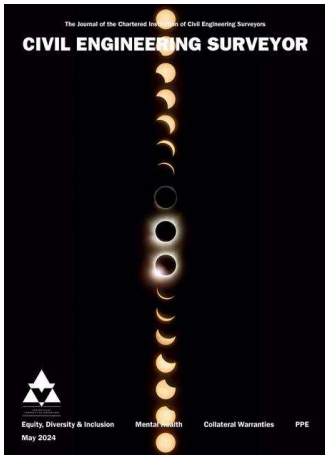

GeoWorx
CAPABILITY OVERVIEW
INFRAMARA
Digital Twins,
Site Investigations &
Latent Conditions
Elysian
3 Axis Cloud
TRUSTED. ACCURATE. REAL-TIME.
02 GeoPhysical
03 GeoTechnical
Can you tell if this project is an asset or a liability?
We can
Digital Ground Data Acquisition and Management Platform

Reference

This presentation is an extension on a paper written by

- Johan Van Straveren
- David Kinlan
- Jason Errey

https://journals.cices.org/ces/ces-may-2024/features/challenges-in-site-investigation-for-infrastructure-projects



SITE INVESTIGATION

Challenges in site investigation for infrastructure projects

Johan van Staveren, Geotechnical Engineering Specialist, Van Oord, David Kinlan, Contracts Director, Inframara, and Jason Errey, Director, OEMG Global, with Dr Euan J Provost, Surveyor, OEMG Global

Tendering processes and risk management

THERE are numerous examples of major cost blowouts in civil infrastructure projects in Australia. A recent audit of the AU$120bn Australian federal infrastructure pipeline revealed AU$33bn in currently forecast overspend. Worse still, this figure is expected to rise, as many projects are yet to commence.

As a result of the overspend, the government has flagged infrastructure projects are likely to be cut, however, no criteria have been made available for stakeholders and communities to understand if their projects are at risk, causing substantial anxiety.

Two notable and recent examples of projects experiencing overruns are the Melbourne City West Gate Tunnel (WGT) project and Snowy Hydro 2.0. Together these projects represent AU$14bn in cost over-runs. Both projects share a similar issue, namely insufficient acquisition of site data, and poor communication of data that has resulted in an underestimation of risk.

The WGT Project is projected to create 1.5 million m3 of tunnel spoil (excavated rock and soil), over an 18-month period. During excavation on the WGT Project PFAS (per- and polyfluoroalkyl substances) soil contamination was discovered. PFAS is a 'forever' chemical linked to liver disease, fertility issues and cancer amongst other complications.

The regulator rightly determined that the excavated soils required treatment prior to disposal, resulting in tunnelling being delayed for a number of years.

Assessment of the likely levels of contamination were clearly underestimated, despite the knowledge of the site history and its industrial heritage.

The Victoria State Budget in 2022 revealed a massive AU$4.7bn cost blowout to the project. It is now projected to cost AU$10.2bn to complete and will be delivered eight years late.

There is a lack of transparency regarding the work or costs associated with the ground modelling for this project, which is typical for infrastructure programmes throughout the world.

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Snowy Hydro 2.0 is located remotely within the Kosciuszko National Park in the Snowy Mountains of New South Wales. In essence, the Snowy Hydro 2.0 system will link the Talbingo Reservoir (bottom storage) and Tantangara Reservoir (top storage) via 27km of new tunnels.

The project also includes a new power station which will be located in a cavern some 800m underground.

In October 2023, the Australian Broadcasting Corporation's programme Four Corners investigated the problem-plagued Snowy 2.0 pumped hydro project, shedding light the current situation: A bogged tunnelling machine, an unexpected volume of sludge and toxic gas.

This investigation provided unusual insight into the ground modelling studies and costs for major government infrastructure.

In August 2023, the federal government further increased funding for Snowy 2.0 to AU$12bn – triple the October 2018 figure, when the final decision was made to go ahead; and six times the initial AU$2bn estimate that was claimed it would cost when originally proposed in March 2017.

The Four Corners programme reported on the geotechnical assessment, and that as much as AU$2bn of the cost over-runs, can be attributed to an intersection of; poor decision making, inadequate ground characterisation and ground conditions that were worse than foreseen.

The bogged tunnel boring machine (named Florence) stalled when a sinkhole appeared just 150m after it started operations.

While engineers had expressed concerns regarding uncertainty about the ground during the feasibility stage, the request for more geotechnical information was turned down by project engineers.

The project engineer acknowledged that it was understood that Florence was proceeding into soft ground, however both the softness and extent of this ground were underestimated, to the extent that the machine was stopped due to inflowing sludge that caused a sinkhole to

Cutting to the chase

Siloed analogue ground data results in decentralised decisions that lack accountability and cost ground connected projects cumulatively, $100's of Billions every year.

Multiple studies conclude that 50% of total project overruns are related to latent ground conditions, poor risk management of ground conditions and combative contracts attempting to manage the unlimited cost and time blow-out potential of unknown ground conditions.

50% of Projects fail because of poor ground modelling

*Engineers Australia

Australian Mega Project failures in the news

Snowy Hydro 2.0 – $100+ Spend on Ground Studies

West Gate Tunnel – $4Billion Overruns PFAS

Snowy 2.0 tunnel-boring machine grinds to halt and hole appears on surface

7.30 / Exclusive by Ashlynne McGhee

Posted Sun 12 Feb 2023 at 10:37am, updated Mon 13 Feb 2023 at 9:47am

The complexity of the geology has been long known, but Snowy Hydro CEO Dennis Barnes said recent additional surveying of a fault zone confirmed the need for another machine.

"We've carefully considered a range of options to get through the fault zone and overcome the initial design immaturity," he said in a statement.

West Gate Tunnel project faces $4b blowout amid contaminated soil crisis

Timna Jacks

June 16, 2021 — 5.09am

'Gut-wrenching' reality for homeowners in sinking Sydney suburb

Glass smashing without warning and cracks up to the roof. This is the reality for homeowners in a Sydney suburb that's sinking.

Ally Foster

@allyjfoster 2 min read May 19, 2021 - 10:37AM

The Obvious

"You pay for soil investigation, whether you have one or not!!"

G. S. Littlejohn, author of
Ground: Reducing the Risk.
Thomas Telford (1994)

'...and we can save 700 Lira by not taking soil tests.'

Illustration from Craig and Jones (1985)

Legal Developments

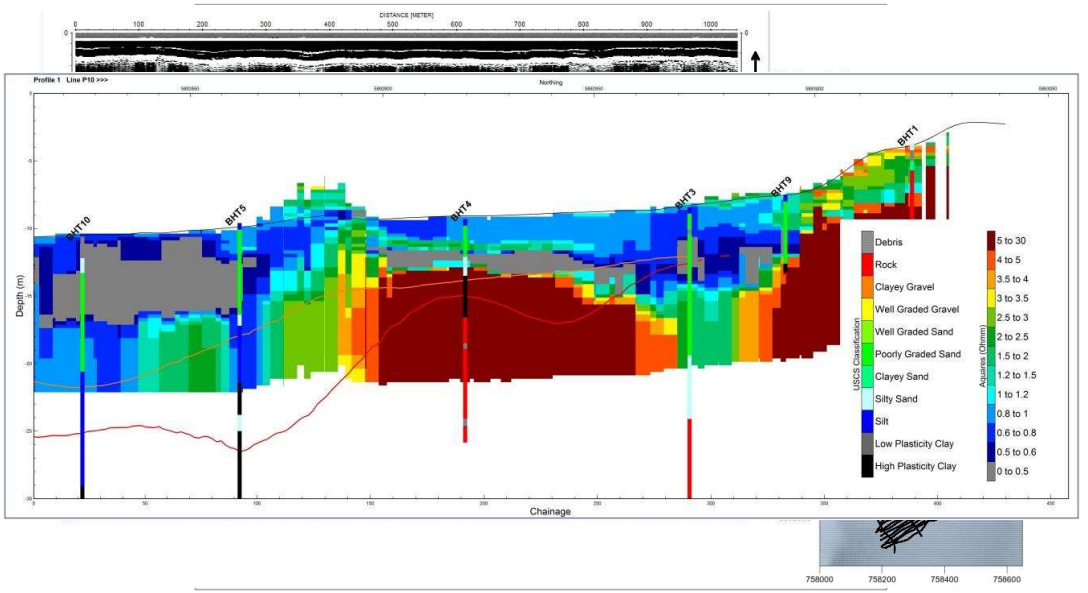
- Obrascon Huarte Lain SA v Her Majesty's Attorney General for Gibraltar [2014] EWHC 1028; [2014] BLR 484 ("Obrascon")

- Van Oord UK Ltd and SICIM Roadbridge Ltd v Allseas UK Ltd[2015] EWHC 3074 (TCC) ("OSR")

Trust Anchors

All jobs fail for the same reasons

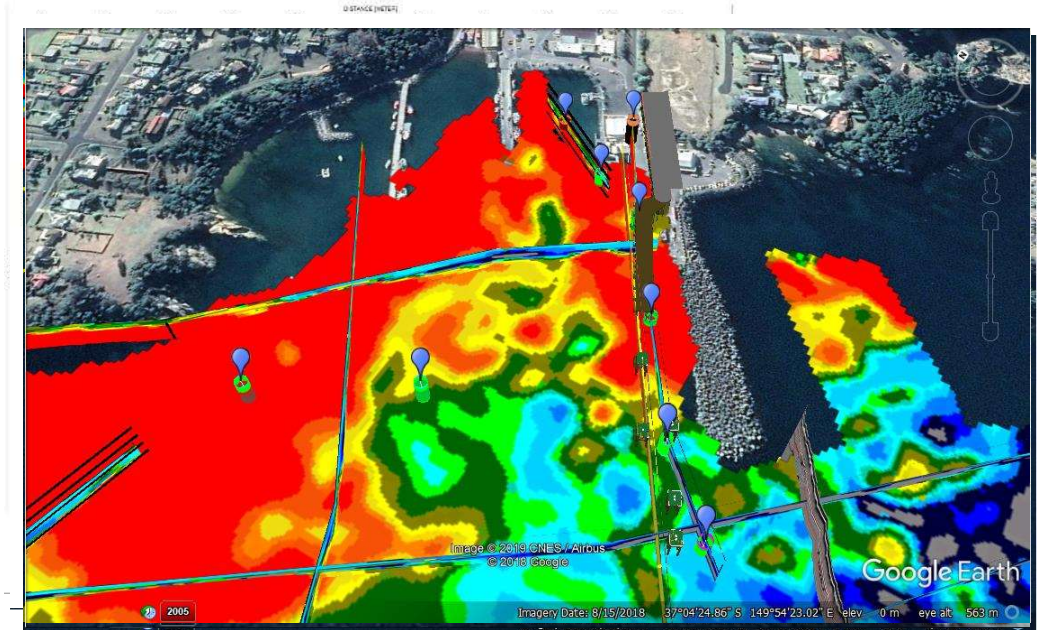
- No Data Acquisition Strategy
- No Data or Data Provenance Strategy or Policies
- No Enforcement of Data Policies
- No Accountability for exceptions
- No Expert/non-expert Communication Strategies
- No Connections between decisions and Data



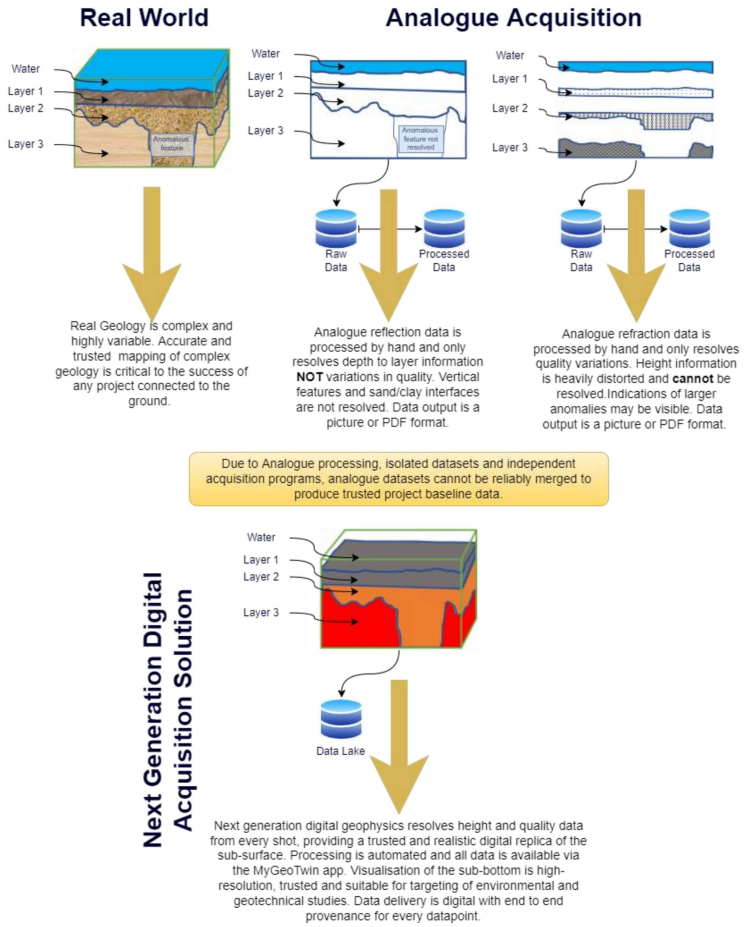
Same Reasons, Different Job

Exception Reporting and Accountability

Project Managers must be able to keep control of not only who collected what data when, where and why, but also who made what decisions, when where and why



More Boreholes Right



Today's Ground models are 10% data and 90% interpretation and cannot be verified. Next Generation Digital Ground Modelling is 90% data and 10% interpretation, fully verified and transparent.

End the Blame Game

"the contractor cannot simply accept someone else's interpretation of the data and say that is all that was foreseeable."

Akenhead J

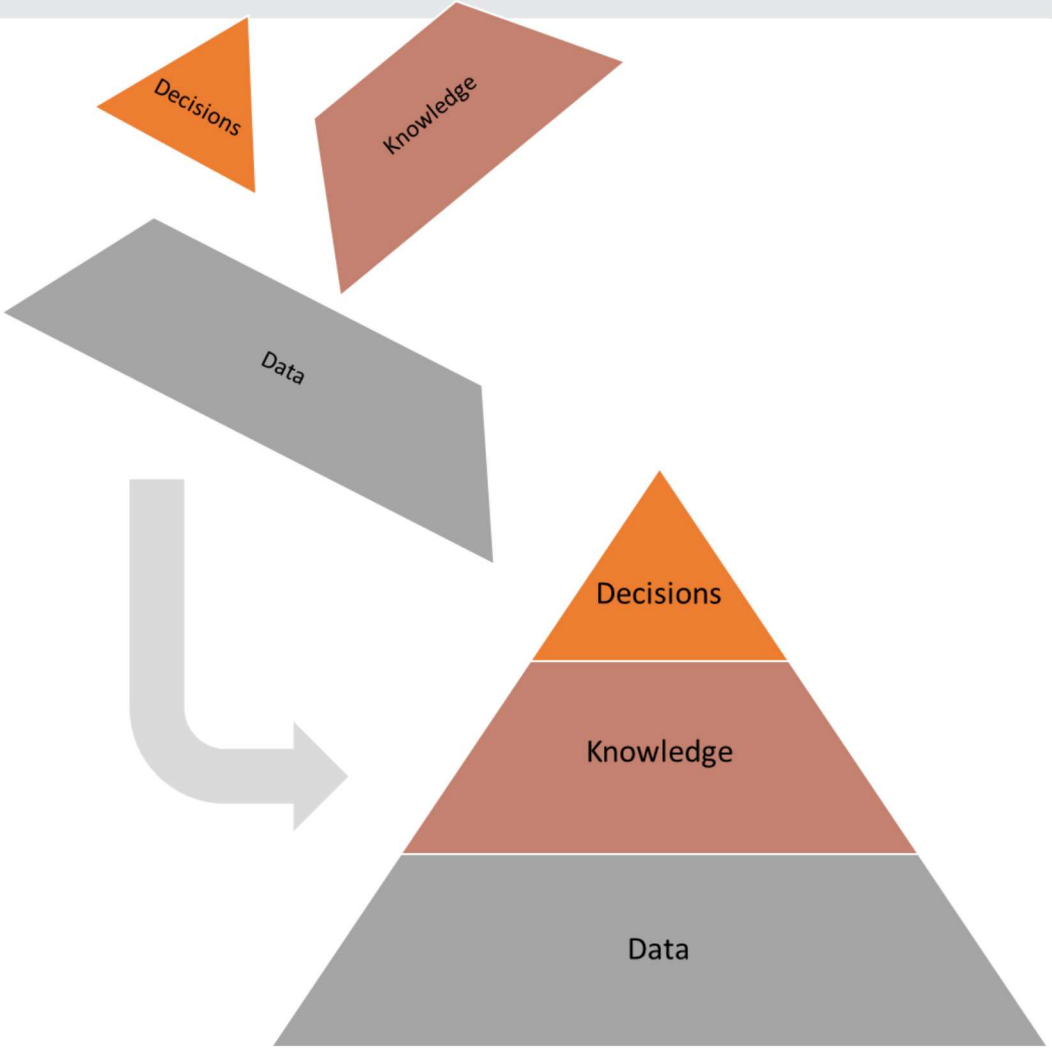
"...every contractor knows that ground investigations are only 100% accurate in the precise locations in which they are carried out, and that it is for an experienced contractor to fill in the gaps"

Coulson. J.

Trust in Decisions

Today, there is little connectivity between the decisions made and the data that supports those decisions.

Connecting decisions directly back to verified data is critical to increasing trust, compressing action timelines and reducing error.

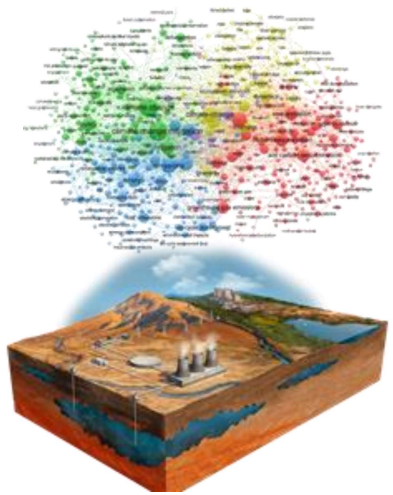


Reality Today

Where We Are Going?

INFRAMARA GeoWorx

Data Challenge



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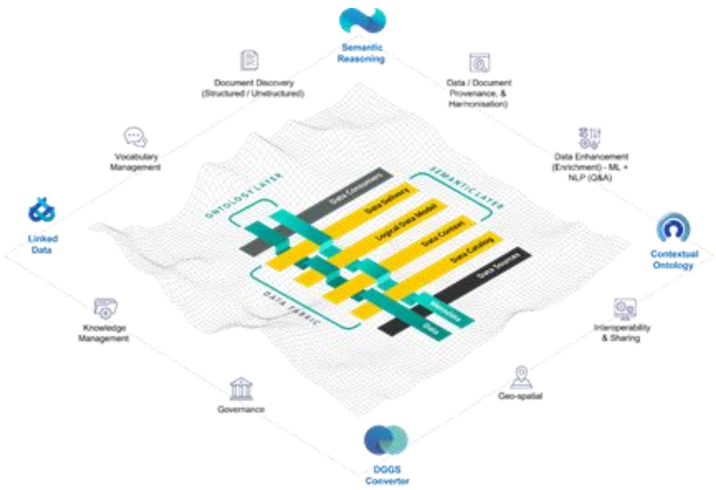
The Path



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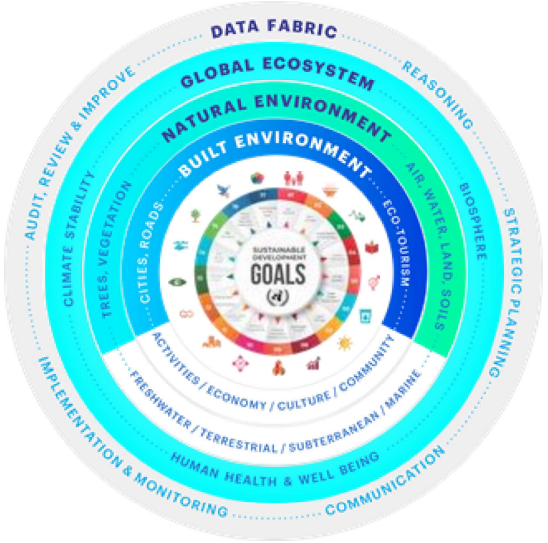
The Outcome

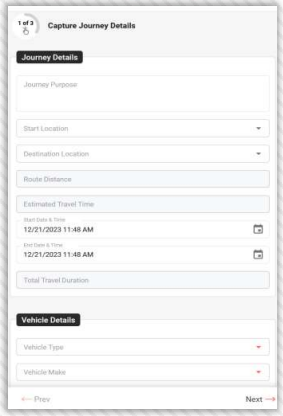


DESIGN ANALYSE SIMULATE VERIFY REPEAT

Data Foundations

Create your form, **Collect** your Data, **View** the Report, **Connect** your Data

MOBILE BASED DATA CAPTURE



FUNCTION SPECIFIC DIGITAL FORMS

GEOWORX SOFTWARE

- GEOTECHNICAL DATA MODULE
- GEOPHYSICS DATA MODULE
- ENVIRONMENT DATA MODULE
- SPATIAL DATA MODULE
- PEOPLE STUDIES & GOVERNANCE DATA MODULE
- UNIFIED DATA ADMINISTRATION

CENTRAL REPOSITORY OF DIGITAL FORMS, LOGS

CENTRAL REPOSITORY OF OBJECTIVES LIST & TASKS

CENTRALISED DATA FOR UNIFIED REPORTING

OPEN API ACCESS

REAL-TIME CUSTOMISED DASHBOARDS, ROLE BASED ACCESS

CLIENT SPECIFIC DASHBOARD

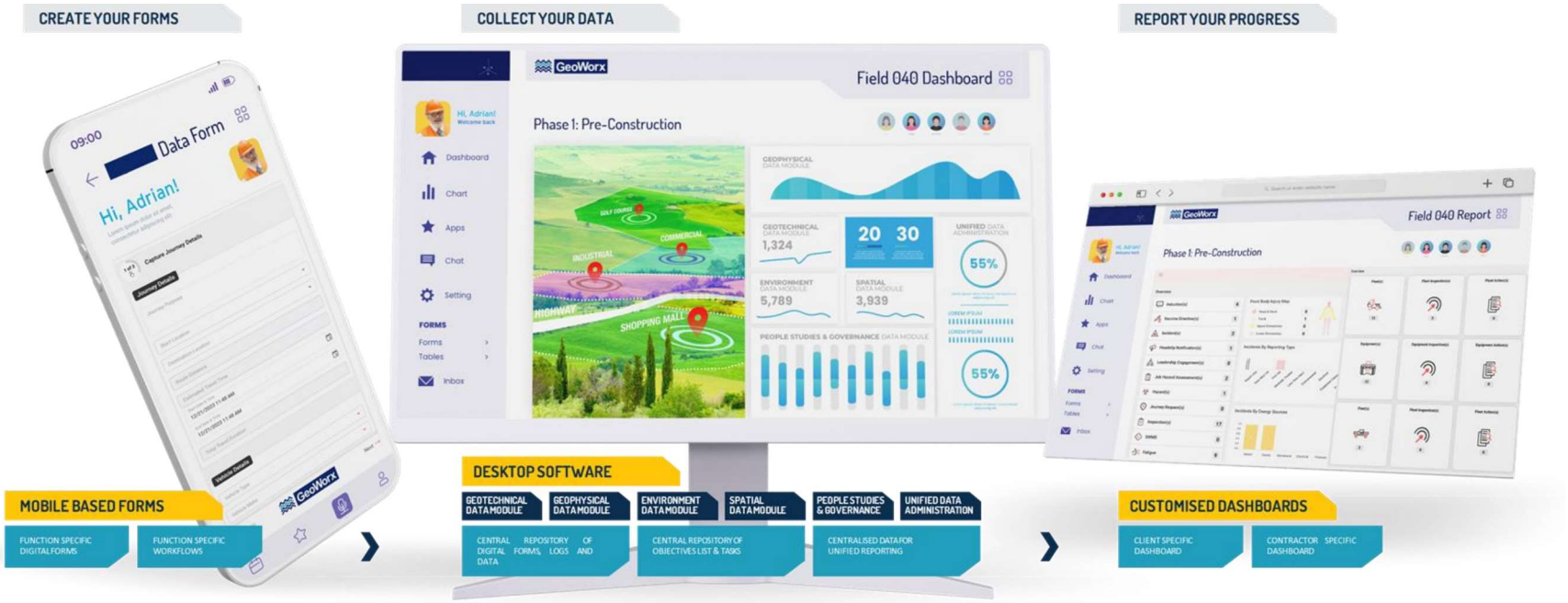
CONTRACTOR SPECIFIC DASHBOARD

GeoWorx Platform

INFRAMARA GeoWorx

Easier, smarter, more intelligent field data management

Designed to make life easier for field data and mitigate risk, Elysian is an intelligent platform with clever form capture, data integration and reporting that serves all of your stakeholders by enhancing collaboration, control, access to data and optimising efficiency along the entire project life cycle. Through digitalisation of every touch point, construction companies can effectively manage and safeguard their projects using this easy to use, smart platform that ensures your project is a success from the get-go.

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