geolutions

AN INDEPENDENT GEOTECHNICAL SPECIALIST

Updated Version **2025 / 2026**

COMPANY PROFILE

Designed by: Daphne Ong

INTRODUCTION

HISTORY

2022

- Founded in 2022
- Conducted 1st 90,000kN Bi-directional static Pile Load Test

2023

- Awarded inaugural multi-million dollar foundation testing LTA project
- Awarded first integrated recharge well LTA project (design-build-maintain-remove)

2024

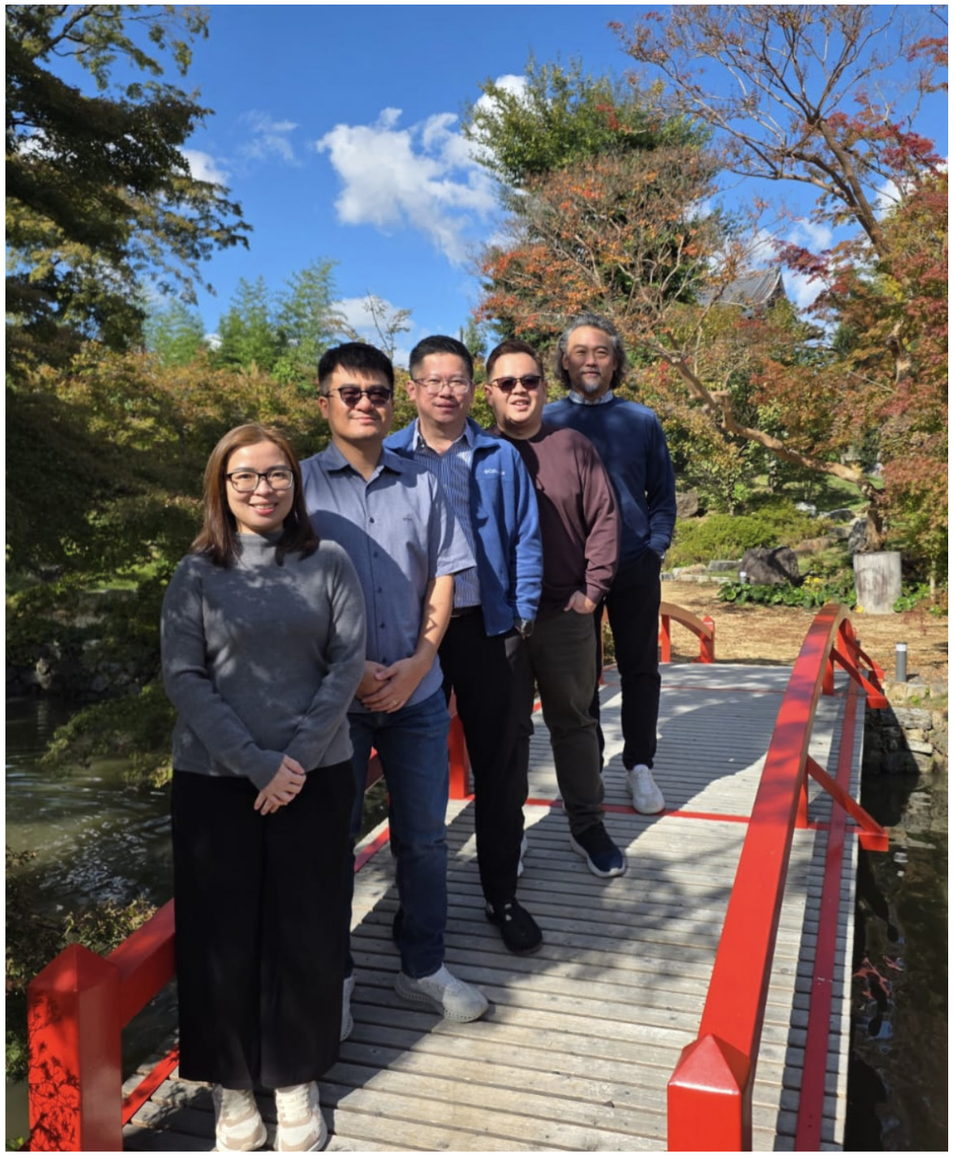
- Secured first multi-million dollar ground improvement LTA contract
- Completed first 60,000kN kentledge set-up with pile instrumentation and interpretive report
- Boosted site investigation works capacity with 11 new Hanjin drilling rigs
- Awarded multiple foundation testing and site investigation scopes at MBS IR2

2025

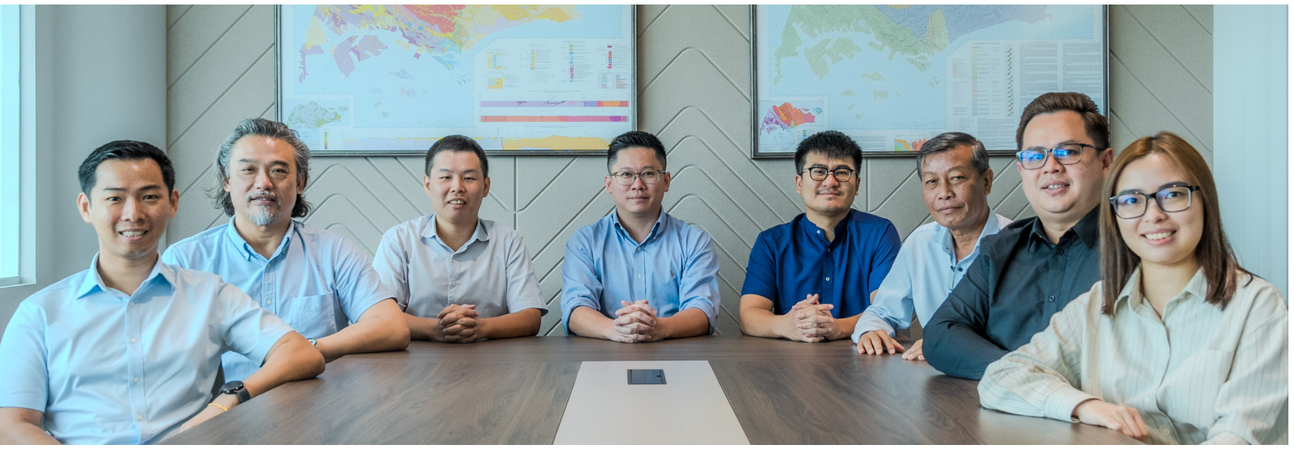
- Expanded equipment fleet with 5 micropile drilling rigs for ground engineering works
- Awarded first micropile CAG project
- Delivering first ERSS works LTA project
- Won contract for multiple foundation testing services in T5
- Maintained a 90-member team to support industry demands

WHO ARE WE

Fit for purpose is our guiding principle, a question we constantly pose to ourselves in our daily tasks. This commitment to delivering work that meets and exceeds our clients' needs drives our team and defines the quality of our output. As we delve deeper into the realm of geotechnical specialist contractor work, our ability to serve our clients as a comprehensive solution provider only improves. Gone were those days of settling for the bare minimum, choosing instead to go the extra mile to understand and address our clients' challenges. This dedication to going beyond for our clients than what's expected is also a valuable learning experience for us all.



OUR TEAM



CHRIS CHENG → MANAGING DIRECTOR | CO-FOUNDER

Chris Cheng is the co-founder and Managing Director of the company, with over 14 years of experience in foundation testing and pile instrumentation. His academic background includes a Bachelor of Science in Construction Management from RMIT and a Bachelor of Engineering in Civil Engineering from the Singapore Institute of Technology, giving him a unique blend of engineering expertise and project management insight.

Chris leads the company's business development and financial operations, driving strategic growth and operational efficiency. His hands-on approach and commitment to quality have been instrumental in expanding the company's footprint and delivering high-performance geotechnical solutions across the region.

JAMES WONG → MANAGING DIRECTOR | CO-FOUNDER

James Wong is the co-founder and Managing Director of the company, bringing over 13 years of experience in geotechnical engineering. With a strong specialization in Bi-directional Static Load Testing (BDSLT) and Instrumentation & Monitoring, he has played a key role in shaping the company's technical capabilities and reputation for innovation.

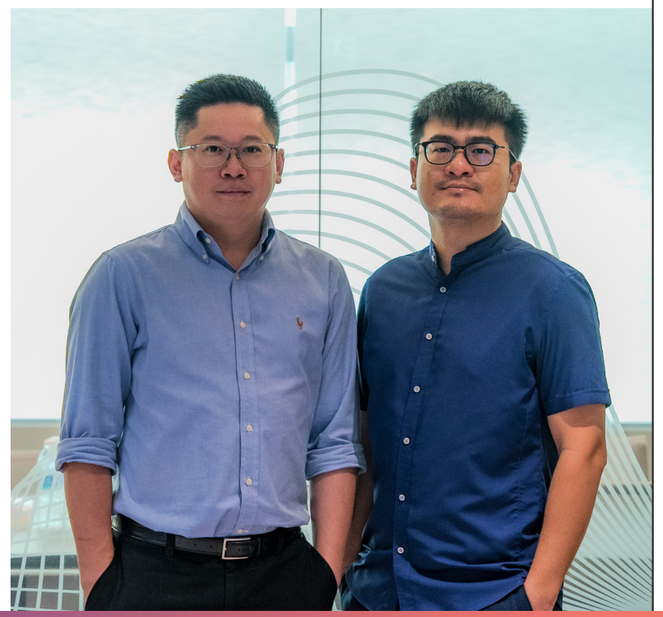
He holds a Bachelor of Science (Honours) in Geology from The National University of Malaysia and has built a career defined by precision, reliability, and a deep understanding of ground behavior and instruments data. James oversees the company's Soil Investigation and Instrumentation & Monitoring operations, ensuring each project is executed with technical rigor and a commitment to excellence.

ER. GOH KEK POH ↓

TECHNICAL DIRECTOR | PROFESSIONAL ENGINEER (CIVIL & GEOTECHNICAL)

Er. Goh Kek Poh is a licensed Professional Engineer (Civil & Geotechnical) and Technical Director with over 13 years of experience in civil and geotechnical engineering. He holds a Bachelor of Engineering in Civil Engineering from the University of Malaya and a Master of Science in Civil Engineering (Geotechnical) from the National University of Singapore.

A key member of the company, Er Goh leads with deep technical expertise and hands-on project experience. He has successfully delivered a wide range of projects, from building structures to complex foundation systems, including earth retaining stabilizing system, ground improvement, pile load testing, soil investigation, shallow/deep foundation and soil–structure interaction. With a strong focus on innovation, safety, and value engineering, Er Goh consistently delivers practical and reliable solutions that meet the highest industry standards



LEE YEONG KANG ↓

TECHNICAL MANAGER

Yeong Kang brings more than 13 years of specialized experience in geotechnical engineering and foundation testing. As the Technical Manager at Geolutions, he oversees technical operations, project execution, and engineering development. He holds a Bachelor's Degree in Civil Engineering (Hons) from Universiti Tenaga Nasional, Malaysia, and is a certified Resident Engineer (RE), Geotechnical Instrumentation Engineer (GIE), and Project Management Professional (PMP).

He has delivered complex geotechnical projects across Singapore, Malaysia, Hong Kong, Vietnam, and the Philippines, with extensive expertise in Rapid Load Testing (RLT), Bi-Directional Static Load Tests (BDSLT), borehole magnetometry, Cone Penetration Tests (CPT), high-strain dynamic testing (PDA), Ground Penetrating Radar (GPR), and distributed fiber optic sensing.

Backed by strong field experience in instrumentation, data acquisition, analysis, and reporting, Yeong Kang is well regarded for his geotechnical interpretation skills and his ability to provide precise, reliable solutions for major infrastructure and high-rise developments across Southeast Asia.

Our co-founders

Photo credits: Lee Yeong Kang

JOSEPH LING

HEAD, FOUNDATION TESTING

Joseph Ling heads the Foundation Testing division, bringing over 13 years of experience in foundation testing and pile instrumentation. He is an Approved Signatory of SAC-SINGLAS for all scopes under the company's foundation testing schemes and an Accredited Geotechnical Instrumentation Engineer with the Geotechnical Society of Singapore.

Joseph's deep technical knowledge and commitment to quality ensure that testing operations meet the highest standards. His data-driven approach supports safe and efficient foundation design, reinforcing the company's reputation for reliability and excellence.

SANDY HO

HEAD,
BUSINESS SUPPORT

Sandy Ho leads the Business Support division with over 13 years of experience in the construction industry. Her expertise in contract management and financial planning ensures smooth and compliant operations across all projects.

She plays a vital role in budgeting, cost control, and regulatory compliance, aligning business operations with strategic growth objectives. Sandy's collaborative leadership and focus on operational excellence make her an essential part of the company's success.

FABIAN TAN

HEAD,
GROUND ENGINEERING

Fabian Tan brings 28 years of experience in ground engineering and underground construction. He holds a Bachelor's Degree (Honours) in Construction & Project Management from the University of the West of England (Bristol) and a Specialist Diploma in Underground Construction from BCA Academy, Singapore.

Fabian has led major infrastructure projects across Singapore, including MRT stations, deep tunnel sewerage system (DTSS), and PUB and SP Group (NS2) excavations. His expertise includes Ground Improvement Works, NATM tunneling, ERSS shaft sinking caisson method and soil stabilization techniques. Known for his strategic planning and safety leadership, Fabian continues to drive innovation in ground improvement works.

AUNG MOE

HEAD, SITE INVESTIGATION

Aung Moe is the Head of Site Investigation, with over 30 years of experience in geotechnical engineering. He graduated with a Bachelor of Science (Honours) in Geology from Yangon University in 1992. Aung Moe was trained by British Geological Survey (BGS) during the development of Singapore's lithostratigraphic framework through core logging and geological interpretation.

Aung Moe specializes in site investigation and instrumentation & monitoring, with a proven track record as a Project Manager on complex engineering projects. His meticulous approach and deep technical expertise ensure accurate subsurface assessments and reliable data for design and construction. Aung's leadership continues to uphold the company's commitment to quality and innovation in geotechnical services.

CERTIFICATIONS & ACCREDITATIONS

Our commitment to continuous improvement and adherence to industry best practices is reflected in the certifications and accreditations we have earned over the years. These include internationally recognized standards such as ISO certifications, regulatory approvals, and professional memberships that affirm our expertise and reliability.

BCA

Licenced Builders

- SB(GS): Specialist Builder (Ground Support and Stabilisation Works)
- SB(IM): Specialist Builder (Instrumentation and Monitoring Work)
- SB(PW): Specialist Builder (Piling Works)

Registered Contractor

- CR12: Ground Support & Stabilisation Works
- CR15: Site Investigation, Instrumentation and Monitoring Works

BIZSAFE LEVEL: STAR

- ISO 9001:2015 – Quality Management Systems
- ISO 45001:2018 – Occupational health and Safety (OH&S) management systems

SAC-SINGLAS ACCREDITATION

ISO/IEC 17020: 2012

- Scheme: Inspection Bodies | Field: Site Investigation and Instrumentation & Monitoring

ISO/IEC 17025:2017

- Scheme: Laboratories | Field: Civil Engineering, Pile Testing

These certifications reflect our dedication to continuous improvement customer satisfaction, and adherence to global standards.

At Geolutions, accreditation is not a symbolic achievement—it is a strategic commitment. We approach the certification and licensing process as a valuable opportunity to reinforce our organisational framework, elevate operational standards, and drive sustainable growth. Each credential we earn reflects our dedication to building a resilient, accountable, and forward-looking company that our clients can trust with confidence.

TRUSTED BY CLIENTS, **STRENGTHENED** BY STANDARDS

Geolutions has successfully delivered a wide range of geotechnical services across numerous projects in Singapore. Our track record includes:

WITHIN 5 YEARS

305
STATIC PILE LOAD TESTS

529
RECHARGE WELL INSTALLATIONS

384
CALIBRATED SPT HAMMER INSTALLATIONS ON DRILLING RIGS

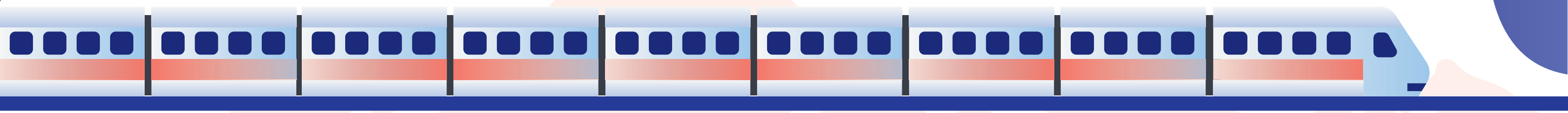
172
FOUNDATION CORING OPERATIONS

1,803
DYNAMIC PILE LOAD TESTS

TRACK RECORD (LTA)

HIGHLIGHTED PROJECTS FOR 2024/2025

GEOLUTIONS



CR101 CR102 CR103 CR105 CR106 CR107 CR108 CR110 CR111 CR112 CR116 CR117 CR202 CR203 CR205 CR206 CR208 CR209 CR211

J102 J111 J112 J113 J115A

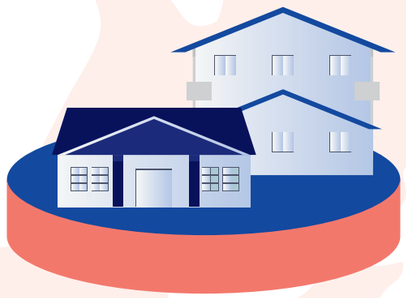
N102 N103 N108 N113

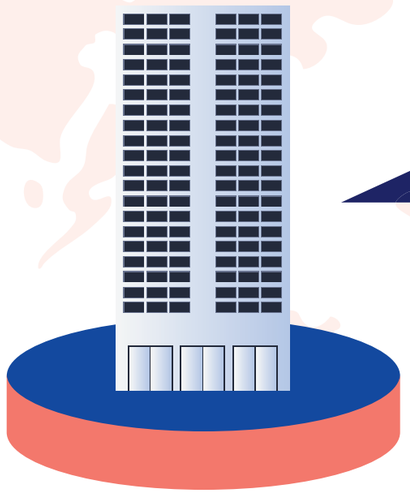
TRACK RECORD

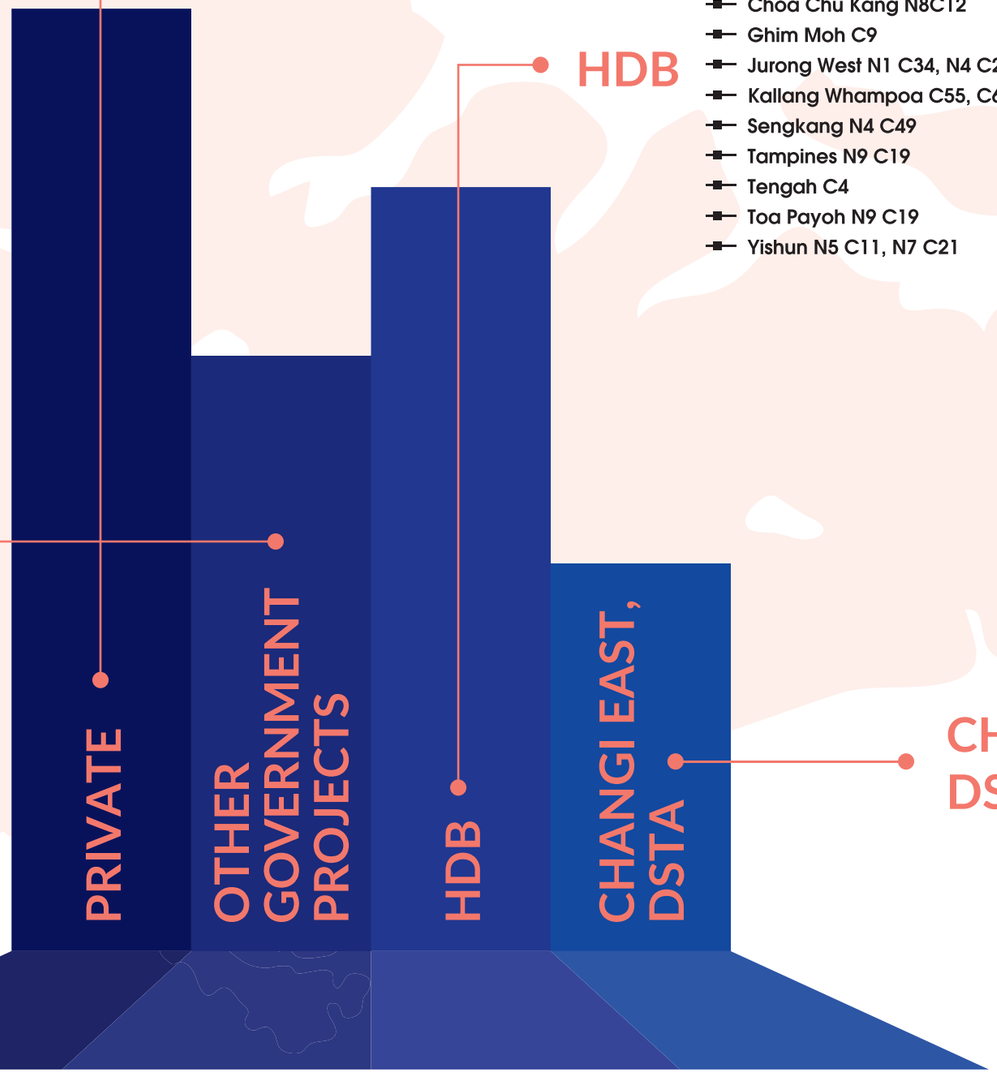
HIGHLIGHTED PROJECTS FOR 2024/2025

PRIVATE

- Vanguard International Semiconductor Corporation at Tampines
- VisionPower Semiconductor Manufacturing Company Plant at Tampines
- United Microelectronics Corporation at Pasir Ris
- Headquarters of Quek & Quek CEPL at Woodlands
- New Science Centre at Jurong Lake Gardens
- Singapore 2 Data Centre at Loyang Crescent
- Jalan Boon Lay Data Centre
- DayOne data centre at Jalan Buroh
- Singtel Green Data Centre at Tuas
- YTL Powerseraya - Electrical building and CCGT at Seraya Avenue
- Marina Bay Sands, Integrated Resort 2 at Bayfront Avenue
- Prima Food Factory at Jurong Port Road
- Private Residential, Media Circle Residences at Media Walk
- Private Residential, Coastal Cabana EC at Pasir Ris
- Private Residential, Aurea at Beach Road
- Private Residential, The Myst at Upper Bukit Timah Road
- Private Residential, Norwood Grand at Champions Way
- WuXi STA Pharmaceutical Manufacturing Facility at Tuas
- Golden Mile Complex Redevelopment
- Mandai Rainforest South at Mandai





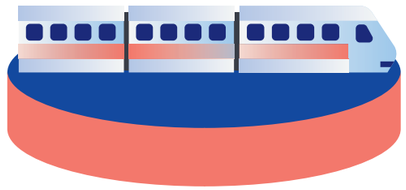


HDB

- Bayshore C2
- Bishan C36
- Bukit Merah C51
- Bukit Merah C54
- Choa Chu Kang N8C12
- Ghim Moh C9
- Jurong West N1 C34, N4 C22
- Kallang Whampoa C55, C60, C70
- Sengkang N4 C49
- Tampines N9 C19
- Tengah C4
- Toa Payoh N9 C19
- Yishun N5 C11, N7 C21

CHANGI EAST, DSTA

- C02
- C08
- C09A
- C11
- C12
- C15A



OTHER GOVERNMENT PROJECTS

- Bukit Batok Community Centre
- Chong Pang Integrated Development
- Elective Care Centre and National Dental Centre
- Hendon Camp at Changi East
- Jurong Island Fire Station
- Marine Parade Community Centre
- NS Square at Marina Bay
- Singapore Aviation Academy at Changi East
- T5 Mock-up Centre at Changi East
- Toa Payoh Integrated Development

MARINA BAY SANDS, INTEGRATED RESORT 2 (MBS, IR2)

BAYFRONT AVENUE, SINGAPORE

ABOUT THE PROJECT

Geolutions is proud to support the development of Marina Bay Sands' new ultra-luxury resort expansion, IR2, as a sub-contractor to LT Sambo and consultant ARUP Singapore. With a projected cost of US$8 billion, this landmark project will enhance the existing resort and redefine Singapore's skyline. IR2 will feature a 570-suite luxury hotel with a signature rooftop experience, alongside destination dining, nightlife, and public attractions. Key facilities include 200,000 square feet of premium MICE space and a 15,000-seat arena set to become Asia's leading live entertainment venue.

Construction is scheduled to begin in June 2025 and complete by June 2030, with the official opening expected in January 2031, subject to government approval. Geolutions brings proven expertise in comprehensive geotechnical specialist works to this prestigious development.

Geolutions conducted the Site Investigation (SI) works using our Hanjin drilling rigs imported from South Korea. Based on our SI report, we utilized the factual soil data to develop the Ultimate Load Test proposal submitted to Arup, aiming to validate the initial design parameters of the project's overall foundation scheme.

The proposed testing method was a bi-directional static load test for a 90,000 kN test barrette pile. Geolutions was responsible for the complete design, assembly, installation, and testing of the bi-directional jack system, ensuring continuous supervision throughout the process to maintain high-quality standards.

Additionally, we provided support for the Foundation Base Grouting works, enhancing quality assurance by improving the toe contact between the foundation and the competent

stratum. To further verify the integrity of the working bored piles and diaphragm walls, a comprehensive series of foundation tests were conducted, including High Strain Dynamic Test also commonly know as 'PDA' (Pile Driving Analyzer), PIT (Pile Integrity Test), Sonic Logging, and Sonic Coring.

All tests were conducted exclusively by Geolutions' personnel, utilizing our own machinery, equipment, and tools. The geotechnical specialist works were carried out in full compliance with the relevant reference standards under our SAC-SINGLAS accredited Laboratories and Inspection Bodies Scheme.

Scope of Works conducted in MBS, IR2

- Bi-directional Static Load Testing, including pile instrumentation and data interpretation for both Ultimate Load Test (ULT) and Working Load Test (WLT) on barrette piles and bored piles
- Cross-hole Sonic Logging
- High-strain Dynamic Pile Test (PDA) with CAPWAP Analysis
- Low-strain Impact Pile Test (PIT)
- Foundation Base Grouting with Pile Movement Monitoring
- Site Investigation Works with associated Laboratory Tests
- Foundation Coring Works with associated Laboratory Tests

LTA CONTRACT CR103 – DESIGN AND CONSTRUCTION OF AVIATION PARK MRT STATION AND ASSOCIATED TUNNELS

AVIATION PARK ROAD, SINGAPORE

Geolutions is engaged as a sub-contractor in the design and construction of Aviation Park MRT Station and associated tunnels under Contract CR103, awarded by the Land Transport Authority (LTA) to Hock Lian Seng Infrastructure Pte Ltd. The contract is valued at S$320 million.

Located at the junction of Changi Coast Road and Aviation Park Road, the station will form part of the Cross Island Line (CRL)—Singapore's eighth MRT line. The CRL will significantly enhance connectivity across the island and support future developments in the Changi region. Once completed, it will feature the highest number of interchange stations among all MRT lines, with nearly half of its stations linked to existing lines.

The project presents complex engineering challenges. The station is being constructed on reclaimed land with deep layers of marine clay, requiring advanced ground-stabilisation techniques and deep excavation works. Additionally, its proximity to Changi Airport demands strict control measures to avoid disruption to aviation operations and safeguard critical airport infrastructure.

Geolutions contributes its technical expertise and proven track record in managing challenging ground conditions and delivering high-precision geotechnical specialist works in sensitive environments.

ABOUT THE PROJECT

Geolutions carried out the Site Investigation (SI) works for the Aviation Park MRT Station project. The factual soil data obtained from our SI report formed the basis for developing the Ultimate Load Test proposal, which was submitted to the design consultant to validate the initial design parameters of the foundation system.

The proposed testing method involved a bi-directional static load test on an 88,000 kN test barrette pile. Geolutions was responsible for the full scope of this operation—including the design, assembly, installation, and testing of the bi-directional jack system—ensuring continuous supervision and strict adherence to quality standards throughout the process.

In addition, Geolutions conducted Foundation Base Grouting works to enhance the toe contact between the foundation and the competent stratum for all the Diaphragm walls in the station. To verify the quality and performance of the working bored piles and diaphragm walls, we conducted a comprehensive suite of foundation tests, including Pile Integrity Test (PIT), Sonic Logging, and Sonic Coring.

Geolutions was responsible for the groundwater management works at the Aviation Park MRT Station site through the implementation of a recharge well system. Our in-house design team conducted detailed hydrogeological analyses to develop a tailored solution that ensured effective groundwater control throughout the construction phase. The recharge wells were fully designed, installed, maintained, and monitored by Geolutions personnel, ensuring seamless integration with site operations. All plumbing works associated with the system were carried out by our dedicated in-house plumbing team, allowing for full quality control and operational efficiency.

All testing and specialist geotechnical works were executed exclusively by Geolutions personnel using our own equipment and tools. These activities were carried out in full compliance with relevant reference standards under our SAC-SINGLAS accredited Laboratories and Inspection Bodies Scheme, ensuring the highest level of technical reliability and quality assurance.

Scope of works conducted in CR103

- Bi-directional Static Load Testing, including pile instrumentation and data interpretation for both Ultimate Load Test (ULT) on bored piles
- Design and Stacking of 42,000 kN kentledge system for ULT
- Cross-hole Sonic Logging
- High-strain Dynamic Pile Test (PDA) with CAPWAP Analysis
- Low-strain Impact Pile Test (PIT)
- Foundation Base Grouting for 320m of Diaphragm Wall
- Site Investigation Works with associated Laboratory Tests
- Foundation Coring Works with associated Laboratory Tests
- Design and construct of Recharge Well systems including full plumbing works
- Instrumentation and monitoring works

SCOPE OF SERVICES SUMMARY

FOUNDATION TESTING

- Automated Static Load Test (ASLT)
- Bi-Directional Static Load Test (BDSLT)
- Crosshole Sonic Logging (CSL)
- High Strain Dynamic Load Test (PDA)
- Kentledge Set Up
- Lateral Load Test
- Pile Coring Test
- Pile Instrumentation Works
- Pile Integrity Test (PIT)
- Pile Profile Test
- Windsor Probe Test

GROUND ENGINEERING

ERSS temporary slope stability

- Shotcrete/guniting
- Sub soil drain
- J-Pin/Soil Nail/Rock Bolt
- Ground Anchor
- Earth Matt Drilling

Foundation Piles

- Micro Pile
- Grout Mix Pile

Underground Construction – Subterranean Passage

- NATM for Adit tunnel
- Cross Passage
- Breakthru – Tunnel Eye
- Shaft sinking – Caisson & RC

GEOTECHNICAL INSTRUMENTATION

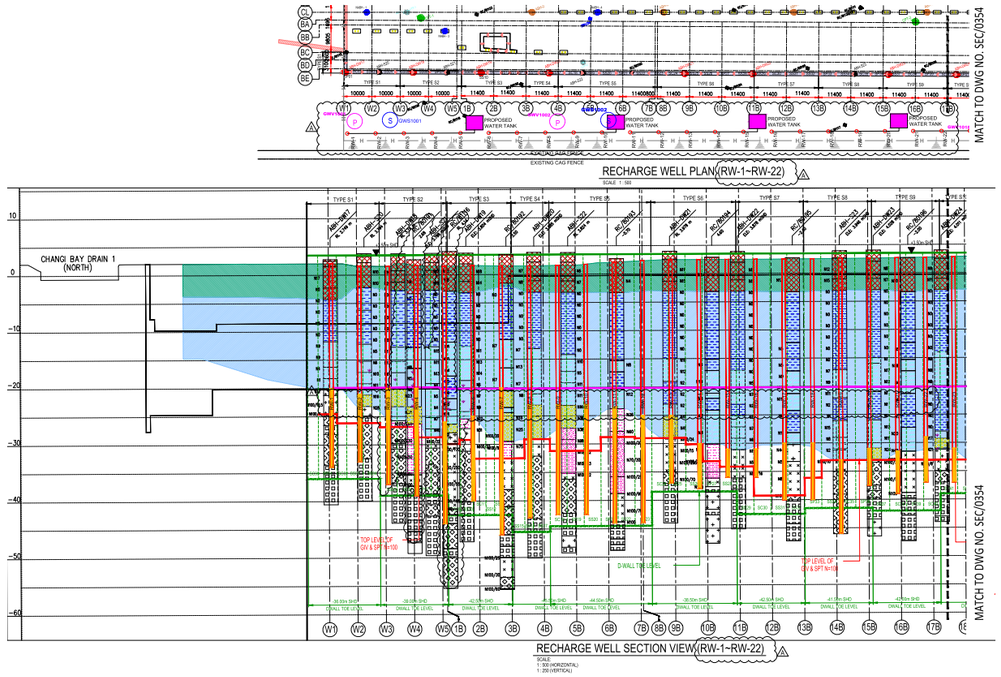
- Ground Water Level & Pressure
- Inclination & Tilt
- Vibration & Noise Monitoring

SITE INVESTIGATION

- Concrete Core Test
- Foundation Coring
- Plate Load Test
- Recharge/Relief Wells & Pumping Test
- Soil Investigation & In-situ Tests
- SPT Hammer Calibration

RECHARGE WELL

Recharge wells are a specialized method used to manage and prevent the excessive settlement of stable ground during excavation, particularly in areas with high groundwater tables or in unstable soil and rock conditions. The concept involves the controlled injection or replenishment of water into the ground to stabilize the soil formations, thus reducing the risk of collapse and ensuring the safety and stability of excavations. We provide complete site investigation and its associated services, including the design, installation, and maintenance until removal and reinstatement of recharge wells.



Design

We will begin by designing the recharge well, focusing on estimating its flow rate and radius of influence based on CIRIA R113 guidelines and input parameters provided by GIBR. The shop drawings will be prepared using reference data from the site investigation borehole logs. If necessary, a trial will be conducted to assess the actual ground permeability and to evaluate the effectiveness of the recharge well spacing and water source.

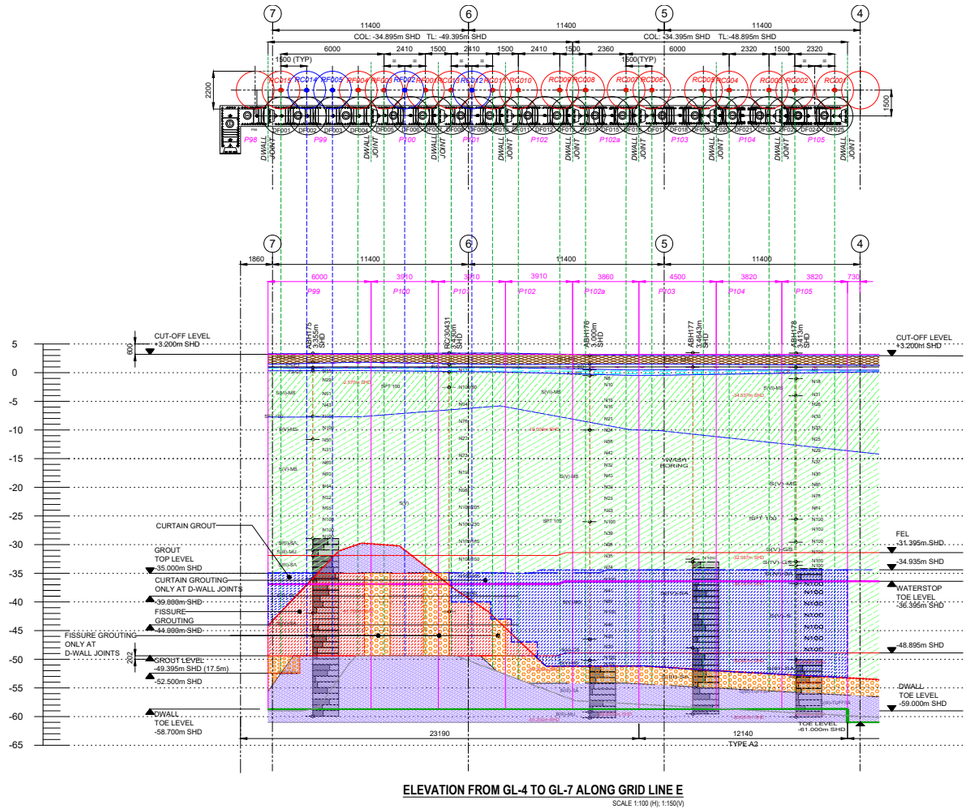
Construction

Leveraging our extensive expertise in site investigation, we utilize the same drilling rigs for both the construction and installation of recharge wells. In our workshop, we operate an automated perforated punching machine engineered to produce evenly spaced holes, ensuring compliance with standard requirements for perforated area percentage and enabling consistent recharge rates across the entire zone. Our in-house plumbing team is equipped to handle complex site conditions, allowing for precise and adaptive modifications throughout the installation process. To ensure long-term functionality, we conduct monthly performance checks and restore ground conditions to their original state upon completion, maintaining a high standard of service for our clients.

FISSURE GROUTING

At Geolutions, fissure grouting is one of our ground improvement solutions, designed to address the challenges of fractured rock and unstable subsurface conditions commonly encountered in deep excavation and tunneling projects. This technique involves the strategic injection of grout into natural fissures, joints, and voids within the ground to reinforce and seal the formation, thereby enhancing its structural integrity and reducing permeability. Our team combines advanced site investigation capabilities with precision grouting techniques to deliver reliable and effective ground stabilization. Fissure grouting is particularly valuable in high groundwater environments or where geological discontinuities pose risks to excavation safety and long-term performance.

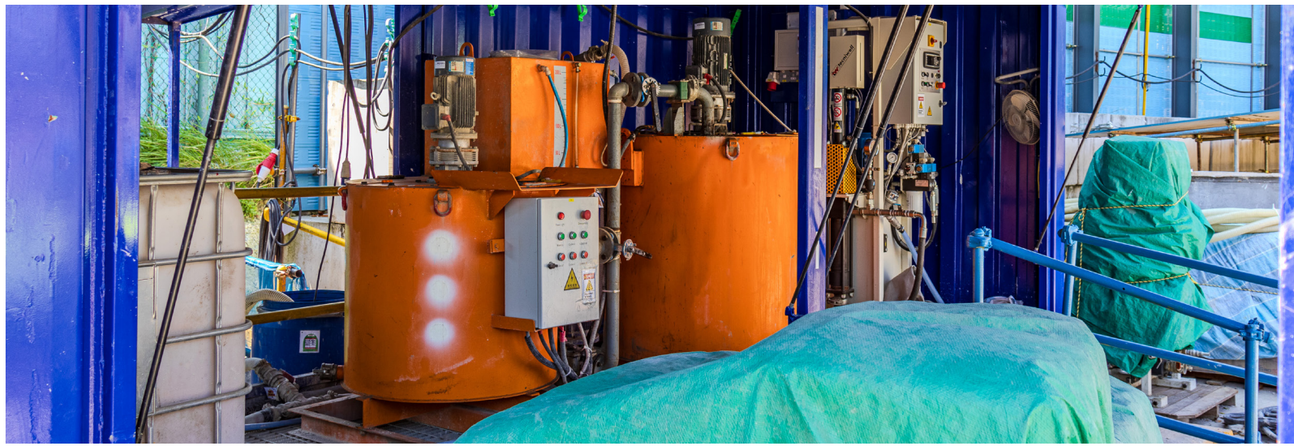
From initial investigation and design to installation, monitoring, and reinstatement, Geolutions provides a fully integrated service that ensures each fissure grouting system is tailored to site-specific conditions and project requirements. Our commitment to technical excellence and responsive execution makes us a trusted partner for complex ground engineering challenges.



Design

At Geolutions, our approach to fissure grouting design is grounded in practical experience and data-driven decision-making. The process begins with a thorough site investigation, including borehole logging and groundwater profiling, to understand subsurface conditions and inform the grouting strategy. We focus on estimating key parameters such as grout flow rate, radius of influence, and injection pressure using input data from reliable sources like GIBR. These values are critical to achieving effective grout penetration and uniform coverage across the treatment zone.

Detailed shop drawings are prepared based on borehole data, outlining grout hole locations, injection depths, and sequencing plans. Prior to production grouting, we conduct trial grouting to validate design assumptions, optimize grout mix formulations, and assess ground response. Our design methodology is flexible and responsive, allowing for real-time adjustments during execution to ensure optimal performance and constructability. This ensures that every fissure grouting solution we deliver is tailored to the specific needs of the project and site conditions.



Construction

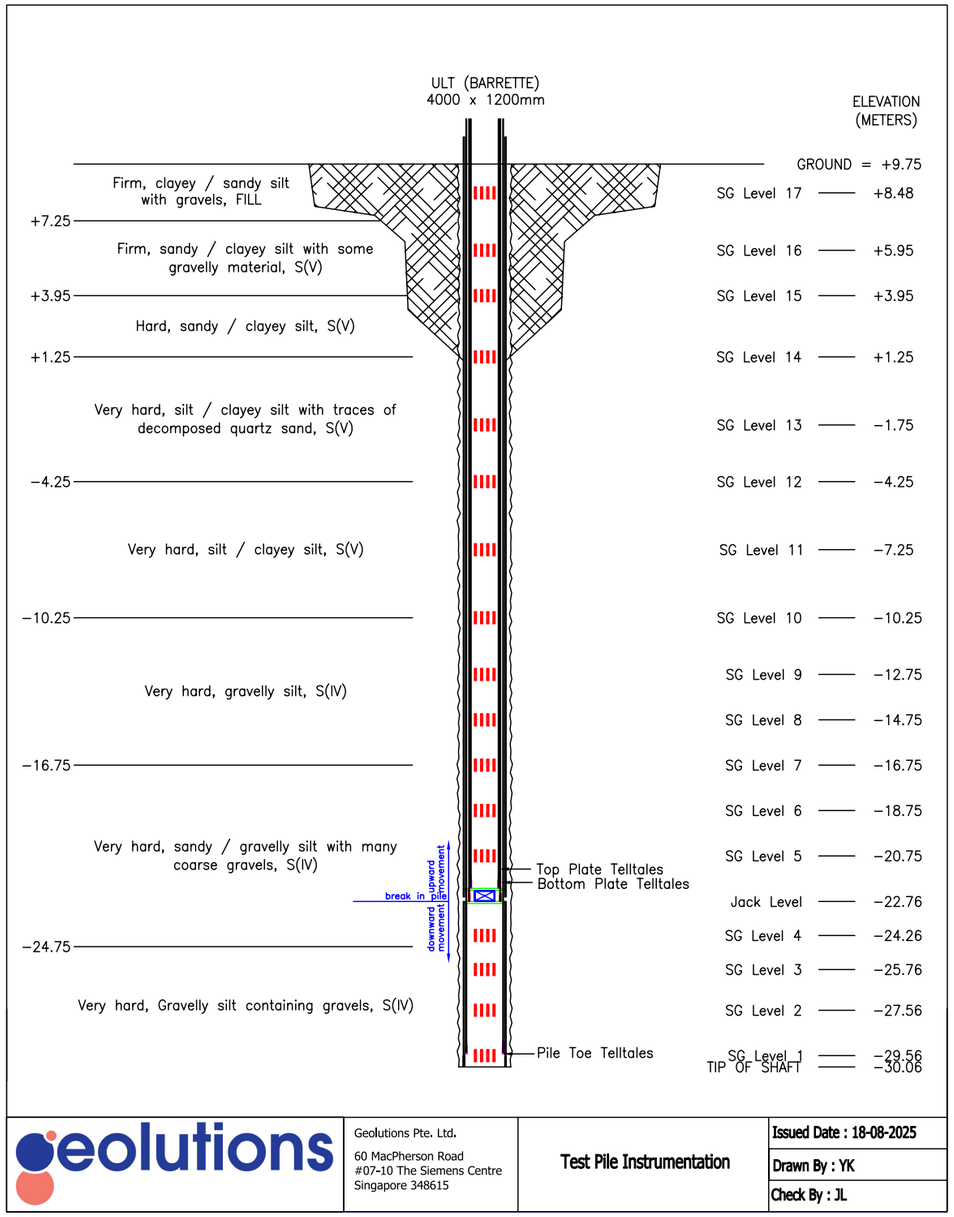
Precision and consistency are critical to the success of fissure grouting, especially in challenging ground conditions. Our grouting setup is purpose-built to support high-performance operations, featuring a well-organized station for mixing, pumping, and on-site testing. This controlled environment ensures accurate grout preparation and eliminates the need for makeshift testing setups, such as conducting mud balance tests on uneven or substandard surfaces. We utilize high-quality Italian grouting pumps specifically engineered for fissure grouting applications. These pumps maintain stable pressure and flow rates, which are essential for injecting microfine cement grout deep into fractured rock or soil. This consistent performance enables broader grout penetration, significantly improving the effectiveness and coverage of ground treatment.

To ensure precision and traceability, our operations are integrated with synchronized dataloggers and flowmeters. These instruments continuously monitor and record grout volume and pressure, generating digital printouts that serve as essential documentation for quality assurance and compliance. This data-driven approach ensures every grouting task meets the highest standards of performance and reliability.

BI-DIRECTIONAL LOAD TEST

Bi-Directional Static Load Testing (BDSLT) is a core component of our specialized geotechnical foundation testing services. This advanced method is designed to evaluate the performance of deep foundation elements—such as bored piles and barrettes—by applying load simultaneously in both upward and downward directions through a hydraulically actuated loading cell embedded within the pile. BDSLT offers a highly effective solution for testing high-capacity foundations, particularly in situations where conventional static load testing using kentledge systems is constrained by space, logistics, or load limitations. By eliminating the need for massive reaction weights, BDSLT enables testing to significantly higher loads, making it ideal for large-scale infrastructure and high-rise developments.

This method provides accurate assessment of both shaft friction and end bearing resistance, delivering critical data for foundation design verification and optimization. The test setup is supported by precision instrumentation and monitored through an automated data acquisition system, which displays live results and real-time load-displacement plots via a connected laptop—ensuring immediate feedback and high-resolution data capture throughout the test. All BDSLTs are conducted in full compliance with ASTM D8169/ D8169M-18 and SS TR 63:2018, ensuring adherence to international and local standards for bi-directional static axial load testing.



geolutions	Geolutions Pte. Ltd. 60 MacPherson Road #07-10 The Siemens Centre Singapore 348615	Test Pile Instrumentation	Issued Date : 18-08-2025 Drawn By : YK Check By : JL

Design

At Geolutions, the design of a Bi-Directional Static Load Test (BDSLT) is a vital step in ensuring that the test setup accurately captures the true performance of the foundation element under evaluation. Our approach is rooted in sound engineering principles, enriched by site-specific geotechnical data and insights gained from our extensive portfolio of past projects. The core of the BDSLT setup is the bi-directional hydraulic jack assembly, which is strategically embedded within the pile—typically at a depth that allows for clear separation between upper shaft resistance (mobilized above the cell) and lower shaft resistance & end bearing resistance (mobilized below). This configuration enables a comprehensive understanding of load distribution and pile behavior under high test loads.

BDSLT is especially valuable for testing deep foundations with high design capacities, where conventional kentledge systems are often limited by space, logistics, or achievable load levels. By eliminating the need for external reaction weights, BDSLT allows for efficient and safe mobilization of significantly higher test loads, even in challenging site conditions. To date, our team at Geolutions has collectively conducted over 1,000 bi-directional static load tests, demonstrating our depth of experience and commitment to precision in foundation testing. Each test is supported by high-accuracy instrumentation and robust data acquisition systems, ensuring reliable results that inform safe and cost-effective foundation design.

Construction

The construction phase of a Bi-Directional Static Load Test (BDSLT) is executed with precision to ensure the integrity and accuracy of the test setup. It begins with the careful installation of the bi-directional hydraulic jack at the designated depth within the test pile, allowing for the mobilization of both shaft resistance and end bearing resistance during loading. Each hydraulic jack used in the test is calibrated by a SAC-SINGLAS accredited laboratory in Singapore immediately prior to delivery, ensuring compliance with stringent accuracy standards. This guarantees that load measurements are reliable and traceable throughout the testing process.

To further ensure safety and performance, the joint connections of the bi-directional jack assembly is professionally engineered and endorsed by a licensed Professional Engineer (PE). This certification confirms that the jacks can withstand the maximum anticipated test loads without compromising structural integrity.

Instrumentation such as pressure transducer, displacement transducers, and strain gauges is installed with care and connected to an automated data acquisition system, which is operated via a laptop interface. This setup enables real-time monitoring, with live display of test results and plotting of load-displacement curves throughout the test duration. The system ensures high-resolution data capture and immediate feedback for on-site decision-making.

AUTOMATIC STATIC LOAD TEST (ASLT)

A SMART initiative for foundation testing - Geolutions adopts the Fully Automated Pile Test System (FAPTS) by MDC Tech Centre which can conduct a full pile test unmanned. It increases productivity by providing accurate and reliable test data with the ability to monitor the progress of the test pile anywhere.

Geolutions' Automated Static Load Test (ASLT) is a state-of-the-art solution designed to streamline and enhance the accuracy of pile load testing. Fully approved by HDB, the ASLT combines automation, safety, and real-time data capabilities to meet the rigorous demands of modern geotechnical projects.

The ASLT automates the entire pile loading and unloading process with precision control of the hydraulic jack, maintaining load accuracy within ±5% of the target. Throughout the test, it continuously records critical data—including pile movement, applied load, and strain readings—at consistent 5-minute intervals, ensuring comprehensive and reliable results.

Equipped with 4G connectivity, the ASLT enables wireless data transmission and real-time monitoring via an on-site computer and viewing screen. Test data is securely transmitted and can be exported in .csv format to designated recipients, supporting efficient reporting and collaboration.

Remote operation is a key feature, allowing users to start, pause, and stop the test from a distance. The system also includes remote monitoring of hydraulic stroke, with a built-in safety limit switch that automatically pauses the test to prevent jack overuse, protecting both equipment and personnel.

To ensure uninterrupted operation, the ASLT is backed by an integrated UPS system that maintains functionality during power failures and sends out alerts in case of system issues. Its tamper-proof design guarantees data integrity, giving stakeholders confidence in the accuracy and security of the results.

With its blend of automation, safety, and connectivity, Geolutions ASLT sets a new benchmark in pile load testing—delivering smarter, safer, and certified performance for every project

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