2008

Standard Operating Procedures
For
Technical Survey Operations by LMAC

Version 1.0
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Director's Word

The Lebanese Mine Action Center (LMAC) was founded to address the impact that mines and unexploded ordnance have on people and their livelihoods. For that purpose, a General Survey was finalized in 2004, covering the entire nation, in order to help establish the impact that mines and unexploded ordnance have on affected communities. The hard work continues, as we move forward into the Technical Survey plan and execution phase of the national strategy.

The Standard Operating Procedures (SOP), the Official Reference for Technical Survey (TS) operations, help the staff of the Lebanon Mine Action Center (LMAC) and LAF Engineering Regiment understand the strategic direction and technical procedures to follow during the survey.

Furthermore, the Lebanese Technical Survey project is the next step in the evolution of making Lebanon mine free, where it aims to accurately define the boundaries of minefields, provide fencing and marking to protect local communities, produce detailed plans for mine clearance operations, and provide technical requirements for each demining site.

The Technical Survey is an important part of the clearance process, since it provides the information required for safe, effective and efficient clearance.

To conclude, we are grateful for the support provided by the International Community and donors who continue to help fund this valuable work, and we thank all assistance given by Lebanese people throughout the country whose support ensures the TS leads to a safer homeland for all.

Brigadier General Mohamad Fehmi

Lebanon Mine Action Center Director

List Of Definitions

UNDP	United Nations Development Program
GICHD	Geneva International Center for Humanitarian Demining
LMAC	Lebanon Mine Action Center
LAF- ER	Lebanese Armed Forces- Engineering Regiment
GIS	Geographical Information System
GPS	Global Positioning System
DSS	Decision Support System
DDX	Data Dictionary
TOR	Terms of Reference
IMSMA	Information Management System for Mine Action
SQL	Structured Query Language
DB	Data Base
PR	Public Relations
MRE	Mine Risk Education
MVA	Mine Victim Assistance
OPS	Operations
MDD	Mine Detection Dog
QA	Quality Assurance
Contaminated	An area known to contain Explosive Remnants of War (ERW)
IS	Impact Survey
TS	Technical Survey
ERW	Explosive Remnants of War
SOP	Standard Operating Procedures
DV	Data Verification
Cadastre	Parcels of land that match the administration of Land Management parcels
POC	Point Of Contact
PM	Project Manager
XO	Executive Officer
TL	Team Leader
AR	Area Reduction
DA	Dangerous Area

MA	Mine Area
MF	Mine Field
P Rep	Progress Report
QR	(IMSMA) Quarterly Reports
CR	Completion Report
RF	Range Finder

Amendements

1. Amendments to this document can be published whenever required with their related records (Date, Author, Amendement)
2. Comments and suggestions about this publication should be addressed to: LMAC Information Technology Section

Contents

1 INTRODUCTION

1.1 Background

The gathering of detailed technical and topographical information of known, or suspected hazardous areas, is conducted through a process known as Technical Survey. Such areas, was previously identified during the general mine action assessment or Landmine Impact Survey (LIS). The primary aim, of a Technical Survey, is to collect sufficient information to enable the clearance requirement to be better accurately defined, by: defining the area(s) to be cleared, the depth of clearance, local soil conditions, and the vegetation characteristics.

The information obtained from the Technical Survey will be summarized in Clearance Plans, which will be used as the technical specification for the planning and management of a subsequent clearance task. The output of a Technical Survey will also include perimeter marking of the defined area, to reduce the risk of unintentional entry into the hazardous area, and it will produce data for any ongoing mine risk education program. If clearance does not immediately follow the Technical Survey, then survey markers will be left securely in place. Such markers will enable the hazardous area to be located accurately and safely at later.

Definition by IMAS

Technical survey is the detailed topographical and technical investigation of known or suspected mined areas identified during the planning phase. Such areas may have been identified during general surveys or have been otherwise reported. The primary aim of a technical survey is to collect sufficient information to enable the clearance requirement to be more closely defined, including the area(s) to be cleared, the depth of clearance, the local soil characteristics, and other topographical and technical information. The technical survey may also involve area reduction; the process through which the initial area indicated as contaminated (during the general survey) is reduced to a smaller area as a consequence of collecting more reliable information on the extent of the hazard area.

Sometimes, the technical survey will represent just the first phase of a clearance project, and a detailed technical understanding of the mine and UXO threat will develop as clearance progresses. This will often be the case during early humanitarian interventions, such as the rapid survey and clearance of routes needed to deliver humanitarian aid or to assist the movement of refugees and internally displaced persons (IDP's). Guidance on the requirements of technical surveys is given in IMAS 08.20.

1.2 Scope of challenges

Knowing the challenges, that will affect the Technical Survey procedures, will help everyone to understand the need to be flexible in planning and operations. There are limiting factors that can be overcome; such as the following:

1.2.1 Nuisance Mining: Non-Availability of Minefield Records:

One of the main problems of humanitarian mine clearance is the non-availability of proper records of mined areas. Mines may were laid by various sources including regular army, militia, rebel forces etc. Most of the forces that laid mines have kept no or very poor records. What happened, is, that many fights took place over several period of times and have remained under control of various groups who have laid their own mines beside the mines already laid by others.

1.2.2 Presence of Metal Fragments:

Mines have been usually used in areas where heavy fighting has taken place. As a result, millions of metal fragments have been littered all over these areas. The presence of metal fragments considerably hampers the mine clearance operations making it extremely slow and time consuming. Each piece of metal has to be treated as a mine. Besides slowing the operations, deminers lose interest and concentration due to frustration of continuously digging up metal fragments. This sometimes results in mine accidents among the deminers. about 450 metal fragments are detected and investigated for each mine found.

1.2.3 Hard, Rocky and Bushy Ground:

The ground surface in some areas, especially roads, where mines have been laid many years ago, is often very hard. Prodding for mines in such areas is very dangerous. If excessive force is applied, the chance of initiating a mine becomes very high, especially in anti personnel minefields. Rocky and bushy ground also makes the task of demining slow and dangerous.

1.2.4 Mine Free vs. Free From the Effects

There has to be a balance among the time spent on demining areas, the amount of impact being reduced and the amount of funds available to carry out the task. At the strategic level, there are two outcomes that could be sought. These two options are:

- ***Mine Free***: This implies that all mines in the entire country are to be removed from the land, and, therefore all possible risk related to mine and UXO contamination is to be removed as well. While, such an idealistic end state might not be desirable, a more realistic assessment indicates that it is not achievable, nor would pursuing it to this end, could be a good use of limited resources. The laws of diminishing returns, limitations on available donor resources and simple cost-benefit analysis, all, highlight that a mine free state is practically unobtainable. The cost of removing the last mine in a country would be considered prohibitively high and offers very little (if any) benefit as compared to the other possible uses for the same amount of money.
- ***Free from the Effects of Mines***: During the planning process, consideration should be given to adopt a risk management approach focusing on controlling or mitigating the worst impacts of mines in order to make a country "free from their effects." This approach may result in the occasional unfortunate accident; however, accidents will be rare, economic impacts will be negligible and the people will have learned to live with the residual level of contamination. The effects of mines and UXO can be reduced to a tolerable level through clearance of the most dangerous areas followed by a continual capacity to conduct limited clearance and/or Explosive Ordnance Disposal (EOD) tasks; Mine Risk Education (MRE) and the maintenance of a marking system.

It is clearly beneficial to adopt the second option, when planning clearance operations, and, address high-impact areas first, and, then proceed to address those areas more moderately impacted. Hazardous areas, having impact on communities should be planned by priority, and the solution selected to decrease the impact, should be applicable to provide the greatest relief in the shortest time or in the most cost-effective manner.

2 TECHNICAL SURVEY

2.1 General

2.1.1 Scope of Work

The main objectives of the TS are:

- Clearly define the scope of the mine/ ERW problem
- Reduce contaminated area to the actual hazard
- Define contaminated area perimeters
- Mark & fence all suspected areas
- Develop clearance requirements & plans for each contaminated area.
- Update IMSMA data base with accurate information

The Technical Survey is the primary source of planning information for mine and ERW clearance operations and usually involves gathering specific information, entering the contaminated area, area reduction, mapping, marking, and fencing the contaminated area. In doing so, the survey process will Provide:

- Essential information for regional and local planning.
- Information to assist in defining training requirements.
- Planning information for subsequent area reduction, clearance and marking operations.
- The basis for scheduling clearance assets in order to reduce the time.
- Expedite clearance activities through the provision of accurate and in-time information on the particular site.

2.1.2 Presence of Mines and ERW

Should the presence of mines or multiple ERW, be found, the Data Verification Team would carry out the following:

- Provide definition of the area in terms of its size, described through bearings and distance. Area measurements have to be accurate and describe the perimeters of the contaminated area.
- Suggest the depth to which clearance should be conducted. This suggestion does not replace the requirement to clear to a depth determined by the future intended use of the land; it is rather a suggestion based upon actual information collected in the hazardous area.
- Determine resources required for carrying out clearance activities per identified area and calculate estimated time for manual teams, mechanical teams, mine detection dog teams and EOD teams as appropriate.
- In addition to the information mentioned above, a detailed site sketch must also be prepared, as this will be provided to the clearance organization that will eventually carry out the task. The following information should be noted on the sketch of the area:

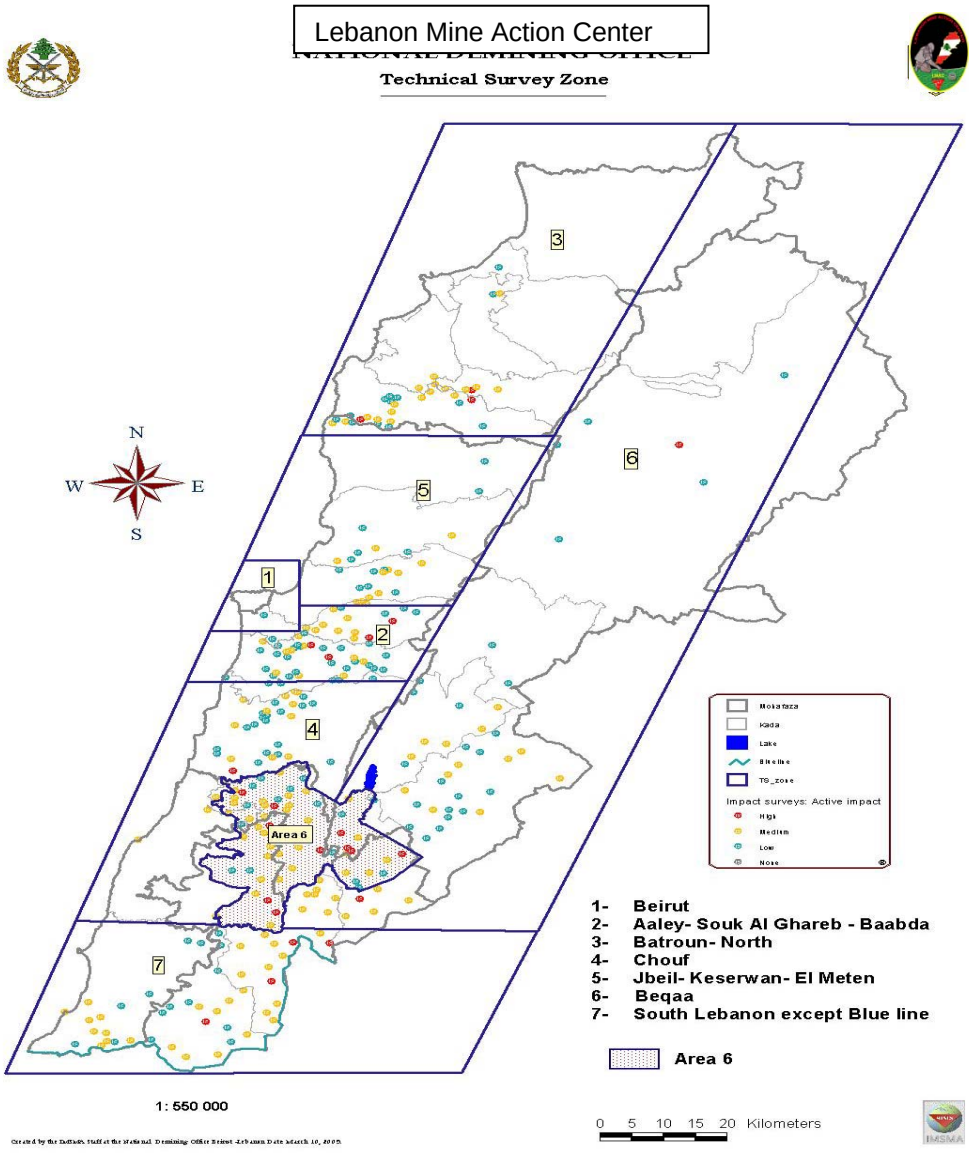
- Exploratory lanes and safe access routes as applicable.
- Benchmarks and turning points as applicable.
- Distances and bearings from the benchmarks and turning points.
- Location(s) of visible mines/ ERW and the pattern of mines (if known).
- Location(s) of any mine, ERW or other devices destroyed during survey.
- Location(s) of any accidents in or around the contaminated area.
- Natural prominent features such as hill contours, creeks, bushy areas, etc., and other prominent man-made features within the hazardous area (houses, tombs, fortifications, canals, roads, hills, rivers, etc.).

In order to collect the required information, it will be necessary to enter hazardous areas by breaching exploratory lanes into the suspect area. Once the information has been collected and documented, it should be returned to the Technical Survey Operations Room (TSOR) to be recorded in the IMSMA database. This will assist in the preparation of the annual program and the tasking orders that will be provided to clearance organizations. These tasking orders will describe in detail what the clearance requirements are (area and depth), which kind of resources and how many of them are best to use, and how long they are expected to work on the task in order to address the impact that was defined during the Technical Survey process.

2.2 Priorities

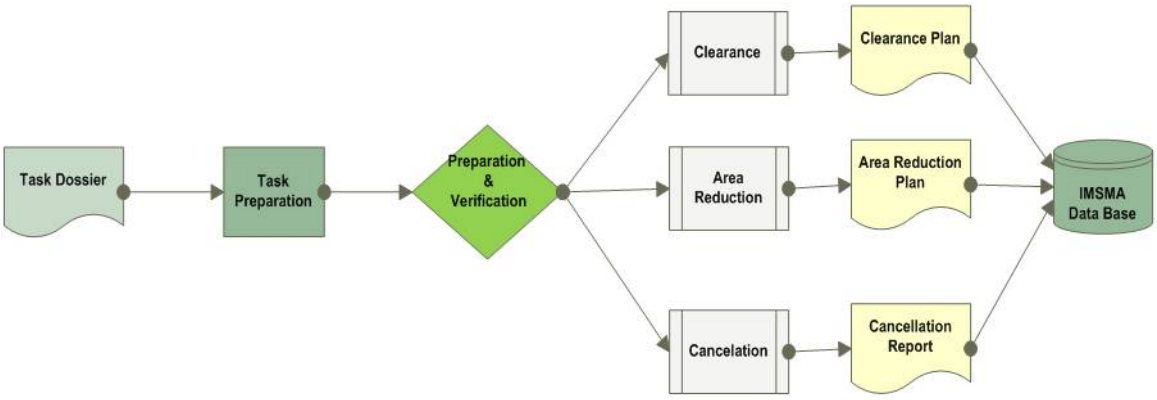
After impacted communities have been ranked by priority, and, a selection has been made, the Technical Survey will carry out to collect sufficient information to enable the clearance requirement to be more accurately defined.

The following map illustrates the priorities by region as established by the Director of the Lebanon Mine Action Center:



2.3 Sequence of Events for the Technical Survey

The following flowchart presents a general description of the sequence of events within the Technical Survey carried out in Lebanon.



Flowchart for Sequence of Events

1. **Task dossier:** Issued by IMSMA Section to field teams based on prioritization (cadastres)
2. **Task Preparation:** Preparation for field deployment (Maps, analyzing task, resources …)
3. **Site preparation and verification:** clearance, area reduction or cancellation
   Verification – check of benchmark – check of perimeters – if necessary record new or old perimeter as shape file, fill out all relevant data entry forms
   a. Clearance – Prepare clearance Plan: Photo, shape file of areas to be reduced and type of reduction – e.g. MDD, Manual, Mechanical
   b. Area Reduction- prepare area-reduction plan – Photo, shape file of areas to be reduced and type of reduction – e.g. MDD, Manual, Mechanical
   c. Cancellation: Photo, shape file and Ca.Report
4. **IMSMA DB:** Reporting from the field – return of the task dossier to XO for review and submission to IMSMA Section.

3 DATA VERIFICATION TEAM (DVT) GUIDELINES

The following guidelines are intended for use by the DVT and describe the day to day operations of tasks and planning that influence their decision making. In addition, they are the minimum acceptable standards to be applied for TS in Lebanon

To summarize the sequence of operations for the DVT, we have divided the procedures into the following three phases:

1. **Pre-Visit**
   - Tasking
   - Task Analysis

2. **Site-Visit**
   - Interview
   - Data Collection

3. **Post-Visit**
   - Consideration of site facts
   - Implement 1 of 5 possible recommendations
   - Develop Plan or Report for recommendation
   - Follow up on recommendation/plan (as needed)

3.1 Pre-Visit

3.1.1 Tasking

Each DV Team will be assigned a cadastre to survey. The Team Leader will receive the Cadastre Task Dossier from the LMAC IMSMA section.

The following procedures will be executed, when the DVT receives the Task from the XO.

3.1.2 Task Analysis

After receiving the Cadastre Task Dossier form the IMSMA section, The DVT Team will confirm to the XO the dossier receipt.

Before going to the field, the DVT Team Leader will analyze and develop a plan of action to survey the assigned Cadastre.

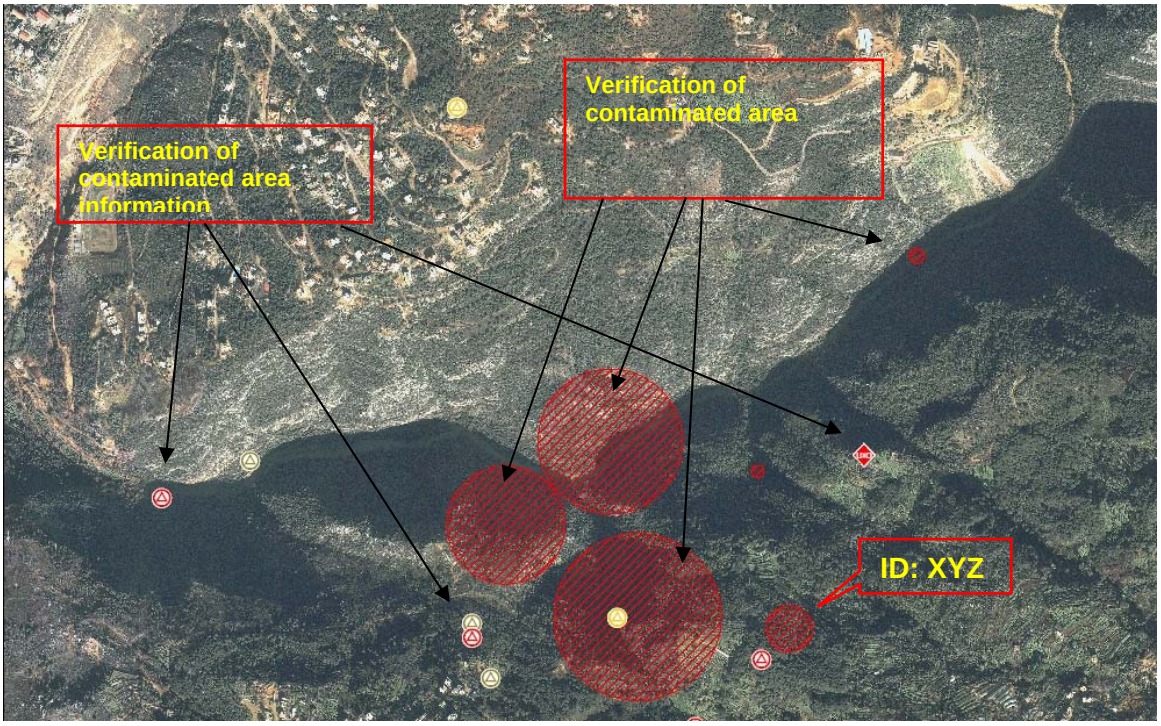
The preparation should include:

- Analyzing the task (Task Dossier). Is all information available to execute the task?
- Map and task analysis
    - The dossier will consist of reports for all MF, DA, and MA in the cadastre where the team will be working:
        - DA Reports for all DA within the Cadastre.
        - MA Reports for all MA within the Cadastre.
        - MF Reports for all MF within the Cadastre.
    - Maps are to include Satellite Images, shape Files, etc…
- The Team Leader must study all available information carefully. He should take notes about these files and develop a schedule to conduct his work in that cadastre
    - If there are DAs, MAs, or MFs bordering the tasked cadastre or overlapping between two or more cadastres at the same time; the IMSMA section will include the additional reports in the cadastre dossier. This will be by coordinating the reference points of overlapping cadastres.
- What are the priorities within the task and what is the status of the task sites?
- Preparing contact information:
    - Make appointment to interview Engineer Regiment Points of Contact (POC)
    - Make appointments to interview local POC
- Team preparation: Brief team members on assigned cadastre.

  Who is doing what, where and when?

Example:

The following Map shows a possible situation to analyze. The map accompanying the task documents will include an overview of the tasked area.



Objects are labeled with an ID number and other information available in the attribute table. The ID will help to identify the corresponding detailed reports on the object (MF, MA, DA). Upon request detailed maps can be printed.

The main information is printed out and added to the task dossier. However, all the detailed report information, as well as any related information can be viewed, as a read only version, and, can be printed by the Team Leader.

1- Visit the Information Technology (IT) section at the Engineer Regiment (ER) and search all relevant documents/reports regarding each contaminated area pertinent to the task. .
2- Collect data from the operations file of the ER Demining Company that worked in the area.
3- If the ER previously worked on MF's, contact the officers who conducted the work/demining. Additionally, try to visit the area with them as part of the site visit.
4- Call the officers or the individuals identified in the DA and MA reports. Make appointments with them to visit the areas.
5- Call the Mayor and make an appointment with him. He can help by providing contact information of the necessary people and/or ex-militia members that could provide valuable information.

3.2 Site-Visit

The following outlines the activities that should take place for a successful site visit:

Meet with POC (Mukhtar, landowner, ER Rep, MRE Rep, etc..)
The meeting location should be easily found and in a safe location.
Questions for the POC;

- Name
- Telephone Number
- Village of residence
- POC relationship to the suspect site (ie, ex-militia member, landowner, etc…)

3.2.1 Interview the POC:

- Use Satellite images to find current location.
- Ask the POC for the following information:
  - Perimeters of suspect area
  - Location of known devices
  - Location of accidents
  - Type of mines (i.e., AT, AP, Booby-trap)
  - Is there a confrontation line, and where is it?
  - Use picture book to verify type of mine.
  - Who placed mines (i.e., LAF, Militia, Israeli, etc…)
  - Number of mines
  - Placement of mines "pattern vs scattered"
  - What is the future use of the area?
  - Any additional information

Travel to the suspect site via safe routes:
Safe routes are roads/areas that are paved or used regularly.

"Under no circumstances are Team members to enter a minefield."

"DO NOT use foot paths that cross minefields. Always stay outside the perimeters of the suspect area."

1- Go to a "Safe Vantage Point" that overlooks entire area (for example a tall building or adjacent hilltop…)
2- While at the Vantage Point the DV, Team will review the information the POC provided.

3- If NO Vantage Point is available the DV Team will need to make a "Detailed Sketch of area" instead of using "Vantage Point Photographs"

Vantage Point Activities

- Interview POC again
- Take Photos of the entire suspected site.
- Take zoomed photos of accident sites or known device locations
- Take photos of site access routes and prominent structures
- Take photos and notes of benchmarks, starting points, and turning points

NO Vantage Point:

- The DV Team must always travel the entire perimeter of the suspect area via safe routes only.
- Take notes and photos of benchmarks, starting points, and turning points.
- Take photos and notes of access routes and prominent structures.
- Draw a detailed sketch of the area. The sketch should include the following:
    - Benchmarks, starting points, turning points
    - Distance and bearing between points
    - Access routes and prominent structures.
        - Access routes include roads and footpaths within the area.
    - Vegetation type and density
    - Fences and walls

3.3 Post-Visit

The Post-Visit consists of the recommendation and planning phase of the DV Team responsibilities. Upon completion of the steps in the Pre-visit and Site-Visit, the DV Team will formulate a recommendation and develop a plan for the contaminated area. The process for recommendation and plan development will be as follows:

- Consider all site facts
- Implement 1 of 5 possible recommendations
- Develop Plan or Report for recommendation
- Follow up on recommendation (as needed)

3.3.1 Consider Site Facts

After careful analysis, the DV Team will make its recommendation taking the following key factors into consideration:

1. Is the Minefield “Scattered or pattern?”
2. Is the local population using the area?
3. Have accidents occurred in the area?
4. Can mines be seen on the surface?
5. Is the contaminated area in a densely populated area?
6. What is the future use of the contaminated area?

The DV Team will make one of five recommendations for a suspect contaminated area:

1. Cancellation
2. Area Reduction Plan
3. Clearance Plan
4. Duplicated Sites
5. Skip Site

3.3.2 Implement 1 of 5 Recommendations

The following outlines "differences and restrictions" of the 5 recommendations. Before making a recommendation, the DV Team shall carefully consider the following:

1. CANCELLATION

Cancelling a contaminated area should take place when the site/area is safe for use by the local population. Sometimes a landowner or municipality will construct/develop/cultivate an area on a previously reported contaminated area. If the local population is using the site and there is no doubt that the area is safe, the task should be cancelled.

2. DUPLICATED SITE

Due to overlapping information and for the sake of practicality, sometimes it will be necessary to cancel one or more sites in order to generate one site. . The following condition will necessitate the duplication of 2 or more sites together:

- More than one report/IMSMA ID for the same area or site.

Should the need arise to duplicate sites, the Team Leader will have to unite the sites into one report. The Team Leader will take the IMSMA ID for the primary site, that, will be considered as the master site. All of the pertinent information will be combined into one report. In Addition, the Team Leader will submit cancellation reports for the unused IMSMA ID reports, and document on the cancellation report that the site was duplicated into another one.

3. SKIPPING

A site can be skipped when the LAF Engineer Regiment is actively clearing the site or the site is finished.

4. AREA REDUCTION

Area Reduction (AR) is necessary when land is suspected of having mines or UXO contamination, and no detailed maps/information or fencing is available to show the location of the hazard.. AR is utilized to determine the exact location of a contaminated area and its borders/perimeters. AR may involve the use of integrated clearance assets (mechanical, MDD, manual), and procedures such as clearance.

5. CLEARANCE

Clearance of a contaminated area is carried out when we know its exact borders. The entire area is to be cleared and it has to be marked and fenced. To carry out a Technical Survey for a MF and to clear all the area we need the same steps as AR. The Clearance plan has to contain the same aspects as well as the following additional aspects:

- During Clearance the entire area (100%),is cleared, and, not only part of it.

- We are sure that the area is contaminated.
- We have to use more than one asset, where the primary one shall always be manual.
- The contaminated area must be marked and fenced, if this has not yet been done.
- The Clearance Plan must include Reference point, Benchmarks, Starting-Point, Turning Points, etc.
- Timeline for each asset (also for AR plan)

<u>Differences between AR and Clearance Operations</u>

- *AR uses only one clearance asset, which is primarily manual. But where ground permits mechanical and MDD can be used to assist. Clearance operations require a minimum of 2 different assets to be used on the same MF.*
- ***AR** plans **do not normally involve clearing the entire suspected** area. Cut lanes are cleared through the suspect area to find mine lanes, perimeters, mine locations, or ERW locations.*
- ***Clearance** operations, **require that 100% of the area should be cleared**.. In some instances (i.e. scattered minefields), it may be necessary to demine a site 100% by Area Reduction. If an item is found, a 10mx10m box will be cleared by 2 assets to determine if there is further contamination.*

If a DV Team Leader determines that an AR plan or clearance plan is required, the following information must be gathered and planned:

- *Which and how many clearance assets will be used?*
- *How much time will be required for the clearance assets to accomplish the task?*
- *What are the size/perimeters that need the AR? Additionally, how many cut lines are needed to thoroughly investigate the site?*
- *How many teams are required? i.e. 2 men manual teams, etc…*
- *What are the known or suspected hazards? i.e. AP mines, AT mine, booby-trap, number of mines, locations of mines, location of accidents, etc…*
- *What is the working rate of each clearance asset?*

3.3.3 Develop Plan or Report for Recommendation:

3.3.3.1 Cancellation Report

(Refer to example attached)

The following determinations/actions must take place to CANCEL a site:

- Determine perimeters and make shape files (perimeter with PDA and the size)
- Interview all the POC's and confirm their data. Plus, visit the area with them and confirm the area being cancelled.
- Fill in a cancellation report with all the data and have at least 2 people sign on this report (chief of the municipality, AL-MOKHTAR, the land owner, etc.) in Addition, the TL and XO must sign the cancellation report.
- Take digital photos of the area.
- The cancellation report must contain:
    - IMSMA Id and the army ID for the site.
    - The location of the area (cadastre and municipality) and the number of the estate (Plot number)
    - The UTM coordinates of the area
    - Date of the visit/s.
    - Reasons for cancellation.
    - The remarks and signatures of necessary people.
    - The signature of the TL, XO, Project Manager.

3.3.3.2 Area Reduction Plan

Should the DV Team recommend the site for Area Reduction they must develop a plan that includes the following:

1. **Team composition**
2. **Date**
3. **Description of Area**
4. **Description of Hazards**

5. Recommend Sampling Asset

a. Manual Clearance

Estimated production rate is 5 m^2 per day per team. A team consists of 2 deminers rotating at 30 minute intervals

This type of clearance utilizes a trained individual who uses a Metal Detector and demine to detect/dispose of mines. This method is very slow, but has the least limitations. Most limitations can be overcome with improvisation. However, when planning manual demining the DV Team must remember that deminers can only check out level ground or in an upward slope terrain.

b. <u>Mechanical Ground Preparation</u>

Estimated production rate is 1000 m^2 per day per machine. Mechanical means is the fastest method of preparing an area. The following are factors influencing the performance of mechanical means:

Armtrac 100 • Flail • Milling Drum	**Armtrac 75** • Flail • Milling Drum • Roller	**Mine Cat** • Flail
Bull Dozer • Blade UP • Blade Down	**360 Excavator** • Bucket • Strimmer • Hammer	**Mine roller**

1. *<u>Terrain:</u>*

   - Mud or standing water
   - Densely wooded area with trees exceeding 5 cm in width
   - Cable network or high voltage cables.
   - Steep slopes (More than 45^0 degree angle)
   - Terrain densely covered with large rocks or debris, which could damage the machine.

2. *<u>Maneuverability:</u>*

   The machines all have a unique turning radius and different widths. The following table outlines the turning radius in meters and width of vehicle.

Armtrac 100 TR = 5m Width = 2.5m	**Armtrac 75** TR = 2m Width = 1.5m	**Mine Cat** TR = Pinpoint Width = 1.5m
Bull Dozer TR = Pinpoint Width = 2.5m	**360 Excavator** TR = Pinpoint Width = 3m	**Mine Roller** TR = Pinpoint Width = 2.5m

3. *Safety Distances:*

When utilizing the Flail; there is a 250m safety distance in front of the machine. This safety distance is due to debris/chain links being thrown forward of the machine. All other attachments have the standard safety distance of 25m to 50m.

4. *AP Minefields only:*

Mechanical equipment is intended to assist in the clearance of anti-personnel minefields. The machines are designed to withstand the effects of an Anti-Tank mine, however the effects of AT mines does cause damage to the machine. If a minefield is suspected of containing AT mines, machines will not be used.

5. *Transportation Requirements*

It will normally take one working day to relocate equipment from one site to another.

c. Mine Detection Dog (MDD)

Estimated production rate is 500 m² per day per team. A team consists of 2 dogs. MDD Clearance is a fast method of clearance;. However, the following limitations must be considered when employing them:

1. Weather:

- Working temperature must be between 10 and 32 degrees Celsius
- Must work from crosswind direction
- Must wait 24hrs after a heavy rain
- Cannot work in snow or ice
- Wind must not exceed 11km per hour

2. Terrain:

- **CANNOT** be used in high density minefields
- **MUST** wait 5 days after an area has been burnt
- Vegetation cannot be too tall or it will irritate the dogs nose.
- Cannot be used on steep slopes
- Normal effective sensing depth is 20cm

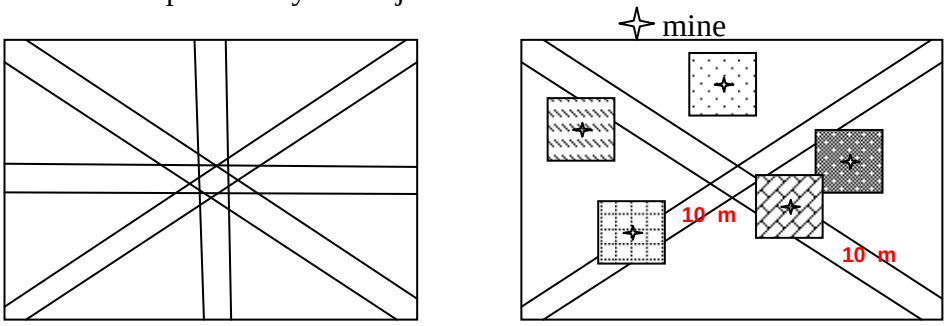
6. **Working rates for Recommended Sampling Assets/Methods**
Estimated production rate for the AR assets/methods are for:

- ***Manual Clearance***: 5m^2 per day per team (2 men)
- ***Mechanical Ground Preparation***: 1000 m^2 per day per machine
- **Mine Detection Dog (MDD):** 500 m² per day per team (2 dogs)

7. **Photos**
DV Teams will use photos to show the overall site, benchmarks, starting points, turning points, and prominent structures. If photos are to be used instead of a detailed sketch the DV Team must sketch/draw on the photo the detailed information of benchmarks, starting points, and turning points. Additionally, the DV Team should sketch on the photo the planned cut lines, and/or boxes.

8. **Detailed Sketches**
A detailed sketch must be drawn, if the DV Team is unable to take a photo of the overall site. Satellite imagery cannot be used in place of ground photos. Satellite images are normally 2 to 3 years old and do not accurately reflect the detail on the ground.

9. **Area reduction Methodology**
Area reduction (AR) is necessary when land is suspected to contain mines or UXO with the absence of any confirmation and indications of their existence or any detailed maps or fencing to show their exact location.
AR involves these methods:
1. MDD's and Mechanical Means: two assets used, at the same time, for the entire area.
2. If one, of above point, is not possible, then a manual asset (union jack) combined with a sampling process is used as follows:
   - proceed by union jack method



At any mine or indication is found by method 1 or 2 , then a 10m × 10 m box (Centered on the mine) is demined (clearance process) to determine if there is further contamination.

3.3.3.3 Clearance Plan

Should the DV Team recommend the site for Clearance they must develop a plan that includes the same information as an Area Reduction Plan with the following additions:

- The DV Team must plan for two different demining assets.
- The MF must be marked and fenced.
- The plan must include where, how many, and what type of mines are suspected (the MF perimeters must be known)
- In addition, a detailed sketch shall be attached to the file, with a shape file on the PDA

3.3.4 Follow up on recommendation:

AR and Clearance Teams are required to contact the DV Team when they start work on the MF. This contact is required so that DV Teams can track the effectiveness of their plans. It is paramount that the DV Teams have effective planning and follow-up, and feedback from the AR and Clearance Teams is the best method. DV Teams should periodically visit the AR and Clearance operations to see if their plans where changed or the timelines for production are accurate.

4 EQUIPMENT FOR DVT

Equipment	Quantity
Laptop (charged)	1
PDA (charged)	1
GPS	1
Compass	1
Range finder	1
Measurement tape 100m	1
Marking tape	n
Mine signs	n
Pens & Papers	n
Digital Camera (charged)	1
Extra CD for the digital camera	n
Plugs of the digital camera	1 set
PPE	2 sets
Truck (fuelled)	1
Radio hand	2
Extra batteries for GPS& RF	n
Medical Kit	1
Mobile Telephone	1

* n : refers to number of items that differ depending on the area and operations requirements.

5 JOB DESCRIPTIONS

5.1 TS Project Manager Job Description

Tasks and Responsibilities

- Responsible for the project, he handles the following:
  - Planning
  - Monitoring
  - Implementing
  - Controlling
- Define the resources needed for the project: personnel and equipment.
- Define each element of the project: goal, main structure, positions and job descriptions, deliverables, constrains, start and end of each activity.
- Disseminate tasks to project personnel.
- Allocate staff for each post in the project.
- Organize Training for Operations, field staff and office staff.
- Define DV Task contents in conjunction with TS XO then task the LMAC IMSMA Supervisor to prepare task dossier.
- Monitor the project through checking the Advancement TS sheet.
- Internally QA the TS by making random field visits and checking the Data collected with the filed.
- Consult with TA's for any technical problem encountered through the implementation of the TS process.
- Review Technical Survey SOP in consultation with the Deputy Project Manager and Team Leaders.
- Define reports and forms required for the project.
- Design the flow of information.

Post

LMAC TS PM office

5.2 Executive Officer Job Description

General:

- Act as Deputy Project Manager
- Handle the execution of operations.

Duties:

- Monitor Tech. Survey ops. Room.
- Define operational areas for teams with the Project Manager.
- Coordinate with IMSMA section, teams, and Engineering Regiment.
- Delegate everyday tasks and missions.
- Tracking and following execution.
- Submit reporting forms to Project Manager.
- Custodian of the Technical Survey SOP

Jobs:

- Coordinate with Project Manager to define work areas.
- Verify tasked missions and information.
- Deliver files for each team.
- Approve the approach plan submitted by the Team Leader after survey.
- Define delays and timelines.
- Control personnel and equipment.
- Verify reporting forms data.
- Internal QA/QC

Goals:

- Conducting Tech. Survey for all suspected areas in order to:
  - Verify the existing IMSMA data.
  - Confirm actual contaminated areas.
  - Plan for future operations
- Providing info. to define the scope of the problem:
  - Eliminate the safe areas (Area cancellation/Area Reduction).
  - Denote suspected hazardous areas (marking and fencing) and plan for area reduction process.
  - Define existing minefields by Marking and Fencing, and plan for Clearance Ops.

Forms:

- Sketch of the visited area showing area to be reduced.
- Minefield report.
- Area Cancellation report.
- Clearance plan.
- Area Reduction plan.

5.3 DVT Team Leader Job Description

General:

- Responsible for execution of operations on site.
- Liaison between the local community and the TSOR.

Duties:

- Execute the task given from the ops room.
- Responsible for the team equipment (storage, maintenance, serviceability).
- Control team members.
- Daily reporting on activities to the X.O.
- Submitting final report to X.O.

Jobs:

1. **Site Pre-visit**
   - Receive the dossier from the ops room.
   - Analyze the task:
     - Study the area:(geographic type, best route to the area, casevac procedure, emergency response plan)
     - Determine the hazard
     - Brief team (hazard, location, route to the site, timeline, job)
   - Contact the MRE representative and POC.
   - Check all the equipment.
   - Check the vehicle for serviceability.
2. **Site Visit**
   - Compare the area between the map and the ground.
   - Verify the existing data on the site (ask the community and the persons interviewed before about this info).
   - Collect more information (questions, refer to the interview sheet).
   - Identify the safe and dangerous area (sketch & turning points)
   - Take pictures (entire area, dangerous& safe areas from different angles if possible, mines & UXO if they exist, POC's.
   - Supervise personnel and equipment.
   - Mark BM and TP's by landmarks and spray-paint (grid and description).
   - Make a site sketch.
3. **Site Post-Visit**
   - Make detailed sketches. [Entire area, dangerous and safe areas, the hazard, the roads, (setting up, cut lines and boxes if required)]
   - Report and discuss with XO (Difficulties, problems, solutions)
   - Give suggestions regarding:
     - ❖ Amendments in SOP's.
     - ❖ Requirements for specific equipment.
     - ❖ Changes in responsibilities and jobs.
   - Make a decision for the all suspected areas in the dossier:
     1. Cancellation.(fill in the cancellation form).
     2. Area reduction (AR plan).
     3. Clearance (Clearance plan).
   - Request the required forms (cancellation, AR, clearance).

Goals:

- Conducting Tech. Survey for all suspected areas in order to:
  - Verify the existing IMSMA data.
  - Confirm the actual contaminated area.
  - Provide the new minefields and dangerous area boundaries to the information section.
- Providing information to define the scope of the problem:
  - Eliminate the safe areas (Area cancellation/Area Reduction).
  - Define existing minefields by Marking and Fencing, and dangerous areas by signs
  - Plan for the area reduction and clearance operations.

Forms:

- IMSMA Minefield & DA report.
- Cancellation form.
- Clearance plan form.
- Area reduction plan form.

5.4 TS Data officer Job Description

Responsibilities

- Check the Task folder contents in both formats, electronic copy on the PDA and hard copy, upon reception from LMAC IMSMA section.
- Deliver task folders to TS Team Leaders, as deployment assigned by the TS XO officer.
- Check field reports and forms contents upon reception from TS Team Leaders, All critical fields should be filled by field teams; If any missing or inappropriate data is observed, the hard copy should be returned to corresponding Team Leader.
- Check the presence and validity of sketches.
- Check Digital photos and correspondence to proper report.
- Check MF perimeter data on the PDA.
- Deliver checked field reports, sketches and photos to LMAC IMSMA Data Entry Supervisor.
- Update the Advancement TS sheet.
- Fill the TS control sheet and update whenever its content is modified
- Provide TS Team Leader with Empty forms, stationary and consumables.
- Coordinate with Team Leaders and IMSMA Data Entry Supervisor to assure dissemination of practical remarks to enhance data quality.
- Report to TS XO officer and TS Project Manager.

Post
TS operations room.

6 ATTACHMENTS

This section defines templates for the reports and documents used for the TS

- Minefield Report
- Dangerous Area Report
- Technical Survey Mined Area Report
- Clearance Plan
- Area Reduction Plan
- Cancelled Minefield Report
- Technical Survey Weekly Report
- Information & Maps Request Sheet
- Data Verification Team Checklist