 180-181) ▪ MSF (1994: II30-II31)

7.10 Domestic Solid Waste Management (form G2)

Potential projects/activities	Reference and guidelines
Construct and/or provide bins (e.g. single family bins; multiple/communal bins)	▪ Davis and Lambert (2002: 179-180) ▪ Mihelcic, et al. (2009: 457-466) ▪ MSF (1994: II34-II35)
Construct new or improve existing communal disposal facilities (e.g. single family pit; multiple/communal pit)	▪ Davis and Lambert (2002: 180-181) ▪ Mihelcic, et al. (2009: 467-469; 469-478; 480-487) ▪ MSF (1994: II30-II31; II32-II33)

7.11 Medical Center Solid Waste Management (form G3)

Potential projects/activities	Reference and guidelines
Construct and/or provide medical waste containers (e.g. general; sharps; pathological)	▪ Davis and Lambert (2002: 180-181)
Construct new or improve existing disposal facilities (e.g. waste pit)	▪ Davis and Lambert (2002: 180-181) ▪ MSF (1994: II30-II31)
Construct new or improve existing medical waste incinerator	▪ Davis and Lambert (2002: 181-182) ▪ Mihelcic, et al. (2009: 478-480) ▪ MSF (1994: II36-II37; II38-II39)

7.12 Wastewater (Grey Water/Runoff) Management (form H)

Potential projects/activities	Reference and guidelines
Construct new or improve existing facilities (e.g. drainage channels, soakaways/soakpits)	▪ Davis and Lambert (2002: 173-179) ▪ Mihelcic, et al. (2009: 409-415) ▪ MSF (1994: II40-II41; II42-II43)
Construct new or improve existing drainage facilities	▪ Davis and Lambert (2002: 513-521) ▪ Mihelcic, et al. (2009: 193-203)
Construct new or improve existing grease trap	▪ Davis and Lambert (2002: 177) ▪ MSF (1994: II46-II47)

7.13 Vector Control (form I)

Potential projects/activities	Reference and guidelines
Provide, construct, or improve existing individual vector controls (e.g. impregnated bednets; trainings and promotion of personal hygiene, food protection; waste disposal; household drainage)	▪ Davis and Lambert (2002: 183-192) ▪ MSF (1994: III3-III34)
Provide, construct or improve existing community physical, environmental, and/or chemical controls (e.g. drainage pooling water and ponds; waste disposal; information of chemical spraying program)	▪ Davis and Lambert (2002: 183-192) ▪ Mihelcic, et al. (2009: 193-203) ▪ MSF (1994: III3-III34)

8 Example

8.1 Introduction

This chapter provides an example of how this Guide is applied in the field and specifically the process of completing the forms and developing priorities for recommended projects and activities. This example does not include every detail that needs to be performed or recorded during an assessment, but is intended to provide a useful overview of the process.

The example is a USN PDSS assessment of selected public health infrastructure for an internally displaced persons (IDP) camp that was set-up approximately 10 years ago in a Southeast Asian nation. The population of the camp is 2,000 people.

8.2 Assessment

Based on directives from the team leader, assessments and corresponding forms were completed for the public health infrastructure sectors listed below and are attached.

- Form A: Background information
- Form B: Subject matter expert exchange (SMEE)
- Form C: Health and Hygiene promotion
- Form E1: Water quantity
- Form E2: Water quality
- Form E3: Water use facilities and goods
- Form F1: Domestic excreta disposal
- Form F2: Public places excreta disposal – medical centers
- Form F3: Public places excreta disposal – schools
- Form G1: Domestic solid waste management – on-site pits
- Form G3: Medical center solid waste management – on-site pits/incinerator

8.3 Scores and Results

A summary table of the scores from each sector is listed in the summary table below.

Table 8.1: Summary table-sector scores and priority level

Checklist form/Sector	Score	Priority
Form B: Subject matter expert exchange (SMEE)	N/A	Medium
Form C: Health and Hygiene promotion	12.00	Medium
Form E1: Water quantity	6.25	Low
Form E2: Water quality	16.50	Medium
Form E3: Water use facilities and goods	8.25	Low
Form F1: Domestic excreta disposal	5.75	Low
Form F2: Public places excreta disposal – medical centers	9.50	Low
Form F3: Public places excreta disposal – schools	15.75	Medium
Form G1: Domestic solid waste management – on-site pits	8.50	Low
Form G3: Medical center solid waste management – on- site pits/incinerator	11.45	Medium

8.4 Recommended Priorities and Interventions

Based on the scores and priorities listed in the table above, the recommended priorities and intervention projects and activities are as follows:

Table 8.2: Summary table of priority interventions

Sector	Priority	Recommended Projects and Activities
Form B: Subject matter expert exchange (SMEE) Form C: Health and Hygiene promotion	12.00 Medium	▪ Provide SMEE and capacity building trainings on the following subjects and at the proposed setting: ○ Disease overview: in community, general public. ○ Water supply/wastewater operation: one-on-one at facility, O&M staff. ○ General solid waste: in community, general public. ○ General food protection: in community, general public. ○ Hygiene promotion (reinforce topics such as hand washing with soap): in community, general public.
Form E2: Water quality	16.50 Medium	▪ Construct drainage around well to prevent runoff from entering well area. ▪ Construct concrete apron around well, approximately 1 meter wide. ▪ Construct fencing around well. ▪ Install chlorination system for each well; use locally available chlorination injection pumps.
Form F3: Public places excreta disposal – schools	15.75 Medium	▪ Construct additional latrine block for school students; preferably separate space for both boys and girls. ○ Girls: 10 spaces (one space per 15 girls). ○ Boys: 5 spaces (one space per 30 boys). ○ Construct one of the spaces for both girls and boys with facilities for vulnerable/disabled populations including size, ramps, and handrails. ▪ Provide hand washing facility near latrines.
Form G3: Medical center solid waste management – on-site pits/incinerator	11.45 Medium	▪ Construct permanent incinerator for the medical center: ○ Based on 50 consultations per day and design of 10kg/10,000 people per day, incinerator should be capable of incineration of 0.35kg/week. ▪ Construct waste pits - one pit for general waste and one pit for incinerator ash: ○ Based on 50 consultations per day and design of 0.6 m^3 per patient, pit volume should be 30 m^3 or 2m deep and 3.8m square.
Form F2: Public places excreta disposal – medical centers	9.50 Low	▪ Construct additional latrine space at medical center for vulnerable/disabled populations including adequate size, ramps, and handrails.

Checklist Form A
Background Information

Assessment for Public Health Infrastructure Facilities
International Humanitarian Assistance Missions

Location of assessment: ***Valley of Peace, Southeast Asia*** **Date:** ***1-Jan-10*** **Assessor:** ***PHS Engineer***

Item	Collected data	Key Indicators
1	***The Southeast Asian village named Valley of Peace was originally established as an IDP camp approximately 10 years ago. An assessment of selected sectors of public health infrastructure facilities was conducted in support of a U.S. Navy PDSS mission.*** ***The population of the community is approximately 2,000 people with an average family size of four.*** ***Anticipate short-term and long-term interventions.*** ***Valley of Peace is located adjacent to a river with high hills on both sides of village. The village is accessed by a well-maintained dirt road from a large city approximately 20km away.*** ***No rain during assessment; village reports heavy rain from June-August.*** ***Village has several resources and assets available including labor, wood (lumber), and sand and rock from nearby river.*** ***Village population of 2,000 people appears to be equally distributed by gender. Village representative reports confirm this. In addition, village representative indicates of the total population approximately 300 children are currently enrolled in school with equal distribution of genders. Village has one active medical center.*** ***Village representative reports that several of the children are disabled and still attending school.*** ***No anticipated significant increase in population of village.*** ***Village has two existing water wells approximately 30m from the river; it appears that river water infiltrates through the sand to the wells.*** ***Water in wells appears to be approximately 10m below ground level. No reported loss of water during dry season. Village obtains additional water from the river for livestock and crops.*** ***Water from the wells is pumped to a nearby storage tank on a nearby hill with a gravity distribution system to several collection points in the village.*** ***Electric pump is used; some loss of power in area.*** ***Village primarily uses single family pit latrines located nearby dwellings.*** ***No signs of significant pooling water in village (dry season) and no significant water pooling or run-off by water collection points/taps.*** ***Observations of general solid waste scattered throughout village. Village representative indicated about half of the homes have family pits for solid waste disposal and only a small communal pit is available.*** ***Ground is primarily flat in valley area with gain in elevation in the nearby hills. Soils are primarily gravel, sands, and silts.***	Provide general description, information, demographic data, and geographical information. Include photos and/or a sketch map with critical features and information. **General description:** Provide a general description of the situation, affected area, and population. Political structure of the community (i.e. who plans, carries out, and controls projects for the community). **General information:** Agency carrying out assessment Anticipated level of intervention (e.g. short-term, long-term) General location of site or area Resources available Seasonal/climatic implications **Demographic data:** Approximate number of affected people Approximate number of homes Past population changes: when, why, and how much Seasonal changes in population: when, why, and how much Critical breakdown of populations by gender and age Vulnerable groups (e.g. female, women, sick, disabled, elderly, etc.) Average family size Likely increase or decrease in population size Predominant occupations (e.g. farming, industry, business, etc.) **General resources and infrastructure description:** Location and types of existing water supply and sanitation facilities Estimates of distances from dwelling areas Location of key public buildings (e.g. schools, medical centers, etc.) Location and types of water sources Location and types of water storage and distribution points Location and type of excreta disposal facilities Pooling of wastewater Location and type of solid waste disposal facilities Groundwater levels Geological features; soil descriptions Slope directions and drainage patterns Dwelling indoor air quality (e.g. cooking habits, fuels, house vents, etc.) Description of industrial-type activities (e.g. use of chemicals, etc.) Community-wide environmental risks (e.g. industrial activities, chemical use, known/suspected chemical spills, etc.) **Community involvement:** Describe and list any established community groups, types of groups, activities currently in place, and who internally and externally supports these activities (e.g. NGO).

Checklist Form B
Subject Matter Expert Exchange (SMEE)

Assessment for Public Health Infrastructure Facilities
International Humanitarian Assistance Missions

Location of assessment: ***Valley of Peace, Southeast Asia*** **Date:** ***1-Jan-10*** **Assessor:** ***PHS Engineer***

Item	Collected data	Key Indicators
1	***From discussions with village representatives, requested two general types of SMEE: for water system staff and general public. SMEE for O&M will be on-site and in selected locations within the community for the people.*** ***IDP community has selected community members responsible for routine day-to-day maintenance. IDP community has established a water, sewer, and development committee with four male and female representatives. Representatives identified two staff for O&M SMEE/training.*** ***Community requests SMEE to general public for basic disease overview, general solid waste, and reinforcement of selected hygiene practices***	Collect data for potential subject matter exchange events (SMEE) and anticipated audience and setting/forum. **Audience:** Officials — Local Organizations Students — General public Educators **Setting/forum:** Office — Field site Classroom — One-on-one

Item	Subject matter description and topics	Y/N	Item	Subject matter description and topics	Y/N
2	**Disease overview and control**		8	**Food protection**	
	General: definitions, control, environmental factors	Y		General: personal hygiene, sanitary practices, food handling	Y
	Respiratory diseases			Temperature controls, food preservation, ice	
	Water-borne diseases	Y		Microbiological and chemical standards	
	Food-borne diseases	Y		Dry food storage	
	Insect-borne diseases and zoonosis			Milk source, transportation, processing, control tests	
	Miscellaneous diseases: ringworm, hookworm, lead poisoning, air pollution			Design: kitchen floor plans, ventilation, refrigeration, storage	
3	**Environmental planning**		9	**Air pollution and noise control**	
	Types of planning: regional, community, project			General: health effects, economic effects, climatic effects	
	Process: goals, objectives, studies, mapping, data, plan preparation			Sources: man-made, natural, types of pollutants	
	Comprehensive studies: water, wastewater, solid waste			Sampling/measurement of air pollution: ambient air, smoke	
	Environmental factors: topography, geology, soils, drainage, resources			Environmental factors: meteorology, topography	
	Other factors: growth, housing needs, stakeholder cooperation			Controls: source, emission equipment, particulate collectors	
				Noise control: properties, measurement, reduction, controls	
4	**Water supply**		10	**Other sanitation and environmental health**	
	General: Ground/surface water, water cycle, ground water flow, geology	Y		Wastewater management: drains, soak pits	
	Water quality/quantity: quality indicators, sampling, water analysis	Y		Hygiene promotion: information, communication	Y
	Source and protection: dug wells, drilled wells, spring, surface water	Y		Indoor air quality: source, health effects, venting	
	Treatment: disinfection, sedimentation, filtration, tastes/odors	Y		Industrial hygiene	
	Water system: intakes, storage, pumping, distribution, cross-connections	Y		Occupational health and safety	
	Household water treatment, handling, and storage	Y		Operation and maintenance (See Form D)	
	Other: system flushing, emergency water and treatment				
5	**Wastewater collection, treatment, and disposal**		11	**Emergency/Disaster Management**	
	General: wastewater characteristics, soil/site investigations, sewer flows			General: types of disasters, indicators	
	Small systems: latrines, septic tanks, leachfields, sand filters, composting	Y		Hazards, vulnerability, and resilience assessments	
	Treatment plants: trickling filter, stabilization ponds, anaerobic ponds			Emergency stages and activities/operations	
	Sewage collection and pumping systems: sewer lines, lift stations			Types of assistance to affected populations	
	Final disposal: disinfection, land application, reuse, solids/sludge			Emergency operation planning	
	Industrial wastes: hazardous and toxic wastes, pretreatment			Contingency planning	
6	**Solid waste management**		12	**Other**	
	General: composition, weight, volume	Y			
	Solid waste collection: type of bins, storage, transfer stations, compactors				
	Treatment and disposal: on-site pits, landfill, incineration				
	Special wastes: sharps, pathological, animal waste, tires, hazardous				
	Incineration: design, site selection, controls				
	Other: waste reduction, composting, tire recycling				
7	**Vector control**		13	**Comments**	
	General: types of vectors, vector-borne diseases			Village leaders specifically request for SMEE on hygiene for hand washing with soap. Consider bringing supplies of soap from nearby local suppliers.	
	Principal control measures: environmental, water, chemical, traps				
	Pesticide program: types, application, controls, equipment				
	Individual dwelling protection: bednets, food protection, waste disposal				

Checklist Form C
Health and Hygiene Promotion

Assessment for Public Health Infrastructure Facilities
International Humanitarian Assistance Missions

Location of assessment: ***Valley of Peace, Southeast Asia*** **Date:** ***1-Jan-10*** **Assessor:** ***PHS Engineer***

Classification: C1: **Domestic/dwelling areas**; C2: **Medical center**; C3: **School**

Item	Collected data	Key Indicators
1	***Village representative indicated that when IDP camp was initially set-up there was hygiene promotion activities.*** ***However, currently there are limited activities with some promotion dramas, songs, and plays provided at the school (provided by teachers). Also observed hygiene posters at the medical clinic on general sanitation topics. One staff at medical center does provide general hygiene education to patients and on limited occasions to dwellings in village.*** ***All promotional messages observed and indicated by village representative appear to be appropriate and cover major sanitation sectors.*** ***At school and medical clinic, did observe some lack of use of soap for handwashing after use of latrine.*** ***Did observe some posters at medical center in English, which is not the native language of the village or area.*** ***Village representative requested additional hygiene promotion for hand washing with soap to include training with facilitator, teachers, and clinic staff and some training at classrooms for handwashing with soap.***	Collect data for Facility Type (infrastructure and educational resources); Quality (technical appropriateness, social/cultural acceptability, potential health hazard, sustainability); Quantity (number of facilities/activities, capacity, distance to facilities); and Usage (accessibility and O&M). **Facility type:** No health or hygiene promotion Communal latrine attendants Recruitment and training of promotors On-going or routine assessment/monitoring/education Messaging used for health and hygiene promotion Communication channels used or available (e.g. markets, schools, clinics, house visits, posters, meetings, loud speakers, drama, music, radio, TV) **Quantity/Quality:** Approximate % of facilitators from same social background Approximate % of facilitators properly trained Approximate % of promotional messages are accurate Approximate % of promotional messages delivered that are compatible with socio-cultural aspects of population Approximate number of facilitators per 1,000 people Approximate % of area covered and sanitation sectors promoted Indication of cultural/social stigmas Current hygiene promotion activities/program; in-place, desired, needed Indication of general understanding of water/sanitation related disease Indication of lead for current hygiene promotion activities (e.g. local, NGO) Indication of any past promotion activities and level of success **Usage:** Approximate % population receiving message, understanding, and putting into action (implemented) by population Indicators of hygiene practices (e.g. handwashing, use of soap, living areas free of stagnant water and waste, basic knowledge of disease)

Item	Data	Analyzed data	A	Range 10	7	4	1	B	C
2	% of trained facilitators from the same social background	***Facilitators at school (teachers) and medical staff of same background.***	1	none	50%	75%	>95%	0.25	0.25
3	% of messages accurate, appropriate, and complete	***Majority of messages appear to be accurate and complete.***	3	none	50%	75%	>95%	0.25	0.75
4	% of messages delivered in a way that is socio-culturally acceptable	***Majority of messages are socio-culturally acceptable; however some posters in English (non-native language).***	3	none	50%	75%	>95%	0.25	0.75
5	Number of facilitators per thousand people	***No full-time facilitators; however promotion performed occasionally by teachers and medical staff.***	7	none	1	2	>2	0.25	1.75
6	% of area covered by campaign	***Majority of village is covered.***	2	none	50%	75%	>95%	0.25	0.50
7	% of relevant sanitation sectors of which appropriate use is promoted	***Majority of sanitation sectors are covered.***	2	none	50%	75%	>95%	0.25	0.50
8	% of population receiving, understanding, and remembering promotional messages	***Primarily students and patients at medical center receiving messages.***	5	none	50%	75%	>95%	0.50	2.50
9	% of population putting messages into practice	***Overall, messages put into practice; however observed lack of use of soap on occasion.***	5	none	50%	75%	>95%	0.50	2.50
10	% of messages delivered that are implemented	***Majority of messages are implemented with some exception for hand washing.***	5	none	50%	75%	>95%	0.50	2.50
							Total:		**12.00**

Checklist Form E1
Water Quantity

Assessment for Public Health Infrastructure Facilities
International Humanitarian Assistance Missions

Location of assessment: ***Valley of Peace, Southeast Asia*** **Date:** ***1-Jan-10*** **Assessor:** ***PHS Engineer***

Classification: **E**1.1: **Domestic/dwelling areas**; E1.2: **Medical center**; E1.3: **School**

Item	Collected data	Key Indicators
1	***Village has two existing water wells approximately 30m from the river. It appears that the river water infiltrates through the sand into the wells. Water in wells is approximately 10m below ground surface.*** ***Village representative indicates that there is increase in river flow during wet weather season and river becomes silty (however no significant change in water quality in the wells). Water level in the wells stays fairly constant during the year with similar rise and fall as river level changes. There is no significant change in demand on water system as water for crops and livestock is taken from river directly.*** ***Village representative estimates approximately 50,000 liters a day are pumped from the wells to the water storage tank on the hills. This is based on pump operating times and estimated pumping rate.*** ***At 50,000 l/d for 2,000 people is an equivalent of 25 liters/person/day.*** ***Based on observation of several watering points/taps in the village, the estimated distance from the dwellings is approximately 500m with some less than that. There is limited queuing time at less than 5 minutes and takes 1-2 minutes to fill containers. Separate watering points provided for the Medical Center and the School at the buildings.*** ***Observed some taps with broken valves which resulted in leaks and loss of water (and higher pumping costs).***	Collect data for Quantity (number of facilities/activities, capacity, distance to facilities) and Usage (accessibility and O&M). **Facility type:** Describe if facility is developed or undeveloped No water — Tanker/hauling Surface water: stream, river, ponds, lake — Rainwater Ground water: borehole, dug well — Spring Surface water catchment **Description of facility:** General description of facility (e.g. hand-dug well 10 m deep) Method of delivery (e.g. individually collected, piped) **Description of cost of usage/volume:** Cost or user fee for use of facility (e.g. flat fee, by volume) **Quantity:** Approximate yield of source(s) at liters per minute or per day Seasonal yield changes; wet weather and dry weather Seasonal yield demands from crops, irrigation, livestock, cultural practices New proposed uses and past water uses that were abandoned **Usage:** Approximate % of population has access Population using source Typical distance, terrain, travel time to each water source Restrictions on usage

Item	Data	Analyzed data	A	Range 10	7	4	1	B	C
2	Water quantity: domestic	***Overall, approximately 25 liters/person/day.***	1	none	3 l/person per day	10 l/person per day	>15 l/person per day	0.75	0.75
	Medical center			none	5 l/patient per day	15 l/patient per day	>20 l/patient per day		
	School			none	3 l/pupil per day	10 l/pupil per day	>10 l/pupil per day		
3	Sustainability of facilities	***Generally, water quantity supply is good for long-term.***	1	no facilities or in severe condition/not functional	facilities 1-4 yrs old or in poor condition	facilities 5-9 yrs old or in moderate conduction	facilities >10 yrs old or in good condition	0.50	0.50
4	Maximum one-way walking distance to water point	***Approximately 500m.***	4	>1000 m	1000 m	500 m	<500 m	0.25	1.00
	Medical center			>100 m	100 m	50 m	<50 m		
5	Queuing time at water source	***Queuing time less than 5 minutes.***	1	>30 minutes	30 minutes	15 minutes	<5 minutes	0.25	0.25
6	Time to fill a 20-liter container (indicate source or tap)	***Time to fill containers is approximately 1-2 minutes.***	3	>3 minutes	3 minutes	2 minutes	<1 minutes	0.25	0.75
7	% of population with access to appropriate facilities	***Overall, high % with access to water quantity at long-term levels.***	2	none	50%	75%	>95%	0.50	1.00
8	% of population using appropriate facilities correctly	***Overall, high % with appropriate use of facilities. Some taps need additional O&M.***	4	none	50%	75%	>95%	0.50	2.00
							Total:		**6.25**

Checklist Form E2
Water Quality

Assessment for Public Health Infrastructure Facilities
International Humanitarian Assistance Missions

Location of assessment: ***Valley of Peace, Southeast Asia*** **Date:** ***1-Jan-10*** **Assessor:** ***PHS Engineer***

Classification: E2.1: **Domestic/dwelling areas**; E2.2: **Medical center**; E2.3: **School**

Item	Collected data	Key Indicators
1	***Village has two existing water wells approximately 30m from the river. It appears that the river water infiltrates through the sand into the wells. Water in wells is approximately 10m below ground surface.*** ***Village representative indicates that there is increase in river flow during wet weather season and river becomes silty. However, there is no significant change in water quality in the wells during this time.*** ***Village representative reports no major source of potential contamination upstream. However, there are several villages upstream and cattle and other livestock observed in the river.*** ***Some latrines are on higher ground but at least 50m away. However, there is no protection and no controlled access to the wells: no fences; no concrete apron around well; and no drainage to prevent runoff from village entering well area.*** ***At time of assessment, water was clear with turbidity at approximately 5 NTU and village representative reports no significant change during the year. No other tests taken. Village representative reports that previous tests for E. coli had some positives during the wet season.*** ***Existing disinfection system, but has not been operational for 1 year. System uses pump and chlorine.***	Collect data for Quality (technical appropriateness, social/cultural acceptability, potential health hazard, sustainability) and Usage (accessibility and O&M). **Facility type:** Describe if facility is developed or undeveloped No water — Tanker/hauling Surface water: stream, river, ponds, lake — Rainwater Ground water: borehole, dug well — Spring catchment **Quality:** Risk of contamination (primarily fecal) at water source Water quality indicators for core tests Level of protection of areas where population access water Level of protection of post-delivery contamination Type of disinfection system (e.g. chlorine, UV) Level of chlorine residual Proper management of water treatment chemicals (e.g. chlorine) Indication of other contamination of water source (e.g. chemicals) Potential contamination of water source (e.g. fuel, chemicals, animals) Indication of desired treatment by the community or past attempts Types of treatment used in surrounding communities Indication of community treatment vs household treatment used **Usage:** Approximate % of water sources protected from contamination Approximate % of population with access to water that is of sufficient quality and palatable

Item	Data	Analyzed data	A	Range 10	7	4	1	B	C
2	Technical appropriateness	***Overall, electrical submersible pump in well is appropriate; however occasional loss of power.***	3	inappropriate	technically basic	appropriate	very appropriate	0.25	0.75
	Notes: Facilities for water intake (e.g. dug well, river inlet, spring catchment), means of water extraction (e.g. bucket/rope, handpump, electrical pump, gravity pipe), flowrates, % capture, % failure rates, and community program for O&M								
3	Potential hazard to health	***Limited hazard from villages upstream, as well is 30m from river bank for protection. Potential hazard from run-off to well area.***	7	major hazard	basic protection	minimal hazard	no hazard	0.50	3.50

Notes:
Major hazard: Majority of the criteria are not met and/or known contamination of source
Basic protection: Majority of the criteria are met, however suspected contamination of source (e.g. animals upstream from source, fuel/oil, chemicals)
Minimal hazard: All the criteria are met, no known or suspected sources of contamination, and proper management of water treatment chemicals
No hazard: All criteria are met and exceeded, no known or suspected sources of contamination, and community program for source water protection

Criteria:

Borehole or dug well	Surface water
No latrine within 10m	No human habitation upstream to pollute source
Latrine on higher ground and not within 30m	No animals or other waste upstream to pollute source
No other source of pollution (e.g. animal, solid waste) within 10m	No crop production or industrial activities upstream to pollute source
Adequate drainage preventing stagnant or pooling water within 2m	Limited risk of landslide, mudflow, or debris in catchment area
Structure around well prevents drainage or surface water to enter	Intake area is protected from uncontrolled access (e.g. fencing)
Concrete floor/apron around well approximately 1m wide and no cracks	Appropriate filtration (e.g. sand, gravel) and operational
Well seal extends 3m below ground	Means to control flow
Adequate and safe access to water (e.g. communal bucket not on ground)	
Handpump is secured to base to prevent surface water entry	
Adequate and secure cover for well	
Adequate and secure fencing around facility, as necessary	
Other sources of potential pollution (e.g. uncapped wells, refuse dumps) not within 100m	

4	Sustainability of facilities	***System is sustainable for long-term.***	1	no facilities or in severe condition/not functional	facilities 1-4 yrs old or in poor condition	facilities 5-9 yrs old or in moderate condition	facilities >10 yrs old or in good condition	0.25	0.25
5	Water quality core tests	***Majority of core tests appear good; however reported positive E. coli results.***	5	major hazard	basic protection	minimal hazard	no hazard	0.50	2.50

Notes:

Major hazard: Majority of the time, water quality does not meet survival levels for core tests

Basic protection: Majority of the time, water quality meets survival levels for core tests

Minimal hazard: Majority of the time, water quality exceeds survival levels and frequently meet longer-term levels

No hazard: Majority of the time, water quality meets longer-term levels for core tests and secondary levels (e.g. fluoride, iron, manganese, arsenic)

Core tests:

Test	**Reason of concern**	**Survival**	**Longer-term**
Turbidity	acceptability to consumer and treatment requirements	20 NTU	5 NTU
Odor	acceptability and indicates other pollutants	no restriction	acceptable to consumer
Color	acceptability and indicates other pollutants	no restriction	15 TCU
Conductivity	acceptability and corrosion/encrustation	no restriction	1400 µS/cm
pH	effects treatment requirements	no restriction	6 to 8
E.coli	indicates possible presence of pathogens	<1000 E.coli/100 ml *	0 E.coli/100 ml *

* always aim to disinfect supplies

6	Water disinfection (e.g. chlorine residual, UV, etc.)	***Chlorination system is not operational; no disinfection of water system.***	10	none	inappropriate	appropriate	very appropriate	0.50	5.00

Notes:

None: Majority of the time, no program for disinfection to ensure disinfection of water source or water collection point

Inappropriate: Majority of the time, program for chlorination, but less than 0.4 mg/l entering distribution and less than 0.2 mg/l of free residual at collection points or other disinfection system (e.g. UV) does not operate

Appropriate: Majority of the time, program for disinfection (e.g. chlorination frequently at 0.4 mg/l entering distribution and 0.2 mg/l of free residual at collection points)

Very appropriate: Active program for disinfection (e.g. chlorination with consistent chlorination for 0.4 mg/l entering distribution and 0.2 mg/l of free residual at collection points)

7	% of facilities which provide safe water quality	***Overall, water facilities provide safe water for the majority of the year; however with some suspected contamination from run-off. No disinfection.***	6	none	50%	75%	>95%	0.50	3.00
8	% of population with access to water that is of sufficient quality and palatable	***Overall, high % of population with access to water of sufficient quality and palatable.***	3	none	50%	75%	>95%	0.50	1.50
								Total:	**16.50**

Checklist Form E3
Water Use Facilities and Goods

Assessment for Public Health Infrastructure Facilities
International Humanitarian Assistance Missions

Location of assessment: ***Valley of Peace, Southeast Asia*** **Date:** ***1-Jan-10*** **Assessor:** ***PHS Engineer***

Classification: E3.1: **Domestic/dwelling areas;** E3.2: **Medical center;** E3.3: **School**

Item	Collected data	Key Indicators
1	***Based on observation of several watering points/taps in the village, the majority of the population is using 10-20 liter plastic containers; containers appear to be new. At separate watering points at the Medical Center and the School, staff and students using containers as well.*** ***Based on observation and local knowledge from village representative, the majority of the dwellings have separate containers for water storage. A 20-liter container is typically used; however some observed had the container placed on the floor, did not use a lid, and a had no separate ladle for handling water.*** ***At the watering points, people do laundry on small flat stone slabs; however the area appears small and provides poor drainage. Bathing is done by the river, at the taps or at the dwellings. Soap is used.*** ***Community has two water storage tanks on nearby hill. One tank is constructed of corrugated steel sheets with rubber liner and the other of ferrocement. The corrugated steel tank is in poor condition, however the ferrocement tank is in good condition. Each tank is approximately 5.7m base diameter and 1.80m wall height for an approximate volume of 40,000 liters.***	Collect data for Quality (technical appropriateness, social/cultural acceptability, potential health hazard, sustainability); Quantity (number of facilities/activities, capacity, distance to facilities); and Usage (accessibility and O&M). **Facility type:** Household water collection containers Household water storage containers Private/communal bathing facilities Private/communal laundry facilities Personal hygiene soap Community water storage Rigid plastic tanks Flexible tanks Ferrocement tanks Earth berms with liner tanks Steel tanks **Quantity/Quality:** Number and volume of household collection and storage containers Household containers have appropriate design Appropriate facilities for bathing and laundry Type and volume of community water storage tanks **Usage:** Approximate % of population with appropriate water containers Approximate % of population with access to bathing and laundry facilities Approximate % of population with access to appropriate level of community water storage facilities

Item	Data	Analyzed data	A	Range 10	7	4	1	B	C
2	Household water collection containers	***Generally, each dwelling using clean containers with acceptable volume.***	1	very unacceptable	unacceptable	acceptable	very acceptable	0.50	0.50

Notes:
Very unacceptable: No household collection containers
Unacceptable: Each household has water containers, however not clean and/or less than 10-20 liters
Acceptable: Each household has two clean water collecting containers of 10-20 liters
Very acceptable: Each household has at least two clean water collecting containers of 10-20 liters or water service inhouse

3	Household water storage containers	***Acceptable volume for storage, however unsafe means of storage and handling.***	5	very unacceptable	unacceptable	acceptable	very acceptable	0.50	2.50

Notes:
Very unacceptable: No household storage containers
Unacceptable: Each household has water storage containers, however provides less than 4 liters/person/day and not safe storage (e.g. no cover, no tap, on ground)
Acceptable: Each household has a water storage container for approximately 4 liters/person/day and with safe means of storage, drawing, and handling
Very acceptable: Each household has a water storage container for at least 4 liters/person/day and with narrow neck and/or covers, or other means of storage and handling

4	Bathing and laundry facilities	***Limited facilities for laundry and bathing; soap is used.***	5	very unacceptable	unacceptable	acceptable	very acceptable	0.25	1.25

Notes:
Very unacceptable: No bathing or laundry facilities and no soap available
Unacceptable: Central/communal bathing and laundry facilities; however facility does not provide appropriate location, size, privacy, safety, and design; some soap
Acceptable: Central/communal bathing and laundry facilities and most of the location, size, privacy, safety, and design features are appropriate; soap available to all
Very acceptable: Bathing and laundry facilities at household or central/communal facilities and the location, size, privacy, safety, and design are all appropriate; soap

5	Community water storage facilities	***Sufficient storage with at least 2 days; however steel tank in poor condition.***	4	very unacceptable	unacceptable	acceptable	very acceptable	0.50	2.00

Notes:
Very unacceptable: No community water storage tanks
Unacceptable: Community water storage tanks; however technically inappropriate design; less than 1 day storage; no O&M
Acceptable: Community water storage tanks; technically appropriate design; between 1-2 days storage; limited O&M
Very acceptable: Community water storage tanks; technically very appropriate design; at least 2 days storage; well-managed O&M

6	% of population with appropriate water containers	***Overall, high % with appropriate containers.***	1	none	50%	75%	>95%	0.50	0.50
7	% of population with access to bathing and laundry facilities	***Overall, medium level % with access to appropriate bathing and laundry facilities.***	4	none	50%	75%	>95%	0.25	1.00
8	% of population with access to community water storage facilities	***Overall, high % with access to community water storage.***	1	none	50%	75%	>95%	0.50	0.50
								Total:	**8.25**

Checklist Form F1
Domestic Excreta Disposal

Assessment for Public Health Infrastructure Facilities
International Humanitarian Assistance Missions

Location of assessment: ***Valley of Peace, Southeast Asia*** **Date:** ***1-Jan-10*** **Assessor:** ***PHS Engineer***

Classification: F1.1: **Single or shared family latrines**; F1.2: Domestic communal latrines; F1.3: Special/vulnerable groups

Item	Collected data	Key Indicators
1	***Village primarily uses single family pit latrines located nearby dwellings.*** ***Based on observation and indication from village representative, the majority of the dwellings have a single family pit latrine with limited use of VIP latrines. Construction primarily of wood superstructure and wood or concrete latrine slab. Several homes observed do not have a latrine and use open field defecation. Also, some homes with vulnerable groups (old and disabled) have latrines but do not have adequate design for access (ramps and handrails).*** ***Overall, existing family latrines are socially and culturally acceptable; typically use water for anal cleaning; latrines provide adequate privacy.*** ***Latrines are not near water source and adequate handwashing facilities by latrines. However, observed children only using water for hand washing and not using soap.*** ***Latrines at dwellings are vary from approximately 15-30 meters from the homes.***	Collect data for Quality (technical appropriateness, social/cultural acceptability, potential health hazard, sustainability); Quantity (number of facilities/activities, capacity, distance to facilities); and Usage (accessibility and O&M). **Facility type:** Open field defecation / Shallow family pit latrines Shallow trench latrines / VIP latrines Deep trench latrines / Pour-flush latrines Composting latrines / Over-hung latrines Storage tank latrines / Lagoons Chemical toilets / Sewerage system **Quantity/Quality:** Typical ratio of one space/cubicle to number of people Typical maximum walking distance (one way) to facility Describe status (life) of the system; e.g. are the latrines full Indication of who paid for private household facilities **Usage:** Approximate % of population has access Approximate % of population using facilities correctly on a regular basis

Item	Data	Analyzed data	A	Range 10	7	4	1	B	C
2	Technical appropriateness	***Overall, very appropriate for latrine size; shape of slab; and access. Some limitations for vulnerable populations at dwellings.***	3	inappropriate	technically basic	appropriate	very appropriate	0.25	0.75
	Notes: Keyhole size and shape in slab; foot rest position; minimum dimensions for inside latrine; superstructure provides necessary privacy and appropriate weather protection; drainage around facility; access path to facility; seasonal variation has minimum affect on access to facility; accessible and easy to use by all vulnerable groups (e.g. elderly and disabled); lit at night if necessary; and personal security for vulnerable groups (especially women)								
3	Social and cultural acceptability	***Latrines are culturally acceptable and provide sufficient privacy.***	1	very unacceptable	unacceptable	acceptable	very acceptable	0.25	0.25
	Notes: Religious and cultural factors; methods of anal cleaning; preferred defecation position; need for privacy; segregation of genders or different groups for whom it is culturally unacceptable to share a latrine; provision for the disposal of women's sanitary protection or privacy for washing and drying sanitary protection cloths; cultural taboos; and special arrangements for children								
4	Potential hazard to health	***Limited hazard as sufficient latrines at dwellings and not near water sources.***	2	major hazard	basic protection	minimal hazard	no hazard	0.25	0.50
	Notes: **Major hazard:** Open/indiscriminate defecation; no anal cleaning material; no handwashing near latrines; potential for water source pollution; no O&M of structures **Basic protection:** Controlled defecation in designated locations; some anal cleaning materials; some hand washing available; possible water source pollution; some O&M **Minimal hazard:** One space per 50 people and not more than 50m away; anal cleaning materials available; handwashing near facilities; no water source pollution; O&M **No hazard:** One space per 20 people and not more than 25m away; anal cleaning materials available; handwashing near facilities; no water source pollution; O&M								
5	Sustainability of facilities	***Sustainable facilities with overall good condition.***	1	no facilities or in severe condition/not functional	facilities 1-4 yrs old or in poor condition	facilities 5-9 yrs old or in moderate condition	facilities >10 yrs old or in good condition	0.25	0.25
6	Ratio of latrine spaces to population (or can be calculated per household)	***Generally, majority of dwellings have a family latrine.***	1	none	1/100 or immediate responses	1/50	1/20	0.50	0.50

7	Maximum one-way walking distance	***Generally, latrines are 15-30 meters from dwellings.***	2	>100 m	75 m	50 m	<25 m	0.50	1.00
8	% of population with access to appropriate facilities	***Overall, high % with access to latrines; however, some of population uses open defecation. Also, limited access to some vulnerable populations at dwellings.***	3	none	50%	75%	>95%	0.50	1.50
9	% of population using appropriate facilities correctly	***Overall, high % using facilities correctly; however some of population not using soap for handwashing.***	2	none	50%	75%	>95%	0.50	1.00
								Total:	**5.75**

Checklist Form F2
Public Places Excreta Disposal

Assessment for Public Health Infrastructure Facilities
International Humanitarian Assistance Missions

Location of assessment: ***Valley of Peace, Southeast Asia*** **Date:** ***1-Jan-10*** **Assessor:** ***PHS Engineer***

Classification: F2.1: **Medical centers**

Item	Collected data	Key Indicators
1	***Medical center uses a communal pit latrine located nearby the building.*** ***Based on observation at the medical center, the construction is a communal block pit latrine (not VIP); with two (2) units; wood superstructure; and concrete latrine slab. Medical center has numerous vulnerable groups (sick, elderly, disabled) and the existing latrines do not have adequate design for access (ramps and handrails). Vulnerable groups have great difficulty entering and using latrines. Latrines are not separated by gender.*** ***Overall, existing latrines are socially and culturally acceptable; typically use water for anal cleaning; latrines provide adequate privacy.*** ***Latrines are not near water source and adequate handwashing facilities by latrines. However, observed only limited hand washing using soap.*** ***Communal latrines is approximately 15 meters from the medical center.*** ***Medical staff estimate approximately 50 consultations per day at the center as it serves surrounding villages as well. Approximate equivalent to 1 space per 25 patients.***	Collect data for Quality (technical appropriateness, social/cultural acceptability, potential health hazard, sustainability); Quantity (number of facilities/activities, capacity, distance to facilities); and Usage (accessibility and O&M). **Facility type:** Open field defecation / Shallow family pit latrines Shallow trench latrines / VIP latrines Deep trench latrines / Pour-flush latrines Composting latrines / Over-hung latrines Storage tank latrines / Lagoons Chemical toilets / Sewerage system **Quantity/Quality:** Typical ratio of one space/cubicle to number of patients/beds Typical maximum walking distance (one way) to facility Describe status (life) of the system; e.g. are the latrines full Indication of who paid for community facility Indication of who manages/operates the facility and costs Location of public water taps or other water source to community facility **Usage:** Approximate % of population has access Approximate % of population using facilities correctly on a regular basis

Item	Data	Analyzed data	A	Range 10	7	4	1	B	C
2	Technical appropriateness	***Overall, latrine is basic and does not address vulnerable populations.***	7	inappropriate	technically basic	appropriate	very appropriate	0.25	1.75
	Notes: Keyhole size and shape in slab; foot rest position; minimum dimensions for inside latrine; superstructure provides necessary privacy and appropriate weather protection; drainage around facility; access path to facility; seasonal variation has minimum affect on access to facility; accessible and easy to use by all vulnerable groups (e.g. elderly and disabled); lit at night if necessary; and personal security for vulnerable groups (especially women)								
3	Social and cultural acceptability	***Overall, latrine is acceptable but does not provide for segregation by genders.***	4	very unacceptable	unacceptable	acceptable	very acceptable	0.25	1.00
	Notes: Religious and cultural factors; methods of anal cleaning; preferred defecation position; need for privacy; segregation of genders or different groups for whom it is culturally unacceptable to share a latrine; provision for the disposal of women's sanitary protection or privacy for washing and drying sanitary protection cloths; cultural taboos; and special arrangements for children								
4	Potential hazard to health	***Minimal hazard with 1 space per 25 patients and latrine is nearby medical center with handwashing facilities.***	2	major hazard	basic protection	minimal hazard	no hazard	0.25	0.50
	Notes: **Major hazard:** Open/indiscriminate defecation; no anal cleaning material; no handwashing near latrines; potential for water source pollution; no O&M of structures **Basic protection:** Controlled defecation in designated locations; some anal cleaning materials; some hand washing available; possible water source pollution; some O&M **Minimal hazard:** One space per 20 beds and not more than 50m away; anal cleaning materials available; handwashing near facilities; no water source pollution; O&M **No hazard:** One space per 10 people and not more than 25m away; anal cleaning materials available; handwashing near facilities; no water source pollution; O&M								
5	Sustainability of facilities	***Latrine is sustainable and in good overall condition.***	1	no facilities or in severe condition/not functional	facilities 1-4 yrs old or in poor condition	facilities 5-9 yrs old or in moderate condition	facilities >10 yrs old or in good condition	0.25	0.25

6	Ratio of latrine spaces to health center beds/patients	***Overall, acceptable ratio of 1 space per 25 patients.***	2	none	1/50 beds 1/100 outpatients	1/20 beds 1/50 outpatients	1/10 beds 1/20 outpatients	0.50	1.00
7	Maximum one-way walking distance	***Latrine is approximately 15 meters from medical center.***	1	>100 m	75 m	50 m	<25 m	0.50	0.50
8	% of population with access to appropriate facilities	***Overall, medium % of population with access; limited for vulnerable populations.***	7	none	50%	75%	>95%	0.50	3.50
9	% of population using appropriate facilities correctly	***Overall, high % of population using facilities correctly. However, limited handwashing.***	2	none	50%	75%	>95%	0.50	1.00
								Total:	**9.50**

Checklist Form F3
Public Places Excreta Disposal

Assessment for Public Health Infrastructure Facilities
International Humanitarian Assistance Missions

Location of assessment: ***Valley of Peace, Southeast Asia*** **Date:** ***1-Jan-10*** **Assessor:** ***PHS Engineer***

Classification: F3.1: **Schools**

Item	Collected data	Key Indicators
1	***School uses a communal pit latrine located nearby the building.*** ***School staff indicated that there are currently 300 children enrolled in the school with equal distribution of genders. Of these children there are approximately 40 children with disabilities.*** ***Based on observation at the school, the construction is a communal block pit latrine (not VIP); with three (3) units/spaces; wood superstructure; and wood latrine slab. Latrine is in poor condition with missing sections of the roof, walls, and boards on the slab. School staff reports that latrine is not used by all students (no privacy and unsound). Also, the students with disabilities do not have access to the latrines. Students typically either have to travel home for latrine or go in open fields nearby school. Latrines are not separated by gender.*** ***School staff reported that latrines are not socially and culturally acceptable because not segregated by gender. However, water for anal cleaning is available and some privacy.*** ***School has watering point and bucket for handwashing; however its not near latrines and observed only limited hand washing using soap.*** ***Communal latrines is approximately 40 meters from the school.*** ***Latrine has 3 spaces; approximate 1 space per 100 students. Not separated by gender or space for disabled students.***	Collect data for Quality (technical appropriateness, social/cultural acceptability, potential health hazard, sustainability); Quantity (number of facilities/activities, capacity, distance to facilities); and Usage (accessibility and O&M). **Facility type:** Open field defecation / Shallow family pit latrines Shallow trench latrines / VIP latrines Deep trench latrines / Pour-flush latrines Composting latrines / Over-hung latrines Storage tank latrines / Lagoons Chemical toilets / Sewerage system **Quantity/Quality:** Typical ratio of one space/cubicle to number of boy/girl students Typical maximum walking distance (one way) to facility Describe status (life) of the system; e.g. are the latrines full Indication of who paid for community facility Indication of who manages/operates the facility and costs Location of public water taps or other water source to community facility **Usage:** Approximate % of population has access Approximate % of population using facilities correctly on a regular basis

Item	Data	Collected data	A	Range 10	Range 7	Range 4	Range 1	B	C
2	Technical appropriateness	***Overall, latrine is basic. However, does not address disabled students.***	4	inappropriate	technically basic	appropriate	very appropriate	0.25	1.00
	Notes: Keyhole size and shape in slab; foot rest position; minimum dimensions for inside latrine; superstructure provides necessary privacy and appropriate weather protection; drainage around facility; access path to facility; seasonal variation has minimum affect on access to facility; accessible and easy to use by all vulnerable groups (e.g. elderly and disabled); lit at night if necessary; and personal security for vulnerable groups (especially women)								
3	Social and cultural acceptability	***Overall, latrine is acceptable but does not provide for segregation by genders.***	4	very unacceptable	unacceptable	acceptable	very acceptable	0.25	1.00
	Notes: Religious and cultural factors; methods of anal cleaning; preferred defecation position; need for privacy; segregation of genders or different groups for whom it is culturally unacceptable to share a latrine; provision for the disposal of women's sanitary protection or privacy for washing and drying sanitary protection cloths; cultural taboos; and special arrangements for children								
4	Potential hazard to health	***Basic protection. Insufficient spaces; not gender segregated; 40m near school; limited O&M; limited handwashing facilities.***	7	major hazard	basic protection	minimal hazard	no hazard	0.25	1.75
	Notes: **Major hazard:** Open/indiscriminate defecation; no anal cleaning material; no handwashing near latrines; potential for water source pollution; no O&M of structures **Basic protection:** Controlled defecation in designated locations; some anal cleaning materials; some hand washing available; possible water source pollution; some O&M **Minimal hazard:** One space per 30 girls/60 boys and not more than 50m away; anal cleaning materials available; handwashing near facilities; no water source pollution; O&M **No hazard:** One space per 15 girls/30 boys and not more than 25m away; anal cleaning materials available; handwashing near facilities; no water source pollution; O&M								
5	Sustainability of facilities	***Latrine is sustainable but only 5 years old and in moderate condition with limited maintenance.***	4	no facilities or in severe condition/not functional	facilities 1-4 yrs old or in poor condition	facilities 5-9 yrs old or in moderate condition	facilities >10 yrs old or in good condition	0.25	1.00

6	Ratio of latrine spaces to school pupils/students	***Overall, unacceptable ratio and no segregation for boys and girls.***	7	none	1/50 girls 1/100 boys	1/30 girls 1/60 boys	1/15 girls 1/30 boys	0.50	3.50
7	Maximum one-way walking distance	***Latrine is approximately 40 meters from school.***	3	>100 m	75 m	50 m	<25 m	0.50	1.50
8	% of population with access to appropriate facilities	***Overall, limited % of students with access to appropriate facilities.***	7	none	50%	75%	>95%	0.50	3.50
9	% of population using appropriate facilities correctly	***Overall, medium level % of students using facilities correctly; limited handwashing.***	5	none	50%	75%	>95%	0.50	2.50
								Total:	**15.75**

Checklist Form G1
Domestic Solid Waste Management - On-Site Pits

Assessment for Public Health Infrastructure Facilities
International Humanitarian Assistance Missions

Location of assessment: ***Valley of Peace, Southeast Asia*** **Date:** ***1-Jan-10*** **Assessor:** ***PHS Engineer***

Classification: G1.1: **Single or shared family/communal** G1.2: **School**

Item	Collected data	Key Indicators
1	***Observations of general solid waste scattered throughout village. Village representative indicated 3/4 of the homes have family pits for solid waste disposal and only a small communal pit is available for the others. School also uses communal pit.*** ***No observations of pollution of food or water sources. Medical waste from the medical center is not mixed with the general waste from the dwellings. Village representative indicated that limited number of vectors (rodents).*** ***Communal pit measures approximately 1.5 meters deep and 3.5 meters square (observed usable volume).*** ***Communal pit: an equivalent of 18.375m ^{3}/500 people (remaining 1/4 of population) or 6m ^{3}/163 people.*** ***Family pits: approximately 0.25m3 per family pit or an equivalent of 6m3/100 people.*** ***Family pits are nearby dwellings and communal pit is within 150 meters from homes without pits.***	Collect data for Quality (technical appropriateness, social/cultural acceptability, potential health hazard, sustainability); Quantity (number of facilities/activities, capacity, distance to facilities); and Usage (accessibility and O&M). **Facility type:** Open ground disposal — Single family bins Burning on open ground — Multiple family bins Single family pit Multiple family/communal pit **Quantity/Quality:** Typical ratio of one bin to number of people Typical maximum walking distance to pit Typical volume of pit per persons Describe any accumulation of wastes by household or community Describe any composting activities Describe how different types of waste are handled (e.g. which wastes are saved, burned, composting, use of plastics, or metal wastes) **Usage:** Approximate % of population has access to facilities Approximate % of population using facilities correctly on a regular basis

Item	Data	Analyzed data	A	Range 10	7	4	1	B	C
2	Technical appropriateness	***Overall, appropriate facilities with both family pits and communal pit.***	3	inappropriate	technically basic	appropriate	very appropriate	0.50	1.50

Notes:
Inappropriate: Open and indiscriminate dumping; no storage, collection, transport, and disposal facilities; no management
Technically basic: Solid waste disposed in designated areas which are cleared at least every two weeks; controls of open dumping
Appropriate: On-site disposal facilities in place or basic containers provided and emptied at least every one-two weeks; off-site disposal in designated areas; basic O&M
Very appropriate: On-site disposal facilities in place and well-designed solid waste containers emptied weekly; O&M
Criteria for storage: One bin (100 liters) to 100 people (short-term) and 50 people (long-term) for domestic solid waste

3	Potential hazard to health	***No observed or reported pollution of food or water sources. Medical waste is not mixed.***	2	major hazard	basic protection	minimal hazard	no hazard	0.50	1.00

Notes:
Major hazard: Pollution of food and water sources; high vector population close to dwellings; medical waste mixed with general waste; access uncontrolled
Basic protection: No pollution of food and water sources; some vectors; medical waste is separated from general waste; workers provided some tools and gloves
Minimal hazard: No pollution of food and water sources; medical waste is separated from general waste; access to disposal area by people and animals controlled
No hazard: No pollution of food and water sources; separation of wastes; access to disposal area controlled; no smoke or odor hazards; workers provided tools and gloves
Criteria for solid waste pits: Base 1.5m above wet seasonal water table and 30m from water source

4	Sustainability of facilities	***Family pits sustainable; many over 5 yrs old and in moderate condition. Communal pit has limited volume remaining.***	2	no facilities or in severe condition/not functional	facilities 1-4 yrs old or in poor condition	facilities 5-9 yrs old or in moderate condition	facilities >10 yrs old or in good condition	0.25	0.50
5	Ratio of pit volume to population	***Volume of commnal pit is under sized. Family pits appear to be sufficient.***	6	none	6m^3/200	6m^3/100	6m^3/50	0.25	1.50
6	Maximum one-way walking distance to family or communal pit	***Family pits nearby dwellings. However, communal pit is 150 meters from homes with no pits.***	3	>70 m family >250 m comm	45 m family 200 m comm	30 m family 150 m comm	15 m family 100 m comm	0.50	1.50

7	% of population with access to appropriate facilities	***Overall, approximately 75-80% of population has access to appropriate facilities.***	3	none	50%	75%	>95%	0.50	1.50
8	% of population using appropriate facilities correctly	***Overall, high % of population using facilities correctly.***	2	none	50%	75%	>95%	0.50	1.00
								Total:	**8.50**

Checklist Form G3
Medical Center Solid Waste Management

Assessment for Public Health Infrastructure Facilities
International Humanitarian Assistance Missions

Location of assessment: ***Valley of Peace, Southeast Asia*** **Date:** ***1-Jan-10*** **Assessor:** ***PHS Engineer***

Classification: G3.1: **Medical center with on-site pits** G3.2. **Medical center with on-site pits and incinerator**

Item	Collected data	Key Indicators
1	***Medical center uses an on-site pit and small incinerator.*** ***Based on observation at the medical center and information from medical staff, the waste at the medical center is separated in three separate containers for sharps, pathological, and general waste.*** ***The medical center has an on-site pit for general waste and a temporary incinerator made from an oil drum for all other waste. Ash is placed in same pit with general waste.*** ***Medical staff estimate approximately 50 consultations per day at the center as it serves surrounding villages as well.*** ***There are 2 sets of segregated containers for the 50 patients or an equivalent of 25 patients/set. Containers are less than 5 m away.*** ***Pit measures 1.5 meters deep and 2.5 meters square for a volume of 9.375m^3 or an equivalent of 9375 liters or 187 l/patient.*** ***Incinerator is an old oil drum and incinerated at low temperatures; waste is visible afterwards.*** ***Pit is 80m from nearest dwelling.*** ***Incinerator is 15m from nearest dwelling.***	Collect data for Quality (technical appropriateness, social/cultural acceptability, potential health hazard, sustainability); Quantity (number of facilities/activities, capacity, distance to facilities); and Usage (accessibility and O&M). **Facility type:** Open ground disposal — Sealed sharps pit Segregated containers (e.g. sharps) — Incinerator-permanent Use of disinfection — Pit for incinerator ash Open pit with no controlled access — Pit for pathological waste Incinerator-temp (e.g. oil drum) **Quantity/Quality:** Typical ratio of set of three segregated containers (sharps, pathological waste, general waste) per number of beds Typical walking distance to containers Original pit volume Capacity of incinerator Distance of pit and incinerator to nearest habitable building Describe any accumulation of wastes Describe any composting activities Describe how different types of waste are handled; e.g. which wastes are saved, burned, composting, use of plastics or metal wastes **Usage:** Approximate % of waste appropriately collected and sorted Approximate % of collected waste transported correctly Approximate % of collected waste disposed of correctly

Item	Data	Analyzed data	A	Range 10	7	4	1	B	C
2	Technical appropriateness	***Technically basic; waste segregated but burned at low temps and disposed of together.***	7	inappropriate	technically basic	appropriate	very appropriate	0.30	2.10

Notes:
Inappropriate: No segregated medical waste management; medical waste indiscriminately disposed of with domestic waste; no storage, collection, or disposal systems
Technically basic: Very basic medical waste management; medical waste and general waste segregated but all medical waste disposed of together; burned at low temps
Appropriate: Medical waste management in place; general waste and different types of medical waste segregated in different containers; incinerated waste and ash in pits
Very appropriate: Medical waste management in place; general waste and different types of medical waste segregated in different containers; incinerated and sealed pits
Criteria for storage: One bin (100 liters) to 100 people (short-term) and 50 people (long-term) for domestic solid waste

3	Potential hazard to health	***No observation of pollution of food or water sources. Separate containers. Pits above water table.***	4	major hazard	basic protection	minimal hazard	no hazard	0.30	1.20

Notes:
Major hazard: Pollution of food and water sources; high vector population close to dwellings; medical waste mixed with general waste; access uncontrolled; no disinfection
Basic protection: No pollution of food and water sources; some vectors; medical waste is separated from general waste; workers provided some tools and gloves; pits
Minimal hazard: No pollution of food and water sources; medical waste is separated from general waste in separate containers; incinerator; ash in deep pits
No hazard: No pollution of food and water sources; separation of medical wastes in separate containers; workers trained and provided w/equip; incinerator at correct temps
Criteria for medical waste pits: Base 1.5m above wet seasonal water table and 30m from water source

4	Sustainability of facilities	***Sustainable; good condition.***	1	no facilities or in severe condition/not functional	facilities 1-4 yrs old or in poor condition	facilities 5-9 yrs old or in moderate condition	facilities >10 yrs old or in good condition	0.30	0.30

5	No. of beds per set of segregated containers * *if no beds-2 outpatients equivalent to 1 bed	***At 25 patients per set (or 12.5 beds/set).***	1	none	40 beds/set	30 beds/set	20 beds/set	0.20	0.20
6	Average one-way walking distance to containers	***Walking distance to containers is approximately 10 m.***	4	>20 m	20 m	10 m	<5 m	0.20	0.80
7	Volume of transport for segregated waste	***Volume for transport is sufficient.***	2	none	insufficient	sufficient	ideal	0.20	0.40
8	Original pit volume per bed * *if no beds, 2 outpatients equivalent to 1 bed	***At a pit volume of 187 liters/patient (or an equivalent of 374 liters/bed).***	6	none	400 l/bed	800 l/bed	>1200 l/bed	0.15	0.90
9	Capacity of incinerator	***Capacity of incinerator is insufficient; burned at low temperatures and waste visible after burning.***	7	none or very insufficient	insufficient	sufficient	ideal	0.15	1.05

Notes:

None or very insufficient: No incinerator or not properly incinerated; waste clearly visible after attempted incineration; incinerator unable to cope with medical waste per day

Insufficient: Incinerated at low temperatures; some waste visible after attempted incineration, but most rendered inert; able to cope with medical waste per day

Sufficient: All general medical waste successfully incinerated each day to produce residual ash

Ideal: All generated medical waste successfully incinerated each day at 1,000-degrees C or above and a uniform fine ash is produced

Criteria for an ideal incinerator should be able to incinerate 10kg of waste/10,000 people per day at a minimum of 1,000-degrees C (temp will not be obtained in open pit)

10	Distance of incinerator from nearest habitable building	***Incinerator distance is 15m to nearest dwelling.***	4	0 m	5 m	15 m	>30 m	0.15	0.60
11	Distance of pit from nearest habitable building	***Pit distance is 80m to nearest dwelling.***	4	<25 m	50 m	75 m	>100 m	0.15	0.60
12	% of waste appropriately collected and sorted	***Overall, high % of waste collected and sorted.***	2	none	50%	75%	>95%	0.30	0.60
13	% of collected medical waste safely transported	***Overall, high % of waste safely transported.***	2	none	50%	75%	>95%	0.30	0.60
14	% of collected medical waste safely disposed	***Overall, low % of waste safely disposed; poor incineration and mixed waste in pit.***	7	none	50%	75%	>95%	0.30	2.10
							Total:		**11.45**

9 Appendix

9.1 References

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9.2 Personal Items Packing Checklist

Items	Items

Uniform
▪ ODU, two sets (see CC421.01 or .02 for composition of ODU)
  ○ Utility jacket
  ○ Foul weather parka
  ○ Trousers
  ○ Belt and buckle
  ○ Boots (black combat) and blank socks
  ○ T-shirt, blue PHS
  ○ Headgear: command cap, utility 8-point, watch cap (cold climates)
  ○ Rain poncho
 	
Clothing
▪ Civilian clothing: shirt and pants
▪ Underwear and socks
▪ Bathing suite (bathing)
▪ Flip-flops/sandals (bathing)
 	
Documents/finances
▪ PHS ID (CAC Card)
▪ Valid official passport with appropriate visas and extra photos
▪ Copy of immunization records
▪ Contacts (i.e. team leader)
▪ Travel itinerary
▪ U.S. currency and credit card (personal)
▪ Business cards
▪ Photocopies of all important documents including PHS ID and passport
 	
Equipment
▪ Cell phone and charger
▪ Flash light/extra batteries
▪ Swiss army knife/Leatherman
▪ Watch with stopwatch and alarm clock features
	Stationery
	▪ Small notebook
	▪ Pens and pencils
	▪ Highlighter
	▪ Permanent marker
	
	Toiletries
	▪ Towel
	▪ Soap w/plastic container
	▪ Shampoo
	▪ Hairbrush/comb
	▪ Shaving kit
	▪ Deodorant
	▪ Tooth brush/tooth paste
	▪ Dental floss
	▪ Nail clippers/scissors
	▪ Spare glasses/contact lenses/solution
	
	Personal first aid kit
	▪ Band aids
	▪ Mole skin (blisters)
	▪ Antiseptic cream
	▪ Pain relievers
	▪ Personnel medications
	
	Miscellaneous
	▪ Duffel bag
	▪ Backpack/carry-on bag
	▪ Water bottle/canteen and/or Camelback
	▪ Sleeping bag
	▪ Ear plugs
	▪ Emergency food (Snack Bars)
	▪ Insect repellant
	▪ Sun screen
	▪ Hand sanitizer
	▪ Sun glasses
	▪ Length of clothes line and clothes hangers
	▪ Laundry soap (powdered)
	▪ Laundry bag and pins
	▪ Zip-loc bags
	▪ Padlock
	▪ Shoe-shine kit
	▪ Sewing kit

9.3 Assessment Items Packing Checklist

Some of the assessment items may be provided by the mission sponsor. Check with the team leader prior to departure.

Items	Items
Personal protective equipment (PPE) ▪ Safety/work sunglasses ▪ Gloves ▪ Hearing protection – earplugs, disposable **References** ▪ *Conducting Initial Assessments for PHS Engineer Officers* and recommended primary companion references **Stationery** ▪ Field notebook ▪ Engineer/graph paper ▪ White paper for printing/copying ▪ Pens/pencils/markers ▪ Calculator (solar powered) ▪ Engineer's scale (English/metric units) ▪ Ruler (English/metric units) ▪ Aluminum case for paper/forms	**Equipment/other items** ▪ Flash light w/extra batteries ▪ Swiss army knife/Leatherman ▪ Tape measure (100 ft, fiberglass) ▪ Folding tape (6 ft) ▪ Compass ▪ Hand level ▪ Altimeter ▪ Handheld Global Positioning System (GPS) ▪ Chlorine residual test kit ▪ Test strips for pH/Nitrates/Chlorine ▪ Small plastic containers for water samples ▪ Maps of host nation **Electrical/electronic equipment** ▪ Digital camera w/extra batteries ▪ Laptop computer ▪ Electrical adaptors for equipment ▪ Thumb drive/data stick (1-2 GB) ▪ Compact disks (CD)

9.4 Force Health Protection – Preventive Measures

Preventive Measures	Preventive Measures

Insect exposure (mosquitoes, fleas, etc.)
▪ 30-40% DEET (apply in early morning and dusk hours)
▪ Permethrin treated uniforms
 	
Malarial prophylaxis
▪ Doxycycline
  ○ 1 tab daily, starting 2 d PTA
  ○ Continue until 1 month after leaving
  ○ Take with food and full glass of water
▪ Mefloquine 250mg weekly
 	
Sun/heat exposure
▪ Apply sun screen/wear sunglasses
▪ Drink water at regular intervals
▪ Adequately salt food
▪ Modify daily activities
 	
List adopted from the PP10 CONOPS.
	Parasite or infectious exposure
	▪ Hand washing with soap and water, use hand sanitizer if unavailable
	▪ Do not wade or swim in fresh water
	▪ Do not contact dogs or other animals
	▪ Always wear shoes or shower sandals
	▪ Eat only approved food sources (MRE)
	  ○ Avoid local dairy products
	  ○ If eating fish, test by chewing a small bite (dime-sized) slowly for 2-3 minutes. Stop eating if burning or numbness of tongue/lips
	▪ Drink only approved water sources (bottled water)
	▪ Avoid exposure to unsafe water sources
	  ○ Food washed in unsafe water (salads, uncooked vegetables and fruit)
	  ○ Ice – most manufactured ice is safe.
	  ○ Chipped ice from blocks within establishments is not safe.

9.5 Commonly Used Acronyms

International Humanitarian Response

FAO	Food and Agriculture Organization (UN)
ICRC	International Committee of the Red Cross
IDP	Internally Displaced Persons
NGO	Non-Governmental Organization
OFDA	Office of U.S. Foreign Disaster Assistance (USAID)
OHCHR	Office of the United Nations High Commissioner for Human Rights
UN	United Nations
UNDP	United Nations Development Program
UNHCR	United Nations High Commissioner for Refugees
UNICEF	United Nations International Children's Emergency Fund
UNOCHA	United Nations Office for the Coordination of Humanitarian Affairs
WASH	Water, Sanitation, and Hygiene (UNICEF sector strategies)
WFP	World Food Program (UN)
WHO	World Health Organization (UN)
USAID	U.S. Agency for International Development

PHS and U.S. Military

ADVON	Advanced Operations Unit
AH	Auxiliary Hospital (USN ship classification)
BMET	Biomedical Equipment Technician
CBMU	Construction Battalion Maintenance Unit – Seabees
CDC	Centers for Disease Control and Prevention
CMOC	Civil Military Operations Center
COMREL	Community Relations
CONOPS	Concept of Operations
DENCAP	Dental Civic Assistance Program
DOD	Department of Defense
EHO	Environmental Health Officer
ENCAP	Engineer Civic Assistance Program
EPA	U.S. Environmental Protection Agency
EPAC	Engineer Professional Advisory Committee
FDA	Food and Drug Administration
FDPMU	Forward Deployed Preventive Medicine Unit
HADR	Humanitarian Assistance and Disaster Relief
HCA	Humanitarian and Civic Assistance
HHS	Department of Health and Human Services
HLZ	Helicopter Landing Zone
HN	Host Nation
HQ	Headquarters
IHC	International Humanitarian Community
IHS	Indian Health Service
JAG	Judge Advocate General's Corps
LCAC	Landing Craft, Air-Cushioned (USN ship classification)
LCU	Landing Craft, Utility (USN ship classification)
LHA	Amphibious Assault Ships, Tarawa-class (USN ship classification)
LHD	Amphibious Assault Ships, Wasp-class (USN ship classification)
LZ	Landing Zone
MEDCAP	Medical Civic Assistance Program
NPS	National Park Service
REDDOG	Office of Force Readiness and Deployment

OIC	Officer-In-Charge
PAX	Passengers/Personnel
PDSS	Pre-Deployment Site Survey
PHS	U.S. Public Health Service
PM	Preventive Medicine
PN	Partner Nation
SITREP	Situation Report
SME	Subject Matter Experts
SMEE	Subject Matter Expert Exchange
T	USN classification of ships under the Military Sealift Command
USN	U.S. Navy
USNS	United States Navy Ship (USN non-commissioned/civilian manned ships)
USS	United States Ship (USN commissioned ships)
VETCAP	Veterinary Civic Assistance Program

9.6 Example CONOPS ENCAP and MEDCAP Projects

PACIFIC PARTNERSHIP 2010

Cambodia CONOPS

Annex C – Engineering Working Group Site Surveys

Mission Dates

15 June – 28 June 2010

UNCLASSIFIED

Water Well ENCAP 3

Ang Chum Primary School & Pagoda (KD1)

DESCRIPTION: Primary School Principal and Pagoda Monks have requested a water well, elevated water tank, solar pump and distribution system in order to provide potable water for students and Monks living at compound. The current water source at this site is a pond located to the rear of the classroom building.

LOCATION: Ang Chum Primary School/ Pagoda, Chveang Commune, Ponhea Leu District, Kandal Province, Cambodia (Lat/Long: N11°41'31.94" E104°47'16.90"), (MGRS 48PVT 76896, 92531)

POC: Mrs. Pichsavorn (Director), Cell# 011669899 or Mr. Y Kavin (Commune Chief), Cell# 012251042

GEO-RESTIVITY RESULTS: Good yield, 90m depth

PAX: 25 Seabees, Australian Engineers, 20 Cambodian Engineers

EST. PROJECT COST: $40,000.00 USD (Military) / $55,000.00 USD (Contracted)

EST. DURATION: 12 Days

SCOPE OF WORK: Construct/ drill one water well to estimated depth of 90m. Install prefabricated elevated water tower, 10,000 liter water tank, solar pumping system and distribution lines to the school restroom. Construct two each masonry hand washing stations and add an additional distribution point on perimeter masonry fence to serve local residents. *Additional tasking if time permits: Construct 4 stall restroom facility.

Water Well ENCAP 3

Ang Chum Primary School & Pagoda (KD1)

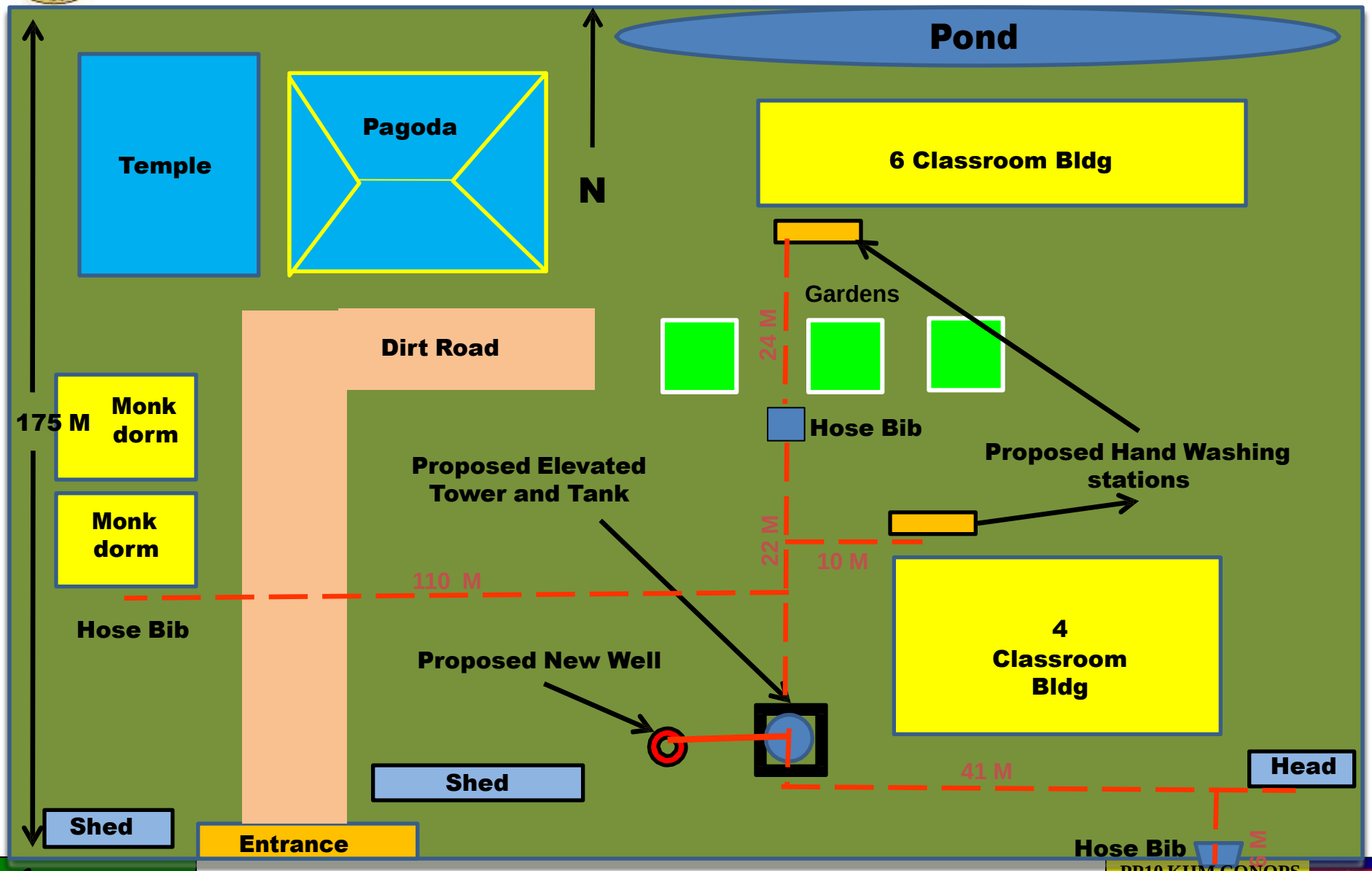
DEMOGRAPHICS & SITE CONSIDERATIONS::

- Rural School and Pagoda in farming/ fishing community, located in the outskirts of Phnom Penh on unpaved road 9km west of National Road #5.
- Serves 2 villages with population of 7,779 residents.
- 25 km northwest of Phnom Penh, (45 minutes) drive.
- 459 Students, 7 Teachers, 10 classrooms, Grades 1 thru 6.
- Ethnicity of students, 100% Cambodian
- No electricity available at site, car batteries used for lighting.
- Non-potable water available from pond on School grounds
- HLZ available, large field behind commune post on main road
- (Lat/Long: N11°40’35.41” E104°46’53.50”).
- Nearest Clinic, 4km away, Hospital, 25km away.
- Berthing available in Primary School building or guest house in Phnom Penh (25km).
- Summer Break, 31July- 01 September.
- Good cellular phone reception.
- Wet season Jun – Sep

ISSUES:

- Care must be taken not to damage existing structures
- Quality, sourcing and delivery of construction materials
- Contract support required
- Safety (heat exhaustion, heavy lifting, falling debris)
- Need to finalize commitment from RCAF to provide engineers
- Will require life support contract for messing and berthing.

Ang Chum Commune School & Pagoda



Recommendations

Plan for electric/solar pumps, elevated steel water towers, 10,000 liter water tanks and distribution systems for all water well sites

- Plan to procure solar system, water pumps, electrical and plumbing items locally in Cambodia
- Plan to procure well casing and associated specialty muds/aggregates stateside
- Plan to procure pre-fabricated steel water towers and 10,000 liter plastic water tanks locally in Cambodia

PACIFIC PARTNERSHIP 2010

Indonesia

Mission Dates
11 July – 31 July 2010

UNCLASSIFIED

Public Health CONOPS 11-30 Jul 2010

- Morotai
  - SMEE and Field Training
- Ternate
  - Ternate: 12 prevmed team members will fly to Ternate on 10 Jul from Jakarta and conduct;
  - SMEE Muhammidayah University
    - Basic epidemiology, biostatistics, water, sanitation, vector control, food safety classroom training (at MPH level)
  - SMEE at Ananda Hospital
    - Classroom training for public health technicians in water quality and analysis, sanitation, vector control, disease management, disease surveillance and food safety
  - Outreach for water, sanitation, vector control, parasitological lab management
    - at Gambesi Puskesmas
    - at Sio Village
    - at Kampulang Puskesmas
    - At Mare Island (Tidore district)
- Sofifi
  - Outreach at community center
  - Outreach Galala Clinic
- Ambon/Banda
  - SMEE and Field Training

Public Health CONOPS 18-25 Jul 2010

- Jailolo
  - SMEE Jailolo Hospital
    - Basic infection control, disease surveillance, water, sanitation, vector control, food safety classroom training (at public health staff level)
  - SMEE at Jailolo Hospital
    - Classroom training for public health field technicians in water quality and analysis, sanitation, vector and zoonotic disease control, disease management, disease surveillance and food safety
  - Outreach for water, sanitation, vector control, parasitological lab management
    - at Jailolo Puskesmas
    - at Northern site
    - at Southern site

NOTE: Public Health Team to provide MEDCAP FHP as needed

A Guide for U.S. Public Health Service Engineer Officers Conducting Assessments for Public Health Infrastructure and Capacity Building International Humanitarian Assistance Missions