

PRE- QUALIFICATION DOSSIER



- Geotechnical Instrumentation & Monitoring
- Geodetic, Topographic, Aerial, Land and Construction Surveys



TUNNELS



HYDROELECTRIC



CONSTRUCTION



STRUCTURAL



METRO & RAIL



BRIDGES



MINING

Encardio-Rite Group - India | Bhutan | Nepal | Bahrain | Qatar | Saudi Arabia | UAE | Greece | Spain | UK | USA

Encardio Rite Electronics Pvt. Ltd. – An Encardio-Rite Group Company
Building no. 7235, 2392 Al Olaya St., Riyadh - 12244, Saudi Arabia | amitrnanjan@encardio.com | +966 55 495 8630

Contents

1. Introduction and Company Profile
 - 1.1 Business Overview
 - 1.2 Strengths
 - 1.3 Application Areas
 - 1.4 Real time data at user's desk
 - 1.5 Data Transmission
 - 1.5.1 GSM/GPRS transmission
 - 1.5.2 Wireless (RF) transmission
 - 1.6 One-point Monitoring Solutions
 - 1.6.1 Geotechnical Monitoring - Civil Engineering Projects
 - 1.6.2 Structural Monitoring- Infrastructure & Monuments
 - 1.6.3 Geodetic Survey
 - 1.6.4 Laser scanning
 - 1.6.5 Monitoring using drones/UAV
 - 1.6.6 Tunnel Boring Machines
 - 1.7 Experience
 - 1.8 Global presence
2. Company registration certificates
3. Company organisation chart
4. Quality management system certificate
5. Company HSE Plan
6. Geotechnical & Structural Monitoring
 - 6.1 Database management system
 - 6.2 Monitoring solutions
 - 6.3 Geotechnical – Construction monitoring
 - 6.4 Structural – Asset monitoring
 - 6.5 Automatic monitoring system
 - 6.6 Tunnel Boring Machines
 - 6.7 Environmental-Water level/quality, Weather Station
7. List of references
8. Details of completed underground metro projects
9. Performance certificates
10. Ongoing projects
11. Experience in GCC
12. Experience Worldwide

ENCARDIO-RITE GROUP

India | UAE | Qatar | Bahrain | Bhutan | Morocco | Europe | UK | USA



RITE GEOSYSTEMS TRADING LLC

P.O. Box 89077, Office 3-203, 3rd Floor, Fordeal Business Centre
29 Mohammad Saeed Hared Building, Port Saeed Ittihad Road, Deira, Dubai, UAE
Mobile: +971507153594 | ergs.abudhabi@encardio.com | www.encardio.com



1 INTRODUCTION AND COMPANY PROFILE



ENCARDIO-RITE GROUP

What we do

Large infrastructure calls for safety and risk assessment monitoring, which can be required before, during, and/or after construction. With our core purpose to keep people and structures safe through innovative solutions, Encardio-rite Group offers advanced real-time safety monitoring solutions. Our solutions are focused on clients' needs and guided by the philosophy of 'Jan hith'.

Encardio-rite views safety monitoring as a holistic concept. Our solutions aim to enhance safety, ensure zero risk, increase productivity and deliver an exceptional monitoring experience. We give real-time alerts, required to take timely decisions for pre-damage control. This is supported by a seamless flow of data as meaningful information at fingertips. Stakeholders can count on us to provide a monitoring solution that gives them peace of mind.

We are informed, we are experienced, we have insights into technology and future, and we evolve accordingly.

Encardio-rite has always been ahead of times.

Who we are

Established in 1966, Encardio-rite designs and manufactures the widest range of civil engineering and structural monitoring instrumentation available from any single manufacturer in the World.

We are known as a focused leader in the geotechnical field. We have a proud heritage of cutting-edge innovation that stretches back to over 55 years.

Our real-time solutions are fully automated using smart sensors, dataloggers, wireless transfer techniques, software, and an advanced database management system.

Encardio-rite has branches in eight countries, supported by well-trained, qualified and experienced industry professionals.

At Encardio, we exchange knowledge and work together to create an environment where ideas and solutions are born.

Our perseverance to innovate, vast expertise, advanced technology and forward-thinking have enabled us to provide intricate solutions for countless projects.





Why us

Encardio-rite Group has built up its reputation based on consistent quality products and reliable services. Our products comply with the ISO-9001 quality systems conforming to international standards.

Almost all geotechnical instruments used by the group are manufactured by our trained, qualified and experienced staff. Our state-of-the-art in-house manufacturing and calibration facilities are equipped with the best of tools and technology including electron beam welding and load cell calibration facilities up to 15,000 kN. Most of our products are available ex-stock or within shortest delivery times because of our large production facility.

A wide range of our sensors is hermetically sealed resulting in IP-68 protection, making them best suitable for long-term monitoring.

Our in-house R&D Centre is recognized by the Government of India. It is passionate about bringing new techniques in instrumentation and software to meet the challenging requirements of the construction sector.

We have worked with some of the best consultants and construction companies in the World on landmark construction projects. Our excellence is reflected through hundreds of successfully performing projects.

As experts with decades of experience in the field, we provide in-depth information and expert advice to clients.

With us, technology and experience join hands to give the clients innovative solutions they can rely on.

Who we serve

Our products and services are widely used in applications such as

- Geotechnical monitoring – mega construction
 - Tunnels - metros, rails, sewage tunnels
 - Dams/Hydro-electric projects,
 - Roads, highways, railways
 - Bridges and overpasses
 - Mines
 - Wind turbines
 - Nuclear power plants
 - High rise buildings, foundations
 - Deep excavations, piles, diaphragm walls
 - Airports, seaports, embankments

We are among the few in the world who provide one-stop solutions

Real time monitoring

- 
IN-HOUSE
 - R&D
 - Manufacturing
 - Calibration & Quality Control
- 
IN-HOUSE DEVELOPED
 - Data Management System
 - Software
- 
TURNKEY SOLUTIONS
 - Supply, Installation & Monitoring
 - Data reports
 - Web based data management
- 
 - Engineering services
 - Expert advice
 - Layout drawings
- 
 - GEOTECHNICAL (under construction)
 - STRUCTURAL HEALTH (existing structure, long-term)
- 
GEODETIC SURVEY
 - Robotic total station
 - In-house developed Control box with mini PC and software
- 
ENVIRONMENTAL MONITORING
 - Groundwater level
 - Weather
 - Vibration, Seismic
- 
ADVANCED SERVICES
 - Aerial mapping by UAVs
 - Laser scanning with OPSIS software

- Structural health monitoring – existing structures
 - High-rise buildings for long term monitoring
 - Historical monuments during restoration works
 - Assets - existing tunnels, dams, bridges and buildings, during nearby construction works.
- Landslides and Slopes monitoring
- Environment monitoring
 - Weather
 - Groundwater monitoring



Real-time monitoring solutions

1.1 Geotechnical and structural monitoring solution

To ensure zero risk during the construction process and safety of existing buildings and infrastructures, we offer a comprehensive range of sensors to monitor surface and sub-surface parameters. The data is provided online or through evaluation reports which expedites work in the safe zones and takes corrective action where there is a possibility of any risk.

1.1.1 High quality sensors

Parameter	Sensor
Water Pressure & level	Piezometer, water level sensor, seepage monitoring sensor, uplift pressure meter, etc.
Pressure	Stress cells – Concrete, soil, soil-rock/concrete interface, shotcrete, jack-out.
Lateral Deformation & settlement	Digital & in-place inclinometer, tilt meter, beam sensor, extensometer, crack & joint meter, prism target, etc.
Force – load and strain	Compression & center hole load cell, embedment & arc weldable strain gage, etc.
Temperature	Temperature meter, thermistor, thermocouple, RTD.
Environment	Groundwater level, conductivity, water discharge rate, weather station

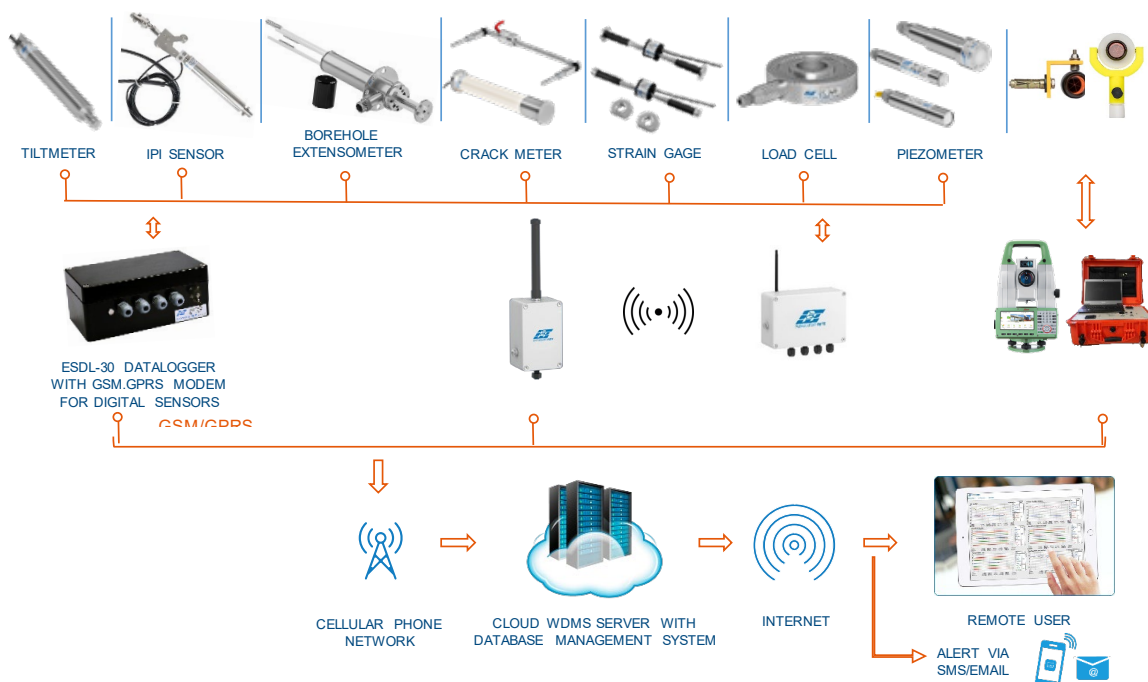
1.1.2 Game-changer wireless solutions

Encardio-rite provides the best combination of advanced wireless dataloggers for effortless, efficient and cost-effective project monitoring –

- GSM/GPRS datalogger. A single datalogger can connect several digital sensors. The advantage of the system is that only a single 3 conductor cable is required to interconnect all the sensors and the datalogger in a serial bus. A cellular network is required to transfer the data from the datalogger location to a remote server.
- RF datalogger with Gateway. In this end-to-end wireless monitoring system, the sensors (analog or digital) are interfaced with the long-range, low-power wireless network through RF dataloggers that send recorded data to the Gateway with utmost reliability. Gateway uploads the collected sensor data to the central/cloud server.

Encardio-rite is the only one that offers a choice of both the wireless technologies, and our experienced team decides the cost-efficient and better technology for specific project.

We meet client's real time data demands with least fuss, using either any of the two, or a combination of the two technologies, depending on site requirements. The client gets the best solution to have online data with minimal downtime, quick installations and improved reliability.





1.1.3 Robotic geodetic survey

If used judiciously with geotechnical instrumentation, geodetic monitoring provides co-related data which is relevant and extensively used in civil construction and structural monitoring. Encardio Group uses an in-house developed control box with advance software to control robotic total stations. The system ensures valuable and timely monitoring of the displacements, providing high measurements density, simultaneous wireless transmission and automatic entry of the results in the monitoring database.

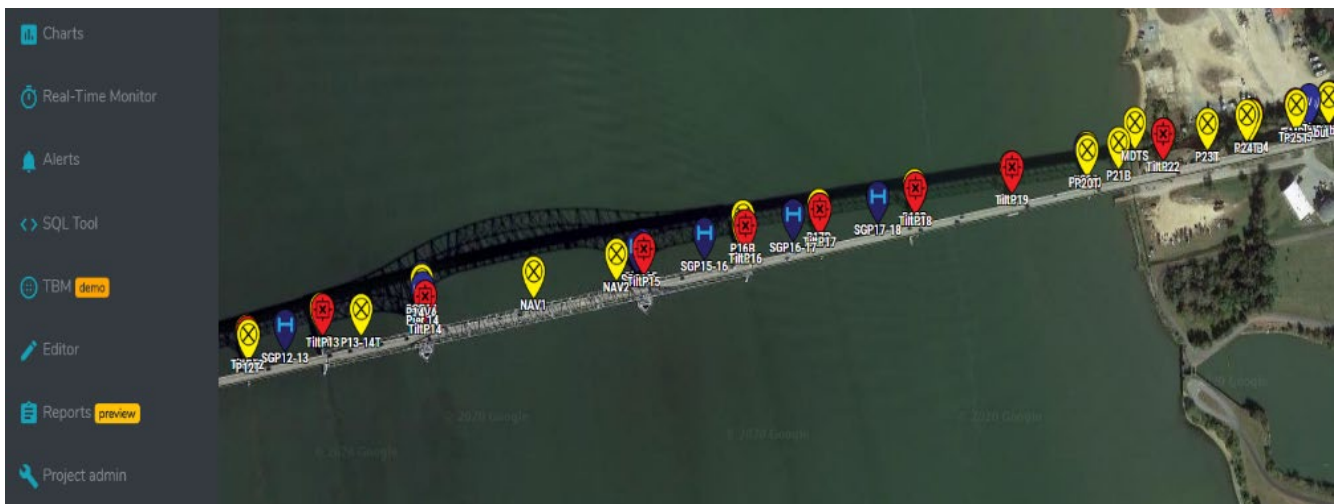
1.1.4 Real-time database management

Encardio-rite provides a highly flexible WEB based or local access data management solution. Our database software can combine data from **structural, geotechnical, geodetic, environmental and Tunnel Boring Machine sensors**.

Some of the features of this software are:

- Single platform for comprehensive project data allows rapid evaluation, interpretation and decision-making

- Single portal to manage multiple projects
- Variety of visualization and analysis tools to identify potential failure scenarios.
- Support to have a live visual feed from the project site
- Offers an interactive user interface, taking care of all database interactions automatically
- User defined multiple graphs on single screen provide visual insight for analysis
- Real time multiple alarm setting ensures no critical information is missed.
- All key information can be viewed at a glance on customized screen options
- Virtual variable calculations available for corrections (temperature effect etc.) and re-calibration of sensor
- Instant automatic alerts sent via SMS or email for data variations, missed data or sensor malfunction
- User can generate comprehensive report or a customized report quickly.

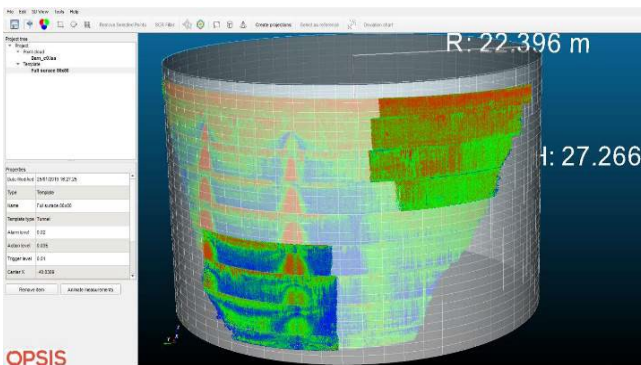




1.2 Advanced solutions

1.2.1 Laser scanning

It is a method to automatically monitor & collect the data in real time 3D surface coordinates of an object in normal grid. Laser scanning is a rapid and reliable surveying method, it collects the data in static, stop and go or kinematic mode. From the point where cloud produced, the exported section profiles can be used to monitor deformations or displacements. Although these are mainly used in tunnels but can be used in structures, landslides and rockfall areas and for Building Information Modeling (BIM). Our in-house developed advanced software OPSIS optimizes the huge data from laser scanner and provides an analysis directly from the 3D data for accurate and fast monitoring of deformations, in a snap.



1.2.2 Monitoring using drones/UAV

UAVs are the latest trend in Geodesy's technology for aerial mapping. Unmanned and remotely-piloted aircrafts that follow a preprogrammed path for takeoff, flight and landing. These aircrafts are equipped with HD/IR/Thermal cameras that compute aerial images and videos over a defined area at a specified height. The point clouds, meshes and 3D models produced are the data to be compared between sequel flights during monitoring time. This is a very fast, accurate and low cost way to monitor the progress of any large scale project, where frequent geospatial and/or imaging information is needed, in order to monitor earth moving issues or the progress of a project running.



Our experience

The number and variety of projects we have successfully completed, we are pretty certain, is unmatched by any other organization

Few landmarks projects are listed below, reflecting our excellence:

- Copenhagen Metro, Paris Metro, Los Angeles Metro, Lima Metro, Oslo Metro, Downtown MRT Line-Singapore, Expolink Route 2020, Dubai Metro, Doha Metro, almost all metros in India
- The 150 km STEPs deep sewer system in Abu Dhabi, including World's deepest pump station (110 m deep x 55 m dia).
- Infrastructure including existing metro lines, road tunnels, bridges & shoring works at Diera Waterfront Development Project, UAE.
- Sheikh Zayed Street tunnel-Dubai, Rohtang Road Tunnel-India, Pir Panjal Railway Tunnel-India.
- 230 m high Tehri Dam-India (largest earth & rockfill dam in Asia), Sugar Pine Dam-USA, Koprubasi Dam-Turkey, M'Dez Dam-Morocco, Morro Do Ouro Gold Mine-Brazil
- One Za'abeel ICD Headquarter-UAE, Marina Bay Sands-Singapore, Mirani Fort-Oman
- Harry Nice Bridge & I-78 Easton Rd. Bridge-USA, Bogibeel Bridge-India

QUICK FACTS

250 km
METRO TUNNELS

325 km
RAIL & ROAD TUNNELS

200 km
SEWER TUNNELS

Over 200
DAMS, HYDROELECTRIC PROJECTS

Over 100
HIGH RISE BUILDINGS, MONUMENTS & ASSETS

Over 6500
ONLINE GROUNDWATER WELLS



Driven by our values

Values are more than just words, they're a way of life. They are the foundation of our company culture.

Our culture would not be what is it today without our dedicated team and valued clients, past and present. It is what makes it unique.

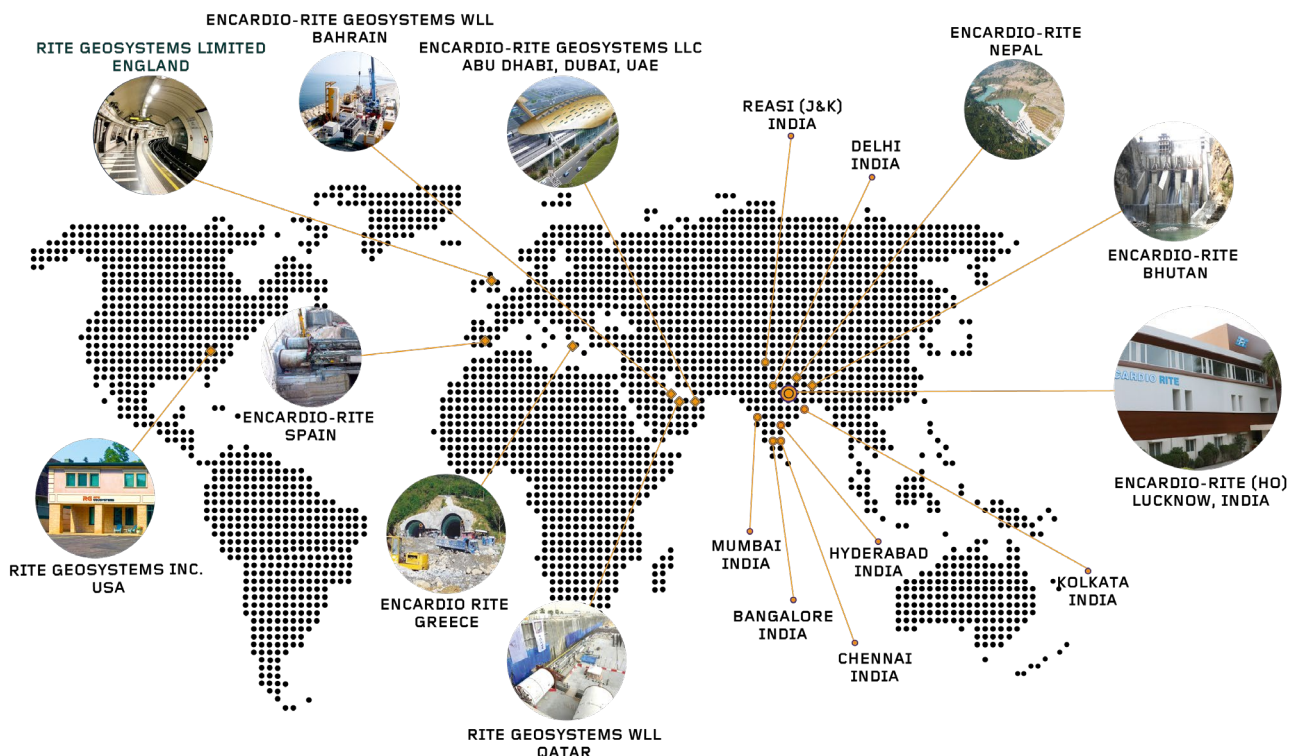
We believe that companies with a strong culture and a higher purpose perform better in the long run.

As we continue to grow, we strive to ensure that our culture remains alive, yet keeps up pace with changing times.

- *Integrity. We are fair, honest and ethical and believe in a win-win for all the stakeholders.*
- *Relationships. We build relationships. We listen well and are calm in the most stressful situation. We respect without exception.*
- *Go getters. We believe we can attain whatever we set our mind to*
- *Trendsetters. We are curious and deliver innovating solutions with the highest standard of quality. We identify root cause and go beyond treating the symptoms. We are a solution oriented, high accountability team. We deliver what we promise and take personal responsibility for our words, our actions and our result. We are proactive.*

Geographies don't limit us

Encardio-rite Group has offices Worldwide. We are always awake, on our toes, keeping our eyes on every structure we monitor. With Encardio-rite Group, you get complete end-to-end support.



India: Lucknow – Head Office | Delhi | Kolkata | Mumbai | Chennai | Bangalore | Hyderabad | J&K | geotech@encardio.com | www.encardio.com

Middle East
Dubai, Abhu Dhabi U.A.E.
Saudi Arabia
Qatar
Bahrain
+971 50 7153594
ergs.abudhabi@encardio.com

USA
+1 (412) 680 2526
melih@ritegeosystems.com
thomas.stabile@ritegeosystems.com

UK
+44 7455 702 032
jose.berrio@ritegeosystems.com
Greece
+30 6944798872
nikolas@encardio.com

Spain
+34 633 772270
jmartinez@encardio.com

2 COMPANY REGISTRATION CERTIFICATES



رخصة تجارية Commercial License

تفاصيل الرخصة / License Details

License No.	605420	رقم الرخصة
Company Name	ENCARDIO RITE GEOSYSTEMS (L L C)	اسم الشركة
Business Name	ENCARDIO RITE GEOSYSTEMS (L L C)	الاسم التجاري
License Category	Dep. of Economic Development	فئة الرخصة
Legal Type	Limited Liability Company - Single Owner(LLC - SO)	الشكل القانوني
Expiry Date	16/01/2027	تاريخ الإصدار
D&B D-U-N-S ® N	851051586	رقم الرخصة الام
Register No.	1022129	عضوية الغرفة
	تاريخ الإنتهاء	Issue Date
	الرقم العالمي	Main License No.
	رقم السجل التجاري	DCCI No.

الاطراف / License Members

Share / الحصص	Role / الصفة	Nationality / الجنسية	Name / الإسم	No./ رقم الشخص
100.00%	Shares Owner / مالك	India / الهند	إنكارديو رايت إليكترونيكس برايفت ليمتد	696860
	حصص		ENCARDIO RITE ELECTRONICS PRIVATE LIMITED	
	Manager / مدير	India / الهند	اروشى بهالا امود جوجرال	696982
	Manager / مدير	India / الهند	اميت جوجرالامود جوجرال	276557
	Manager / مدير	India / الهند	اميت رانجان سونيل كومار سريفاستافا	848151
	Manager / مدير	India / الهند	فيكاس فيشفا كرما مهيش شاندرافيشا كرما	1761632

Print Date 11/12/2025 9:27 تاريخ الطباعة

Receipt No.

رقم الإيصال



يمكنك الآن تجديد رخصتك التجارية من خلال الرسائل النصية القصيرة، أرسل رقم الرخصة إلى 6969 (دو) / اتصالات للحصول على إذن الدفع.

Now you can renew your trade license by sending a text message (SMS). Send your trade license

number to 6969 (Du / Etisalat) to receive payment voucher

Get FREE access to Zoho One for the first year
احصل على زوهو ون مجاناً للسنة الاولى



وثيقة إلكترونية معتمدة وصادرة بدون توقيع من دائرة الاقتصاد والسياحة في دبي. لمراجعة صحة البيانات الواردة في الرخصة يرجى مسح رمز الاستجابة السريعة
This is a certified e-document issued without signature by the department of Economy and Tourism. Kindly scan the QR Code to verify the certificate



أنشطة الرخصة / License Activities		
النشاط	الحالة	Status
النشاط <td>الحالة<td>Status</td></td>	الحالة <td>Status</td>	Status
النشاط	الحالة	Status
النشاط	الحالة	Status
النشاط	الحالة	Status
العنوان / Address		
صندوق بريد	123850	P.O. Box
رقم القطعة	373-1424	Parcel ID
البريد الإلكتروني	amgujral@gmail.com	Email
مكتب رقم 1211 - ملك سيف بن محمد الدرويشي الشامسي - بردي - البرشاء الاولى		
الملاحظات / Remarks		
تم نقل الموقع في 18/03/2012 / تم نقل موقع في 25/1/2017		

Print Date 11/12/2025

تاريخ الطباعة 9:27

Receipt No.

رقم الإيصال



يمكنك الآن تجديد رخصتك التجارية من خلال الرسائل النصية القصيرة، أرسل رقم الرخصة إلى 6969 (دو/ اتصالات) للحصول على اذن الدفع.

Now you can renew your trade license by sending a text message (SMS). Send your trade license

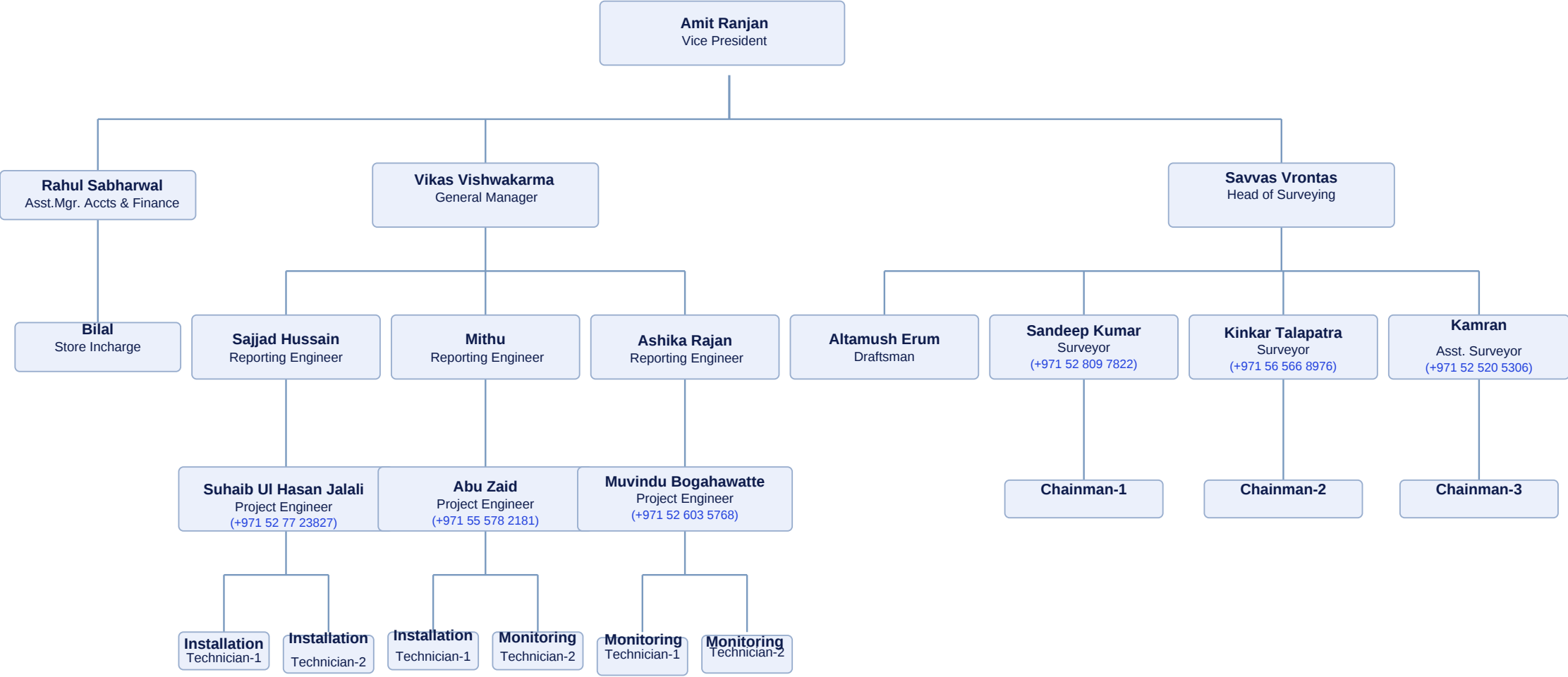
number to 6969 (Du / Etisalat) to receive payment voucher

Get FREE access to Zoho One for the first year
احصل على زوهو ون مجاناً للسنة الاولى
Zoho.com/det



وثيقة إلكترونية معتمدة وصادرة بدون توقيع من دائرة الاقتصاد والسياحة في دبي. لمراجعة صحة البيانات الواردة في الرخصة يرجى مسح رمز الاستجابة السريعة
This is a certified e-document issued without signature by the department of Economy and Tourism. Kindly scan the QR Code to verify the certificate

3.COMANY ORGANAISATION CHART



4 QUALITY MANAGEMENT SYSTEM CERTIFICATE

ISO 9001:2015 & ISO 45001:2018



Certificate Of Registration

Awarded to

ENCARDIO RITE GEOSYSTEMS LLC

at

P.O. BOX NO: 123850, AL BARSHA 1, DUBAI, UAE

Quality Registrar Systems certify that the management system of the above organization has been audited and found to be in compliance with the QRS & ISO standard requirements for registration of the management system standard detailed below:

ISO 9001:2015

Quality Management Systems

Scope of work

- MEASURING AND CONTROL SYSTEMS TRADING
- MEASURING AND CONTROL SYSTEMS INSTALLATION AND REPAIRING
- INSTALLATION & REPAIR OF MEASUREMENT & CONTROL EQUIPMENT
- PRE AND POST CONSTRUCTION CONDITION SURVEY
- STRUCTURAL AND TOPOGRAPHIC SURVEY

EA 28,29

Certificate No: ADU-2598

Originally Registered: 26 JUN 2025

Latest Issue: 26 JUN 2025

Valid up-to: 25 JUN 2026

Quality Registrar Systems



QUALITY REGISTRAR SYSTEMS

P.O Box :26826
United Arab Emirates

Tel: +971-2-6714302

Tel: +971-2-3096166

www.qrsyst.com

WORLDWIDE CERTIFICATION

This certificate is the property of Quality Registrar Systems and remains valid subject to satisfactory annual surveillance audit.
This certificate is only valid when confirmed by the Register listed in Quality Registrar Systems (qrsyst.com)



Certificate Of Registration

Awarded to

ENCARDIO RITE GEOSYSTEMS LLC

at

P.O. BOX NO: 123850, AL BARSHA 1, DUBAI, UAE

Quality Registrar Systems certify that the management system of the above organization has been audited and found to be in compliance with the QRS & ISO standard requirements for registration of the management system standard detailed below:

ISO 45001:2018

Occupational Health and Safety Management Systems

Scope of work

- MEASURING AND CONTROL SYSTEMS TRADING
- MEASURING AND CONTROL SYSTEMS INSTALLATION AND REPAIRING
- INSTALLATION & REPAIR OF MEASUREMENT & CONTROL EQUIPMENT
- PRE AND POST CONSTRUCTION CONDITION SURVEY
- STRUCTURAL AND TOPOGRAPHIC SURVEY

EA 28,29

Certificate No: AAU-4191

Originally Registered: 26 JUN 2025

Latest Issue: 26 JUN 2025

Valid up-to: 25 JUN 2026

Quality Registrar Systems



QUALITY REGISTRAR SYSTEMS

P.O Box :26826
United Arab Emirates

Tel: +971-2-6714302

Tel: +971-2-3096166

www.qrsyst.com

WORLDWIDE CERTIFICATION

This certificate is the property of Quality Registrar Systems and remains valid subject to satisfactory annual surveillance audit.
This certificate is only valid when confirmed by the Register listed in Quality Registrar Systems (qrsyst.com)

5 COMPANY HSE PLAN

HSE PLAN

It is Encardio-Rite Geosystems L.L.C's objective to provide a safe and healthy place of work for all staff members and to meet all our duties and obligations to its clients.

All Rite Geosystems staff members are fully briefed on the company safety policies and are informed of their individual responsibility for their as well their co-workers safety.

1. While installation, personnel should be wearing proper personal protective equipment (PPE). It comprises of:
 - a. Helmet
 - b. Safety jacket
 - c. Safety shoes
 - d. Hand gloves
2. Personnel to wear long pants and long sleeve shirts at the place of work/site. Loose clothing should not be worn while working at site.
3. When working in sun, personnel should wear proper sunscreen to prevent sunburns. Also should carry sufficient drinking water.
4. In case the working place/site is near road or highway, proper cones, barriers and sign boards should be used.
5. When working on road/highways, flagman should be used for traffic diversion.
6. The work area should be investigated for any hazards that may exist in and around the specified site i.e. the condition of ground under foot, slipping and tripping over items located in the area.
7. Right size tools like right size spanner for nut, should be used. While using adjustable spanner, extra care should be taken as they slip easily.
8. While using portable electric tools, proper earthing should be checked before using. All cables, plugs and connectors should be sound. Before use, it should be ensured that the working voltage of the tool and the supply voltage should be same.

The cable should be long enough to reach the work place loosely. It should also be off the floor to avoid any tripping. While using electric tool, user should not stand on damp or wet surface. The electric tool should not be carried or lowered by its cable. Proper maintenance should be done on regular basis.

9. All the tools must be proper maintained and checked before use. Also they must be properly used and handled. Tools should be scraped when they become worn out or beyond repairs. Personnel should not try to improvise standard tools or try to repair them themselves.
10. Good housekeeping should be followed at work place. All the tools should be kept aside or in toolbox after work to prevent any accidents by tripping over them.
11. When using solvents, compounds, epoxies, hand gloves should be worn. After use, hands should be properly washed. The compounds should be stored safely.
12. Site personnel should have first aid for at least minor accidents in their toolbox. In case of any severe accident, the emergency numbers should be available for immediate contact and help. After giving first aid, the person should be taken to the nearest hospital immediately. Following Rite Geosystem's person to be contacted in case of emergency
 - TBA
 - TBA
13. In case of any accident and near misses, a report should be prepared and recorded. It should properly reported to all concerned for corrective action to prevention of the recurrence of such accident in future.

14. All precautions should be taken while lifting loads. Heavy loads should be lifted by two people. While lifting, it should be ensured that the load does not block visibility.
15. In case ladders are used, they should be kept on flat and solid surface and should be securely fixed. Also ladders should be used only to reach a location, not as a working place. Working on top of ladder is prohibited. No load should be carried while ascending or descending the ladder.
16. While working in vicinity of a mobile plant, safe distance should be maintained and an alert should be kept.
17. All material and equipment, which would liable to cause injury if they fell, must be stocked and stored so as to prevent any easy displacement.
18. Night work should be done only on instructions from the supervisor/engineer/manager. While working at night, it should be known that light casts shadows. So extra care should be taken when working near protruding steel, scaffold or excavation area. Also should be careful of the grease/water on ground floor. In case there is insufficient lighting at working place, supervisor/engineer/manager to be informed for proper action.
19. Site people should be aware of the nearest emergency exists and fire fighting / first aid equipment when working at project site.
20. Site should be kept clean while working as well as after working. No waste material, rubbish should be left at site after work.
21. It is not permissible to attend work under the influence of intoxicating liquor or drugs. The smoking of tobacco products is prohibited in the offices/storage/site/working areas.
22. Personnel should partake in any form of horseplay or prank likely to lead to injury to them or others.
23. Security passes/project IDs issued by the client to be worn by the employees at all times during duty hours. Any suspicious objects/activities which may pose threat to security shall be reported to the Site Manager/Site Engineer immediately.
24. Client's site safety procedures to be followed by Encardio-Rite Geosystem's personnel.

SAFETY STATEMENT

This statement sets out the health & safety policy of Encardio-Rite Geosystems L.L.C and the means through which that policy is to be implemented. Our objective is to provide a safe and healthy place of work for all staff members and to meet all our duties and obligations to our clients.

It is Encardio-Rite Geosystems's intention to protect our employees from accident or ill health at work. The company will seek to ensure that all our equipment and systems do not constitute a risk to the Health & Safety of our employees and we will consult with employees on risk mitigation.

Our approach to Health & Safety as far as is reasonably practicable will be:

1. To provide a safe place of work.
2. To continue to identify and control hazards.
3. To prevent as far as is reasonably possible, any improper conduct or behavior likely to put the Safety, Health & Welfare of employees at risk.
4. To consult with staff on all Health & Safety matters.
5. To provide protective clothing and equipment where necessary.
6. To provide a safe system of work practices.
7. To provide appropriate information and training to staff members on a continuous basis.
8. To make Health & Safety a key issue.

Employer responsibilities:

The responsibility for the provision of a safe place of work rests with the Encardio-Rite Geosystems Management. Specifically these responsibilities are:

1. To maintain a safe and healthy work environment for employees, in addition to conforming to all current statutory requirements.
2. To provide the appropriate type and level of training to enable employees perform their work safely and efficiently.
3. To make available to every employee appropriate equipment to ensure Health & Safety.
4. To maintain a vigilant and continuing interest in all Health & Safety matters relevant to both the company and staff.

Employee Responsibilities:

As a valued Encardio-Rite Geosystems employee, you have a responsibility to yourself and your fellow workers to carry out your work in a safe and considerate manner. Employees must:

1. Co-operate with the company in maintaining a safe work place.
2. Report any potential hazards to management and not work in any hazardous conditions should they; in the employee's opinion exist.
3. Be aware of the nearest emergency exits and fire fighting / first aid equipment.
4. Never interfere with or misuse anything provided by the company in the interests of Health & Safety.
5. Read the company Health & Safety statement and obey all mandatory signs.
6. Not partake in any form of horseplay or prank likely to lead to injury to you or others.

Smoking/Alcohol and Drugs:

It is not permissible to attend work under the influence of intoxicating liquor or drugs. The smoking of tobacco products is prohibited in the Encardio-Rite Geosystems offices/storage areas.

Smoking can take place outside, in the areas designated for smoking.

This smoking policy forms part of the overall Health & Safety Policy and any breach will be dealt with under the Company's disciplinary procedure.

Visitors, contractors and temporary members of staff are expected to abide by the terms of this policy.

Manual Handling:

Manual Handling is defined as the "transporting of a load by one or more employees and includes lifting, putting down, pushing, carrying or moving a load, which by reason of its characteristics or of unfavourable ergonomic conditions involves risks, particularly of back injury to employees".

This is a priority issue because it is a major cause of accidents in the workplace. It is Encardio-Rite Geosystems's policy to minimise the need for manual handling of loads and so therefore should be avoided as far as is reasonably practicable.

Employees must check the weight of the load before attempting to lift it and if the load is too heavy get help. When lifting, follow the following basic principles:

1. Relax the knees. Lowering movements should start at the knees not the head.
2. Get close to the object to be lifted. Get a good balance by keeping the feet apart. One foot will automatically be ahead of the other.
3. When in position, bend the knees and lift with the strong muscles in the legs.
4. Lift gradually, smoothly and without jerking, keeping the object close to the body and the back straight.

Training:

The company is committed to identifying the safety training needs on an ongoing basis. Staff will be involved in the identification of hazards in the office and work site and advised of the particular hazards pertaining to their area. Staff will be trained to respond to such hazards in order to prevent accidents/injury to themselves, their colleagues and clients.

All staff will be trained in emergency procedures and where appropriate, staff will be trained in the use of special machinery and equipment. All staff will be trained in the correct techniques involved in safe manual handling.

Consultation:

Encardio-Rite Geosystems is committed to consulting with its staff members regarding safety, health and welfare in the office. Staff is involved in the identification of hazards and are trained in dealing with the hazards identified.

The safety statement will be included in Induction Training and staff will be advised on how to deal with any problems that arise.

Reporting of Accidents:

Staff are required to report all accidents and near misses, whether resulting in injury or not, to management and ensure records are kept on site. The following details are required:

- Date, time and place of the incident.
- Name, address, occupation and age of the injured person.
- Circumstances, including cause and nature of the injury and the arrangements made for its treatment.

All accidents will be investigated by a member of management and a written report prepared. Corrective action will be taken where necessary to avoid a reoccurrence.

Accidents involving persons who are not members of staff but are visiting or working on the premises must also be reported.

Fire procedures:

In the event of a fire and providing there is no danger to the persons concerned, every effort should be made to extinguish or contain the fire pending the arrival of the fire brigade. The magnitude of the outbreak must dictate whether attacking the fire should take priority over reporting and evacuation.

All staff should be familiar with the exit routes and should also know the location and type of fire extinguishers in the office.

If you discover a fire you should:

- Activate the fire alarm.
- If there is a reasonable hope of extinguishing the blaze, attack the fire immediately.
- Do not under any circumstances, expose yourself to danger.
- Leave the building by the nearest fire exit and proceed to your designated assembly point.

If you hear the alarm you should:

- Switch off any equipment under your control and leave the building by the nearest fire exit.
- Do not stop to collect personal belongings.
- Once outside, do not enter the building until you are told it is safe to do so.
- Management will on occasion perform fire drills to ensure that procedures are known and followed in the event of a real fire.

Hazard Analysis:

A hazard is anything at work that might cause harm e.g. electricity, hot surfaces, lifting heavy loads, slippery floors, and poorly lit stairways etc. Staff must be aware of the potential hazards and risks involved and report specific hazards to management.

A hazard analysis will be carried out once a year by the management. Particular attention will be paid to areas of high risk i.e. floors, stairs and manual handling. The company will remove hazards by engineering means where necessary.

First aid:

First aid boxes are provided to ensure that first aid supplies are easily accessible when required in an emergency. They are to be checked weekly and shortages replaced. Employees have an obligation to ensure that first aid boxes, like any safety equipment, are not tampered with. Free access to first aid boxes must be maintained at all times.

Security:

Security passes/project IDs to be worn by the employees at all times during duty hours. Any suspicious objects/activities which may pose threat to security shall be reported to the management immediately.

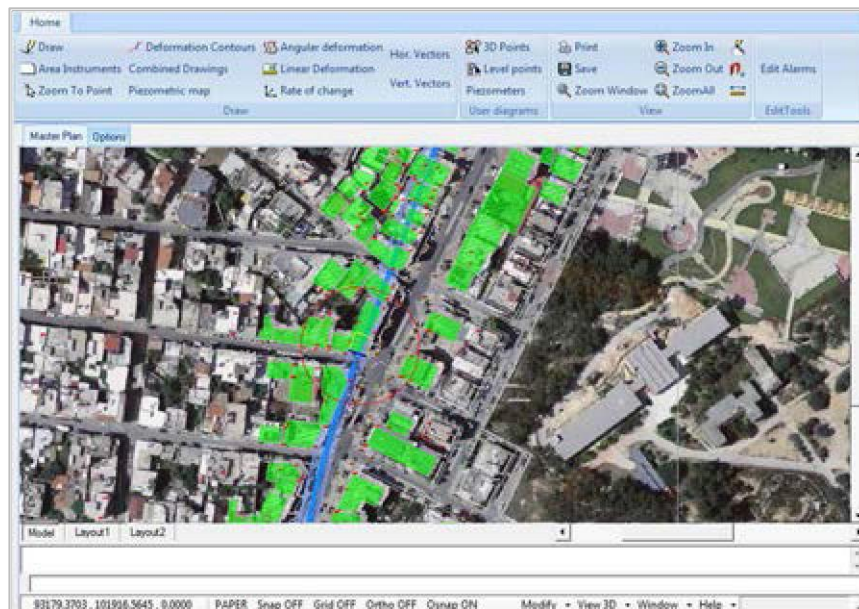
6 GEOTECHNICAL & STRUCTURAL MONITORING SOLUTIONS

2.1 Database management system

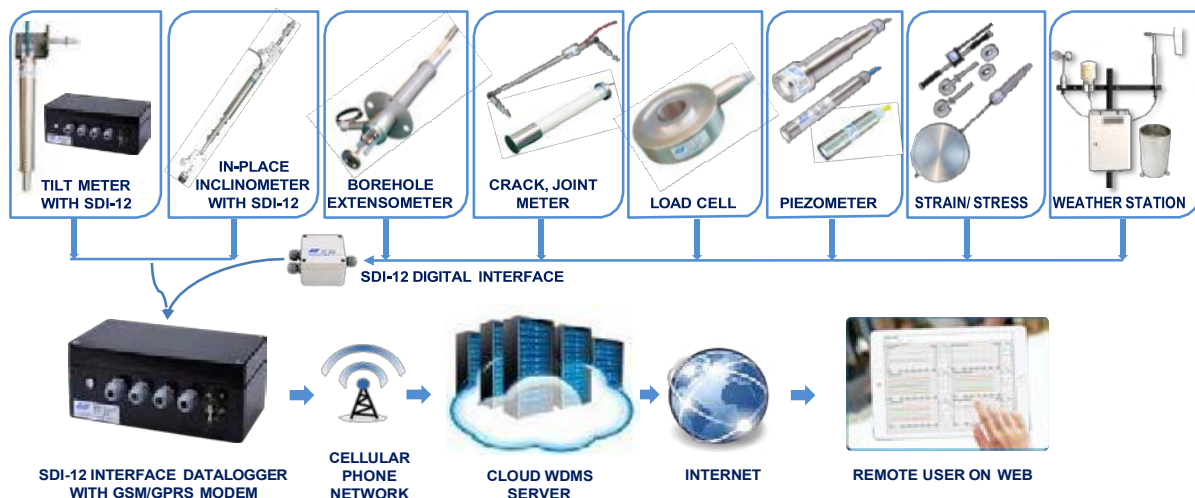
Encardio-rite provides a complete WEB or local access Data Monitoring Solution. This is a highly flexible deformation monitoring system that can combine data from **structural, geotechnical, geodetic, environmental and Tunnel Boring Machine sensors.**

Some of the features of this software are:

- Data available in graphical as well as numerical format.
- Results also available on tablets and smartphones
- Access to all sensors in one screen
- Instant alerts via SMS or email to authorized personnel
- Combined charts in one report (mix deformations, TBM data and water levels)
- Live monitor displaying all the incoming measurements from TBM.
- Diagrams from every TBM parameter updated real time
- Create diagrams from any combination of parameters and time period.



A snapshot from database management system



Schematic diagram for online monitoring of sensors

2.2 Geotechnical – Construction monitoring solutions

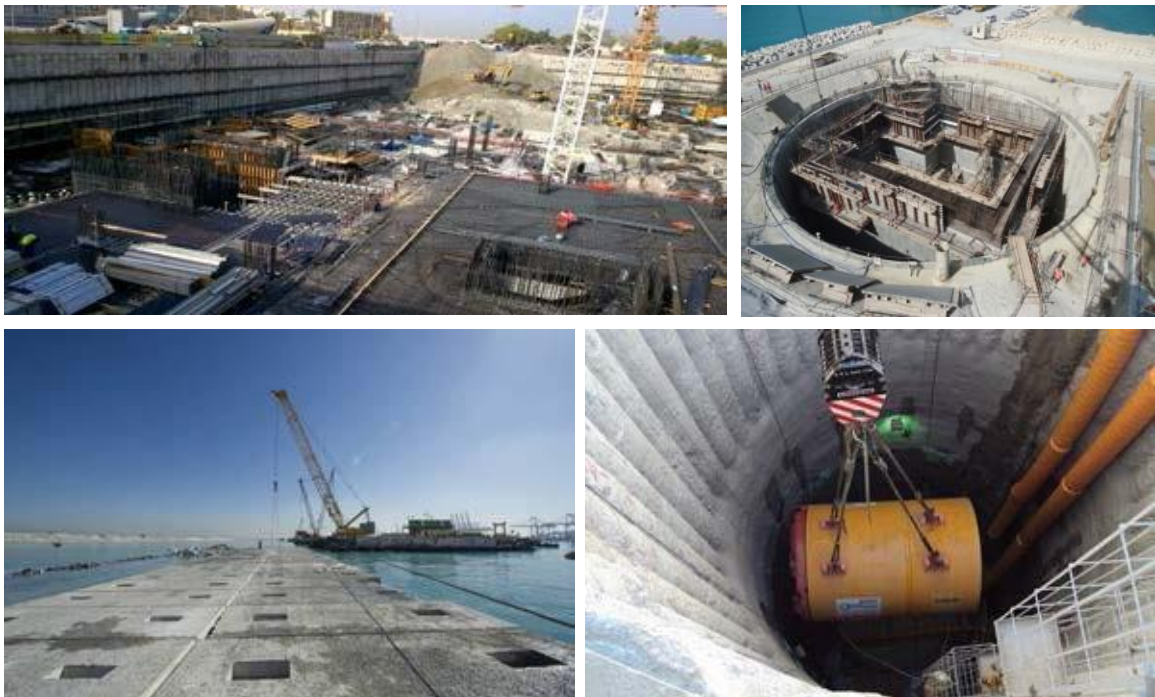
During any construction activity, safety of personnel and equipment during the construction process and safety of the adjoining buildings and structures is of paramount importance. The main purpose of the Instrumentation and Monitoring is to ensure zero risk during the construction process. Where ever required, the data is also available online.

We offer comprehensive range of sensors with advanced data base management for manually as well as automatically monitored sub-surface and surface parameters like stress, strain, load, piezometric pressure, water level, lateral deformation, joint meter, settlement, convergence, tilt etc. Refer to Encardio-rite Consolidated Catalog for in-house developed and manufactured sensors, dataloggers, software and web based online cloud monitoring systems.

Our work starts before the actual construction begins by conducting a pre-construction condition survey of all the buildings, structures and utilities in the zone of influence of the construction activity.

Before construction work starts, base readings of all the instruments installed are also recorded for observing change in data during construction.

During the construction process, the construction area, structures and the subsurface between the construction and the structures are monitored by instrumentation.



The data monitoring techniques ensure the safety of the construction process and surrounding structures. The data is constantly fed to the construction Contractor who uses it to expedite work in the safe zones and take corrective action where there is a possibility of any risk. Wherever required, the data is also provided to the concerned Consultants.

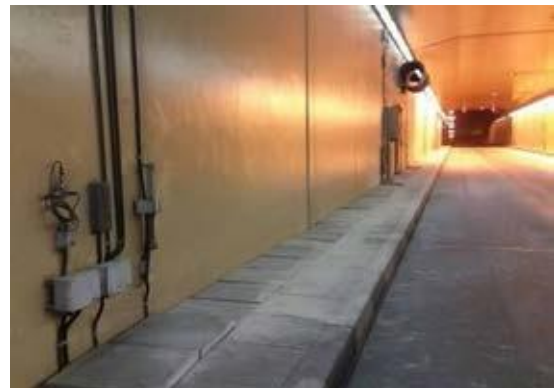
2.3 Structural – Asset monitoring

For buildings and infrastructures already constructed, it is essential to periodically or continuously monitor the health to ensure proper maintenance and hence safety. The term **Structural Health Monitoring** is attracting great significance lately and is being used more and more today to ensure safety of man and material.

The **monitoring system** consists of a range of instrumentation installed on existing infrastructures like historical buildings, rail/road/metro tunnels, bridges, dams, etc.

The purpose of the monitoring system is to assist and inform owner/designer/contractor/architect about continued performance of structure under gradual or sudden changes to their state.

The main factors affecting the performance of any structure is steel corrosion, degradation of concrete with age, undue settlement/tilt due to soil conditions, vibrations due to traffic, ground water level and



atmospheric conditions etc. In such cases, the instruments installed give very important data on the state of the structure. This is reflected in abnormal changes in strain, inclination and settlement values. Another parameter to be closely monitored is the development of cracks in the structure.

This kind of monitoring normally requires real time data on the desk. Encardio Group has good expertise in this having completed a number of such projects in Gulf and Worldwide.

2.4 Automatic monitoring system

Projects safety requires 24/7, high frequency & accurate measuring monitoring systems. Encardio Group uses an in-house developed system that consists of a series of networked robotic total stations, each one controlled by the Terramon software, installed in the dedicated total station control box.

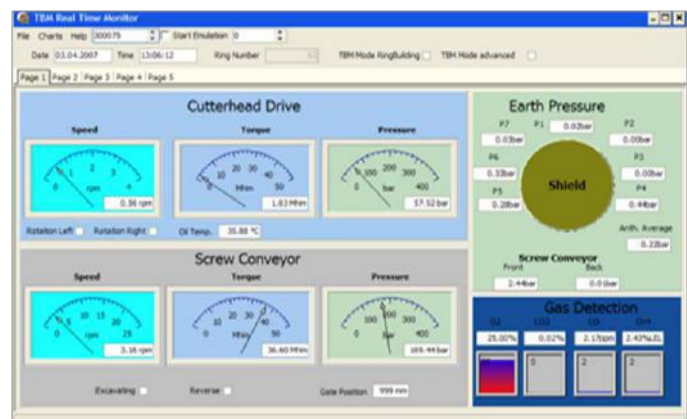




The system ensures valuable and timely monitoring of the displacements, providing high measurements density, simultaneous wireless transmission and automatic entry of the results in the Terramove monitoring data base. The system can be accessed and controlled remotely from anywhere by the users.

2.5 Tunnel Boring Machines

Tunnel excavation is associated inevitably with ground loss, and high pressure conditions which, in turn, results in associated ground movement. It is important, therefore, to closely monitor the TBM parameters when tunneling, especially through urban areas. Through over advanced software we can integrate the essential parameters from the TBM with the monitoring and geophysical data to provide essential information.



2.6 Environmental

2.6.1 Water level/quality

For proper monitoring of ground water resources, online web based monitoring of following parameters is very critical today.

- Water table/water level
- Water temperature
- Conductivity
- Flow
- Rainfall in the area

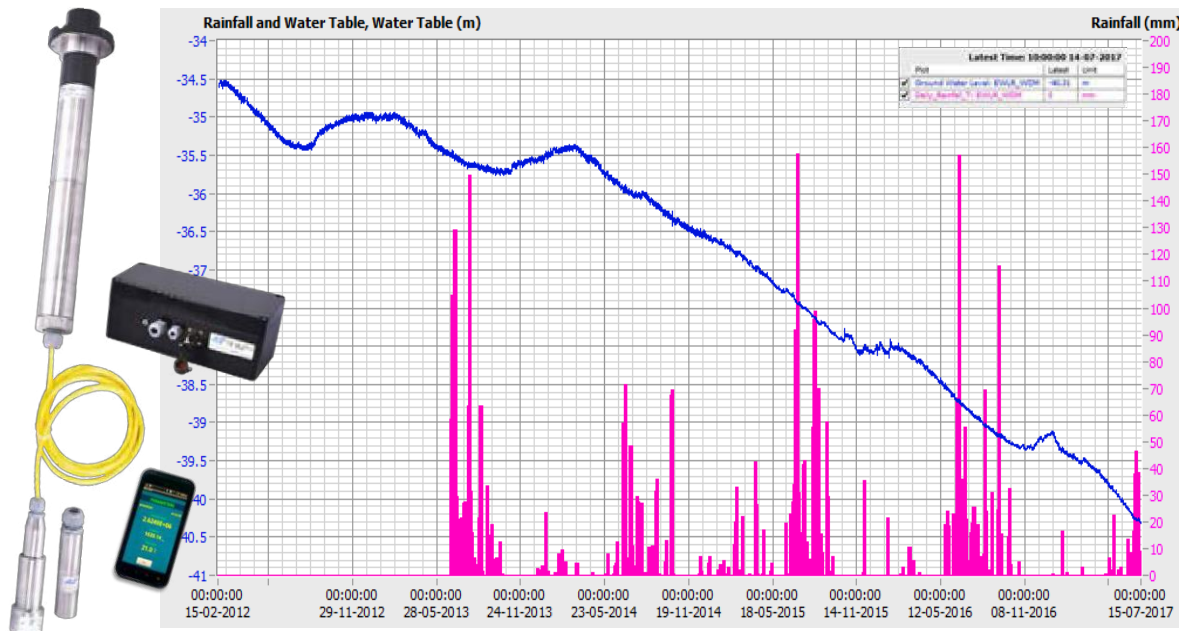
For any program of efficient water management to be successful, continuous monitoring of water level and quality in the ground, rivers, lakes and reservoirs etc. is necessary. It is essential to map, measure and monitor extent and quality of both sub soil aquifers and surface fresh water resources.

Encardio-rite provides optimum and most economical automatic water monitoring systems that provide a variety of solutions ranging from unattended monitoring of a single borehole for use by industry to monitoring of hundreds of boreholes spread over a wide geographical area from a central location.

Encardio-rite's web based monitoring solution allows water level/quality at remote locations to be monitored continuously in near real time from a central location that also sends alerts through SMS and emails. The solutions will enable groundwater researchers and decision makers to have quick access to the ground water/surface water data in meaningful information with less effort and cost.

2.6.2 Weather Station

Encardio-rite offers automatic web based weather monitoring station, a weather data management and presentation system for meteorological data for Rainfall, Wind velocity, Humidity, Temperature, Radiation, etc. The datalogger handles all data processing requirements, starting with collection and storage of data, performing required calculations on data, presenting results in graphical and numerical format and generating alarm messages. It also has option to monitor meteorological data remotely from an internet connected computer.



7 LIST OF REFERENCES

SOME PROJECT PHOTOGRAPHS



**INCLINOMETER INSTALLATION DUBAI METRO
PROJECT, DUBAI**



**INCLINOMETER MONITORING
AL SALAM STREET TUNNEL PROJECT, ABU
DHABI**



**INCLINOMETER INSTALLATION IN STEP DTS
T03 PROJECT, ABU DHABI**



**INCLINOMETER MONITORING
STEP T01 PROJECT, ABU DHABI**



**INCLINOMETER INSTALLATION
REHABILITATION OF MIRANI FORT PROJECT,
OMAN**



**IN-PLACE INCLINOMETER INSTALLATION IN TSE
RESERVOIR PROJECT IN QATAR**



**INSTALLATION BI-REFLEX TARGET IN STEP DTS T01
PROJECT, ABU DHABI**



**INSTALLATION OF CASAGRANDE PIEZOMETER IN
STEP DTS T01 PROJECT, ABU DHABI**



**INSTALLATION OF MPBX IN STEP DTS T03
PROJECT, ABU DHABI**



**MPBX INSTALATION AT AL SALAM STREET
TUNNEL PROJECT-NDM WORKS, ABU DHABI**



**MULTILEVEL PIEZOMETER INSTALLATION
DTS T02 PROJECT, ABU DHABI**



**BOREHOLE EXTEMSOMETER INSTALLATION
DTS T02 PROJECT, ABU DHABI**



**READING WITH PORTABLE TILT METER
DUBAI METRO PROJECT, DUBAI**



**BRONZE TILT PLATE INSTALLED
DUBAI METRO PROJECT, DUBAI**



**CRACK GAGE
DELHI METRO PROJECT, INDIA**



**CRACK GAGE
DUBAI METRO PROJECT, DUBAI**



**TILT METER INSTALLATION
DELHI METRO PROJECT, INDIA**



**CLOSE VIEW OF TILT
METER INSTALLATION
DELHI METRO PROJECT,
INDIA**



**ANCHOR BOLT LOAD CELL FOR GROUND ANCHOR
DELHI METRO PROJECT, INDIA**



STRUT LOAD CELLS INSTALLATION DUBAI METRO PROJECT, DUBAI



**STRAIN GAGE INSTALLATION
DUBAI METRO PROJECT, DUBAI**



8 DETAILS OF COMPLETED UNDERGROUND TUNNEL PROJECTS

- 1 **Expolink Route 2020 metro rail project:** This is an extension of existing Dubai Metro Red Line, consisting of a branch line starting at Nakheel Harbor and Tower Station and extending to the 2020 Expo site. The project's alignment comprises of 2 km of TBM bored tunnels and 10 km of elevated structures with 2 underground and 5 elevated stations.

Encardio-rite executed the database management and visualization system for the structural monitoring work with automatic generation of alerts in case of breach of any trigger value. Dilapidation survey for buildings, utilities, landscape, road infrastructure for metro alignment and de-route using aerial videography and photography. Flood survey using aerial mapping. Surveying and stake out of locations of instruments at site. Supply and installation of monitoring instruments, including trial pits at all drilling locations, drilling and backfilling of boreholes for instruments as per the Project's I&M plan worked out by the Designer. Re-calibration and periodic maintenance of monitoring devices. Field monitoring, data validation, processing & reporting including baseline, daily and weekly readings with weekly hard copy monitoring report.

- 2 **Marsa Al Seef Project, Dubai:** We executed the Red Line Metro Tunnel Monitoring (between Union Square and Burjuman underground metro station) & Ground Instrumentation System. The work included Web Base Data Monitoring (WDMS) of existing Red Line Metro Tunnel using automated total station, vibration sensors, strain gages and beam sensors. The ground surface was monitored by using various surface settlement points, building settlement points and multipoint borehole extensometers.

- 3 **Deira Waterfront Development, Phase-1 - Multi level Car Park, Plot-3, Plot-13, Plot-11B & Phase-2 - Plot-1, Plot-2:** Encardio-Rite has worked closely with the client ITHRA DUBAI on the whole Deira Waterfront Development and with various Geotechnical/Structural Consultants such as AE-7, COWI, COFFEY, E-construct, DAR and PARSONS. We executed the monitoring works on turnkey basis that included supply, installation of instruments, monitoring and reporting.

The Green line underground metro tunnel between Palm Deira to Al Ras and Shindagha tunnel (effected zone due to plot-13 construction) is fully instrumented by several automated total stations, optical targets, beam sensors, crack meters, strain gages and vibration sensors. The complete monitoring system was designed to work as standalone system inside the tunnel for any kind of alarm or alert message for the contractors and developers.

- 4 **Dubai Metro Project - Red Line:** We have executed on a turn key basis the I&M works (supply, installation, monitoring, maintenance and annual calibration) of the Dubai Metro Project - Red line at a contract value of around US\$ 2.95 million for JT Metro JV, comprising of Mitsubishi Corporation, Obayashi Corporation, Kajima Corporation and Yapi Merkezi Insaat ve Sanayi A.S. The Engineer for this project was Parsons-Systra and the designer, WS Atkins and Partners. Total project stretch of 5.7 km included 4 no. underground stations, 3 no. annexed structures, 2 no. cut and cover sections tunnel sections and 2 no. bored tunnel sections. The work was completed in October-2008.

- 5 **Dubai Metro Project - Green Line:** We have executed on a turn key basis the I&M works (supply, installation, monitoring, maintenance and annual calibration) of the Dubai Metro Project - Green-line at a contract value of around US\$ 2.09 million for JT Metro JV, comprising of Mitsubishi Corporation, Obayashi Corporation, Kajima Corporation and Yapi Merkezi Insaat ve Sanayi A.S. The Engineer for this project was Parsons-Systra and the designer, WS Atkins and Partners. Total project stretch of 7.1 km included 6 no. underground stations, 3 no. annexed structures 2 no. cut and cover sections tunnel sections and 3 no. bored tunnel sections. The work was completed in April-2009.

- 6 **STEP (Strategic Tunnel Enhancement Programme), Abu Dhabi:** The project constitutes of one of the largest tunneled sewerage systems in the world. This huge gravity-driven hydraulic wastewater network tunnel was divided into 3 sections => main sewer; link sewer; pumping station. Owner of the Project were Abu Dhabi Sewerage Services Company; CH2M were the Consultants. Encardio has provided turnkey services to all 3 sections. Details are given below.
- **Main Sewer (41 km) :** T01 (Samsung) - Pre and post construction building condition survey, supply, installation and monitoring of geotechnical sensors and surveying. Contract value AED 7 million. The work was completed in 2015. T02 & T03 (Impregilo) - pre and post construction building condition survey for T02, supply and installation of geotechnical sensors for both T02 and T03. The work was completed in 2013.
 - **Link Sewer (40 km);** LS01 & LS02 (Zublin) - Pre and post construction building condition survey, supply, installation and monitoring of geotechnical sensors and surveying. Contract value AED 20 million. The work was completed in 2016.
 - **Pumping station (Odebrecht)** – 100 m deep, 55 m wide; one of the deepest shaft for a sewage treatment plant: Pre and post construction building condition survey, supply, installation and monitoring of geotechnical sensors and surveying. The data is monitored online with our web based data monitoring service. Contract value AED 2 million. The work was completed in 2014
- 7 **ADMAC - Construction of Trunk Sewers in Abu Dhabi Island, Asset Enhancement scheme, Stage-1, Abu Dhabi:** Encardio–Rite entered into the contract with ADMAC for Dilapidation survey of Villas in affected zone of tunneling and Geotechnical instrumentation, monitoring and reporting the construction of trunk sewer and associated works under the ADSSC contract O-11385. Tunneling length was approximately 4 km which included 17 shafts for monitoring.
- 8 **Al Salam (Shiekh Zayed) Street Tunneling Project, Abu Dhabi:** I&M Works at a contracted value of around AED nine million. The work includes pre-construction building condition survey, supply, installation, monitoring and reporting of all geotechnical instruments and surveying points on a turnkey basis. The 3.6 km long Al Salam tunnel in being built underneath the eight lanes Al Salam Street. Owner of the Project were Department of Municipalities & Agriculture (DMA), Abu Dhabi; Parsons were the Consultants and Contractors were Samsung (Korea) & Saif Bin Darwish (UAE) Joint Venture. This work was done through our Organisation Encardio-rite Geosystems LLC, a registered Company in Dubai, UAE. The work was completed in 2010
- 9 **Doha Metro Project:** We have executed on a turnkey basis the I&M works (supply, installation, monitoring, reporting, maintenance and annual calibration) and pre construction building condition survey of **Gold Line underground, Green Line underground** and **Major stations**. By winning all these monitoring contracts, we are presently in a leading monitoring position for the Doha Metro Project
- 10 **Muharraq Sewage Treatment Plant and Sewer Conveyance System, Bahrain:** The project with 16 km sewer line (micro-tunneling) with 50 shafts and a sewage treatment plant was the first of its kind in Bahrain. Owners were Ministry Of Works Bahrain; Hyder Consulting Middle East were the Consultant and Contractors were Samsung Engineering. Encardio-rite Geosystems WLL, our company in Bahrain, did the complete monitoring job on turnkey basis that included pre and post construction building condition survey, supply, installation and monitoring of geotechnical sensors and surveying. Contract Value was US\$ 1.5 million. The work was completed in 2014.

- 11 **Delhi Metro Project - MC1A** - We have executed on a turn key basis the I&M works (supply, installation, monitoring, maintenance and annual calibration) of the Delhi Metro Project - MC1A for KSHI JV, comprising of Kumagai Corporation (Japan), Skanska (Sweden), HCC (India) and Itochu (Japan). The consultants to this project were Maunsell, Australia. The instrumented sections included four underground stations of 1200 m length and 3.3 km of cut and cover tunneling. The work was completed in 2006.
- 12 **Delhi Metro Project - MC1B** - We have executed on a turn key basis the I&M works (supply, installation, monitoring, maintenance and annual calibration) of the Delhi Metro Project - MC1B for IMCC JV, comprising of Dywidag International, Larsen & Toubro Ltd., Samsung Corporation, Ircon International, Shimizu Ltd. The consultants to this project were Mott MacDonald, U.K. The NATM Consultant was Geoconsult, Austria. The instrumented sections included six underground stations of 1800 m length, 7.6 km of TBM and 1.0 km of cut and cover tunneling. The work was completed in 2006.

All major metro projects in India including Delhi, Mumbai, Chennai, Kolkata, Bangalore and Jaipur

- 13 **Pir Panjal/Konkan Railway tunnels** - We are executing on a turnkey basis the I&M works (supply, installation, monitoring, maintenance and annual calibration) of the Pir Panjal/Konkan Railways Railway project in the Himalayas. The work consists of twenty tunnels, the longest being around 10 km long.

9 PERFORMANCE CERTIFICATES



JT METRO JV
JAPAN-TURKEY
METRO JOINT VENTURE

JT METRO JV
(Obayashi-Kajima-Yapi Merkezi)
P.O. Box 182845,
Dubai, UAE
Tel.: +971-4-221-2121
Fax.: +971-4-221-2181

Ref:

Date : 18 May 2011

By Fax/By Hand

Subject : WORK COMPLETION CUM PERFORMANCE CERTIFICATE FOR
INSTRUMENTATION AND MONITORING WORKS

Project : DUBAI METRO PROJECT- RED LINE

Owner : ROADS AND TRANSPORT AUTHORITY (RTA), DUBAI

Project Engineer : PARSONS-SYSTRA

TO WHOMSOEVER IT MAY CONCERN

This is to inform and certify that **Encardio-rite Electronics (P) Ltd.**, Lucknow, India, in capacity of a specialist subcontractor have executed supply, installation, monitoring, maintenance, annual calibration and factual data reporting of the instruments listed below, in our **Dubai Metro Project - Red Line**. The instrumented sections in the project's 5.7 km long (approx.) underground alignment included: 2 no. cut-and-cover tunnel sections (adjoining Khalid Bin Waleed and City Centre Station boxes); 4 no. underground stations (Khalid Bin Waleed, Union Square, Al Rigga and City Centre); 2 no. TBM bored tunnel sections (from Union Square Station to Khalid Bin Waleed Station and to City Centre Station), 3 no. annexed structures (Annex 1, 2 and 3) and 1 no. at-surface station (Jafza Limitless).

List of instruments used in the Red-Line project:

1. Surface settlement point for green field model ESMP-10C2
2. Surface settlement point for road and pavement model EPS-12
3. Water stand pipe model EPP-30SP
4. Inclinator system model EAN-25M
5. Vibrating wire strain gage model EDS-20V-SW
6. Strain gage type compression load cell model ELC-210S
7. Tape extensometer model EDS-80
8. Building settlement point model EBS-16
9. Portable tilt meter model EAN-70M
10. Crack meter model EDJ-40C
11. Magnetic extensometer model EDS-91
12. Portable readout unit cum dataloggers and accessories including cables, junction boxes etc. for the above instruments.

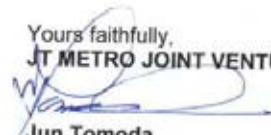


JT METRO JV
(Obayashi-Kajima-Yapi Merkezi)
P.O. Box 182845,
Dubai, UAE
Tel.: +971-4-221-2121
Fax.: +971-4-221-2181

The above instruments have performed in a satisfactory manner and we have no hesitation in recommending them for similar usage in other projects. We are also satisfied with the technical services provided by Encardio-rite on this project.

Total value of work executed by them for the project during the period May-2006 to October-2008 is approximately **AED 10.78 million**.

Yours faithfully,
JT METRO JOINT VENTURE


Jun Tomoda
Senior Project Manager – Red Line - Civil





JT METRO JV
JAPAN-TURKEY
METRO JOINT VENTURE

JT METRO JV
(Obayashi-Kajima-Yapi Merkezi)
P.O. Box 182845,
Dubai, UAE
Tel.: +971-4-221-2121
Fax.: +971-4-221-2181

Ref:

Date : 18 May 2011

By Fax/By Hand

Subject : WORK COMPLETION CUM PERFORMANCE CERTIFICATE FOR
INSTRUMENTATION AND MONITORING WORKS

Project : DUBAI METRO PROJECT- GREEN LINE

Owner : ROADS AND TRANSPORT AUTHORITY (RTA), DUBAI

Project Engineer : PARSONS-SYSTR

TO WHOMSOEVER IT MAY CONCERN

This is to inform and certify that **Encardio-rite Electronics (P) Ltd.**, Lucknow, India, in capacity of a specialist subcontractor have executed supply, installation, monitoring, maintenance, annual calibration and factual data reporting of the instruments listed below, in our **Dubai Metro Project - Green Line**. The instrumented sections in the project's 7.1 km long (approx.) underground alignment included: 2 no. cut-and-cover tunnel sections (adjoining Khalid Bin Waleed and Salah Al Din Station boxes); 6 no. underground stations (Saeediya, Al Ghubaiba, Al Ras, Palm Deira, Baniyas Square, Salah Al Din); 3 no. TBM bored tunnel sections (Union Square-Salah Al Din; Union Square-Baniyas Square-Palm Deira; Palm Deira-Al Ras-Al Ghubaiba-Saeediya-Burjuman), 3 no. annexed structures (Annex 4, 6 and 7).

List of instruments used in the Green-Line project:

1. Surface settlement point for green field model ESMP-10C2
2. Surface settlement point for road and pavement model EPS-12
3. Water stand pipe model EPP-30SP
4. Inclinator system model EAN-25M
5. Vibrating wire strain gage model EDS-20V-SW
6. Strain gage type compression load cell model ELC-210S
7. Tape extensometer model EDS-80
8. Building settlement point model EBS-16
9. Portable tilt meter model EAN-70M
10. Crack meter model EDJ-40C
11. Magnetic extensometer model EDS-91
12. Portable readout unit cum dataloggers and accessories including cables, junction boxes etc. for the above instruments.



JT METRO JV
(Obayashi-Kajima-Yapi Merkezi)
P.O. Box 182845,
Dubai, UAE
Tel.: +971-4-221-2121
Fax.: +971-4-221-2181

The above instruments have performed in a satisfactory manner and we have no hesitation in recommending them for similar usage in other projects. We are also satisfied with the technical services provided by Encardio-rite on this project.

Total value of work executed by them for the project during the period May-2007 to April-2009 is approximately **AED 7.62 million**.

Yours faithfully,
JT METRO JOINT VENTURE


Jun Tomoda
Senior Project Manager – Green Line - Civil



SAMSUNG C&T CORPORATION
STEP Deep Tunnel Sewer Contract T-01
P.O.Box 127533, Abu Dhabi, UAE



Our Ref.: SCE-ERE-T1-LT-02199-0022
12th October 2015

Mr. Vikas Vishwakarma
Project Manager
Encardio-rite Geosystems LLC – Abu Dhabi Branch
P.O. Box 131126
Abu Dhabi, United Arab Emirates

Project: Contract O-1557, STEP Deep Tunnel Sewer Contract T-01

Subject: Appreciation Letter

Dear Sir,

We confirm that Encardio-rite Geosystems LLC have successfully completed the Sub-contract for Pre and Post Condition Surveys on our T-01 contract for the Abi Dhabi Strategic Tunnel Enhancement Programme(STEP) Deep Tunnel Sewer tunneling project.

During the execution of their work Encardio-rite Geosystems LLC has demonstrated professional approach and enthusiastic support for the WORKS and we would certainly be happy to work with Encardio-rite Geosystems LLC in the future.

Yours faithfully,

For and on behalf of Samsung C&T Corporation.


Young Jin Yoon
Project Manager
STEP Deep Tunnel Sewer Contract T-01





Ref: IGL-OTH-T3-LT-00557/ENCARDIO
Date: 9th July 2014

To:
ENCARDIO-RITE Geosystems L.L.C.
P.O. Box 131126
Abu Dhabi – U.A.E.

Att: **Mr. Amod Gujral**
Mr. Prateek Mehrotra

Subject: **Design and Construction for Strategic Tunnel Enhancement Programme**
Deep Tunnel Sewer Contract T-03
Subcontract for Pre/Post Construction Condition Surveys
Subcontract Completion

Dear Sirs,

Pursuant to clause 6 of the subject Subcontract, we hereby certify the completion of the Subcontract Works for STEP T03 on 25th December 2013.

All the invoices issued till date have been paid.

We look forward to receiving your confirmation and concurrence on all the foregoing by signing and stamping in the space provided here below.

Mr.
Salini Impregilo S.p.A. - Abu Dhabi
Branch

Mr.
ENCARDIO-RITE Geosystems L.L.C.



Salini Impregilo S.p.A. Abu Dhabi Branch
formerly IMPREGILO S.p.A.
Al Watda City 1 Commercial Tower
27th Floor, Office no. 2704
Murad Street
P.O. Box 47849, Abu Dhabi – UAE

Tel: (+971) 2 6422208
Fax: (+971) 2 6430094
igkpa@impregilo.ae
www.salini-impregilo.com

Commercial License no. CM-1145/316
Chamber of Commerce Membership
no. 341414

Ed. ZUBLIN AG

ZÜBLIN

Date: October 12, 2017

SUBJECT : WORK COMPLETION CUM PERFORMANCE CERTIFICATE FOR INSTRUMENTATION, MONITORING AND PRE & POST CONSTRUCTION CONDITION SURVEY

PROJECT : STRATEGIC TUNNEL ENHANCEMENT PROGRAMME-LINK SEWER CONTRACTS LS-01 (O-1859) & LS-02 (O-1703)

CLIENT : ABU DHABI SEWAGE SERVICES COMPANY (ADSSC)

CONSULTANT : CH2MHILL

PROJECT PERFORMANCE & COMPLETION CERTIFICATE

This is to inform and certify that Encardio-rite Geosystems LLC, Abu Dhabi branch, U.A.E, in capacity of a specialist subcontractor have executed supply, installation, monitoring, maintenance and factual data reporting of the instruments listed below, in our Step Link Sewer Project. The instrumented section in the project 42 KM long (approx).

A- Geotechnical Instrumentation and Monitoring:

1. Inclinator in soil and scant piles
2. Multilevel vibrating wire piezometer
3. Water stand pipe
4. Multipoint bore hole extensometer
5. Vibration monitoring
6. Portable readout unit cum datalogger and accessories including cables, junction boxes etc. for the above instruments.
7. Weekly Reporting of 151 weeks

B- Pre & Post Construction of Building Condition Survey (Dilapidation Survey):

Pre and post condition survey carried out in this project by photography and crack measurement for approximately 1900 total structures, included high rise buildings, villas, banks, hotels, mosques, pumping station etc.

Total project value of work executed by them is approximately AED 17.6 million during the period May, 2012 to December, 2016.

The above mentioned instruments have performed in a satisfactory manner and we have no objection in recommending them for similar usage in other projects. We are also satisfied with the preconstruction condition survey reports and technical services provided by Encardio-rite on this ADSSC project.

For Ed. Zublin AG

Mohamed El Azab
Project Manager



Ed. Zublin AG
P.O.Box 656, Abu Dhabi, UAE.
Tel.: +971 2 6344039
Fax: +971 2 6211014
E-Mail: office.abudhabi@zublin-international.com
www.zueblin.de



Company Registration CN - 1001294

Page 1 of 1

Ed. Züblin AG
م.ب. 656 أبو ظبي، دولة الإمارات العربية المتحدة
التل: +971 2 6344039
الفكس: +971 2 6211014
البريد الإلكتروني: office.abudhabi@zublin-international.com
www.zueblin.de

 
The Civil Works Joint Venture (CWJV)
for the Route 2020 Metro Project

Members of
EXPOLINK
2020

Dubai, 22 February 2017
Ref: DMR10-AGJ-ERG-17-00001-TK

M/s ENCARDIO RITE GEOSYSTEMS LLC
P.O. Box 123850
Dubai, UAE

Project: ExpoLink Route 2020
Subject: Letter of Award – Structural Survey and Monitoring Service
Agreement Ref: R2020/CWJV/17/LOA/005

Dear Sirs,

Please find attached one original Letter of Award documents fully signed by CWJV for the Structural Survey and Monitoring Service on the ExpoLink Route 2020 Project.

We wish you a successful time on this Project and hope your experience is an enjoyable one.

Yours faithfully,

For and on behalf of Civil Works Joint Venture


Jose Luis Olivan
Project Director


DR/TK/MS

We confirm receipt of this signed Letter of Award for the Structural Survey and Monitoring Service

Signature _____ Date: _____

Print Name _____

Acciona Infraestructuras S.A & Gulermak Agir Sanayi Insaat ve Taahhut A.S. Civil Works Joint Venture Operating Address : Arenco Building No 3, DIP, Dubai, UAE PO Box : 487540	ROUTE 2020 Metro Rail Project	Page: 1/1
---	-------------------------------	-----------



Ref : EM706/SCA-1647/3437/2016
Date : 22nd December 2016

Encardio Rite Geosystems LLC
P.O. Box 123850,
Dubai, United Arab Emirates

Attention: Mr. – Vikas Vishwakarma – Sr. Project Manager
Dear Sirs,

Project: R1013/1 Improvements of Al Shindagha Corridor (Sana Junction)

Subject: Sub-Contract Agreement, EM706/1647/2016 – Instrumentation and Monitoring at the Metro Pier

We enclose two original sets of the Sub-Contract Agreement No. EM706/1647/2016 dated 15th December 2016 for the above works.

Please initial and affix your company seal to every page of the Sub-Contract Agreement and put full signature of your authorised signatory on Page no.7.

Please return the two original sets duly signed and stamped within 3 days from the date of this letter and provide a copy of the power of attorney and passport copy of your authorised signatory. We shall return one original set of the Sub-Contract Agreement after our signature.

Please note that no work should commence prior to signing of the Sub-Contract Agreement by both parties.

Yours faithfully,
for Wade Adams Contracting (L.L.C)



Michael Tsialis
Manager

scw/gc

P.O. Box 4337, Dubai, United Arab Emirates
Tel: +971 4 4535000, Fax: +971 4 4508087
E-mail: wadeadam@emirates.net.ae, www.wadeadams.com
Share Capital Dhls. 3,000,000 Fully Paid Up

شركة وادامز للمقاولات (ش.م.م.)، دبي، الإمارات العربية المتحدة
هاتف: +971 4 4535000، فاكس: +971 4 4508087
E-mail: wadeadam@emirates.net.ae, www.wadeadams.com
رأس المال 3,000,000 درهم مدفوع بالكامل

SUB-CONTRACT AGREEMENT

MAIN CONTRACT : RI013/1 IMPROVEMENTS OF AL SHINDAGHA
CORRIDOR (SANA JUNCTION)

CONTRACTOR : WADE ADAMS CONTRACTING (L.L.C.)

SUB-CONTRACTOR : ENCARDIO RITE GEOSYSTEMS (L.L.C)

SUB-CONTRACT WORK : INSTRUMENTATION AND MONITORING AT THE
METRO PIER

SUB-CONTRACT NO. : EM706/1647/2016

SUB-CONTRACT DATE : 19 DECEMBER 2016


EM706/1647/2016

Form B

PARSONS

Site Office Phone: 04-4428694 Fax: 04-4428278
Email: r10131pol@gmail.com

Parsons Overseas Limited, Oud Metha Road, P.O. Box 9123 | Dubai, U.A.E.
P: +971.4.402.9700 | F: +971.4.336.7920 | www.parsons.com
شركة بارسونز أوفرسيز ليمتد ، شارع عود ميثاء ، ص.ب. 9123 | دبي ،
الإمارات العربية المتحدة
ت: +971.4.402.9700 | ف: +971.4.336.7920

25 December 2016

Our Ref: 202/R1013/1/16R0167

The Director General
and Chairman of the Board and Executive Director
Roads & Transport Authority
P.O. Box 118899, Dubai
United Arab Emirates

Attn: Dr. Mohammed Abdullah Yousef, Construction Supervision Manager

Dear Sir,

Contract R1013/1: Improvements of Al Shindagha Corridor (Sana Junction)
Prequalification for Metro Pier Monitoring during underpass work (PQ-40)

With reference to the above mentioned subject, please find attached copy of Prequalification Document of M/s Encardio-Rite & Moniterra Group Metro Pier Monitoring during Underpass Works in the subject project.

The pre-qualification documents of the sub-contractor has been reviewed by us and found acceptable. We hereby recommend the approval of M/s Encardio-Rite & Moniterra Group Metro Pier Monitoring during Underpass Works in the contract R1013/1.

This is for your kind information and formal approvals.

With Best Regards,
PARSONS OVERSEAS LIMITED



Adel Mohammad Masadeh
Sr. Resident Engineer

Mob. 050 5546576
Adel.masadeh@parsons.com

cc: - Engr. Malek Mishmish, Liaison Engineer, RTA
- M/s. Wade Adams Contracting LLC
- Main Office File
- File 202

Attachment: As stated above



Parsons PLUS envision more



AM/HW/16R0167

wagner biro

To,
Director of Roads & Structures Maintenance Department
Government of Dubai
Roads and Transport Authority
P.O. Box 118899
Dubai, U.A.E

Attention : Mr. Hassan Ali Thair
The Manager of Roads Structures & Facilities Maintenance Section

Your reference : your message dated 11.10.2016 / Your reference : your message dated 11.10.2016

RMB 3721-1

11.10.2016

Projects: M1009/B1- Routine Maintenance of Road Structures (Bur Dubai)

Subject: Quotations for Approval - One Week Monitoring each Bridge Bearing Uplift
R317-2 Trade Center Interchange Flyover No 2,3 & 4.

Dear Sir,

Reference to the above subject, please find attached sealed quotations from specialist contractors, submitted to install necessary monitoring meters to measure the uplift of bridge bearings at Trade Center 2, 3 & 4 bridges.

1. M/s Freyssinet LLC
2. M/s Encardio Rite Geosystems LLC

Here, we are submitting two quotations only because the bridge monitoring system works are carried out from specialized contractor. We don't have third contractor to submit the quotations.

Therefore, we would kindly request you to review/Approve and issue a letter of approval in order to further instruct approved sub-contractor. The Method Statement and Risk Assessment will be submitted accordingly.

Your Cooperation in this regard will be highly appreciated.


Gopal Krishnan
Project Manager

Attachments: Quotations

Wagner Biro Gulf LLC, P.O. Box 8542, Dubai - U.A.E., Main office [tel] 04-4403870, [Fax] 04-4403871, Site office [tel] 04-2873211, [Fax] 04-2873213,
[e] maintenance@wbogulf.com [1] www.wagner-biro-gulf.com

Topo-Aerial Surveys, Geotechnical, Structural and Groundwater Monitoring Solutions
Over 50 years of excellence through ingenuity



July 3, 2017

To Whom It May Concern

This is to inform and certify that Encardio Rite Geosystems L.L.C., Dubai, U.A.E had performed Supply and Installation of Geo-Technical Instruments for Construction Monitoring, Pre- Construction Surveys of Existing Red Line Metro and Monitoring and produced and issued all kind of required reports on a weekly basis for **Dubai Water Canal Infrastructure Package (Canal and Costal Works).**

Following activities were performed by them during the construction of the Canal.

A.) Pre-Construction Condition Survey of Metro track and Pier

Duration: approx. 1 week

Structures/Buildings Surveyed: From RPN-410 till RPN-413 and additional 25 m both sides of canal excavation (approximately 150 m) and metro piers RPN-410, 411, 412 and 413

B.) Instrumentation and Monitoring for metro track and metro piers on a turnkey basis:

Instrument Used	Quantity	Remark
Inclinometer in ground	2	Depth=10m
Extensometer	2	Depth=10m
Automatic water level monitoring system	3	Depth=10m
Tilt Meter	8	
Prism on metro track side	20	
Prism on metro piers	8	
Building settlement point	4	
Manual standpipe	2	Depth=10m
Manual vibration monitoring	87 visits	
Daily monitoring and Weekly Reporting	8 months	

شركة هندسة الجيوتقنيّة
الإمارات العربيّة المتّحدة
ص.ب. 13055

هاتف: ٣٤٧٢٧٧٧
فاكس: ٣٤٧٣٤١٩

BELHASA SIX CONSTRUCT L.L.C.
Dubai, United Arab Emirates
P.O. Box 13055

Tel: +971 4 3472777
Fax: +971 4 3473512
www.besix.com



These instruments have performed in a satisfactory manner during the duration of 8months and we have no

This certificate has been issued upon **Encardio Rite Geosystems L.L.C.**, Dubai, U.A.E request without any liability to the company.

Yours faithfully,
For Belhasa Six Construct LLC


Mohamed Elaby
 Project Manager

شركة بلحسا سبكن كونستراكت ل.م.م
 دبي، الإمارات العربية المتحدة
 ص.ب. ١٣٠٥٥

هاتف: +٩٧١ ٤ 3472777
 فاكس: +٩٧١ ٤ 3473512

BELHASA SIX CONSTRUCT LLC
 Dubai, United Arab Emirates
 P.O. Box 13055

Tel +971 4 3472777
 Fax +971 4 3473512
www.besix.com



M/s Encardio-rite Geosystems L.L.C
P.O. Box 131126,
Abu Dhabi
UAE

For the attention of : Mr. Amit Ranjan
Head Operations

Date : 16 July 2015

Ref : DCA-SIX-LTX-GE-00-00660-00

Project :
Dubai Water Canal Infrastructure
Package 3 – Canal and Coastal Works

Contact :

Felix Warny
Mob – 050-622 06 08
Email : fwarny@sixco.ae

Enclosure(s) :

As mentioned

Copy to :

Subject: Letter of Award for Metro Monitoring

Dear Sir,

Please find attached herewith one (1) Original Letter of Award duly signed and stamped in between M/s. Encardio-rite Geosystems LLC and Belhasa Six Construct LLC, for Vibration monitoring to the Sewerage System areas and metro Monitoring Canal Area for R999/3 Dubai Water Canal –Infrastructure Package-3– Canal & Coastal Works in the Emirates of Dubai.

Thanking you,

Yours faithfully,
For and on behalf of
Belhasa Six Construct LLC

Felix Warny
Project Director

شركة بلحسا سبكس كونستراكت ل.م.ع.
بي.إ.إ. الإمارات العربية المتحدة
ق.م.ب. ١٣٠٥٥

هاتف: +٩٧١ ٤ 3472777
فاكس: +٩٧١ ٤ 3473512

BELHASA SIX CONSTRUCT LLC
Dubai, United Arab Emirates
P.O. Box 13055

Tel +971 4 3472777
Fax +971 4 3473512
www.besix.com



M/s Encardio-rite Geosystems L.L.C
P.O. Box 131126,
Abu Dhabi
UAE

For the attention of : Mr. Amit Ranjan
Head Operations

Date : 10 April 2017

Ref : DCA-SIX-LTX-GE-00-02021-00

Project :
Dubai Water Canal Infrastructure
Package 3 – Canal and Coastal Works

Contact :

Qasbi Llesis
Mob. : 056 115 1135
Email : qs-dca@sixco.ae

**Subject: Final Settlement –Encardio-rite Geosystems LLC,
Preconstruction Survey**

Dear Sir,

Please find attached herewith one (1) original form of final settlement for subcontract duly signed and stamped by us for your record.

This is for your necessary information / records / action.

Enclosure(s) :

As mentioned

Copy to :

Yours faithfully,
For and on behalf of
Belhasa Six Construct LLC



Mohamed Elaby
Project Manager

شركة بالخصا سكس كونستراكت ل.م.م.
دبي، الإمارات العربية المتحدة
ص.ب. ١٣٠٥٥

هاتف: +٩٧١ ٤ ٣٤٧٢٧٧٧
فاكس: +٩٧١ ٤ ٣٤٧٣٥١٢

BELHASA SIX CONSTRUCT L.L.C.
Dubai, United Arab Emirates
P.O. Box 13055

Tel +971 4 3472777
Fax +971 4 3473512
www.besix.com

Date: 26 /10 /2016

Reference:PTA/MD/9433/2016

Mr./ Manager of Roads Structures and Facilities Maintenance. ... Respectful

Subject: Start of Base Line Monitoring for Al Garhoud Bridge Pier

Project: PTA/MAR/062/01a Al Garhoud Vessel Maintenance Facility Marine Works Package

We would like to extend our gratitude for continues cooperation though out Marine Transport Department. This is with reference to meeting held with your department and your consultant AECOM, Marine Consultant CHSS, Monitoring contractor ENCARDIO, Marine contractor DBB with our department on 26 October 2016. All the parties have exchanged the information related to Maintenance Facility and the proposed Bridge Pier Monitoring Plan. AECOM consultant from your side informed that they do not have any objection on starting base line monitoring as proposed monitoring plan for two weeks. However, they will comment if required further after reviewing of the monitoring plan proposed by ENCARDIO within three weeks time. Same Monitoring proposal to be submitted for the Bridge Designer CH2M (HALCROW) for their review and comments as well.

As per Contractor DBB requests, we would like you to inform that ENCARDIO contractor will start base line monitoring from 27 October 2016. No Objection for the installations of instrument also obtained during the meeting from your side and we will proceed accordingly. This is for your information and necessary instructions if any.

هاتف +971 4 284 4444 . فاكس +971 4 206 5555 . ب 118899 دبي ا ع م . Fax. Tel. +971 4 284 4444 . P.O.Box 118899, Dubai, UAE . www.rta.ae

-1-

PTA/MD/9433/2016



هيئة الطرق والمواصلات
ROADS & TRANSPORT AUTHORITY



Ali Essa Ali Abdulla Ahli
Studies and Design Manager

Copy to:

- Mr./ Roads Planning and Design Manager ... Respectful

هاتف +971 4 284 4444 . فاكس +971 4 206 5555 . ص ب ١١٨٨٩٩ دبي ، ا ع م .
+971 4 206 5555 . P.O.Box 118899, Dubai, UAE . www.rta.ae

-2-

PTA/MD/9433/2016

دتكو بلفوربيتي (ش.ذ.م.م.)
Dutco Balfour Beatty (L.L.C.)



Ref: L/AA9027/13.2/EFG/TJ/ms/3013

19th November 2016

M/s Encardio Rite Geosystems L.L.C
P.O. Box 131126
Abu Dhabi
United Arab Emirates

For the attention of Mr. Amit Ranjan – Head Operations

Dear Sirs,

**PROJECT NAME: PTA/MAR/062/1A – CONSTRUCTION OF AL GARHOUD
MAINTENANCE FACILITY PACKAGE 1 (MARINE WORKS)
SUB: BRIDGE PIER MONITORING WORKS - LETTER OF INTENT**

We refer to your quotation ref. PI-DBB-16106R4 dated 17th Oct 2016 and our order confirmation via email dated 23rd October 2016 we hereby confirm our acceptance to your price for carrying out the Bridge Pier Monitoring for the aforementioned Project.

This letter of intent is subject to the following terms and conditions:-

1. Approval of M/s. Encardio Rite as the subcontractor for bridge monitoring works for the above mentioned project by the Engineer / Client.
2. The subcontractor shall execute the works in accordance with the Main Contract Specification and to the satisfaction of the Engineer / Client / Authorities.
3. All necessary documentation shall be in place
4. The subcontract rates shall be as per your quotation ref. PI-DBB-16106R4 dated 17th Oct 2016 (copy attached).
5. The subcontractor shall commence the work on site as per agreed schedule and the reports need to be submitted as per the requirement from authorities.
6. Payment terms shall be 60 days upon submission of report and invoice.
7. The subcontractor shall fully comply with the Main Contractor's Health & Safety and Environmental Plan and in accordance with the Client Site Safety Rules for the development. Any non-compliance and / or breach of safety and environmental rules will result in fines being issued and deducted from the subcontract account.



P.O. Box : 6944, Dubai, UAE
Telephone : +971 4 880 2288
Facsimile : +971 4 880 1457
Email : mail@dbb.ae
Website : www.dutcobalfourbeatty.com

A Dutco Balfour Beatty Company

Dutco Balfour Beatty LLC
Limited Liability Company
Share Capital: AED 300,000
Commercial Registry No. 41514

دتكو بلفوربيتي (ش.ذ.م.م.)
شركة ذات مسؤولية محدودة
رأسمال: ٣٠٠,٠٠٠ درهم
رقم السجل التجاري: ٤١٥١٤

ZERO HARM
MAKE SAFETY PERSONAL

Contd.../Page-2

ص.ب. : ٦٩٤٤، دبي، الإمارات العربية المتحدة
تليفون : +٩٧١ ٤ ٨٨٠ ٢٢٨٨
فاكس : +٩٧١ ٤ ٨٨٠ ١٤٥٧
البريد الإلكتروني: mail@dbb.ae
www.dutcobalfourbeatty.com

WI AD 006/Jan. 2015



Ref: L/AA9027/13.2/EFG/TJ/ms/3013
Date: 19th November 2016

Page: 2

8. The subcontract prices shall be inclusive of all labour, supervision, plant, equipment and other costs required for the successful completion of the subcontract works.
9. Kindly note that establishment and monitoring of the approved system is of utmost important to the authority approvals and subsequent commencement of construction activities on site, we request you to expedite the process of instrument arrangements / installation to facilitate the commencement of approved monitoring system.

This letter of intent is your authority to start the subcontract work.

A standard form of Subcontract Agreement / LPO will be forwarded for your acceptance and signature in due course.

Until and unless a Subcontract Agreement is signed between M/s. Encardio-Rite and M/s. Dutco Balfour Beatty LLC, this Letter of intent shall be binding document between our companies for all relevant purposes.

Accepted and Agreed

For Dutco Balfour Beatty LLC

Ednor F. Garcia – Sr. Project Manager

Accepted and Agreed

For Encardio Rite

Authorised Signatory



Emaar Properties PJSC
P.O.Box 9440, Dubai
United Arab Emirates

T +971 4 3673333
F +971 4 3673000

enquiry@emaar.ae
emaar.com

Pre-Qualification Notification: APPROVED

Company : Encardio Rite Geosystems LLC

Category : Geotechnical Instrumentation, Monitoring and Underground Studies

Reference No: EMAAR/PQ/0756

Date : 30th June 2016

Attn : Mr. Amit Ranjan

Dear Sir,

We would like to confirm that your company has successfully prequalified for Emaar projects for the above mentioned categories. We will invite you to participate in our tender process when a suitable opportunity arises.

Yours faithfully,

**For and on behalf of
Emaar Properties PJSC**



**Alan Sinclair
Director, Contracts**

Topo-Aerial Surveys, Geotechnical, Structural and Groundwater Monitoring Solutions
Over 50 years of excellence through ingenuity

AECOM

SUBMITTAL REVIEW COMMENTS

PROJECT: BAWABAT AL SHAQ – PHASE 3 – VILLAS
SUBMITTAL NUMBER: OT-ASSC02-0018 REV 01
SUBMITTAL SUBJECT: Method statement For Settlement Monitoring of Raft Foundation. (Villa no 69 &70)
COMMENTS DATE: 28/6/2017

REVIEW STATUS: (B) Approved as noted

COMMENTS.

1. RIC is fully required to comply with all the requirements as contained in the approved HSE Plan.
2. This does not also relieve the contractor from her duty of ensuring the total monitoring of the effective measures as contained in the RA.
3. RIC will be solely responsible to whatever happened at site during the Activities.

Review By: Nnamani Emmanuel.

28/06/2017



دتكو بلفوربيتي (ش.ذ.م.م.)
Dutco Balfour Beatty (L.L.C.)



Ref.: L/AK8302-001/13.2/TJ/ss/3015

09th June 2015

M/s. Encardio - Rite GeoSystems LLC
P.O. Box 131126
Abu Dhabi
United Arab Emirates

Tel: 025535680
Fax 025535681

Attention: Mr. Amit Ranjan – Head Operations

Dear Sirs,

**0102 – MARSA AL SEEF DEVELOPMENT
LETTER OF AWARD – METRO TUNNEL EXCLUSION ZONE MONITORING &
INSTRUMENTATION SYSTEM**

We are pleased to award the subcontract for the metro tunnel exclusion zone monitoring and instrumentation system to M/s Encardio - Rite GeoSystems LLC under the subject Contract, based on the specification, drawings, other documents, terms and conditions as included in the attached Subcontract Agreement no. 3200.

This Award is subject to the following suspensive conditions:

- DBB obtaining the consent of the Engineer / Employer as to M/s Encardio - Rite GeoSystems supplying the subject materials; and
- The Subcontract Agreement including all attachments being returned to DBB duly stamped and signed by M/s Encardio - Rite GeoSystems LLC.

Please arrange for each page of the Subcontract Agreement and its attachments to be stamped, initialled and the signature of a duly authorized person on Page 29.

Both copies of the document are to be returned to this office within seven (7) days from the date of this Letter of Award, whereupon receipt, we will complete the documents and return one full copy to you for your record.

We would like to welcome M/s Encardio - Rite GeoSystems LLC in to this prestigious project and look forward to a mutually rewarding outcome for both our companies.

Yours faithfully
For DUTCO BALFOUR BEATTY LLC

MARTIN HARPER
COMMERCIAL MANAGER

Encl: Subcontract Agreement no. 3200– 2 sets

P.O. Box : 8944, Dubai, UAE
Telephone : +971 4 880 2288
Facsimile : +971 4 880 1457
Email : mail@dbb.ae
Website : www.dutcobalfourbeatty.com
A Dutco Balfour Beatty Company

Dutco Balfour Beatty LLC
Limited Liability Company
Share Capital : AED 300,000
Commercial Registry No. 41314

دتكو بلفوربيتي (ش.ذ.م.م.)
المرحلة ذات مسؤولية محدودة
رأسمال المساهمة : ٣٠٠,٠٠٠ درهم
رقم السجل التجاري : ٤١٣١٤

ZEROHARM
MAKE SAFETY PERSONAL

صن خبء : ٨٩٤٤ ، دبئي - ا.ع.م.
تليفون : +٩٧١ ٤ ٨٨٠ ٢٢٨٨
فاكس : +٩٧١ ٤ ٨٨٠ ١٤٥٧
البريد الإلكتروني : mail@dbb.ae
www.dutcobalfourbeatty.com

WI AD 006/Jan. 2015


SAMSUNG-SAIF BIN DARWISH JV

P.O. Box 53581, Abu Dhabi, UAE

Tel : (02) 4949 600

Fax : (02) 4949 800

Ref No. : SSBD/SUB/INF/4842/11
Date : 21 Sep 2011
Encardio-Rite Geosystems L.L.C

Abu Dhabi Branch

P.O Box 131126

Abu Dhabi, United Arab Emirates

Attention : Mr. Amit Ranjan/Project Manager
**Project : Upgrading Al Salam Street and Abu Dhabi City Ring Road
Contract No.1 (Al Salam Street Tunnel)**
**Subject : Work Completion cum Performance Certificate for Instrumentation,
Monitoring and Pre-Construction Condition Survey**
Owner : Department of Municipal Affairs, Municipality of Abu Dhabi, U.A.E
Consultant : Parsons International

Dear Sir,

This is to inform and certify that **Encardio-rite Geosystems L.L.C**, Abu Dhabi Branch, U.A.E, in capacity of a specialist subcontractor have executed supply, installation, monitoring and factual data reporting of the instruments listed below, in our **Al Salam Street Tunnel Project, Contract 1**. The project comprises of 3.1km tunnel from Al Mina Road intersection to Al Falah Street intersection constructed using cut and cover method. The tunnel will be the longest in the Middle East once complete.

A). Geotechnical instrumentation and monitoring:

Instrument Used	Quantity	Remarks
Inclinometer (D-wall)	57 no.	Probe type, Depth=17m 2m below D-wall toe
Inclinometer (D-wall)	10 no.	Probe type, Depth=20 2m below D-wall toe
Tiltmeter (Building)	78 no.	Tilt plate type
Prism (Building)	45 no.	
Settlement pin (Building)	78 no.	

1

HG/jovie

Crack meter	100 no.	
Ground Settlement Marker	257 no.	Asphalt Concrete type
	100 no.	Soil type
Anchor Load Cell -I	50 no.	Strain gage type, design load=60 ton
Anchor Load Cell -II	6 no.	Strain gage type, design load=120 ton
Dip meter (within excavation)	67 no.	Casagrande type, GL to 20m
Piezometer (outside excavation)	67 no.	VW type, GL to 5m & 10m
Borehole Extensometer	13 no.	Electrical type, 3m, 6m, 9m
Portable readout unit cum dataloggers and accessories including cables, junction boxes etc. for the above instruments.	1 lot	
Weekly Reporting	60 weeks	Daily Monitoring Basis
	40 weeks	Weekly Monitoring Basis

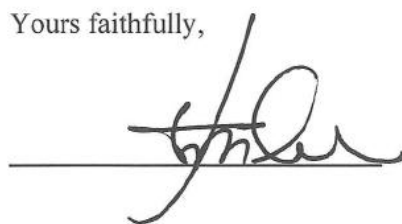
B. Pre- Construction Building Condition Survey

Duration	6 months approximately
No. of Structures/Building surveyed and documented in reports	179 (structures surveyed included high rise office, bank, residential and hotel towers, villas, mosques filling station etc.)

The above-mentioned instruments have performed in a satisfactory manner and we have no hesitation in recommending them for similar usage in other projects. We also satisfied with the preconstruction condition survey reports technical services provided by Encardio-rite on this project.

Total value of work executed by them for the project during the period December -2008 to July-2011 is approximately **AED 8 million.**

Yours faithfully,




H.J. Lee

Project Director

For and on behalf of Samsung-Saif Bin Darwish JV

شركة اميكو للمقاولات ذ.م.م

Ammico Contracting Co. W.L.L.

Ammico

P.O.Box : 14330, Doha - State of Qatar. Tel. : +974 - 44886531/44886581, Fax : 44886507, E-mail : qatar@ammico.biz

Our Ref. No. ACC/AHCC/196

Dated: September 11, 2012

Subject: Performance Certificate for Instrumentation and Monitoring Works

Project: Supply, Calibration, Maintenance & Monitoring of Instrumentation at Heart of Doha Project, Phase 2& 3 Enabling Works, Doha - Qatar

Owner: Msheireb Properties

This is to inform and certify that M/s. Encardio-rite Electronics (P) Ltd., Lucknow, India executed supply, calibration, maintenance and monitoring of instrumentation at Heart of Doha Project, Phase 2&3 enabling works, Doha - Qatar during 2010-11.

Below said instruments were supplied and monitored for our Project:

Surface Settlement Point	10 Nos.
ESPM-10, (Rod Type- 1m Deep)	
Heavy Duty Cover	10 Nos.
Suitable for Settlement Point	
PVC Perforated Pipe	27 Nos.
OD : 48mm, ID : 38mm, 3m Length with 1m Perforation	
Rigid PVC Standpipe	63 Nos.
OD : 50mm, ID : 44mm, 3m Length for 25m Depth	
Rigid PVC Standpipe	36 Nos.
OD : 50mm, ID : 44mm, 3m Length for 15m Depth	
Rigid PVC Standpipe	27 Nos.
OD : 50mm, ID : 44mm, 3m Length for 9.5m Depth	
Bottom Stopper	27 Nos.
Top Cap	27 Nos.
Water level Sounder	1 Nos.
EPP-10/6, 30m Long, 1mm Resolution	
ABS Self Aligning Access Tube	35 Nos.
EAN-25/1.1, 3m Length	
ABS Telescopic Coupling	42 Nos.
EAN-25/1.1	
End Cap	10 Nos.
EAN-25/1.4 End Cap (Top Or Bottom)	



شركة اميكو للمقاولات ذ.م.م.

Ammico Contracting Co. W.L.L.

Ammico

P.O.Box : 14330, Doha - State of Qatar. Tel. : +974 - 44886531/44886581, Fax : 44886507, E-mail : qatar@ammico.biz

Accessories	46 Nos.
BOPP Tape	
Accessories	1 Nos.
Self Taping, Screws with Nylon Washers	
Software for Inclinator	1 Nos.

The above instruments have performed in a satisfactory manner and we have no hesitation in recommending them for similar usage in other projects. During the work, it is observed that Encardio-rite personnel have good experience in their field.

We wish to thank you for your cooperation and successful execution of the contract.

The issuance of this certificate shall not relieve contractor from any of its obligations under the contract or operate as a waiver by company of any of its rights there under, except in each case as may be expressly provided in the contract.

For and on behalf of
Ammico Contracting Co. W.L.L.

for
Muzaffar Iqbal Anjum
Deputy General Manager



**INTERNATIONAL METRO CIVIL CONTRACTORS**

DYWIDAG - L&T - SAMSUNG - IRCON - SHIMIZU JV

Metro Corridor Contract MC1B

8, Jantar Mantar Marg, Near Connaught Place, New Delhi - 110 001

Ref: IMCC/MCIB/DES/D 5902
Dated: 28th June, 2004Encardio - rites Electronics Pvt. Ltd.
A-7, Industrial Estate, Talkatora Road
Lucknow,
U.P.-226011, India**Sub: METRO CORRIDOR CONTRACT, MC1B**
Completion certificate for Instrumentation and Monitoring

This is to certify that Encardio-rite Electronics Pvt. Ltd, Lucknow have supplied and successfully installed geotechnical instruments for Delhi Metro Corridor contract MC1B against various IMCC purchase orders and work orders.

They have also satisfactorily completed data monitoring from the installed instruments involving data acquisition, processing and preparation of reports.

The instruments supplied, installed and monitored are as follows:

1. Casagrande piezometers and standpipes
2. Inclinometers with or without magnetic extensometer
3. Multipoint electronic borehole extensometers
4. Strain Gauges
5. Crackmeters
6. Read out units for above instruments
7. Settlement monitoring points for wall and pavement

Regards

J. H. Kim
(Geo technical Manager)

CC: Sunit, Rahul



Telephone: +91 11 336 9158 Telefax: +91 11 336 0346, E-mail: imcc@mc1b.com

KSHI JV**KUMAGAI-SKANSKA-HCC-ITOCHU GROUP**33/35, Mall Road, Delhi - 110054
Tel : + 91 11 23910442 - 23910469 Fax : + 91 11 23910474

May 6, 2004

Ref: 37/00/Pm/51703

**DESIGN AND CONSTRUCTION CONTRACT MC1A
METRO CORRIDOR BETWEEN VISHWA VIDYALAYA & ISBT STATIONS****TO WHOM IT MAY CONCERN**

This is to certify that M/s Encardio-rite Electronics Pvt. Ltd., Lucknow have supplied and successfully installed geotechnical instruments for our Delhi Metro Corridor Contract MC1A against various KSHI purchase orders.

In addition to above, they have satisfactorily completed data monitoring from the installed instruments involving data acquisition, processing and preparation of reports against various KSHI work orders.

The instruments supplied, installed and monitored in the above-said project are as follows:

1. Inclinometers
2. Casagrande and stand pipe piezometers
3. Vibrating wire piezometers
4. Earth pressure cells
5. Strain gages and load cells
6. Tiltmeters
7. Crackmeters
8. Multipoint borehole extensometers
9. Read out units for above instruments
10. Settlement monitoring points
11. Magnetic Extensometer (Vertical settlement gages)

The performance of above instruments is found to be satisfactory.


H. Yoshikawa
Project Leader

Page 1 of 1

Created by RAS



Leighton India Contractors Pvt. Ltd.
Chenani Nashri Tunnel Project

Lower Mada, Village Gujard, Tehsil Chenani,
District Udhampur, Jammu and Kashmir – 182141
India

t: +91 1992 285202
f: +91 124 44958201

www.leighton.co.in

Date: 19-02-2015

Service Certificate.

To Whom It May Concern.

This is to certify that Encardio-rite Electronics Pvt Ltd.- Lucknow has supplied, installed and monitored the below mentioned geo-instruments for the Chenani – Nashri Highway Tunnel Project in accordance with the Works Order No. I1007-COM-ECR-SC-0116 dated 22nd June 2011.

Following geo-instruments were supplied, installed and monitored by Encardio rite:

- Vibrating Wire Type Strain Gauges for shotcrete.
- Vibrating Wire Type Pressure Cells for shotcrete.
- Multipoint Borehole Extensometers.
- Bore Hole Inclinoimeters.
- Digital Read Out Units.
- Optical Bi – reflex Targets.

The above geo instruments which were installed in the project area – underground and on ground, have performed in a satisfactory manner during the construction period from September 2011 to December 2014. We have no hesitation in recommending the said instruments for usage of any other similar project.

Finally, we wish to state that Leighton Contractor was satisfied with the technical response of Encardio rite Electronics as well as it's after sales services provided to this project.



Chief Engineering Geologist.



For Leighton India Contractors Pvt. Ltd.



Arab Center
For Engineering Studies

المركز العربي
للدراسات الهندسية

Performance Cum Completion Certificate

TO WHOM SO EVER IT MAY CONCERN

This is to inform that Encardio-Rite Electronics Pvt. Ltd., Lucknow (INDIA) have participated with ACES in supplied, installed & commissioned following geotechnical instruments for one of our client for **DEEP EXCAVATION PROJECT** at Doha in Qatar during April-May 2010.

- In-place inclinometer system (EAN-51M) with bi-axial sensors for an average depth of 34.5m. Total 09 boreholes /locations.
- ABS casing pipes each having 3m length & accessories for In-place inclinometer system – 80 nos.
- Accessories like switch cum junction boxes, cables, multilogger software, etc.
- Automatic data acquisition system (EDAS-10) – 1no. inside control room.

These instruments have performed in a satisfactory manner and we have no hesitation in recommending them for similar usage in other projects.

We are also satisfied with the technical response as well as their after sales services on this project.

FOR ARAB CENTER FOR ENGINEERING STUDIES (ACES)

MR. RASHAD KILANI
GEOTECHNICAL MANAGER



Arab Center العربي
For Engineering Studies الدراسات الهندسية

Date: Feb. 26, 2011

Geo. Dept. letters/2011
Page 1 of 1



م.ب. ١٩٥٧٩، الدوحة، قطر هاتف : +٩٧٤ ٤٤ ٨٧٠ ١٤١ فاكس : +٩٧٤ ٤٤ ٨٧٠ ١٤٦
P.O.Box : 19579, Doha, Qatar Tel: +974 44 870 141 Fax: +974 44 870 146
E-mail: acesdaoha@aces-int.com www.aces-int.com



Al Futtaim Exova LLC
Dubai Investments Park
P.O. Box 34924, Dubai
United Arab Emirates

T: +971 (0)4 885 1001
F: +971 (0)4 885 4004
E: dubai.lab@exova.com
W: www.exova.com



Testing. Advising. Assuring.

Performance Certificate

TO WHOM SO EVER IT MAY CONCERN

This is to inform that Encardio rite Geosystems LLC, U.A.E. have participated with Al Futtaim Exova LLC, Dubai for supplying of the following geotechnical instrument for one of our client for Static Pile Load Test jobs in Dubai and Abu Dhabi. The detail of instrument is listed below:

- ❖ *Encardio rite model EDS-20V-E: Embedment Type Water Proof Vibrating Wire Strain Gages with 1 m cable length - 52 no. at various levels of pile depth.*
- ❖ *Range: 3000 microstrain*
- ❖ *Standard Operating Temperature: -20°C to +60°C*

These strain gages have performed in a satisfactory manner and we have no hesitation in recommending them for similar usage in other projects.

We are also satisfied with the technical response as well as their after sales services on this project.

For Al Futtaim Exova LLC



Mahesh Hingorani
Civils – Site Manager

Dated: Feb 27, 2011



(08)
المصنع إستوغا الفطيم
Al Futtaim Exova LLC
P.O. Box 34924, Dubai, United Arab Emirates
Tel: +971 (0)4 885 1001 Fax: +971 (0)4 885 4004

الفطيم كاريليون (ش.ذ.م.م)



Ref: AFC/ERG/AC528/L/00001

27th July 2013

ENCARDIO-RITE GEOSYSTEMS LLC
P. O. Box: 131126,
Abu Dhabi, U.A.E.

Fax: 02 5535681

ATTN. : MR. PRATEEK MEHORTA – GENERAL MANAGER

PROJECT : BURJ DUBAI DEVELOPMENT - ROADS & INFRASTRUCTURE WORKS

SUBJECT : PRE-CONSTRUCTION CONDITION SURVEY AT THE DUBAI MALL EXPANSION PROJECT.

REF : UAE 13060 dated 25th July 2013

Dear Sir,

We hereby confirm our intention to engage M/s ENCARDIO-RITE GEOSYSTEMS LLC to carry out and complete the pre construction condition/dilapidation survey in connection with the Dubai Mall expansion work at our Burj Dubai infrastructure Development project, as more detailed in your offer.

You are required to proceed with the work immediately, in close coordination with Mr. Vijayaram, our Project Manager designated for the work.

You are also required to liaise with AFC safety manager Mr. Sandeep (mobile no: 050-4526021) for appropriate safety induction procedure.

A formal subcontract order is being processed and will be issued in due course.

Yours faithfully,
For AL FUTTAIM CARILLION


SIMON BELTON
CONSTRUCTION DIRECTOR

PP

Cc:

Al Futtaim Carillion L.L.C.
P.O.Box 1811
Dubai
United Arab Emirates

Phone: 04 3331200
Fax: 04 3331018
E-mail: afc@alcarillion.ae
www.alcarillion.ae
www.carillionplc.com

ISO 9001, 14001 &
OHSAS 18001 registered



بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

المنار الدولية Al Manar INTERNATIONAL

Ref.No./ALM/RCA/J61/83/10

July 15, 2010

Performance Certificate

This is to inform that **Encardio-Rite Electronics Pvt.Ltd.**, Lucknow have supplied, installed & commissioned following geotechnical instruments to us towards **Rock Slope Stability of MIRANI FORT project at MUSCAT in OMAN**, controlled by Sultanate of Oman.

- In-place inclinometer system (EAN-51M) with bi-axial sensors for an average depth of 25m and gage length of 2m – 14 locations.
- Vibrating wire type bore hole extensometer (EDS-71V) suitable for an average depth of 26m along with accessories - 28 locations.
- EI-Beam sensors (EAN-31 EL-B) – 20 locations.
- Tilt meter (EAN-90M) – 1 location.
- Temperature meters (ETT-10TH) – 6 locations.
- Accessories like switch cum junction boxes, cables, multi-logger software, portable readout unit, etc.
- Automatic data acquisition system (EDAS-10) – 3nos. inside control room.
- Web based data monitoring system (WDMS) with modem & necessary software to acquire data remotely – 1no.

Presently the said system is being monitored & maintained by Encardio-rite Electronics (P) Ltd., India. These instruments have performed in a satisfactory manner and we have no hesitation in recommending them for similar usage in other projects.

We are also very satisfied with the technical response as well as their after sales services on this project.

AL MANAR INTERNATIONAL LLC

Engr. Waleed Youssef Agha
General Manager



من بـت: ١/١٩٦٦٤/٥، عـرب: ٢٤٥٥، روي، الرمز البريدي: ١١٢، سلطنة عمان، هاتف المكتب: ٢٤٥٩٤٥٥، ٢٤١٩٣٠٣٥، فاكس: ٢٤٥٩٣٧٠٢، ٢٤١٩٣٠٣٢، بـرقيا: عمان ديكو، مسقط
C.R. : 1/69664/5, P.O.Box : 2455 Ruwi, Postal Code : 112, Sultanate of Oman, Tel. Off: 24594550, 24493035, Fax : 24593702, 24493032, E-mail : manarint@omantel.net.om



Performance cum Completion Certificate

Commitment, Reliability & Quality TO WHOM SO EVER IT MAY CONCERN

This is to inform and certify that Encardio-Rite Electronics Pvt. Ltd., Lucknow have supplied & monitored following geotechnical instruments through us for Water Resources Division, Goa - Cabo Hills at Raj Bhavan - Governor's Bunglow, Goa for the Rock Slope Stability Work - Phase-I and phase-II carried out by us:

- Supply of Inclinator bore hole casing having an average depth between 20m to 29m
- 18 nos.
- Supply of Digital Inclinator system model EAN-26M having bi-axial type inclinometer torpedo (probe) along with battery operated hand held data logger and cable reel - 1 set.
- Supply of Crack meter (vibrating wire type) model EDJ-50 for embedded application having measuring range of 0-50mm - 8 nos.
- Supply of In-place inclinometer model EAN-51M system with EAN-51M-B IPI biaxial sensor with suitable accessories - 99 nos.
- Supply of Vibrating wire battery operated portable readout unit model EDI-51v along with its accessories - 1 no.
- Supply of Pore Pressure meter (Piezometer) with integral data logger for measurement of underground water level / pressure and temperature - 6 nos.
- Supply of Automatic Data Acquisition system model EDAS-10 data acquisition system suitable for above instruments (99 sensors + 6 piezometers + 2 crack meters) - 1 set.
- Supply of Remote Data Monitoring Service - Web based

Phase - 1 instruments have been performing in satisfactorily since 2007 and Phase - 2 instruments have been performing in satisfactorily since 2013.

In addition, they supplied technical expertise during installation of instruments in the field.

We are satisfied with the technical response as well as their after sales services on this project.

For ITD Cementation India Ltd.

Manish Kumar
Vice President



June 18, 2014

ITD CEMENTATION INDIA LIMITED

Registered & Corporate Office : National Plaza Building, A - Subhash Road, Paranjape B Scheme, Vile Parle (East), Mumbai - 400 057. Tel: 91-22-66931620 Fax : 91-22-66931628 www.itdcem.co.in



THE FREYSSINET PRESTRESSED CONCRETE CO. LTD.

6/B, 6th Floor, Sterling Centre, Dr. Annie Besant Road, Worli, Mumbai - 400 018.
Phone : (B) 4322 9500 • Fax: 2493 8461 • E-mail : freyssinet@fpccindia.com

Performance cum Completion Certificate

TO WHOM SO EVER IT MAY CONCERN

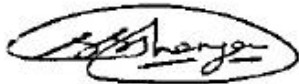
This is to inform and certify that Encardio-Rite Electronics Pvt. Ltd., Lucknow have supplied & installed following geotechnical instruments to us through Gammon India Ltd. for Nuclear Power Corporation India Ltd. (NPCIL) for their Kaiga 3 & 4 reactor building towards pre-stressing cable anchors:

- 08 nos. Vibrating wire type 6 element centre hole load cell model ELC-32V-350/202 having ID of 202mm and OD of 275mm along with its bearing & distribution plates.
- 02 nos. Vibrating wire battery operated portable readout unit model EDI-51v along with its accessories.

These instruments have performed in a very satisfactory manner and we have no hesitation in recommending them for similar usage in other projects.

We are very satisfied with the technical response as well as their after sales services on this project.

for The Freyssinet Prestressed Concrete Co. Ltd.



Sunil Dhangar
General Manager

September 19, 2010



**LARSEN & TOUBRO LIMITED**

ECC DIVISION (ENGINEERING CONSTRUCTION & CONTRACT)

20th September 2010**Performance cum Completion Certificate****TO WHOM SO EVER IT MAY CONCERN**

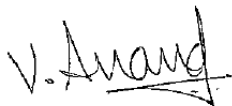
This is to inform and certify that Encardio-Rite Electronics Pvt. Ltd., Lucknow have supplied & installed following geotechnical instruments to us for Nuclear Power Corporation India Ltd. (NPCIL) for their Tarapur 3 & 4 reactor building towards pre-stressing cable anchors during 2004:

- 08 nos. strain gage based centre hole load cell model ELC-30S-450/195 having capacity of 4500 kN, ID of 195mm and OD of 260mm along with its bearing & distribution plates.
- 08 nos. battery operated portable readout unit model SS-901 along with its accessories.

These instruments have performed in a satisfactory manner and we have no hesitation in recommending them for similar usage in other projects.

We are very satisfied with the technical response as well as their after sales services on this project.

for Larsen & Toubro Ltd., ECC Division.



V. Anand
Technical Manager

Mumbai Regional Office: Landmark "A", 2nd & 3rd Floor, Suren Road, Off Andheri-Kurla Road, Chakala, Andheri (East),
Mumbai - 400093.
Tel.: 022-5696 5200 Fax: 022-5696 5345

ALPHA. MINERALS. METALS

#

P:01



OFFICE OF THE MANAGING DIRECTOR TALA HYDROELECTRIC PROJECT AUTHORITY

Gedu : Bhutan

Telephone : +975-5-282 001

Facsimile : +975-5-282 011

e.mail : mdthpa@druknet.bt

No. THP/G-13/ 574

19 September 2007

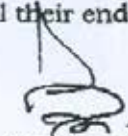
TO WHOMSOEVER IT MAY CONCERN

This is to certify that M/s Encardio-rite Electronics Pvt. Ltd., Lucknow (UP), India, executed successfully the contract of Supply, Installation and Monitoring of geotechnical instruments of 92m high concrete gravity Dam and three underground desilting chambers (250m x 13.9m x 18.5m size) of the Tala Hydroelectric Project, Bhutan (1020 MW). The contract valued at INR 20.51 million involved supply, installation and monitoring of the following instruments :

- Thermometers
- Uplift Pressure meters
- Joint meters
- Strain meters
- Stress meters
- Pore-Pressure cells
- Multi Point Bore - Hole Extensometers
- Automatic Water Level recorders
- Normal Plumb line Assembly
- Inverted Plumb line Assembly
- Strong Motion Accelerometers
- Read-out Units
- Automatic Data Acquisition System (EDAS-10) computer based with Multi-logger Software.

The Agency deputed experienced personnel including a full-time engineer to the Project site for managing/carrying out the work of installation and monitoring of instruments right from the start of work in January 2001 till its completion in June 2007. The instruments installed at the Project are found to be of high quality and performance. The installation and monitoring services were professional and reliable.

I wish M/s Encardio-rite best of luck in all their endeavours.


19.9.2007
[R. N. Khazanchi]
Managing Director

Patel

PATEL ENGINEERING Ltd.

ENGINEERS AND CONTRACTORS

PHONE : 2678 2910, 2678 4863, 2678 2885, 2678 2600, 2678 4410/11/12

FAX : (91-22) 2678 2455, 2678 1606, MUMBAI-400 102.

E-mail : headoffice@pateleng.com

ho@pateleng.com

Performance Certificate

This is to certify that Encardio-Rite Electronics Pvt.Ltd., Lucknow have supplied & installed following geotechnical instruments to us for Ghatghar Pumped Storage Scheme (Upper Dam - Roller Compacted Concrete) near Igatpuri for Government of Maharashtra Irrigation Dept. (Koyna Irrigation Circle)

- Vibrating wire type foundation piezometer meter along with electronic LPU's
- Vibrating wire type pore pressure meter along with electronic LPU's
- Vibrating wire type temperature meter along with electronic LPU's
- Readout unit for vibrating wire instruments
- Automatic weather station along with data logger
- Radar type level transmitter for reservoir level measurement along with electronic LPU's
- Automatic Data acquisition system having CR10X module
- Instrument control panel
- 2Kva Uninterrupted power source to give back-up upto 4 hrs.

These instruments have performed in a satisfactory manner and we have no hesitation in recommending them for similar usage in other projects. Presently Encardio-rite Electronics (P) Ltd. are satisfactorily executing similar instrumentation works for us at Ghatghar Lower Dam (RCC dam having height of 84M) and are also monitoring work of instruments including preparation of reports & graphs at upper dam.

We are also satisfied with the technical response as well as their after sales services on this project.

for Patel Engineering Ltd

Date: July 20, 2005.



Sunil D. Saple
Dy. Director (Projects)

REGD. OFFICE : PATEL ESTATE ROAD, JOGESHWARI (WEST), MUMBAI-400 102.

Site office Address:-
Gammon India Limited,
Adavinainarkoil Masonry Dam,
P.B. No.8, Tenkasi,
Dist. Tirunelveli,
TAMIL NADU - 627811.

**GAMMON**

Ref: AMD/2-F/2127

Date: 09.03.2000

TO WHOM IT MAY CONCERN

This is to certify that M/s. Encardio Rite have supplied geo technical instruments for Adavinainarkoil Dam Project in the year 1998-99. The instruments include :-

1. Stress Meter.
2. Thermometer.
3. Pore pressure meter.
4. Joint Meter.
5. Plumb line.
6. Inclino meter.

Installation of above instruments is in progress. The performance of so far installed instruments since the commissioning has been found satisfactory. The after sales services of M/s. Encardio rite has been also good.

For GAMMON INDIA LIMITED,

(S.G. PARETKAR)
DY. GENERAL MANAGER

GAMMON INDIA LIMITED

GAMMON HOUSE, VEER SAVARKAR MARG, P. O. BOX NO. 9129, PRABHADEVI, MUMBAI-400 025, INDIA.
Telephone : 91-22-430 6761 • 430 1084 • Fax : 91-22-430 0221 • 430 0529
E-Mail: gammon@giasbm01.vsnl.net.in • Internet: <http://www.gammonindia.com>

10 ONGOING PROJECTS

Project	Contractor/Client	Scope of works
1.0 UAE		
Etihad Rail C0303 - Package 2A Design& Build Contract (Ghweifat - Ruwais)	ETIHAD RAIL	Embankment Settlement monitoring works during the construction operations of the embankment.
Etihad Rail C0304 - Package 2B Design & Build Contract (CRCC - GTGC, JV)	ETIHAD RAIL	Embankment Settlement monitoring works during the construction operations of the embankment.
Etihad Rail C0306 - Package 2C Design & Build Contract (CRCC - GTGC, JV)	ETIHAD RAIL	Existing bridges, underground Tunnel, Embankment Settlement monitoring works during the construction operations of the embankment.
Etihad Rail C0308 - Package 2D Design & Build Contract (CRCC - NPC, JV)	ETIHAD RAIL	Blasting Tunnel, Embankment Settlement monitoring works during the construction operations of the embankment.
DS233/2_Deep Tunnel Storm Water System- Main tunnel	PORR-BESIX/ STANTEC / Dubai Municipality	Supply, installation, monitoring, automatic survey / Pre- Construction Condition Survey
Hatta Pumped Storage Hydro Power Plant- HATTA DAM, HATTA	STRABAG-OZKAR- ANDRITZ / Government of Dubai	Supply and Installation of Geotechnical Instruments.
Contract: 0-13153, Construction of Deep Gravity Scheme Sewer line, Abu Dhabi	Mace/ Abu Dhabi Sewerage Services Company(ADSSC)	Supply, Installation and Monitoring of Geotechnical Instruments.
Asset Enhancement Scheme, Sewer line, Al Ain	IFG/ Abu Dhabi Sewerage Services Company(ADSSC)	Supply, Installation and Monitoring of Geotechnical Instruments.
One Za'abeel ICD Headquarters, Dubai	ALEC Engineering & Contracting LLC./Investment Corporation of Dubai/Parsons	Web base data monitoring of Existing Al Saa'da Bridge, Raft Monitoring, Building movement monitoring and Link bridge monitoring. Supply, installation, manual + automatic monitoring, automatic survey

Project		Contractor/Client	Scope of works
B4 Residential Tower, Opera District Downtown, Dubai	Construction of tower	CSCEC/EMAAR	Web base data monitoring of tower, Supply, installation, automatic monitoring, automatic survey
Al Wathba Mountain, Abu Dhabi	Construction of mountain.	E11	Web base data monitoring of MSE Wall Monitoring, Supply, installation, manual + automatic monitoring.
UAQ – 150 MIGD RO Desalination Plant	Construction of 150 MIGD water (682,000 tons of clean drinking water per day) desalination plant.	China Railway 18th Bureau Group LLC	Supply, Installation and Monitoring of Surveying and Geotechnical Instruments.
Deira Waterfront Development, Plot 04, Dubai	Construction of tower above existing underground metro station	ALEC Engineering & Contracting LLC / ITHRAA Dubai	Web base data monitoring of existing Green Line tunnel, station and concourse level Supply, installation, automatic monitoring, automatic survey
Deira Waterfront Development, Plot 13, Dubai	Construction of tower adjacent to existing metro line	Dutch Foundation / Dubai Civil Engineering L.L.C / Deira Waterfront Development	Web base data monitoring of existing Green Line tunnel, Shindagha tunnel and shoring works Supply, installation, automatic monitoring, automatic survey
Vida Mall Plot 132-133	Construction of two towers which shares podium at the bottom	Shapoorji Pallonji Middle East Limited / EMAAR / WSP	Manual monitoring of Raft Foundation Monitoring, Building movement monitoring. Supply, installation, manual + manual monitoring, manual survey
F1007 KIFAF DEVELOPMENT PHASE II-PLOT 5	Construction of two towers. An iconic project named as "No.1" by the Dubai Ruler for its mirror-like shape of number '1' when viewed bi-directionally	SsangYong Engineering & Construction Co. Ltd/ AL KIFAF REAL ESTATE DEVELOPMENT/ATKINS	Manual monitoring of Raft Foundation Monitoring, Building movement monitoring. Supply, installation, manual + manual monitoring, manual survey
Plot no. 138-291 Building (2B+G+6 Floor), at Al Karama, Dubai	Construction of building adjacent to existing metro line	Al Shafar National Contracting / Mr. Ahmed Abdulla Ali Al Shafar	Supply, Installation and Monitoring

Project		Client	Scope of works
2.0 QATAR, BAHRAIN & OMAN			
Wakrah and Wukair Drainage Tunnel- C853/2, QTQGC-Qatar	Construction of deep shaft and drainage tunnels	Porr-HBK-MIDMAC/Qatar-ashghal	Supply, Installation and Monitoring
Wakrah and Wukair Drainage Tunnel- C853/2, PHMJV, Qatar	Construction of deep shaft and drainage tunnels	Porr-HBK-MIDMAC/Qatar-ashghal	Supply, Installation and Monitoring
North Field East Project onshore facilities EPC-2 PACKAGE, QATAR	Construction of Gas Tank	Samsung/Qatargas Operating Company Ltd.	Supply, Installation and Monitoring
SH.JABER AL AHMED AL SABA Highway, Ma`ameer Culvert. Bahrain.	Construction of Culvert	Ministry of works, Bahrain	Supply, Installation and Monitoring
Saay Flood Protection Dam, Duqm Oman	Flood Protection Dam	Premier Inetrnational	Supply and Installation of Automatic Water Level Recorder and Rain Gauges.
Jurf Flood Protection Dam, Duqm Oman	Flood Protection Dam	Premier Inetrnational	Supply and Installation of Automatic Water Level Recorder and Rain Gauges.

11 EXPERIENCE IN GCC

Project		Client	Scope of works
10.1 UAE			
	Red Line ~ 5 km underground tunnel and 4 stations Green Line ~ 5 km underground tunnel and 4 stations		
Expolink Route 2020	Dubai Metro extension	Expolink-CW JV	Web base data monitoring of buildings/underground stations Supply, Installation, manual monitoring, online monitoring Pre-construction building condition survey
Deira Waterfront Development, Plot 11 Contract, Dubai	Multi Level Car Park construction adjacent to existing metro line	Al Futtaim Carillion, Dubai	Web base data monitoring of existing Red Line tunnel and shoring works Supply, installation, automatic monitoring, automatic survey
Deira Waterfront Development, Plot 13 Contract, Dubai	Multi Level Car Park construction adjacent to existing metro line	Al Futtaim Carillion, Dubai	Web base data monitoring of existing Green Line tunnel, Shindagha tunnel and shoring works Supply, installation, automatic monitoring, automatic survey
Masra Al Seef Project, Dubai	Heavy construction activities adjacent to existing metro line	Dutco Balfour Beatty/WS Atkins/Halcrow	Web base data monitoring of existing Red Line Metro Tunnel and adjacent ground surface Supply, installation, automatic monitoring, automatic survey
One Za'abeel ICD Headquarters, Dubai	Construction of two towers on either side of existing Bridge; enabling works	A.P.C.C. Piling & Contracting L.L.C./Investment Corporation of Dubai/Parsons	Web base data monitoring of Existing Al Saa'da Bridge and shoring works Supply, installation, manual + automatic monitoring, automatic survey
Dubai Water Canal Infrastructure	Package-3 Canal and Coastal Works (R999/3) adjacent to existing metro line	Belhasa Six Construct L.L.C (Besix)/RTA	Web base data monitoring of existing metro line piers Supply, installation, manual + automatic monitoring, automatic survey
Improvement of Al Shindagha Corridor - Sana Junction, Dubai	Underpass structures adjacent to existing metro	Wade Adams Contracting LLC/Parsons	Web base data monitoring of existing Red Line Metro piers and adjacent ground surface Supply, installation, automatic monitoring, automatic survey
Al Garhoud Maintenance Facility Package-1	Marine Works - quay wall	Dutco Balfour Beatty	Web base data monitoring of existing Bridge piers Supply, installation, automatic monitoring, automatic survey

Project		Client	Scope of works
Mediclinic Healthcare City Project, Dubai	Construction works adjacent to existing metro station, shaft monitoring	Kele Contracting	Supply, installation and monitoring
	Contract T01: 13 km main sewer deep gravity tunnel	Samsung C&T Corporation, Korea	Supply, Installation and Monitoring
	Contracts T02 & T03: 25.5 km main sewer deep gravity tunnel	Impregilo, Italy	Supply & Installation
	Contracts LS01 and LS02: 40 km link sewer deep gravity tunnels	Zublin, Germany	Supply, Installation and Monitoring
	Contract PS01: 100 m deep x 55 m dia underground Pump Station <i>One of the deepest and largest underground pump station.</i>	Odebrecht, Brazil	Supply, Installation and Monitoring
Sheikh Zayed (Al Salam) Street Tunnel Project, Abu Dhabi	4-lane road tunnel – cut and cover, 3 km long; 4 interchange underpasses, each 1 km long.	Samsung – Saif Bin Darwish Joint Venture/Parsons	Supply, installation, drilling, surveying and data monitoring with daily and weekly reporting Pre-construction building/structure condition survey
NDM tunneling for storm water pipeline under Corniche road, Abu Dhabi	56 m tunnel, 1.8 m dia, 4 m below GL in silty soil, under busy Corniche Road	Samsung – Saif Bin Darwish Joint Venture	Supply, Installation and Monitoring
Burj Khalifa, UAE	818 m tallest building in the world; Foundation monitoring	Bodycote	Supply of instruments
Corniche Hotel Project, UAE	Foundation/D-wall monitoring	Soil Foundation Technology	Supply, Installation and Monitoring
City Seasons Hotel Project, UAE	Foundation/D-wall monitoring	Saile Foundations L.L.C.	Supply, Installation and Monitoring
Jumeirah Village Project, UAE	Foundation/D-wall monitoring	Pilex	Supply, Installation and Monitoring
Deira Waterfront Development, Plot 03 Contract, UAE	Shoring works/deep excavation; Hotel construction	Al Futtaim Carillion, Dubai	Web base online monitoring; Supply and Installation
Meena tower, UAE	Foundation/D-wall monitoring	Arabian Construction Company	Supply, Installation and Monitoring
Mankhool Service Hotel apartment/residential building, UAE	Foundation/D-wall monitoring	Stromek	Supply, Installation and Monitoring

Project		Client	Scope of works		
ICD Brookfield Place, UAE	Deep Foundation, Raft Monitoring, shoring works, Settlement	Brookfield Multiplex Ssangyong Joint Venture	Supply, Monitoring	Installation	and
Al Zaabi Tower, UAE	Foundation/D-wall	Middle East Foundation Group LLC	Supply, Monitoring	Installation	and
Tamdeen high rise building project, UAE	Shoring works/D-wall	Zetas Zemin Teknolojisi A.S	Supply, Monitoring	Installation	and
Al Muteena – Building no. 123-547, UAE	Commercial/Residential Building; Shoring & dewatering works	General Construction Company LLC	Supply, Monitoring	Installation	and
Trident Hotel, UAE	Foundation/D-wall	Afcons	Supply, Monitoring	Installation	and
Masdar City, UAE	Foundation/Pile testing	Arabian Foundation Engineering LLC	Supply, Monitoring	Installation	and
Ghantoot Building, UAE	Foundation/D-wall	Al Hai Al Mukaddam	Supply, Installation and Monitoring		
High rise building, UAE	Mixed use development project/D-wall	Edrafor Emirates LLC	Supply, Monitoring	Installation	and
High rise building, UAE	Office and Residential Tower, 27 level/Foundation	Al Hai Al Mukaddam	Supply, Monitoring	Installation	and
High rise building, UAE	Mixed use development project/D-wall	JSCOM Contracting LLC	Supply, Installation and Monitoring		
High rise building, UAE	Mixed use development project/D-wall	Torque Piling and Technology	Vibration monitoring		
Damac Heights Project, Dubai Marina, UAE	Foundation/D-wall	Zetas Zemin Teknolojisi A.S	Vibration monitoring		
Sea Port, Dubai	Container terminal; soil improvement, track settlement monitoring	Dutco Balfour Beatty	Supply, Monitoring	Installation	and
Dubai Airport, Dubai	Ground improvement	Al Bayan	Supply of Instrumentation		
Al Raha Beach Development, Abu Dhabi	Ground improvement	Zetas Zemin Teknolojisi A.S.	Supply of Instrumentation		
Khalifa Port and Industrial Zone Project, Abu Dhabi	Ground improvement	Gulf Laboratories	Supply of Instrumentation		
Al Suwwah Island Development Work, UAE	Ground improvement	Terrasearch Gulf	Supply and Installation		
Arabian Canal Project, Dubai	Ground improvement	Arab Centre for Engineering Studies (ACES)	Supply of Instrumentation		
Sea Water Intake Project-3 (SWI-3) in Ruwais, UAE	Vibration monitoring	Abu Dhabi Oil Refining Company (TAKREER)	Vibration monitoring		
KPIZ Project, UAE	Pile testing	Through Marketing Associate	Supply of Instrumentation		

Project		Client	Scope of works
Hotel Site at Khalifa City A. UAE	Pile testing	Baynunah Laboratories	Supply of Instrumentation
10.2 Other countries in GCC			
	Gold Line ~13.5 km tunnel with 10 underground stations	ALYSJ JV	Web base data monitoring of TBM tunnels, underground stations, NATM cross passages, station entrance emergency exits and structures within the zone of influence Pre and post-construction building condition survey
	Green Line ~16.6 km tunnel with 8 underground stations	VMT-Noack-MTEC JV	Monitoring of TBM tunnels, station boxes, trough structures Pre and post-construction building condition survey
	Major stations	SOQ JV	Web base data monitoring of Msheireb & Education City underground stations Pre and post-construction building condition survey
Inner Doha Resewerage Implementation Strategy (IDRIS)	Main Trunk Sewer Tunnel - Contract MTS-01, MTS-02 & MTS-03	ACTS, Doha	Supply, Installation and Monitoring
Al Rayyan Road Project 7 Contract 2 Doha	West of Olympic Roundabout to West of New Rayyan Roundabout. Construction and Upgrade of Road	Doğuş- Onur-JV	Supply, Installation and Monitoring
Muharraq STP Project, Bahrain	16 km sewer tunnel with 50 main shafts; micro-tunneling project	Samsung Engineering Co. Ltd.	Supply, Installation and Monitoring
Convention Centre, Qatar	108 storey tower; Foundation monitoring	Ammico Contracting Co. WLL, Doha	Supply of instruments
Al Quid Towers, Qatar	100 storey tower; Foundation monitoring	Ammico Contracting Co. WLL, Doha	Supply of instruments
CP07B-Project in Lusail, Qatar	Underground tunnel and tunnel road monitoring	ACTS, Doha	Supply, Installation and Monitoring
Lusail Development - Irrigation TSE reservoir (IR3), Qatar	Foundation works	Arab Center, Qatar (for Sino Hydro, China)	Supply and Installation
Mirani Fort, Muscat, Oman	200 years old Historical fort on hill top beside sea; slope monitoring for restoration works	Al-Manar International	Web based online monitoring system for slope monitoring
Expansion of the Al Masjide Al Haram, Saudi Arabia	Foundation/raft	Through marketing associate	Supply of Instruments

Project		Client	Scope of works
Kettaneh Construction W.L.L., Qatar	LNG tank settlement monitoring	Ishikawajima-Harima Industries Co. Ltd. (IHI), Japan	Supply and Installation
Al-Zour refinery Project NRP/EPC - 0048 - Van Oord, Kuwait	LNG tank settlement monitoring	Kuwait National Petroleum and Refinery	Supply of Instrumentation

12 EXPERIENCE WORLDWIDE

(OTHER THAN GCC)

Project		Client	Scope of works
11.1 METRO RAILWAY PROJECTS			
	Phase III - (Various sections)	Pratibha, JK Infra, L&T, Valecha, Era, HCC	
	Phase II - 20 km (Lines BC15- BC24)	L&T, Senbo, ITD CEC-Soma, MTG	
	Phase II - 15 km (Lines C1-C7)	Senbo Engineering, Afcons, L&T, Alpine Samsung, Alpine HCC	
	Phase I - 14 km (Lines MC1A & MC1B)	International Metro Civil Contractors (IMCC) and KSHI	
	Package UG-1	Coastal TTS JV	
	Package UG-2	CEC-Soma-CICI JV	
	Package UAA-01	Afcons TTA JV	
	Package UAA-02, UAA-03	Gammon OJSC Mosmetrostroy JV	
	Package UAA-04	L&T-ECC-SUCG JV	
	Package UAA-05	Afcons TTA JV	
	Package UG-1	Afcons TTA JV	
	Package UG-2	ITD-ITD Cementation JV	
	Package UGC-01	L&T-STEC JV	Supply, installation Pre-construction survey
	Package UGC-02	HCC-MMS JV	Supply of instrumentation Pre-construction survey
	Package UGC-03	Dogus-Soma JV	Pre-construction survey
	Package UGC-04	CEC-ITD-TPL JV	Supply, installation Pre-construction survey
	Package UGC-07	L&T-STEC JV	Supply, installation Pre-construction survey
Lucknow Metro, India	Underground Tunnel sections – 3 km	Tata –Gulermak JV	Supply and installation
Jaipur Metro, India		ITD-ITD Cementation JV	Supply and installation
Izmir Metro, Turkey		EGE Temel	Supply of instruments
Ankara-Sivas High Speed Railway Project, Turkey		MBEC-Cengiz-Limak-Mapa-Kolin JV	Supply of instruments
Ankara-Istanbul High Speed Train Project, Turkey		CIB-Cengiz –Ictas-Belen JV	Supply of instruments
Bucharest Metro, Romania			
Torino Metro, Italy			

Project	Client	Scope of works
Athens Metro, Greece		
London Metro, England		
Santiago Metro, Chile		
Ankara Metro, Turkey		
Istanbul Metro, Turkey		
Taiwan Metro, Taiwan		
Hong Kong Metro		
Singapore Metro		

11.2 ROAD/RAIL TUNNEL AND UNDERGROUND CAVERN PROJECTS

Chenani-Nashri Road Tunnel Project, India	~ 9 km two lane tunnel	Leighton	Monitoring of T74R, T77B, T-77C, T49B tunnels Supply and Installation
Banihal- Qazigund Road Tunnel Project, India	~ 9 km four lane tunnel	Navyug	Supply of Instruments
Rohtang Road Tunnel, India	~ 8.8. km, one of the longest road tunnel in India	HP/Strabag Afcons JV	Supply of Instruments; Carrying out tests by TSP System of Amberg Switzerland
Kiratpur-Ner Chowk Site, India	~ 5 km, 5 road tunnels	HP/IL&FS Engineering	Supply and Installation
Srinagar - Baramulla Rail Link Project (Konkan Banihal) , India	~90 km Katra-Laole Section of Udhampur	Konkan Railway Corporation Limited	Monitoring of T1, T2, T3, T5, T7, T8, T9, T10, T11, T12, T38, T39, T40, T42, T43, T44, T45, T46 and T47 tunnels Supply and Installation
Pir Panjal Railway Tunnel Project, India	~ 11.5 km Zone-V; Laole- Qazikund section and Zone-III Khari section	Ircon International Limited	Monitoring of T-73, T-80 & T69 tunnels Supply and Installation
Udhampur- Srinagar- Baramulla Rail Link Project, India	~8.5 km Zone-IV A & IV in Dharam-Qazigund section	Ircon International Limited	Monitoring of T74R, T77B, T-77C, T49B tunnels Supply and Installation
	Tunnels: Jiribam-Tupul, Imphal – 5 tunnels	Geoconsult India Pvt. Ltd.	Supply and Installation
	Tunnels: Manipur, Imphal	AECOM	Supply, Installation and Monitoring
	Contract I6057: T-1 to T-9 & I6066_T-12 for tunnels	Geoconsult India Pvt. Ltd.	Supply, Installation and Monitoring
	I6072_Lumding-Silchar	Geoconsult India Pvt. Ltd.	Supply, Installation and Monitoring
Mumbai Mono Rail, India	Pile Load Testing and Bridge Instrumentation	L&T-SCOMI JV/ MMRDA	Supply of Instruments
Gulbarga Rail Line	~1.7 km tunnel at	Bidar Gulbarga, SC	Supply & Installation

Project		Client	Scope of works
Project, India	Margutti	Railways	
Vizag Cavern Project, India	~ 3.3 km length, ~30 m height, ~22 m width	EIL-Sweco, HCC, ISPRL	Supply, Installation and Monitoring
Padur Cavern Project, Mangalore, India	~ 2.7 km running length, ~ 31.5. m height, ~ 20 m width	EIL, HCC, ISPRL	Supply, Installation and Monitoring
Lyon-Turin Rail Tunnel, France	~57 km long base tunnel	Through marketing associate	Supply of Instruments
East West Highway Project, Algeria	~5.6 km long tunnel	Taisei Corporation, Japan; Cojaal (c/o Itochu Corporation) Consultant	Supply of Instruments
Brenner Base Tunnel (Italy to Austria)	~ 55 km long tunnel	Through marketing associate	Supply of Instruments
Platamonas tunnel, Greece	Tunnel sections	Through marketing associate	Supply of Instruments
Egnatia Motorway, Greece	~ 680 km long – Anilio and Anthochori tunnels	Through marketing associate	Supply of Instruments
CCSA Subway Tunnel Line H Project, Argentina	Tunnel sections	Through marketing associate	Supply of Instruments
Istanbul Strait Road Tube Crossing Project, Turkey	~ 5 km Eurasia tunnel	Yapi Merkezi Insaat ve Sanayi A.S. and SK Engineering & Construction Co.Ltd. JV	Supply of Instruments
Marmaray CR1 Project, Turkey	Rail/Road Tunnel and Underground Caverns Project	Dogus Insaat	Supply of Instruments

11.3 HISTORICAL MONUMENTS & HIGH RISE BUILDINGS/FOUNDATION

Cabo Fort, Governor's Bungalow, Goa, India	1 st & 2 nd phase; Historical fort beside sea; structure stability monitoring	ITD Cementation	Web based online monitoring system for the fort
Lodha World One Residential Tower, India	117 storey tallest residential tower in the World; Foundation monitoring	Lodha Developers	Supply of instruments
Nova East & Nova West Project, India	Foundation monitoring	Supertech Ltd.	Supply and Installation of Instruments for Raft
Basilica of S. Maria Assunta Carignano, Italy	Structure monitoring for restorations works.	G.D. Test	Web based online monitoring system
Marina Bay Sands-Hotel Towers, Singapore	Three 57 storey hotel towers, ~ 200 m tall	Syseng, Singaore	Web based online monitoring of foundation and the curved structure during construction.
Bomonti Time Residence, Turkey	48 storey, 195 m tall	Sinpas Gyo	Supply of instruments

Project		Client	Scope of works
11.4 BRIDGES & HIGHWAYS			
2nd Bridge on Narmada river (NH-8) , India	Balanced cantilever type bridge	L&T/Dar Consultants, UK	Supply and Installation
Chiraiyatand Bridge, Patna, India	4 lane cable stayed bridge	BBR/IRCON	Supply and Installation
Naini Bridge, Allahabad , India	Cable stayed bridge	Kowi-Span/NHAI	Supply and Installation
Bogibeel Bridge, Assam, India	Rail-Cum-Road Bridge	HCC	Supply of Instrumentation
Second Vivekananda Bridge Toll way Project, Kolkata, India	Cable stayed bridge	L&T ECC Division	Supply, Installation and Monitoring
Allahabad Bypass Bridge Project (Ganga Bridge Project) , India	1 km long bridge	L&T ECC Division and The Freyssinet Pre-stressed Concrete Co. Ltd.	Supply and Installation
Jaipur-Kishangarh Expressway, India	NH-8 Expressway Road Project	Jaipur Kishangarh with L&T/GVK Becom, French Engineering Consultants	Supply, Installation and Monitoring
Izmit Bay Bridge, STFA, Turkey	Suspension Bridge	IHI	Supply of Instrumentation
11.5 DAMS AND HYDROELECTRIC PROJECTS			
11.5.1 India and neighboring countries			
Tala Hydroelectric Project, Bhutan	Concrete gravity dam	HCC/WAPCOS	Supply, Installation and Monitoring
Chukkha Hydro Power Corporation (CHPCL) Bhutan	Underground power house and surge shaft	HCC/ CHPCL/ WAPCOS	Supply and Installation
Dagachhu Hydro Power Project, Bhutan	Concrete gravity dam, power house, diversion weir, desilter, HRT, surge tank, pressure shaft, TR & transformer cavern	HCC/ Druk Green Power Corporation	Supply, Installation and Monitoring
	Power house	HCC/WAPCOS	Supply, Installation and Monitoring
	Slope stability monitoring	L&T	Supply, Installation and Monitoring
Punatsagchhu-II Hydroelectric Project, Bhutan	Power house	Jaiprakash/WAPCOS	Supply, Installation and Monitoring
Mangdechhu – I Hydroelectric Project, Bhutan	Concrete gravity dam	Jaiprakash Associates Ltd./NHPC	Supply, Installation and Monitoring

Project	Client	Scope of works	
Middle Marsyangdi Hydroelectric Project, Nepal	Earth & rockfill dam, surge shaft, pressure shaft, concrete spillway, tunnels, power house	Dywidag/Fichtner Consultants, Germany	Supply and Installation
	Earth and rockfill dam, power house & tunnels		Supply and Installation
	Spillways		Supply, Installation and Monitoring
Shapurkandi Project, India	Concrete gravity dam	Soma	Supply, Installation and <u>Web Based Data Monitoring</u>
Akash Ganga Project, India	Dam	TTD	Supply, Installation and Monitoring
	Teesta VI: Barrage, HRT & power house	HCC/Lanco	Supply and Installation
	Teesta V: Concrete gravity dam, power house, HRT, desilting chamber & surge shaft	Jaiprakash/NHPC	Supply, Installation, Monitoring and AMC
	Teesta Low Dam-IV: RCC dam, power house, HRT & desilting chamber	HCC/NHPC	Supply, Installation and AMC
	Teesta Low Dam-III: Barrage, power house slope & abutment	Patel-Simplex/NHPC	Supply, Installation and AMC
	Teesta III: Dam, power house & HRT	Abir Infratech	Supply, Installation and Monitoring
	Penstock, Power house & butterfly valve chambers	Patel/NTPC	Supply, Installation and Monitoring
	Barrage	Rithwik/NTPC	Supply, Installation and Monitoring
	HRT	L&T-AM JV/NTPC	Supply and Installation
	Concrete gravity dam	Soma/NHPC	Supply, Installation and Monitoring
	Underground works	L&T/NHPC	Supply, Installation and Monitoring
Koldam Hydroelectric Power Project, India	Earth and rockfill dam & Spillways	ITD/NTPC	Supply, Installation and Monitoring
	Diversion barrage (Sloping Glacis type)	Patel/WAPCOS	Supply, Installation and Monitoring
	Slope monitoring	HPPCL/WAPCOS	Supply, Installation and Monitoring
Chaudhary Charan Singh Lahchura Dam Irrigation Project, India	Dam	UP Irrigation Department	Supply, Installation and Monitoring
Uri Hydroelectric Project, India	Concrete gravity dam, HRT & Power House	HCC/NHPC	Supply, Installation and Monitoring

Project		Client	Scope of works
Indira Sagar Project, India	Concrete gravity dam & Power House	NHDC	Supply, Installation and Monitoring
Kishan Ganga Hydroelectric Project, India	Concrete face rockfill dam	NHPC HCC-Halcrow JV /NHPC	Supply, Installation and Monitoring
Ujh Dam, India	Barrage	CWC Jammu	Supply, Installation and Monitoring
A.V. Koil Dam, India	Masonry dam	Gammons/NHPC	Supply and Installation
Baghlihar Hydroelectric Project, India	Concrete gravity dam & Power house	Jaiprakash	Supply and Installation
Bajoli Holi Hydroelectric Project, India	Concrete gravity dam	Gammon/GMR	Supply and Installation
Bhilangana Hydroelectric Project , India	Concrete gravity dam	Bhilangana Hydro Power Limited	Supply and Installation
Budhil Hydroelectric Project, India	Concrete dam	Lanco Infratech	Supply and Installation
Chagallu Barrage Project Stage-II, India	Earth dam & spillways	Navyuga Transtroy JV /AP Irrigation	Supply and Installation
	Concrete gravity dam & penstock	Jaiprakash/NHPC	Supply and Installation
	Power station	NHPC	Supply and Installation
Chamera III Hydroelectric Project, India	Concrete gravity dam, HRT & power house	HCC/NHPC	Supply and Installation
Chutak Hydroelectric Project, India	Barrage, HRT & power house	HCC /NHPC	Supply and Installation
	Concrete faced rockfill dam, spillways & power house	KDJV/HCC/NHPC	Supply and Installation
	Pressure tunnel	Samsung Korea	Supply and Installation
Doyang Hydroelectric Project, India	Earth & rockfill dam	SEW & Gammon/ NEEPCO	Supply and Installation
Gerusoppa Project, India	Dam	KPCL	Supply and Installation
Ghatghar Lower and Upper Dam, India	Roller-compacted concrete dam	Patel/WRD	Supply, Installation& AMC
GNSS Padipalem Project, India	Earth dam	HES Infra/AP Irrigation	
Gollapalli Earth Dam, India	Earth dam	AP irrigation	Supply and Installation
Gosi Khurd Irrigation Project, India	Earth dam	HCC/VIDC	Supply and Installation
Alaknanda Hydro Power Corpn, India	Power house	GVK	Supply and Installation
Jeedipalli Reservoir Project, India	Earth dam	BNR Constructions/ AP Irrigation	Supply and Installation
Kalpong project, Andaman	Concrete dam	NHPC	Supply and Installation
	Bichom dam	Patel/NEEPCO	Supply and Installation
	Tenga dam	Patel/NEEPCO	Supply and Installation
	Kimi power house – slope monitoring	Patel/NEEPCO	Supply and Installation

Project		Client	Scope of works
Karbi Langpi Hydroelectric Project, India	Dam	Assam Power Generation Corporation Ltd.	Supply and Installation
Khuga Irrigation Dam Project, India	Dam	Irrigation & Flood Control Department	Supply and Installation
Komaram Bheem Project, India	Earth dam & spillways	Navyuga engineering Limited/AP irrigation	Supply and Installation
Koyna Dam, India	Concrete spillway strengthening	Devigiri Engineering/ Soma	Supply and Installation
Koyna Stage IV Hydroelectric Project, India	Head race tunnel	Patel	Supply and Installation
Loharinagpala Hydroelectric Power Project, India	Barrage & Desilting Chambers	HCC/NTPC	Supply and Installation.
Lower Goi Irrigation Project, India	Earthen dam	AKR Constructions	Supply and Installation
Mawphlang Project, Shillong, India	Concrete gravity dam	Patel/Public Health Engineering Department	Supply and Installation
Middle Vaitarna Dam, India	Roller compact concrete dam	L&T/Soma/BMC	Supply and Installation
Musurumilli Reservoir Project, India	Earth dam & spillway	Srinivasa Civil Works Ltd/ AP Irrigation	Supply and Installation
Nimoo-Bazgo Hydroelectric Project, India	Concrete gravity dam, HRT & power house	HCC/NHPC	Supply and Installation
OWK Resovior, India	Three earth dams	Deepika Constructions/ AP Irrigation	Supply and Installation
Parbati II Hydroelectric Project, India	Concrete gravity dam, power house, HRT, pressure & surge shafts	Patel Engineering/NHPC	Supply and Installation
Pench Diversion Irrigation Project, India	Composite dam (earth dam, concrete dam)	WRD, Chhindwara	Supply and Installation
Phata Byug Hydroelectric Project, India	Diversion dam	Lanco Infratech	Supply and Installation
	Barrage	Mega Engineering/TS irrigation	Supply and Installation
	Tunnel	Prathima Infra/ TS irrigation	Supply and Installation
Pulichintala Hydroelectric Project, India	Spillway	Aarvee Associates /AP Irrigation	Supply and Installation
Purulia pumped storage project, India	Rockfill upper dam	Taisei Corporation, Japan/WAPCOS	Supply and Installation
Purulia pumped storage project, India	Rockfill lower dam, power house & penstock	HCC – L&T JV/ Taisei Corp, Japan/ WAPCOS	Supply and Installation
Ranganadi Hydroelectric Project, India	Dam	HCC/NEEPCO	Supply and Installation
Rammam Hydroelectric Project, Stage-III, Darjeeling, India	Dam	Simplex Infrastructures Limited/NTPC	Supply and Installation

Project		Client	Scope of works
Sewa-II Hydroelectric Project, India	Concrete gravity dam, power house, HRT & desilting chambers	Gammons/NHPC	Supply and Installation
Sripadasagar Project, India	Earth dam & concrete spillways	ITD Cementation/AP Irrigation	Supply and Installation
	Earthfill & concrete gravity dam	AP irrigation	Supply and Installation
	Power house	AP GENCO	Supply and Installation
Thoubal Irrigation Dam Project, India	Dam	Irrigation & Flood Control Department	Supply and Installation
Tural Hydroelectric Project	Dam & power house	Patel/ NEEPCO	Supply and Installation
Vamsadhara Project Phase-II, India	Earth dam & spillway	Soma-Patel-ASI JV/AP irrigation	Supply and Installation
Varahi HEP, India	Penstock	KPCL / Indian Hume Pipes	Supply and Installation
Veligonda Reservoir Project, India	Concrete gravity dam	BSCPL-SCL JV/AP irrigation	Supply and Installation
Vishnuprayag Hydroelectric Project, India	Barrage & power house	Jaiprakash	Supply and Installation
Vishnugad Pipalkoti, India	Dam & underground power house cavern	HCC/SMEC	Supply and Installation
Vyasi Hydroelectric Project	Dam	Gammon/UJVNL	Supply and Installation
Nira Deogharand Gadnadi, Nasik, India	Earth dam	Maharashtra Research Engineering Institute	Supply of Instruments
Tarali Dam, India	Concrete gravity dam	Devgiri Engineering/ MKVDC	Supply of Instruments
11.5.2 Worldwide			
Salma Dam Project, Afghanistan	Earth dam	Angelique International Limited/WAPCOS	Supply, Installation and Monitoring
Upper Kotmale Hydropower Project, Sri Lanka	Concrete gravity dam	Maeda Nishimatsu JV, Japan	Supply and Installation
Koprubasi Hydroelectric Power Project, Turkey	Clay cored rockfill dam & power house	Yuksel Enerji	Supply of instruments
Livada Dam, Greece	Earth dam		
Kastoria Earth Dam, Greece	Earth dam		
Lechago (Jiloca river) Dam, Spain	Earth dam		
Pinalto Dam, Dominican Republic	Earth dam		
Gibe III, Ethiopia	Earth dam		
Ingenieria Y Construcion Cosapi S.A., Peru	Dam		

Project		Client	Scope of works
San Martin-Contratistas Generales S.A., Peru	Dam		
Constructora Queiroz Galvao S.A., Peru	Dam		
Geotecnia Peruana S.R.L., Peru	Dam		
Consorcio Cosapi-SSK, Peru	Dam		
Traverse Olmos Project, Peru	Irrigation project		
Cincoop, Belo Horizonte, Brazil	Trial embankment on gold mine tailings		
Cat Leo Project, Brazil	Broken canoe dam		
Canoa Quebrara Dam, Brazil	Dam		
Achiras dam, Argentina	Dam		
Shenzhen river project- Stage III, Hong Kong	River regulation project		

11.6 SOIL CONSOLIDATION AND GROUND IMPROVEMENT PROJECTS

Kandla Port Trust (8 th berth) , India	Soil consolidation	Afcons	Supply, Installation and Monitoring
Kandla Port Trust (9 th berth) , India	Soil consolidation	Shantilal B Patel	Supply, Installation and Monitoring
Vishakhapatnam sea port project , India	Ground improvement	Skanska	Supply and Installation
Runway Ground Improvement, Vizag Airport, India	Ground improvement	Sohams/Airport Authority of India	Supply and Installation
Vallarpadam Port, India	Ground improvement	Soma/NHAI	Supply and Installation
Gujarat Adani Port, Mundra, India	Tie rod monitoring (Bulk Terminal)	Adani group	Supply and Installation
Dry dock GRSE, Kolkata, India	Ground improvement	ITD	Supply, Installation and Monitoring
Borusan Gemlik Port Soil Improvement Project, Turkey	Ground improvement	Borusan Logistic	Supply of Instrumentation

11.7 OTHER PROJECTS

Nuclear Power Corporation Of India Ltd.(NPCIL), Tarapur, India	Stressing of cable strands in reactor building	L&T, ECC	Supply of Instrumentation
Nuclear Power	Stressing of cable strands in	Gammon, Freyssinet	Supply of Instrumentation

Project		Client	Scope of works
Corporation Of India Ltd.(NPCIL), Kaiga, India	reactor building		
Pasir Panjang Expressway, Singapore	Pile testing	SysEng, Singapore	Supply of Instrumentation
New Phosphate Rock Terminal, Jordan	Pile testing	Through Marketing Associate	Supply and Installation
Southern Peru Copper Corporation, Peru	Mine monitoring		
Cia. Minera Antamina S.A., Peru	Mine monitoring		
CSN Casa De Pedra Mine, Brazil	Mine monitoring		
RPM Mine Project, Brazil	Mine monitoring		
Copper Mine Bor, Serbia	Mine monitoring		
Sepetiba Harbour Stock Piles, Brazil	Stockpile monitoring		
Boa Hora Landfill project, Brazil	Landfill monitoring		
ThyssenKrupp CSA Siderurgica do Atlantico Project, Brazil	Automated monitoring of ore yards and piles (largest automated instrumentation project in Latin America)		Supply and Installation
BOGAZICI UNIVERSITY Kilyos Saritepe Campus Wind Turbine Project, Turkey	Wind energy project	Geogrup, Turkey	Supply of Instrumentation