

# RJM GROUND SOLUTIONS LIMITED

Value driven geotechnics by design

## CHRIS MILNE CURRICULUM VITAE

|                                    |                                                                                                                                                                                                                                                                                                                                                                                                               |
|------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>NAME</b>                        | Chris Milne                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>ACADEMIC QUALIFICATIONS</b>     | <ul style="list-style-type: none"><li>✦ BSc (Hons) Geology</li><li>✦ MSc Groundwater Engineering</li><li>✦ Postgraduate Diploma in Geotechnical Engineering Design &amp; Management (Distinction)</li></ul>                                                                                                                                                                                                   |
| <b>PROFESSIONAL QUALIFICATIONS</b> | <ul style="list-style-type: none"><li>✦ Chartered Engineer</li><li>✦ Member, Institution of Civil Engineers</li><li>✦ Chartered Geologist</li><li>✦ European Geologist</li><li>✦ Fellow of the Geological Society</li><li>✦ Member of the British Geotechnical Association</li><li>✦ CSCS Project Manager certified</li><li>✦ Personal Track Safety Certificate</li><li>✦ SISG Geotechnical Advisor</li></ul> |
| <b>POSITION</b>                    | Director                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>DATE OF BIRTH</b>               | 1966                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>NATIONALITY</b>                 | British                                                                                                                                                                                                                                                                                                                                                                                                       |

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### Overall Experience

Chris is a Chartered Civil Engineer & Chartered Geologist with 20 years geotechnical engineering and commercial experience, specialising in slope stabilisation, railway geotechnics (including as Contractor's Responsible Engineer and Contractor's Engineering Manager) and treatment of abandoned mine workings. He has specialist expertise in the assessment and management of geotechnical risk for engineering projects, including major project risk register and strategy development, risk management planning and risk evaluation for optioneering. His experience in relation to non-coal mineworkings is nationally recognised and has been extensively involved in the design and management of large railway geotechnical engineering schemes. Other major project involvement includes acting as geotechnical team leader for highways schemes, housing developments, business parks and hospitals.

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### Detailed Experience

#### **2007 to date Director, RJM Ground Solutions Limited**

##### **Drake Gardens, Tavistock**

Mining risk assessment and feasibility study for treatment of abandoned lead workings located below a housing estate, including advice on monitoring and risk management, including construction of the project risk register. Presentations at public meetings and to funding bodies. Preparation of application under the Land Stabilisation Programme and advice on Derelict Land Clearance Order submission. Design of remedial works and advice on commercial & procurement issues.

##### **Prestatyn Station Temporary Footbridge**

Design of spread foundations for new scaffold railway footbridge.



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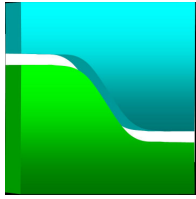
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### **Duddon Estuary Flood Protection, CBC1 38m 0250y to 0700y**

Geotechnical assessment and preliminary retaining wall design for new flood defence wall at Kirkby-in-Furness Station in Cumbria

### **Highbarns Chalk Mine Project**

Completion of the Geotechnical Assessment Report for abandoned chalk mines within a residential area of Hemel Hempstead including acting as risk workshop facilitator, attending public meetings and construction of a detailed risk management strategy.

### **Southwaite Cutting CGJ7 61 1/4m Down**

Emergency inspection and geotechnical assessment of a railway cutting failure on the West Coast Main Line.

### **Lowwood Hydro Scheme**

Geotechnical assessment for the refurbishment of a hydroelectric scheme leat on a slag embankment.

### **Queens Drive, Arnside**

Geotechnical assessment and remedial works recommendations for a former quarry face subject to rockfall and adjacent to housing.

### **Parton & Whitehaven Sea Defences, CBC2 T12 to T16.5 & T23 to T26**

Construction CRE for installation or rock armouring and repairs to existing sea defences to the Barrow to Carlisle coastal line.

### **LNW Rock Slope Stabilisation**

Geotechnical assessment and design of rockfall protection remedial works for railway cuttings at Stainforth, Birkett & Oxenholme, including acting as CRE and on site supervision during construction works.

### **Paddy Lane CGJ7 21m 32c to 34c Up**

Emergency inspection and design of remedial works for a railway cutting failure on the West Coast Main Line.

### **Conwy Rock Cutting**

Emergency inspection and geotechnical assessment of a failing boundary wall above a railway cutting failure on the main line to Holyhead.

### **Blackbush Drove Embankment EMP 96m 03ch to 96m 09ch**

Form A design of for cess support to a railway embankment founded on peat using a king post wall system. Development of a monitoring strategy in accordance with the Network Rail Observational Approach.

### **Ramsey Road Embankment EMP 95m 32ch to 95m 35ch**

Form A design of for cess support to a railway embankment founded on peat using a king post wall system. Development of a monitoring strategy in accordance with the Network Rail Observational Approach.

### **Evenlode, Gloucestershire**

Geotechnical assessment and design of remedial works to address badger activity beneath a railway overbridge approach embankment.



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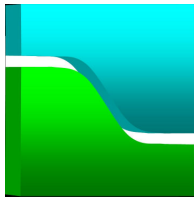
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### **Wood Cottage, Delamere**

Design of remedial works to stabilise a failing wall and rock slope behind a private house

### **Blakeston Lane**

Design checking of 140m of reinforced earth slope up to 6m high for new housing development

### **Stanground Bypass**

Design checking of 60 degree soil nailed slope up to 6.7m high at either side of a 260m section of new road near Peterborough.

### **Dove Holes Cutting CBN1 164m 0880y Dn**

Geotechnical inspection of cutting and preparation of an assessment report following rockfall.

### **Tipton Station Platform Reconstruction RBS2 8m 0352yds**

Temporary earthworks design including piling platform design to BR470, slope stability analyses and Form C preparation.

### **LNW 2010-11 GRIP Stage 2 sea defences**

Geotechnical inspection and single option reporting for five sea defence sites in North Wales and West Cumbria, including acting as Design CRE.

### **Carlingill & Lowgill Embankment, CGJ7 29m 0330y to 29m 0880y**

Construction CEM for major embankment regrading works up to 17m in height on West Coast Main Line.

### **Harrington Sea Defences, CBC2 3m 1150y to 3m 1600y**

Construction CRE for installation or rock armouring and repairs to existing sea defences to the Barrow to Carlisle coastal line.

### **Parton Bag of Rocks, CBC2 2m 0y to 2m 440y**

Construction CRE for regrading and Tecco mesh installation to failed sea cliff on the Barrow to Carlisle coastal line. Cat 3 check of rig anchoring system.

### **Gungate**

Review of grout performance for soil nailing undertaken as part of the Trent Valley 4 Tracking project for the West Coast Route Modernisation.

### **Dilton Marsh Station SAL 111m 11c**

Geotechnical assessment of leaning station platforms founded on an embankment. Completion of full geomorphological mapping and recommendations for potential remedial works.

### **Shap Rock Cutting CGJ7 40m 20c to 40c**

Geotechnical inspections during rock slope stabilisation works to a cutting on the West Coast Main Line.

### **158 Daniells**

Geotechnical risk assessment advice following collapse of suspected chalk mine beneath a house and highway in Welwyn Garden City.

### **Belgrave Yard**

Design checking for a PLAXIS finite element analysis of basement construction adjacent to existing housing in Belgravia, London.



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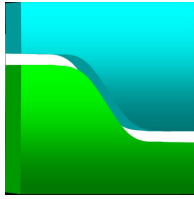
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### **Millom Site Access CBC1 44m 23c**

Geotechnical assessment for new road rail access point to a railway embankment in estuarine silt. Works included a hand auger investigation and supervision of excavations to the embankment.

### **Arqiva Mast, Aylesbury**

Design checking of mast foundation strengthening by mini-piling and reinforced concrete base extension.

### **Dockray Hall Estate, Kendal**

Phase 1 geotechnical, contamination and gas risk assessment reports for proposed commercial unit development.

### **Hutton Roof Saw Mill**

Contamination and gas risk assessment reports for industrial extension close to a former landfill including negotiation with Local Authority and Environment Agency to satisfy planning conditions.

### **Watford Station multi-storey car park**

Advice on risks from chalk mining & natural cavities for new station car park development.

### **Woolley North Drainage**

Mining risk advice for proposed railway drainage pipe bridge.

### **Devil's Bridge dam, Chapeltown**

Review of mining risk for a new dam to provide increased attenuation to storm flows along the Blackburn Brook.

### **Luton Station multi-storey car park**

Temporary earthworks design for piling platforms for new station car park development.

### **Leigh Embankment XTD 28m 4c to 5c Dn**

Desk study, geomorphological mapping, ground investigation design & supervision, preliminary slope stability analysis and options study for remedial works to failed section of railway embankment in Kent.

### **Southborough Embankment TTH 31m 51c to 55c Dn**

Desk study, geomorphological mapping, ground investigation design & supervision, preliminary slope stability analysis and options study for remedial works to failed section of railway embankment on soliflucted slope in Kent. Slope stability analysis undertaken for remedial option development.

### **Parton Embankment**

Cat 2 check for temporary works slope stability for drainage works to a railway cutting.

### **Hatfield Chalk Mining Risk Assessment**

Undertook a detailed review of risk assessment strategies for chalk mining in Hatfield. Advice on the development of risk assessment strategy for chalk mining in Hatfield including provision of training to local authority staff with respect to development control issues.

### **Briars Lane Chalk Mine Stabilisation Scheme**

Consultancy advice on the implementation of compaction grout and bulk infilling work beneath houses and a school, including advice on grout & foam concrete mixes, monitoring systems, risk management and contractual issues.



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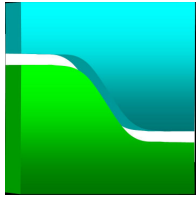
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### **Stocks Mill Garage, Kendal**

Geotechnical inspection and desk study report (Phase 1 contamination assessment) for proposed new commercial building.

### **Ulverston Autism Centre**

Geotechnical inspection and desk study (Phase 1 contamination assessment) report for proposed new residential centre.

### **Yewbarrow Depot, Grange-over-Sands**

Phase 1 and 2 geotechnical and contamination assessment reports for proposed housing development including negotiations with the Local Authority.

### **Estragan Hydroelectric Scheme**

Geotechnical desk study and geomorphological mapping for penstock route for proposed hydroelectric scheme in Scotland.

### **Broken Brae Flood Defences**

Geotechnical assessment of existing flood defences in support of a planning application for a new ecological holiday park development. Services provided included a walk over survey, design, specification, procurement and supervision of an intrusive ground investigation. Subsequent stability analysis of the flood defences under 100 year flood conditions and recommendations for remedial measures and emergency planning. Design of earthworks for construction of lodges was also undertaken. A validation report was prepared to comply with planning consent.

### **Scaleford Care Home, Lancaster**

Production of a Phase 1 Assessment report in accordance with NHBC guidance in support of the planning application for the development of an existing residential home in Lancaster. The site was located immediately adjacent to the former Lancaster town gas works and the tidal River Lune.

### **Boon Town, Burton in Kendal**

Design, specification, procurement and supervision of an intrusive investigation for a new housing development. Works focused on the potential use of soakaways at the site through in situ infiltration testing in both boreholes and trial pits.

### **Blea Moor & Blue Clay Cuttings**

Inspection, scoping and design of rock slope and earthwork stabilisation for two railway cuttings up to 30m high on the Settle to Carlisle Line, including acting as Design CRE.

### **SAC Earthworks**

Inspection, scoping and design of cess support and earthwork stabilisation for four railway embankments on the Settle to Carlisle Line, including acting as Design CRE.

## **2005 to 2007 Technical Director (Geotechnics), Hyder Consulting (UK) Limited**

### **Stratford International Station Packages 6 & 8**

Geotechnical Team Leader for tender design of earthworks, foundations and retaining walls for Docklands Light Railway enhancements in advance of the London 2012 Olympics. Work included outline design of additional ground investigations and identification of geotechnical risk for key elements.



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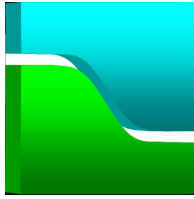
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### **Hatfield Chalk Mining Risk Assessment**

Construction of a risk assessment and risk management strategy for chalk mining in Hatfield. The project was designed to provide an integrated approach to prioritisation of sites for investigation as well as developing and approach for new development. The scheme included development of a spreadsheet risk assessment Tool based on GIS data systems, and risk assessment manual and staff training. This scheme has been promoted by the client (Hertfordshire C C) as leading UK best practice in mining risk assessment and was a finalist for the 2008 Association of Local Authority Risk Managers (ALARM) awards for strategic risk management.

### **Briars Lane Chalk Mine Stabilisation Scheme**

Project Director for major abandoned chalk mine treatment scheme beneath an area of housing in Hatfield. Provision of significant mining risk assessment and treatment advice including emergency planning, treatment options, risk quantification and treatment design. Developed a comprehensive peer-reviewed strategy for mine treatment including the design specification and validation approach. The project risk management strategy developed was circulated by the funder English Partnerships as an example of best practice and subsequently the subject of a presentation to the 2006 English Partnerships Land Stabilisation Best Practice Event.

### **Upwell Street, Sheffield**

Pre-purchase advice on geotechnical risk for former gasworks site including assessment of large retaining structures and assessment of abnormal cost impacts for foundations and mining. Undertook geotechnical validation of remediation earthworks and undertook an assessment of shallow mineworkings at the site. Provided advice on foundations, floor slab design and road and hardstanding formation.

### **A595 Parton to Lillyhall Bypass**

Coal mining risk assessment to produce an investigation and treatment strategy for scheme costing for new by-pass in Cumbria with the potential for extensive shallow coal workings.

### **N18 Route Selection**

Risk assessment for potential groundwater conduit collapse as a result of new road construction. The site was particular sensitive with environmental sites of European importance and nationally recognised historical sites. The complex geology included groundwater fed turloghs (lakes) with shallow and deep limestone conduits, the condition of and location of which was uncertain. A risk assessments strategy was developed which successfully allowed a lowest risk agreed route to be selected.

### **Dale Fort, Pembrokeshire**

Design of rock stabilisation measures for the construction of new classrooms below a listed structure. Design included soil nailing, rock bolting and fibre reinforced shotcrete.

### **Reading West Curve**

Design of stabilisation for 5 chain section of failed embankment. Design included a gravity wall, drainage and new driver's signal access.

### **Magnolia Road Embankment**

Design CRE for feasibility study for embankment stabilisation works including full geomorphological survey and stabilisation optioneering. Constructed Kier Rail template for earthworks feasibility and provided input into a Network Rail research project on vegetation related movements in high plasticity embankments being conducted at the site.



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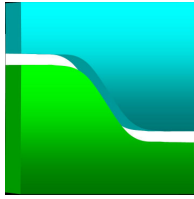
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### **Timberlog Lane Cutting**

Design CRE for feasibility study for cutting stabilisation works including full geomorphological survey and stabilisation optioneering.

### **Park Lane Bridge Abutment**

Design CRE for abutment removal and regrading scheme.

### **Lakes Road, Duckinfield**

Mine treatment assessment and grouting validation, earthworks and foundation design for new housing development.

### **Hackney Sewer**

Geotechnical advice for diversion of failing sewer located beneath the track with difficult access and excavation constraints.

### **A57/A628 Mottram-Tintwhistle Bypass**

Hydrogeological advice on potential artesian groundwater pressure for cut and cover tunnel design.

### **Land Stabilisation Programme**

Technical reviews and advice to the funder of major mine stabilisation schemes. Projects include the £28m stabilisation of salt mines in Northwich, grouting of ironstone mines in Bream, and the investigation of limestone mines and adits in Ironbridge town centre.

### **New bridge at A5 Pont Melin Rug, Corwen**

Geotechnical risk review for foundation options for a new bridge to be constructed over 50m of glacial silts including the evaluation of full-scale load test data and the relative risk of raft and deep pile solutions. The scheme includes an assessment of the impact of scour protection walls and effects on an adjacent listed bridge. The scheme, which involved a peer-reviewed FE analysis, successfully demonstrated that shallow foundations could be constructed with settlements that could be accommodated within the construction sequence.

## **2004 - 2005 Associate Director, White Young Green Environmental Limited**

### **Alfred McAlpine Capital Projects GWESPA framework**

WYG Design Co-ordinator and CRE for framework contracts with Alfred McAlpine Capital Projects for railway earthworks remediation schemes up to £5m capital value.

### **Birse Rail framework**

WYG Contractor's Responsible Engineer and CRE for framework contract with Birse Rail for design & build railway earthworks remediation schemes.

### **DMKD, Ukraine**

Geotechnical advice for the extension of existing 10m deep basement skip pits for the construction of a new steelworks.

### **Birmingham New Hospitals Project**

Project Director for geotechnical, contaminated land and ecological input to major PFI development comprising 3 new hospitals. Scheme involves development of foundation option



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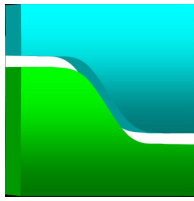
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development, earthworks and remediation strategies and input to masterplan. Geotechnical issues include deep basements, cut slopes, piled foundations and re-use of materials.

### **Kingsway Business Park, Rochdale**

Project Director for geotechnical input to major development project including modifications to a motorway junction, construction of a new footbridge. WYGE works include ground investigations all three phases of development, production of the Highways Agency geotechnical report and earthworks design.

### **M62 J36 Slip Road Improvements, Goole**

Geotechnical Design Team Leader for HA Approval in Principle for retaining structures to new culvert construction.

### **Hertford Loop**

Project Director for investigations and foundation remedial options assessment for 50 leaning railway OLE stanchions.

### **Northwich Salt Mines Project**

Project Director for WYG appointment as Contract Supervisor for £30m mines infilling scheme beneath centre of Northwich, covering engineering consultancy, cost consultancy, risk management and Planning Supervisor roles. The scheme is high profile involving treating over 750,000m<sup>3</sup> of mineworkings beneath existing structures and removing and disposing of an equivalent volume brine to enable town centre redevelopment.

### **CST No. 3, Vittoria, Brazil**

Review of contractor design for raft foundations to new blast furnace. Work included a detailed assessment of likely variation in lateritic soils including an assessment of soils encountered in excavations. A review of soil properties for modelling was undertaken including a comparison between in situ plate test data and back analysis of previous foundation performance foundation. A report on levels of geotechnical risk assessment was provided with mitigation/site control recommendations.

### **Nun Monkton**

Investigation and assessment of long standing slope failure within the grounds of a Grade 1 listed building.

### **ISIS, Rutherford Appleton Laboratory**

Project Director for the assessment and optimisation of foundations for a nuclear targeting facility. Included specialist large diameter plate load testing to provide accurate estimates of chalk stiffness and creep parameter followed by finite element analysis of the proposed foundations using PLAXIS.

### **Braes of Doune Windfarm**

Tender advice for construction of windfarm foundations and haul roads across an area of peat bog in Scotland.

### **Project Annona**

Review of ground improvement implementation for new retail development on former open cast colliery site.



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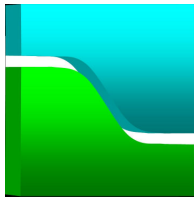
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**2002 to 2004 Associate, White Young Green Environmental Limited**

### **Coulston Embankment**

Feasibility and remediation design for an embankment with drainage problems and a long history of instability including minipiling and anchoring design.

### **Westerleigh Embankment**

Feasibility and remediation design for over 2 miles of embankment up to 12m high with a long history of instability, drainage problems and mining.

### **Tutshill North Cutting**

Inspection & emergency remedial measures design for rock cutting.

### **Somerton Cutting**

Inspection and remedial works design for emergency works to rock cutting.

### **Chepstow Cutting**

Design CRE for Inspection, assessment and remedial measures (permanent and emergency works) for 25m high rock cutting including rock bolting, rockfall protection and dentition.

### **Honeybourne Embankment**

Design CRE for inspection, assessment and remedial works design.

### **Reading East Embankment**

Design CRE for inspection, assessment and remedial works including analysis of inclinometer data.

### **Pannal Station Cutting**

Investigation and remedial works design for failed railway cutting.

### **Birse Rail Framework**

Design CRE for geotechnical advice and design for remedial works to earthworks, infilling and bridge reconstructions throughout Network Rail Midland Region.

### **North West Structures Alliance (Edmund Nuttall)**

Geotechnical advice and foundation design for wide range railway structures renewals including pile and anchor design.

### **APT Ultramast**

Investigations and foundation design for railway telecoms masts.

### **Cameron LNG Terminal**

Earthworks specification and settlement analysis for new gas terminal in Louisiana.

### **Rabbit Banks, Riverside**

Tender advice for the development of retaining wall and slope stability solutions for new busway.

### **English Partnerships Land Stabilisation Programme**

Technical review of schemes for treatment of abandoned non-coal working such as limestone mines in the West Midlands and anhydrite mines in Hartlepool. Also Project Manager on behalf of English Partnerships for the £30m Northwich Salt Mines stabilisation scheme.



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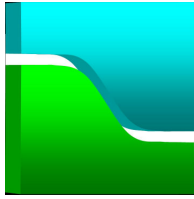
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**2001 to 2002 Principal Geotechnical Engineer, White Young Green Environmental Limited**

### **Project Enigma**

Design check and validation reporting for ground improvement scheme (vibro stone columns) for settlement sensitive distribution development.

### **Commonwealth Games, Manchester**

Review for geotechnical aspects of proposed new tramway for NWDA.

### **Woodborough Embankment**

Feasibility study and detailed design of remediation scheme for railway embankment subject to instability due to following and adjacent to an environmentally sensitive area (SSSI with protected species), including acting as Design CRE. Remedial works designed include soil nailed gabion baskets, bored king post retaining walls and new drainage.

### **Lavington Embankment**

Feasibility study and detailed design of remediation scheme for railway embankment founded on geologically complex unstable natural ground (solifluction lobes) including acting as Design CRE. Remedial measures designed include soil nails, toe weighting and gabion walls together with new drainage.

### **ECML Bridges**

Geotechnical advice for foundation design for six bridge renewal schemes.

### **Crimea Bridges Infilling (TCC 58 and PSB1 16)**

Geotechnical assessment and advice for infilling of two bridges.

### **Ashington Blythe and Tyne**

Geotechnical assessment for five new station sites.

Leeds Station Engine Shed Arches - geotechnical advice on infilling of disused vaults beneath platform and tracks.

### **Railtrack Great Western**

Two months secondment as APM for earthworks remediation schemes up to £800k from feasibility through to construction.

### **Irish Rail**

Limerick Division Earthworks - principal inspections, SI and remedial works outline and detailed design for embankments and cuttings.

### **GN-GE Track Renewal Inspections**

Detailed track-bed investigations and assessments.

### **Silverdale Colliery**

Feasibility study for major redevelopment of former colliery site including foundation, gas, contamination and mineworkings issues.

### **Marks & Spencer, Kendal**

Advice on basement car park retaining wall remediation.



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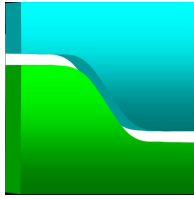
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### **2000 to 2001 Principal Geotechnical Engineer, Montgomery Watson Limited**

#### **Teesdale South Development**

Validation risk assessment following remediation of a former industrial site (including an area of landfill) for prestigious office development adjacent to the River Tees. Work included risk assessment for landfill gas and negotiation with the Environment Agency and Local Authority over the extent of further remedial works required to meet the planning consent and address risk to controlled waters. Issues addressed included the stability of existing foundations and retaining structures on or adjacent to the river bank.

#### **Former Shell Fuel Depot, Preston Farm, Stockton**

Prepared a Land Quality Statement for submission to the Local Planning Authority regarding the redevelopment former fuel distribution depot for light industrial use. Undertook detailed review of the adequacy of the existing contamination investigation and remediation. Made recommendations for further validation testing at the site which were accepted by regulatory bodies.

#### **National Semiconductor UK, Greenock**

Specification and health and safety planning as project manager for remedial excavation and reinstatement of an area of oil contamination. Earthworks, included assessment of stability of existing foundations, effects on services and reinstatement of a concrete roadway.

### **1996 to 2000 Senior Geotechnical Engineer, Hyder Consulting Limited**

#### **LNE Earthworks Package 5 & 6**

Project manager and geotechnical team leader for the development of feasibility studies and designs to Form A and Form B stage for seven rock cutting and embankment stabilisation schemes in LNE Zone. Schemes within the programme included:

- Roped access inspection of a rock cutting and design of remedial measures including rock bolting, dentition and spray concrete.
- Design of riverbank stabilisation works for the River South Tyne. The proximity of SSSIs in the river and the presence of salmonid fish stocks required management of ecological surveys as well as close liaison with Local Authorities, English Nature and the Environment Agency.
- Embankment stabilisation schemes including the design of drainage measures, modifications to flood defences, sheet pile and gravity retaining walls.
- Category 3 checks on schemes designed by other consultants - Possession planning undertaken for surveying, ground investigations and inspections (including "Red Zone" working). The schemes addressed all aspects of feasibility including liaison with planning authorities and regulatory bodies as well as environmental surveys and consents. Provided advice during construction stage.

#### **AMP Structures**

Inspection and review of leaning OHLE stanchions along the WCML. Identification of possible movement mechanisms and remedial works options.

#### **Bridges FEP 30 & 63**

Project manager and geotechnical team leader for investigations and geotechnical advice on remedial works to two railway bridges as part of upgrading and re-opening of the line.

#### **Land Stabilisation Programme**

Project manager and team leader for advice and appraisal of applications from Local Authorities under the UK Government Land Stabilisation programme for treatment of non-coal workings. Schemes for which he had responsibility included:



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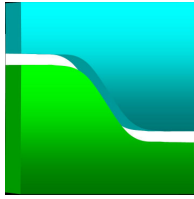
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# RJM GROUND SOLUTIONS LIMITED

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## CHRIS MILNE CURRICULUM VITAE

- Treatment of minewater adits in the Roman Gravels Mine, Shropshire
- Haematite mines and shafts in Cumbria
- Investigation into iron mines in limestone in Bream, Gloucestershire
- The £3m scheme for salt mine stabilisation in Cheshire
- The proposed £30m stabilisation works for salt mines in the Centre of Northwich.
- Investigation into clay mining associated with the Jackfield landslide near Telford
- Proposals for investigation into coastal mineral workings in Cornwall
- A review of limestone mine monitoring in the West Midlands

Each project involved a technical assessment, cost evaluation and appraisal of the business case for treatment including issues of land valuation.

### **A5 Pont Padog Retaining Walls**

Project manager and designer for mini-pile group foundations for an anchored retaining wall constructed as part of improvements to the A5 trunk road including pile group analysis.

### **Kelloe Bank Foot Restoration**

Project manager for the development of feasibility proposals and Form A (Approval in Principle) for reinstatement of an embankment after subterranean fire. The appraisal of construction options and an outline earthworks specification to provide an economic reuse of existing marginal material the site. Subsequent work included contamination assessment.

### **Alkrington Lodges, Rochdale**

Project manager for scheme to provide remedial measures for a leaking earth dam. Scheduled inspection by Supervising Engineer and prepared remedial works options.

### **LNE Earthworks IV(B) Package 2**

Preparation of feasibility studies and outline design for remedial works to three sites with unstable embankments and cuttings to Form A (Approval in Principle). Schemes included sensitive sites such as adjacent to landfills and nature reserves. Designs included soil nailing, sheet pile walls and crib wall structures. Undertook optioneering and provided cost estimates for alternatives. Inspection team leader for surveying and investigations under possession, including electrified lines without isolation.

### **West Coast Main Line: Moses Gate Retaining Wall**

Prepared the feasibility study report and Form A for the removal of an unstable retaining wall (former bridge abutment). Developed a feasible method of working and an outline soil nail design for stabilisation of the slope, which minimised possession working required during construction.

### **West Coast Main Line: Bridge No 1**

Prepared the feasibility report for infilling of a redundant bridge including the outline specification for the earthworks.

### **Lea Green Station**

Provided the geotechnical input to the feasibility study for development of a new station, including acting as Inspection team leader for surveying, investigations under possession. Undertook assessment of construction and landfill gas issues at the site and prepared outline design for gravity retaining structures. Provided advice for the detailed design of retaining walls and excavations.

### **Fleetwood Power Station Cooling Water Pipelines**

Prepared the geotechnical interpretative report for over 3km of onshore pipelines, including pumping stations. Also scoped and controlled the site investigations for the onshore and offshore



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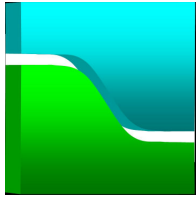
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sections of the pipelines including pump testing. Provided geotechnical advice on tunnelling and shaft construction options.

### **Noble's Park Drainage Study, Douglas, IoM**

Supervised a hydrogeological study into the interaction between groundwater and surface water in an area of road flooding. Assessed the long-term groundwater monitoring data in relation to rainfall records and prepared recommendations for drainage improvements.

### **Preston UCSOs**

Prepared geotechnical assessments for a number of deep shafts as part of tender assistance. Identified and assessed the options for shaft design and construction.

### **Dewatering Claim, Manchester**

Prepared a claim for the costs of dewatering during a pumping station shaft construction based on unforeseen ground conditions. Supervised additional investigations and prepared the case for the construction contractor.

### **Edinburgh Castle**

Designer for slope stabilisation by soil nailing to HA68/94 and BS8081.

### **Negril Water Project, Jamaica**

Undertook Electrokinetic (EKS) geophysical survey to determine the location of discrete groundwater flow zones around freshwater "blueholes" used for mains water abstraction.

### **Swanbourne Lake, Sussex**

Undertook Electrokinetic (EKS) geophysical survey to determine the effects of abstraction on a chalk aquifer fed lake. The survey was successful in independently confirming the predications of groundwater modelling and allowed local policy on abstractions to be renewed.

### **Horsfall Tunnel**

Resident Engineer for ground investigation and trial piling exercise for design of major remedial works for a tunnel suffering movement due to an unstable slope. Works included a tunnel inspection and the construction of bored trial piles under a track possession with vibration monitoring. Assessed slope and tunnel stability and prepared the interpretative report for the site which identified possible mechanisms for tunnel deformation and considered remedial options to allow reconstruction within the 4 week pre-booked possession. Provided advice during construction. The scheme was winner of the 1999 ICE Yorkshire Association Award for Excellence in the Concept, Design and Execution of Civil Engineering Works.

### **Conwy Road Pumping Station**

Prepared design memorandum for a permanent sheet pile retaining wall. Analysis using Geosolve WALLAP model considered the determination of maximum bending moments, prop forces and displacements during both temporary and permanent states.

### **Rainscough Brow CSO**

Carried out rock socket pile design for a combined sewer overflow near Bury.

### **Holland St, Sandal St & Sandal Court, Ancoats**

Undertook desk study enquiries and prepared proposals at proposed housing developments on derelict land in Manchester. Designed and managed investigations into contamination and shallow mineworkings which included geophysical surveys and shaft probing. Prepared the geotechnical, contamination and mineworkings assessment reports for the sites which included an integrated evaluation of remediation options.



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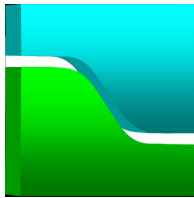
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### **Hydro Electric Power Schemes, River Irwell & River Trent**

Prepared geotechnical assessment reports for the sites of four proposed hydro-electric generating facilities. Provided design recommendations for retaining structures to ground anchorage.

### **ACER Electronics Wentlooge**

Scoped and project managed ground investigations for pile design at a proposed electronics facility. Assisted in preparation of design and build piling specification.

### **Pen-Y-Bont Clay Pit, Ruabon**

Prepared slope failure report on the site of a proposed landfill. Carried out back analysis of slope failure using Geosolve SLOPE software.

### **Kimmel Bay STW**

Supervised ground investigation for extension of treatment facilities at an existing sewage treatment works and prepared geotechnical assessment Undertook settlement evaluation for deep foundations using VDISP software.

### **Moredun Institute, Gilmerton, Edinburgh**

Project Manager for a three-phase scheme for treatment of shallow mineworkings beneath a proposed housing development. The scheme included investigations for coal, fireclay and limestone gallery workings driven from an infilled quarry. Undertook study on the effects of investigation and treatment on artesian groundwater encountered. Designed and supervised treatment work and prepared contract documentation including a detailed specification report on consolidation work for submission to Building Control and the NHBC.

### **Glascoed To Trecastell Pumping Station**

Designed and supervised ground investigation for a pumping station at the corner of a former domestic landfill site. Prepared the geotechnical assessment report for the site. Carried out a detailed contamination assessment of the site and made recommendations for gas protection measures on a heavily gassing site.

### **Rhosneigr Wastewater Treatment Scheme, Anglesey**

Designed and supervised the ground investigation for sewage treatment improvements including new pipelines, buried storm tanks and facilities. Prepared the desk study and geotechnical assessment report for the scheme including recommendations for foundations and shaft excavation in rock.

### **Ganol WwTW**

Designed and supervised an extensive ground investigation for a major new treatment works. Prepared desk study and interpretative report and carried out preliminary pile design. Prepared design and build piling specification and undertook pre-tender meetings with piling contractors.

### **A40 Robeston Wathen Bypass**

Acted as client's representative during a pre-tendering ground investigation for a proposed bypass in Pembrokeshire.

### **A470 Llangurig to Wern Villa**

Prepared the Department of Transport Procedural Statement 1 (PS1) for a proposed road improvement in mid Wales.

### **Bryn Cowlyd Treated Water Main**

Prepared desk study and interpretative report for pipeline across Afon Conwy, which included a tunnelled railway crossing.



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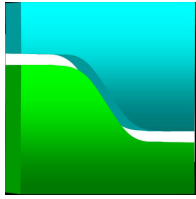
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### **St. Ivel, Effluent Treatment Plant, Chard**

Designed and supervised ground investigation for development of existing effluent treatment plant. Prepared desk study and interpretative report for site including preliminary pile design.

### **Davyhulme WwTW**

Prepared contamination assessment and risk assessment reports of former sludge drying beds in accordance with DoE guidance.

### **Llechwedd Slate Mine**

Carried out slate mine tip inspections and assessed slope stability and compliance with mine tip regulations. Prepared inspection report.

### **Dwr Cymru Environmental Improvement Programme**

Preparation of desk study and interpretative reports and supervision of a number of small ground investigations for potential sewage treatment improvement schemes in Wales. Design and supervision of investigations for shallow mineworkings and shafts and preparation of reports on treatment options.

### **1995 to 1996 Geotechnical Engineer, Exploration Associates**

#### **Southbank Transfer, Teesside**

Senior logging engineer for a major investigation for a proposed sewage pipeline through contaminated land and heavy industrial sites (including a steelworks and railway).

#### **Tees Jetty**

Site Agent and engineer for an offshore barge based investigation at a heavily contaminated site adjacent to a chemical works and special waste landfill in the mouth of the River Tees.

#### **West's Diversion, Sunderland**

Site Agent and engineer for a borehole investigation for deep storm sewer improvements.

#### **Westbourne Grove Sewer Scheme**

Site Agent and engineer for ground investigation for road sewer improvement scheme on a busy trunk road in Harrogate.

### **1994 to 1995 Hydrogeologist, Sir Alexander Gibb & Partners**

Engineer's Representative during testing of boreholes of the Nirex Sellafield Geological Investigations. Responsible for the design, supervision, analysis and reporting of hydrogeological testing:

- Design and supervision of deep borehole pump and packer tests.
- Data analysis using Horner plots, pressure derivative analysis, Hvorslev and curve matching.
- Preparation of borehole hydrogeological interpretative reports incorporating relevant geochemical and geophysical data.

### **1991 to 1993 Laboratory Administrator, MSSL**

Senior management post responsible to the Director for the finances of a large space engineering laboratory with an annual income of £4m. Rapidly promoted, ultimately providing financial consultancy on major bids as part of the Management Group:

- Preparation of the laboratory five-year financial plan; financial forecasting and modelling.



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## CHRIS MILNE CURRICULUM VITAE

- Negotiation and costing of contracts including presentations to major clients.
- Contract management, cost control and application of EU Purchasing Directives.
- Line manager for 14 staff.
- Manpower planning for the 150 staff and research students of the Laboratory.
- Management of support services, accommodation, security and health and safety.

### **1990 to 1991 Administrative Assistant, British Dental Association**

Part of the 5-man Secretariat to the General Dental Practitioner Services Committee:

- Took part in NHS contract negotiations and costing exercises of up to £1.4bn.
- Liaison with Health Department staff up to Assistant Secretary on behalf of Statutory Bodies.
- Reported on House of Commons Committees and provided briefings for MPs.

### **1989 Field Geophysicist, Gardline Surveys**

Ship based geophysical shallow site surveys for oil rig location in the North Sea:

- Real-time interpretation of digital and analogue seismic data.
- Monitoring and analysis of sidescan sonar data.
- Sediment sampling.

### **1988 to 1989 Materials Technician, Devon County Council**

Laboratory and field based testing for County engineering contracts:

- Concrete testing (slump tests, cube and core strength determination).
- Aggregate identification, density tests, grading and plasticity testing.
- Safety fence bending moment determination.
- Road skid testing.

## **Publications & presentations**

Younger, PL and Milne, CA (1997) "*The Hydrostratigraphy and Hydrogeochemistry of the Vale of Eden, Cumbria*". Proc. Yorks. Geol. Soc. Vol. 51 Part 4 pp 349 - 366.

Milne, CA and Solera, SA (1999) "*Investigations and Strategy for the Reconstruction of Horsfall Railway Tunnel, Todmorden*", Ground Engineering pp 32 - 37 (Presented at Tunnel Construction & Piling 99, International Symposium & Exhibition, Olympia 8 September 1999).

Presentation to English Partnerships Land Stabilisation Programme 2002 Best Practice Event "*The West Midlands Limestone Mines Schemes*"

Presentation to English Partnerships Land Stabilisation Programme 2006 Best Practice Event "*Preparing a Risk Register – Briars Lane Chalk Mine Hatfield*"

Solera, SA and Milne, CA (2009) "*The influence of soft ground conditions on new bridge design at A5 Pont Melin Rug, Corwen*" In Basset, MG, Boulton, H & Nichol, D (Eds) *Urban Geology in Wales: 3*. National Museum of Wales Geological Series No. 26

Milne, C A, O'Donovan, A & Rigby-Jones, J (submitted for publication to Civil Engineering in 2009) "*Briars lane, Hatfield - a holistic approach to mine treatment*" (Presented at joint meeting of British Tunnelling Society and MinSouth, ICE, Great George Street, Feb 2009)



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