

Leak Detection Management



Maynilad

Central NRW
November 18, 2010

What We Will Cover Today

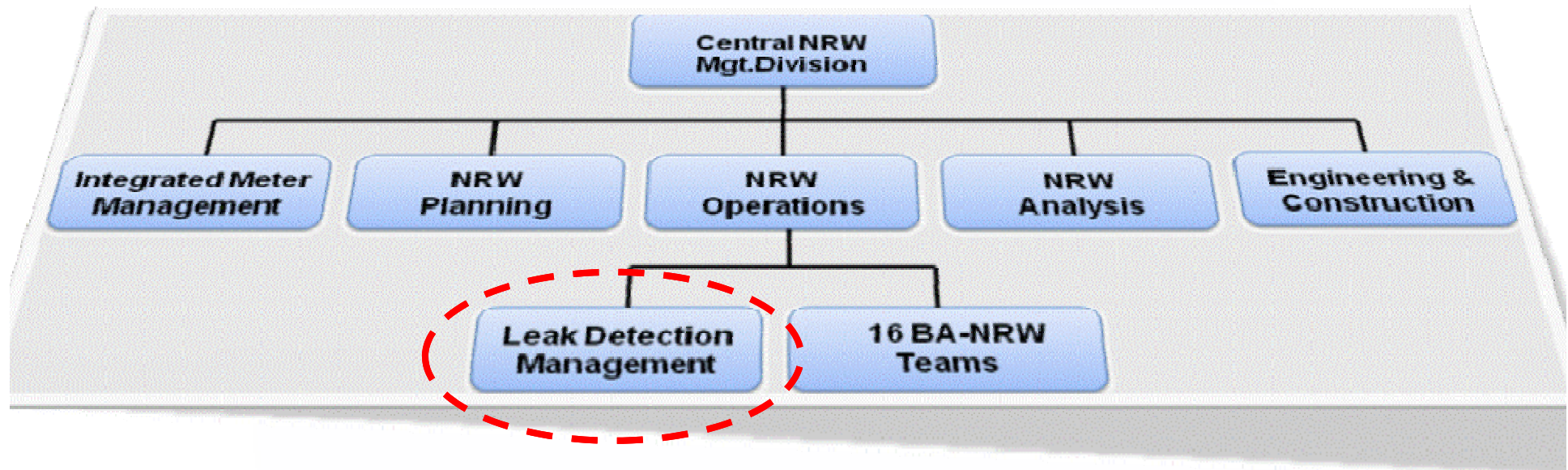
- **Maynilad Situation in 2007**
- **Building of Leak Detection Teams**
- **Understanding Leakage**
- **Finding Leaks**
- **Leak Volume : A function of Time and Flow Rate**
- **Leak Detection Activities**
- **Operational Strategy**
- **Searching for Leaks in Large Mains**
- **Continuous improvement (JD7)**



Maynilad Situation in 2007

- NRW Level at **67%**, 1500 MLD water loss
- Water Balance: 70% Physical Losses
30% Commercial Losses
- No NRW Management Program
- No dedicated leak detection team
- Deteriorated and leaking network
- Poor operation and maintenance
- High cost of repairs, oftentimes, the solution is massive pipe replacement

Leak Detection Management



In 2008, the LDM was created under Central NRW Division to localize, locate and pinpoint leaks to address the high physical losses of Maynilad

Building-up of Leak Detection Teams

- **Hired new and young engineers**
- **Trained with foreign experts**
- **Upgraded equipment**
- **New office environment**
- **Acquired new service vehicles**
- **Full management support**



Leak Detection Team



**Fully equipped
with leak detection
equipment, tools,
safety gadgets, &
service vehicle**

**22 Teams, going
30 within the year**

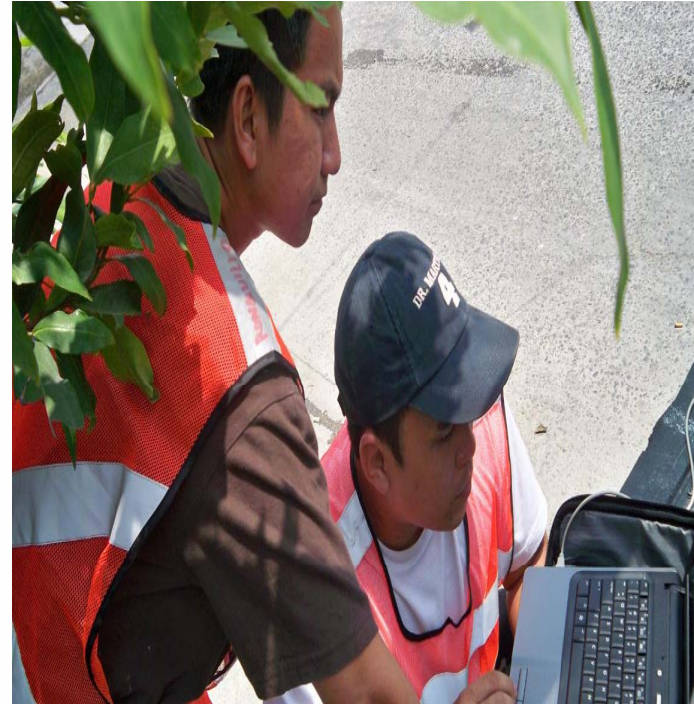


Training with Foreign Experts



From classroom lecture to actual field training

Training the Trainers



- Creation of trainers amongst Maynilad staff
- 4 Level Leak Detection Training Programs

Replacing Old Equipment



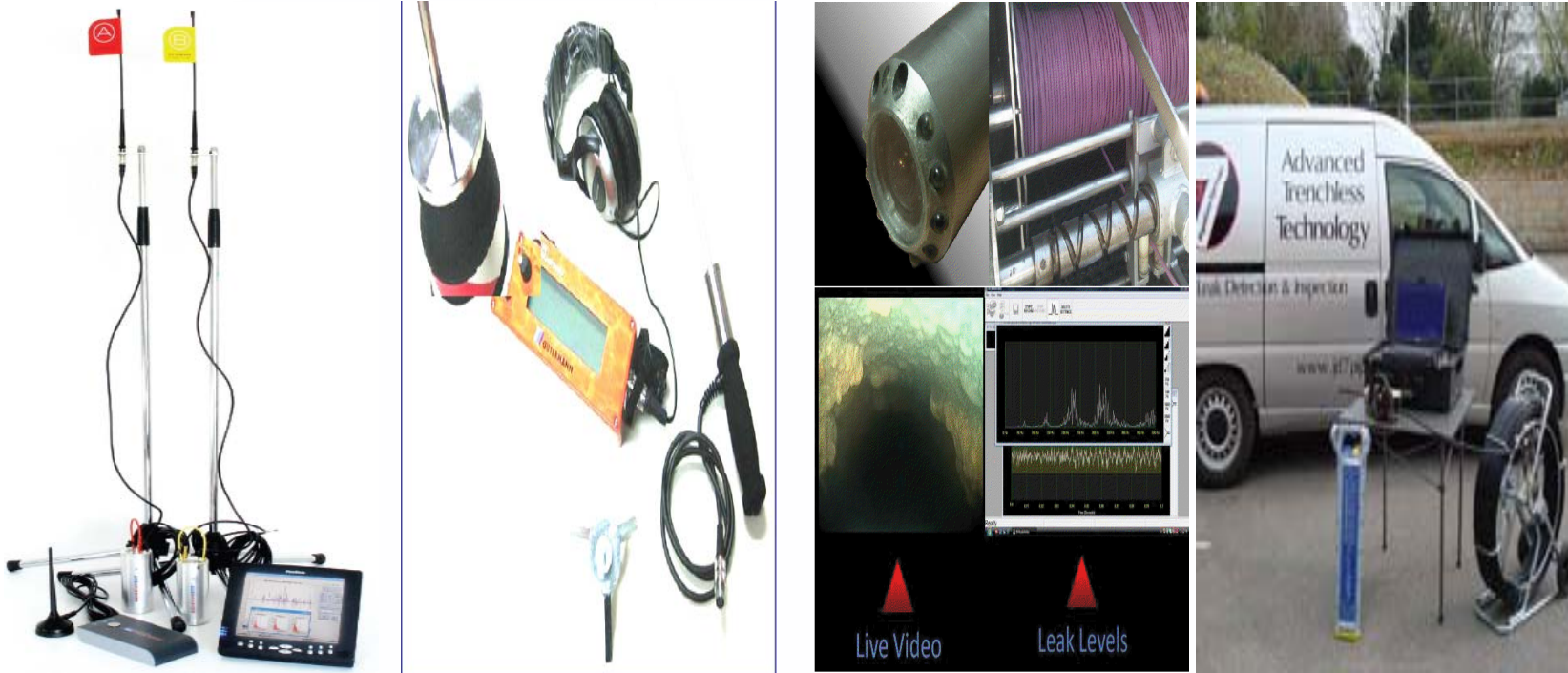
Old equipment acquired during MWSS time

Acquiring New Equipment



Modern equipment with latest technology

Acquiring New Equipment



**Modern equipment with latest
technology**

New Office



**The LDM HQ is strategically located
at Arroceros, Manila**



New Service Vehicles



Complete with early warning device

What's Next?

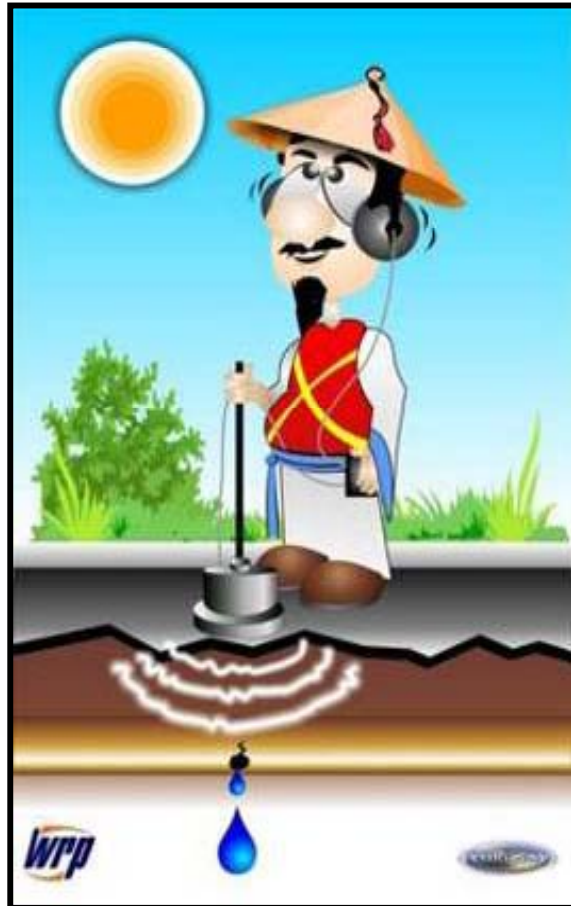
- 1. Train-the-Trainers Program for Global Competitiveness**
- 2. Continuing research and upgrade of equipment for Global Competitiveness**

Understanding Leakage

- Physical losses nearly always the largest part of NRW
- Most leaks do not surface
- Leak detection requires a lot of experience and understanding
- Repairing leaks immediately minimize water losses
- Maynilad struggles to repair the large number of leaks detected every month

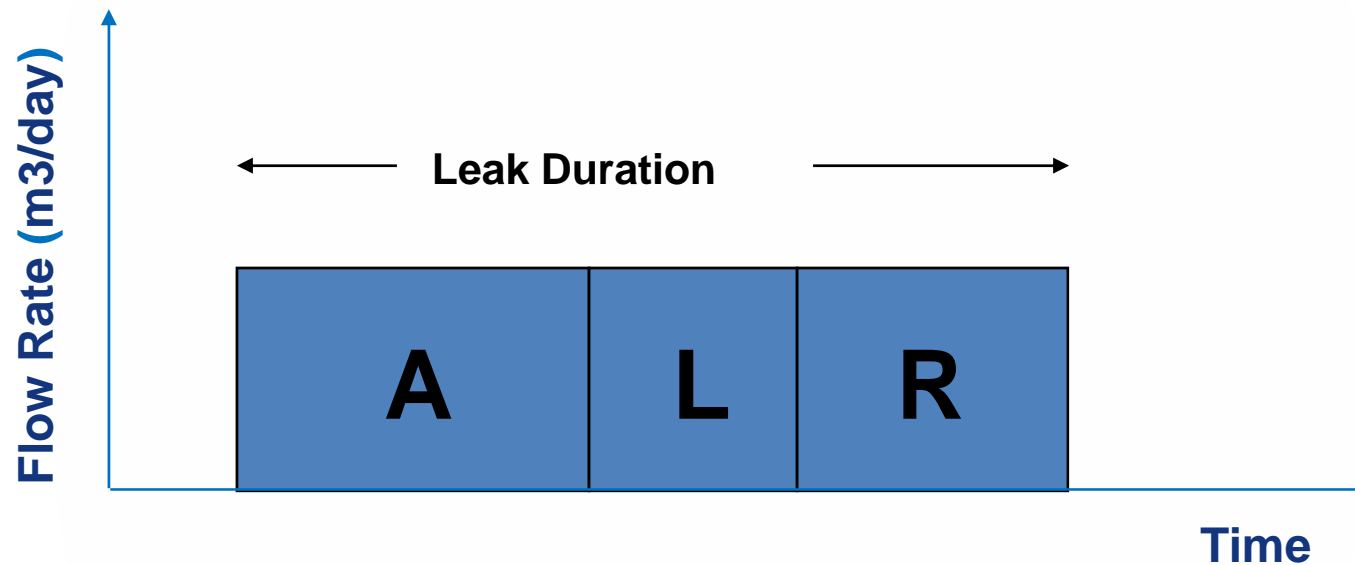


Finding Leaks



- Average Leak Finder: ALF
- How does he find leaks?
- By detecting leak noises and pinpointing their location
- By using other sophisticated equipment
- He needs the right equipment, training and commitment!

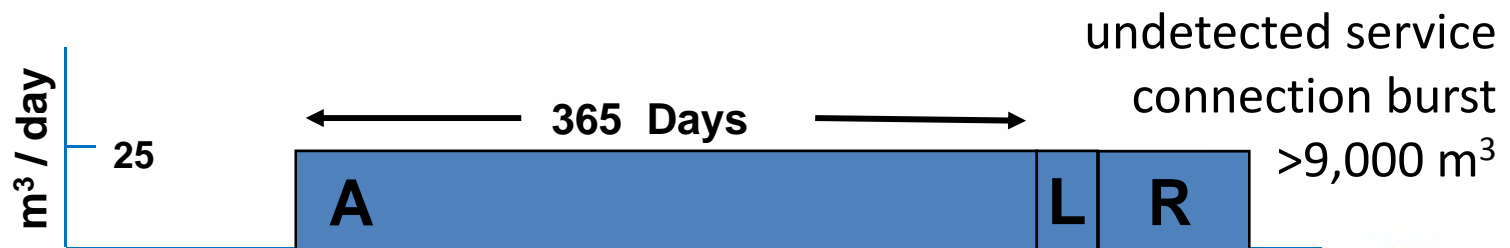
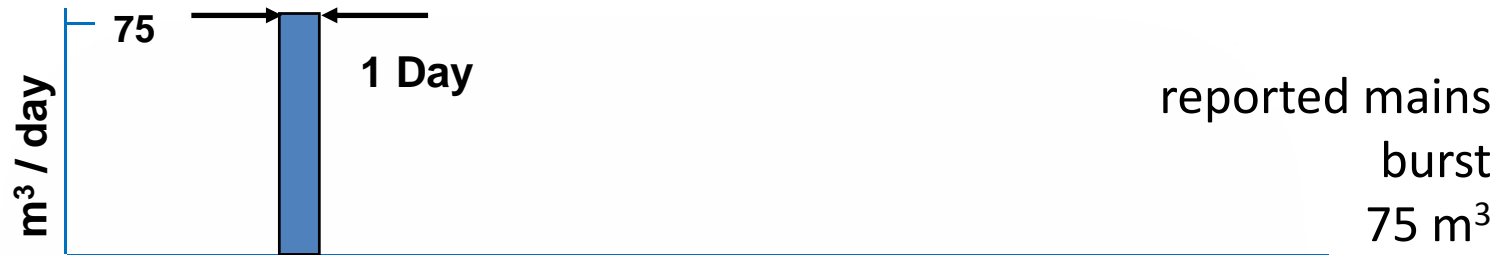
Leak Volume: A function of Time and Flow Rate



Leak Volume = Time (A+L+R) x Flow Rate

A: Awareness; L: Localization; R: Repair

Time Makes Difference

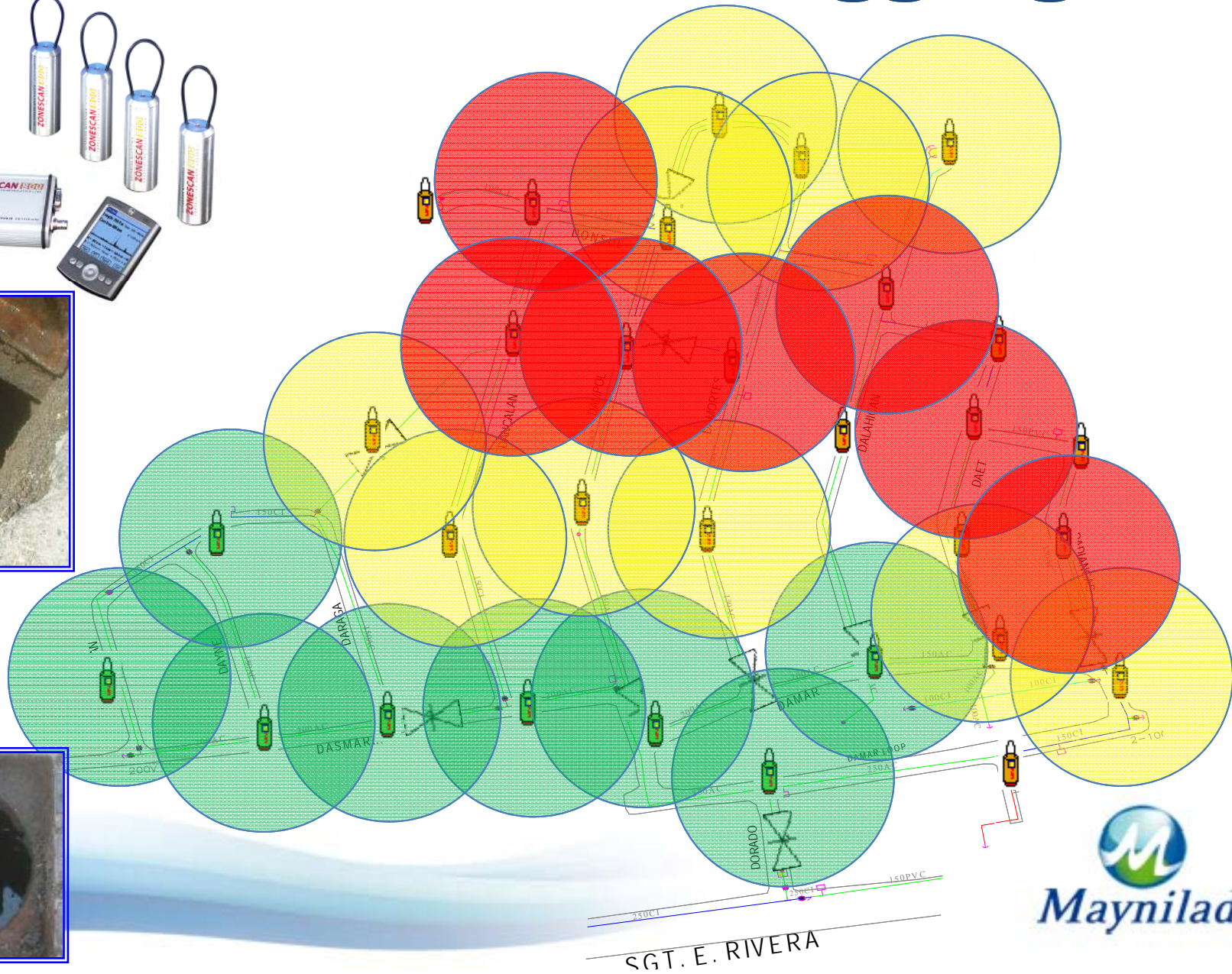


Leak Detection Activities

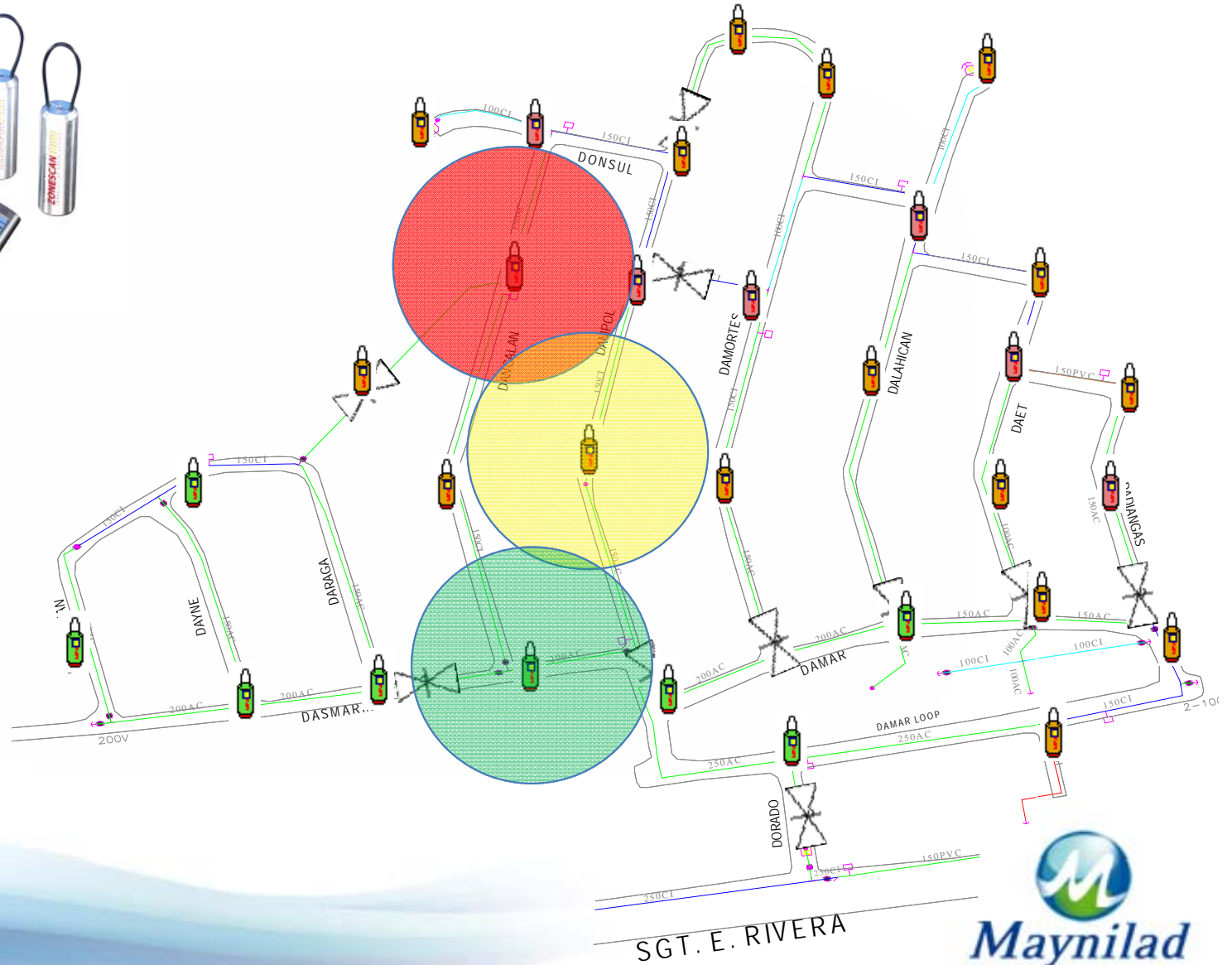
- Leak localization using acoustic noise logging (alternative to step-testing)
- Leak correlation to locate the region of potential leak
- Pinpointing the exact location of the leak prior to excavation
- Blanket sounding survey – area saturation using listening sticks
- Boundary valve verification
- Sahara System for primary leak detection



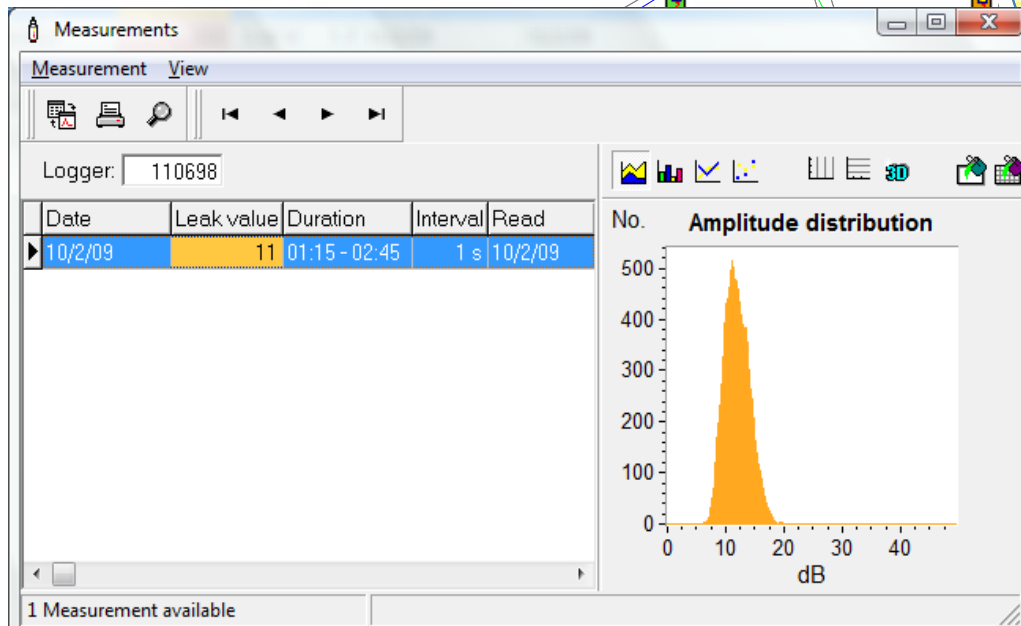
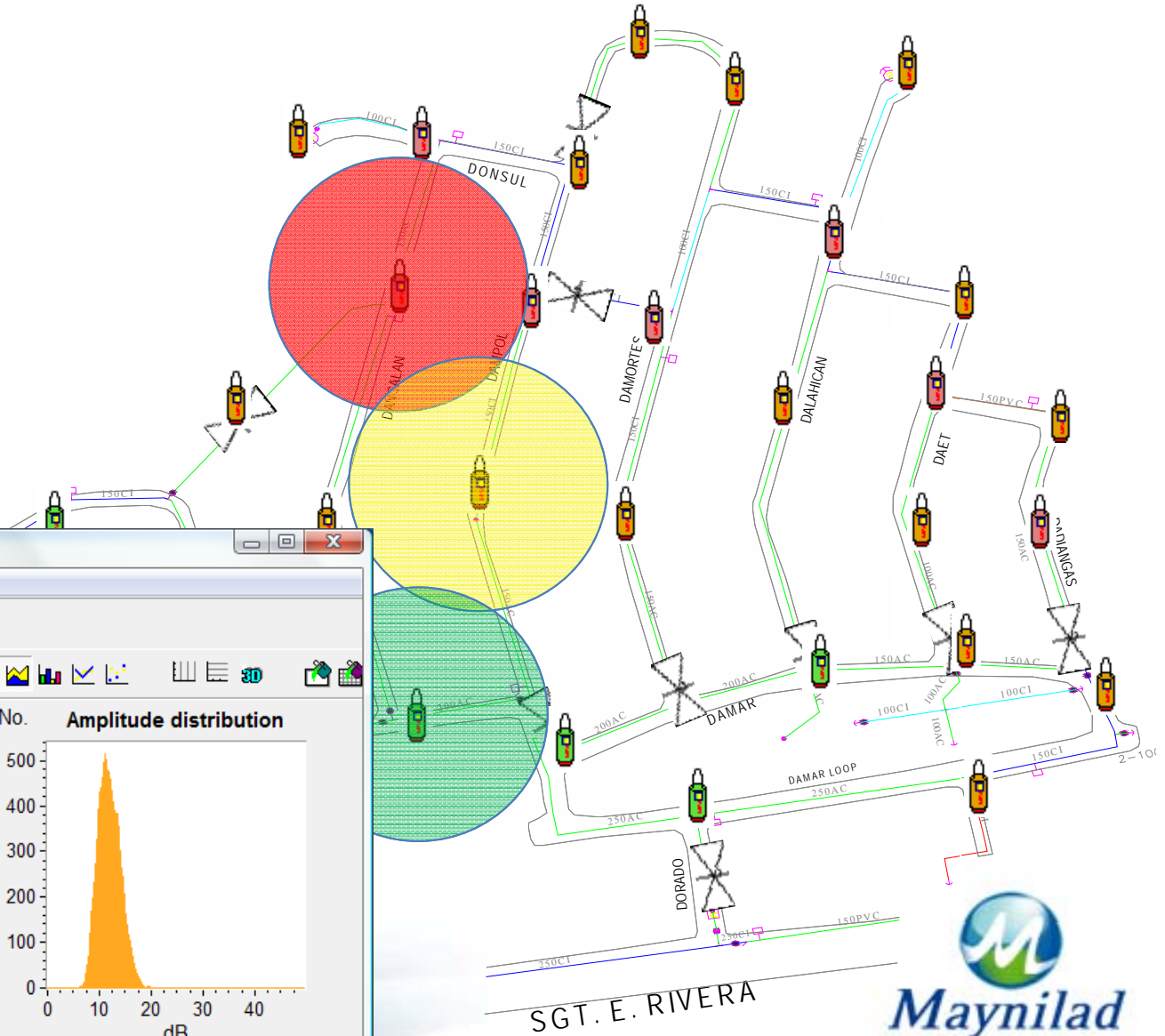
Acoustic Noise Logging



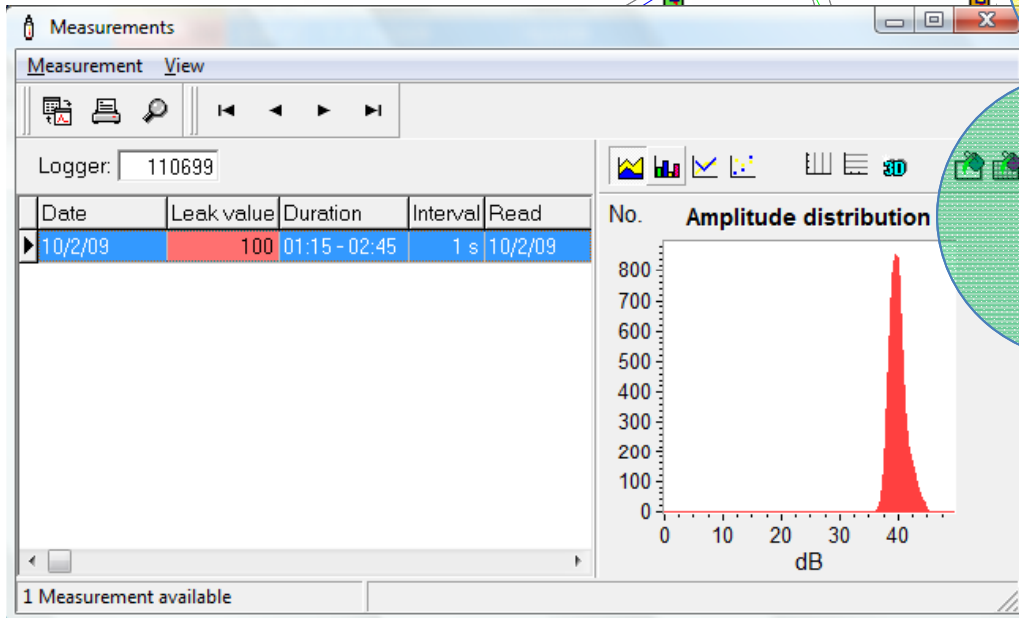
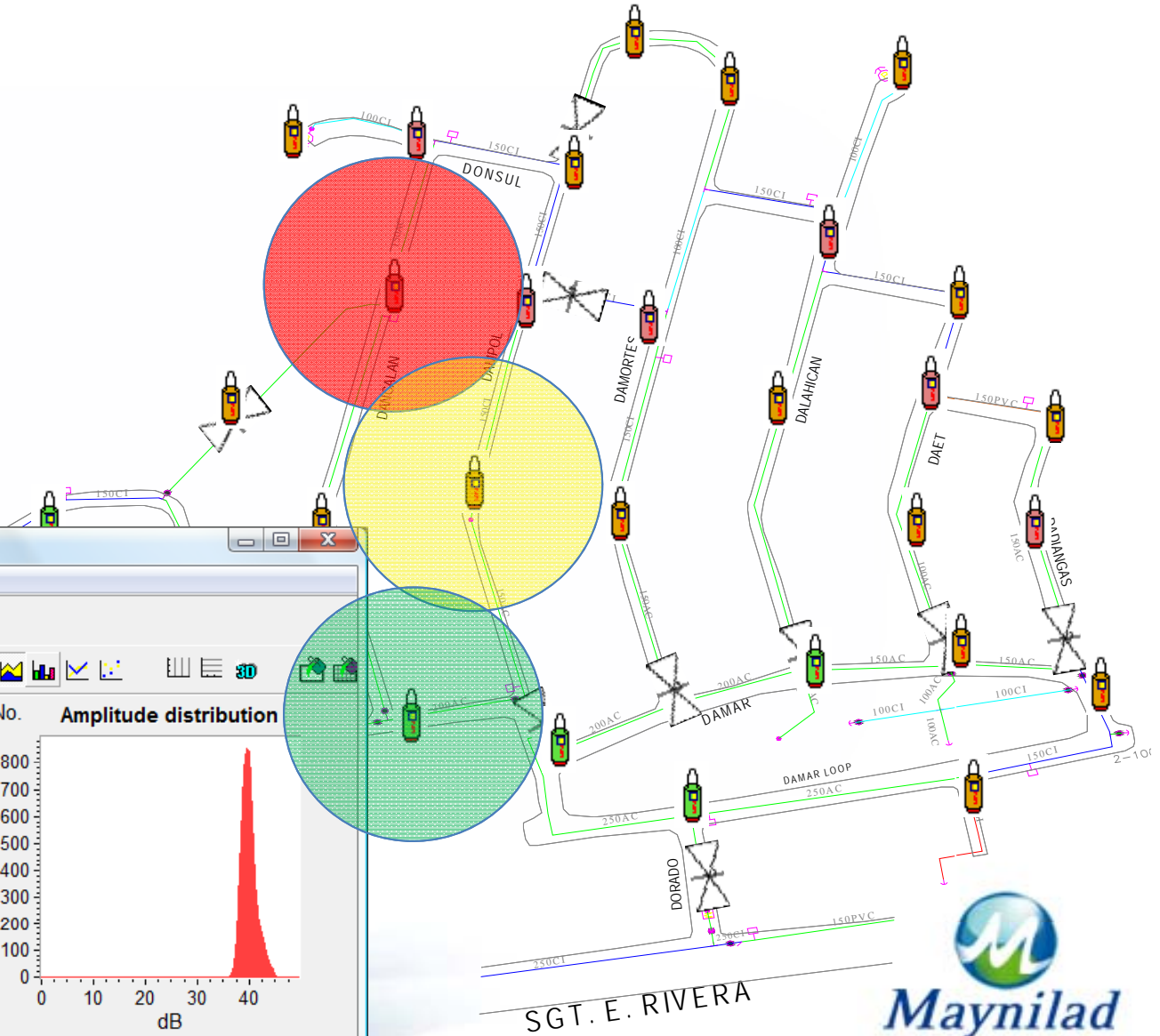
Acoustic Noise Logging



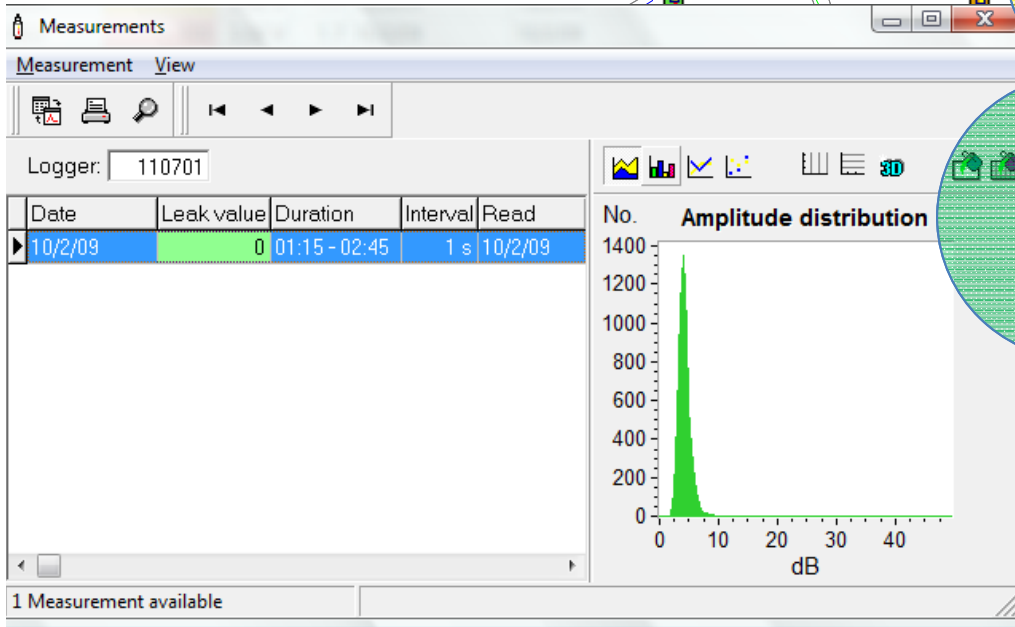
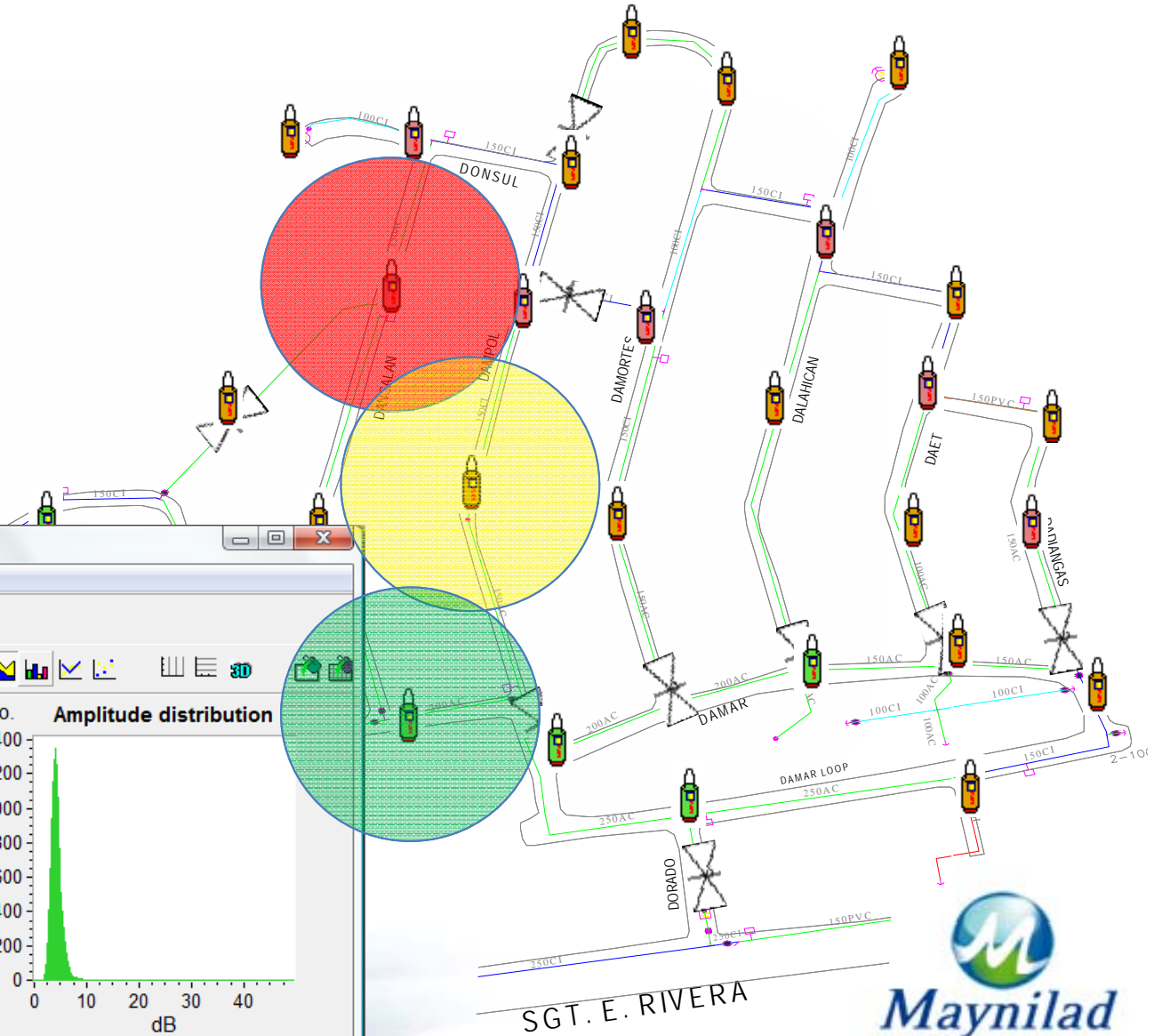
Acoustic Noise Logging



Acoustic Noise Logging



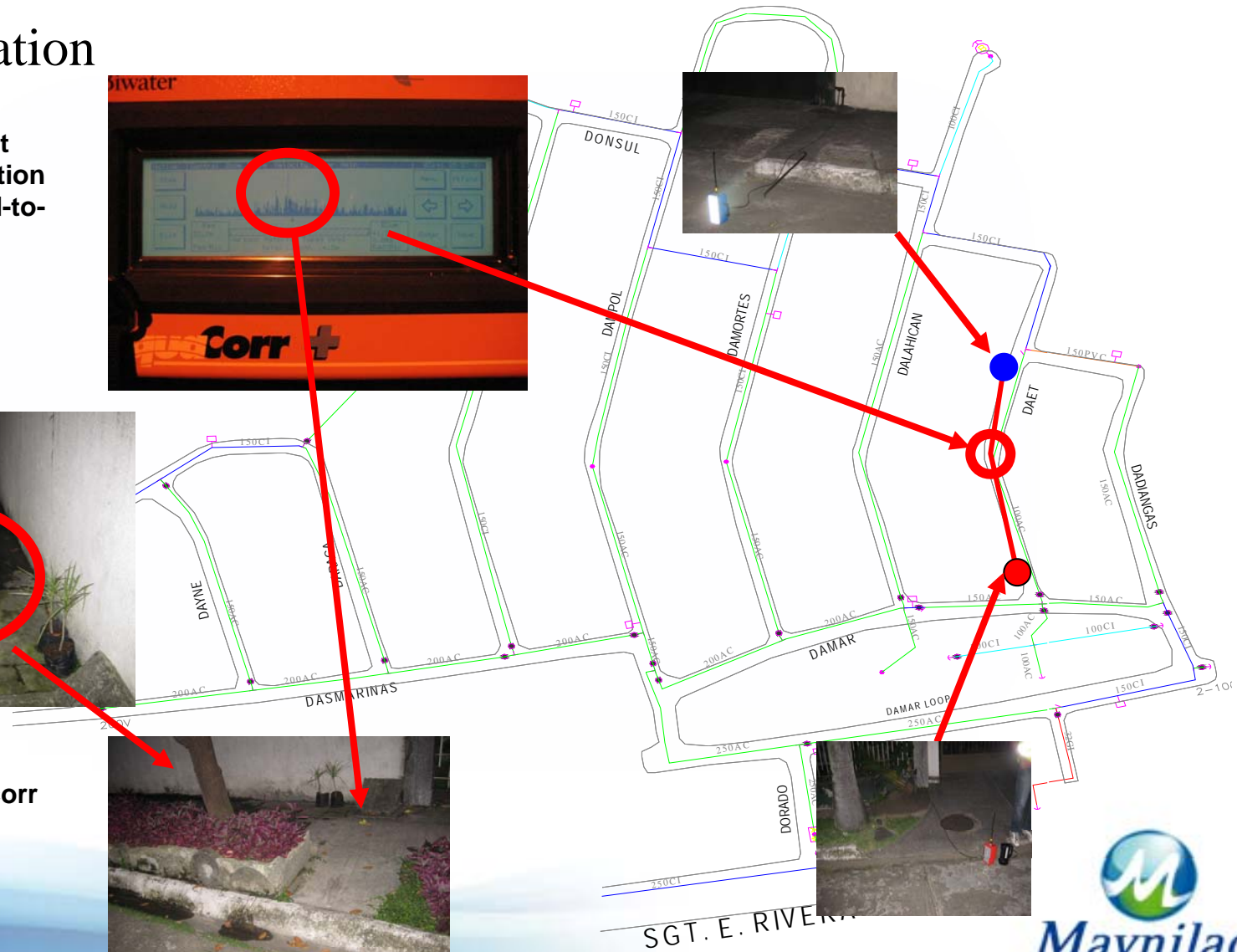
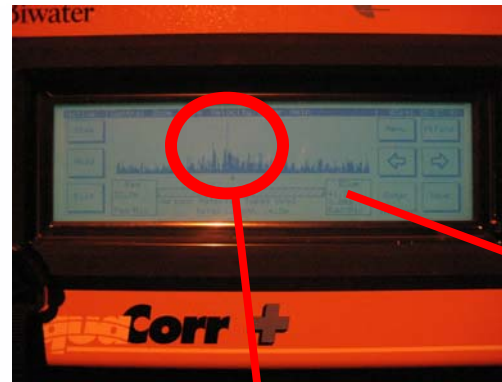
Acoustic Noise Logging



Leak Correlation

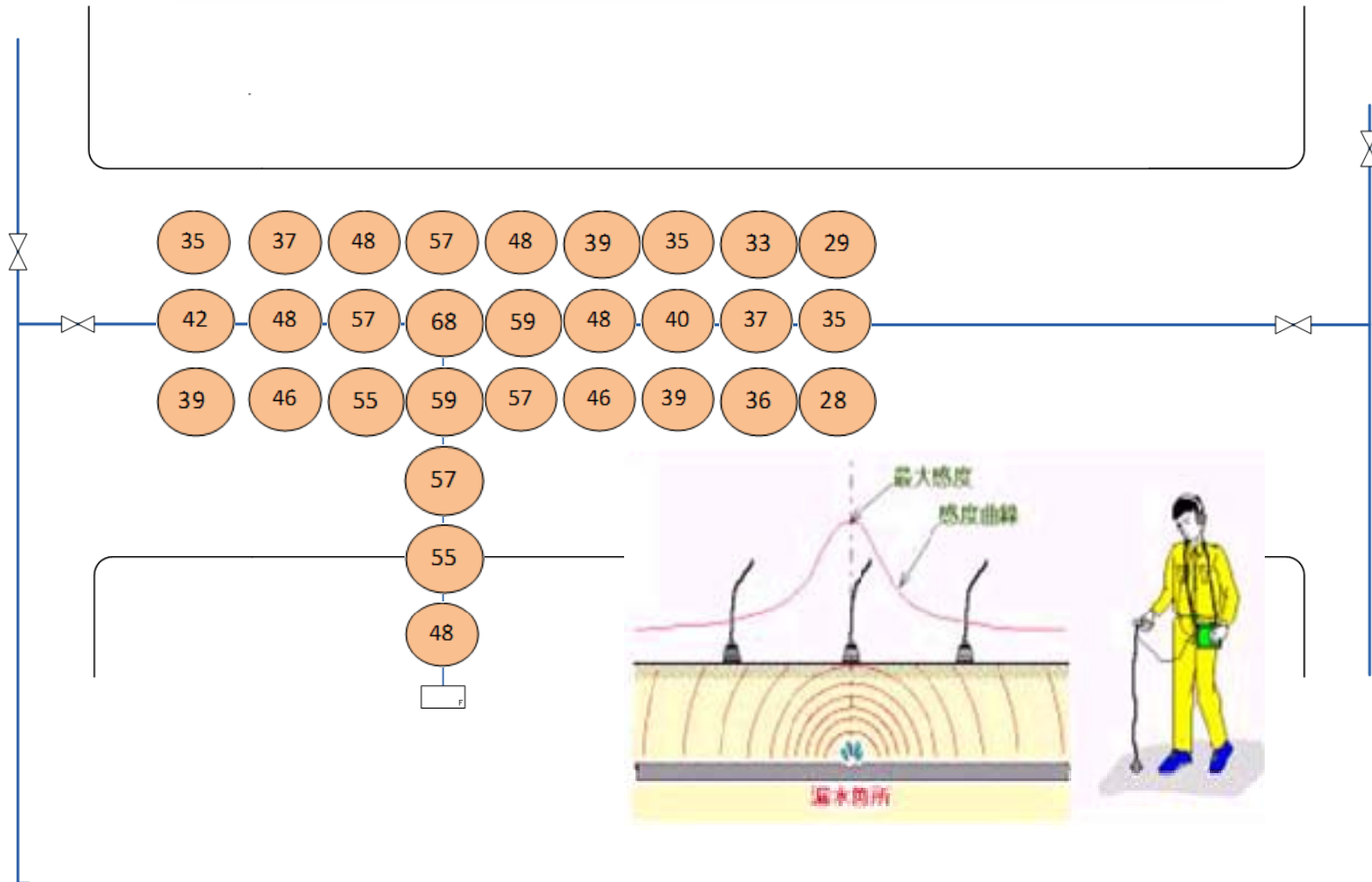
Leak Correlation

Correlation and pinpointing is the last method in leak detection by detecting the hard-to-find leaks.



An example of Correlation by Aquacorr locating a strong underground leak.

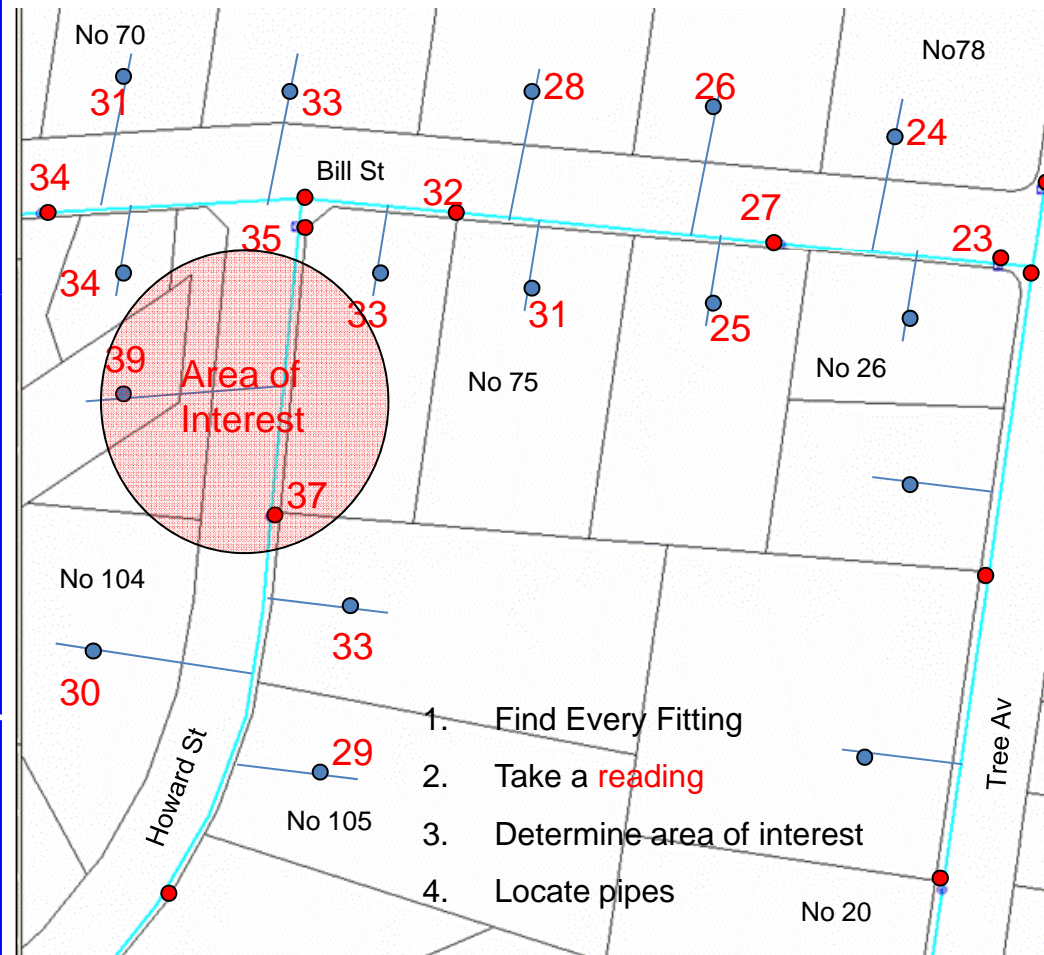
Pinpointing



Operational Strategy

Category	Scope	Indicator
DMA	Priority DMAs with high NRW volume,	Lpcd and NRW Volume in MLD
Outside DMA	Areas with high occurrence of leaks and illegal connections (Blanket Sounding Survey)	High NRW Volume
Primary Lines	<ul style="list-style-type: none">• 350 mm and above Primary Network• Water audited segments with high NRW volume	High NRW Volume

Blanket Sounding Survey

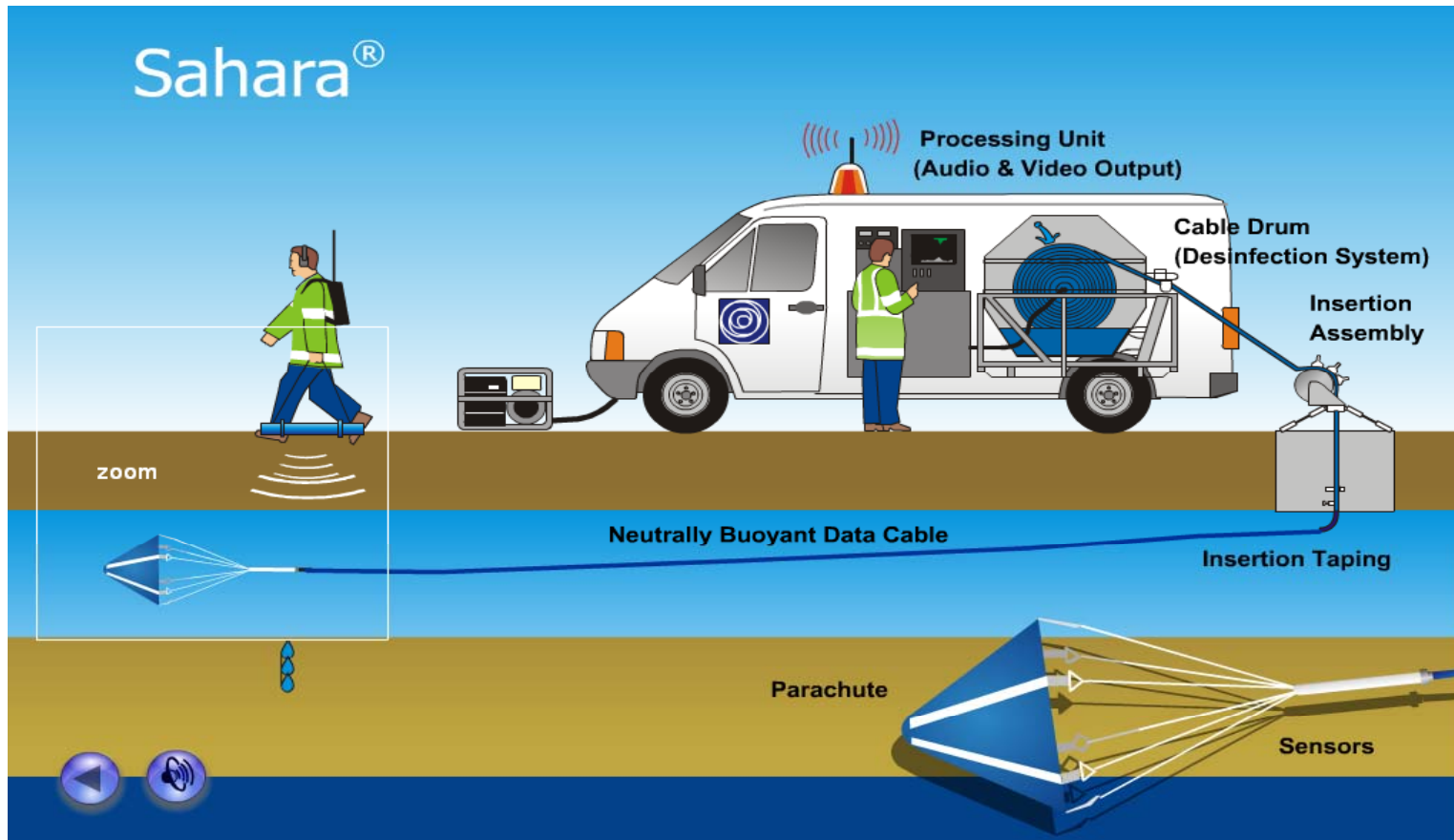


● Hydrant

● Meter

— Pipe Network

Searching Leaks in Large Mains



Before & After

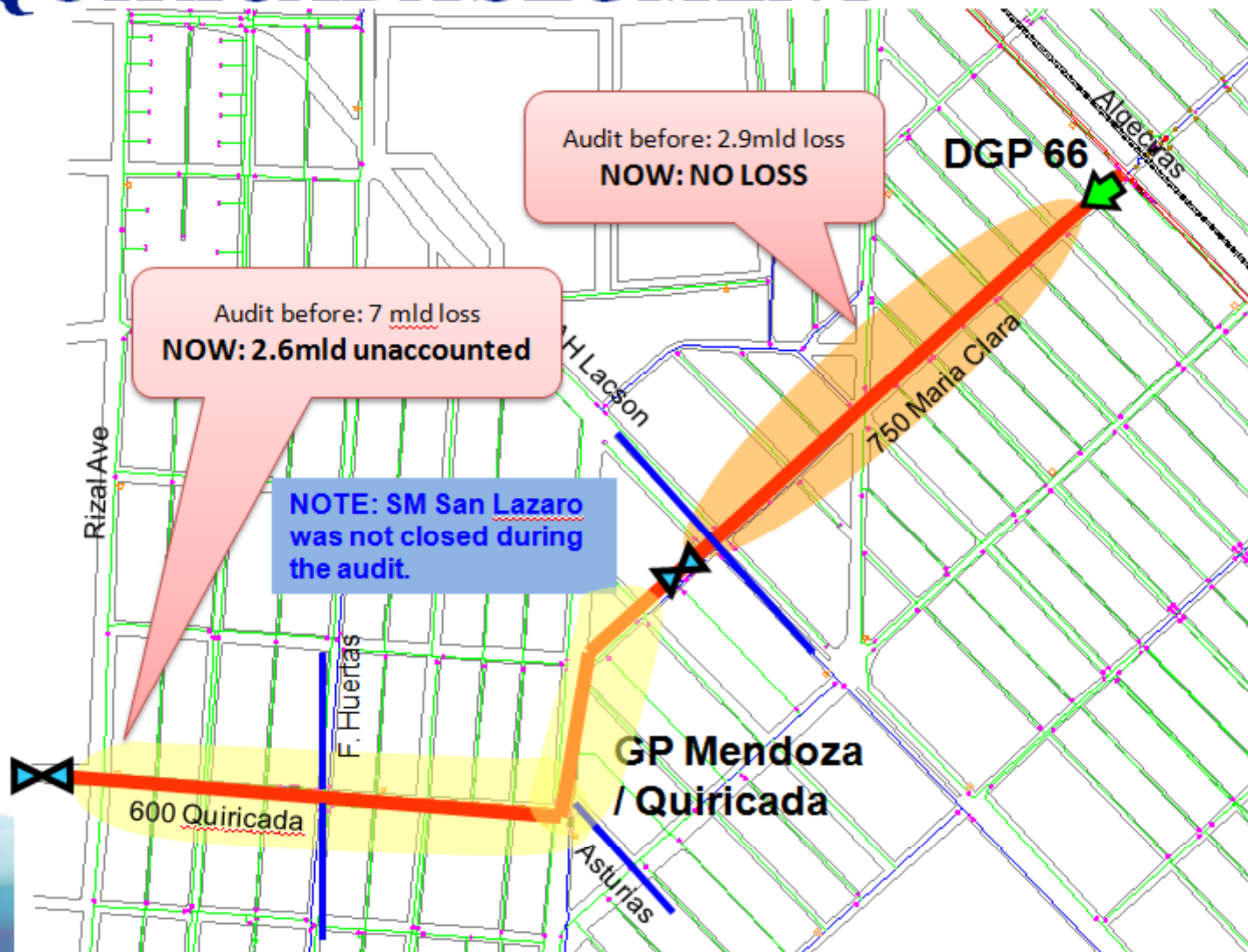


Leak Found by Sahara Algeciras/Laon Laan



RE-AUDIT OF 750-600 M. CLARA-QUIRICADA SEGMENT

Audited: Oct. 20-21, 2010



JD7 – LDS1000

LDS1000 - is a long distance trunk main CCTV and leak detection system designed for internal investigation work.

Assess inside pipe conditions while the line is in service

JD7 – UK based company which provides unique design, development And implementation solutions for industrial, nuclear, aerospace and process plants.

JD7 – LDS1000 versus Sahara

JD7 – LDS1000

- 1000m of cable length
- CCTV and leak detection are done on one insertion only
- Inspect pipeline 300mm & above
- Lesser pullback pressure (not using drogue), meaning more distance to cover

Sahara

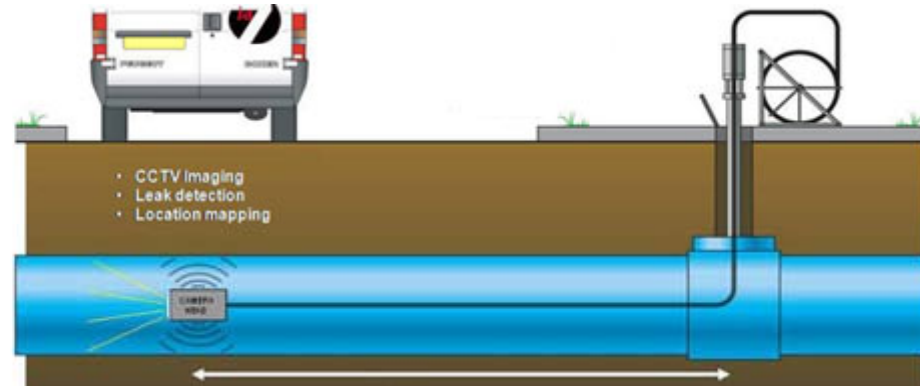
- 1850m of cable length
- CCTV and leak detection are done on separate insertion
- Inspect pipeline 400mm & above
- Experience critical pullback pressure (due to drogue), meaning short distance to cover

JD7 – LDS1000

LIVE INSERTION NO - DIG INSPECTION

Live insertion to water
mains via:

- Fire Hydrant
- Quadrina
- Valve



JD7 – LDS1000

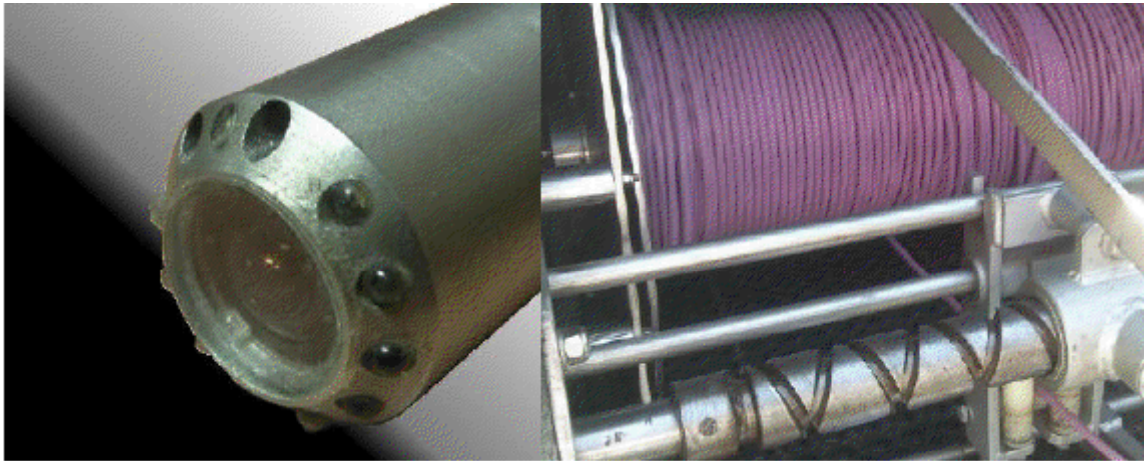


Illustration 1
Probe with CCTV, Hydrophone & Sonde

Illustration 2
Electronic Cable Drum

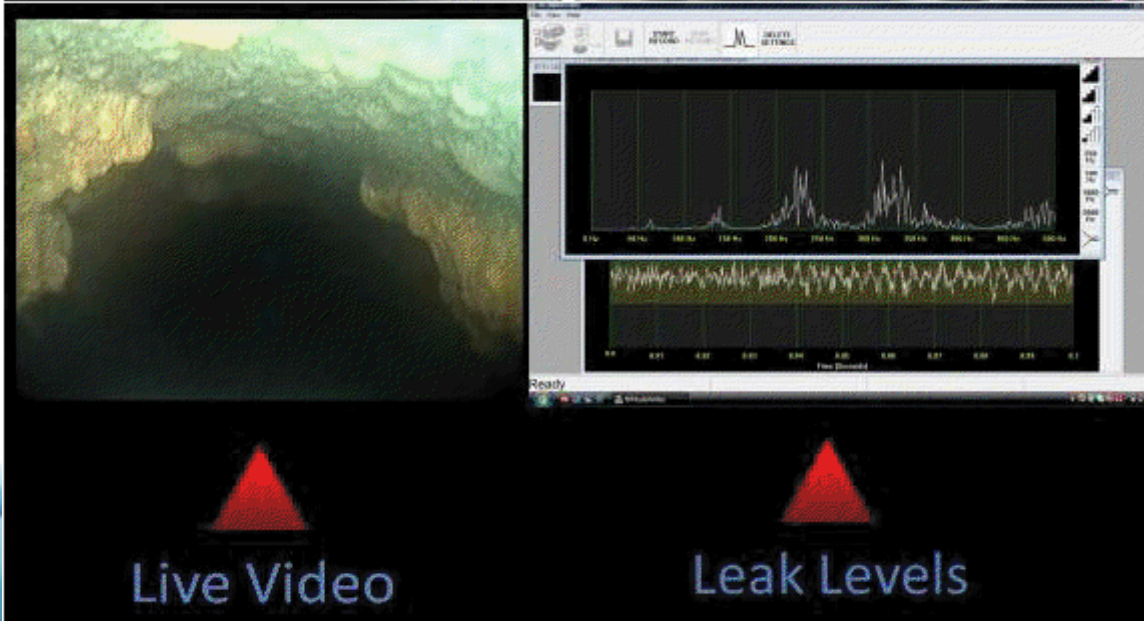
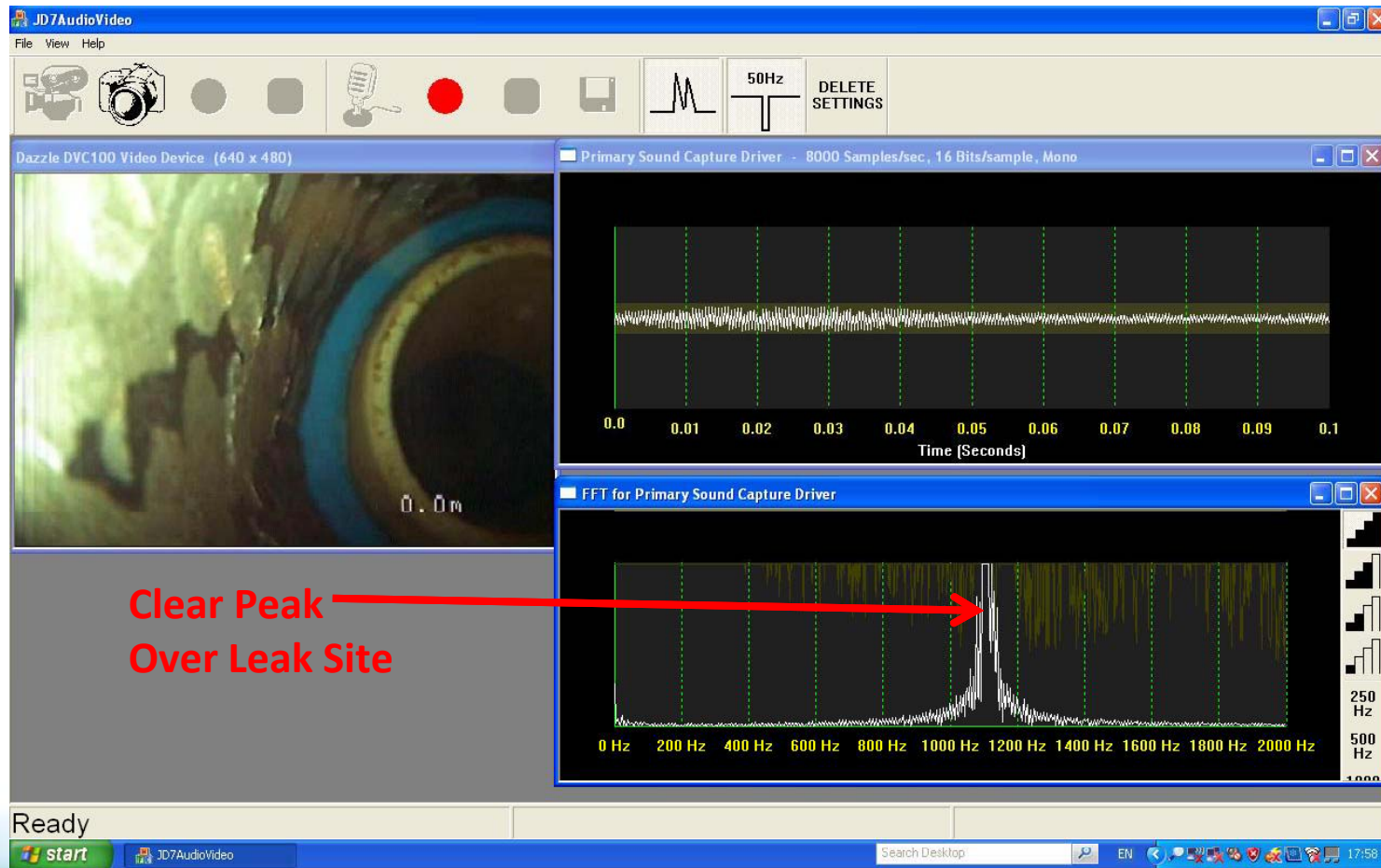


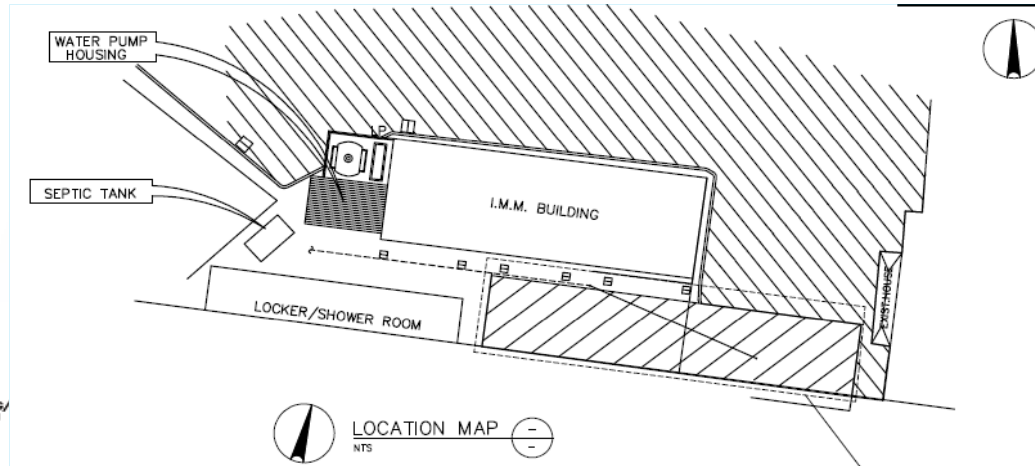
Illustration 3
Live & internal images from video and
acoustic sensor

JD7 – LDS1000

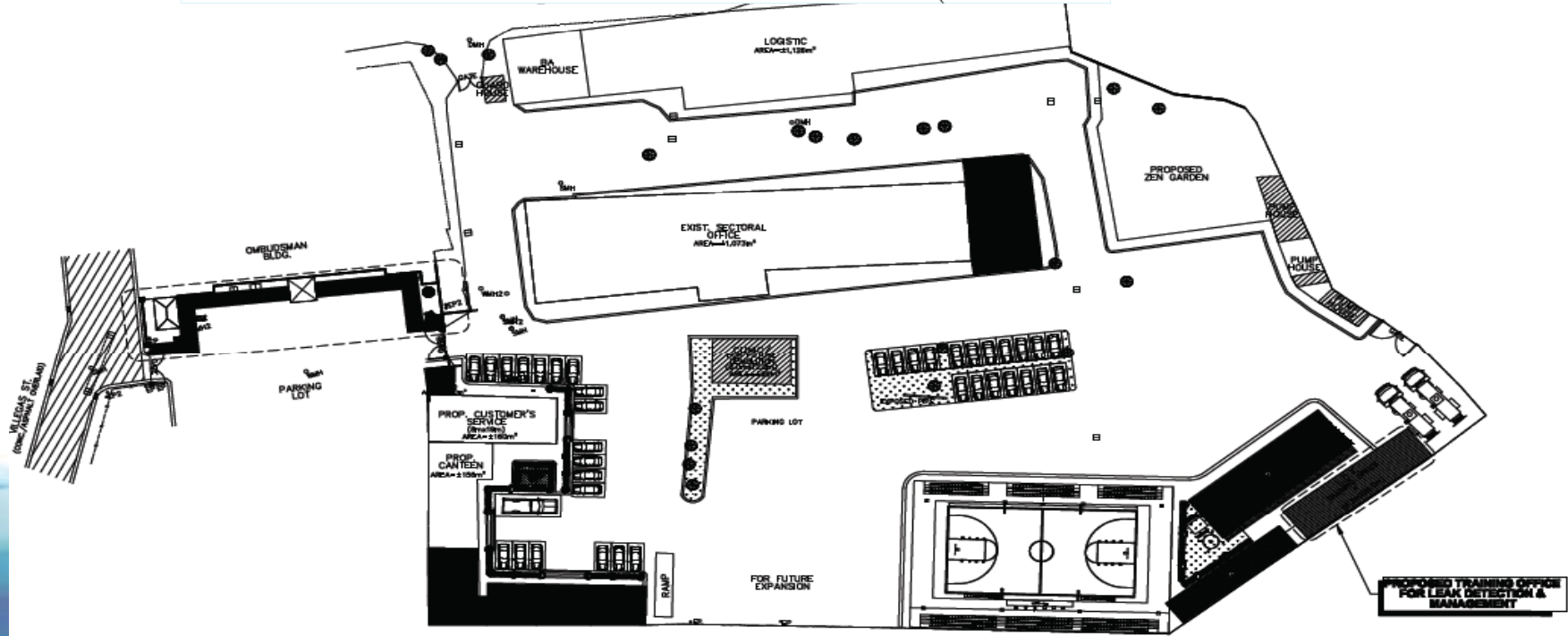
Leakage Results



Future Training Facility

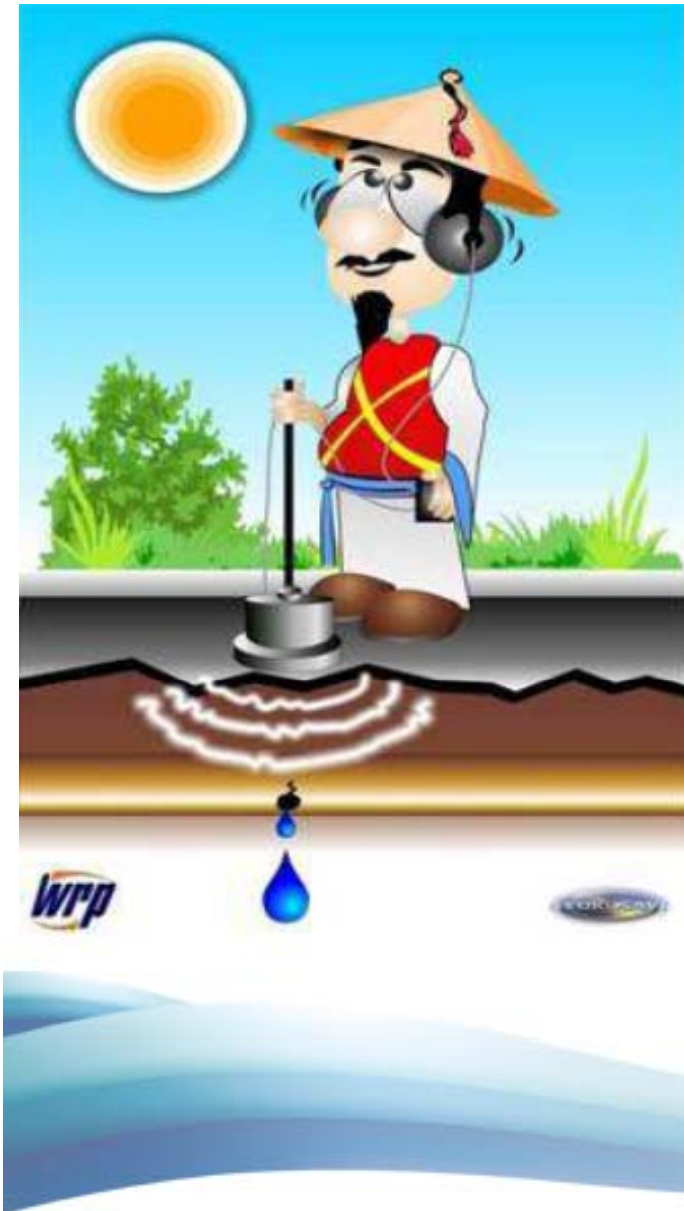


- LEGEND:
- EXISTING BUILDING
 - PROPOSED BUILDING/ UNDER RENOVATION
 - GRASS



Leak Detection Tip

**90% skills,
10% equipment**



Our vision is to produce top-notch leak detection personnel as we continue strengthening our program and someday we may be able to export Maynilad's leak detection services outside.

Thank You

