

XRF

CSA Global has been using field portable XRF (FPXRF) technology successfully in the minerals industry for over ten years in exploration, grade control and environmental applications. Our expertise in this field allows us to provide program design, data capture, interpretation of results and data management solutions for our clients as well providing FPXRF units for hire.

CSA Global's data collection, data management and GIS expertise provides an ideal platform to deliver support for training and ongoing assistance of FPXRF programs to the minerals industry. CSA Global has expert staff dedicated to FPXRF program design and management and to assist with any technical enquiries or the rental requirements you may have for an XRF instrument.

XRF is a well established laboratory technique for elemental analysis used all over the world. Recent advancements in this technology have allowed field portable XRF analysis at geochemical concentrations useful to the exploration geologist.

CSA uses Innov-X Handheld XRF units to assist miners, geologists and environmental scientists to save time and money by implementing on-site analytical programs. The units are highly versatile and able to analyse elements in solids, liquids, powders, cores, fragments, filters & films, and slurries.

Our Innov-X Handheld XRF units meet EPA Method 6200 for metals in soil, NIOSH Method 7702 for lead in air filters, and OSHA Method ID-204 for lead in air filters. The 8 RCRA Metals and Priority Pollutant Metals are easily monitored onsite.

CSA also offer a broad range of contract geochemical services to our clients including orientation surveys, mapping, drill sample analysis, grade control, baseline studies and environmental monitoring. Given our expertise in geology we are able fully integrate the results with geological understanding.

FPXRF PRACTICAL FIELD SOLUTIONS



Applications in Exploration:

Geochemical exploration - orientation, reconnaissance, or grid geochemical surveys - real-time detection of anomalies, no need to wait for lab results to carry out infill surveys.

Mapping - regolith and outcrop mapping for real-time alteration and rock identification.

Drilling - auger, RAB, aircore, RC, diamond - in field analysis direct from the sample, instant results and screening of samples sent for laboratory analysis.



Applications in Mining:

Mapping - in pit or underground - obtain real time data at low cost and improve definition of ore waste boundaries and alteration haloes

Grade control - analysis of grab, channel, blast hole, RC and dump samples - low cost allows greater density of measurements, instant data provides greater flexibility in mine planning

Geometallurgy - multi-element analysis for input in flow sheets allowing real time refinement of processes.



Applications in Environmental Studies:

Baseline studies - increase the density of sampling for the same cost

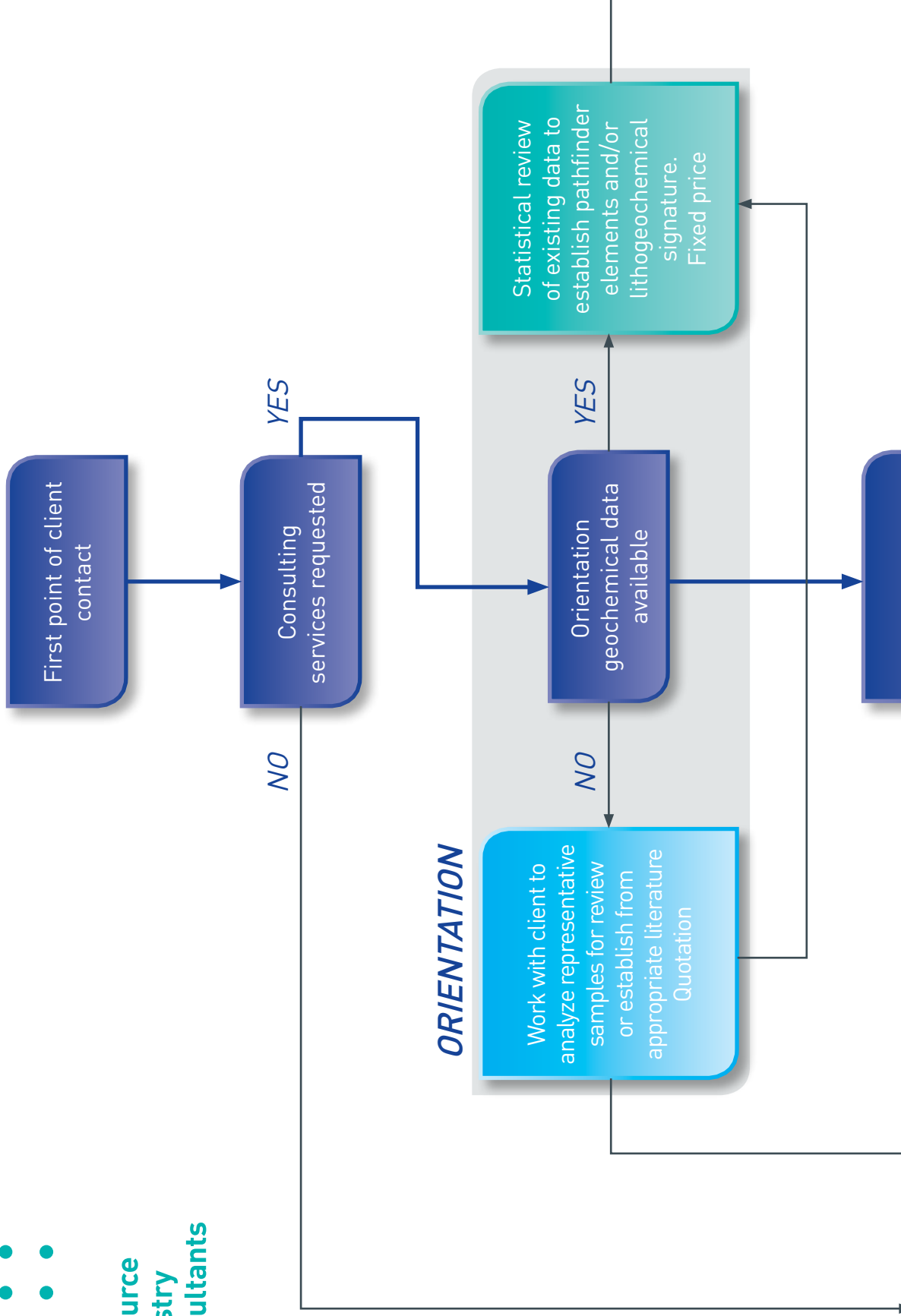
Contaminated sites assessment - ability to analyse surface exposures (insitu samples) reduces the dilutionary effects of whole sample analysis.

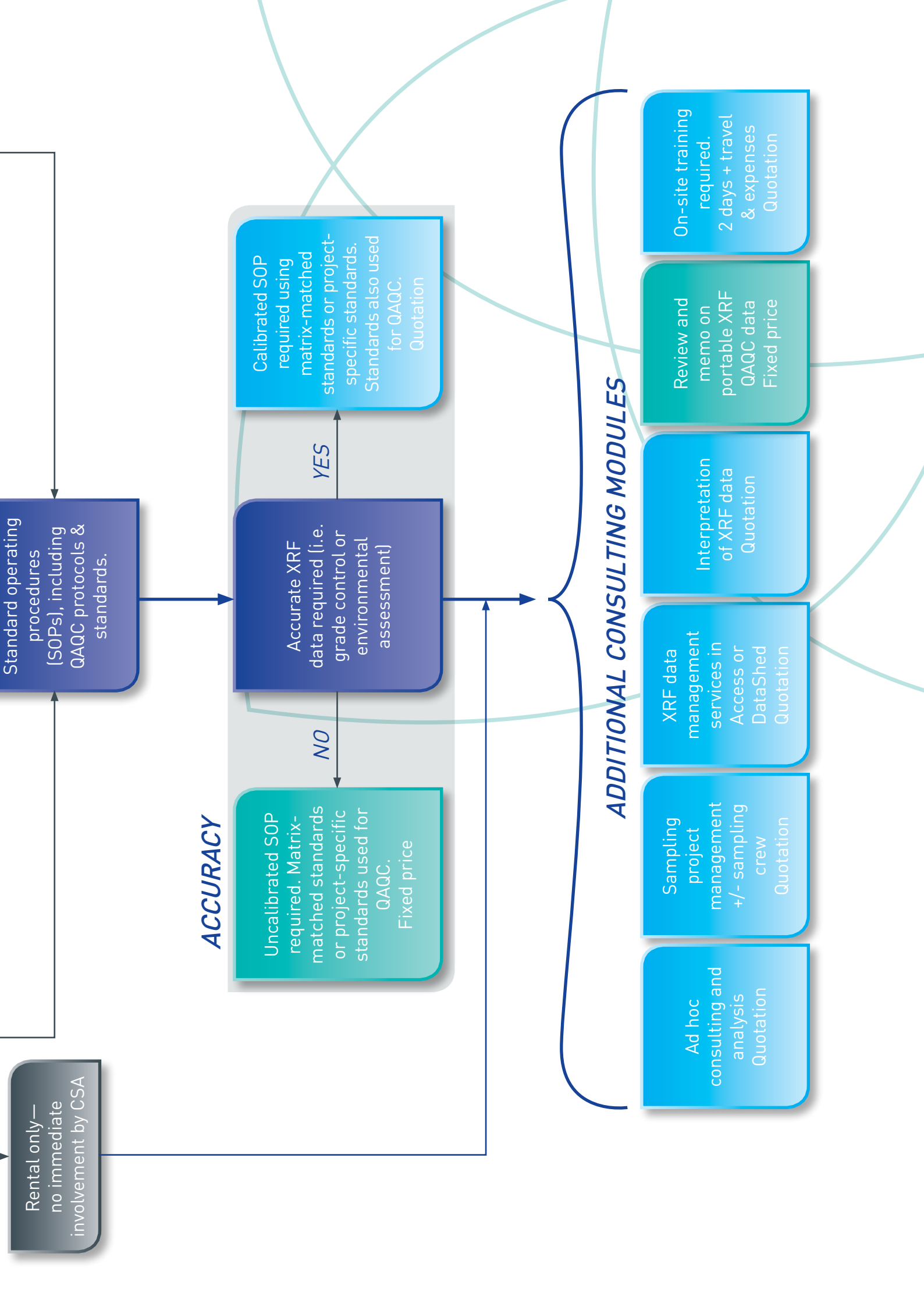
Environmental monitoring - real-time results, allow earlier hazard identification and faster response time.



**Resource
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CSA GLOBAL XRF CONSULTANCY SERVICES





Rental only—
no immediate
involvement by CSA

Standard operating
procedures
(SOPs), including
QAQC protocols &
standards.

ACCURACY

Uncalibrated SOP
required. Matrix-
matched standards
or project-specific
standards used for
QAQC.
Fixed price

NO

Accurate XRF
data required (i.e.
grade control or
environmental
assessment)

YES

Calibrated SOP
required using
matrix-matched
standards or project-
specific standards.
Standards also used
for QAQC.
Quotation

ADDITIONAL CONSULTING MODULES

Ad hoc
consulting and
analysis
Quotation

Sampling
project
management
+/- sampling
crew
Quotation

XRF data
management
services in
Access or
DataShed
Quotation

Interpretation
of XRF data
Quotation

Review and
memo on
portable XRF
QAQC data
Fixed price

On-site training
required.
2 days + travel
& expenses
Quotation



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We draw on our collective experience to customise exploration and mining solutions to each client's requirements. Our advice and services are tailored to respond to the individual advantages and constraints of each geographical region.

We have worked with all sizes of companies from small businesses to international majors, as well as with governments and NGO's. We make it our business to get to know and understand the region's cultural diversity, political background, sovereign risk, workforce and technical capability. We identify with each region's approach to sustainability and its level of support for our industry.

About CSA Global

We are a leading geological, mining and management consulting company with 30 years experience in the international mining industry.

Exploration & Evaluation

- Research & targeting studies
- Exploration planning & supervision
- Field investigations
- Project reviews & evaluation
- Technical & expert reporting

Resources & Mine Geology

- Data collection & QA/QC audits
- Geological modelling & Mineral Resource estimation (*JORC, NI.43-101, PERC, China, Russia, etc*)
- Resource assessment & expert reporting
- Mine geology reviews & contract services
- Grade control & dilution management

Community Development & Sustainability

- Impact assessment & sustainability programs
- Stakeholder liaison & community engagement
- Landscape interpretation & geotourism
- Educational workshops & training courses
- Sustainability benchmarking & certification

Data Management & Mapping

- Data capture & validation
- Database design & management
- GIS & mapping services
- Database hosting, security & audits
- Intranet design & setup

Mining & Projects

- Ore Reserve reporting & classification
- Mine & operations design & strategy
- Engineering studies (*concept & PFS to BFS*)
- Due diligence & operational audits
- Strategic planning & productivity improvement

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