

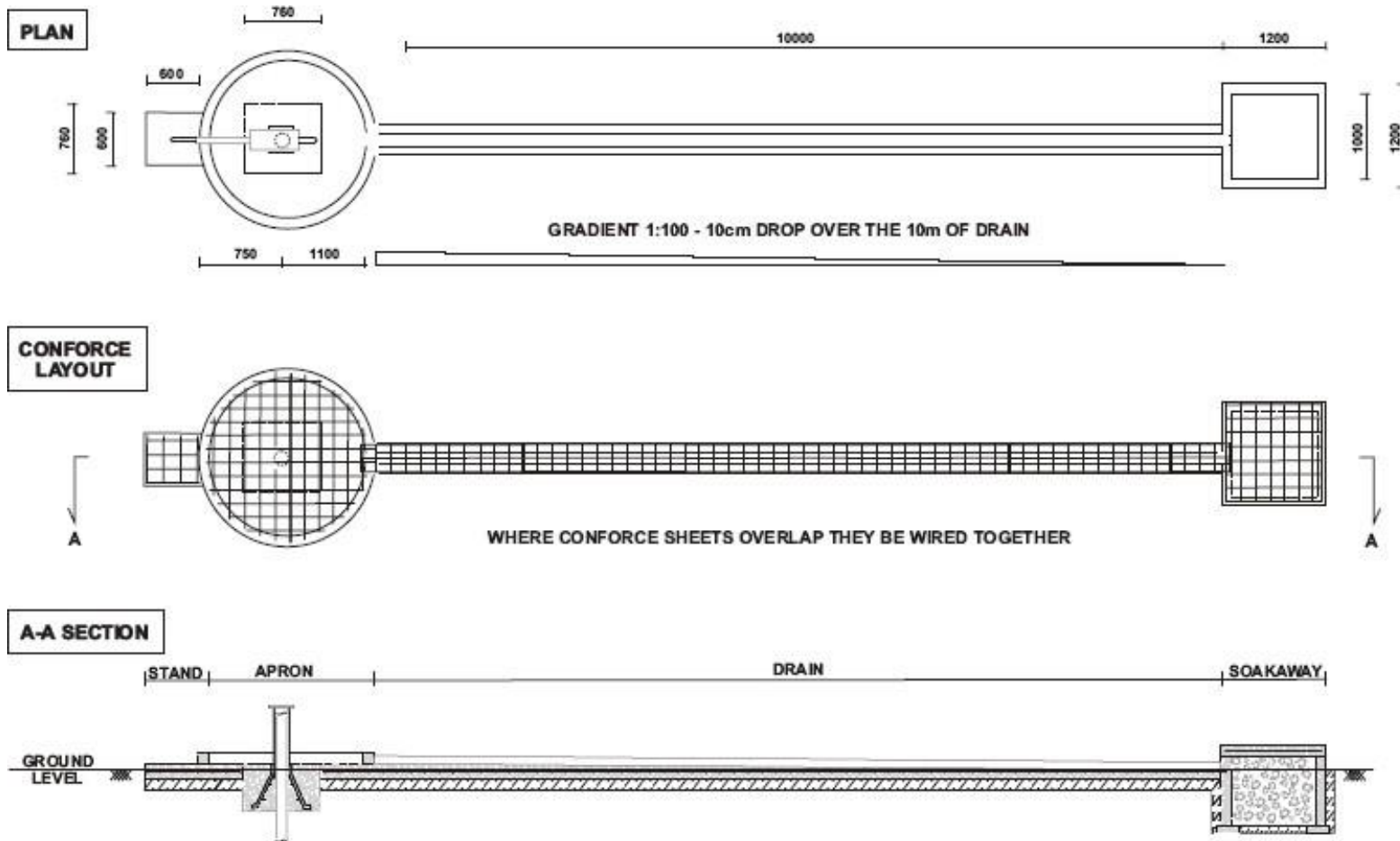
# **HYDROGEOLOGY AND DRILLING SUPERVISION TRAINING**

## **Day 4**

# Course Objectives Day 5

- Borehole Rehabilitation
- Papertrail
- Contract
- Practicals

# Layout of Superstructure



# Quality of materials

- Aggregates
- Water
- Cement
- Steel Reinforcement

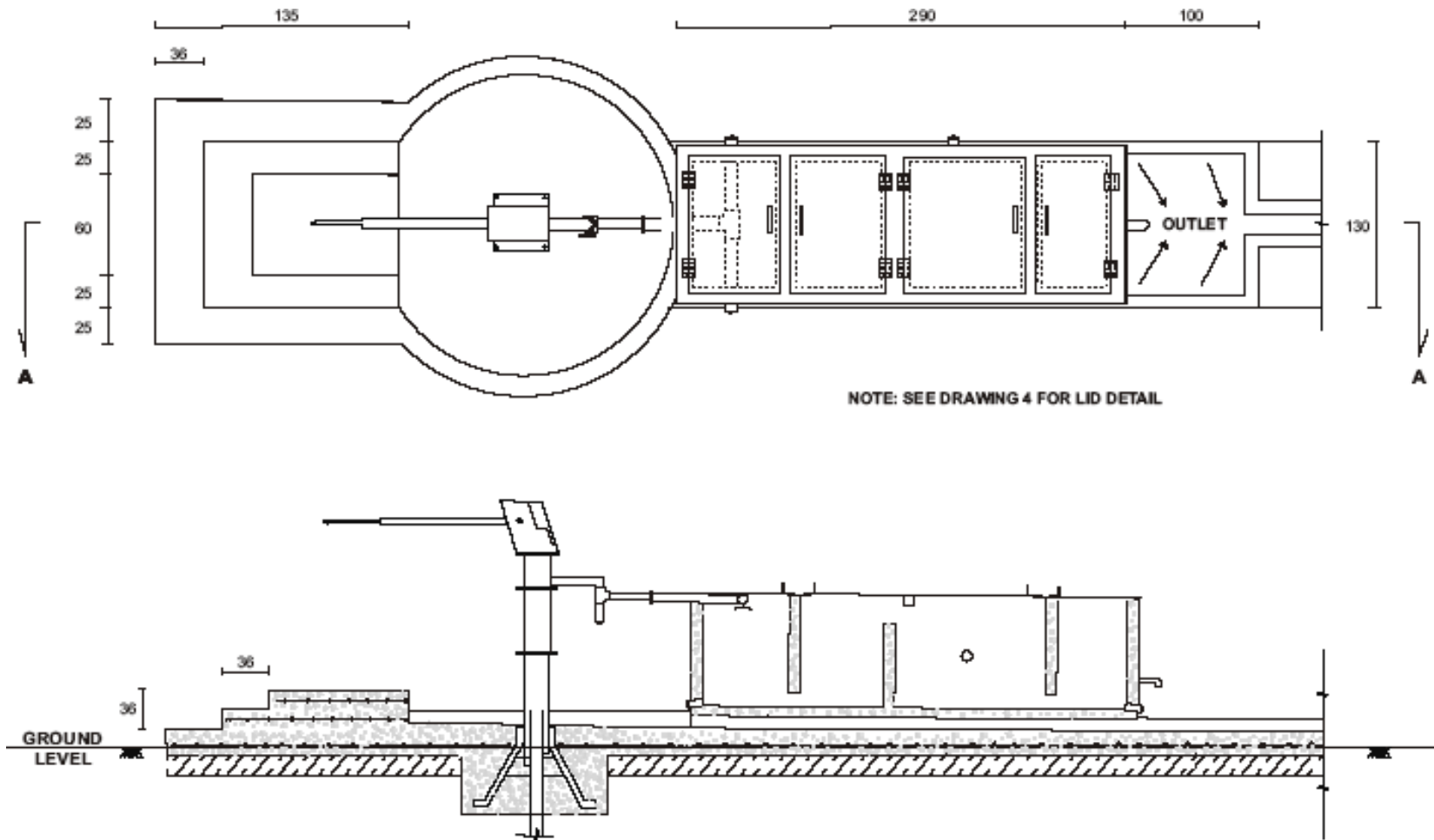
This is where the contractor will try to save

The community can help - form

# Setting Out



# Iron Filters Layout



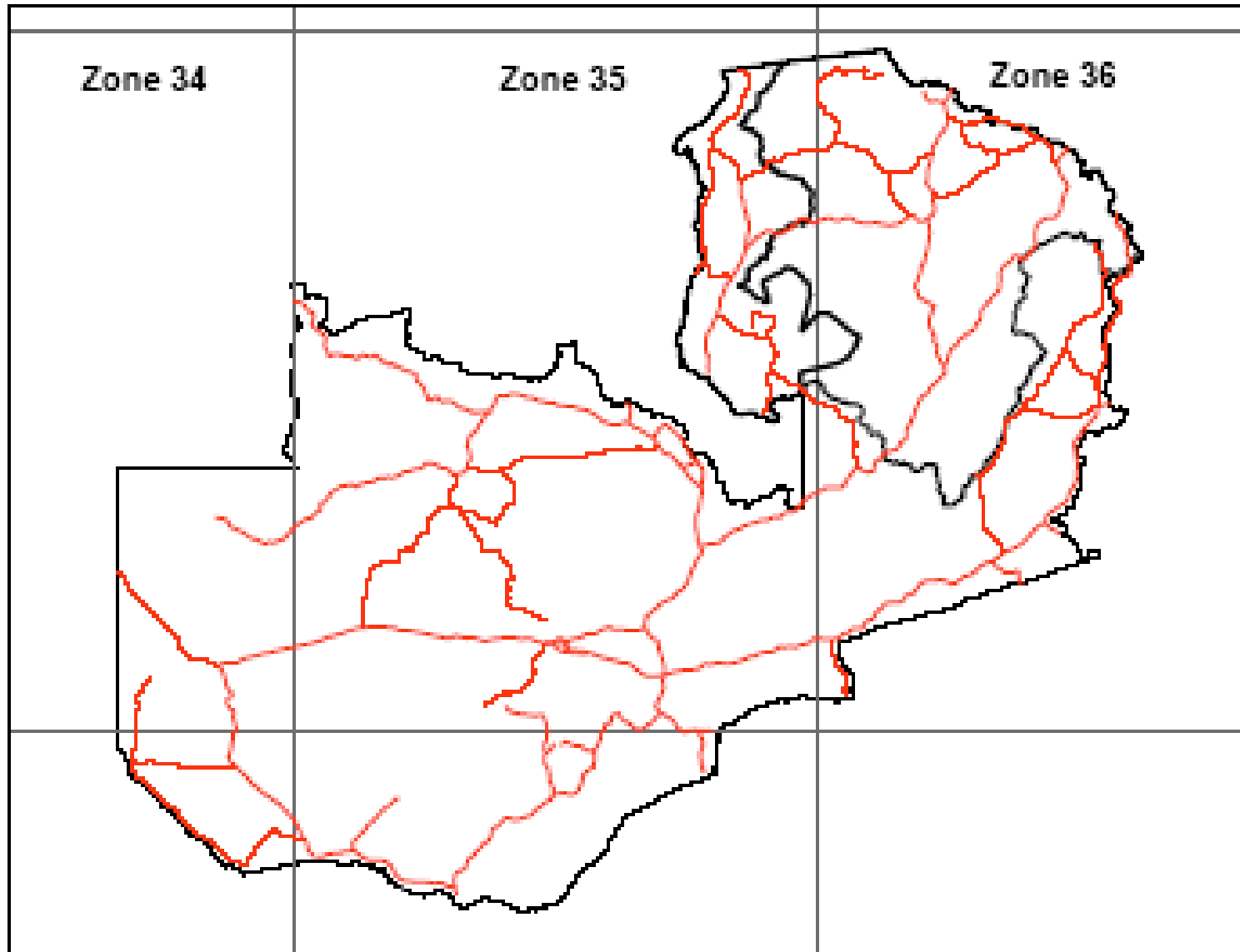
# Iron Filter Detail

- Level of construction much higher
- Essential to have enough head
- How to avoid cracks
- Are they sustainable
- Operation and Maintenance

# Use of GPS

- Use of GPS for locating villages
- Geophysical Survey A & B sites
- Tracklogs





# UTM Zones

# GPS

- Hddd.ddddd - Decimal Degrees
- Hddd°mm.ss.s' - Degrees, Minutes, Seconds
- Hddd°mm.mmm' - Degree and Minutes
- UTM - Universal Transverse Mercator

# Rehabilitation

- Not a lump sum per borehole
- Maximise use of available funds
- Assessments essential
- Contractor to assist with logistics

# Rehabilitation Assessment Form

- Try to identify boreholes that worked well for several years
- No point in wasting money on boreholes with poor quality or unreliable (go dry)
- Each itemAssessments essential
- Contractor to assist with logistics

# Rehabilitation Tender

- Tender for all rehabilitation construction?
- Use rehabilitation assessment to work out how much can be done with available funds
- Each possible site must be assessed - consultant is contractually paid to help you visit 25 sites.
- Should it be a small works contract?

# Contract Management

- Working Knowledge of the Hardware
- Knowing what is going on and where
- Supervising the contractor
- Understanding the contract
- Keeping track of the quantities

# Why are Contracts Important

Factors where knowledge of hardware can reduce failures:

- Inappropriate Location - Siting
- Borehole depth - WL changes
- Borehole diameter - filter/working
- Poor Quality - TDS/Fe/Turbidity
- Bent twisted casing - premature wear
- Alien Blockages - Dropped equipment
- Siltation

# Contracts

Large Documents full of legal language:

- Technical
- Bill of Quantities
- Retention



# How To Keep Track

The District must keep track of whats going on:

Main element is a way of organising information

- Break down into sections
- Checking invoices - Countersigned hard copies
- Database

# Borehole Codes

Essential to have unique ID for each site

- Code to Indicate District
- Code to indicate Ward
- Borehole Site A (Priority) and B (Backup)

# Knowing Whats Is Going on Where

- Now you have a way of identifying each community and borehole
- Earlier the better - standing time
- Planning

# Stretching Logistics

- Contractor will be happiest if you cannot get to the drill site
- Planning must be thought out
- Do not let yourself be bullied
- If unhappy about something – what do you do?

# Understanding the Contract

Only key sections need to be understood

- Technical Specification
- The BoQ works

# BoQ

- What is the Bill of Quantities
- Structured invoicing
- Legal aspects
- BoQ Detail

# The Bill of Quantities - BoQ

## Assumptions

Proportion of Hard and Soft Formations – drilling types

Average depths

Average length of screens

Average depth of cylinder

# The Bill of Quantities - BoQ

## Essential to keep track of each BoQ Unit

- For each Invoice
- Keep track of total amount left
- Averages good way to keep track



25

Water Engineer		District		Ward/s		Dates	
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# Community Consultation

- District to arbitrate in case of location conflict
- Community Agreement form
- Sites should be approved by Village and District
- Ensure hydrogeological information quality

# Objective of Contract

- Framework for establishing boundaries
- Technical Specifications
- Legal Framework
- Grey Areas – success of borehole criteria

# Progress Meetings and Minutes

- Provide a record of meeting and decisions
- Action Points - method to constrain time frames and techniques
- Minutes must be agreed and signed
- Legal redress if decisions and action points continuously ignored

# **Progress Meetings**

## **Essential Record of the progress of the project**

- **Consultant will be recording the minutes**
- **District should attend to make sure they are representative**
- **After the meeting the minutes are written up**
- **THEY MUST THEN BE APPROVED**

# Progress Meeting Format

- Format
- Who writes them?
- When are they agreed upon
- Legal redress if decisions and action points continuously ignored

# Progress Meetings Format

- **Opening Remarks**
- **First meeting - outline meeting structure**
- **Last meetings minutes**
- **Progress Statement by Contractor**
- **Progress Statement by Consultant**
  - **Action Points**
  - **Go through each construction activity**

# **Progress Meetings Format**

**ACTION POINTS do what you say**

- **Contractors will agree to anything you say in meeting with no intention of carrying them out.**

- **Set a date**

- **If not done – letter to contractor & MLGH**



# **Progress Meetings Format**

- **Progress Statement by District**
- **Logistics**
- **Invoicing**
- **Any Other Business AOB**
- **Date of Next Meeting**

# Supervision Forms as Contracts

- Each stage of supervision needs a signed form
- Signing of the form represents and agreement that the work has been carried out to satisfactorily.
- If you think something is wrong - state your reasons and do NOT sign the form

# Community Consultation

- District to arbitrate in case of location conflict
- Community Agreement form
- Sites should be approved by village and District
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# Contractor Issues

- How they will try to change boundaries
- Contract negotiations
- Dispute Resolution
- Papertrail

# Retention

- 10% of contract is retained
- 5% paid at completion of works once all snags sorted out
- Completion certificate
- Final 5% after 12 months from certificate

# Summary

- A lot of information in short time
- Break down into stages
- Take part in all activities
- Remember you do have support

**Thank You**