



HK>A

DECODING COMPLEXITY

A multidisciplinary
approach to disputes

Disputes happen. The question is how best to resolve them.

It takes a clear understanding of the often-complex web of causes and effects to achieve the best possible outcome.

Quantifying the cost and time impacts, investigating engineering issues, assessing the effectiveness of project management, and analysing delay, disruption and damages – all require specialist expertise.

At HKA, we have hundreds of experts, consultants and advisors who have the commercial, financial, planning, scheduling, technical and language skills to get quickly to the heart of the most complex issues.

Whether providing expert advisory, expert determination or expert witness services, HKA provides the unique, multidisciplinary service that combines quantum, engineering, delay, disruption, and damages (QED+).

Benefits of a multidisciplinary approach

Our multidisciplinary expert service streamlines and improves the entire dispute resolution process. Expert teams are assembled to embody the most comprehensive experience from our global network, and deployed rapidly.

Clients can have direct access either to stand-alone experts or an integrated expert team of problem-solvers, who thrive on decoding complexity.

This unique capability not only ensures a seamless multidisciplinary service, it enables greater collaboration and provides better value for money.

Clients tell us that this coordinated approach delivers significant added value. They deal with an experienced Expert Lead, who is responsible for managing the assignment and maximising the benefits of collaboration by HKA experts from multiple disciplines.

ENQUIRIES@HKA.COM



Industrial Manufacturing Facility – Europe

Client	Confidential
Value	€100 million
Services	Quantum, engineering, delay, damages, digital (QED+)

Brief

The project ran into serious difficulties, which resulted in significant delay and cost escalation.

HKA was retained by the client to assess the performance of the contractor and to provide an independent expert opinion on the reasons for the cost and schedule overruns and the resulting operational losses.

What we did

The complexity of the project demanded an integrated multidisciplinary approach to establish how the contractor's actions, or omissions, affected the outturn costs and overrun.

The HKA team comprised experts in project delivery, process engineering, civil engineering, 3D modelling, delay and quantum, and a specialist in assessing losses and damages.

This analysis involved:

- Using our own unique methods of analysis to forensically interrogate the available data including HKA Advanced Project Performance Analytics (APPA) to identify and understand the issues and causation affecting progress at each stage of the programme.
- Innovative use of specialist software to analyse the changes within the 3D model.
- Mining project records to develop a factually based as-built schedule and identifying critical impacts on the planned programme.
- Assessing manpower levels on site and how they changed as engineering problems were encountered.
- Identifying the true causes and quantifying the increases to project costs and schedule delays.
- Quantifying the impact of delayed completion on the manufacturer's operational costs and lost profits.
- Mapping the evolution of the scope and detailed design and then correlating this to the corresponding changes to the 3D model. The change control records were a crucial strand of the investigation to determine the underlying reasons and the impact of those changes.

Benefit

Our client gained an independent, expert perspective on the project and how it was executed.

By combining complementary skills in a multi-faceted and integrated analysis, we were able to decode a highly complex project and construct an alternative, evidence-based assessment of the project delivery.

This will provide the basis for a negotiated settlement or the detailed analysis required to support litigation.

Liquefied Natural Gas (LNG) Project – Australia

Client	Confidential
Value	US\$40 billion
Services	Quantum, engineering, delay (QED)

Brief

This LNG project ranks among the most significant, large and technically complex oil and gas projects in the world. It combines three mega-projects: one of the world's largest offshore, semi-submersible facilities; a state-of-the-art onshore production facility; and an 890 kilometre undersea pipeline.

This is also one of the few projects worldwide that incorporates the whole chain of development and production components: subsea, offshore, pipeline and onshore.

5 The operator faced several disputes including arbitration proceedings instigated by EPC contractors and equipment suppliers engaged on the project.

What we did

The client required expertise from across our quantum, engineering and delay services to advance, improve and pursue claims against the operator. HKA was also instructed to advise on the operator's counterclaims concerning liquidated damages, late delivery and defective performance.

The client had the benefit of a global team of 28 professionals combining more than 400 years of experience in quantum, engineering, delay and dispute resolution.

A decisive factor in advancing the client's claims was our robust and comprehensive prospective delay analysis, a fundamental building block in establishing its entitlements to extensions of time.

HKA's multidisciplinary engineers provided technical support to advance the client's case under the contract for changes arising out of a highly complex project featuring some world-first technologies.

Benefit

6 Based on HKA's contributions to the client's position paper for the negotiation process – consisting of hundreds of pages of detailed submissions, analysis and supporting evidence – our client achieved a favourable US\$70 million commercial settlement in negotiations with the operator.

“ The client sought HKA's expertise across our quantum, engineering and delay (QED) services to advance, improve and pursue claims against the operator. ”

Major Light Rail Transit North America

Client	Joint venture company
Value	CAD\$2 billion
Services	Quantum, engineering, delay (QED)

Brief

A major Light Rail Transit project in a north American city comprising 13km of new line served by over 12 stations, including a number of underground, and a Maintenance & Storage Facility (MSF). The joint venture company tasked with constructing the project is engaged in a dispute with its designers in relation to a series of issues concerning the quality and completeness of its designs. It is alleged that errors and omissions have resulted in an increased scope of work, greater costs, and delays to construction.

What we did

The joint venture company sought HKA's expertise across quantum, engineering and delay services to review a series of specific matters of dispute and to give advice on quantum, technical and scheduling issues.

With a very wide range of technical issues in dispute, HKA was able to draw upon its sizeable pool of experts to rapidly assemble the best team, with vast experience and knowledge of the rail sector, for this project.

With our experts from different disciplines working together from England, Scotland and the United States, we were able to provide a greater depth of understanding when addressing the issues.

Benefit

HKA experts drafted, prepared and submitted a series of reports which will inform a forthcoming mediation, with the possibility that the dispute will subsequently move to arbitration.



Clean Fuels Project Middle East

Client	Confidential
Value	c. €40 million
Services	Quantum, engineering, delay (QED)

Brief

The Joint Venture (JV) Contractor was engaged under an Engineering Procurement Construction (EPC) contract to revamp existing facilities and install new units on behalf of the refinery Employer.

The JV Contractor sought an adjustment of the contractual completion date and financial compensation due to delays in purchase order placement, discovery of unexpected underground obstacles, delay in manpower mobilisation and time-consuming procedures for access to site.

Heavy rain and subsequent flooding caused serious damage to the greenfield area of the site causing the JV Contractor to require both a geotechnical engineering expert and an insurance coordinator to advise on the extent of the damage and on the remediation measures that the JV Contractor should adopt, as well as to advise and lead the preparation of the claim to the insurers.

What we did

The HKA team comprised three quantum experts, two delay experts, one planning consultant, one geotechnical expert and one insurance expert, mobilised from our network of offices worldwide.

The HKA team initially carried out a comprehensive review of the available documentation relating to the JV Contractor's first submitted Extension of Time (EOT) claim and subsequently, working alongside the JV Contractor's team, prepared a revised, robust EOT claim. The revised EOT claim consisted of contractual entitlement, identification and justification of delays not attributable to the JV Contractor, an in-depth analysis of the delays and a quantum analysis of the delay and disruption. HKA also supported the JV Contractor in the EOT negotiations with the Employer.

Following the heavy rains, the geotechnical expert visited the site to inspect and record visible damage, assess subterranean damage and review on-site records. A desk study appraisal was carried out where the expert reviewed all available contractual, hydrological and project documents in order to formulate detailed guidance on the design and implementation of the preferred ground and drainage remediation options.

Working alongside the rest of the HKA team, the insurance coordinator assisted the JV Contractor to prepare the insurance claim for the ground remediation works, and any associated costs arising from the flood, as well as prepared draft correspondence to both the Employer and the Insurer.

Benefit

Our findings on quantum, engineering and delay confirmed that a robust case based on further detailed evidence needed to be constructed.

The client and its legal advisors appreciated the value that our joint approach added to the JV Contractor's case and claim and were confident they had achieved greater clarity on their position.

The integrated QED approach that was applied by the HKA team of experts was vital towards building a strong case to support the client's claim.

9

10



Major Teaching Hospital – Europe

Client	Confidential
Value	£250 million+
Services	Quantum, engineering, delay (QED)

Brief

HKA was engaged to undertake a cost-to-complete exercise on the incomplete teaching and research hospital. The detailed analysis required a collaborative approach by our building services engineers, quantum and delay consultants, who were based on site for a number of weeks.

Following an analysis of the findings, HKA acted as independent moderator to calculate termination compensation in accordance with the terms of the project surety bonds.

What we did

HKA's building services engineers worked closely with mechanical, electrical and plumbing (MEP) sub-contractors engaged on the project in order to understand the status of works completed, what remained to be completed, and any other associated risks to time and/or budget.

Drawing on the findings of HKA's technical experts, our delay and quantum specialists assessed the reasonable forecast completion date and final costs to complete the project.

Benefit

HKA's assessment under the surety bonds was accepted in full. The thoroughness of the analysis meant that the conclusions were not subject to challenge or further scrutiny by the bond providers own assessors.



Oil and Gas Offshore Platform – North Sea

Client	Construction consortium
Value	US\$2.2 billion
Services	Quantum, engineering, delay (QED)

Brief

A major energy company awarded a contractor consortium a US\$2.2 billion contract to provide engineering, procurement, fabrication, hook-up, and commissioning assistance for a fixed wellhead and process platform and associated facilities.

The project was two years in delay when the energy company terminated the contract for the engineering, procurement and construction (EPC) of the platform, holding the consortium in material breach of its contractual obligations.

What we did

HKA was retained by the contractor consortium to assist in resolving the claims.

Our quantum, engineering and delay experts analysed claims submitted by the client. Working closely together, they provided independent assessments validating claims in relation to the scope of works, analysing the delay on the as-planned versus as-built schedule to determine the root causes of each variance, and assessing the claims' value and entitlement.

Our experts drafted and prepared the claim document submitted in arbitral proceedings.

Benefit

Our integrated quantum, engineering and delay service ensured that the expert analysis conducted by HKA assisted the parties understand the facts of the claims and the real causes of the issues experienced on the offshore platform.

Through the enhanced work of our experts, the parties negotiated a settlement that resulted in the contractor consortium receiving US\$130 million.

“ With our experts from different (QED) disciplines working closely together, we were able to provide greater depth of understanding when analysing the claims submitted by the client. ”



World Cup Stadium Middle East

Client	Confidential
Value	Confidential
Services	Quantum, engineering, delay (QED)

Brief

As Qatar prepares for the 2022 World Cup, the Supreme Committee in charge of delivery is striving to complete seven all-new stadiums by the end of 2020.

HKA has supported parties involved in the construction of two of the new venues, which feature advanced cooling technologies. Our second commission was from a subcontractor responsible for mechanical, electrical and plumbing (MEP) services.

Awarded a lump-sum contract, the building services subcontractor was incurring significant unbudgeted costs. Despite delays in completing the design and civil works, the main contractor, who had full design responsibility, had rejected the subcontractor's claims.

HKA was commissioned to undertake an initial review and prepare a strategy to maximise the commercial position of the MEP subcontractor. We were subsequently appointed to prepare a series of claims for extension of time, delay and disruption related costs and variations.

What we did

HKA assembled a multidisciplinary team, drawing on our QED (quantum, engineering, delay) capability.

Our initial review clearly established that failures by the main contractor in its design obligations and allowing access for the MEP works had caused the client critical delays. Significant design changes had also resulted in additional costs.

We advised on the need for more detailed progress updates and daily site records, and devised a strategy that, nevertheless, would provide a strong basis for recovering costs. This included a potential claim for constructive

acceleration as well as for design variations, extension of time, and delay and disruption related costs.

In stage two, our team – which comprised five quantum specialists, two engineers and two delay analysts – prepared these claims.

- **Variations:** A structured workshop with the site team identified time-critical design variations. We reviewed the subcontractor's previous submissions, carried out our own technical analysis to define the scope of works based on the original design documents, and mapped the extent of the design changes.

Detailed and persuasive claims for each major variation were then prepared. These were extensive, amounting to around a hundred claims.

- **Extension of time:** Our 'as-planned versus as-built' methodology provided the basis for a solid delay analysis backed up with a detailed narrative of logic and findings. When updating the claim, the subsequent period was subjected to a 'time slice' retrospective analysis.

We also reviewed the contract to assemble the strongest possible case for the recovery of time and costs arising from each delay event.

- **Additional claims:** Our team carried out all the necessary assessments to establish entitlement to other costs arising from prolongation, disruption/lost productivity, constructive acceleration (to meet an imposed completion date), and related losses.

The impact of disruption was calculated on an earned value basis. As when updating the EOT claim, with more detailed records available, we could deploy a 'measured mile' methodology for the later period. This was then applied retrospectively to supersede the initial claim.

Benefit

Our integrated QED capability was critical both in securing the commission and the subcontractor's commercial position.

The HKA team safeguarded the rights of our client ahead of arbitration. Our advice on record keeping and subsequent analysis strengthened its claims, which have been prepared to the most rigorous standards possible. Their total value exceeded that of the subcontract.

Hydropower Project South Asia

Client	Confidential
Value	> US\$350 million
Services	Quantum, engineering, delay (QED)

Brief

Our client, an international contractor, submitted a claim for extension of time and additional costs arising from a change in the seismic design requirements. HKA was retained to provide an initial opinion on the strength of the claim – which had been rejected by the employer – and advise on whether it would succeed at arbitration.

What we did

In addition to expertise in delay and quantum analysis, the HKA team required specialist technical knowledge to evaluate the seismic design variations.

An experienced seismologist from our UK pool of engineers reviewed the ICOLD (International Commission on Large Dams) guidelines referenced in the contract, checked the contractor's calculations of earthquake parameters, and assessed the extent to which the revised seismic requirements were more onerous.

Working closely together the team also:

- Reviewed the chronology of relevant events in detail.
- Assessed the case made for entitlement under the EPC contract.
- Examined the methodology used to quantify delay.
- Evaluated how variation costs were calculated.
- Explored the basis and scope of prolongation costs.

Benefit

Our quantum, engineering and delay experts undertook a high-level review of the claim. Investigating responsibility for disruption and acceleration of works could support additional claims for loss of productivity and increased expenditure.

Nuclear Power Plant Europe

Client	Consortium lead
Value	US\$3.7 billion
Services	Quantum, engineering, delay (QED)

Brief

This significant 1600MW international nuclear power plant is a first-of-a-kind third-generation EPR (pressurised water reactor). The unit includes modern proven technology and advanced new safety features.

The consortium lead, coordinating the overall project, including functional and technical integration of the complete plant, engaged HKA's quantum, engineering and delay experts to support them in its dealing with the client on the nuclear power plant.

What we did

HKA's quantum, engineering and delay experts prepared and submitted several reports including the analysis of large volumes of data in order to provide expert opinions and recommendations in connection with the construction of this complex, first-of-a-kind nuclear power plant project.

Benefit

Our quantum, engineering and delay experts provided support and analysis in the preparation of the claims for arbitration.



Giant Oil Field Caspian Sea

Client	Confidential
Value	US\$187 billion
Services	Quantum, engineering, delay (QED)

Brief

The oil field covers 3,300 square kilometres of the North Caspian Sea. Its recoverable oil reserves are estimated at 9-13 billion barrels. The scale, safety, engineering, logistical and environmental challenges make this one of the world's biggest and most complex mega-projects.

The client engaged HKA to act as trusted commercial, programme and engineering advisors.

What we did

As expert advisors, we provided a suite of specialist services which included:

- Detailed technical audit of the consortium contractor including contractual ecosystem, systems, processes, controls, and managerial performance.
- Technical and commercial evaluation of consortium contractor's proposed options and subsequent proposed improvement works for phase II works – principally to increase experimental production to full capacity.
- Failure causation analysis of technical issues including desktop studies and laboratory testing.
- Year on year forensic analysis of consortium contractor's performance for contractual and commercial compliance and ultimately cost recovery under the production agreement contract.
- Expert engineering, contractual and commercial assessment of project delays, cost increases and the associated programme and budgetary impact.
- Party support in commercial negotiations. Subsequent evaluation of draft contractual amendments to the development plan and budget for the following year.

Benefit

Our cost, programme and technical assurance provided the client and key stakeholders with enhanced confidence in the development plan and budget, saving our client billions of dollars and allowing them to successfully renegotiate the Production Sharing Agreement.

“ The HKA team have supported us in the analysis and examination of technical and commercial issues, strategic and commercial advice, audits, and negotiations.

Over the course of several years we have appreciated the great value of [HKA's] collaborative work and advice. ”

Managing Director, Client (Confidential)



High-Rise Office Development–Europe

Client	Confidential
Value	€40 million
Services	Quantum, engineering, delay (QED)

Brief

Under the bespoke contract, primarily design and build, the main contractor was responsible for detailed design as well as construction. Works took longer than scheduled, ran significantly over budget, and the parties disagreed over whether completion had been fully achieved under the terms of the contract.

When the contractor invoked arbitration proceedings for extension of time and additional costs, the developer engaged HKA to provide a preliminary opinion on the claim.

What we did

From our discussions with the lawyers representing the developer, it emerged that various technical issues may have had a critical impact on the construction programme. It was agreed that HKA's engineering

expertise was required along with delay and quantum analysis to achieve a holistic understanding of the project.

Our team comprised three scheduling analysts, two quantum experts and two engineers with mechanical and structural specialisms.

Working closely together, HKA experts reviewed project records, evaluated the quality of the available evidence and whether there was sufficient granularity to support the claims raised in arbitration. Any missing documents that would be required later for a more definitive analysis were also identified.

Actual progress against milestones, the quantum of the claims – which amounted to more than half the contract value – and the design concerns raised during the execution of the works were a major focus of this review and investigation. Our experts paid particular attention to the design and its submission, given the contractor's contention that the developer's outline design was incomplete and this affected the programme.

Our specialist engineers investigated the main concerns raised during the design development, and the underlying factors, while their delay and quantum colleagues analysed the impact on progress and costs. Their combined insights allowed the team to begin disentangling the web of causes and effects and thus form a robust preliminary opinion.

Benefit

Our findings on quantum, engineering and delay confirmed that a robust case based on further, detailed evidence needed to be constructed.

The client and its legal advisors appreciated the value of our joined-up approach to the contractor's claim, and were confident they had achieved greater clarity on their position, ahead of proceedings under the Vienna International Arbitral Centre.

Our integrated QED approach – and the impartiality and experience of the HKA team – strengthened the preliminary opinion provided.

Offshore Natural Gas Project – Canada

Client	Design, build, lease and operate contractor
Value	Can\$570 million
Services	Quantum, engineering, delay (QED)

Brief

The project involved the production of natural gas from four wells within an offshore field located approximately 250 km southeast of Halifax, Nova Scotia.

Operated by a leading North American energy producer, the field exports its gas via a subsea pipeline to shore, and ultimately, to markets in Canada and the United States.

The energy producer appointed an engineering, procurement, installation and commissioning (EPIC) contractor for the fabrication, installation, hook-up and commissioning of the offshore gas project platform.

Engineering, delay and quantum disputes arose out of the performance of the EPIC contract.

What we did

HKA professionals acted as quantum, engineering and delay experts. Having analysed all relevant information, they produced independent expert reports for service in litigation in the Supreme Court of Nova Scotia arising out of the dispute between the energy producer and EPIC contractor.

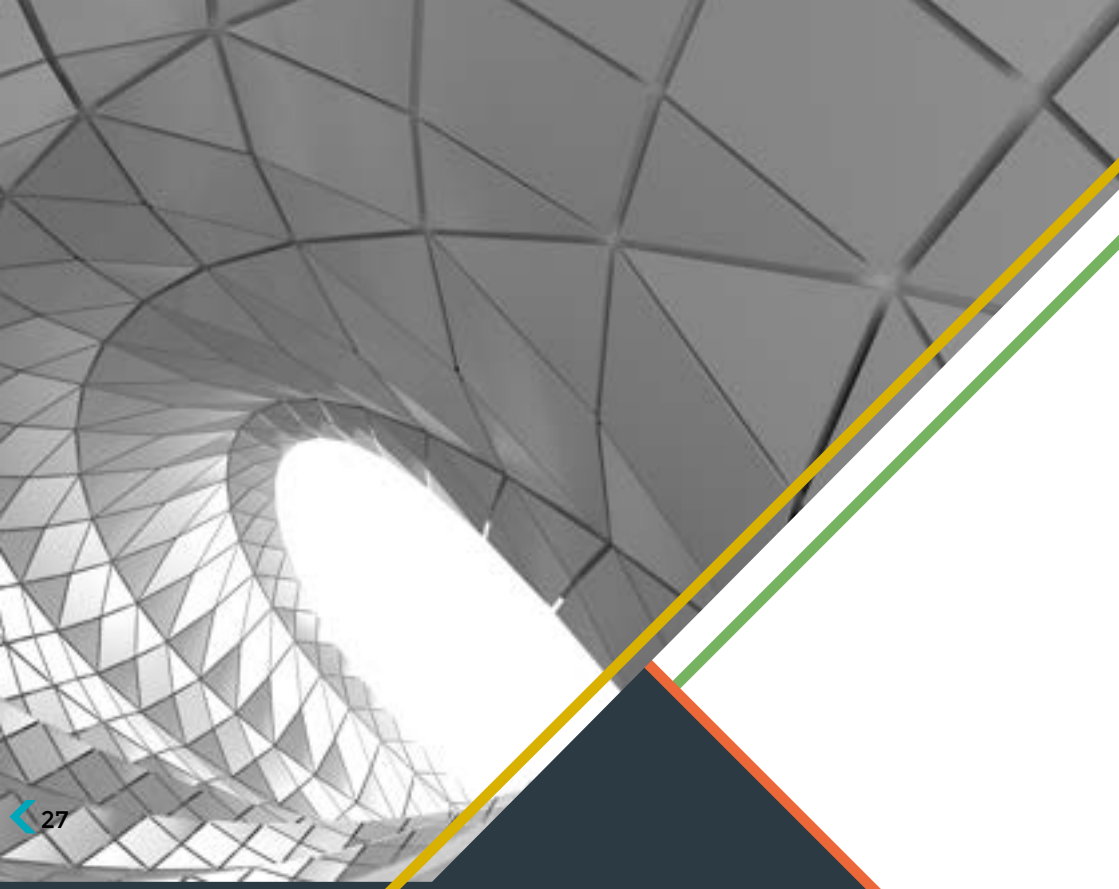
Benefit

The matter was settled shortly after the service of experts' reports by the quantum, engineering and delay team, which included a lead coordinator charged with overall management of the expert delivery.

“In addition to the superb analysis of tens of thousands of individual inputs of information, the team's clairvoyance in the overall assessment of the case was unmatched by any other expert analysis in the case.”

Instructing Counsel





Our experts help to resolve disputes in expert determination, mediation, adjudication, arbitration and litigation. Experienced as party- or tribunal-appointed experts, we are able to advise and, if needed, give evidence under cross-examination – including concurrent ‘hottubbing’ – in every jurisdiction.

HKA was awarded Who’s Who Legal’s (WWL) Construction Expert Witness Firm of the Year in 2018, 2020 and 2022. We have ranked as the top firm in WWL’s Construction Expert Witnesses analysis for the last seven years, with our leading quantum, engineering and delay experts being recognised for their skills and reputation. Our expert witnesses also feature in WWL’s Arbitration, Litigation, Quantum of Damages, Forensic Accounting, and Investigations analysis, selected for their excellence across a wide range of matters in dispute.

HKA is an accredited corporate provider of expert services with The Academy of Experts (TAE), having individually accredited experts from Europe, the Middle East, Asia and Australia. We are the largest corporate provider within TAE.

As well as more than 500 expert witnesses, HKA now has in excess of 500 advisors and consultants - across 45+ offices in 17 countries - with diverse skills and the insight to anticipate, investigate and resolve complex challenges.

About HKA

HKA is the leading global consultancy in risk mitigation and dispute resolution, using our multi-disciplinary expertise to provide a comprehensive set of specialist services:

- Expert, Claims and Advisory services for the capital projects and infrastructure sector.
- Forensic Accounting and Commercial Damages services for all types of contracts, including commercial and investment treaty disputes.
- Consulting services to support companies working on US Federal Government contracts.



45+ offices | 17 countries

1,000+

experts, consultants and advisors

Our Sixth Annual CRUX Insight Report, Forewarned is Forearmed, quantifies the damage done to engineering and construction projects worldwide, and the recurrent causes, which are often predictable and avoidable.

As infrastructure and capital projects around the world are hit hard by higher financing costs and inflation, promoters and contractors can relieve the pressure by curbing the significant losses of money and time routinely incurred across market sectors and the world.

Find out more
about our
CRUX research

The massive scale of these disputed costs and overruns, and their often-controllable causes, are revealed in the Sixth Annual CRUX Insight Report, Forewarned is Forearmed, and its analysis of 1,800 projects in 106 countries.

Please feel free to contact a member of the CRUX team should you be interested in collaborating with us.



FOREWARNED IS FOREARMED

Anticipating challenges, mitigating risk



www.hka.com/crux-reports



DECODING **COMPLEXITY**

HKA.COM

ENQUIRIES@HKA.COM