# Modern Borehole Logging & Database Management – A Geodata Lifecycle


Presented by:

**Simon Hardham**

BE. Hons (Civil Engineering)

COO - TabLogs

# Introduction

**The importance of a good site investigation**
Recap of why geo investigations are important to get right.

**Traditional Methods and how they differ**
Historically, borehole logging has been done manually, leading to issues such as data inconsistency, loss, and inefficiency.

**Why go modern now?**
Things like digital logging have existed for over a decade. Why are we seeing the industry shift now?

**Modern capabilities and the results**
What does digital logging and database management actually look like, and how does it impact engineering decisions and overall project success?

**Case Study – 124 Mile Pipe Replacemet**
A recent project and how modern logging allowed seamless operation of riggs simultaneously

# Site investigations are important

**Poor Geotechnical Investigations result in:**

- Design inefficiencies (Either over designed or under designed)
- Constructability issues
- Long term issues (settlement, subsidence, slope instability issues etc. )

**So let's optimise how we conduct them:**

- Collect data with consistency
- Avoid double/triple handling of data
- Establish version control
- Improve investigation oversight and collaboration
- Use existing data to complement new
- Use geo data properly throughout design phase

*"You always pay for Geotech, one way or another."*

Credit: James Daly – Geotechnical Engineer (2014)

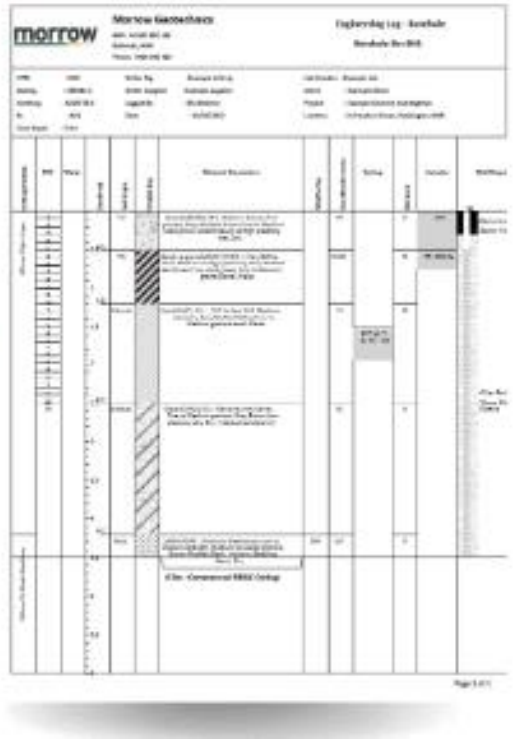
# Traditional Investigations

**Onsite:**

- Pen and paper

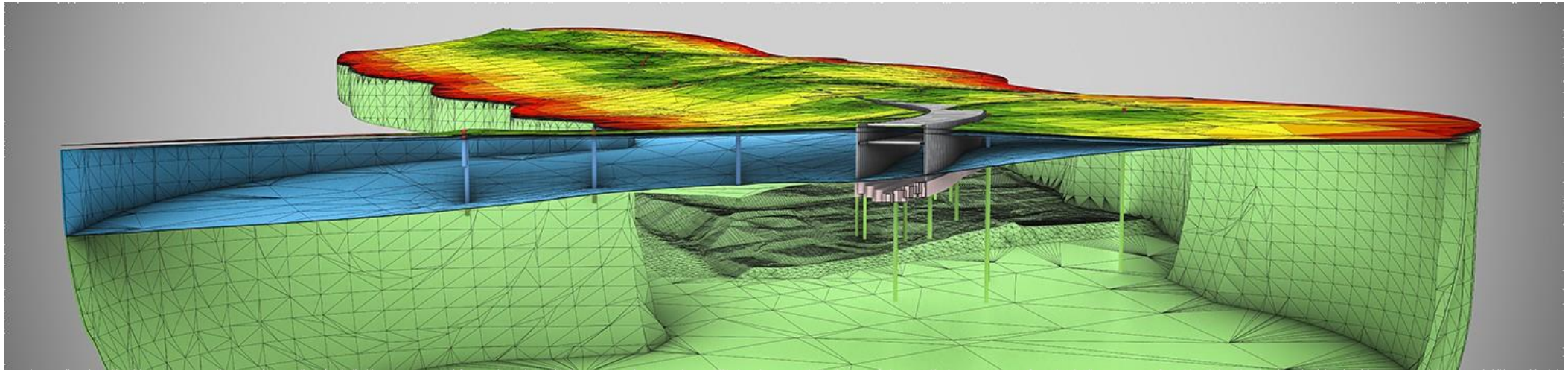
**In the office:**

- Data entry of hand written logs into gINT to produce first draft logs
- Produce site plan
- Produce your lab test request
- Re-typed your logs again to align with lab results
- Then a back and forth red-line review.
- Finally an interpretive report with recommendations is produced with all data attached as pdf’s in the appendices.



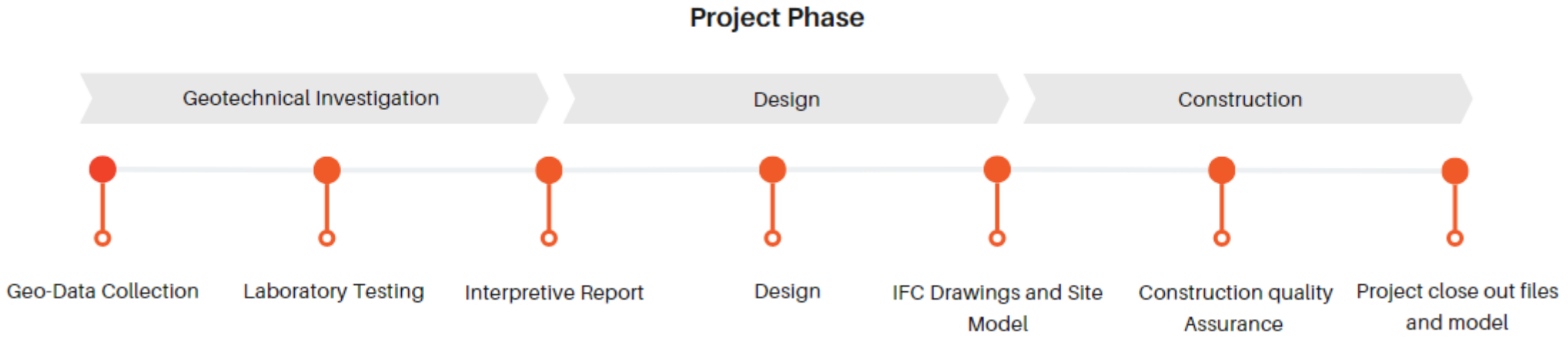
# So why are we changing now?

- Geo investigation are becoming more complex
- More project contributors who need to access and share the geo data.
- Design and modelling software is more accessible and readily used on projects.
- The Digital Twin movement is highlighting the value in brining geo data into design and construction phases of projects.
- Field software for digital data capture that gets user adoption.



# Modern geodata lifecycle

**To Collect, Report, Database and Share geo data in a high quality and cost-effective way.**



# Digital Logging

**Key features to digital logging**

- Asset owners can determine logging workflows available to staff in the field
- Data captured with parameter by parameter precision, the make logging quick but structured.
- GPS, direction and time stamped photos
- Rock core and testpit onsite scan’s
- Realtime data transfer back to the office for field staff guidance and support
- Live maps, site investigation methodology, geology maps and design drawings all onsite through the tablet
- Offline logging capability
- Programable QR code sample labels and stickers
- MWD graphs and comparison with logs and data onsite


*“Real-time monitoring allows me to review ground conditions and photographs of the drilling progress, enabling me to make informed decisions about designing groundwater monitoring wells. This feature provides a level of confidence akin to being physically present on-site, which was invaluable for ensuring the accuracy and efficiency of our work.”*

Mark Challoner - Principal Environmental Scientist (2024)

# Building Software for adoption

**The Key Features Digital Boring Log Software Needs**

## 1. Strong Foundations

- Designed with end users and robust architecture at the core.
- Developed through collaboration between software developers and geotechnical engineers.

## 2. Workflow and UI Focus

- Features tailored by specialists and refined with industry feedback.
- Parameter-by-parameter precision enables quick, structured data entry.

## 3. User Benefits

- People need to actually enjoy using it more than pen and paper

## 4. Support

- Ability to quickly ask questions in the field

# Modern Data Management Systems

1. **Data Ownership and Accessibility**
   - The asset manager owns and can access/export their data at any time
   - Data can be moved across any software using industry standard protocols, DIGGs & AGS
2. **Data Integration:**
   - Combines geotechnical, geophysical, and environmental data.
   - Centralized databases for comprehensive analysis.
3. **Real-Time Analysis:**
   - Instant processing and interpretation of data.
   - Facilitates timely responses to emerging issues.
4. **Data Security and Compliance:**
   - Robust security protocols to protect sensitive information.
   - Ensures compliance with industry standards.
5. **User-Friendly Interfaces:**
   - Intuitive tools for data visualization and analysis.
   - Accessible to both specialists and non-specialists.
6. **Adaptability and Automation:**
   - Flexible systems that adjust to project needs.
   - Automates routine tasks, reducing human error.

*"Appropriate software conforming to building information modelling (BIM) that facilitates the input of geotechnical information would reduce the risk of errors and speed up the analysis of data, which can be filtered for accuracy and tailored to meet specific project requirements. Cloud connected data management of geotechnical information would definitely be an improvement on older applications"*

**Nirmal Tiwari**
Civil Engineer (2022)

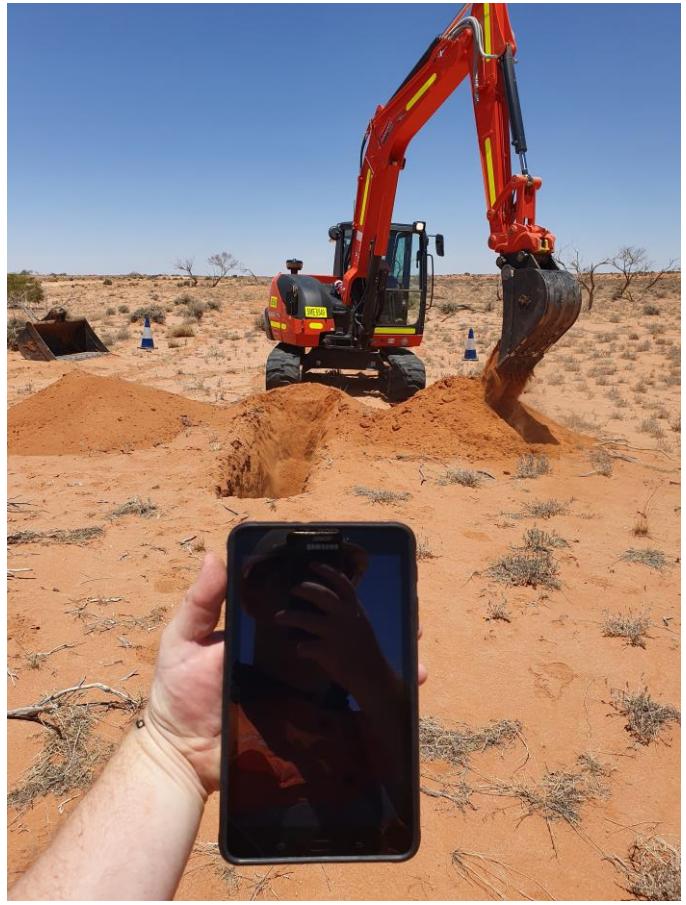
# Case Study – 124 Mile Borefield Water Pipeline

**The Project Scope**

- Replacement of a NPS24 Mild steel cement lined pipe
- Length 124 miles
- The existing pipeline alignment was in poor condition need to be replaced asap.
- Design was done concurrently with the geotechnical investigations to expedite construction

# Case Study – 124 Mile Borefield Water Pipeline

- A total of 150 test pits were carried out along the alignment
- Onsite digital logging and database management was leveraged to provide real-time data and reports to designers
- This resulted in better design and a saving of 250,000 tons of imported pea gravel and ~$35m saving.



# Results and Lessons Learned

**1. Geodata lifecycle has expanded:**

- Modern logging and data management tooling now make it possible to properly leverage your geodata to add value across a projects entire life.

**2. Traditional logging:**

- Given todays project quality, complexity and collaboration requirements, traditional logging is slowly becoming untenable.

**3. Digital logging:**

- Offers both the consultant and the client substantial savings.
- A quality data collection process is key in building a quality database to be leveraged.
- Field hardware and software usability is now at the point where field logging apps are gaining wide-spread adoption across the industry

**4. Modern Geodatabase:**

- It will allow you to effortlessly take you geodata where it needs to go. Whether its CAD, AGS, DIGGS, GIS etc.
- Allow you to properly leverage historical data alongside new.