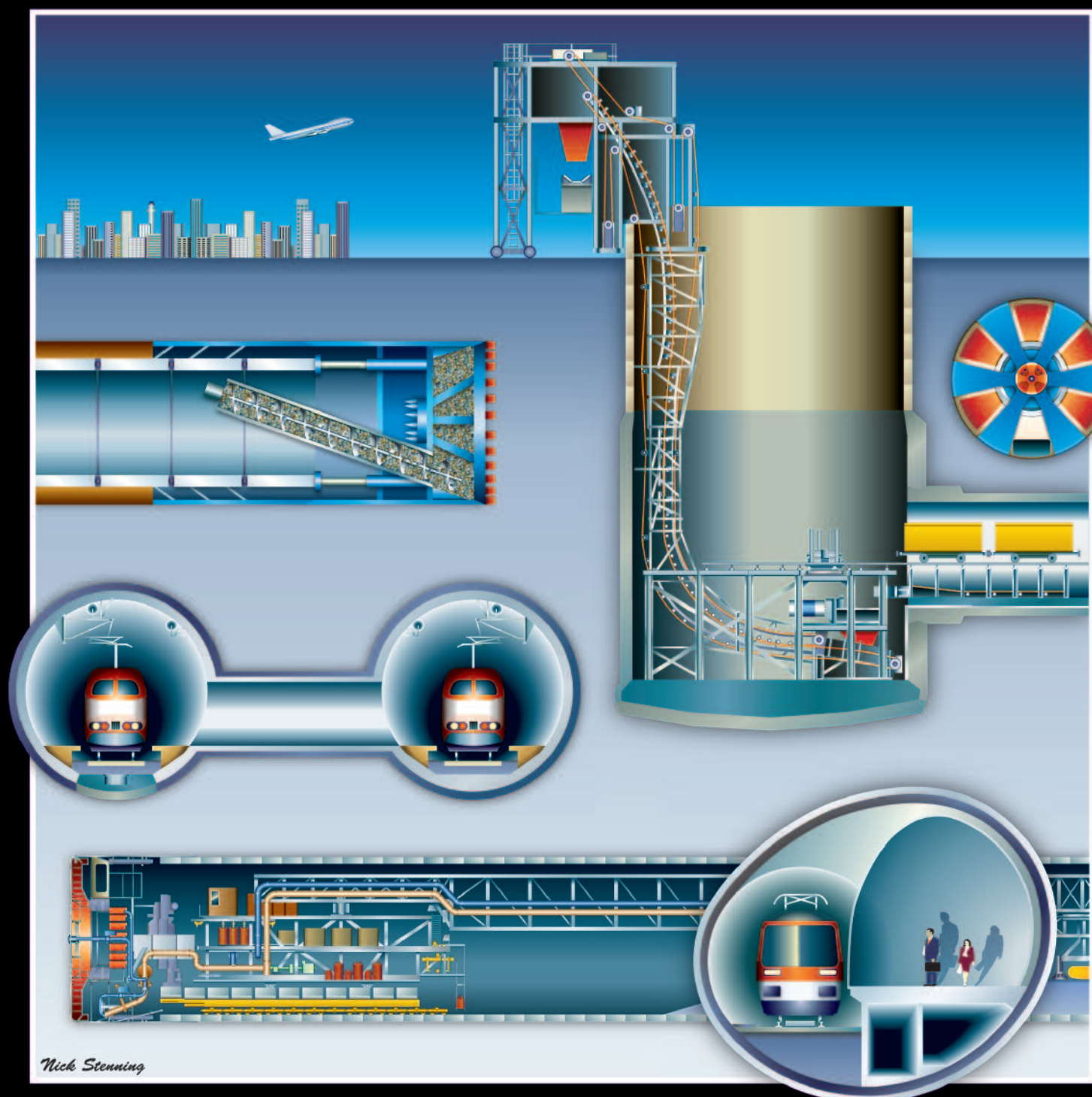


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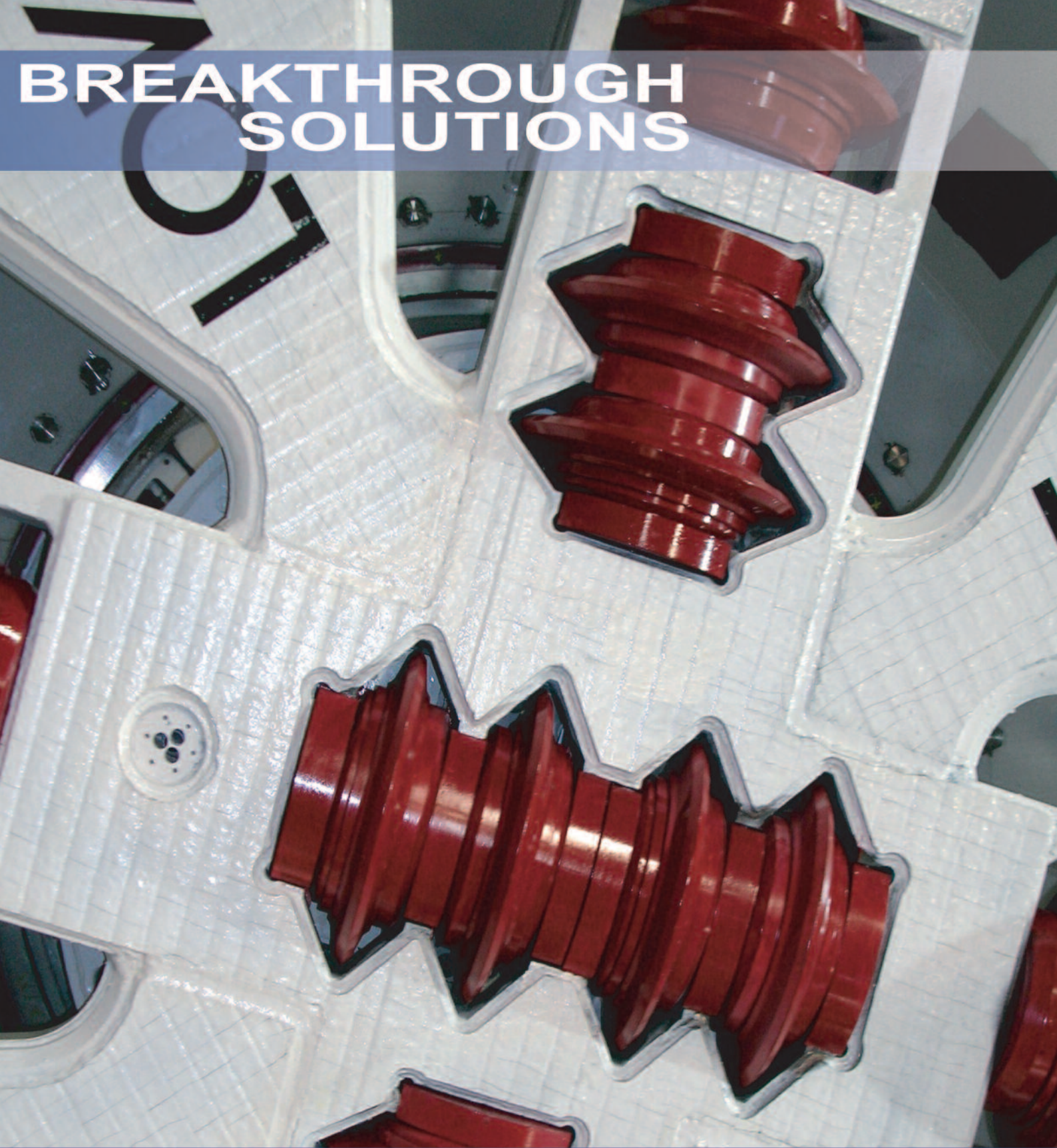
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Nick Stenning

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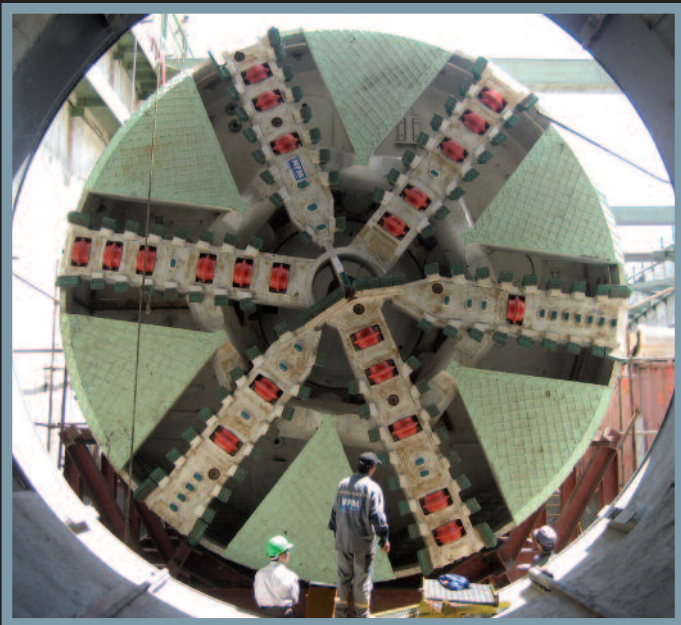
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COMMENT

Welcome again to T&T's yearly World Profile of Tunnelling Contractors & Consulting Engineers. Again, the response to the call for information from both sectors has been overwhelming so a big thank you to all the companies who took the time to fill out the forms and return them to us (even if most of them were very late!). It is amazing the skill base out there, spread right around the world.

Looking through the pages it seems that there is no international shortage of work on the horizon. This also does not really include the simply huge workload in China, as information from this part of the globe seems to be in short supply. But we all know it's there!

The trend appears to be that there is no slow down in the metro work underway or coming up. This is obviously a reflection of the burgeoning demands on the existing infrastructure of ever growing cities. Not only transport tunnels, but sewer systems, water and cable tunnels will also feel the knock on of this.

Another interesting development are the High Speed Rail Links that are primarily there to take heavy freight, and therefore trucks off the roads. This is both an economic, to free up congested road arteries (specifically Europe), and an environmental issue, with the world becoming ever aware of our affect on the very ecosystem we live in.

So, lets look at it - this is an industry that gets people around, provides them with all of their basic 'needs' for life, and one that is actively doing something to help improve the very environment we live in. Take a step back and think about how important your role in the world is, and then give yourselves a big pat on the back. You deserve it!



Tris Thomas

Drives under at Tabriz

Excauation has commenced for the metro in Tabriz, Iran using two NFM Technologies machines similar to the pair used elsewhere in the country to build a subway at Shiraz.

The twin 6.88m diameter EPBMs were only getting set to start their drives at the end of last year despite having been originally ordered in 2004. The client severely delayed payment of the US\$20M contract for the machines, which led to subsequent financial difficulties for the TBM manufacturer.

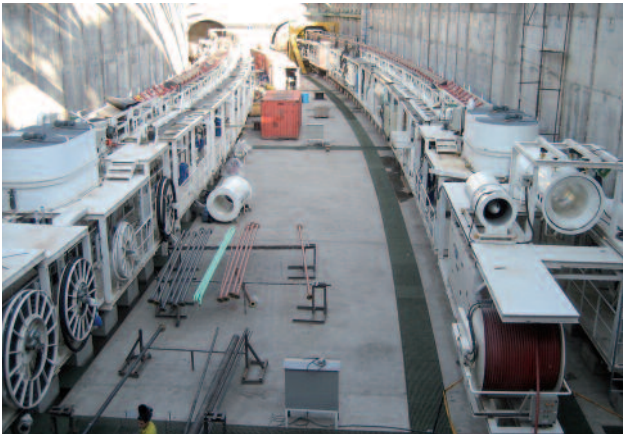
NFM Technologies kept the TBMs in storage until the payment was made, in 2006, and now the second machine is set to soon start its drive.

Following the period of financial difficulties early in

contract, negotiations led to a major ownership stake being taken in NFM Technologies by a Chinese firm, Shenyang Heavy Machinery Group (SHMG). The deal was agreed to in mid-2007 and involves a cash injection and a debt settlement plan with creditors that should enable the manufacturer to exit commercial court protection by mid-2010.

NFM Technologies will continue to be active in China, as it was in the last few years, but will also be seeking more opportunities and clients in Europe, such as Spain, and elsewhere, such as India and Turkey.

Right and below: NFM Technologies' EPBMs start to bore at Tabriz, Iran



Fatalities at Strazevica tunnel

Two workers were killed late last year in the construction work on the Strazevica tunnel on the Belgrade bypass road in Serbia.

The ground collapsed during shutter removal from the walls near a portal of the second 745m long bore where the men were working.

The Serbian road authority, JP Putevi Srbije, said investigations were ongoing and no comment on the cause of the collapse and fatalities was made.

The twin tube tunnels are being excavated in soft ground in the Resnik neighbourhood of Rakovica municipality. The contract to complete the partly built tunnel was awarded in late 2004 to Energoprojekt.

The Belgrade bypass involves construction of a total of 69km of road to the west and south of the city. The Strazevica tunnel is in a section of existing ring road being rehabilitated, and the works on that bypass section also involve stabilisation of landslides.

HCC-Alpine JV takes more Delhi work

Hindustan Construction Co (HCC) and Alpine Mayreder have won another metro contract on the airport link in Delhi.

Late last month, the client, Delhi Metro Rail Corp (DMRC), awarded the JV a US\$76M contract to design and build a 2.6km long NATM tunnel between Talkatora Gardens and Budha Jayanti Park stations.

The tunnel will have an internal width of 10m to take a twin track railway as well as an access and ventilation shaft, and the contract is to be completed by July 2010.

In September 2007, the two companies plus Samsung Corp were awarded a US\$198M (excl VAT) contract from DMRC also on the Airport Metro Express Line-1, which is being built in the Phase 2 expansion of the city's subway network. The contract period is 32 months.

The contract involves design and construction of two stations and twin bored tunnels each of 2.2km length, 5.6m i.d., between New Delhi and Talkatora Gardens stations. In addition, a 1.27km long cut and cover box tunnel is to be built with the two underground stations to take twin rail tracks.

DMRC has awarded a number

of contracts over the last year for the Phase 2 works. On another section of the airport link, Larson & Toubro (L&T) in joint venture with Shanghai Urban Construction Group (SUCG) won a US\$70M contract to design and build 2.4km of twin tunnel from the airport to Dwarka Sector-21. Two-thirds of the excavation will be executed by TBM and the balance by cut and cover.

On another metro branch, L&T also won a US\$50M contract to build 1.5km long twin tunnels as part of the development of Saket station, which is at the end of the excavation works on different metro branch. Excavation techniques will include cut and cover and NATM.

The company was also successful in other contract on the branch, which includes the most excavation on the Phase 2 works. It is building the Udoyog Bhavan and Green park stations plus a 1km long cut and cover tunnel (T&T, November 2007, p11).

A JV of Dywidag, Samsung, Shimizu, Iroon and L&T is to undertake TBM excavation for running tunnels as well as build stations at Hauz Khas and Malviya Nagar.

Glendoe TBM holes through

Major tunnel boring on the Glendoe hydropower project in Scotland was completed early this month when the 5m diameter TBM holed through to complete the headrace drive.

The unshielded TBM was originally a Robbins build but was refurbished by Herrenknecht for Hochtief-Glendoe JV to excavate a 6.2km long headrace. The tunnel runs at 0.5% grade and then rises to a 11.7% incline. The contractor's designer is Poyry.

Geology along the alignment comprised schist and quartzite rocks with strengths ranging from 30MPa-150MPa. The TBM started its drive in September 2006. Excavation support included rockbolts, shotcrete, mesh and steel liner ribs.

Other key excavations on the project undertaken by drill and blast included a 1159m long access bore, a 1780m tailrace tunnel, a water transfer tunnel, and a 47m long by 33m high by 19m wide powerhouse cavern (*T&T*, April 2007, p21).

Work on the design and construct project started in early 2006, and tunnel excavation for the access tunnel started in May that year.

The 100MW scheme is being developed by the utility Scottish & Southern Energy (SSE). It said in a statement that the development requires an investment of more than US\$280M, though the contract value was earlier stated as US\$260M. The scheme is near Fort Augustus at Loch Ness, and is the first major hydropower project in the UK for decades.

Rome metro in busy year for TBM starts

Preparations are underway to launch the first of two Herrenknecht EPBMs on Line B1 of the Rome metro.

Seli is undertaking the Line B1 drives under subcontract to a JV of Salini Costruttori and Maire Engineering. The first drive with TBM S-387 is due to commence shortly and all excavation to be

finished by September 2009.

The 6.77m diameter machines were ordered in 2006, and the total length of tunnel to be bored by them is 5.6km. The segmental lining of the 5.8m i.d. tunnels will be 350mm thick.

Geology along the alignment consists of clay, sandy clay and conglomerate. Each has EPBM has

maximum cutterhead thrust of 50,000kN and torque of 6,967kNm.

Herrenknecht is also supplying four EPBMs to a JV led by Astaldi for excavation works on the metro's Line C. They are to also start their drives this year.

One of the two EPBMs for Seli to drive Line B1 of Rome metro



Second Terrassa EPBM for Lovat

Two Lovat EPBMs have been ordered to excavate the twin tubes of the Terrassa section of the Barcelona metro.

The contractor, a joint venture of FCC Construcción, Copisa and Obrascón Huarte Lain, is to receive the first 6.9m diameter mixed face machine around the middle of the year for launch in October. Lovat is also to supply technical assistance and parts for both EPBMs as they bore the twin 3,727m long tunnels.

Lovat received an order just after the middle of 2007 for one machine from the JV, and there

was an option to call up a second, identical EPBM. Late last year, Lovat said the option had been exercised for another RME270SE machine. The machine is to start its drive in 2009.

The project is being developed by Ferrocarrils de la Generalitat de Catalunya (FGC), which is the rail company of the autonomous Government of Catalonia. The project is an extension inland to Terrassa of the FGC network in Barcelona. FGC's route runs includes new stations of Can Roca and Vallparadis-Universitat.

Geology along the route comprises sedimentary deposits including argillaceous, granular and cemented materials, and isolated layers of conglomerate and cemented deposits. The complete alignment is below groundwater with surface levels varying from 5m-24m from the invert of the segmentally lined tunnels.

Each 80m long EPBM is expected to advance at an average rate of 10m per day. The TBMs can produce 9,000kNm of torque and thrust is 65,000kN. They have been designed to bore at 160m radius and up to 4% incline.



TOP SPEED, TOP SAFETY.

83.2 meters of tunnel on only one drilling day, 430.4 meters within 7 days – the Herrenknecht S-373 Double Shield achieved top results in hard rock drilling with a diameter of 9.69 meter, which remains unmatched worldwide. The Spanish rail network operator ADIF is modernizing the railway connection in the north-east of Spain between Valencia and Madrid for high speed traffic. These modernization measures include a tunnel with two 7.2 kilometer tubes, running parallel through the limestone of the Sierra de la Cabrera. 6,200 meters of each tunnel are to be driven by tunnelling machines.

The Herrenknecht S-373 Double Shield TBM began its hard rock mission at the end of July 2007. After installing a total of 1,000 segmental rings in the month of November alone, the machine reached the 75 percent mark in the first of the two tunnels as early as the beginning of December 2007. With top performances and staying power, the Herrenknecht machine and the construction site team are driving the project ahead at top speed. If this record pace continues, final breakthrough will be achieved several months ahead of schedule.

CABRERA TUNNEL | SPAIN

PROJECT DATA



S-373
Double Shield TBM
 Diameter: 9,690mm
 Driving power: 4,900kW
 Tunnel length: 2x 6,200m
 Geology: limestone

CONTRACTOR

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 Construcciones
 Sanchez Dominguez-
 Sando, S.A.



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Lovat 11m TBM set for Moscow

Lovat's 11m diameter mixed face EPBM is set for shipment to Moscow following the factory acceptance of the machine by the customer Mosmetrostroy.

The EPBM is the company's largest machine and is to be used to drive at a 30 degree incline to excavate access tunnels for escalators on Moscow's metro. Lovat said that the machine was the first large diameter TBM built to drive such a steep slope.

Excavation is scheduled to start in the next few months. Geology along the route comprises dolomite, limestone, clay, marl, loam and loamy sand. Mixed ground conditions are anticipated for much of the drive, which will be below groundwater with heads up to 4 bar from three aquifers.

Lovat has fitted the TBM, named 'Victoria', with a high density muck pump to be supplied by a two-stage screw conveyor equipped

with dual, independent drives. The EPBM has been designed to be capable of a 100m radius vertical turn to bore 150m long escalator tunnels, the manoeuvrability coming from two articulation joints and a cyclical copy cutter.

Lining for the project will be segmental concrete (6+1) with the 9.4m i.d. tunnel having an outside diameter of 10.6m. Lovat is supplying a design for the lining, segment forms, technical support for commissioning and operation, together with guidance systems, ground conditioning and grouting equipment. The cutterhead will have six injection ports for ground conditioning.

The large TBM has also been built for dismantling upon completion of the bore and transported back along the tunnel.

Right: Lovat is supplying a 11m diameter EPBM to Moscow



Four shortlisted for Malaysia bore

Four Japanese companies have been shortlisted to bid for the construction of a 45km long tunnel as part of Malaysia's US\$1.2bn Pahang-Selangor water transfer project.

The Ministry of Energy, Water and Communications declined to name the firms but they are believed to be Kajima, Taisei, Obayashi and Kubota.

The four shortlisted companies were picked by ministry officials assisted by Japanese consultant Tokyo Electric Power Services. The consultant was appointed in April 2007 to prepare engineering designs and oversee and supervise construction.

A total of 36 companies bought the tender documents but only nine made submissions, one of which was disqualified because it was

returned after the deadline, said the ministry.

Of the remaining bidders, half were Japanese and half Chinese.

The tunnelling work is expected to cost about two-thirds of the project.

The tunnel will be built through the Titiwangsa mountain range to transport raw water from Pahang to a water treatment plant at Hulu Langat in Selangor. Excavation is planned to start in a few months and be completed by 2013.

The project is part of an effort to secure water supplies for Kuala Lumpur and the administrative capital Putrajaya. The entire water transfer scheme is partly funded by a US\$746M loan from the Japan Bank for International Cooperation (JBIC).

HK moves on more tunnels

Hong Kong has pushed ahead with its tunnel project plans with the award of another drainage contract to a JV contractor and giving the greenlight to planning for the extension to the rail network at the eastern section of the South Island line.

The design and build drainage contract - the second in a short time - is to build the 5.1km long Tsuen Wan drainage tunnel in Kowloon, and is worth US\$144M. It was awarded to a JV contractor comprising Japan's Maeda, Seli and China Railway Engineering. The project involves construction of the 6.5m i.d. tunnel and three intake structures plus an outfall at Yau Kom Tau, and is to be finished in 2011.

Hong Kong's Drainage Services Department also awarded a contract last month for construction of the 10.5km long West Drainage Tunnel to a JV of Dragages and Nishimatsu. The contract value is

US\$352M, and the project involves construction of a tunnel with an internal diameter varying from 6.25m-7.25m (T&T, December, p6). The project is to be finished in 2012.

The West Drainage Tunnel, which will be built on Hong Kong Island from Tai Hang to Pokfulam, includes 8km of connecting tunnels, and ancillary works. Both projects aim to solve flooding problems in the northern part of Hong Kong Island and Tsuen Wan, and Kwai Chung in Kowloon, by collecting stormwater for discharge into the sea. All tunnels are to be excavated by TBM.

Further work on the tunnelling mini-boom in Hong Kong took a step forward with MTR Corp winning approval from Parliament to undertake preliminary planning and design of the 7km long eastern section of the South Island line. Construction of the line is due to start in 2011 for completion by 2015.

Cabrera feels the speed

The first twin tube drive for the Cabrera tunnel in Spain's expanding high-speed rail network is feeling the speed with the TBM having excavated more than three-quarters of the 6.2km long run within five months. Herrenknecht's 9.69m

diameter double shield (S-373) TBM started the drive in late July and has achieved a best monthly advance of 1,598m, the best weekly advance of 430.4m, the best daily rate of 83.2m – and best 12 hours of 44.8m. The total length of each tunnel is 7.25km, and 86% of the length

will be shield driven. The twin tubes will be connected by cross passages every 400m. The Cabrera tunnel is on the high-speed rail line between Valencia and Madrid, and cuts through the limestone, dolomite geology of the Sierra de la Cabrera. Cutterhead power is 4900kW and the back-up has 13 gantries. The seven-piece segmental concrete rings have an 8.75m i.d. and are 1.6m long.

The contractor on the project is a joint venture of FCC Construcción with Construcciones Sanchez Domiiguez-Sando. The project developer is ADIF, the national railway infrastructure company.

While Cabrera is the major tunnel excavation on the 11.2km stretch of the Siete Aguas-Bunol section of the high-speed rail link, there are two other tunnels – the 1,856m long Bunol and 424m long Siete Aguas tunnels. In addition, the JV's contract also includes construction of two viaducts.

In total, the three tunnels on the Siete Aguas-Bunol section of the Valencia-Madrid rail link have a combined length of 9,527m, which is 85% of the entire route. The contract period is 41 months.

Left: Good progress on Spain's Cabrera high-speed twin bore



Lovat EPBM deal for China

Lovat is to supply a pair of 6.3m diameter EPBMs for two metro projects in China.

The Canadian firm signed a contract with China Railway Tunnel Group (CRTG) to supply the RME246SE mixed face machines, which will be used to excavate a total of 6,251m over two drives on the metros in Shenzhen and Guangzhou, in Guangdong province.

Geology along the routes is a combination of clay and both silty and coarse sands, and also soft-to-hard conglomerates. The drive will be below groundwater level with the head 7m-16m above invert and a maximum EPB pressure of 4 bar is foreseen.

The TBMs are to be built in China and both machines are to be delivered mid-year. The cutterhead face and rim of each machine will be equipped with chromium carbide plating to help minimise wear due to the abrasive strata.

The EPBMs will also be fitted with Lovat's ground conditioning system.

Seli builds tunnels business in India

Italian full service tunnelling firm Seli has established a local subsidiary in India to provide a range of services to main contractors undertaking tunnel projects in the country. The new business, Seli-India, is based in New Delhi.

Seli-India plans to supply TBMs, design and technical services for tunnelling projects to general contractors in India. The market in India includes increasing numbers of tunnelling

projects for hydropower, water supply and transport.

Seli worked in joint venture with Jaeger to excavate the two 4.88m diameter inclined pressure tunnels for the Parbati II hydro scheme. The second of the bores, which the JV undertook as subcontractor to Gammon India, was finished just over a year ago.

Right: Seli builds on project success with India business venture





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Robbins pushes ahead in Lebanon

More than a year into the war-delayed 4km long drive for the El Madiq water tunnel in Lebanon, the 3.8m diameter Robbins TBM is expected to complete excavation in the coming months.

The main beam TBM is driving along the coast through limestone and mudstone with areas of clay, the geology having 20MPa-60MPa UCS. It is fitted with 14" and 12" cutters, and ground support consists of shotcrete and wire mesh where required.

In the mid-2006 war between Israel and Lebanon the project was brought to a halt before the TBM could be launched by the JV contractor Baresel AG/Al Tajj Est, and workers left the site. No

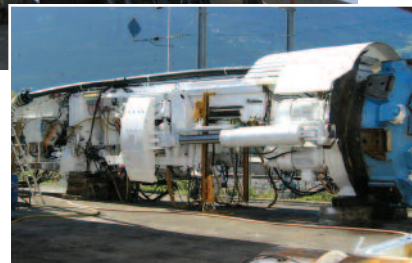
damage was suffered by the project except for a six month delay, which saw the shield start its drive in December 2006.

The water supply tunnel is jointly funded by the Ministry of Hydraulic and Electric Resources, the Council for Development and Reconstruction, and the Kesrouane Water Authority. The scheme will bring water to the Kesrouane district 20km north of Beirut.

A further series of distribution tunnels are planned for later phases of the scheme to expand the country's water supply grid. By 2020, a population of quarter of a million are to be served with supplies drawn from the river Nahr Ibrahim.



Above, Right: The Robbins TBM digging the El Madiq water tunnel in Lebanon will soon finish the drive after delays caused by the Israeli conflict in 2006



Brisbane weighs road link bids ...

Bid assessment began at the end of December on tenders submitted by the three shortlisted groups for Brisbane's 7km long airport link and northern busway tunnel projects.

Queensland state government treasurer, Andrew Fraser, confirmed that the three shortlisted groups had all lodged bids on 14 December. The award of the contract is not expected until the middle of this year.

The bidders are: BrisConnections – formed by Thiess, John Holland and Macquarie Capital Group; NorthConnect Motorway, comprising Baulderstone Hornibrook, Bilfinger Berger Civil, Babcock & Brown and Abigroup; and, Northern Motorway, formed by Leighton Contractors and ABN AMRO Australia (*T&T*, August, p10).

Fraser said: "These groups have invested significant resources and put an enormous amount of work into preparing their bids. These projects are a vital part of our comprehensive infrastructure plan to meet Brisbane's transport needs."

He added that tender evaluation was likely to take about

six months. A state government-led team is to assess the bids in terms of engineering design, traffic benefits, environmental outcomes, community outcomes as well as value-for-money.

With the preferred bidder being selected about June 2008, the public-private partnership (PPP) contract is expected to be signed around September. Construction would start shortly after and both

projects are to be completed in 2012.

The PPP plans call for the winning firm to finance, design, construct, commission, operate and maintenance of the airport link underground toll road, which consists of a 6.7km highway of which 5.7km will be in tunnels. The road will connect the North-South bypass tunnel (*T&T*, November, p32), inner city bypass

and the local road network at Bowen Hills with Gympie and Stafford Roads at Kedron.

The same contractor will also build the Windsor to Kedron section of the northern busway which will also be constructed in tunnel. The projects are being overseen by City North Infrastructure, which is wholly owned by the Queensland government.

... and backs metro plan

Moves to build a metro system in Brisbane have won broad cross-party political support as the feasibility study continues although work may not get underway until the next decade.

The subway plan includes a rail tunnel up to 6km long from Park Road in Buranda to Woolloongabba, together with new underground train stations including facilities at Gardens Point and in Brisbane's financial district where up to six stations could be built. A station is also

planned at Woolloongabba,

The US\$4.3M inner city rail capacity study is being carried out by Maunsell/Parsons Brinkerhoff for the Queensland state government and is to be completed in the second half of this year. The study will identify and assess options for development of the inner-city rail network, including river crossings, up to 2026.

Queensland Premier, Anna Bligh, said the scheme would include a tunnel crossing under the Brisbane river, which would

augment the existing Merivale rail bridge that will become a capacity bottleneck by around 2016 as many new services are being added.

No details of the cost of the project have been released but the rail tunnel could cost at least several billion dollars, the state government has said.

Brisbane City Council and both political parties back the scheme. The business district, especially Queensland University of Technology and Riverside Centre are underserved, advocates said.

Boring through future

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Detroit in 2nd run at outfall sewer

Detroit has called on contractors to prequalify for the city's second push to build Outfall No2 tunnel after the first attempt was stopped by flooding in 2003 and the contract subsequently terminated.

The new tunnel will be 1900m long and have almost 7.4m excavated diameter, bored by slurry TBM almost 50m below the surface. A single pass, gasketed segmental concrete lining of 6.6m i.d. is to be built.

Geology along the alignment comprises permeable rock and the entire route is below groundwater level. The client, City of Detroit Water and Sewerage Dept (DWSD), said groundwater pressure could be up to 5 bar and that hydrogen sulphide and possibly other hazardous gases are anticipated.

Contractors had until 11 January to submit a statement of

qualification, which lets DWSD undertake a risk management of the procurement process by first assessing technical competence. A prequalification meeting was held early last month. Shortlisted firms will be invited to submit fixed price bids for the job, MOD DRO-2.

The old tunnel was to be about 1600m long and 6.45m i.d. – about 300m shorter than the new sewer. Construction work on the original contract (PC-709) started in November 1999 to excavate the sewer at a depth of approximately 92m.

By mid 2005 the outfall tunnel was to have been completed and in service, discharging treated effluent to the Detroit river, but a flood in April 2003 brought excavation to a halt. The tunnel remains flooded.

URS closes Washington Grp buy

URS has completed its acquisition of Washington Group International for a total price of approximately US\$3.1bn following the mid-year announcement of the proposed deal.

Washington Group International is now the Washington Division of URS. In a statement, URS said that the merged engineering and construction services units of the US firms meant the merged group was now one of the few fully-integrated engineering, construction and technical services firms that can take on all project stages.

The deal had the backing of the boards of both URS and Washington Group International, and the close of the purchase follows approvals given by the shareholders of each firm.

Initially, the deal was said to be valued at US\$2.6bn with Washington Group International shareholders being offered US\$43.80 plus 0.772 shares of URS stock for each share held. In the final deal, the exchange rate moved to US\$43.80 plus 0.9 shares of URS stock for each share held by Washington Group International shareholders. However, the payout was also possible as all stock or all cash equivalents.

Stephen Hanks, former chief executive officer of Washington Group International, has been appointed president of Washington Division and joins the board of URS.

The companies have tunnel project experience that covers the Downtown Seattle Transit Tunnel, the Metro Gold Eastside Extension in Los Angeles, the Long Island Rail Road East Side Access.

The new contract will plug the original, flooded part-built sewer and backfill the lower portion of each of the following - the entrance shaft, two access shafts and six diffuser riser shafts at the river. A pile supported concrete box will be excavated at the entrance shaft to intercept and transfer all flows from an existing box outlet.

Then, the main tunnelling works will be driven at a higher level along the original alignment and connect with the remaining portions of the access and diffuser riser shafts. Ground treatment, such as by grouting and freezing, will be needed along the route to control groundwater for shaft construction work.

Seattle light rail moves ahead

SoundTransit, the authority developing the light rail network in Seattle, was planning before the end of last month to start applying for a US\$750M federal grant for the University Link tunnel project, which could start construction later this year.

The 5km extension to the light rail network in the city will run in twin bore tunnels from downtown northwards to the University of Washington. It will have stations at Capitol Hill and near Husky Stadium, on the university campus.

A recent audit by the state noted that construction of the extension was expected to commence in late 2008 or early 2009, and the link is to be in service in 2016. Focusing on the light rail scheme only, which has involved significant tunnelling works such as at Beacon Hill, the audit also noted that SoundTransit had extensively improved its construction planning and management since 2002.

SoundTransit recently re-opened the retrofitted Downtown Seattle Transit Tunnel after two years of refurbishment work. Light rail trains will be able to join with buses in the tunnel from 2009.



Arup in planning for HS-2

Consultant Arup is planning to have a preliminary study into the construction of a second high-speed rail line (HS-2) for the UK, which is expected to involve some major tunnelling work, completed within the next few months, T&T has learned.

The potential project would run from the existing line, HS-1, to Heathrow airport and then to the Midlands and further north in the UK. Work on the study began seriously about six months ago, said Mark Bostock, a director with Arup.

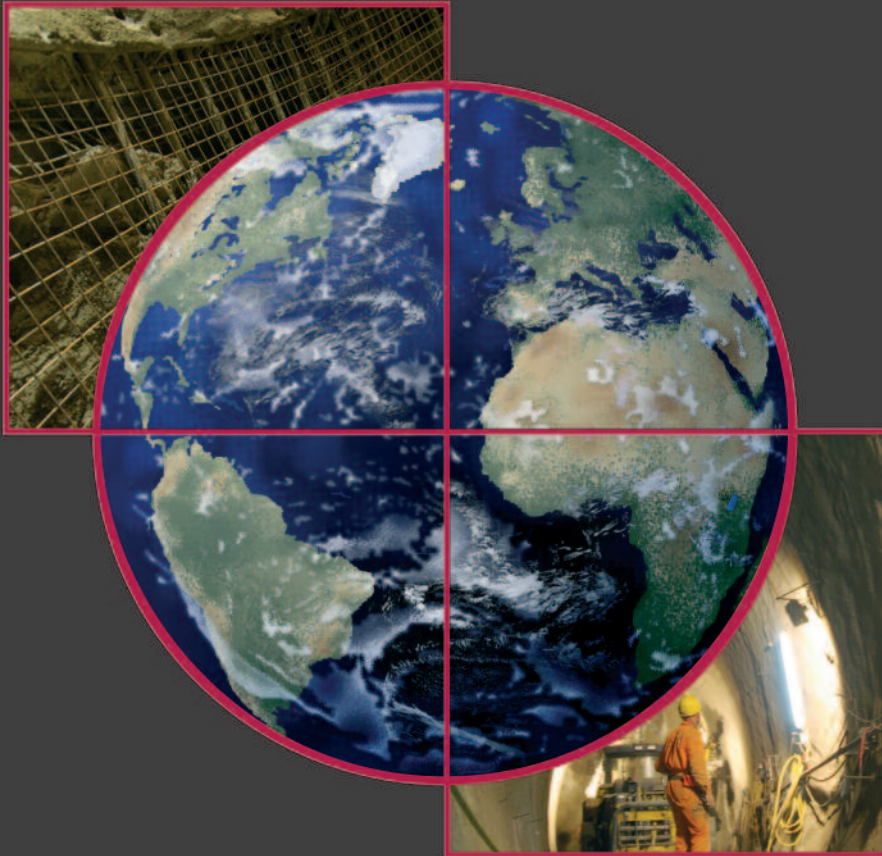
The idea for the new rail link builds upon the experience of HS-1, formerly known as the Channel Tunnel Rail Link (CTRL), and for which Arup was a catalyst. The story of

the challenge of building HS-1 has been told in a new book, 'The Right Line', which was published at the opening of the link from the coast to London last year.

Arup is doing the study into HS-2 at its own costs. While declining to comment on the scope of the tunnelling works or the route, Bostock said that the establishing costs and benefits of HS-2 were critical to success, and that like HS-1 the backing of political heavyweights and cross-party support would be vital.

He added that it had yet to be decided if the report, expected in the second quarter, would be issued externally or remain internal in the short-term.

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TUNNELLING CONSULTANTS

A

Company information	(a) Turnover (b) Turnover in tunnelling	Areas of expertise	Tunnel contracts underway	Recent tunnel contracts
AECOM Technology Corp Enterprize House 160 Croydon Rd, Beckenham Kent, BR3 4DE United Kingdom Tel: +44 20 8639 3500 Fax: +44 20 8663 6723 Web: www.fabermaunsell.com www.maunsell.com www.maunsell.aecom.com www.dmjmharris.com www.uma.aecom.com	a) US\$3.3bn b) US\$67M	Project planning, preliminary & detailed design, project management, site supervision, multi-disciplinary & multi-professional specialist services for highway, rail, water, power & utility tunnels	USA: Fork Creek, Atlanta, GA Homestead Ave, Hartford; 2nd Ave Subway, NY; North Shore Connector, Pittsburgh; Trans Hudson Expressway, NJ/NY; Silverline III, Boston; ESA, NY; UK: Lower Lea Valley Cable Tunnel; West Ham Flood Alleviation; Shetland Fixed Link; Shepherds Bush Station; Europe: Dublin Metro North; Dublin Eastern Bypass; Attiko Metro, Athens; Hallandsås, Sweden; Australia & NZ: North South Bypass, Brisbane; City West Tunnel, Sydney; Inner Northern Busway, Brisbane; City Link Project, Melbourne; M5 East Tunnel Air Filtration, Sydney; Victoria Park Tunnel, NZ; North Shore Outfall, NZ; Hong Kong: Harbour Transfer; Ocean Park Funicular; Po Shan Drainage; KDB200 & 300	USA: PR53 - Mariani Road Tunnels, Puerto Rico; Silverline II, Russia Wharf Segment, Boston; CA/T Section 9, Boston; JFK Airport, NYC; UK: CTRL 2, C342; Europe: Schaarbeek Redevelopment, Brussels; Australia & NZ: City West Tunnel, Sydney; India: Delhi Metro; HK: Eagles Nest Tunnel; Southern Rail Link; Shatin Height Road Tunnel; Tsim-Sha-Tsui Rail Station; Singapore: North-East Line C708, Changi Airport Line C503; PLE Pelton Canal; Cable Tunnels C201, C202 & C203
AJS ingénieurs civils Rue de la Place d'Armes 5 CH 2001 Neuchâtel Switzerland Tel: +41 32 720 0100 Fax: +41 32 720 0101 Email: ajs@ajs.ch Web: www.ajs.ch	a) US\$3.5M b) US\$0.4M	Claims management, tunnel muck management, waterproofing and drainage, directional drilling, CM and advice	A5 Längholz tunnel, Bern, Switzerland – 2.5km long twin-tube highway tunnel with typical cross section of 100m ² , construction started in 2007 and will cost approx. US\$240M; A16 Court tunnel, Bern, Switzerland – 686m long single tube road tunnel, connecting canton Bern with canton Jura, with a typical cross section of 100m ² , construction is due to commence in 2009	BLS AlpTransit, Lötschberg Base Tunnel (Mitholz), Switzerland – 10km of twin-tube and 7km of single-tube tunnel for high speed rail line connecting Bern with canton Wallis, typical cross section 67m ² , completed in 2006
Alpina Via Ripamonti 2 I-20136 Milan Italy Tel: +39 02 5830 5010 Fax: +39 02 5830 7388 Email: info@alpina-spa.it Web: www.alpina-spa.it	a) US\$7.8M b) US\$2.3M	Preliminary and final design, hydro electric project tunnelling, microtunnelling, monitoring, warning/alarm systems, renovation, site investigation, project management and supervision of works	Roma Pigneto Railway Station, Italy – Final design of the new railway station in Rome on the FM1 urban main line. lengthening of artificial tunnels on the Roma-Cassino line. Client: RFI; Damascus-Daraa railway line, Syria – Construction design of tunnels and portals for freight and passenger railway (1.7km tunnel, 270m and 175m long artificial tunnels). Client: Italferr; Cassia-Monte Mario Railway, Italy – Design of safety upgrade for the tunnel. Client: Italferr; Integrated Plan Garibaldi Repubblica, Milan, Italy – Final design of an 800m long artificial tunnel as part of the scheme. Client: IN.G.RE	Parma city underground, Italy – Final design of a 10km long line A (1.2km artificial tunnels, 3km TBM tunnel); 11 underground stations. Client: Metro Parma; Passo Corese-Rieti railway line, Italy – Final design for railway tunnel portal support. Client: Italferr; Bologna HSRL, Italy – Construction design of an air shaft. Client: Italferr; Messina-Palermo railway line, Italy – Final design for tunnel portals. Client: Italferr; Genova-S.Benigno Junction, Italy – Preliminary design of 11 tunnels. Client: Technital
Amberg Engineering Trockenloostrasse 21 PO Box 21 CH-8105 Regensdorf-Watt Switzerland Tel: +41 44 870 9111 Fax: +41 44 870 9175 Email: info@amberg.ch Web: www.amberg.ch	Undisclosed	Engineering services for the construction and refurbishment of underground structures including complete planning and project design, site management, expert consulting, state assessment services, conventional and TBM tunnelling	Gotthard Base Tunnel, Switzerland – 57km long high speed rail line: project design and site supervision (JV) for Bodio, Faido and Sedrun sections. TBM heading Ø9.3m + drill & blast headings; XFEL, DESY, Germany – 4.5km and 1.34km length of cut and cover linear accelerator tunnel followed by five branch tunnels, distribution and dump shafts: Preliminary planning and design, regulatory approval and tender docs; Gubrist Highway Tunnel, Switzerland – 3.3km long Ø15.7m TBM single tube tunnel, providing 3-lanes: design and construction supervision; Alborz Highway Tunnel, Iran – 6.3km long service tunnel: Design and CM; AYA Tunnel, Singapore – MRT tunnel in soft ground: Design	Uetliberg Motorway Tunnel, Switzerland – Design and CM for a 2 x 4.5km long twin tube, 3-lane, motorway tunnel; Lyon-Turin HSRL, France/Italy – Preliminary design for 2 rail tunnels, 53km and 12km; Oartzun-Irún, Spain – Regulatory approval design and project design for 3.8km long double-track single tube tunnel; Jinping II HEP, China – Headrace tunnel, 4 x 16.67km: Feasibility of TBM heading and contract mode, CM; Zimmeregg Railway Tunnel, Switzerland – Project design for renewal of 1.1km rail tunnel
Arcadis 9 avenue Réaumur F-92354 Le Plessis-Robinson France Tel: +33 146 237 850 Fax: +33 146 237 807 Email: direction@arcadis-fr.com Web: www.arcadis-global.com	a) US\$1.4bn b) -	Full range of consulting services in the field of design and works supervision for all kind of tunnels, in any ground and watertable conditions	A50/A57 link, 2nd tube, Toulon, France – 1,820m twin tube highway tunnel; Upper Rouge River CSO, USA – 11.3km combined CSO: Shaft & tunnel design (in JV); Slivenec Tunnel, Czech Republic – Twin tube highway tunnel, 1,650m; Statenweg Tunnel, Netherlands – 2.4km double tube rail tunnel: Settlement calculations & advice for lining; Perthus Tunnel, France/Spain – 8.4km double-tube rail tunnel: Detailed geotechnical studies, CM; Rio São Francisco Project, Brazil – PM for 27.8km of tunnel (5 tunnels), as part of river integration; A86 West, France – 10km single tube road tunnel: Geotechnical, hydrological & structural services; Schlüchtern Tunnel, Germany – PM for 3.9km rail tunnel	Hnevkovsky tunnel I and II, Mala Huba Tunnel, Czech Republic – 1km twin track rail tunnel; Combined Tram/Railway, La Réunion Island, France – 4km-12km double tube single track tunnel: Preliminary & basic design; Lyon-Turin HSRL, France/Italy – Modane & St Martin La Porte galleries: CM, geotechnical studies, detailed design & tender docs; Santiago Metro Line 4, Chile – Detailed engineering for 4.5km tunnel & 4 stations; Belo Horizonte Metro, Line 1 & 2, Brazil – 16.5km of tunnel & 18 mined stations
Arup 13 Fitzroy Street London W1T 4BQ United Kingdom Tel: +44 20 7636 1531 Fax: +44 20 7755 2121 Email: tunnelling@arup.com Web: www.arup.com/tunnels	a) US\$1.2bn b) US\$25M	All tunnelling and underground projects: Design and project management packages for all types of tunnels, shafts, caverns, large excavations and mining stabilisations, Expert advice and forensic engineering services	UK: Crossrail, MDC2; King's Cross Station Redevelopment; Powerlines Undergrounding Project, UK; Copenhagen Metro, Denmark; Tindaya Cavern, Canary Islands; USA: 2nd Ave Subway, NYC; California HSR (LA-Fresno); Trans-Hudson Express; 7th Line Ext, NYC; Lake Mead Intake No.3; Fulton Street Transit Centre, NYC; New Crystal Springs Bypass (Polhemus) Tunnel, San Francisco; Miami Port Tunnel, Florida; Cornell LINAC Ext, NYC; Santiago Metro, Line 5, Chile; Palomino HEP, Dominican Republic; HK: Hong Kong West Drainage Tunnel; Harbour Area Treatment Scheme Stage 2A; Ocean Park Funicular; Gautrain, South Africa; Brisbane Airport Link, Australia	CTRL 2, UK; LGV Côte d'Azur, France; Nicoll Highway Collapse investigation, HK; Gold Coast Desalination Project, Australia; Nam Wan Tunnel, HK – Design and supervision; Dulles Corridor Metrorail-Tysons Corner, USA

TUNNELLING CONSULTANTS

Company information	(a) Turnover (b) Turnover in tunnelling	Areas of expertise	Tunnel contracts underway	Recent tunnel contracts
Atkins Woodcote Grove Ashley Road Epsom Surrey KT18 5BW Tel: +44 1372 726140 Fax: +44 1372 740055 Email: info@atkinsglobal.com Web: www.atkinsglobal.com	a) US\$2.5bn b) US\$24.5M	Advanced numerical analysis, cavern engineering, ventilation analysis & design (inc. thermodynamic and surge pressure analysis) seismic analysis and design, pedestrian flow monitoring	Gautrain Rapid Rail Link, South Africa – Detailed design for 11km bored tunnels; Bond St Station Upgrade, UK – Detailed design; Dubai Metro Red Line, UAE – Detailed design; Dubai Metro Green Line, UAE – Detailed design; DLR Dagenham Dock Extension, UK – Technical consultant; Cooling the Tube Project, UK – Victoria Line Ventilation Study; Metronet BCV and SSL, UK – Inspection and assessment; Belfast Sewers Project, Ireland – Construction supervision; A3 Hindhead Tunnel, UK – Technical advisor; DLR (Western Extensions), UK – Feasibility; KCRC Southern Link KBD200, HK – Independent checking; Nanjing Metro, Line 2, China – Technical consultant; Castle Peak Cable Tunnel, HK	Victoria Line Upgrade, UK – Ventilation study; China Light & Power, Castle Peak Cable Tunnel, HK – Contract documentation; China Light & Power, Cable Tunnels, HK – Scheme design, documentation and supervision; China Light & Power, Power Tunnelling Project Consultancy Service, HK – Scheme design, contract documentation and supervision; Lok Ma Chau Spur, HK – Independent checking engineer
Babendererde Ingenieure Markt 2 D-23611 Bad Schwartau Germany Tel: +49 451 300 939 0 Fax: +49 451 300 939 29 Email: contact@bab-ing.com Web: www.bab-ing.com	a) US\$1.5M b) -	Design works, technical consultancy, construction management, troubleshooting for mechanised tunnelling. Soft ground and hard rock tunnelling, compressed air works, data management, claim & arbitration support, PPP services	Teesta (Stage V) HEP, India – Face 7. Technical assistance; Hallandsås, Sweden – Technical committee; Hobson Bay Tunnel, NZ – 2.9km water tunnel. Design Work; Athens Metro, Line 2 Ext, Greece – 5.1km long double track tunnel (Ø9.49m EPBM); Athens Metro, Line 3 Ext, Greece – Double track tunnel; Thessaloniki Metro, Greece – Twin 7.5km long tunnels, TBM and NATM, plus 15 stations. Member of client's team; River Elbe Crossing, Hamburg, Germany – Twin 5.5km long rail tunnels; Brightwater Conveyance System, King County, US – Water transfer line, 26km long. Member of design team; Beacon Hill Light Rail, Seattle, US – Twin metro tunnels, 1.6km long (EPBM Ø6.4m). Member of CM team	Anchor Recovery Petersbogen, Leipzig, Germany – Pipe jacked inclined tunnels from beneath building; Herrentunnel, Lübeck, Germany – Twin slurry TBM road tunnel. CM works for bored tunnels; Cable Tunnel C230, Singapore – 2.5km long EPBM tunnel; Nodo Bologna, Lot 5, Italy – Twin 6.2km long EPBM tunnels. Member of client's CM team
Basler & Hofmann Consulting Engineers Forchstrasse 395 CH-8029 Zurich Switzerland Tel: +41 1 387 1522 Fax: +41 1 387 1500 Email: basler-hofmann@bhz.ch Web: www.bhz.ch	Undisclosed	Project management, specialist design and site supervision for urban tunnelling. Mechanised tunnelling, ground consolidation and supporting structures. Business development services and project management for tunnelling suppliers	Swiss Railways, Löwenstrasse station, Zurich – Design and site supervision for 4-track underground station in complex urban environment; Swiss Railways, Weinberg Tunnel, Zurich – Overall design for a double-track TBM tunnel in urban area; ÖBB Wienerwald Tunnel, Austria – Specialist design and tender documents for 33km TBM drives; ÖBB Koralm Tunnel, Austria – Design for TBM drives and access shafts for HSR; Swiss Railways, Underground Rail Station, Berne – Feasibility study for an extension of a 4-track underground station; Tunnel Buchrian, Lucerne, Switzerland – Design for single tube 2-track highway tunnel; AlpTransit, Lugano-Chiasso, Switzerland – Feasibility for new track alignment	RFI, Monte Olimpino Tunnel, Italy – Specialist design and site supervision for emergency measures for tunnel redevelopment, including extensive grouting; Borik Road Tunnels, Slovak Republic – Design and tender documents; Swiss Railways, Zurich-Thalwil Tunnel – Overall project design and site supervision, including two double track TBM drives and drill & blast sections
Bennett Associates, MG Bennett House Pleasley Road Whiston Rotherham, S60 4HQ Tel: +44 1709 373782 Fax: +44 1709 363730 Email: jcb@bennettmg.co.uk Web: www.bennettmg.co.uk	a) US\$3.8M b) US\$0.2M	Expert witness in relation to design and use of TBMs, investigation into TBM failures for insurance companies, design of tunnelling machines and back-up systems, design of bespoke tunnelling equipment	Glendoe Hydro Electric Project, Scotland – Advisor to Scottish and Southern Energy on TBM matters; Singapore – Advisor on TBM matters for a cable tunnel; Assistance to loss adjuster for various tunnelling projects; Delhi Metro, India – Design and preparation of detail manufacturing drawings for a back-up system for a 6.52m diameter TBM	Aliminetti Madhava Reddy Project, India – Design and preparation of detail manufacturing drawings for a back-up system for 10m TBM; Pajares Tunnel, Spain – Design of segment hoist and segment feeder for 8m tunnelling machine
BG Ingénieurs-Conseils 61 avenue de Cour - CP241 CH 1001 Lausanne Switzerland Tel: +41 21 618 1505 Fax: +41 21 618 1122 Email: pierre.kohler@bg.21.com Web: www.bg-21.com	a) US\$39M b) US\$13M	Design of tunnels at great depth, risk analysis and operation safety of road and railway tunnels, renovation of operational tunnels	Monaco tunnel, France – General project design & CM of a 1.6km tunnel renovation. Civil engineering and E&M equipment; Maurice Lemaire motorway tunnel, Alsace, France – Project design and CM of a 6.7km long bi-directional tunnel. Total renewal of equipment and new parallel ventilation & emergency gallery; Raimeux Tunnel, Switzerland – Design of a 3.2km tunnel and parallel emergency gallery for the A16 motorway; Lausanne Metro, Switzerland – Coordination of operational & safety equipment; Serrieres Motorway Tunnel, Switzerland – Final project and realisation of a motorway tunnel with two tubes of 800m long in urban area	Glion Road Tunnel, N9 Motorway, Switzerland – Project design and CM of road tunnel renovation. Civil engineering and E&M equipment. Twin tube tunnels, 1.3km in length; Lötschberg Base Tunnel, Switzerland – Preliminary design, implementation & supervision of tunnel works. Length 37km: design, call for tenders & follow-up of the operational & security equipment works
Black & Veatch 8400 Ward Parkway Kansas City Missouri 64114 USA Tel: +1 913 458 2000 Fax: +1 913 458 3626 Email: corporateinfo@bv.com Web: www.bv.com	a) US\$1.6bn b) US\$40M	Planning, design, construction management, resident engineering, design-build, geotechnical engineering, investigation, hydro electric tunnels, rehabilitation of water, wastewater and CSO tunnels, microtunnelling	System Conveyance & Operations Program, Las Vegas, USA – Lead design for 15.4km long treated effluent conveyance rock tunnel, powerhouse and lake diffuser; Lantau Tunnel, HK – Pre-design of 7.1km rock tunnel for potable water conveyance; Copper River and Danel Island Tunnels, Charleston, USA – Design, CM and resident engineering for 11.2km long soft rock wastewater tunnels and 400m long microtunnel; Bi-County Water Main, Washington DC, USA – Design of 9km long rock tunnel for potable water conveyance, 80m raise bore; Sydney Desalination Inlet and Outlet Works, Sydney, Australia – Design of nine deep sea risers and two x 2.5km long tunnels	Kai Tak Transfer Scheme, HK – Design and CM of 1.5km long mixed face storm water tunnel; Milwaukee NWSRS, USA – Design and construction services for 11.4km rock wastewater tunnel; Cady Marsh Tunnel, Chicago Metro, USA – Design, construction services and resident engineering for 2km long soft ground storm water tunnel; Lewes CSO, UK – Design-build for 1.2km long storage and conveyance tunnel; Ashley River Tunnel, Charleston, USA – Design, CM and resident engineer for 3.6km wastewater tunnel

B

TUNNELLING CONSULTANTS

Company information	(a) Turnover (b) Turnover in tunnelling	Areas of expertise	Tunnel contracts underway	Recent tunnel contracts
C Capita Symonds Capita Symonds House Wood Street East Grinstead West Sussex, RH19 1UU United Kingdom Tel: +44 1342 327 161 Fax: +47 1342 315 927 E-mail: richard.lunniss@capita.co.uk Web: www.capitasymonds.co.uk	a) US\$491M b) US\$12.2M	Immersed tunnels, sprayed concrete lining design, cut and cover tunnels, tunnel refurbishment, E&M and communication and control systems	M25 Holmesdale Tunnel Refurbishment, UK – Detailed design for two additional lanes and refurbishment of operational systems for 650m long cut & cover tunnel; Limerick Southern Bypass, Ireland – Detailed design of 600m immersed tunnel; E18 Bjorvika Tunnel, Oslo Norway – Detailed design of dual two-lane highway immersed tunnel under Oslo harbour; London Underground Tunnel Cooling, Northern & Central Lines, UK – Design; Tyne Tunnel, UK – Technical advice; Mont Sion Tunnel, Switzerland – Technical advice	Gautrain Rapid Rail Link, RSA – Technical advisers on 75km rail link including 22km of tunnel; Southall-Harefield gas pipeline, UK – Employers agent (includes 3km of bored tunnels); Saltash Tunnel, UK – Road tunnel refurbishment including slope stabilisation, E&M installations, drainage and tunnel cladding; Dubai Metro, UAE – Preliminary design of 6km of bored metro tunnel and four stations; Weston Hills Tunnel, Baldock Bypass – Detailed design of 250m twin arch cut and cover through chalk
Coffey Geotechnics PO Box 125 North Ryde NSW 1670 Australia Tel: +61 2 9911 1000 Fax: +61 2 9911 1001 E-mail: geotechnics@coffey.com Web: www.coffey.com	a) US\$326M b) US\$2M	Site characterisation, numerical modelling, soil structure interaction, shaft design, support design	Power Grid Cable Tunnel, Singapore – Design & construct project for a 2.6km cable tunnel. Undertook detailed design of the shafts and tunnel components and construction services; Inner Northern Busway, Brisbane, Australia – Alliance partner in the design and construction of this project; Airport Link, Brisbane, Australia – Geotechnical and groundwater input to the tender design	SMART Tunnel, Kuala Lumpur, Malaysia – Geotechnical review of tunnelling works; Perth Urban Railway Development (PURD F), Australia – Geotechnical engineering advice; Lane Cove Tunnel, Sydney, Australia – Scope of works included investigation, prediction of rock mass response, design of retaining walls, ground improvement measures and settlement assessments
Connell Wagner Level 1, 433 Boundary Street Spring Hill Queensland Australia Tel: +61 3135 8000 Fax: +61 3135 8001 Email: cwbne@conwag.com Web: www.conwag.com	a) US\$563M b) US\$15.5M	Planning, design, documentation & CM for all forms of tunnels and underground works, full support services in geotechnical, environmental engineering & ventilation (M&E). Cost estimating, instrumentation & monitoring	Eastlink, Melbourne, Australia – Twin 1.5km long 3-lane road tunnels excavated by roadheader and D&B. Detailed design and documentation of linings, provision of advice during construction; Airport Link, Brisbane, Australia – Twin 6km long 3-lane road tunnels. Preliminary engineering and environmental assessment for feasibility study and EIS; North South Bypass Tunnel, Brisbane, Australia – Twin 5km long 2-lane road tunnels, using roadheaders and TBMs. Preliminary design & investigations for EIA, preparation reference design and tender documents; Hobsons Bay Tunnel, Auckland, NZ – 3km long sewer tunnel. Preliminary engineering and investigation, detailed design and tender documents	Cross City Tunnel, Sydney, Australia – 7km of driven tunnels beneath CBD of Sydney. Detailed design and documentation of driven and cut & cover tunnels; Heroes Ave Sewage Redirection, Brisbane, Australia – 700m, Ø1.2m pipejacked sewer tunnel. Reference design and preparation of contract documents, including GBR; Browns Bay Trunk Sewer Replacement, Auckland, NZ – 2km, Ø2.5m pipejacked sewer tunnel through sands, with shallow cover. Detailed design and documentation, advice during construction
Cowi Parallelvej 2 2800 Kongens Lyngby Denmark Tel: +45 4597 2211 Fax: +45 4597 2212 Email: cowi@cowi.dk Web: www.cowi.dk	a) US\$465M b) US\$16M	Design of immersed tunnels, soft ground tunnelling with EPBMs, prefabricated concrete linings, durability assessments of concrete structures, risk assessment, groundwater control schemes, E&M design for tunnels & stations, QM systems	Copenhagen Metro, Denmark – Client's consultant for development and implementation; Seattle SR520 Project, USA – Mediation and independent review; Thesaloniki Immersed Tube, Greece – Detailed design; Lyon Metro, France – Feasibility and design development; Nanjing Yangtze River Tunnel, China – Supervision of TBM manufacture; Western Yunnan Roads Project, China – Design review and inspection; Busan-Geoje Immersed Tube, Korea – Design; District Heating Tunnel, Denmark – Design; Malmö City Tunnel, Sweden – Engineering services; Limerick Southern Ring Road, Ireland – Tender design; Hallandsås, Sweden – Assistance to contract negotiation	Lyon-Turin Rail Tunnel, France/Italy – Design (emphasis on environmental matters) of 40km rail tunnel; Nuuk-Akia Tunnel, Greenland – Feasibility study for 15km road tunnel in granite, depth of up to 350m; Svanemølle Tunnel, Denmark – Feasibility study for dual two-lane highway tunnel; Budapest Metro Line 4, Hungary – Technical audit of 10.4km of twin tube tunnels and 14
D D2 Consult Hirschgasse 32 A-4020 Linz Austria Tel: +43 732 713812 Fax: +43 732 713812 4 Email: infracon@d2-consult.co.at Web: www.d2-consult.at	Undisclosed	Underground structures, such as traffic tunnels, water tunnels, metros and caverns; risk analysis (lining and connection technologies), TBMs and NATM	Wuhan Yangtze River Crossing, China – Technical assistance for 3.7km of twin two-lane TBM tunnels. Ground dominated by sandy soils saturated with water; Nürnberg-Ingolstadt High Speed Railway, Germany – Construction supervision for 7.1km of double-track NATM tunnel; BEG Wörgl-Baumkirchen High Speed Railway, Austria – Technical assistance, design review and structural analysis for a 39km section of the European North-South Railway Axis, total tunnel length of 28km	Automated People Mover Tunnels, Dulles Airport, Washington DC, USA – Four tunnels up to 225m under the existing operational airport area; WSKE Sewer, Vienna, Austria – Detailed design of inner lining of the 2.5km long 8.3m diameter TBM-driven tunnel for storm water overflow
Dawn Underground Engineering 10 Village Court Hazlet NJ 07730 USA Tel: +1 732 739 8840 Fax: +1 732 739 8870 Email: dawnunderground@comcast.net Web: www.dawnunderground.com	Undisclosed	TBM in rock and soft ground, microtunnelling, drop shaft design, Geotechnical Baseline Reports, design of shaft supports, design of ground improvements	Croton Water Tunnel, NYC, USA – Design of TBM option for twin 9ft i.d. water mains in rock tunnel to connect the New Croton aqueduct with a new water treatment plant; Kensico Water Tunnel, NYC, USA – Member of design team for shafts and tunnel for new water supply line; Dobson Run Flood Relief Sewer, Philadelphia, USA – Design and geotechnical engineering for 3,500lf of 12'6" i.d. storm relief sewer in rock by TBM or roadheader; Dugway East Interceptor Relief Sewer, Cleveland, USA – Design and geotechnical engineering for two RR crossings in tunnel (hand mined and micro) for 78" and 48" relief sewers; CSO Facilities Plan, NY, USA – Evaluation of tunnel storage options	Contract T230 Relief Sewer, Cleveland, USA – Design and geotechnical engineering for 11,000lf of 6' i.d. sanitary relief sewer and six shafts; Linden Flood Control, Linden NJ, USA – Design of twin 330lf 66" RCP storm sewers in microtunnel beneath 14 active rail lines with shallow cover; Toledo East Side Water Main, USA – Design and geotechnical engineering for 1,600lf 48" concrete pressure pipe in tunnel beneath the Maumee River; Mill Creek Tunnel Phase 2, Cleveland, USA – Design of 3 vortex drop structures

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TUNNELLING CONSULTANTS

Company information	(a) Turnover (b) Turnover in tunnelling	Areas of expertise	Tunnel contracts underway	Recent tunnel contracts
Donaldson Associates Eastfield Church Street, Uttoxeter Staffordshire ST14 8AA United Kingdom Tel: +44 1889 563680 Fax: +44 1889 562586 Email: tunnels@donaldsonassociates.com Web: www.donaldsonassociates.com	Undisclosed	Design, site supervision, technical advice for all tunnel related projects including civil, structural and geotechnical aspects from pre-feasibility to construction, asset management and remedial works, expert witness services	Bristol City Flood Relief Scheme, UK – Permanent works design of a new flood alleviation tunnel in hard rock (up to 470MPa) interbedded with weak mudstones under high hydrostatic head; London Cable Tunnels, North London, UK – Feasibility studies for +30km of tunnel routes for new high voltage transmission cables to be installed in tunnels of 3m-4m diameter; Bramhope and Bradway Rail Tunnels, UK – Refurbishment design for two rail tunnels comprising extensive grouting, brick and masonry replacement	Edinburgh Airport Rail Link, Scotland – Design of twin TBM bored rail tunnels, beneath runway and adjacent River Almond. Also includes design of new station box and all geotechnics; Bressay Fixed Link, UK – Feasibility studies for a new fixed link road tunnel between the mainland of Shetland and the island of Bressay
Dorsch Consult Ingenieur Hansastrasse 20 PO Box 210243 80686 Munich Germany Tel: +49 89 5797 602 Fax: +49 89 5797 874 Email: juergen.flicke@dorsch.de Web: www.dorsch.de	a) US\$97M b) US\$5.7M	Road/railway tunnels and galleries, underground traffic structures, subways, underground structures for water and sewage, structural engineering: design, construction supervision, project management, project auditing	Moosach Station, Munich, Germany – Twin-track rail tunnel (460m), siding and underground garage, slotted wall/top cover method; Emscher Kanal, Germany – 40km sewage tunnel constructed with EPB, 80 excavation pits; Tunnel Luise-Kiesselback-Platz and Heckenstaller Strasse, Munich, Germany – Length 1,530m and 630m respectively, 4 lanes in each direction, cut & cover/top cover	MRTA 3 Lines Project, Bangkok, Thailand – Preliminary design of about 33km metro tunnel, for Orange, Purple and Blue Line extension. Tender documents for Blue Line; Manaklah Tunnel, Jemen – 5km twin NATM road tunnel, execution of second tube in later phase; Tunnel Petuelring, Munich, Germany – Length 1,470m, 4 lanes, approach tunnel approx. 400m long, cut & cover with bored pile walls, open cut construction
EBA Engineering Consultants 9th Floor, Oceanic Plaza 1066 West Hastings Vancouver, BC V6E 3X2 Canada Tel: +1 604 685 0275 Fax: +1 604 684 6241 Email: istewart@eba.ca Web: www.eba.ca	a) US\$16M b) US\$0.59M	Rock tunnel design, tunnel inspection, support design, geotechnical & geological mapping, geotechnical investigation, CM, instrumentation & monitoring, seismic tunnel assessment	Seymour-Capilano Twin Tunnels, N. Vancouver, Canada – Assessment and mapping of geotechnical and geological conditions for 14.6km of twin TBM water transfer tunnels. Work involves producing sidewall maps, water inflow measurements and rock sample collection and testing; Nanaimo Aqueduct Tunnel, Vancouver Island, Canada – Assessment and rehabilitation of an aqueduct tunnel. Work involves assessing geotechnical conditions, permanent support design, CM and QA; RAV Line, Vancouver, Canada – Working for SNC Lavalin on the bored and C&C section, Marine Drive to Waterfront Station. Work includes site investigation along the route, including over 40 boreholes, & coordination of lab tests	Coquitlam Dam Tunnel, Vancouver, Canada – Employed by GVRD to assess the dam outlet tunnel stability as part of remediation programme; First Narrows & Port Mann Water Supply Crossing, Vancouver, Canada – Employed by GVRD to assess tunnels and pipelines for water supply crossings. FE software used to assess seismic risk and recommendations made on remediation measures; 44th Ave Water Main Tunnel, Burnaby, Canada – Site investigation, route selection and preliminary design of the tunnel
EGIS Tunnels Les Pleiades No 35 Park Nord Anecy 74373 Pringy France Tel: +33 4 5027 3939 Fax: +33 4 5027 3940 Email: contact.egis-tunnels@egis.fr Web: www.egis.fr	a) US\$48M b) US\$22M	Geology, soil & rock mechanics, civil engineering, M&E, ventilation, fire studies, risk & danger studies, rescue & intervention plans, analysis of pollution, monitoring, diagnosis & renovation of tunnels, operation	Maurice Lemaire Tunnel, France – Project management (in JV) for design and construction of renovation for 7km tunnel. Administrative procedures (impact studies, environmental and groundwater studies, safety study); A89 Tunnels, Lyon-Balbigny, France – Project management. Full design and site supervision of 3 tunnels – Violay (4km), Chassolet (1km) & Bussieres (1km); A8 Tunnel Renovation, France – Project management. Full design and site supervision for the upgrade of 5 tunnels and construction of a new 1km tunnel (Borne Romaine); Croix-Rousse Tunnel Renovation, France – Project management/design of the functional and technical programme for design & build contract	Thira Tunnel, Albania – Design of 5.5km long motorway tunnel; A51-Sinard, France – Full project management of tunnel drilling works and studies. Detailed design of engineering structures; Pir Panjal Road Tunnels, Kashmir, India – Design and studies for 8.7km of road tunnels; Lyon-Turin, France/Italy – Construction of St Martin La Porte gallery, two galleries and carried out pre-development work on site. Studies for main 52km tunnel; Grands Goulets Tunnel, France – Studies and works for several tunnels
ELEA iC Dunajska cesta 21 SI-1000 Ljubljana Slovenia Tel: +386 1 420 1060 Fax: +386 1 420 1066 Email: info@elea.si Web: www.elea.si	a) US\$4.4M b) US\$1.7M	Geological, geotechnical and numerical modelling, structural and tender design, electromechanical design, architectural design, construction supervision	Sentvid Tunnel System, Slovenia – Twin road tunnel in urban area; Vodole Tunnel, Slovenia – First tunnel in SLO with a Markovec Tunnel, Slovenia – Two twin road tunnels in urban area, length 4km (JV with IRGO consulting) (NATM: 105m ²); Tabor and Barnica Tunnels, Slovenia – Two twin road tunnels, length 1850m (NATM: 105m ²) including geological and geotechnical modelling and E&M equipment; Lesceveje Tunnel, Slovenia – Twin road tunnels; Cenkova Tunnel, Slovenia – Twin road tunnels; Karavanke Tunnel, Slovenia – Rehabilitation of highway tunnel; Sten Tunnel, Slovenia – Consultant for client; Encarnaçao Metro Station, Lisbon, Portugal ; 3rd Development Axis, Slovenia – Studies	Sentvid Tunnel System, Slovenia – Various lots completed. Tunnel length approx. 3.5km (NATM); Tabor and Barnica Tunnels, Slovenia – Two twin road tunnels, length 1850m (NATM: 105m ²) including geological and geotechnical modelling and E&M equipment; Karavanke Tunnel, Slovenia – Rehabilitation studies for a highway tunnel
European Tunnelling Services 5 Fleet Road Benfleet, Essex SS7 5JE United Kingdom Tel: +44 1268 750708 Fax: +44 1268 750708 Email: gordon@grince.plus.com	Undisclosed	Advice on TBM selection, specification, procurement and manufacture	TBM Consultancy, CLRL, London, UK – Specialist TBM advisor to Crossrail promotor, Cross London Rail Links (CLRL). Member of Expert Panel. Lower Lea Valley Cable Tunnels, London, UK – Specialist TBM advisor to J Murphy & Sons, responsible for drafting TBM specification, procurement and manufacture; Thames Tideway Project, London, UK – Peer review member for Thames Water; Deerborn, USA – TBM expert working for insurers	Qumroud Water Transport Tunnels, Lots 1 & 2, Iran – TBM specification for Sabir Waterworks & Dam Company; Channel Tunnel Rail Link, Section 2, London, UK – Specialist TBM advisor to CTRL working on insurance claims

TUNNELLING CONSULTANTS

Company information	(a) Turnover (b) Turnover in tunnelling	Areas of expertise	Tunnel contracts underway	Recent tunnel contracts
3G Gruppe Geotechnik Graz Elisabethstrasse 22/II A-8010 Graz Austria Tel: +43 316 3377 99 Fax: +43 316 3377 9911 Email: office@3-g.at Web: www.3-g.at	a) US\$4.4M b) US\$3.7M	Geological, hydro-geological & geotechnical services for design & construction, structural design for cut & cover, NATM and TBM tunnels, site supervision, claims, tunnelling in squeezing ground, tunnelling in complex conditions	Metsovo Tunnel, Greece – Second tube for 2-lane NATM road tunnel, 3.5km, incl. a 1.8km long vent tunnel, in squeezing ground. Geotechnical & structural design, technical supervision; Koralim Tunnel, Austria – 32.8km long twin-tube rail tunnel (NATM and TBM). Site supervision, geological documentation of exploratory tunnels & shafts, geological & geotechnical design; Tauern Gas Pipeline, Austria – 20km tunnel section. Geological, hydrogeological & geotechnical investigation & design work. Route selection, feasibility study, environmental impact study, preliminary design; Eisack HEP Project (90.9MW), Italy – Geological, hydrogeological & geotechnical consulting. Feasibility, EIS, preliminary design	Freeway Pafos-Polis, Cyprus – 3 x tunnels. Geological, hydrogeological & geotechnical services. Tender design for PPP project; Inn HEP Project (88MW), Austria/Switzerland – Geological, hydrogeological & geotechnical services. Detailed design, tender design; Central Area Carinthia, Austria – HSR route selection. Geological mapping, rock mass modelling, geotechnical assessment (total tunnelling 40km); Dagachhu HEP Project (100MW), Butan – Investigation, comparison of alternatives, feasibility, detailed design
Gall Zeidler Consultants 44345 Premier Plaza Suite 210 Ashburn, Virginia 20147 USA Tel: +1 703 726 2700 Fax: +1 703 726 6999 Email: office@gzconsultants.com Web: www.gzconsultants.com	a) US\$2.5M b) US\$2.5M	Geotechnical engineering, NATM/TBM tunnel design, soil improvement, construction design, soil structure interaction analyses and calculation, instrumentation & monitoring, claims, waterproofing, shaft design, CM	Dulles Corridor Metrorail, Northern Virginia, USA – TBM and NATM subway tunnels and underground station at Dulles International Airport; East Side Access, NYC, USA – Manhattan running tunnel, crossover caverns, Grand Central Terminal Station caverns; King's Cross Station Redevelopment, London, UK – Underground station redevelopment; Crossrail, London, UK – Subway tunnels and stations; Trans Hudson Express, NJ, USA – Single-track railway tunnels and underground stations; Beacon Hill Station and Running Tunnels / West Portal Wall, Seattle, USA – Running tunnels and station	Fort Canning Tunnel and Realignment of Stamford Road, Singapore – Three lane highway tunnel; Bergen Tunnel Rehabilitation, Jersey City, NJ, USA – Rehabilitation of 120-year old twin-track railway tunnel, partially brick lined; Weehawken Tunnel, North Bergen, NJ, USA – Reconstruction of railway tunnel and station
GeoCompany Tecnologia Calçada das Tulipas 111-Centro Comercial Alphaville CEP 06453-020 Barueri SP Brazil Tel: +55 11 4195 4435 Fax: +55 11 4193 6146 Email: geocompany@geocompany.com.br Web: www.geocompany.com.br	a) US\$1M b) US\$0.5M	Rock tunnels in fractured rock masses, soil tunnels below groundwater level, waterproofing, tunnels under water crossings	Tunnel Tarapoto Yurimaguas, Interocean Roadway, Peru – Executive and detailed design; São Paulo Subway Line 4, Brazil – 2-5km stretch of NATM double-track tunnel in weathered rock. Consultancy to main contractor (Via Amarel/Odebrecht/Queiroz Galvão/OAS/Camargo Correa/ Andrade Gutierrez); São Paulo Water Company, Brazil – Several sewage and water tunnels. Consultancy and detailed design for the owner; Santa Rosa Hydroelectric Plant, Brazil – Headrace tunnel. Consultancy and detailed design for the owner	San Francisco Hydroelectric Project, Ecuador – Large underground rock cavern and TBM bored headrace tunnel. Consultancy to main contractor (PCE-Odebrecht); Ita Hydroelectric Power Plant, Brazil – Headrace tunnel. Consultancy to the main contractor (Odebrecht); Machadinho Hydroelectric Power Plant, Brazil – Consultancy to the main contractor (Camargo Correa); São Paulo Ring Road, Brazil – Large road tunnels in NATM. Consultancy and detailed design for the owner
GeoConSol 17 Everett Street Sherborn MA 01770 USA Tel: +1 508 650 3600 Fax: +1 508 650 3688 Email: pj@geoconsol.com Web: www.geoconsol.com	Undisclosed	Tunnels, tunnel boring differing site conditions, forensic investigations, construction productivity	Singkarak Hydropower Plant, Indonesia – Total of 7km, with diameters varying from 1.5m to 3m; Washington Subway, Washington DC, USA – 1.5km of 6m diameter tunnel; Various Pipe Jacking Projects (New England, Hawaii, California, Texas); DTSS, Singapore; Cable Tunnel, Singapore	Boston Harbor Outfall, USA; Boston Central Artery, USA; Metropolitan Water Reclamation District, Sewer Tunnels, Chicago, USA; Various Pipe Jacking Projects (New England, Texas, California); LA Subway, Los Angeles, USA; Tsen-Wen Water Supply Tunnel, Taiwan
GeoConsult Höhlstrasse 5 A-5071 Wals, Salzburg Austria Tel: +43 662 659 650 Fax: +43 662 659 6510 Email: office@geoconsult.at Web: www.geoconsult.at	a) US\$14.4M b) US\$11.7M	All ground conditions, from hard to soft rock, cohesionless sand & all cohesive soils and mixed face conditions. Conventional tunnelling, shield and TBM tunnels. Special expertise in compressed air, ground freezing and grouting	Brenner Base Tunnel, Austria – 55km rail tunnel. Preliminary design, EIS; Tapovan Vishnugad HEP, India – Design review, consulting & construction supervision; HSR Munich-Verona, Austria – Lots H2-2, H3-6, H4-3, H5, H6, H7 & H8. Detailed design & construction supervision; Pir Panjal Tunnel T80, India – 10km rail tunnel. Detailed design & construction supervision; Koralim Tunnel, Austria – 32km rail tunnel. Design & EIS; Lowari Rail Tunnel, Pakistan – 8.5km rail tunnel; Metro Dubai, UAE – Detailed design for TBM sections; Metro Budapest, Line 4, Hungary – Tender & detailed design; Shimla Tunnels, India – 7 road tunnels; HSR Lahore-Rawalpindi, Pakistan; Lainberg Tunnel, 2nd Tube, Austria	Lyon-Turin HSRL, France/Italy – 53km + 12km tunnels EIS; Arlberg Rail & Road Tunnel, Austria – Preliminary, tender & detailed design; New MetroRail City Project, Contract 27/03, Perth, Australia – 800m twin tube bored tunnel (EPB), 1.5km C&C and 2 x underground stations; AGTS Tunnels, Atlanta, USA – Detailed design; A10 Katschberg Tunnel, 2nd Tube, Austria – Preliminary & detailed design; BAB A38, Höllberg Tunnel, Germany – Preliminary, tender & detailed design of 2 road tunnels
Geocontrol Cristóbal Bordiú 19-21 5ª planta 28003 Madrid Spain Tel: +34 91 553 1763 Fax: +34 91 554 9396 Email: geocontrol@geocontrol.es Web: www.geocontrol.es	Undisclosed	Tunnelling (D&B, TBMs, cut & cover), geological, hydro-geological and geotechnical studies, underground construction engineering and consultancy, safety & fire protection, tunnel inspection, technical assistance during construction	Guadarrama Tunnels, Spain – Twin bore HSR tunnels, 28.3km (4 Ø10m double shield TBMs). Technical assistance; San Pedro Tunnels, Spain – 2 twin-tunnels, 9km each. Technical assistance; Abdalajis Tunnels, Spain – 2 twin tunnels, 8km each (2 TBMs Ø10m). Technical assistance; Barcelona Metro, Spain – Assisting in the administration of extension on Line 3 (D&B) and expertise on Line 9 (EPB Ø12m and TBM Ø12m); Access NW to Santiago de Chile – 5 motorway tunnels (D&B, 3.2km). Design; Variante Vespucio-El Salto-Kennedy, Chile – 2 twin road tunnels in Santiago de Chile for Dragados-Hochtief (1.6km D&B); Lalin-Santiago HSR, Spain – Technical assistance to ADIF	HSR Upgrade Lorca, Spain – Design; Orense-Monforte-Lugo HSR (Canabal's Bypass), Spain – Design; Highway GC-1, Puerto Rico-Mogán, Canary Islands – Construction supervision; Tunnel of Padomelo, Spain – Design of the rehabilitation of an old 6km long tunnel on the HSR line to Galicia; Tunnel of Archidona, Spain – Design of a 2km long HSR tunnel (D&B) for the new line between Bobadilla and Granada

TUNNELLING CONSULTANTS

Company information	(a) Turnover (b) Turnover in tunnelling	Areas of expertise	Tunnel contracts underway	Recent tunnel contracts
Geodata Corso Duca degli Abruzzi 48/E I-10129 Torino Italy Tel: +39 011 5810 611 Fax: +39 011 597 440 Email: gd_commercial@geodata.it Web: www.geodata.it	a) US\$22M b) US\$19.1M	Planning, design, supervision & management of tunnels, time/cost & risk analysis, TBMs, pre-cast linings, C&C, monitoring; environmental control systems & fire safety, health & safety, expert witness, independent design check	Gibraltar Strait Tunnel, Morocco/Spain – Updating design; Palermo Rail Crossing, Italy – Design & project management; Turin Metro Ext, Italy – Design & CM; Frejus Rail Tunnel Upgrade, Italy – Construction design & follow-up; Salerno Reggio Calabria Motorway, Lot 2, Italy – Infrastructure design; Palermo-Agrigento Railway, Italy – Project management; Bologna Metro, Line 1, Italy – Final design; Chengdu Metro Line 1, Phase 1, Lot 3, China – Consultancy; Malakasi Hydraulic Tunnel, Greece – Final design; Electrified Double-Track Project, Ipoh-Pandang Besar, Malaysia – Detailed engineering design; Douera Dam, Algeria – Final design & construction management	Turin Metro, Line 1, Italy – Detailed design and construction management; HSR Milan-Naples, Bologna Underpassing, Italy – Technical assistance for 2 6km EPB-TBM tunnels; Lyon-Turin HSR, France/Italy – 53km base tunnel & 12km Bussoleno Tunnel. Design of civil & underground works; Oued Tielat Railway, Algeria – Design of the underground works & related geological and geotechnical studies; San Martino Urban Tunnel, Italy – Final design and construction follow up
Geo-Design lbsley House Mockbeggar Lane Ringwood Hampshire, BH24 3PR United Kingdom Tel: +44 1425 473005 Fax: +44 1425 473007 Email: geo-design@geo-design.co.uk Web: www.geo-designgroup.com	a) US\$1.18M b) US\$0.98M	Specialist design & feasibility reviews, assessment of tunnelling conditions, state-of-the-art numerical modelling, evaluation of insitu stress fields, cavern design & performance monitoring, large span covers under limited cover	Tel Aviv Jerusalem Railway, Israel – Review; Rosia Montanna, Romania – Review; Dublin Metro North, Ireland – Reference design of O'Connell Street Station (station located within cavern); Canal Basin Cavern and Mine Gallery, UK – Stability assessment and review of stabilisation options; Bincombe Tunnels, UK – Assessment of impact on tunnel by proposed road cutting. Investigation of construction shaft; Gautrain High Speed Rail Project, South Africa – Independent checking engineer of 3 bifurcation caverns and station caverns, including stacked station cavern and three track 22m span cavern; Gerrards Cross, UK – Review of causes of collapse; Hong Kong West, HK – Review	Dublin Port Tunnel, Ireland – Detailed design of cross overs and associated caverns; DTSS, Singapore – Review of chamber collapse causes; Dublin Metro North, Ireland – Concept design for O'Connell Street Station Cavern; Wren's Nest, UK – Detailed review of stabilisation options; Triangle Station Cavern, Malmo, Sweden – Feasibility assessment of cavern construction; Steelport Pump Storage Scheme, SA – Review of cavern design; Bramhoek PSS Scheme, SA – Review of cavern design
Geos Ingenieurs Conseils 7 Route de Drize 1227 Carouge Geneva Switzerland Tel: +41 22 309 3060 Fax: +41 22 309 3070 Email: geos@geos.ch Web: www.geos.ch	a) US\$3.9M b) US\$3M	Design, supervision of construction works including cost control, geotechnical engineering, geomechanical engineering, soil structure interaction analysis, rock mass behaviour, risk assessment, hydraulic and hydro structures	Treme Tunnel, Switzerland – Bi-directional road tunnel, 710m long, glacial soils, shallow depth, ground water, de-watering gallery. Project and work supervision; M2 Subway Lausanne, Switzerland – OURS Subway Station, Perdonnet Tunnel and Tribunal Federal cut & cover, total length 360m, marl and glacial till, shallow depth, urban environment. Detail design, tender documents supervision of work; Grouff Tunnel, Luxembourg – Twin tube bi-directional road tunnel, 2.9km long, lias formations (Luxembourg sandstone) and Keuper marl, brittle rock behaviour and swelling potential of the Rhetien; Lyon-Turin Railway base liaison, Italy/France – Member of the engineering consortium; detailed design	Lötschberg Base Tunnel, Switzerland – Raron branch of base tunnel, as partner of "Ingenieurgesellschaft Westschweiz" engineering consortium. Preliminary study, detail design, cost control and work supervision; Gousselerberg Tunnel, Luxembourg – Twin tube, bi-directional road tunnel, 2695m long
Geosigma Box 894 SE-75108 Uppsala Sweden Tel: +46 18 650 800 Fax: +46 18 121 302 Email: rikard.dahlstrom@geosigma.se Web: www.geosigma.se	a) US\$11M b) US\$8M	Site investigation (geological, hydro geological, geophysical), ground water, pollutants in soil and rock, Geotechnical Baseline Reports, design of underground works	Geological Deep Repository (for high level nuclear waste), Sweden – Site investigation; Citybanan Rail Tunnels, Stockholm, Sweden – Project management; Ådalsbanan Railway Tunnels, Hämösand, Sweden – Project management; Hallandsås Railway Tunnel, Sweden – Member of the technical committee	Geological Deep Repository (for high level nuclear waste), Sweden – Pre studies; Ådalsbanan Railway Tunnels, Hämösand, Sweden – Geophysical site investigation; Citybanan Rail Tunnels, Stockholm, Sweden – Rock characterisation
Geotunnel Molo Ponte Morosini 13 16186 Genova Italy Tel: +39 010 752 701 Fax: +39 010 750 603 Email: info@geotunnel.it Web: www.geotunnel.it	a) US\$11.8M b) US\$11.8M	Design of ventilation, bolting, drill and blast, belt conveyors, computerised drilling and foundations	Rome Metro, Italy – Specification of plant for Astaldi Company; Bologna, Italy – Specification of plant for Astaldi Company; Variante di Valico Project, Italy – Belt conveying (Marti Technik)	Various foundations projects: Venice, Italy – Deep foundations; Moderne, Italy – Full displacement piles; Rome, Italy – Soil mixing; Drilling projects: Salerno Reggio Calabria Highway, Italy – Drilling with 2 jumbos (Robodrill);
GIUA & Partners 59 Viale Parioli 00197 Rome Italy Tel: +39 06 8069 1529 Fax: +39 06 8075 575 Email: info@giuapartners.com Web: www.giuapartners.com	Undisclosed	Design/engineering for lighting, ventilation, safety systems, electrical equipment, fire protection, traffic control (CCTV, PMV, etc), risk analysis, CFD	Rome Ring Road, GRA, QNO segment, Italy – Design, supervision and CM of E&M and safety system for 10 urban tunnels; Motorway Terni-Rieti, Italy – Design and construction management of E&M and safety system for 3 bi-directional tunnels (6km in total); Statal Road SS42, Tonale, Italy – E&M and safety system design for 3 single tube, bi-directional tunnels (6.1km in total); Laghi di Pusiano Tunnel, Italy – 2km bi-directional tunnel. Design of all E&M, ventilation and safety systems; Saudi Arabia – Final design of E&M systems for 36 tunnels (12km); Rome Underground, Line C, Rome, Italy – Pre and final design of E&M systems for 10 stations	A12 Highway, Italy – Final design of E&M, lighting and safety systems for 10 tunnels (14km in total); Statal Road SS589, Laghi di Avigliana, Italy – Preliminary, pre and final design of ventilation and fire systems for 2 tunnels; Statal Road SS340, Regina, Italy – E&M, ventilation, safety and comms system design for 2 tunnels; Corso d'Italia Urban Tunnels, Rome, Italy – Design, supervision and CM of lighting system; Statal Road SS23, Sestriere, Italy – E&M and comms systems design for 2 bi-directional tunnels (1.7km)

TUNNELLING CONSULTANTS

Company information	(a) Turnover (b) Turnover in tunnelling	Areas of expertise	Tunnel contracts underway	Recent tunnel contracts
GOBA PO Box 180 Sunninghill 2157 South Africa Tel: +27 11 236 3300 Fax: +27 11 807 8535 Email: dienie@goba.co.za. Web: www.goba.co.za	a) US\$35M b) -	Drill and blast tunnelling, hard rock and soft ground TBM tunnelling, design and construction supervision, claims evaluation and adjudication, DABs and mediation	Lesotho Highlands Water Project – Feasibility studies of future development options for further phases. Detailed feasibility study for Phase 2, including preliminary design of 40km of hard rock tunnels	Durban Harbour Tunnel, South Africa – 600m long sub-aqueous tunnel excavated 35m below sea level with mixed shield slurry TBM, with precast segmental lining and tunnel gradient up to 20%; Gautrain, South Africa – Underground works design for bidding consortium for 15km of high speed rail link; Leeuwkes Relief Outfall Sewer Tunnel – Drill and blast tunnel; Lesotho Highlands Water Project – Mohale-Katse Tunnel, 32km hard rock TBM tunnel. Matsoku Diversion Tunnel, 6km drill and blast tunnel
Golder Associates 2390 Argentia Road Mississauga Ontario, L5N 577 Canada Tel: +1 905 567 4444 Fax: +1 905 567 6561 Email: tunnels@golder.com Web: www.golder.com	Undisclosed	Environmental permits, risk management, site characterisation, tunnelling methodology, ground response, ground improvement, ground water control, rock support, pressure tunnel design, instrumentation, tunnel rehabilitation	Upper Mamquam Hydro Project; Second Narrows Water Tunnel, BC, Canada; Low Lift Pumping Station Tunnel, Hamilton; St. Lawrence River HDD Crossing, Quebec, York Peel Water Main & Sanitary Sewers, Ontario; Hallandsås Tunnel, Sweden; Lumwana Mine Development, Zambia; Underground Command Post, South Korea; Lyon-Turin HSR; Turin Metro; Milan-Napoli HSRL; Bakun Water Supply, Philippines; KHNP Cooling Water Tunnels, S Korea; Nathpa Jhakeri HEP, India; Dendrobium Mine Access; Cincinnati CSO, Ohio; Pittsburgh North Shore Transit Connector, Pennsylvania; Pine Mountain Highway, North Carolina; Blue Ridge Outlet & Nancy Creek Tunnels, US	2nd Auckland Harbour Crossing, New Zealand; Bondi Sewage Treatment & Perth Railway Tunnels, Australia; Antamina Mine Diversion & Decant Tunnels, Peru; Brightwater Sewer Tunnels, US; San Vicente Water Supply and Arrowhead East & West Inland Feeder Tunnels, US; Edmonton South LRT, Canada; Heart Lake Sewer Rehabilitation and Canadian Library of Parliament Access Tunnels, Canada; East Side Access, NY, US; Mission Valley East LRT, US; PATH Tunnel, New Jersey, US
Gruner Consulting Engineers Gellertstrasse 55 CH-4020 Basel Switzerland Tel: +41 61 317 6161 Fax: +41 61 312 4009 Email: mail@gruner.ch Web: www.gruner.ch	a) US\$46.6M b) US\$8M	Civil engineering, underground structural engineering, hydroelectric and hydraulic engineering, tunnel safety, tunnel aerodynamics	Gotthard Base Tunnel, Switzerland – (GBTN), planning application and detailed scheme for two 20km long single track tunnels (Erstfeld-Amsteg-Sedrun), with intermediate attack at Amsteg	J2 Sissach Bypass, Chienberg Tunnel, Switzerland – Design and site supervision (in JV), ecological site supervision; B33 Hornberg Bypass, Hornberg Tunnel, Germany – Design of M&E installations, tunnel ventilation including escape galleries and air locks, energy supply, lighting, telecoms, traffic management; Munich-Verona rail link, Germany – (Radfeld-Baumkirchen section) design, site inspections; A16 Transjurane motorway, Beuchille tunnel, Switzerland – Detailed design/production information

HARBOUR AREA TREATMENT SCHEME - STAGE 2A CONSTRUCTION OF SEWAGE TUNNELS

CONTRACTOR FORUM

The Government of the Hong Kong Special Administrative Region is undertaking the implementation of the Harbour Area Treatment Scheme Stage 2A which involves construction of around 19km of sewage tunnels with maximum finished diameter of 3m and 15 number associated vertical shafts.

The tunnels are to be constructed mainly in granitic and volcanic rock at depth of up to around 160m below sea level using the drill-and-blast method.

The construction works will be covered under 2 contracts and tenders will be invited by around late 2008.

A contractor forum will be held to give interested parties general information about the project. Details of the forum are as follows:

Date 15 February 2008
Time 9:30am to 12:30pm
Venue Drainage Services Department
 The Government of the HKSAR
 43/F, Revenue Tower
 5 Gloucester Road
 Wan Chai
 Hong Kong

Interested parties are invited to contact the following person before 5 February 2008 so that administrative arrangements could be made to attend the forum.

Gary Shing, Senior Engineer
 Metcalf & Eddy - Maunsell Joint Venture
 at gary.shing@maunsell.aecom.com

 Drainage Services Department

 MAUNSELL | AECOM

TUNNELLING CONSULTANTS

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Company information	(a) Turnover (b) Turnover in tunnelling	Areas of expertise	Tunnel contracts underway	Recent tunnel contracts
Halcrow Group Vineyard House 44 Brook Green London W6 7BY United Kingdom Tel: +44 20 7602 7282 Fax: +44 20 7603 0095 Email: halcrow@halcrow.com Web: www.halcrow.com	a) US\$671 b) -	Conceptual, preliminary & detailed design, settlement analysis & building damage assessment, contract documents & procurement strategy, tender & detailed design for contractors, project modelling, project & construction management	Tottenham Court Rd Station Upgrade, London, UK – Multi-disciplinary design services to increase station capacity, including new, enlarged escalators, new tunnels, new station concourse; Northern Line Package 4, RIBA Stage D, London, UK – Preparation of RIBA D outline design for cooling options for two stations; Vauxhall Station Step Free Access, London, UK – Detailed design of tender documents for step-free access (RIBA Stages E F G) and congestion relief (RIBA Stages E F G), through re-arrangement of existing facilities; Highbury & Islington Station Step Free Access & Capacity Enhancement, London, UK – Modernisation and enhancement of station and step free access to platforms	Crossrail, Isle of Dogs-Abbey Wood (MDC4), London, UK – Design of south east section of Crossrail, including 7 shafts, 3 portals and underground station; DLR Ext to Woolwich, UK – Performance specification for life safety & ventilation systems for a 2.6km light rail extension & underground station; HSL Zuid Rail Tunnels, The Netherlands – Aerodynamic calculations for 3 tunnels, using 1D ThermoTun tunnel aerodynamics programme; Edinburgh Airport Rail Link, Scotland – Design of proposed rail link
Haley & Aldrich 465 Medford Street Suite 2200 Boston MA 02129-1400 USA Tel: +1 617 886 7400 Fax: +1 617 886 7600 Email: info@haleyaldrich.com Web: www.haleyaldrich.com	a) US\$75M b) US\$29M	Geotechnical site investigation and ground characterisation, tunnel and shaft design, microtunnel design, HDD design, construction management	Easterly CSO Plan, Cleveland, US – Preliminary engineering for over 15km of rock tunnels, 4.6km of soft ground tunnels, and 12km of conduit; APM, Washington Dulles Airport, US – Underground engineering, construction monitoring for tunnels between main terminal and concourses; Providence CSO, Providence, US – Field investigation, geotechnical design and construction phase services for 4.8km of rock tunnel; Potomac Bi-County Supply Main, MD, US – Alignment study-phase geotechnical study for an approximately Ø2.1m, 8km long treated water main; Croton Water Treatment Plant Project, NY, US – CM geotechnical support for underground WTP and tunnels; Design of over 30 large Ø HDD crossings	Detroit River Outfall Tunnel No.2, Detroit, US – Geotechnical investigations/design and construction phase services for 1,850m tunnel (slurry TBM); Alvarado Trunk Sewer Phase II Tunnel, San Diego, US – Tunnel redesign for Ø0.75m HDPE carrier pipe beneath 8-lane highway; Alvarado Water Treatment Plant Conveyance Tunnel, San Diego, US – Design recommendations and CM; St George HEP, Canada – Geotechnical studies and tunnel design; Numerous small diameter tunnels for various water and WW projects, CA, US
Hatch Mott MacDonald Transportation & Tunnels 3825 Hopyard Rd (Suite 240) Pleasanton CA 94588 USA Tel: +1 925 469 8010 Fax: +1 925 469 8011 Email: corporate@hatchmott.com Web: www.hatchmott.com	Undisclosed	Soft ground and hard rock tunnelling, TBMs, slurry shields, EPBMs, single pass pre-cast concrete linings, geotechnical services for tunnelling, tunnel ventilation, fire/life safety	Beacon Hill, Seattle, US – Design services for twin bored tunnels for Sound Transit; Niagara Tunnel Project, Canada – Representative for design and CM; Seymour Capitano Twin Tunnels, BC, Canada – Design/cost/CM for client; Dulles Airport, Washington, US – Design services for MWAA 7-year project; Silicon Valley, US – Design/construction and project controls for transit tunnels; East Side Access, NY, US – Consultant to the management; Cross Harbor Study, NY, US – Consultant for the EIS evaluating options for a freight tunnel across NY Harbor; Southern California's Inland Feeder Programme, US – CM for Arrowhead East and West segments involving 42,000ft of tunnels	Sheppard Subway, Toronto, Canada – Project management/design and CM/testing/commissioning and start-up; CA/T I-90/I-93 Interchange, Boston, US – Design/construction support for tunnel jacking/grade separation; Mission, US – Design/construction support for light rail tunnel; ECIS and NEIS, US – Design of bolted and gasketed PC segmental lining for waste water tunnels; Elizabethtown, US – 72" eastern transmission reinforcements, Phase II, including design/construction engineering management
HBI Haerter Stockerstrasse 12 CH-8002 Zurich Switzerland Tel: +41 44 289 3900 Fax: +41 44 289 3999 Email: info.zh@hbi.ch Web: www.hbi.ch	a) US\$4.4M b) US\$4.4M	Ventilation, pollution dispersion, aerodynamics/climate/safety & mechanical equipment, consulting/studies & design checks, design/planning & commissioning, site supervision & measurements, acceptance & fire tests	Rail: Gotthard Tunnel, Switzerland – 57km, longitudinal & transverse in rescue stations; Brenner Base Tunnel, Austria – 54km, longitudinal & transverse in rescue stations; Ceneri Base Tunnel, Switzerland – 15km; Engelberg Tunnel, Switzerland – 5km; Road: Kirchenwaldtunnel, Switzerland – 1.6km, ventilation; N5 Biel 3 Tunnels, Switzerland – 2.5km, 1.3km and 945m, longitudinal; Nordtangente Basel, Switzerland – 2.9km, ventilation; Rheinfurterunnel, Düsseldorf, Germany – 1.9km; Wattkopftunnel, Germany; Frankenschneidweg, Germany; Elbtunnel, Germany; Schweizerhalle, Switzerland; Taloun & Alborz Road Tunnels, Iran; N-W Bypass Meran, Italy	Rail: Lötschberg Tunnel, Switzerland – 35km, longitudinal & transverse in rescue stations; Munich Marienplatz, Germany; Road: Cross City, Sydney, Australia – 2.2km, longitudinal, point extraction; Fuelen Tunnel, Switzerland – 2.5km longitudinal, point extraction; Boehammer Tunnel, Germany – Emergency scenarios; Gotschnatunnel, Switzerland – 4.2km, semi transverse; Loppertunnel, Switzerland – 1.5km semi transverse; Chienberg Tunnel, Switzerland; Dublin Port Tunnel, Ireland
Honnun Grensavgveg 1 105 Reykjavik Iceland Tel: +354 510 400 Fax: +354 510 4001 Email: bh@honnun.is Web: www.honnun.is	Undisclosed	Geological investigation, geotechnical design of underground structures, supervision of tunnelling works	Hraunveita Diversion, Iceland – Design of two 1.8km long drill and blast diversion tunnels, 4.5m in diameter; Bolungarvik Road Tunnel, Iceland – Approx. 4km long drill and blast twin-land road tunnel, 54m ² diameter; Karahnjukar Hydroelectric Project, Iceland – Supervision (in JV) of vertical surge shaft about 190m deep, 5m in diameter	Karahnjukar Hydroelectric Project, Iceland – Supervision (in JV) of two caverns, two vertical shafts and tunnel complex around the caverns. Caverns are 100m x 14m x 21m and 120m x 15m x 35m. Vertical shafts are raise drilled, 420m x 2m. Access tunnel (45m ²), cable tunnel (14m ²) and tailrace tunnel (69m ²); Ufsarveita Diversion Tunnel, Iceland – 3.5km 32m ² diameter tunnel; Hedinsfjardur Road Tunnels, Iceland – Project design for two lane 54m ² , 10.7km drill and blast road tunnel in north Iceland
HNTB Corporation 715 Kirk Drive Kansas City MO 64105 USA Tel: +1 617 542 6900 Fax: +1 617 428 6905 Email: hcaspe@hntb.com Web: www.hntb.com	a) US\$518M b) US\$35M	Tunnel design, programme management, geotechnical interpretation, safety systems, ventilation design, seismic retrofit of tunnels, lighting, control systems, construction management, permitting, planning studies, risk management	Devil's Slide Tunnel, California, US – Dual 4000ft long, 30ft wide, NATM highway tunnels through various rock formations and fault zones, in an active earthquake area. Tunnel traverses through a mountain and is approx. 300ft below groundwater levels; Dulles International Airport Tunnels, Washington DC, US – 10 mile long, US\$400M loop tunnel system to support a new Automatic People Mover, baggage transport system, etc. between terminals – TBM, C&C and NATM; Port Washington Road Relief Sewer, WI, US – 2 mile long rock tunnel with 2 x Ø30ft work shafts located 300ft below ground; County Grounds Floodwater Bypass Tunnel, WI, US – 1 mile long, Ø17ft soft ground tunnel (EPBM)	Minneapolis St Paul Light Rail, Minneapolis, US – Design and construction management of dual 7,400ft long, Ø20ft EPB bored tunnels and mined station; CA/T Project, Congress to North Street (Section 17A), Boston, US – Design of a 3/4 mile long cut & cover tunnel, including ventilation, lighting and life/safety systems; Feasibility Study, Dallas, US – Feasibility study for 5 miles of dual highway tunnels; Northwest Side Relief Sewer, Milwaukee, US – Design and CM of 7.2 mile long, Ø20ft CSO and storage tunnel



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Born to be completely and uniformly worn out, the new Sandvik *RT300* drifter bits dramatically cut downtime in mining and construction operations. The more aggressive, fractured or fissured the rock, the more significantly longer the service life of the *RT300s*.

The tailored metallurgical properties of the new Sandvik cemented carbide *XT48*, the precision manufacture and the R&D programs used for their development – plus the numerous field tests to perfect them – have resulted in unprecedented performance quality. So, if button failure is a problem, Sandvik *RT300* drifter bits are the solution.

Even if button breakage is not a problem, you can still expect a 10 to 20 percent increase in bit service life.

Beauty? For the professional there is more to it than first meets the eye.



TUNNELLING CONSULTANTS

Company information	(a) Turnover (b) Turnover in tunnelling	Areas of expertise	Tunnel contracts underway	Recent tunnel contracts
Hyder Consulting 29 Bressenden Place London SW1E 5DZ United Kingdom Tel: +44 20 7316 6000 Fax: +44 20 7904 9064 Email: corp.marketing@hyderconsulting.com Web: www.hyderconsulting.com	a) US\$41.3M b) US\$7.12M	Planning and design of caverns, rock tunnels, soft ground tunnels, immersed tube, cut & cover, box jacks & microtunnels for rail, road, water and utilities. Geotechnical, civil, M&E, operations and maintenance, risk management	Kowloon Southern Link, HK – Independent checking engineer for M&E works; Lai Chi Kok Drainage Tunnel, HK – Feasibility study and preliminary design; Lai Chi Kok Reservoir Transfer Tunnel, HK – Feasibility study; Epping to Chatswood Rail Link, Sydney – Independent project verifier; Doha North STW, Qatar – Detailed design of 20km sewers; Manton Shaft, UK – Ø25m shaft and microtunnels; Dubai Light Rail, UAE – Design of 2 stations; Abu Dhabi Sewerage Master Plan, UAE – Preliminary design; Circle Line, Stage 2, Singapore – Detailed design for 4 stations; North South Bypass, Brisbane – Lead consultant in JV and tender design of 5.3km twin bore road tunnel under Brisbane River	Cross City Tunnel, Sydney, Australia – Independent project verifier; Lane Cove Tunnel, Sydney, Australia – Feasibility and preliminary and tender design, expert advice on ventilation of 3.5km motorway tunnel; Taiwan HSR C230&240 – Mined and cut & cover tunnels; Nickel Mine, Western Australia – Preliminary design of access adit; Fernleigh Tunnel, Newcastle, Australia – Rehabilitation of old brick lined rail tunnel; Kuala Lumpur Sewerage Scheme, Malaysia – Temporary works design checks
Hydrocoop PO Box 92 Dobsinskeho 32 SK-81005 Bratislava 15 Slovakia Tel: +42 124 5522 116 Fax: +42 124 5640 927 Email: gemeran@hydrocoop.sk Web: www.hydrocoop.sk	a) US\$1.3M b) US\$0.9M	Design of trenchless sewers DN2600-3000	Bratislava Waste Water Treatment Plant, Slovakia – Renewal and extension of central waste water treatment plant; Bratislava-Vrancuna, Slovakia – Restoration and extension of WWTP PE200,000; Sewerage Systems in Prievoz, P.Bisucupice and Bratislava, Slovakia	Maiskarcpatsicx Region Project, West Slovakia – Main pressure sewer DN300-DN500, length approx 30km, for transport of waste water to central WWTP
IC Konsulten Kaiserstrasse 45 A-1070 Vienna Austria Tel: +43 1 52 169 Fax: +43 1 52 169 15 Email: j.kleberger@ic-salzburg.at Web: www.ic-group.org	a) US\$23.3M b) US\$9.7M	Geological and geotechnical field work in difficult terrain, risk analysis and management, vibration prognosis and mitigation, geothermal energy extraction, geotechnical and structural design for NATM and TBM tunnels, cavern design	Kalambaka Igoumenitsa, Greece – Ioannina-Igoumenitsa section, design; Wienerwald Tunnel, Austria – Double-tube single-track rail tunnel, length 11.2km, TBM and NATM, detail design and geotechnical site supervision; Lainzer Tunnel, Austria – Single-tube double-track rail tunnel, NATM and C&C, detail design and geotechnical site supervision; HSR Porto Vigo, Lots 1A/1B, Portugal – Alignment selection, ground modelling and tunnel design, tunnels total approx. 42km; Sentvid Motorway Tunnel and Caverns, Slovenia – Geological and geotechnical modelling, risk assessment, design assistance and geotechnical supervision; Limberg HEP, Kaprun, Austria – Expanding existing HEP	Domokos- Lianokladi, Greece, Lot 367 – Independent checking engineer; Parcheggio San Giusto Trieste, Italy – Urban underground parking caverns, ground investigation, modelling, detailed design and execution design; Inoi-Chalkida Rail Tunnels, Greece – NATM design; Motorway Suao Hualien, Taiwan – Preliminary design, total length 28km; Metro Lisboa, Portugal, Linha Vermelha, Station Encarnacao – Design of NATM structures; Egnatia Odos, Greece – Tunnels Kostarakos and Malakassi A and C
IGT Geotechnik & Tunnelbau Mauracherstrasse 9 A-5020 Salzburg Austria Tel: +43 662 641 7270 Fax: +43 662 662 6417 2921 Email: n.ayaydin@igt.co.at Web: www.igt.co.at	a) US\$10.2M b) US\$7.9M	Design, construction supervision, consultancy & project management for all underground constructions. Geotechnical measurement & interpretation	Lainzer Tunnel, Lot LT31, Vienna, Austria – Construction supervision of a 3km rail tunnel, inc. emergency exits. Cross section approx. 145m ² , side gallery method; Vienna-Graz Rapid Railway, Austria – Preliminary design, feasibility studies & approval design for 23-26km twin single-track tubes, TBM or NATM; Roppen Tunnel, 2nd Tube, Inntal Motorway A12, Austria – Project management, supervision and geotechnical construction for 5.1km NATM tunnel & reconstruction and adaptation of the 1st tube; Metro Kadiköy-Kartal, Istanbul, Turkey – Detailed design and application design for 21.6km of tunnel and 16 underground stations. NATM (14km) and TBM (18km)	Geisswandtunnel, Bypass Traunkirchen B145, Austria – Detailed design, escape gallery 1.9km, main tunnel 2.1km; Achraintunnel, Bregenzwald L200, Austria – Detailed design, consultancy, 2 x 3-lane tunnels 3.3km long; Katschbergtunnel, 2nd Tube, Tauern Motorway A10, Austria – Checking design and tender documents, project management, supervision. 5.5km tunnel + 200m snow protection galleries and adaptation of 1st tube
IL-Laabmayr & Partner Preishartweg 4 A-5020 Salzburg Austria Tel: +43 662 430 703 Fax: +43 662 430 70333 Email: office@laabmayr.at Web: www.laabmayr.at	Undisclosed	Road tunnels, railway tunnels, caverns, undergrounds, city railways, galleries, tunnel safety, tunnel inspection, tunnel renovation, rock mechanics, soil mechanics	Bosruck Tunnel, Austria – 2nd tube, 5.5km. Design, tender docs; Tradenberg Tunnel, Austria – Detailed design; Eibesbrunn Tunnel, Austria – Detailed design; Tunnelkette Klaus, Austria – 4 tunnels, 2nd tubes (length 2.9km, 2.2km, 0.8km, 0.5km). Design; Ganzstein Tunnel, Austria – 2nd tube, 2.1km. Design, tender docs; Lainberg Tunnel, Austria – 2nd tube, 2.27km. Design; Gruenberg Tunnel, Austria – 1.16km. Design, tender docs; Kieler Förde Renovation, Germany – Design, tender docs; Lainzer Rail Tunnel, Austria – Site supervision (LT31), technical expert (LT33); Flachau Tunnel, Austria – Design; Kirchdorf & Kaltenbach Tunnels, Austria – Geotechnical advice	Fort Canning Tunnel, Singapore – Construction supervision; Waldeck HEP, Germany – Design, tender docs for renovation; A7, A9, A10 Motorway Tunnels, Austria – Operational concept; Bosruck Tunnel, Austria – Site supervision; Neumarkt & Götschka Tunnels, Austria – Design for permit; Bypass Saalfelden – Feasibility; Bypass Weyr – Feasibility, final design; Linz Tramway, Austria – Feasibility; Ofenauer-Hiefler Tunnels – Design for permit; Henndorf Tunnel, Austria – Technical expert
ILF Consulting Engineers Feldkreuzstrasse 3 A-6063 Rum Innsbruck Austria Tel: +43 512 2412 0 Fax: +43 512 2412 5900 Email: info@ibk.ilf.com Web: www.ilf.com	a) US\$139M b) US\$21.9M	Cut & cover, mined tunnels (NATM), bored tunnels (TBM); consulting services, design and planning, procurement of equipment, supervision and project management, start-up and operation	Gotthard Base Tunnel, Switzerland – 57km HSR tunnel; Pfänder Tunnel, 2nd Bore, Austria – Twin-lane road tunnel, 6.7km; Perschling Tunnels, Austria – Rail (total length 7.5km); Bosruck Tunnel, 2nd Bore, Austria – 5.4km road tunnel; Crossrail, UK – 7km twin tube tunnel; Metro Warsaw, Line 2, Poland – 6.5km; Maliakos Kleidi Road Tunnels, Greece – Tembi I: 1.9km, Tembi II: 6km, Platamonas: 3.3km, NATM; Stans-Terfens Tunnel, Austria – 2.3km rail tunnel, TBM; Leipzig City Tunnel, Germany – 4km twin tube rail tunnel, inc ramps and stations; Wienerwald Tunnel, Austria – 13km rail tunnel, TBM; Niagara Tunnel Project, Canada – 10.4km conveyance system with pressure tunnel; Brenner Base Tunnel, Austria – Permit application design (D0150)	Dublin Port Tunnel, Ireland – 5.6km two-lane twin-tube road tunnel, TBM; Kaiser-Wilhelm Tunnel, Germany – 4.2km single-track rail tunnel, TBM; Strenger Tunnel, Austria – 5.7km two-lane twin-tube road tunnel, NATM; Babenroth Tunnel, Germany – Single-track rail tunnel 1km, NATM; Devil's Slide Tunnel, USA – 1.3km road tunnel, NATM; Nika, Lagadia and Zigra Motorway Tunnels, Greece – Twin two-lane road tunnels, approx. 500m each, NATM; Lötschberg Tunnel, Switzerland – Ferden section, 8.2km twin tube rail tunnel, NATM

TUNNELLING CONSULTANTS

Company information	(a) Turnover (b) Turnover in tunnelling	Areas of expertise	Tunnel contracts underway	Recent tunnel contracts
Ingetec Carrera 6, No. 30A-30 Bogotá Colombia Tel: +57 1 323 8050 Fax: +57 1 288 4513 Email: correo@ingetec.com.co Web: www.ingetec.com.co	Undisclosed	Analysis, design, technical advisory during construction, supervision and CM of underground works as part of HEP developments, water supply and road projects	Porce III HEP, Colombia – Detailed design for a 680MW HEP, works include diversion tunnel (653m), headrace (12.65km), discharge tunnel (827m), construction adits (1.87km), powerhouse access (493m); Porce IV HEP, Colombia – Feasibility review and detailed design for 410MW HEP, works include diversion tunnel (920m), bottom discharge tunnel (625m), discharge tunnel (4.97km) and headrace (268m); El Plantanal HEP, Peru – Feasibility review and detail design for 220MW HEP, works include 12.38km headrace and 933m of construction adits; Rio Guarino Water Transfer, Columbia – Detailed design and construction supervision; Manso HEP, Columbia – Detailed design for 4.44km water transfer tunnel	Mantaro HEP, Peru – Review of operation and condition of 20km conveyance tunnel; Xaclbal HEP, Guatemala – Bid design for 90MW HEP, including 4.72km headrace; Xalala (330MW), Serchil (135MW) and Chulac (440MW) HEPs, Guatemala – Review of feasibility designs; Boruca (Veraguas) HEP, Costa Rica – Feasibility design for 608MW (station) and 23MW (microstation) HEP, including 10.4km headrace, 1.56km diversion tunnel, 1.4km access tunnel, 2.45km discharge tunnel and 2.37km of construction adits
Intergeo Robinißtrasse 93 5020 Salzburg Austria Tel: +43 662 455 007 0 Fax: +43 662 457 316 Email: salzburg@intergeo.at Web: www.intergeo.at	a) US\$4.6M b) US\$2.6M	Engineering geological investigation, hydrogeological investigation, NATM design and consulting in rock and soft ground, geotechnical consulting	Tschirgant Tunnel Project, A12 Tyrol, Austria – 4.4km single-tube road tunnel, plus escape tunnel (4.4km), NATM: General alignment, corridor investigations, geological investigation, general design, detailed design, tender documents, environmental assessment; Lillenberg Tunnel, Völkmarkt, Austria – 1.37km single-tube road tunnel, plus escape gallery, NATM and C&C: Geological investigation, general design, detailed design and tender documents; Grünburg Tunnel, Austria – 1.16km single-tube road tunnel, NATM: Construction supervision	Anillo Tunnel, Egnatia Odos, Greece – Twin 2.2km NATM highway tunnels: Category III checking (geological, statical and support check), consulting services during execution; Panagia Tunnel, Egnatia Odos, Greece – Twin 2.3km NATM highway tunnels: Category III checking (statical and support check); Brnje, Brezik and Plalina Tunnels, Croatia – 2 x 1.55km, 2 x 500m, 2 x 2.3km NATM highway tunnels (Zagreb-Split): Construction supervision
Jacobs Associates 465 California Street Suite 1000 San Francisco CA 94104 USA Tel: +1 415 434 1822 Fax: +1 415 956 8502 Email: info@jacobs.com Web: www.jacobs.com	a) US\$18M b) -	Planning, design and construction engineering for underground projects. Trenchless technology, relining, renovation, civil engineering, detailed structural design, monitoring, CM, claims evaluation and dispute resolution	Joint Water Pollution Control Plant Tunnel & Ocean Outfall, LA, USA – Feasibility & preliminary design of 16 mile tunnel and outfall; University Link, Seattle, USA – Final design for 3 miles of subway; Northern Sewerage Project, Melbourne, Australia – Design under alliance of 5.2 mile sewer (EPBM) and 2.9 mile sewer (hard rock TBM); Bay Tunnel, San Francisco, USA – Design of 5 mile tunnel via pressurised face technology; Willamette River East Side CSO, Portland, USA – Construction management; Narrangansett CSO, Rhode Island, USA – Construction management; San Vicente Pipeline, San Diego, USA – Design of 11 mile pipeline (TBM); Brightwater Conveyance, Washington, USA – Design	Claremont Tunnel Seismic Upgrade, CA, USA – Design and engineering services during construction of 1,570' bypass tunnel (across Hayward Fault), via roadheader & supplementary D&B; Willamette River West Side CSO, Portland, USA – Construction management of 19,000' long 120' deep tunnel, via slurry TBM, plus 2 deep shafts; East Side Light Rail, LA, USA – Design support (geotechnical, structural and tunnel engineering) for 6-mile rail line with 1.8-mile tunnel section and 8 stations
Jacobs Engineering Group 95 Bothwell Street Glasgow G2 7HX United Kingdom Tel: +44 141 204 2511 Fax: +44 141 226 3109 Email: marketing@jacobs.com Web: www.jacobs.com	a) US\$7.8bn b) US\$50M	Design, EU safety requirements, settlement & building assessments, operation & management, assessment & refurb, ventilation & fire engineering, project & construction management, feasibility studies	Glendoe HEP, Scotland – Client's engineer, 17km of tunnels; Dublin Metro, Ireland – Preparation of reference design for 14km; Dartford Crossing, Kent, UK – Operation & maintenance; Port of Miami Tunnel, Florida, USA – Design; Upper Rouge CSO, Detroit, USA – Design and construction management for 12km CSO; Brightwater, Washington, USA – Construction management for 22km sewer tunnel; North Shore Connector, Pittsburgh, USA – Client's programme / construction manager for mass transit; Hartsfield Jackson Airport APM, Atlanta, USA – NATM design; Kowloon Southern Link, HK – Design of KDB400 (1km twin C&C) and independent checking engineer for KDB200 (1.2km twin TBM)	National Grid Cable Tunnels, London, UK – Feasibility study route assessments; Heathrow and Ramsgate Tunnels, UK – Safety compliance; Tottenham Court Road Station, London, UK – Tunnel, E&M, utility diversions & settlement assessment for upgrade; DLR Extension, London, UK – Lender's technical advisor; Dartford Cable Tunnel, UK – Design & supervision; Limerick Immersed Tube, Ireland – Technical advisor; Zabreh-Krasikov Rail Corridor, Czech Republic – Supervision & cost control
Jason Consultants Group Suite 605 95 Wilton Road London SW1V 1BZ United Kingdom Tel: +44 1480 860899 Fax: +44 1480 869234 Email: david.abbott@jasonconsult.com Web: www.jasonconsult.com	a) US\$3M b) US\$3M	Design engineering for underground utility infrastructure, including: Tunnelling, microtunnelling, jacked structures, HDD, management, market and economic studies, expert witness, education and training	Upper Jones Falls Interceptor, Baltimore, USA – Technical advisor for 6,500ft of 48" sewer to alleviate flooding in north-west Baltimore. To be undertaken by slurry microtunnelling through weathered rock and river deposits: Evaluation and recommendations relating to alignments & construction documents, CM support including submittal reviews for trenchless works, inspector training & production monitoring during pipe installation; Fontibon Storm Water Collectors, Bogota, Colombia – 7km of storm water interceptor: Working for client Empresa De Acueducto Y Alcantarillado De Bogota (EAAB), technical review of the project, including tunnelling methods, schedule, costs, specifications & implementation	National City, VA, USA – Technical advisor for feasibility study & design of 1,800ft of 12" sewer along heavily trafficked highway. Evaluation & recommendations relating to proposed alignments, site investigation needs & interpretation, construction documents; Green Mount Interceptor, Baltimore, USA – Technical advisor for 6,300ft of 36/48" sewer to alleviate flooding. To be undertaken by slurry microtunnelling through weathered rock and river deposits: Evaluation & recommendations relating to alignments, SI & interpretation
Jenny Engineering 2 Edison Place Springfield NJ 07081 USA Tel: +1 973 379 6699 Fax: +1 973 379 6774 Web: www.jennyeng.com	a) US\$5.9M b) US\$5M	Planning, feasibility, design, project management, construction management, geotechnical engineering, shafts, rehabilitation, asset management	NYCDEP-Contract TCM-51, New York, USA – Project management services for construction of Manhattan City Water Tunnel No 3 and nine new shafts. Reconstruction of Shaft 16A and 23 chambers, assorted improvements; Port Authority of NY/NJ, Lincoln, Holland and Path Tunnel Systems, USA – Cyclical inspection and design services for rehabilitation	NYCDEP-Contract, City Water Tunnel No 3, New York, USA – Geotechnical engineering and construction management related services for water tunnel in Manhattan, Brooklyn and Queens. Outstanding performance evaluation ratings received for services spanning past 7 years

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TUNNELLING CONSULTANTS

Company information	(a) Turnover (b) Turnover in tunnelling	Areas of expertise	Tunnel contracts underway	Recent tunnel contracts
John Reilly Associates 1101 Worcester Road Framingham MA 01701 USA Tel: +1 Email: relibay@jrg.com Web:	a) US\$0.4M b) US\$0.13M	Management of complex projects, strategies, probabilistic cost estimating and risk mitigation, partnering and alliancing.	Various North American projects including: Washington State Highway projects (including Alaska Way Viaduct and Tunnel, SR520 Floating Bridge, I-405 Highway); New York MTA 2nd Avenue Subway Tunnels; Toronto Waterfront Revitalisation, Canada; Omaha CSO	Various North American projects including: Washington State Highway projects (including Alaska Way Viaduct and Tunnel, SR520 Floating Bridge, I-405 Highway); New York MTA 2nd Avenue Subway Tunnels; Toronto Waterfront Revitalisation, Canada; Omaha CSO, USA
Jordan, Jones & Goulding 6801 Governors Lake Pkwy Norcross Georgia 30071 USA Tel: +1 770 455 8555 Fax: +1 770 455 7391 Email: relibay@jgg.com Web: www.jgg.com	a) US\$71.6M b) US\$10.6M	Tunnel design and engineering, geotechnical sub-surface & geophysical investigations, hydrogeology assessments, risk assessment, allocation & management, environmental permitting, public involvement	Automated People Mover - Hartsfield Jackson Atlanta International Airport, Atlanta, Georgia – The Department of Aviation of the City of Atlanta, Georgia is planning an extension to its existing Automated People Mover (APM) from Concourse F at Hartsfield Jackson Atlanta International Airport (HJIA). This extension includes two, twin-bore tunnels. Their alignments follow the existing APM tracks eastwards beneath Concourse E, underneath Taxiway D, and daylight at the east portal near the Cargo Service Road; West Area CSO Tunnel, Atlanta, USA – 8.5 mile long, Ø24ft, sewer tunnel. Managing partner of design JV, ongoing CM services required to complete the project in Nov 2007	South Cobb Tunnel & Pump Station, Atlanta, USA – Design of a Ø24ft, 30,000ft tunnel & pump station
KBR (Kellogg Brown & Root) Hill Park Court Springfield Drive Leatherhead Surrey, KT22 7NL United Kingdom Tel: +44 1372 865000 Fax: +44 1372 863282 Email: Dougal.Monk@kbr.com Web: www.kbr.com	a) US\$9.6M b) US\$9M	Programme management, project management and construction supervision, tunnel project multi-discipline planning, design, budgeting and scheduling, procurement and contract engineering, urban cable tunnels	Beddington to Rowdown 400kV Cable Tunnel, London UK – Project management, design management (civil, M&E, cabling), construction supervision, outline design, planning, environmental, and third party coordination of a US\$1bn, 10km long, 3m i.d., 60m maximum depth cable tunnel formed of a 6 x trapezoidal pre-cast concrete lining for client National Grid; Los Angeles County Metropolitan Transit Authority - Metro Gold Line Eastside Extension Light Rail Transit Project, LA, US - Project management, construction management and inspection of two 2,250m long, 6.4m diameter tunnels up to 20m deep, formed of a 5 piece trapezoidal pre-cast concrete lining with a project cost of US\$360M	Dublin Port Tunnel, Ireland - Construction supervision services for client, Dublin City Council for a 5.5km long, 10.4m diameter highway tunnel; London Connection Cable Tunnel Project, London, UK – Design, project management, construction supervision, support to planning, environmental and third party consultation for client, National Grid of a 22km long, 3m diameter cable tunnel
Lachel Felice & Associates 11411 NE 124th Street Suite 275 Kirkland Washington 98034 USA Tel: +1 425 820 0800 Fax: +1 425 820 9892 Email: leckert@lachel.com Web: www.lachel.com	a) US\$7.4M b) US\$6.6M	Road, water conveyance, hydro, and sewer tunnels, alignment and feasibility studies, design/build, cost analysis, rehab, construction management, dispute resolution, modelling, lining design, NATM, D&B, TBM construction	Big Walnut Augmentation/Rickenbacker Sanitary Interceptor Project, Columbus, Ohio, USA – Geotechnical investigation and design of approx. 38,000ft of 168 and 144in diameter tunnel; IH 635 Managed Lanes Project, Dallas, USA – Geotechnical engineering and preliminary tunnel design services for sections of twin multi lane tunnels; Lake Dorothy Hydro Project, Juneau Alaska, USA – Final tunnel design services for the project which involves 1000ft of hard rock D&B, with lake tap, and a TBM starter tunnel	Big Walnut Augmentation/Rickenbacker Sanitary Interceptor Project, Columbus, Ohio, USA – Geotechnical investigation and design of approx. 38,000ft of 168 and 144in diameter tunnel; IH 635 Managed Lanes Project, Dallas, USA – Geotechnical engineering and preliminary tunnel design services for sections of twin multi lane tunnels; Lake Dorothy Hydro Project, Juneau Alaska, USA – Final tunnel design services for the project which involves 1000ft of hard rock D&B, with lake tap, and a TBM starter tunnel
Lombardi Engineering Via R Simen 19 CH-6648 Minusio Switzerland Tel: +41 91 744 6030 Fax: +41 91 743 9737 Email: info@lombardi.ch Web: www.lombardi.ch	a) US\$19.4M b) US\$12.9M	Design and supervision of underground structures, geotechnical analysis, tunnel controlling and monitoring, cement and resin grouting for tunnelling and dams, refurbishment of tunnels, tunnel/fire safety	Gotthard Base Tunnel, AlpTranst, Switzerland – Twin HSR tunnel, 57km long, 3 intermediate attacks, crossover and multifunctional caverns. Design and supervision within JV; Kirchenwald Tunnel, Switzerland – Tunnel system, inc. 5.5km of tunnel, several caverns and vertical shaft. Design and supervision; Lugano Bypass Tunnel, Switzerland – Road tunnel, 2.6km with vertical shaft; Tunnel Grouff, Luxembourg – Twin road tunnel, 3km long, ventilation station with vertical shaft; St Gotthard Highway Tunnel, Switzerland – Refurbishment of ventilation and air monitoring equipment; Lyon-Turin Ferroviaire, Modane, France – Inclined access tunnel. Supervision; Haute Savoie, France – Security agent	Fréjus Tunnel, Italy – Safety gallery, aside existing road tunnel, 13km long, Ø6m TBM, 34 bypass galleries and E&M; Tunel sur Avenida, Quito, Ecuador – Consultancy; Bolu Tunnel, Turkey – 3km long, twin tunnels on the Ankara-Istanbul highway; Mt Blanc Tunnel, Italy-France – Project review of the upgrading works on behalf of the bi-national security committee
London Bridge Associates Cranhurst Lodge 37-39 Surbiton Hill Road Surbiton Surrey, KT6 4TS United Kingdom Tel: +44 20 8399 8614 Fax: +44 20 8399 4208 Email: sales@lbassoc.co.uk Web: www.lbassoc.co.uk	a) US\$7M b) US\$6.3M	Construction planning, construction management & technical support at all stages of project life cycle and for all underground techniques, project management and risk management	Crossrail, London, UK – 11km twin bore running tunnels and 6 tunnelled stations. Construction planning support as part of Hybrid Bill team and part of Multi-Disciplinary 3 Team; Holmsdale Tunnel, M25, UK – Civil and M&E refurbishment working as an integral part of the Costain Capita Symmonds design and build team; Dublin Metro North, Ireland – 8.5km twin bore tunnel and 7 deep stations providing construction planning and design management support to the Jacobs reference design team; Victoria Station Upgrade (VDSU) – Construction planning and programming as part of the detailed design team; Cooling the Tube, London, UK – assurance services; A3 Hindhead Tunnel, UK – production supervision for the SCL lined road tunnel	Dublin Port Tunnel, Ireland – 2.5km, Ø12m bored tunnels with 1.5km cut and cover working as part of KBR construction supervision team; CTRL Contract 240, London, UK – 5km twin bore running tunnel, working as an integral part of the JV project management team; Stonehenge Tunnel, UK – Twin bore tunnel beneath World Heritage Site; Tottenham Court Road Station Enhancement, London Underground, UK – Extension to existing ticket hall and new escalator connections. Working for Hawkins Brown architects

TUNNELLING CONSULTANTS

Company information	(a) Turnover (b) Turnover in tunnelling	Areas of expertise	Tunnel contracts underway	Recent tunnel contracts
Metroul 3bis Gutenberg Street Sector 5, Bucharest 050027 Romania Tel: +40 31 104 7107 Fax: +40 21 312 4335 Email: metroul@metroul.ro Web: www.metroul.ro	a) US\$14M b) -	Shield tunnels, cut and cover, pipe-jacking, soft ground tunnels	Bucharest Metro, Line 5, Romania – Technical specifications for Metro Line 5 including 9km running tunnel and 13 stations; Bucharest Metro Airport Link, Romania – Feasibility study for Metro link between “Henry Coanda” (Otopeni) international airport and existing Metro network in Bucharest, 17km with 19 stations; Bucharest Metro, Line 4, Romania – underground section from Mai to Laromet	Underground Parking Studies, Bucharest, Romania – Feasibility studies for 5 underground parking locations in the city; Pipe-jacking – 4m diameter underground crossing of two aqueducts
Moergeli+Moergeli Consulting Engineering Rosengartenstrasse 28 CH 8716 Schmerikon Switzerland Tel: +41 55 282 5001 Fax: +41 55 282 5002 Email: info@moergeli.com Web: www.moergeli.com	a) US\$0.2M b) US\$0.15M	Risk assessments & risk management, health & safety, CE conformity assessments, machinery & system safety	AlpTransit, Gotthard Base Tunnel, Switzerland – Health and safety engineer, 2nd level support for Consortzio Tunnel Alptransit Ticino, Lot 452 (Faido); Belchen Road Tunnel, Switzerland – Implementation of a project specific Quality Management System for the Owner for tunnel rehabilitation; Devil's Slide Tunnel, CA, USA – 2nd Level Support Risk Management for the Caltrans construction management team.	AlpTransit, Gotthard Base Tunnel, Switzerland – Health and safety engineer, 2nd level support for contractors on Lot Lot 554 (Bodio), Lot 252 (Amsteg), Lot 360 (Sedrun); Dulles Corridor Metrorail Project, Dulles, USA – risk assessment, risk management for Dr G Sauer Corporation
Morton & Partners 13028 Highway No. 7 RR #1, Georgetown Ontario L7G 4S4 Canada Tel: +1 905 873 9668 Fax: +1 905 873 9668 Email: mortonlp@can.rogers.com	Undisclosed	Ground stress determination in large basinal sedimentary rock sequences, ground engineering design in difficult ground, design and implementation of Improved Earth techniques	Design review for large-area shaft complex in overburden below water table, for intersection/diversion of overloaded existing trunk sanitary sewer and lift out/recovery of EPBM and trailing gear; Niagara Escarpment World Heritage Domain, Southern Ontario, Canada – Ongoing conceptual, feasibility and design reviews of intended magnesian limestone/dolostone insitu rock berms and narrow perimeters for reservoir impoundment in quarry sites; Winery Cellars, Niagara Peninsula, Ontario, Canada – Rock engineering, feasibility and preliminary design for winery cellars in magnesian limestone/ dolostone; Columbus, Ohio, USA – TBM mining problem resolution for new sewer conduit	Ground engineering inputs involving improved earth techniques for base and precious metal mining projects; Gypsum Mine, SW Ontario, Canada – Automated mining review for mine with very thin rock cover under heavy waterbearing overburden, involving high residual stress bedrock
Moretrench 100 Stickle Avenue Rockway NJ 07866 USA Tel: +1 800 394 MORE (6673) Fax: +1 973 627 6078 Email: pschmall@mtac.com Web: www.moretrench.com	a) - b) US\$60M	Construction dewatering & groundwater control, groundfreezing, grouting systems, earth retention & underpinning, rock protection, micropiles, slurry trenches	New York City Water Tunnel No 3, USA – Groundfreezing, dewatering, groundwater treatment, micropiles; Providence CSO Tunnel, Rhode Island, USA – Groundfreezing; Beacon Hill Station, Seattle, USA –Dewatering; Big Walnut Augmentation/Rickenbacker Interceptor, Ohio, USA – Slurry wall; Niagra Facility Tunnel, Queenston Heights, Canada – Groudwater treatment; Automated People Mover, Dulles Airport, USA – Groundwater treatment; A2nd Avenue Subway, New York, USA – Dewatering, groundwater treatment; North Shore Connector, Pittsburgh, USA – Dewatering, compaction grouting; Brightwater Conveyance System, Seattle, USA – Groundfreezing	East Side Access, New York, USA – Grouting, groundwater control, groundwater treatment; South Ferry Terminal, Manhattan, USA – Dewatering, ejector wells
Mott MacDonald St Anne House Wellesley Road Croydon, CR9 2UL United Kingdom Tel: +44 208 774 2000 Fax: +44 208 681 5706 Email: tunnels@mottmac.com Web: www.tunnels.mottmac.com	a) US\$700M b) US\$30M	Planning, design, construction management of all forms of tunnels and underground works, full support services in geotechnical and environmental engineering, specialist expertise in linings, modelling, design of tunnel ventilation	Crossrail, London, UK – Multi-disciplinary design services for 7km of underground railway and three stations; A3 Hindhead, UK – Detailed design and construction supervision of 2km road tunnel; Karahnjukar Hydroelectric Scheme, Iceland – CM for over 60km of hard rock tunnels; Victoria Station upgrade – Detailed design of modifications to existing underground station; Interconnector Project, Dublin – Preliminary design of tunnels and stations; Thames Tideway, London, UK; Kaohsiung Metro, Taiwan; Heathrow Airport, UK; Thames Water, London, UK; National Grid Tunnels, London, UK; Budapest Metro, Line 4, Hungary; Batapaati Nuclear Waste Storage, Hungary; Delhi Metro, India	Terminal 5, Heathrow Airport, UK – Design and CM of LU extensions and a 4.2km storm water tunnel; Durban Harbour Tunnel, South Africa – Design and CM; SMART Project, Malaysia – Design and supervision of a combined 9.7km long, Ø13.5m highway/stormwater tunnel; Crossrail, London, UK – Geographical multi-disciplinary call off consultancy developing project designs and support to hybrid Bill; Brighton and Hove Sewerage, UK – Preliminary design of new tunnels; Cable Tunnel, Singapore
Movares Nederland Daalseplein 101 PO Box 2855 3500 GW Utrecht The Netherlands Tel: +31 30 265 4531 Fax: +31 30 265 3492 Email: stephan.letanche@movares.nl Web: www.movares.com	a) US\$209M b) US\$37M	Bored tunnels, submersed tube, cut and cover, sprayed concrete, tunnel installations, tunnel safety, risk management	Rehabilitation of 2 Rail Tunnels, Fatima/Albergaria, Portugal – Preliminary design for structural lining, track infrastructure, superstructure, drainage, catenary and E&M installations for two tunnels, each approx. 660m long; De Bongerd Road Tunnel, Amsterdam, The Netherlands – Feasibility, location, alignment & urban development studies, as well as preliminary design for twin 500m cut & cover road tunnel and service tunnel; North-South Metro Line, tunnel under Central Station, Amsterdam, The Netherlands – Due to the wooden pile foundations of the station, tunnel will be built by ‘Sandwich Construction’. Project management, E&M installations, geotechnics, environmental and civil engineering.	Sophia Railway Tunnel, Zwjndrecht, The Netherlands – 8km tunnel, 4km of which is bored with Ø9.75m; Groene Hart Rail Tunnel, The Netherlands – 7km long double-track, Ø14.5m single bore TBM tunnel, built at a max depth of 37m below ground water level, in soft soils with high water pressures; Oude Maas and Dortse Kil Immersed Tube Tunnels, HSR South, The Netherlands – Project management and contract management of 1 x 1.4km and 1 x 1.5km double-track tunnels at 18-20m below water level

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TUNNELLING CONSULTANTS

Company information	(a) Turnover (b) Turnover in tunnelling	Areas of expertise	Tunnel contracts underway	Recent tunnel contracts
Mueser Rutledge Consulting Engineers 14 Penn Plaza 225 West 34th Street - 2nd Floor New York, NY 10122 Tel: +1 917 339 9300 Fax: +1 917 339 9400 Email: hlacy@mrce.com Web: www.mrce.com	a) US\$24M b) US\$24M	Geotechnical and foundation engineering services including groundfreezing, feasibility, alternate alignment studies, rock tunnels, soft ground tunnels, mixed face tunnels, cut and cover, microtunnelling, HDD, NATM, TBM, Drill and Blast, Shafts	Second Avenue Subway, New York, USA – Geotechnical and foundation engineering services and design of underpinning systems for a subway line; New York City Water Tunnel No 3, USA – Evaluation of groundfreezing methods for nine new shafts; Harlem River Crossing for New M-29 Feeder, New York, USA – Utility tunnel and shafts constructed by HDD; Four 138kV Crossing of Harlem River, New York, USA – utility tunnel constructed by HDD; New York Times Headquarters, New York, USA – foundation engineering and adjacent subway protection during highrise tower construction; East Side Access, New York, USA – Geotechnical and foundation engineering services and underpinning design for new subway	New South Ferry Terminal, New York, USA – Design of SOE and underpinning systems for active subway tunnels during expansion; Newark-Elizabeth Rail Link, Newark, USA – temporary excavation support and underpinning for subway extension; New York City Transit 6th Av Fan Plants, New York, USA – foundation engineering and SOE for two new vent plants; 44th St Vent Access, New York, USA ; Jay-Lawrence Street Connector, New York, USA ; One Bryant Bank, New York, USA
Mueller + Hereth Laufener Strasse 16 83395 Freilassing Germany Tel: +49 8654 60110 Fax: +49 8654 601133 Email: office.freilassing@mueller-hereth.com Web: www.mueller-hereth.com	a) US\$9M b) US\$9M	Design for all kinds of underground structures in rock or soil under high or shallow overburden, preparation and checking of stability analyses, consulting, site supervision/management, geotechnical and geological consultation	Tauern Tunnel, Austria – Site supervision for 6.5km road tunnel; Münster/ Wiesing Tunnel, Austria – Design of 5.7km rail tunnel; Radfeld/ Brixlegg Tunnel, Austria – Design of 4.2km rail tunnel; Blessberg Tunnel, Lot 2, Germany – Site supervision of 4.9km HSR tunnel; A26 Westring Linz, Austria – Project management of 8km road tunnel; Stans Tunnel, Austria – Site supervision of 2.5km rail tunnel; Rothenturm Tunnel, Austria – Design of 3km road tunnel; Malmo Citytunnel, Sweden – Design of 0.4km subway tunnel; Metro, Algeria – Design/consulting; M6 Motorway, Hungary – Design of four tunnels; East West Highway, Algeria – Design of three tunnels	Heidkopf Tunnel, Germany – 1.7km long road tunnel; Tunnel Nollinger Berg, Germany – Site supervision for 1.3km long road tunnel; Stuttgart 21, Germany – Design of 8.8km railway tunnel; Tunnel Rennsteig, Germany – Site supervision for 7.9km road tunnel; Schmücke Tunnel, Germany – Design of 1.7km motorway tunnel; Drackenstein Tunnel, Germany – Design of 1.7km tunnel; Himmelschleife Tunnel, Germany – Design of 1.2km road tunnel;
MWH 370 Interlocken Blvd Suite 300 Broomfield Colorado 80021 USA Tel: +1 303 410 4000 Fax: +1 303 410 4100 Email: info@mwhglobal.com Web: www.mwhglobal.com	a) US\$900M b) US\$25M	All areas, including project and construction management; hard to soft ground tunnelling, micro-tunnelling and trenchless, ventilation, geotechnical instrumentation and engineering; underground storage projects	Brightwater Conveyance, WA, USA – JV design & support for 20km of Ø4.3m TBM tunnels and 1km microtunnel; Lake Mead Intake No 3, Nevada, USA – JV design for 4.3km of Ø6.1m water supply; Lake Hodges-Olivenhain Pipeline, CA, USA – Design/owner's engineer for 1.8km of Ø3m hard rock tunnel for water supply & pumped storage HEP; Bradshaw Interceptor Section 8, CA, US – Design for 2.4km of 2-pass Ø3.1m soft ground tunnels; CUP McCook Reservoir, Illinois, US – Design of 780m long Ø3.5m and 230m long Ø2.6m D&B tunnels for CSO & connection to TARP and McCook Reservoir; Mill Creek No. 3, Ohio, USA – Design & engineering support; Pinalto HEP, Dominican Republic – Owner's engineer & CM	Denny Way/Lake Union CSO, Seattle, USA – CM services for 1.9km long Ø4.5m tunnel by EPBM and 730m of Ø1.8m by micro TBM for CSO storage and conveyance, in addition to the outfall, cut & cover pipelines and facilities; Shaler Run, Cincinnati, USA – Design of 8.1 shafts & 3km of Ø1.1m microtunnelled sewer; Shandong Taian Pumped Storage, China – Consultant & technical advisor, design & engineering support for scheme; Lower Northwest Interceptor, CA, USA – Programme management
Nick Barton & Associates Fjordveien 65c Høvik Norway Tel: +47 6753 1506 Fax: +47 6753 1506 Email: nickbarton@hotmail.com Web: www.qtbm.com	Undisclosed	Rock mass quality assessment, tunnel/cavern support, seismic velocity - quality linkage with depth, groutability, TBM prognosis with Qtbm model, shear strength of rock joints and rock masses	São Paulo Metro, Line 4, Brazil – Consultant group reporting to CVA consortium concerning the causes of the Pinheiros metro station accident in January 2007; SRK/Anglo American – TBM prognosis, based on extensive core logging and modelling using Qtbm for 8km Los Bronces mine access tunnel; La Higuera HEP, Chile – Rock classification and tunnel design advisor to Brazilian contractor Queiroz Galvão. Focus on rock reinforcement on the 18km headrace tunnel; Danish Geological Institute, GEUS – Feasibility study for deep and shallow pumped hydro projects in Denmark; Skanska – Rock quality, support, seismic integration, for new E18 road tunnels in Finland; Planservi/Odebrecht, Panama	Seymour Capilano Water Project, Greater Vancouver Water District, Canada – Advice concerning rock quality questions at a deep access shaft and at twin TBM tunnels; CFRD Campos Novos HEP, southern Brazil – Expert to Munich Re and IRB insurance group, concerning concrete cracking, tunnel gate failure and reservoir loss; Skanska, Botnia Rail Tunnels, Sweden – Independent expert; Lysaker-Sandvika Rail Tunnel, Oslo, Norway ; "Rock Quality, Seismic Velocity, Attenuation & Anisotropy" – 730 page book
Norconsult Vestfjordgaten 4 N-1338 Sandvika Norway Tel: +47 6757 1000 Fax: +47 6754 4576 Email: company@norconsult.no Web: www.norconsult.no	a) US\$136.7M b) US\$13M	Lake taps/underwater piercings, undersea tunnels, underground hydrocarbon storage, engineering geology, advice and follow-up for tunnels in poor rock mass conditions, unlined pressure tunnels and shafts	Jinping Access Tunnels, China – Advice for twin 17.5km tunnels with up to 2.5km overburden in karstified marble; Ziangan Undersea Road Tunnel, China – Advice for 5.7km twin tunnel & service gallery; Chiquicamata Copper Mine, Chile – Planning & follow-up of repair of underground transfer for conveyor belt cavern; Greater Istanbul Water Supply Project, Turkey – Construction advice for 5.5km undersea tunnel; City Rail Project Bergen, Norway – Detailed design & preparation of tender docs for 4 tunnels; Sauda HEP, Norway – Construction design & follow-up; Kjonesfjorden HEP, Norway – Construction design & follow-up; Breidalen Water Transfer Tunnel, Norway – Construction follow-up	Ovre Otta HEP, Norway – Construction design & follow-up of 20km of tunnels and 2 power caverns; Ormen Lange Land Terminal, Norway – Construction advice & follow-up for 2 x 2km cooling water tunnels & underground cavern; Upper Tamakoshi HEP, Nepal – Feasibility study for 10km tunnels & power cavern; Jong-Asker Rail Project, Norway – Construction follow-up of 6km tunnels; Xiluodu HEP, China – Planning advisory services for 12,600MW underground plant; Aura HEP, Norway – Planning & follow-up
Norwegian Geotechnical Institute (NGI) PO Box 3930 Ullevaal Stadion NO-0806 Oslo Norway Tel: +47 2202 3000 Fax: +47 2223 0448 Email: ngi@ngi.com Web: www.ngi.com	a) US\$31M b) US\$2M	Geological and geotechnical research and consulting, hydrogeology, site investigation, rock mass classification (particularly Q-method), hydraulic in-situ rock stress measurements, feasibility, modelling, support, grouting	E16 Wøyen-Bjørn Tunnels, Norway – Detailed design for two 1km double-tube road tunnels with limited rock cover; Måleøy-Rødeberg, Norway – Detailed design of 0.7km road tunnel; Stedjeberget Road Tunnel, Norway – Detail design of 2.1km long road tunnel; SKB, Sweden – Design of deep repository for storage of spent nuclear waste Laxemar, Design Phase D1; Butan – Feasibility study for a road tunnel in landslide area	Skaugum Tunnel, Norway – Construction management & supervision of groundwater wells for a 3.4km rail tunnel; Castro Alves HEP, Brazil – Rock support design for tunnelling in areas with high stresses; E18 Oslo Harbour Crossing, Norway – Detailed design & supervision of 0.9km immersed/cut & cover subsea tunnel; Halsnøysambandet, Norway – Site investigation, detailed design & tender docs for 4.1km subsea road tunnel; Nathpa Jhakri HEP, India – Advice during construction

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TUNNELLING CONSULTANTS

Company information	(a) Turnover (b) Turnover in tunnelling	Areas of expertise	Tunnel contracts underway	Recent tunnel contracts
Obermeyer Planen + Beraten Hansastrasse 40 D 80686 Munich Germany Tel: +49 89 57990 Fax: +49 89 5799 222 Email: info@opb.de Web: www.opb.de	Undisclosed	Civil and structural engineering (D&B, cut & cover, TBMs), caverns/ underground storage, ground stabilisation, immersed tube tunnels, electrical engineering, environmental monitoring, communications, fire protection	Metro Hamburg, Line 4 Extension, Germany – Single-track tunnel, 2 x 2.81km (slurry shield); Tunnel Landshuter Allee/ Tunnel Feldmoching, Munich, Germany – Single-track tunnel for maglev, 2 x 3.76km / 2 x 1.37km (EPB and slurry shield); Cornberger Tunnel, Germany – Single-track rail tunnel, 900m (NATM); Tunnel Fritzens/Baumkirchen, Austria – Double-track tunnel for HSR, 2.3km cover & cut, 430m NATM; Tunnel Wiesing/Jenbach, Austria – Double-track tunnel for HSR, 3.21km (slurry shield); Metro 2 Kizilay-Yenikent, Ankara, Turkey – Single track tunnel, 2 x 2.85km NATM, 2 x 950m EPB shield, 2 x 8.1km cut & cover	Albcorlandtunnel, Stuttgart-Ulm, Germany – Single-track tunnel for HSR, 2 x 8.25km NATM; Burgbergtunnel, Erlangen, Germany – Double-track tunnel for HSR, 307m NATM; Tunnel Thympanon, Greece – Two-lane tunnel, 1.42km NATM; Tunnel Aigion, Greece – Double-track tunnel, 3.27km NATM; Metro 3 Batikent-Sincan, Ankara, Turkey – Metro running tunnel, 2 x 940m EPB shield, 2 x 9.35km cut & cover
OTB Engineering 4 La Gare 51 Surrey Row London DE1 0BZ United Kingdom Tel: +44 20 7099 2608 Fax: +44 20 7099 2611 Email: info@otbeng.com Web: www.otbeng.com	Undisclosed	Tunnels & underground engineering, concrete technology, construction materials, geotechnical engineering, mining & mineral resources, railway engineering, E&M engineering, fire protection engineering, management for major projects	Cooling the Tube, London Underground, UK – Development and design of modular tunnel cooling system; Crossrail, London, UK – Expert advice; Thames Tideway – Peer review of proposed deep tunnel wastewater scheme; Santiago Metro – Design review of NATM tunnels; Tubelines – Deep tube tunnel strengthening	Docklands Light Railway, Woolwich-Arsenal Extension, London, UK – Design of temporary openings in segmental linings; Innov8, Metronet, UK – Conception and development of various solutions to improve the performance of London's underground infrastructure; Composite Replacement Sleeper, Metronet, UK – Concept, design and development of new lightweight underground rail sleeper; East Side Access, Manhattan Tunnels – Design of assembly caverns
Parsons Brinckerhoff Geotechnical & Tunnelling Service Centre One Penn Plaza NY 10119 New York USA Tel: +1 212 465 5000 Fax: +1 212 465 5096 Email: munfakh@pbworld.com Web: www.pbworld.com	a) US\$1.7bn b) US\$250M	Underground construction, drill & blast, TBM, EPB, slurry shield, immersed tube, NATM/SEM, cut & cover, pipe jacking, microtunnelling, slurry walls, pile foundations, shafts, groundfreezing, seismic engineering, security and explosion resistant design	Marmaray Project, Istanbul, Turkey; THE Tunnel, New York, USA; East London Line Extension for LU, UK; Delhi Metro, Phase 2 India; East Side Access, New York, USA; Dubai Metro Purple Line, UAE; Epping - Chatswood Rail Line, Sydney, Australia; Shenzhen Metro Line 3, China; Central Link Light Rail, Seattle, USA; Shijiazhuang-Taiyuan High Speed Rail Line, China; Detroit River Outfall, USA; Singapore MRT Circle Line Stages 4&5; No 7 Line Extension, New York, USA; North-South Bypass Tunnel, Brisbane, Australia; London Underground, UK; EDF Brunswick Cable Tunnel, London, UK; National Grid Lea Valley Cable Tunnel, London, UK	Taiwan High Speed Rail - Programme management and design; Singapore Deep Tunnel Sewerage System – Programme management; Singapore MRT North East – Lead consultant; LA Interceptor Sewers, USA – Design & construction management; West Side & East Side CSO, Portland, Oregon, USA – Design; Shanghai Metro Line M, China – Technical support

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Nick Stanning

TUNNELLING CONSULTANTS

Company information	(a) Turnover (b) Turnover in tunnelling	Areas of expertise	Tunnel contracts underway	Recent tunnel contracts
Parsons Corporation 100 West Walnut Street Pasadena California 91124 Tel: +1 626 440 4000 Fax: +1 626 440 6337 Email: Web: www.parsons.com	a) US\$3bn b) US\$53M	Tunnel engineering and design, including hard rock and soft ground TBMs, single pass tunnel construction, advanced waterproofingsystems, electrical, mechanical, ventilation, and fire and life safety systems	Trans Hudson Tunnel, New York, USA; Caldecott Tunnel, CA, USA; Drumanard Tunnel, KY, USA; Tembi Tunnels Greece; Al Salam Street Tunnel, Abu Dhabi; Red & Green Metro Line, Dubai; Palm Island Tunnel, UAE; Brightwater Tunnel, WA, USA; South Cobb Tunnel, GA, USA; Dulles Aiport People Mover and Stations, Washington DC, USA; Austin Downtown Tunnel, TX, USA; San Vicente Tunnel, CA, USA; Doha Expressway Drainage Tunnels, Qatar; SDLAC-JWPCP Tunnel & Ocean Outfall, CA, USA; San Francisco Public Utilities, Crystal Springs Bypass, Bay Division, Irvington Tunnels, CA, USA; Lake Mead Intake No 3, NV, USA	Channel Tunnel Rail Link, UK; Eisenhower-Johnson Memorial Tunnel, CO, USA; Chattahoochee Tunnel, GA, USA; TARP Little Calumet Tunnels, USA; Stone Canyon Bypass Tunnel and Pipeline, CA, USA; Kuwait Interceptor Phase 1; Lake Hodges Pipeline Tunnel, CA, USA; TRex New Mississippi Outfall, CA, USA; OCSO Ellis St Interceptor, CA, USA; San Francisco Transbay Extension Terminal, CA, USA; Kern River No1 Tunnels, CA, USA; Egnatia Motorway Tunnels, Greece
Plinninger Geotechnik, Dr Kirchweg 16 D-94505 Bernried Germany Tel: +49 9905 7070 360 Fax: +49 9905 7070 361 Email: geotechnik@plinninger.de Web: www.plinninger.com	Undisclosed	Rock & soil abrasivity and excavatability, including field and lab investigations, geotechnical documentation and measurements	Kopswerk II, Lot 1, Austria – 5.5km double-shield TBM headrace tunnel, geotechnical documentation, sampling, laboratory investigations, consulting; Nord-Süd Stadtbahn, Construction Lot South, Cologne, Germany – 3.3km shield TBM metro tunnel, laboratory investigations and consulting; Vomp-Terfens Tunnel, Austria – 8.5km NATM railway tunnel, geotechnical documentation, sampling, field and laboratory investigations and consulting	Achrain Tunnel, Austria – 3.2km NATM road tunnel, geotechnical documentation, sampling, laboratory investigations and consulting
Pöyry Infra Hardturmstrasse 161 CH-8037 Zurich Switzerland Tel: +41 44 355 5555 Fax: +41 44 355 5556 Email: uwe.jaeger@poyry.com Web: www.poyry.ch	a) US\$58.2M b) US\$36M	Design, consulting, construction supervision, geotechnical engineering, ventilation, safety, E&M equipment, survey and monitoring, hard rock TBMs, soft soil shield, shotcreting method, drill & blast, etc.	Zurich Central Line, Switzerland – Preliminary design including variant studies, basic design, construction design, consultancy services and construction site supervision for the 4.9km long Weinberg Tunnel on Switzerland's new railway that includes several rescue galleries and open sections; Gotthard Base Tunnel, Switzerland – Involved in all stages and aspects of the design from initial feasibility to construction site supervision and ventilation and safety. Currently a partner in the JV for the design and construction of the southern 3 lots which make up 2/3 of the total 57km tunnel length	Metro Valencia, Venezuela – First stage of 6.2km double track metro line inc. 7 stations, excavation by Ø9.6 slurry shield TBM. Review and approval of E&M and civil work design submissions, geotechnical and tunnelling consultancy services, construction supervision, safety management and claim management; Zurich Western Bypass N4, Islisberg Tunnel, Switzerland – Basic design, detailed design and construction site supervision for the twin tube, 4.9km long, 12.5m diameter Islisberg Tunnel constructed by Slurry TBM
Ramboll Gruppen Teknikerbyen 1 2830 Virum Denmark Tel: +45 4598 6000 Fax: +45 4598 6990 Email: oo@ramboll.dk Web: www.ramboll.com	a) US\$790M b) US\$39.5M	Cut & cover, immersed tube tunnels, rock tunnels, M&E including tunnel ventilation and fire safety	E18 Grimstad-Kristianssand Project, Norway – 7 x rock tunnels and 1 x cut & cover tunnel: Main consultant (in cooperation with Bilfinger Berger Technisches Büro); Malmö Citytunnel, E201, Sweden – Geotechnical & hydrogeological services, M&E, rescue/ventilation shafts & participation in design management; Limerick Tunnel Scheme, Ireland – Cat III check for 900m immersed tube; Citybanan, Södermalm Lot, Sweden – Preliminary design for rail tunnel. 1.5km rock tunnel and cut & cover; Skansenløpet Tunnel, Norway – 500m tunnel crossing. Geotechnical, M&E and structural design	Norra Länken, Lot K2, Sweden – Preliminary design; Marselisborg Tunnel, Denmark – Preparation of tender docs for EIA for a 2km road tunnel; Bording-Låsby Motorway, Denmark – Assistance in connection with the EIA for a new motorway; Steinberget Tunnel, Norway – Design of all works in connection with a 1.3km road tunnel in Trondheim; E18 Larvik, Langangen Bridge, Norway – Engineering services for new road with 4 rock and 1 concrete tunnels; Nordhavnsvejen, Denmark – Studies for bored and C&C tunnels
Rocksoil Piazza San Marco 1 I-20121 Milan Italy Tel: +39 02 655 4323 Fax: +39 02 657 1307 Email: rocksoil@tin.it Web: www.rocksoil.com	a) US\$10.5M b) US\$10.5M	Tunnel design and construction using ADECO-RS approach, core-face reinforcement with fibre-glass bolts, mechanical pre-cutting, horizontal and vertical jet-grouting, cellular arch technology, widening of operational tunnels	Nazzano Tunnel, Milan-Naples Motorway, Italy – Tunnel widening; A14 Motorway Modernisation, Italy – 6 x Ø22m road tunnels, 2 of which will be widened; Naples Metro, Lines 1 & 6, Italy – Running tunnels & stations; Milan Metro, Line 5, Italy – Running tunnels & 8 underground stations; Bologna-Florence Motorway, Lot 6, 7, 10 & 12, Italy – 6 twin road tunnels Ø17m; Milan-Naples Motorway, Lot 13 – 3 x 2.5km twin-tube road tunnels; Genoa Metro, Italy – Running tunnels, Ø9.1m; Thessaloniki metro, Greece – 2 x 7.8km long, Ø6.2m Running tunnels	Milan to Naples High Speed Rail Line, Italy – Ø13.5m, 9 running tunnels; S.P (Country Road), Italy – Parscera road tunnel, Ø12m, 1.7km long; Malpensa Airport-Milano Cadorna FNM Rail Link, Italy – 2 rail tunnels (EPB) Ø8.15, 1.2km long; Bologna to Florence Motorway Lot 3 – Twin road tunnels, Ø17m, 2 x 3.5km
S.I.N.C. 26 Via Ludovico di Breme 20156 Milan Italy Tel: +39 02 3340 1220 Fax: +39 02 3800 2893 Email: info.sinc@sinc.it Web: www.sinc.it	a) US\$1.82M b) US\$1.1M	Final, executive, construction design, mechanised and traditional excavation methods, design & stabilisation of slopes, tunnels in urban areas and interference resolution	Brenner Base Tunnel, Italy – Aicha and Unterplattner tunnels: Executive design, both mechanised and traditional excavation; Catania-Siracusa Motorway, Sicily – 5 x unlined tunnels, total length 25km. Construction, project and geotechnical consulting; A1 Motorway, Toscana, Italy – S. Donato Tunnel, final design	St Petersburg Metro, Russia – Executive project design for access tunnel; Mules-Forzezza Hydraulic Tunnel, Italy – Geotechnical study and interference with existing structures (preliminary project); Urban Malls, Milan, Italy – Executive design and site supervision of 2 urban malls; Brenner Base Tunnel, Italy – Numerical 3D modelling for the original insitu stress determination

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TUNNELLING CONSULTANTS

Company information	(a) Turnover (b) Turnover in tunnelling	Areas of expertise	Tunnel contracts underway	Recent tunnel contracts
Sauer Corporation, Dr G 560 Herndon Parkway Suite 310 Herndon VA 20170 USA Tel: +1 703 707 0700 Fax: +1 703 707 0703 Email: washington@dr-sauer.com Web: www.dr-sauer.com	a) US\$3.5M b) US\$3.5M	NATM/SEM and TBM tunnelling, subway stations, urban tunnelling (all ground conditions), tunnel inspection, rehabilitation and waterproofing design, CM & supervision cost estimating, feasibility studies, value engineering	Metro Red Line, Tel Aviv, Israel – Owners representative in reviewing preliminary design for the NATM/SEM mined structures; Silverline, Phase 3, Boston, USA – NATM specialist preparing preliminary engineering design for mined tunnels; C0028 Northern Blvd Tunnel, New York, USA – Working with the contractor to design 1000ft of slurry walls/tie back support of excavation and a Ø56' x 40' tunnel using barrel vault method with compensation grouting; East Side Access, Contract CM009, Manhattan Tunnels New York, USA; Muni, San Francisco, California, USA; North Link, Seattle, Washington, USA; Devils Slide, San Francisco, USA; Tottenham Court Rd Station Upgrade, London, UK	Tyson's Corner Tunnel, McLean, VA, USA – Design of large bore (Ø44ft) TBM tunnel, NATM/SEM adits and cut and cover stations; Beacon Hill Station, Seattle, WA, USA – Construction inspections and design support for soft ground NATM/SEM tunnels; Pajares Rail Tunnel, Spain – Bifurcation Chamber East, cavern design that allows ongoing TBM operations while cavern excavation proceeds; Singapore – Structural assessment of existing underground structures and design of remedial works
Schroeder et Associes SA 8 Rue des Girondins L-1626 Luxembourg Tel: +352 4431311 Fax: +4352 443131524 Email: contact@schroeder.lu Web: www.schroeder.lu	a) US\$29M b) US\$2.9M	Design of road and rail tunnels, including their technical equipment, in soft and swelling rock	Tunnel Gousseleberg, Luxembourg – 2.6km, 4 lane motorway tunnel; Tunnel Grouff, Luxembourg – 3km, 5 lane motorway tunnel; Tunnel Staffeler, Luxembourg – 2km, 4 lane motorway tunnel; Tunnel Gaalgebierg, Luxembourg – 1km rail tunnel; Tunnel Ettelbrück, Luxembourg – 1km, 3 lane road tunnel	Undisclosed
Scott Wilson Scott House Basing View Basingstoke Hants, RE21 4JG United Kingdom Tel: +44 1256 310200 Fax: +44 1256 816835 Email: geoff.bateman@scottwilson.com Web: www.scottwilson.com	US\$323.5M b) US\$9.9M	Civil, geotechnical & electro-mechanical engineering of tunnels, shafts and caverns in hard rock and soft ground. TBM, drill & fire, submerged tube, cut & cover. Hydropower, mining, transportation and civil underground structures	Igoumenitsa-Ioninia Railway, Greece – Detail design for tunnels; Cooling the Tube, LU, UK – Outline designs for tunnel cooling system; SFA, LU, UK – Feasibility study for step-free access to Green Park station; Wrens Nest Tunnel, UK – Inspection and preliminary designs for re-opening of brick lined canal tunnel; Braamhoek HEP, S Africa – Technical advisor; Edinburgh Airport Rail Link, UK – Lead consultant; Madrid M30, Spain – Lenders independent advisor for South Bypass, inc. Ø15m 3.6km twin EPBM tunnel; Trent Valley 4 Track, UK – Form A&B approvals; Glenfield Tunnel, UK – Inspection, design & supervision of repairs; Jammu-Udhampur Tunnel, India – Feasibility for new 2-lane tunnels	Victoria Station Upgrade, London, UK – Review of feasibility report, development of options & engineering for escalator barrels; Tindaya, Canary Islands – Feasibility, SI and tender design of 45 x 65m span, 50m high cavern; Athens Metro Ext, Greece – Advanced concept design of two extensions and two branches, comprising 27.5km of tunnels; Glendoe HEP, UK – Tender design for bidding contractor; Haymarket Development, Edinburgh, Scotland – Assessment of loading and impacts of new development on old tunnel
Shannon & Wilson Inc 400 N 34th Street Suite 100 Seattle Washington USA Tel: +1 206 632 8020 Fax: +1 206 695 6777 Email: clw@shanwil.com Web: www.shannonwilson.com	a) US\$46M b) US\$6M	Geotechnical and environmental exploration for design and construction management and construction monitoring with field instrumentation of all sizes of tunnels in soil and rock	Beacon Hill Light Rail Tunnels and Station, Seattle, Washington, USA – Geotechnical input for design and contract documents, assisted during construction with instrumentation monitoring, dewatering, ground behaviour assessment for MSE walls, ground improvement with stone columns and jet grouting, approach cut supports with soil nail walls and micropiles, and SEM station construction; Baumgartner Sewer Tunnel and Shafts, St. Louis, Missouri, USA – CM for construction of slurry wall supported shafts, drilled shafts, and TBM driven tunnel; Pump Station and Sewer Conveyance Pipeline, Bellevue, Washington, USA – Geotechnical and environmental assessment	Lake Ford Smith Dam Project, Arkansas, USA – CM for new 2300ft, Ø21ft outlet tunnel and twin 150ft long, 5ft lake taps; Coos Bay Railroad Tunnel Assessment, Oregon, USA – Tunnel condition assessment, preliminary assessment of remedial support requirements, and construction management for emergency repairs of nine 90 year old tunnels
Sinotech Engineering Consultants 14F, 171 Nanking East Road SEC 5, Taipei 10570 Taiwan PR China Tel: +886 2 2769 8388 Fax: +886 2 2766 9186 Email: sinotech@sinotech.com.tw Web: www.sinotech.com.tw	a) US\$111M b) US\$4.5M	Shaft sinking, ground treatment, precast linings, planning, design and supervision for highway, railway, metro, hydropower, water supply and sewage in soft and firm ground	Taipei MRT, Taiwan – Detailed engineering design for DK 192, DK 194, DK147, and DG168; Tseng-Wen Reservoir Transbasin Project, Taiwan – General consultant; Chu-Kong 161kV cable tunnel, Taiwan – Basic design consultant; Song-Hou 345kV and 161kV tunnel, Taiwan – Basic design consultant	Taipei MRT, Taiwan – Detailed design for DD189 and DD188; Hsueshan Tunnel, Taiwan – Detailed design and construction supervision; Yuanshantze Flood Diversion Tunnel Project, Taiwan – Basic design and construction consultation;
Snyder Engineering LLC 4251 Kipling Street Suite 550 Wheat Ridge Colorado 80033-6800 USA Tel: +1 303 420 1544 Fax: +1 303 420 1843 Email: lsnyder200@cs.com	a) US\$0.2M b) US\$0.15M	Design, development, operation & maintenance of all types of hard rock TBMs & soft ground shielded machines, consulting on TBM design, TBM failure analysis, technical support for claims and litigation, expert witness testimony	City Water Tunnel No3, Contract Geo-CM-01, New York, USA – Geotechnical engineering and construction management services for water tunnel construction in New York, expert review board member; Big Walnut Augmentation/ Rickenbacker Interceptor Sewer, Part 1, Columbus, Ohio, USA – Member of a tunnel advisory committee providing recommendations relating to the 15ft diameter EPB shield; Big Walnut Outfall Augmentation Sewer, Part 2, Columbus, Ohio, USA – Member of tunnel advisory committee providing recommendations relating to the EPBM; Big Walnut Rickenbacker Sanitary Sewer, City of Columbus, Ohio, USA – Tunnel advisory committee	Undisclosed

TUNNELLING CONSULTANTS

Company information	(a) Turnover (b) Turnover in tunnelling	Areas of expertise	Tunnel contracts underway	Recent tunnel contracts
Solexperts Mettenbachstrasse 25 CH-8617 Mönchaltorf Switzerland Tel: +41 44 806 2929 Fax: +41 44 806 2930 Email: info@solexperts.com Web: www.solexperts.com	a) US\$10.4M b) -	Geotechnical and hydrogeological testing and instrumentation, High Deformable Concrete (HDC) elements for squeezing and swelling rock, data acquisition and control, data visualisation	Alp Transit Gotthard Base Tunnel, Switzerland – Geotechnical instrumentation; Andra, Bure, France – Hydrogeological and geotechnical site characterisation for nuclear waste management; Lyon-Turin HSR, St Martin, France – High Deformable Concrete (HDC) for squeezing rock; Emosson Dam, Switzerland – Hydrogeological and geotechnical testing in deep boreholes	Brenner Base Tunnel, Austria – Deep borehole testing; Alp Transit Lötchberg Base Tunnel, Switzerland – Automatic monitoring of a deep excavation; Miz-1 – Stand-pipe, multi-packer system, monitoring of porewater pressure and water sampling on 6 levels
STF Consult Lindauer Strasse 3b D-86399 Bobingen Germany Tel: +49 8234 904 9930 Fax: +49 8234 904 9931 Email: thomassteinfeld@aol.com	Undisclosed	All aspects of segmental lined tunnels: manufacturing of segments, plant set-up, planning and commissioning of factories for pre-cast segments, works preparation for segment plants and TBM sites	Now Doha International Airport, Doha Qatar – Cut & cover tunnels for Midfield and Free Trade Zone Area: Double box sections each 20m wide with three lane traffic management. Construction manager on behalf of SGW JV; Sydney Desalination Plant, Sydney, Australia – 2.5km long twin tube bore into the sea for salt water intake and brine outlet. Conducted plant audits, review of factory set-up and checking on mould & precast manufacturers; Airport Link and Northern Busway, Brisbane, Australia – Responsible for planning of all precast works; Metro Line 2, Sofia, Bulgaria – Budget, tender and pricing for precast segments, plants and moulds	HSRL Munich-Verona, Lot H 8 Tunnel Jenback, Austria – Ø11.63m segmental lined TBM tunnel. Layout, planning, equipment selection and start-up of the precast factory; Gold Coast Desalination Alliance, Southport, Australia – 4km Ø2.8m i.d.TBM tunnel for sea water supply for desalination plant. Checked site set-up of precast subcontractor and mould manufacture process
Su Yapi Engineering & Consulting Ahmet Rasim Sokak No.16 Cankaya 06550-Ankara Turkey Tel: +90 312 441 3226 Fax: +90 312 438 2726 E-mail: suyapi@suyapi.com.tr Web: www.suyapi.com.tr	a) US\$7.5M b) US\$2.5M	Civil engineering, cut & cover, D&B, design engineering, electrical & mechanical engineering, environmental monitoring, environmental impact assessment, project management	Marmaray Bosphorus Immersed Tube Tunnel, Istanbul, Turkey – Contract-BC1, civil, electrical and mechanical (except SES analysis), detailed design engineering services for cut & cover structures such as stations, ventilation buildings and tunnels; Dikmen Foul Water Tunnel, Ankara, Turkey – Civil and structural basic design engineering services for 1.8km Ø3m tunnel; Ankara-Ismir HSRL, Turkey – Civil and structural basic design engineering services for 13 tunnels, totalling 13.1km of Ø11m tunnel	Marmaray Bosphorus Immersed Tube Tunnel, Istanbul, Turkey – Contract-BC1, civil, E&M (except SES analysis), detailed design engineering services for cut & cover structures such as stations, ventilation buildings and tunnels; Mengen-Devrek Highway Dorukhan Tunnels, Turkey – Civil and structural detailed design engineering services for 4.5km of Ø11.2m tunnel; Greater Istanbul Water Supply Project, Stage II Melen System, Turkey – Design and construction supervision
TEC Barbarossastraat 35 6522 DK Nijmegen The Netherlands Tel: +31 24 3820430 Fax: +31 24 3229589 Email: info@tec-tunnel.com Web: www.tec-tunnel.com	a) US\$4.65M b) US\$4.65M	Bored tunnels, immersed tunnels, technical systems, tunnels traffic management systems, safety, operation, management and maintenance	Busan Koje Link, South Korea – Will connect Busan with the island Koje. Dual carriageway motorway 8.2km, including an immersed tunnel with a length of 3.4km; Coatzacoalcos Tunnel, Mexico – Immersed tunnel under the estuary with a length of 1.5km; Terreiro do Paco Tunnel, Lisboa – Bored metro tunnel, twin tube Ø9.5m; Hubertus bored tunnel, The Hague, Netherlands – 1.7km twin bore tunnel Ø11m accommodation a dual carriage motorway; N201 Aalsmeer-Hoorn, The Netherlands – 1.4km dual carriage motorway tunnel crossing the Ringvaart around the Haarlemmermeerpolder	Genua Harbour Crossing – Preliminary design study of a harbour crossing by bored and/or immersed tunnel; A73, Netherlands – 2.4km partly immersed cut & cover tunnel accommodating dual carriageway
Temelsu International Engineering Services Yildizevler 4, Cad. 22 Sokak No: 606550 Cankaya, Ankara Turkey Tel: +90 312 442 4720 Fax: +90 312 438 5214 Email: temelsu@temelsu.com.tr Web: www.temelsu.com.tr	a) US\$9.5M b) US\$1.7M	Preparation of designs, repair and retrofitting design, tender documents, technical specifications and construction supervision or road and water tunnels with NATM, TBM, D&B and cut & cover	Trabzon South Peripheral Highway Project, Turkey – Study, design and engineering services. Detailed design of 15 highway tunnels with a total length of 13.1km (longest 1.73km); Bozüyük-Mekece Road Improvement Project, Turkey – Construction supervision and consultancy services for twin tube highway tunnels with total length of 3.27km (longest 2.45km); Greater Istanbul Water Supply Project, Melen System, Turkey – Final design, preparation of tender documents, detail design, construction supervision, consultancy during construction for 7 water tunnels Ø4-8m, with total length of 23.5km (longest 7km)	Borcka-Artvin State Highway Project, Turkey – Detailed design and preparation of tender documents for 11 highway tunnels with total length of 3.74km (longest 920m); Tunnels & Viaducts of Anatolian Motorway, Camlica-Gümüşova Section – Retrofitting and strengthening designs of 5 double tube motorway tunnels, total length of 4.96km (2.1km); Ordu Peripheral Highway Project – Preliminary, final & detailed design and preparation of tender documents of 4 highway tunnels, total length of 4.7km
TunnelConsult Paseo Gaudí 28 08172 Sant Cugat Barcelona Spain Tel: +34 935 907 120 Email: tunnelconsult@telefonica.net Web: www.nicdv.com	Undisclosed	Consultancy on TBMs and shields in challenging ground conditions, underground works design, lining design, CM, feasibility studies, equipment specification & selection, supervision, preparation & evaluation of tenders	Istanbul Metro, LTR Line & MRT Line, Turkey – Lining design, ground and surface monitoring design, construction expertise and technical consultancy for total of 14km of twin tunnels; Beles Hydro Electric Project, Ethiopia – TBM excavation of headrace and tailrace tunnels for total of 20km in volcanic rocks. Services range from lining design revision, TBM performance evaluation, geotechnical engineering	Cadi Tunnel, Catalunya, Spain – Consultancy services to the owner for excavation of 3.7km long emergency evacuation tunnel with open hard rock TBM; Barcelona Metro, Line 9, Spain – Completion of the first drive of Lot 1, excavated with Ø9.4m EPBM. Services included site engineering supervision, claims analysis and expert opinion, master planning

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TUNNELLING CONSULTANTS

Company information	(a) Turnover (b) Turnover in tunnelling	Areas of expertise	Tunnel contracts underway	Recent tunnel contracts
TYPSA, Técnica Y proyectos C/Gomera 9 28700 San Sebastián de los Reyes, Madrid Spain Tel: +34 91 722 7300 Fax: +34 91 651 7588 Email: madrid@typsa.es Web: www.typsa.com	a) US\$220M b) US\$36.6M	Design, project studies, feasibility, supervision, numerical modelling, ground improvement, sub-sidence risk assessment, risk management, monitoring, fire protection, M&E design. All underground construction projects	M-50 Motorway, Northern Sector, Madrid, Spain – Includes 10km tunnel; Fuengirola-Los Monteros, Malaga, Spain – 20.7km rail link; Legutiano-Escorialza HSRL, Spain – Twin tube 5km tunnel; Line 9, Barcelona Metro, Spain – 40km of urban tunnelling; AP-46 Expressway, Las Pedrizas-Malaga, Spain – 2 x twin road tunnels; Metro Line 3 Extension, Malaga, Spain – 2.5km + 2 stations; Chamartin - Atocha High Speed Rail Line, Spain – 8.5km, Ø11.5m TBM; Bilbao - Vitoria - San Sebastian High Sped Rail Line, Spain – 3 NATM tunnels, 5km long	Malaga's new Metro Line 3, Spain – 5.3km of cut and cover, 6 stations; Madrid - Valladolid High Speed Rail Line, Spain – 2km Tunnel in Valladolid; Barcelona Metro Line 5, Spain – Design of a new 200m ² subway station with 5m overburden; Loioa - Herrera Railway Line, Spain – 2km long tunnel, roadheader and NATM; Madrid Metro Extension Line 8 - Terminal T4 Airport, Spain – Ø9.38m TBM driven tunnel; Gibraltar Straight – Team leader for preliminary design of 38km tunnel;
Underground Professional Services Corporation Street Rugby Warwickshire CV21 2DW United Kingdom Tel: +44 1788 538 731 Fax: +44 1788 534 699 Email: info@unps.co.uk Web: www.unps.co.uk	a) US\$2.95M b) US\$2.95M	Permanent & temp works design for transport & utility projects, feasibility studies, buildability advice, research & development, geospatial surveys, management of tunnel lining manufacturing facilities, risk management	Belfast Sewerage Scheme, Ireland – 10km tunnels, 38m i.d. pumping station, 28 shafts and outfall; King's Cross Station Redevelopment, London – New access tunnels to the Victoria Line, Piccadilly Line & Northern Line. CAT III Checking Services; Shepherd's Bush Station, London – Temporary works & primary SCL lining design for step free access and improved ventilation & emergency arrangements; Croydon Cable Tunnel, UK – 10km long 3m i.d. cable tunnel; London Water Ring Main, UK – 4.5km extension; Hendon Cable Tunnel, UK – 2.5m i.d. cable tunnel; Green Park, London – Step free access; A4 Frame work for United Utilities – 20 shafts up to 21m diameter	Heathrow Terminal 5, UK – (in JV with Vinci) Extensions to Heathrow Express and Piccadilly Line, construction of new 8.1m i.d. Airside Road Tunnel and 4km long storm water tunnel. Temporary works design; CTRL 410, UK – (part of the Eurolink JV) 150m ² cross sectional area tunnel, 3.2km long in Chalk. Primary SCL lining design and temporary works
URS Corporation 600 Montgomery Street 26th Floor San Francisco CA 94111-2728 USA Tel: +1 415 774 2700 Fax: +1 415 398 1905 Web: www.urscorp.com	a) US\$3.3bn b) US\$25M	Tunnel design (rock, soft ground), trenchless technology, sewerage, water, rehabilitation, rail/mass transit, civil/geotechnical/structural /value engineering, program/construction management, risk assessment and risk management Big Walnut	Augmentation Rickenbacker Interceptor (BWARI) Parts 1 & 2, Columbus, USA – Design, bid and construction services for 7 miles of Ø14ft & Ø12ft (EPBM); Kensico City Tunnel, New York, USA – Part of a tri-venture (UTG) for planning of 16 mile rock tunnel for NYC water supply; Upper Northwest Interceptor (UNWI) Sections 1 & 2, Sacramento, USA – Design, bid and construction services for 4 miles of 120" i.d. pipeline (EPBM); East Side Access, NYC, USA – Program manager during construction; Lockbourne-Intermodal Subtrunk, Columbus, USA – 3 miles of soft ground tunnel. Fast track design and preliminary engineering; Irvington Tunnel, California, USA – 3.5 miles of Ø10ft tunnel	Water Tunnel No. 3, Manhattan Tunnel, NYC, USA – Construction services for 5 mile, Ø14ft water tunnel; Second Manapouri Tailrace, New Zealand – Design and construction services for Ø33ft, 6.5 mile tailrace; Colorado River Return Project, USA – Feasibility and geotechnical studies for 60 miles of Ø20ft water tunnel; Bergen Tunnel Rehabilitation, NJ, USA – JV work consisting of inspection, plans and specifications for rehabilitation; Cuyahoga Valley Interceptor Rehabilitation, Ohio, USA – Inspection, plans & specifications
Vector Projetos Rua Cardeal Arcoverde 1749 CJ. 103 São Paulo CEP 05407-002 Brazil Tel: +55 11 3034 2333 Fax: +55 11 3034 2334 Email: lgmetto@vector.com.br Web: www.vector.com.br	Undisclosed	Design, consultancy, numerical modelling, risk inspections, soil mechanics, rock mechanics, engineering geology	Metro São Paulo, Line 4, Brazil – Basic design of tunnelling works; Metro Rio de Janeiro, Copacabana - Ipanema stretch, Brazil – Consultancy; La Higuera Hydropower Project, Chile – Consultancy; Pinalito Hydropower Project, Dominican Republic – Consultancy; San Francisco Hydropower Project, Ecuador – Consultancy	Metro São Paulo, Line 2, Brazil – Basic and final design of tunnelling works; Metro Rio De Janeiro, Brazil – Consultancy for Cantagalo Station
Vigconsult A-6780 Schruns Batloggstreet 36 Austria Tel: +43 5556 77844 Fax: +43 5556 77844 13 Email: office@vigconsult.at Web: www.vigconsult.at	Undisclosed	Segmental lining design, hydraulic tunnelling	Extension Hieflau, Austria – HPP headrace tunnel 4.8km; Val Passiro, Italy – HEP headrace tunnel, 6km; Metro Istanbul, Turkey – segmental lining design; Beles, Ethiopia – HEP headrace tunnel/ tailrace tunnel, 18.5km; Semmering Base Tunnel, Austria – HSR Tunnels, 2 x 28km; Perschlingtal Tunnel, Austria – HSR tunnel 7.5km; Gilgel Gibe, Ethiopia – Pressure gallery 22km;	Veligonda, India – Water survey tunnel, 18km; Kopswerk II A2, Austria – HPP 5km long headrace tunnel; Wienerwald Tunnel, Austria – HSR tunnels 2 x 10km; San Francisco, Ecuador – HEP pressure tunnel 11km
Zerna Ingenieure Industriestrasse 27 D-44892 Bochum Germany Tel: +49 234 9204 0 Fax: +49 234 9204 150 Email: ls@zerna.eu Web: www.zerna.eu	a) US\$15.5M b) US\$3.37M	Design and supervision of shield driven tunnels, microtunnelling and tunnels driven by mining and cut & cover techniques, investigation and mitigation of tunnelling and mining induced settlements, non-linear FE analysis	Wehrhahn-Line, Düsseldorf, Germany – Suburban railway in city center, total length of about 3.4 km. 6 stations will be constructed by cut & cover with diaphragm walls. The double track tunnel will be driven by Ø9.4m hydro-shield; Brandenburger Tor Station, Berlin – New station for metro line. One of the three for provisional shuttle service between Lehrter Bahnhof, Reichstag and Brandenburger Tor. Construction is divided into three parts: Two entrance buildings at the eastern and western ends and a platform building with a length of approx. 90m. The subterranean platform building will be driven by conventional mined excavation into a load bearing body of frozen soil. First time GFRP has been employed for extremely stressed diaphragm walls	North-South City Rail, Cologne – 4km tunnel project. TBM/NATM/C&C/ground freezing/soil fracturing. Planning, construction supervision and technical consulting services; B236n road tunnel, Berghofen, Germany – 1.3km long tunnel driven by NATM and C&C. Design of tunnel construction, preparation of the bidding procedure and supervision; Protection against mining damage – Use of algorithm, which separately determines stresses on structures, resulting from soil strains and pressures with respect to structural and building usage

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TUNNELLING CONTRACTORS

A

Company information	(a) Turnover (b) Turnover in tunnelling	Areas of expertise	Tunnel contracts underway	Recent tunnel contracts
Acciona Infraestructuras Avenida de Europa 18 Alcobendas 28108 Madrid Spain Tel: +34 91 663 2850 Fax: +34 91 663 2840 Email: webmail-infraestructuras@acciona.es Web: www.acciona-infraestructuras.es	a) US\$4.3bn b) US\$846M	Underground construction: rail, road, metro, sewer, hydro electric, by TBM (EPB, gripper, double-shield, single-shield), conventional (mechanical, Drill & Blast) and cut & cover methods	Pajares Tunnel, Lot 1, Leon, Spain – Twin railway tunnels, 2 x 10.5km, Ø10m TBM; Line 9, Barcelona Metro, Spain – Metro tunnel, 11km, Ø12m EPBM; Santoña Sewer Tunnel, Cantabria, Spain – 4km tunnel, D&B, Ø5m; Grado Doriga Highway, Asturias, Spain – Twin tunnels, 2 x 0.9km, mechanical-D&B, Ø15m; Horcajada-Naharros, Cuenca, Spain – Rail, 3km, roadheader Ø14m; L5 Barcelona Metro, Spain – mechanical Ø10-20m; Madroñal II, Madrid, Spain – Hydraulic, 3km, TBM Ø3m; Basurto Tunnel, Bilbao, Spain – Rail, 0.7km, roadheader Ø10m; Ojos de Agua Hydroelectrical Project, Chile – 1.5km, D&B Ø4m	M30 South Bypass, Madrid, Spain – Urban road tunnel, 3.6km, by Ø15m EPBM; Villargordo-Venta del Moro, Valencia, Spain – Rail, 3km, roadheader Ø14m; Malta Outfall, Coruña, Spain – 7km, TBM Ø3.5M; Los Nogales A-67 Highway Palencia, Spain – 2 x 0.2km D&B, Ø14m; Timijiraque Tunnel, El Hierro, Spain – Road, 0.5km, mechanical, Ø13m; Guadarrama Tunnel, Madrid, Spain – Twin rail tunnels, 2 x 14km, TBM Ø9.5m; Bologna Railway, Italy – 2 x 6km, EPBM Ø9m
A E Yates Cranfield Road Lostock Industrial Estate Lostock Boston BL6 4SB United Kingdom Tel: +44 1204 696 175 Fax: +44 1204 669 008 Email: trenchless.solutions@aeyates.co.uk Web: www.aeyates.co.uk	a) US\$44M b) US\$30.5M	Mechanised pipejacking and microtunnelling, owners and operators of a versatile fleet of small diameter TBMs and slurry systems, and HDD machines up to 70t pullback	Asselby-Pannal 1220 gas pipeline rail crossings, UK – 4 x rail crossing near Leeds using Ø1500 Herrenknecht and Iseki machines; Colchester-Horkesley A12 crossings, UK – 2 x 60m crossings of A12 using Soltau; Greenlaw Park II Project WP 170, Glasgow, Scotland – 3 x 6.5m i.d. shafts (6m clay, 9m rock and 12m clay), 2 x tunnels, Ø1800mm x 160m long in clay using HK backacter and Ø1500mm x 240m long in rock using HK slurry	Milford Haven-Aberdulais 1220 Gas Pipeline Crossings, South Wales – 1 x Ø1200mm, 4 x Ø1500mm crossings, from 40m-100m long, and 5 x Ø1800mm crossings 70m - 330m long and various shafts; Locks Lane, Purton, Swindon, UK – Combined sewer, 31m of 600mm i.d. pipejack in 1 span using Iseki Unclemole. Construction of 2 x shafts from Ø2m to Ø3m up to 6m deep; A76 Tunnelled Crossing, Ayrshire, Scotland – 34m of 1800mm i.d. pipejack in 1 span using Herrenknecht backacter
Alpine Mayreder Bau Alte Bundesstrasse 10 5071 Salzburg/Wals Austria Tel: +43 662 8582 401 Fax: +43 662 8582 400 Email: office-tunnel@alpine.at Web: www.alpine.at	a) US\$2.4bn b) US\$355M	Tunnels & caverns in soft soil or hard rock, vertical & inclined shafts; NATM (also under compressed air) with pipe screen cover, sidewalls; TBM/TBE drives; Solutions for difficult ground; Foundation engineering	Gotthard Base Tunnel, Switzerland - (in JV), 2 of 5 Lots, HSR, twin TBM tunnels, total length 72.4km; Circle Line, Singapore Metro - Contracts 852 and 855 (both in JV), total length 11.9km; Ermenek HEP, Turkey - 2 TBM tunnels (8km: Ø6.6m, 4km: Ø4m), powerhouse, shafts, power cavern; HSR Nureberg-Ingolstadt, Germany - Middle section, Lot B (in JV), 3 tunnels total length 15.5km (NATM); Ningbo Expressway, China - 42.25km 4-lane motorway inc. 10 tube tunnel, total length 7.3km (NATM); Tsankov Kamak HEP, Bulgaria - double curvature arch dam, diversion, road & pressure tunnels (NATM)	Western Bypass, Zurich, Switzerland - (in JV) 2 x 4.4km, 143-160m ² ; 2 x 2.8km pilot tunnel (Ø5m), widened with TBE to Ø14.4m, other sections by drill & blast; Yellow River Diversion Project, China - Lot 1, Pumping Station No. 1 & 2. Station No.1, intake (1km Ø4.5m) and 10 inlet branch tunnels (25m Ø2m), outlet pressure shaft (142m id 5.2m), tunnel no. 4 (1.7km Ø5.6m), pump Station No.2 and underground reservoir; Athens Metro, Greece - Line 2 Ext. 1.46km NATM, 920m by open face shield
Amalgamated Construction Unit 4A, Birchwood One Business Park Dewhurst Road Warrington, Cheshire WA3 7GB, UK Tel: +44 1925 838070 Fax: +44 1925 816670 Email: info@amco-construction.co.uk Web: www.amco-construction.co.uk	a) US\$108M b) US\$26M	Full face tunnel boring, drill & blast, pipe-jacking, micro-tunnelling, shaft sinking, tunnel refurbishment, shaft refurbishment, underground asset management, asset surveys, design and construct contracts	Barrow-in-Furnace Flood Relief Works - Construction of 1 500m x 2.1m i.d. p.c.c segmental tunnel utilising a Lovat M101 TBM, together with excavation of a 23.6m i.d x 30m deep diaphragm walled underground storage tank and two 3.66m i.d. segmental shafts; Mersey Queensway Road Tunnel Improvements, Merseyside, UK - Construction of new emergency escape routes and refuges with the under-deck area of the tunnel, including construction of new escape tunnel (complex logistics, with materials access only once every 4 weeks)	Katrine Water Project RWPS & Tunnelling Works – Construction of a Ø15m, 29m deep pumping station shaft, 2 inlet tunnels in hard igneous rocks using drill & blast, and 3 outlet tunnels installed by pipe-jacking using an Akkerman Drum Cutter; Bray Head Rail Tunnel Refurbishment – Scheme forming part of the DASH upgrading project for Irish Rail. Drilling and grouting to stabilise 410m of tunnel lining and facilitate water management by way of radial drainage
Amberg Technologies Trockenloosstrasse 21 CH-8105 Regensdorf Switzerland Tel: +41 1 870 9222 Fax: +41 1 870 0618 Email: info@amberg.ch Web: www.amberg.ch	Undisclosed	Underground surveying, motorlaser system for set out work and profile measurement, systems for 3D laser scanning, automatic systems for geotechnical monitoring, seismic prediction	Gotthard Base Tunnel, Switzerland – (Faido) Construction surveying services to the TAT consortium. Services include full application of Amberg TMS Solution for tunnel set-out, 3D profile surveys, tunnel scanning, comprehensive geotechnical monitoring; Ceneri Base Tunnel, Switzerland – Automatic monitoring of the highway A2 above the north portal of the Ceneri Base Tunnel. Integrated monitoring systems including total stations, GPS, inclinometers and extensometers. Automated publishing of deformation results and alarm functions online with Amberg's GEOvis web software	Uetliberg Tunnel, Switzerland – 4.4km road tunnel. Complete surveying services, including application of TMS Solution and extensive optical 3D monitoring; Rhätia Railways, Switzerland – Surface covering, kinematic laser scanning with Amberg's GRP 5000 System of a total 120 tunnels; TTC - Metro Toronto, Canada – Surface covering, kinematic laser scanning of 100km of tunnels including client specific kinematic clearance analysis and digital laser reflection image
Andrade Gutierrez Rua Dr. Geraldo Campos Moreira 375, 4th Floor São Paulo Brazil Tel: +5511 5502 2084 Fax: +5511 5502 2089 Email: flavio.henrique@andradegutierrez.com.br Web: www.andradegutierrez.com.br	a) US\$2.02bn b) -	EPC/turnkey contracts for all types of underground construction (soil & rock) in NATM, TBM/EPBM, cast in-situ linings, shafts, soil treatment, etc. ISO 9001, 14001 and OHSAS 18001 certification for subway works	São Paulo Metro, Line 4 / Yellow (Consortium), Brazil – 12.8km of railway including 6.4km of tunnel by EPBM & 4.7km in NATM. Excavation area for NATM works is 64-69m ² , Ø9.46m TBM. Construction time frame is 56 months. Project comprises a total length of 14.2km and includes 10 stations, 12 ventilation and emergency exit tunnels and maintenance yard. NATM in rock, decomposed rock, soils and saprolite; TBM in tertiary soils from the São Paulo and Resende basins. Key milestones in Line 4 include the Pinheiros River crossing (NATM in rock), and interconnections with Line 1 (Luz Station), Line 3 (Republica Station), Line 2 (Paulista Station) and with CPTM railway's Line C (Pinheiros Station).	São Paulo Metro, Line 2 / Green - Carlos Petit Well/Embucaçu Station - Lot 1, Brazil – Twin tunnel in soil with NATM, within urban area, lined with shotcrete, variable transverse section up to 100.4m ² , main tunnel and auxiliary tunnels totalling 2.29km, and twin tunnel in soil to house the Station proper (147m). Vila Mariana vent shaft (Ø12.6m) in urban area. Trench-based excavation of Chacara Klabin Station in soil, at depth of 21.6m, including foundations and concreting. Execution of diaphragm walling

Integrated Alarm Warning Station

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SENTRO 8

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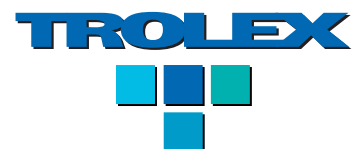
- Up to six integral gas sensing modules
- Auxiliary 4..20mA sensor input channels
- High definition graphical display
- Configurable audio/visual alarms
- Configurable output control relays
- MODBUS datacomms for SCADA compatibility
- Data logging
- Built to withstand adversity

environmental
safety
monitoring

machine condition
monitoring

DATACOMMS

RS485 datacomms can be transmitted by 32 sensor stations on a single cable, communicating with a central PC.



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Trolex supports the RSPB, wildlife and the environment

TUNNELLING CONTRACTORS

B

Company information	(a) Turnover (b) Turnover in tunnelling	Areas of expertise	Tunnel contracts underway	Recent tunnel contracts
Balfour Beatty Major Civil Engineering 86 Station Road Redhill Surrey, RH1 1PQ United Kingdom Tel: +44 1737 785138 Fax: +44 1737 785000 Email: sharon.cox@bbcel.co.uk Web: www.bbcel.co.uk	Undisclosed	Large diameter tunnel construction for highways and railways including cut & cover, segmental linings with full face TBMs, drill & blast, NATM and sprayed concrete linings (SCL)	A3 Hindhead Scheme, UK – 1.9km tunnel to tackle congestion on this busy route, improve road safety and remove traffic from the village and surrounding area. Contract awarded in 2002 as Early Contractor Involvement (ECI) scheme; King's Cross Station, London, UK – Construction of underground ticket hall and installation of M&E equipment	AlpTransit, Lötschberg Tunnel, Switzerland – Part of JV responsible for Steg and Raron southern sections, comprising 21.3km of 9.4m dia rock tunnel; Nam Cheong Station, Hong Kong, PR China – Complex interchange station for KCRC's West Rail project, based on top down construction
Balvac 24 Woodside Business Park Birkenhead Wirral CH41 1EL United Kingdom Tel: +44 151 6500184 Fax: +44 151 6500358 Email: gerry.lister@balvac.co.uk Web: www.balvac.co.uk	a) US\$24M b) US\$4M	Vacuum assisted resin injection, leakage control through injection, structural strengthening, stabilisation of brick work & masonry, precision grouting, stabilisation of track ballast, asset solutions & technical project management	Glasgow Underground, Scotland – 5 year framework contract for rail block grouting, structural strengthening and leakage control by injection methods and sprayed concrete	Terminal 5, Heathrow Airport, UK – Leak sealing and vacuum-assisted resin injection; Conwy Tunnel, North Wales – Regular structural maintenance; Dartford Tunnel, UK – Injection and leak sealing trials plus structural maintenance
Barhale Construction Barhale House Bescot Crescent Walsall WS1 4NN United Kingdom Tel: +44 1922 726700 Fax: +44 1922 726886 Email: info@barhale.co.uk Web: www.barhale.co.uk	a) US\$240M b) US\$80M	Tunnelling, microtunnelling, shaft sinking, pipe-jacking, open-cut drainage, steel fabrication, utility networks, maintenance operations, railtrack crossings, slurry treatment, plant innovation, lateral connections	Maintenance, repair, provision of emergency response partnering term contract in London for Telent, UK; Asset management partnering term contract for Thames Water Utilities, UK; Capital programme partnership, Severn Trent Water, UK; Asset management partnering term contract, Anglian Water Services, UK; Quality and standards III framework, Scottish Water Solutions, Scotland; Flood alleviation scheme in London Rd, Kingston, Thames Water, UK; Wandsworth Phase 2 strategic FAS (WWW), Thames Water Utilities, UK	Felindre - Brecon Special Crossings, UK – 6 crossings of roads railways and rivers using Ø1800mm and Ø1600mm pipejacks with 3 x microtunnelling machines; Deptford to Greenwich Main, UK – 1750m large diameter pipeline, 1540m in open cut, 210m in microtunnel; Sumatra – 650m of Ø600mm and Ø1200mm microtunnel; Queen Mother Reservoir, UK – Relin 1000lm of Ø2.54m i.d. tunnel with 150mm thick reinforced lining; Mill Green, UK – Open cut works, pumping station, Ø1200mm and Ø600mm microtunnel
Beton- und Monierbau Bernhard Hoefel Straße 11 A-6021 Innsbruck Austria Tel: +43 512 23110 Fax: +43 512 392655 Email: office@bemo.co.at Web: www.bemo.net	a) US\$62.2M b) US\$60.4M	Rock tunnelling and soft ground tunnelling using the Lasershell and CombiShell shotcrete methods, value engineering, 'Bochumer Bahnhofsbauweise', 'Innsbrucker Ring', 'Carinthian' and 'Zillertal' cut & cover methods	SVT Lerum-Partille, Gothenburg, Sweden – 7.9km D&B sewer; Neuer Ramholtunnel, Germany – 440m rail tunnel; Lainzertunnel LT31, Austria – 3km rail tunnel; Unterer Finstermuenz-tunnel, Austria – 526m road tunnel; Tröingeberg tunnel, Väst kustbanan Torebo-Heberg, Sweden – 1.1km rail tunnel; Katschberg Tunnel 2nd Tube, Austria – 5.4km highway tunnel, D&B; Arlberg tunnel Safety Upgrade, Austria – 10km rail tunnel, enlargement & reinstatement; Kopswerk II, Austria – 450MW HEP, caverns & tunnels; Achraintunnel, Austria; King's Cross Station Redevelopment, London, UK; LA Metro, Gold Line Eastside Ext., LA, USA; Beacon Hill Station, Seattle, USA	Heidkopftunnel, Germany – 3.4km highway tunnel; Tschambreutunnel, Austria – 564m road tunnel; Weehawken Tunnel/Bergline Station, USA – 1200m rail tunnel & station; Strenger Tunnel, Austria – 11.6km twin tube tunnel; Kienberwand Tunnel, Austria – 1167m road tunnel; Bochum Urban Railway, Germany – 1.3km soft-ground NATM; Amberg tunnel East-Tube, Austria – 2.8km NATM in rock; Blisadonatunnel, Austria – 2.9km NATM; T5 Heathrow Airport, UK; San Vicente, USA; Almaty Metro, Kazakhstan
BBilfinger Berger Tunnelling Branch Kistlerhofstrasse 144 D-81379 Munich Germany Tel: +49 89 74817 252 Fax: +49 89 74817 307 Email: rkoz@bilfinger.de Web: www.bilfinger.de	a) US\$13.3bn b) US\$698M	Plan, build and operate railway, road, metro subway, sewage and water supply tunnels using NATM and TBMs	Hofolding Gallery, Germany – Water supply tunnel; Suburban Train, Hamburg, Germany – Metro subway tunnel; North South City Railway, Cologne, Germany – Rail tunnel; Wienerwaldtunnel, Austria – Rail tunnel; Gotthard Base Tunnel, Lot 360 (Sedrun), Switzerland – HSR tunnel Kirchenwald Tunnel, Switzerland – Road tunnel; Descenderie de Modane, France – Exploratory tunnel; Citytunneln Malmo, Sweden – Rail tunnel; E18 Grimstad-Kristiansand – Autobahn tunnels; North South Bypass, Brisbane, Australia – Road tunnel; Seymour-Capilano Tunnels, Vancouver, Canada – Water transfer tunnel; East Side CS0, Portland, USA – Water tunnel	U2/1 Schottenting, Austria – Metro tunnel; U2/5 Stadium, Austria – Metro tunnel; St Martin La Porte, Savoy, France – Exploratory tunnel; Cross City Tunnel, Sydney, Australia – Road tunnel
Bouygues Travaux Publics 1 avenue Eugene Freyssinet 78061 ST Quentin en Yvelines France Tel: +33 1 30604639 Fax: +33 1 30602953 Email: bouyguestp@bouygues-construction.com Web: www.bouygues-construction.com	a) US\$830M b) US\$320M	Tunnels and caverns in all types of soil, drill & blast, slurry and EPB shield and hard rock TBM, roadheader, NATM, shaft sinking. Total control of geometry and quality. Design and engineering capacity for these projects	Gautrain Rail Link, South Africa – 11.7km drill & blast, 3km TBM; A41 Motorway, France – 2x3km TBM; Hofolding Gallery, Germany – Water supply tunnel; Salazie Water Tunnel, La Réunion Island – 8km TBM; Castke Peak Cable Tunnel, Hong Kong – 4.5km TBM; Chong Ming Motorway, China – 2x7km, Ø15m TBM; Les Grands Goulets Road Tunnel, France – 2x1.65km drill & blast; Tunnel Maurice Lemaire, France – Additional safety tunnel; Ferden, Tunnel Railway, Loschberg, Switzerland – 2x35km drill & blast; Tima Water Tunnel, France – 1.85km TBM; Hofolding Gallery, Germany – Water supply tunnel	Gautrain Railway, Johannesburg, Pretoria, South Africa – Concession; A41 Motorway – Concession; Ilkiluoto Nuclear Power, Finland; Flamanville Nuclear Power Plant, Finland; East Tsing Yi Interchange, Hong Kong; Tyne Tunnel, UK

TUNNELLING CONTRACTORS

Company information	(a) Turnover (b) Turnover in tunnelling	Areas of expertise	Tunnel contracts underway	Recent tunnel contracts
CDM Inc 50 Hampshire St Cambridge MA 02139 USA Tel: +1 617 452 6000 Fax: +1 617 452 8000 Email: geotechnical@cdm.com Web: www.cdm.com	a) Undisclosed b) Undisclosed	New Austrian Tunnelling method, Groundfreezing, Conventional Tunnelling with Tunnel Boring Machines (TBM), Drill and Blast, Pipe Jacking, Microtunnelling and Underground Mining	Harbor Siphon, NYC Harbour, USA – Water main – siphon, precast segments, 3076m, 3.7m diameter, EPB. Brightwater, King County, WA, USA – BT-1, 4320m, 5.9m diameter, EPB. BT-2, 3570m, 5.2m diameter, Slurry TBM. BT-3, 6185m, 5.2m diameter, Slurry TBM. BT-4, 6490m, 4m diameter, EPB. Conveyance. Cowskin Creek, Topeka, KS, USA – Sewer force main, steel casting, 286m, 1.23m diameter, HDD. Homestead Interceptor, Hartford, CT, USA – Interceptor sewer, jacked pipe, 1052m, 1.85m diameter, MTBM. SRVSA, Somerset, NJ, USA – Outfall, steel liner plate, 66m, 2.77m diameter, Shield. Potomac Interceptor, Arlington, VA, USA – interceptor, casing pipe, 364m, 1.85m diameter, Pipe jacking.	Ellis Ave, Fountain City, CA, USA – Sewer interceptor, ribs and lagging, 1600m, 2.77m diameter, EPB. SWWM – No 11 and 12, Charlotte, NC, USA – Water main, rock bolts / steel liner, 708m, 2.46m diameter, TBM. Swamp Creek Connector, King County, WA, USA – Consolidation sewer, jacked pipe, 748m, 1.85m diameter, MTBM. Lowell St Tunnel, Fall River, MA, USA – Connection tunnel, bald, 80.6m, D&B. Third St Tunnel, Fall River, MA – Connection Tunnel, bald, 18.5m, 1.85m x 2.77m diameter, D&B.
Costain Costain House Nicholsons Walk Maidenhead Berkshire SL6 1LN United Kingdom Tel: +44 1628 842444 Fax: +44 1682 842362 Web: www.costain.com	a) US\$1.7bn b) US\$50M	Mechanised tunnelling, shaft sinking, hand tunnelling, drill & blast, water, power, rail and highway tunnels, pipejacking, compressed air works, project management, risk management, refurbishment, SCL	Hampton Pump Out Shafy and Connection Tunnels – 40m deep x 15m i.d. shaft with segmental precast lining and SCL, 3m i.d. connection tunnel with SCL, 1.8m i.d. pipejack; Brighton and Hove Wastewater Treatment Scheme – Preferred bidder for 9km segmental tunnel and 2km of pipejacked and 16 shafts up to 20m i.d.; Holmesdale Tunnel Refurbishment – Refurbishment of existing road tunnel on tein 3 lane motorway including modernisation of M&E and tunnel services	Margate and Broadstairs Wastewater Treatment Scheme – Design and construction of 2km of 2.87m i.d. segmental tunnel, four associated segmental shafts, 600m of 1.8m i.d. pipejacked tunnel including marine recovery of TBM, 15m i.d. shafts, two x twin bore pipejacked railway crossings; CTRL C240 – 4.8km of twin, 7.2m i.d. running tunnels, cross passages, ventilation shafts, establishment and operation of a precast concrete lining factory
CSM Bessac ZI de la pointe 31790 St Jory France Tel: +33 5 61376363 Fax: +33 5 61092629 Email: csmbessac@ csmbessac.com Web: www.csmbessac.com	a) US\$44M b) US\$44M	All tunnelling projects executed with TBM (EPB, compressed air, slurry, digging arm) with i.d. up to 5m	Oued Mkacel Collector, Algiers, Algeria – 4500m long, Ø4m sewage tunnel using Bessac EPBM. Design/build contract; Pointe Pescade Tunnel, Algiers, Algeria – 3500m long sewer tunnel, Ø4m Bessac TBM; Interceptor IFT Bogota, Colombia – 10km, 3.7m i.d. EPBM, design/build; Sea Outfall Rabat, Morocco – 800m, 2m i.d. with slurry machine; Chouilly Tunnel, France-Switzerland – 2200m, 2.5m i.d. with compressed air machine; Sewer Tunnel, Reims – 700m, 3.1m i.d. with compressed air machine; Lyon carrée de la soie – 1000m, 2m i.d. with slurry machine; DPLB, Paris, France – 150m, 4m i.d. with compressed air; CPCU, Paris, France – 400m, 1.4m i.d. slurry TBM	Enertherm, Paris – 1300m, 3.1m i.d.; Cachan, France – 500m, 1.8m i.d.; Alicante, desalination plant, Spain – 1000m, 3m i.d.; Ellis avenue, California, USA – 1650m, 2.8m i.d.; Mantes la Jolie, France – 1000m, 1.8m i.d.; Sables d'Olonne sea outfall, France – 620m, 1.4m i.d.; Lyon A42, France – 90m, 2.9m i.d.
Chantiers Modernes Rhone-Alpes 24 Rue Champ Dolin BP610 F-69804 Saint Priest France Tel: +33 4 7890 0091 Fax: +33 4 7890 1459 Email: lbaviere@chantiers- modernes.fr	a) US\$38M b) US\$22M	Tunnels & underground works in all types of ground, from hard rock to soils, D&B, mechanical excavation, tunnel refurbishment, shotcreting, cut & cover, civil works	Tunnel u Bois de Peu, Besançon, France – 520m long twin road tunnels as part of Basançon ringway, drill & blast; ; Chavanne Tunnel, Belfort, France – 1970m long rail tunnel for French high speed rail, drill & blast, cut & cover; Tunnel de Rochefort, Tech et Poliéans, France – Refurbishment of three rail tunnels	A40 Motorway, France – Civil works as part of refurbishment programme; Nouveau tunnel du Lioran, France – 1515m long single tube road tunnel, drill & blast; A43 Motorway, Tunnel de L'Epine, Southern Tube, France – Complete refurbishment of a 3120m long road tunnel; Tunnel de St Germain, Talloine, France – Refurbishment and concrete lining of 2 road tunnels in service; St Martin d'Estreaux, France – Refurbishment of railway tunnel
Denys Industrierweg 124 9032 Wondelgem Belgium Tel: +32 9 254 0111 Fax: +32 9 226 7771 Email: info@denys.com Web: www.denys.com	a) US\$170M b) US\$55M	Pipe jacking in soft ground under ground water, pipe jacking in rock and mixed face under ground water, microtunnelling in soft ground and rock, tunnelling in soft ground and rock with segmental lining, curved pipe jacking	Aquafin-Woluwe Interceptor Sewer – Total length 5,780m, pipe-jacks: 1.148m x Ø2200mm, 1.030m x Ø2000mm, 1.013m x Ø1600mm, 294m x Ø1200mm, 14m x Ø1000mm, 803m x Ø900mm. Directional drilling: 800m x Ø560mm; GRT Gaz, Lyon, France – 500m pipejack, 2 x 60m pipejack; Aquafin-Gent – Pipe-jacked sewers 500m x Ø1200mm; BAM, Albertkanaal – 100m, Ø1800mm pipejack utility tunnel; IBN, Petit Ry – Sewer pipe-jack, 400m x Ø1200mm; Vorst, Brussels, Belgium – 1000m, Ø2000mmpipejack sewer	AQIRIS-Brussels North Sewer Treatment Plant, Belgium – 1671m x Ø2500mm, 3084m x Ø2200mm, 1836m x Ø1800mm, 181m x Ø1600mm, 181m x Ø900mm pipe jacked reinforced concrete pipe; Inasep, Andenne – 182m, Ø1400mm sewer tunnel; IDEA, Dour – sewer d'Elouges, 568m, Ø1200mm pipejack; Limerick Main drainage, Ireland – Northern Interceptor pipe-jack under river with concrete pipes Ø2m, length 602m/microtunnelling with concrete pipes Ø1.2m for 270m
DMT Am Technologiepark 1 D-45307 Essen Germany Tel: +49 201 172 1970 Fax: +49 201 172 1971 E-mail: exploration@dmtd.de Web: www.dmt.de	a) US\$121.4M b) US\$29.2M	geophysical exploration, surveying, laser scanning, vibration measurements, gyro surveying, snap through prognosis, risk management, safety, ventilation, cooling and climate control, dust and gas control, fire tests/training	Grouff Tunnel, Luxembourg – Motorway tunnel; Karahnjukar Headrace Tunnel, Iceland – Pressure water tunnel; Nord-Süd-Bahn Köln, Germany – Metro tunnel; Hubertustunnel, Den Haag, The Netherlands – Railway tunnel; Pajares Tunnel, Leon, Spain – HSR tunnel; Gotthard Base Tunnel, Switzerland – HSR tunnel; Seymour Capilano Twin Tunnels, Canada – Water tunnel; Vuosaari Railway Tunnel, Finland – Railway tunnel; Malmö Tunnel, Sweden – Metro tunnel; Glendoe Tunnel, UK – Pressure water tunnel; Schlüchtener Tunnel, Germany – HSR tunnel;	Westside CSO, Portland, USA – Sewage; Great Belt Link, Denmark – Railway tunnel; Lesotho Highlands Water Project, Lesotho – Pressure water tunnel system; Vereina Tunnel, Netherlands – Railway Tunnel; Westerschelde Tunnel, Netherlands – Motorway Tunnel; Sophia Tunnel, Netherlands – Railway tunnel; Paghuashan Tunnel, THSR, Taiwan – HSR tunnel; Parramatta Rail Link, Australia – HSR tunnel; Guardarrama Tunnel, Spain – HSR tunnel; Thames Tunnels, UK – HSR tunnel

C

D

TUNNELLING CONTRACTORS

Company information	(a) Turnover (b) Turnover in tunnelling	Areas of expertise	Tunnel contracts underway	Recent tunnel contracts
CDM Inc 50 Hampshire St Cambridge MA 02139 USA Tel: +1 617 452 6000 Fax: +1 617 452 8000 Email: geotechnical@cdm.com Web: www.cdm.com	a) Undisclosed b) Undisclosed	New Austrian Tunnelling method, Groundfreezing, Conventional Tunnelling with Tunnel Boring Machines (TBM), Drill and Blast, Pipe Jacking, Microtunnelling and Underground Mining	Harbor Siphon, NYC Harbour, USA – Water main – siphon, precast segments, 3076m, 3.7m diameter, EPB. Brightwater, King County, WA, USA – BT-1, 4320m, 5.9m diameter, EPB. BT-2, 3570m, 5.2m diameter, Slurry TBM. BT-3, 6185m, 5.2m diameter, Slurry TBM. BT-4, 6490m, 4m diameter, EPB. Conveyance. Cowskin Creek, Topeka, KS, USA – Sewer force main, steel casting, 286m, 1.23m diameter, HDD. Homestead Interceptor, Hartford, CT, USA – Interceptor sewer, jacked pipe, 1052m, 1.85m diameter, MTBM. SRVSA, Somerset, NJ, USA – Outfall, steel liner plate, 66m, 2.77m diameter, Shield. Potomac Interceptor, Arlington, VA, USA – interceptor, casing pipe, 364m, 1.85m diameter, Pipe jacking.	Ellis Ave, Fountain City, CA, USA – Sewer interceptor, ribs and lagging, 1600m, 2.77m diameter, EPB. SWWM – No 11 and 12, Charlotte, NC, USA – Water main, rock bolts / steel liner, 708m, 2.46m diameter, TBM. Swamp Creek Connector, King County, WA, USA – Consolidation sewer, jacked pipe, 748m, 1.85m diameter, MTBM. Lowell St Tunnel, Fall River, MA, USA – Connection tunnel, bald, 80.6m, D&B. Third St Tunnel, Fall River, MA – Connection Tunnel, bald, 18.5m, 1.85m x 2.77m diameter, D&B.
Costain Costain House Nicholsons Walk Maidenhead Berkshire SL6 1LN United Kingdom Tel: +44 1628 842444 Fax: +44 1682 842362 Web: www.costain.com	a) US\$1.7bn b) US\$50M	Mechanised tunnelling, shaft sinking, hand tunnelling, drill & blast, water, power, rail and highway tunnels, pipejacking, compressed air works, project management, risk management, refurbishment, SCL	Hampton Pump Out Shafy and Connection Tunnels – 40m deep x 15m i.d. shaft with segmental precast lining and SCL, 3m i.d. connection tunnel with SCL, 1.8m i.d. pipejack; Brighton and Hove Wastewater Treatment Scheme – Preferred bidder for 9km segmental tunnel and 2km of pipejacked and 16 shafts up to 20m i.d.; Holmesdale Tunnel Refurbishment – Refurbishment of existing road tunnel on tein 3 lane motorway including modernisation of M&E and tunnel services	Margate and Broadstairs Wastewater Treatment Scheme – Design and construction of 2km of 2.87m i.d. segmental tunnel, four associated segmental shafts, 600m of 1.8m i.d. pipejacked tunnel including marine recovery of TBM, 15m i.d. shafts, two x twin bore pipejacked railway crossings; CTRL C240 – 4.8km of twin, 7.2m i.d. running tunnels, cross passages, ventilation shafts, establishment and operation of a precast concrete lining factory
CSM Bessac ZI de la pointe 31790 St Jory France Tel: +33 5 61376363 Fax: +33 5 61092629 Email: csmbessac@ csmbessac.com Web: www.csmbessac.com	a) US\$44M b) US\$44M	All tunnelling projects executed with TBM (EPB, compressed air, slurry, digging arm) with i.d. up to 5m	Oued Mkacel Collector, Algiers, Algeria – 4500m long, Ø4m sewage tunnel using Bessac EPBM. Design/build contract; Pointe Pescade Tunnel, Algiers, Algeria – 3500m long sewer tunnel, Ø4m Bessac TBM; Interceptor IFT Bogota, Colombia – 10km, 3.7m i.d. EPBM, design/build; Sea Outfall Rabat, Morocco – 800m, 2m i.d. with slurry machine; Chouilly Tunnel, France-Switzerland – 2200m, 2.5m i.d. with compressed air machine; Sewer Tunnel, Reims – 700m, 3.1m i.d. with compressed air machine; Lyon carrée de la soie – 1000m, 2m i.d. with slurry machine; DPLB, Paris, France – 150m, 4m i.d. with compressed air; CPCU, Paris, France – 400m, 1.4m i.d. slurry TBM	Enertherm, Paris – 1300m, 3.1m i.d.; Cachan, France – 500m, 1.8m i.d.; Alicante, desalination plant, Spain – 1000m, 3m i.d.; Ellis avenue, California, USA – 1650m, 2.8m i.d.; Mantes la Jolie, France – 1000m, 1.8m i.d.; Sables d'Olonne sea outfall, France – 620m, 1.4m i.d.; Lyon A42, France – 90m, 2.9m i.d.
Chantiers Modernes Rhone-Alpes 24 Rue Champ Dolin BP610 F-69804 Saint Priest France Tel: +33 4 7890 0091 Fax: +33 4 7890 1459 Email: lbaviere@chantiers- modernes.fr	a) US\$38M b) US\$22M	Tunnels & underground works in all types of ground, from hard rock to soils, D&B, mechanical excavation, tunnel refurbishment, shotcreting, cut & cover, civil works	Tunnel u Bois de Peu, Besançon, France – 520m long twin road tunnels as part of Basançon ringway, drill & blast; ; Chavanne Tunnel, Belfort, France – 1970m long rail tunnel for French high speed rail, drill & blast, cut & cover; Tunnel de Rochefort, Tech et Poliéans, France – Refurbishment of three rail tunnels	A40 Motorway, France – Civil works as part of refurbishment programme; Nouveau tunnel du Lioran, France – 1515m long single tube road tunnel, drill & blast; A43 Motorway, Tunnel de L'Epine, Southern Tube, France – Complete refurbishment of a 3120m long road tunnel; Tunnel de St Germain, Talloine, France – Refurbishment and concrete lining of 2 road tunnels in service; St Martin d'Estreaux, France – Refurbishment of railway tunnel
Denys Industrierweg 124 9032 Wondelgem Belgium Tel: +32 9 254 0111 Fax: +32 9 226 7771 Email: info@denys.com Web: www.denys.com	a) US\$170M b) US\$55M	Pipe jacking in soft ground under ground water, pipe jacking in rock and mixed face under ground water, microtunnelling in soft ground and rock, tunnelling in soft ground and rock with segmental lining, curved pipe jackings	Aquafin-Woluwe Interceptor Sewer – Total length 5,780m, pipe-jacks: 1.148m x Ø2200mm, 1.030m x Ø2000mm, 1.013m x Ø1600mm, 294m x Ø1200mm, 14m x Ø1000mm, 803m x Ø900mm. Directional drilling: 800m x Ø560mm; GRT Gaz, Lyon, France – 500m pipejack, 2 x 60m pipejack; Aquafin-Gent – Pipe-jacked sewers 500m x Ø1200mm; BAM, Albertkanaal – 100m, Ø1800mm pipejack utility tunnel; IBN, Petit Ry – Sewer pipe-jack, 400m x Ø1200mm; Vorst, Brussels, Belgium – 1000m, Ø2000mmpipejack sewer	AQIRIS-Brussels North Sewer Treatment Plant, Belgium – 1671m x Ø2500mm, 3084m x Ø2200mm, 1836m x Ø1800mm, 181m x Ø1600mm, 181m x Ø900mm pipe jacked reinforced concrete pipe; Inasep, Andenne – 182m, Ø1400mm sewer tunnel; IDEA, Dour – sewer d'Elouges, 568m, Ø1200mm pipejack; Limerick Main drainage, Ireland – Northern Interceptor pipe-jack under river with concrete pipes Ø2m, length 602m/microtunnelling with concrete pipes Ø1.2m for 270m
DMT Am Technologiepark 1 D-45307 Essen Germany Tel: +49 201 172 1970 Fax: +49 201 172 1971 E-mail: exploration@dmtd.de Web: www.dmt.de	a) US\$121.4M b) US\$29.2M	geophysical exploration, surveying, laser scanning, vibration measurements, gyro surveying, snap through prognosis, risk management, safety, ventilation, cooling and climate control, dust and gas control, fire tests/training	Grouff Tunnel, Luxembourg – Motorway tunnel; Karahnjukar Headrace Tunnel, Iceland – Pressure water tunnel; Nord-Süd-Bahn Köln, Germany – Metro tunnel; Hubertustunnel, Den Haag, The Netherlands – Railway tunnel; Pajares Tunnel, Leon, Spain – HSR tunnel; Gotthard Base Tunnel, Switzerland – HSR tunnel; Seymour Capilano Twin Tunnels, Canada – Water tunnel; Vuosaari Railway Tunnel, Finland – Railway tunnel; Malmö Tunnel, Sweden – Metro tunnel; Glendoe Tunnel, UK – Pressure water tunnel; Schlüchtener Tunnel, Germany – HSR tunnel;	Westside CSO, Portland, USA – Sewage; Great Belt Link, Denmark – Railway tunnel; Lesotho Highlands Water Project, Lesotho – Pressure water tunnel system; Vereina Tunnel, Netherlands – Railway Tunnel; Westerschelde Tunnel, Netherlands – Motorway Tunnel; Sophia Tunnel, Netherlands – Railway tunnel; Paghuashan Tunnel, THSR, Taiwan – HSR tunnel; Parramatta Rail Link, Australia – HSR tunnel; Guardarrama Tunnel, Spain – HSR tunnel; Thames Tunnels, UK – HSR tunnel

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TUNNELLING CONTRACTORS

Company information	(a) Turnover (b) Turnover in tunnelling	Areas of expertise	Tunnel contracts underway	Recent tunnel contracts
Hazama Corporation 2-2-5 Toranomon Minato Ku Tokyo 105-8479 Japan Tel: +81 3 3588 5760 Fax: +81 3 3588 5755 Email: ito57@hazama.co.jp Web: www.hazama.co.jp	a) US\$2.1bn b) US\$371M	All underground works, including H&V shield method, two-stage shield method, tunnel seismic prediction, new pre-lining support method	Hydraulic Power Plant No 3, Miyazaki, Japan – Penstock tunnel (48° inclined adit) 150m x 4 and powerhouse cavern (24m x 24m x 188m); Yamaura Section of Chikushi Tunnel, Kyushu Shin-Kansen Line, Saga – 2.38km twin-track single-tube tunnel of 73m ² cross section (whole tunnel length 11.9km); Takada-Nishi Section, Yokohama city loop railway, Kanagawa, Japan – Construction of 1.3km long twin tunnels Ø5.38m, EPB; SJ62(1), Central Circular Shinjuku Route, Tokyo Metropolitan Expressway, Tokyo, Japan – Construction of a cut & cover highway tunnel and ventilation station	Itsutsugaoka Tunnel Project, Aichi, Japan – 321m long binocular tunnel with no drift for construction of central pillar, excavation is carried out by short bench cut method; Okura Tunnel Project, Fukuoka – 170m long expressway widening (cross section of 155m ²); Route 171 Shimizu Multi-Service Tunnel, Osaka, Japan – Construction of a 2.8km long Ø4.3m diameter tunnel by EPBM; Subway Line 13 Project, Shin-Sendagaya Section, Tokyo, Japan – Construction of an underground station by cut & cover
Hindustan Construction Hincon House Lal Bahadur Shastri Marg Vikhroli (West) Mumbai 400 083 India Tel: +91 022 2571 5332 Fax: +91 022 2579 4771 Email: ajit.pradhan@hccindia.co.in Web: www.hccindia.co.in	a) US\$550M b) US\$85M	All underground works: tunnels include TBM tunnels, hydro electric projects, highways, sea link projects, nuclear power plants	Currently executing 6 major HEP projects (value US\$560.8M), 3 nuclear projects (value US\$197.9M), 17 transportation projects (value US\$1bn), 7 water supply projects (value US\$738.7M), and various other projects (value US\$152.7M). HEP's include: Chamera HEP, Stage III, Himachal Pradesh, India – (231MW) Diversion tunnel, surge shaft, pressure shaft, etc; URI HEP, Stage II, J&K, India – (240MW) Diversion tunnel, gravity dam (38m high), underground powerhouse, etc; Chutak HEP, Kargil, J&K, India – Comprising Barrage, coffer dams, headrace tunnel, surge shaft, pressure shaft, powerhouse, tailrace, etc.	Tala HEP C1, Bhutan, India – (1020MW) comprising Ø6.8m, 356m long diversion tunnel, 92m gravity dam, 6.4km long Ø6.8m headrace, etc; Tala HEP C4, Bhutan – (1020MW) includes 7.18km headrace (Tala is one of the largest HEPs in Asian Sub Continent)
Hochtief Construction Opernplatz 2 D-45128 Essen Germany Tel: +49 201 824 2959 Fax: +49 201 824 3894 Email: tunnelling@hochtief.de Web: www.hochtief-construction.de	a) US\$2.9bn b) US\$642M	All underground works: tunnels and caverns in soft soil or hard rock, with/without ground-water, drill & blast, slurry and EPB shield and hardrock TBM tunnelling. Tailored solutions for complex projects and adverse ground; concrete linings, fire protection	Hafentunnel U4 Tunnel, Hamburg – 2x2.8km metro tunnel, Ø6.5m slurry shield; Jenbach Tunnel, Austria – 4km long twin-track HSR tunnel, Ø13m TBM; Lainz Tunnel, Austria – 3km long twin-track HSR tunnel; Schlüchtern Tunnel, Germany – 4km long, Ø10.3m EPBM tunnel; Glendoe HEP, Scotland – 17km of hard rock tunnelling by TBM and D&B; Ring Road Prague, lot 514, Czech Rep – 2x1.3km road tunnel, d&b; Metro Nuremberg U3, Germany – 2x1.1km metro tunnel, c&c, NATM; Gotthard Base Tunnel, Switzerland – Bodio/Faido, length 33km/30km, Ø8.8m/Ø9.3m hard rock TBM	Copenhagen Heating Tunnel, Denmark – 3.9km Ø5.1m EPBM tunnel; Safety Tunnel, Lugano, Switzerland – 2.3km, hard rock TBM Ø5.1m; Airport Light Rail Tunnel, Hamburg, Germany – Twin rail tunnel, 600m long, Ø6.6m slurry shield; Epping to Chatswood Rail Link, Sydney, Australia – Two x 12.7km, 7.2m dia, hard rock TBM; Herrentunnel Lübeck, Germany – 780m road tunnel, slurry shield, Ø10.4m; CTRL Contract 320, London, UK – 2 x 2.5km tunnel, Ø8.15m slurry shield; Sophiaspoortunnel, Netherlands
Implenia Construction Bahnhofstrasse 24 CH-5001 Aarau Switzerland Tel: +41 62 832 0534 Fax: +41 62 832 0501 Email: victor.wetterwald@implenia.com Web: www.implenia.com	a) US\$1.28bn b) US\$360M	All underground works: tunnels & caverns in soft ground & hard rock, TBMs, TBEs, hydroshield, slurry shields, D&B, concrete linings (segmental & cast-in-situ), shaft sinking, rehabilitation of existing tunnels, pipe jacking	Gotthard Base Tunnel, Switzerland – Bodio 16km Ø8.8m, Faido 15km Ø9.2m TBM and Sedrun 6km Ø9.4m in disturbed zone (D&B); Roppener Tunnel, Austria – 5.1km twin motorway tunnel; Alberg Tunnel, Austria – Evacuation tunnels for parallel railway and road tunnel, 15km; Lungern Bypass, Switzerland – 4.5km long road tunnel, hard rock TBM; Uetliberg Tunnel, Zurich, Switzerland – 4.5km long road tunnel, Ø4.5m pilot bore expanded to Ø14.4m with TBE; Aeschertunnel, Zurich, Switzerland – 2.5km long, jetting/roadheader; Lausanne Metro, Switzerland – Soft ground tunnelling, Lots 1030, 1100, 1200 & 1600; Bulle Bypass, Switzerland – Dewatering gallery, 1.3km and 600m	Flims, Switzerland – Bypass road tunnels, 2.9km & 462m by D&B; Gotschna, Klosters, Switzerland – 4.5km D&B; Denzberg Tunnel, Switzerland – 2.28km Ø12.33m hard rock/Mixshield TBM; A9 Lausanne-Montreux, Switzerland – Renovation of 2 motorway tunnels; San Bernardino Tunnel, Switzerland – Renovation of 6.2km road tunnel; Zurich-Thalwil HSRL, Switzerland – Hard rock TBM drive 5.58km, soft ground hydroshield 730m. Two single track (1.31km/610m) D&B tunnels; Zurich Airport – 2 x 1km metro tunnels
Jäger Bau Batlogg Strasse 95 6780 Schruns Austria Tel: +43 5556 7181 0 Fax: +43 5556 7181 31 Email: office@jaegerbau.com Web: www.jaegerbau.com	a) US\$155M b) US\$75.3M	All underground works in hard rock and soft ground with or without groundwater. Hydropower plant caverns, road and railway tunnels, drinking water and irrigation tunnels, shafts. D&B, NATM, single and double shield TBMs, EPBMs.	Katzenbergtunnel, Germany – Twin tube rail tunnel 9.4km long, 2 x Ø11.12m EPBMs; Wienerwald Tunnel, Vienna, Austria – Twin tube rail tunnels, 10.75km long, two single-shield TBMs, Ø10.69m; Achrain Tunnel, Austria – 3.3km long road tunnel, drill & blast, 140m ² cross section; Katschberg Tunnel, 2nd Tube, Austria – 4.4km long road tunnel, drill & blast; Kopswerk II HEP, Austria – Powerhouse cavern (approx. 120,000m ³) drill & blast excavation with auxiliary underground structures and 1.4km of various service and supply tunnels in drill & blast excavation; Parbati III HEP Lot 2, India ; Extension HEP Hieflau, Austria ; Salt Mine Stetten, Germany ; Tunnel Weising, Austria ;	Strengen Strassentunnel, Austria – Twin tube road tunnels 5.7km long D&B, 80m ² -90m ² section; Abdalajis Tunnel, Spain – 7km long rail tunnel, DS TBM Ø9.93m; Parbati HEP Project, Stage II, Lot 3, Himachal Pradesh, India – Two inclined (30°) pressure shafts, each 1.5km long, DS TBM Ø4.88m; Nollinger Berg Tunnel, Germany – 1.25km long drill & blast road tunnel, cross section 100m ²
John Holland 70 Trenery Crescent Abbotsford Vic 3067 Australia Tel: +61 3 8413 6460 Fax: +61 3 9934 5269 Email: tunnellingho@jhg.com.au Web: www.johnholland.com.au	a) US\$2.6bn b) US\$304M	Tunnel excavation by roadheader, d&b, TBM (hard rock, EPB and slurry), pipejacking, compressed air and ground freezing. Installation of temporary and permanent support, rockbolts, shotcrete, cast in-situ, precast segments and pipes, GRP and steel liners	Kowloon Southern Link, Hong Kong – Twin, 1.1km rail tunnels excavated by Ø8m slurry TBM; Gold Coast Desalination Alliance, Queensland, Australia – Twin, 2km inlet and outlet tunnels excavated by two Ø3.4m slurry TBMs; Sydney Desalination Project, Sydney, Australia – Twin, 2km inlet and outlet tunnels excavated by two Ø4m double shield TBMs; Northern Sewerage Project Stage 1, Melbourne, Australia – 4.8km of sewer tunnel excavated by Ø4m EPBM, and 3.2km of sewer tunnel excavated by Ø3m EPBM; Northern Sewerage Project Stage 2, Melbourne, Australia – 1.3km of sewer tunnel excavated by Ø4m EPBM, and 3.2km of sewer tunnel excavated by Ø3m hard rock TBM	Lane Cove Tunnel, Sydney, Australia – Road tunnels comprising 745m of single lane road tunnel, 2120m of two lane road tunnel, 4400m of three lane road tunnel and 2145m of ventilation and access tunnels excavated using seven 300kW roadheaders; EastLink Project, Melbourne, Australia – Twin, 1.5km three lane undrained road tunnels excavated using four 300kW roadheaders

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TUNNELLING CONTRACTORS

Company information	(a) Turnover (b) Turnover in tunnelling	Areas of expertise	Tunnel contracts underway	Recent tunnel contracts
Johnson Microtunnelling Watling Street Shawell Lutterworth Leicestershire LE17 6AS United Kingdom Tel: +44 1788 861790 Fax: +44 1788 860822 Email: microtunnelling@carillionplc.com Web: www.carillionplc.com	a) US\$8bn b) US\$20.4M	Microtunnelling, pipe jacking, tunnelling, directional drilling, auger boring, guided auger boring, shaft sinking, culvert jacking	Florence Road Flood Alleviation, Poole, UK – Circular segmental shafts 4m, 5m, and 6m diameter and 550m of 1200mm diameter microtunnel; Northern Ring Main, Newcastle, UK – Construction of 800m of pipejacked concrete sleeve between 1200m and 1800mm diameter	Margate Sea Outfall, Kent, UK – Construction of 600m of Ø1.8m microtunnelled under-sea outfall through chalk, using a Herrenknecht AVN 1800 that was recovered from the sea bed using a jack-up barge; Acomb Crescent, Gosforth, Newcastle, UK – 300m of 500mm diameter microtunnel in a busy urban environment
Joseph Gallagher Neagron House Stanford Road Orsett, Essex RM16 3BX United Kingdom Tel: +44 1375 672070 Fax: +44 1375 672073 Email: headoffice@josephgallagher.co.uk Web: www.josephgallagher.co.uk	a) US\$40.9M b) US\$14.3M	Machine, hand driven and concrete lined tunnels, shafts and compressed air, underpinning, basements and deep excavations, reinforced concrete structures	Amsterdam Metro NSZL, The Netherlands – Construction of shafts for new Metro. Jacked caissons up to 42m deep and 6.6m o.d. in water bearing strata; Drummond Gypsum Mine, Co Monaghan, Ireland – Construction of twin drift adits in sprayed concrete along with underground chambers; Finchley Central Underground Station, London, UK – Construction of new lift shafts works for Step Free Access; Puny Drain, Kings Lynn, UK – Construction of 6.5m and 7.5m i.d. shafts and twin 1.5m i.d. pipejack; Hindhead Tunnel, UK – Reinforced concrete works to portal areas. Supply of specialist labour for twin tunnels; Wembley Cable Tunnel, UK – Construction of 2 x 4m i.d. shafts and 900mm pipejack by slurry TBM	Forde Avenue Shaft, Bromley, UK – Construction of 20m i.d. shaft by caisson including concrete works and ancillary chambers; Margate Flood Alleviation, Kent, UK – Construction of shafts and pipejacks and installation of steel pumping mains in tunnel; Leatherhead Road FAS, Surrey, UK – Construction of shafts and pipejacks at very shallow depths in main road; Peckham Pulse, London, UK – Design and construction of service tunnels under building for installation of new pipework to swimming pool
Kenny Construction Co 250 Northgate Parkway Wheeling, IL 60090 USA Tel: +1 847 541 8200 Fax: +1 847 541 8358 Email: pkenny@kennyconstruction.com Web: www.kennyconstruction.com	a) US\$475M b) US\$135M	All underground work: hard rock tunnels machine bored or D&B, EPBM tunnels, SEM tunnels, all soft soil tunnelling methods, microtunnels, large caverns, subways, shaft caissons and tunnel rehabilitation by various lining methods	WePower, Elm Road Generating Station, USA – 27ft tunnel and 4 x lake intake shafts for existing and new generating facilities; Calumet Deep Tunnel Valve Chamber, USA – Deep tunnel, 300ft deep valve chamber and underground control station; Brightwater Conveyance System, East Contract, Seattle, USA – 14,050ft of Ø16'8" precast concrete segmentally lined tunnel and associated structures; Edison Tunnel and Force Mains, Sayerville, USA ; Vulcan Materials Corporation Starter Pit and Ancillary Facilities, McCook, USA ; Commonwealth Edison Company, Chicago, USA – 4 x river tunnels for power distribution	USACE McCook Reservoir and Valve Chamber, Illinois, USA ; Commonwealth Edison Company, Chicago, USA – 15ft diameter Chicago River crossing for power distribution; Lake Michigan Tunnel & Intakes, USA – 9,000ft of Ø27ft TBM tunnel, 3 x shoreline power plant connection shafts and 4 x lake intake connection shafts
Kiewit Construction Co 3555 Farnham Street Suite 200-E Omaha Nebraska 68131 USA Tel: +1 402 346 8535 Fax: +1 402 346 8610 Email: undergroundinfo@kiewit.com Web: www.kiewit.com/underground	a) US\$5bn b) US\$150M	All underground construction including: TBM tunnelling (hard rock, slurry and EPBM), NATM, drill & blast, mechanical excavation, cut & cover, rehabilitation, microtunnelling, shaft construction	East Side CSO Tunnel, Portland, USA – 29,000ft long, 25ft diameter slurry shield tunnel, a precast single pass liner and 9 x shafts along the alignment; Devil's Slide Tunnel, Montara, USA – 4,100ft twin-bore NATM highway tunnels and E&M systems; Cavern No 2, West Virginia, USA – Construction of a liquid storage cavern consisting of a network of approximately 14,500ft of 15ft and 20ft wide x 27ft tall drill & blast tunnels with shotcrete final liner	Lake Hodges, Escondido, USA – Excavation of a 5,850ft long, Ø12'6" horseshoe shaped tunnel with 120-inch steel liner and 12ft diameter vertical shaft; Wheeler Gulch, Parachute, USA – Construction of 3,200ft long tunnel that is 24ft wide x 20ft tall, using a roadheader
Lemminkäinen Infra Esterinportti 2 00240 Helsinki Finland Tel: +358 2071 53608 Fax: +358 2071 51302 Email: risto.kupila@lemcon.fi Web: www.lemminkainen.fi	a) US\$1.1bn b) US\$117.6M	Hard rock railway and motorway tunnels, parking caverns, oil and gas caverns	Multi Utility Tunnel, Helsinki, Finland – Construction of a 2200m section of drill & blast multi-purpose utility tunnel; Kroksberg, Härmösand, Sweden – Construction of a 4540m long railway tunnel; Bjäsöholmen, Härmösand, Sweden – Construction of a 3490m railway tunnel; Torbacken-Hede, Lilla Edet, Sweden – Construction of a 3030m railway tunnel; KEHU, Helsinki, Finland – Construction of a service tunnel by drill and blast in the centre of downtown Helsinki	E18 Motorway Tunnels, Finland – 4 tunnels with a total length of 4429m; VUOLI, Vantaa, Finland – 2 railway tunnels, total length of 5736m; Askottsberget Railway Tunnel, Kramfors, Sweden – 3270m railway tunnel; Asa Tunnel, Kungsbacka, Sweden – 1850m railway tunnel
McNally International 1855 Barton Street East Hamilton Ontario, L8H 7L8 Canada Tel: +1 905 549 6561 Fax: +1 905 549 3548 Email: hamilton@mcnallycorp.com Web: www.mcnallycorp.com	a) US\$98.8M b) US\$59.2M	All areas of tunnel construction including soft ground conventional and EPB with concrete segments, rock with roadheaders, TBM's and drill and blast. Subway tunnels, water and wastewater	Bathurst/Langstaff Trunk Sewers, York Region, Ontario, Canada – Design-build sewer 8.6km of Ø3.3m tunnel via EPBM with precast lining, includes 6 x sealed shafts; YDSS Interceptor, 19th Avenue, York Region, Ontario, Canada – Construction of 4.2km of Ø3.3m sewer tunnel via EPBM with precast lining, includes 5 x sealed shafts; Welland Sanitary Sewer, Niagara, Ontario, Canada – 2.7km of 1.7m diameter tunnel via TBM; Sudbury Rock Tunnel, Sudbury, Ontario, Canada – 6.5km of 2.1m x 1.5m D&B rock tunnel including 3 shafts and connections; Big Walnut Outfall Sewer, Stage 2, Columbus, Ohio, USA – 4km of 3.7m diameter tunnel via Lovat EPBM with precast segmental lining, through mixed ground conditions	16th Avenue Sanitary Trunk Sewers (Phase II), York Region, Ontario, Canada – Design-build trunk sanitary sewer 7km of 2.64m diameter tunnel, including shafts and connections; 16th Avenue Trunk Sewer, (Phase I), Markham, York Region, Ontario – 3.2km of Ø3.5m tunnel and 3.9km of Ø2.85m tunnel; Edmonton South LRT Extension, Edmonton, Canada – 300m of Ø6.4m 6.4m dia tunnel in confined urban area

TUNNELLING CONTRACTORS

Company information	(a) Turnover (b) Turnover in tunnelling	Areas of expertise	Tunnel contracts underway	Recent tunnel contracts
Metrostav Kozeluzska 2246 180 00 Praha 8 Czech Republic Tel: +420 266 709 245 Fax: +420 266 709 193 Email: info@metrostav.cz Web: www.metrostav.cz	a) US\$978M b) US\$262M	Cut and cover, drill and blast, cover and cut, NATM tunnelling	IV.C2 Metro, Prague, Czech Republic – Double track single tube tunnel, 793m long, NATM; Héoinsfjaroargöng Tunnel, Ólafis Fjords, Iceland – 3.8 + 7.5km long NATM tunnel between Siglu and Héoins; Lucica Tunnel, Highway A6 Rijeka-Zagreb, Croatia – 590m long NATM tunnel; New Connection, Prague, Czech Republic – Main Railway Station, Masaryk RS-Liben-Vysocany-Holesovice, driven section 2.4km long, cut & cover section 280m long; Tunnel Blanka, Inner City Ring Road, Prague, Czech Republic – Myslbekova Street-Pelc Tyrolka Section, NATM and cut & cover, total of 6.4km	Panenská Tunnel, D8 Highway, Kninice, Czech Republic – 1.9km road tunnel, NATM; Libouchec Tunnel, D8 Highway, Czech Republic – Twin road tunnel, NATM; Valik Tunnel, D5 Highway, Plzen bypass, Czech Republic – 2 x 330m long NATM twin road tunnel; Klimkovice Tunnel, D47 Highway, Czech Republic – Twin road tunnel, 2 x 678m long, NATM; Euerwang Tunnel, Ingolstadt-Nürnberg, Germany – 1.6km long NATM tunnel; Mrázovka Tunnel, Prague, Czech Republic – Twin road tunnel, 653m long
Morgan Est Morgan Est House Corporation Street Rugby, Warwickshire CV21 2DW United Kingdom Tel: +44 1788 534500 Fax: +44 1788 534550 Email: info@morganest.com Web: www.morganest.com	a) US\$987M b) US\$167.5M	Tunnel design and construction in both soft ground and hard rock, utilising both mechanised segmental and SCL techniques. Manufacture of precast tunnel linings, M&E, caisson and shaft sinking, pipe jacking, drill & blast	Belfast Sewerage Scheme, Northern Ireland – Comprising 10km tunnels, Ø38m pumping station, 28 x shafts and marine outfall; King's Cross Station Redevelopment, London, UK – New access tunnels to the Victoria Line, Piccadilly Line and Northern Line; Shepherd's Bush Station Redevelopment, London, UK – Upgrade to provide step free access and improved ventilation and emergency arrangements; Croydon Cable Tunnel, UK – 10km long Ø3m cable tunnel and associated M&E works; London Water Ring Main (Honor Oak-Brixton), UK – 4.5km extension; London Water Ring Main (Stoke Newington-New River Head), UK – 4km extension; Hendon Cable Tunnel, UK – Ø2.5m cable tunnel	Docklands Light Rail Extension, UK – Twin bore extension under the Thames (as Amec); Terminal 5, Heathrow Airport, UK – In JV with Vinci to construct the tunnels associated with the Terminal 5 project: Airside Road Tunnel – Twin bore tunnel, Ø8.1m approx. 1.3km long; Heathrow Express Extension (HEX); Piccadilly Line Extension to T5; Stormwater Outfall Tunnel; A3044 Service Tunnel
Murphy & Sons, J Hiview House Highgate Road London NW5 1TN United Kingdom Tel: +44 20 7267 4366 Fax: +44 20 7482 3107 Email: info@murphygroup.co.uk Web: www.murphygroup.co.uk	a) US\$775.5M b) US\$91.7M	All underground works: tunnels for water and sewerage, utility services, rapid transit and main line railways, underground storage, caverns, deep hand mined piles in confined city centre sites. Specialist plant holding includes fleet of tunnelling equipment	Lower Lea Valley Cable Tunnels, UK – Enabling works for the Olympic site, involving 2 x parallel cable tunnels each approx. 6km long (NGC Tunnel = Ø4.15m, and EDF Energy Tunnel = Ø2.82m), plus 7 shafts ranging from Ø7.5m up to Ø15m and depths of 25m. Tunnels driven with 4 x Lovat TBMs. Design and construct contract includes civils and M&E works; Bankside to Farringdon Cable Tunnel, London, UK – Contract comprises 2.53km of Ø2.5m segmentally lined tunnel driven in 2 sections with a Lovat TBM, including a mid-tunnel step-plate junction, a spur tunnel driven by backhoe shield (295m x Ø2.44m) and 2 x Ø3.66m shafts and Ø7m working shaft at Bankside	CTRL Contract 320, Thames Tunnels, London, UK – Twin Ø7.85m, 2.5km long tunnels under the Thames undertaken in JV with Hochtief. Closed face slurry Mixshield TBM, using bolted precast concrete segmental tapered lining
Nicholson Construction 12 McClane Street Cuddy, PA 15031 USA Tel: +1 412 221 4500 Fax: +1 412 221 3127 Email: info@nicholsonconstruction.com Web: www.nicholsonconstruction.com	a) US\$100M b) US\$100M	Earth retention systems (rock & soil anchors, diaphragm walls), ground treatment including: Rock grouting (cement, low-mobility & asphalt grouting), soil grouting (jet, compaction, microfine & chemical grouting), deep mixing, slurry trench walls	North Shore Connector, Pittsburgh, USA – Jet grouting, soil mixing, diaphragm walls for new light rail transit tunnels and stations; World Trade Centre Transit Hub, NYC, USA – Part of JV that is installing micropiles and tieback anchors for new underground hub; Block 76, Salt Lake City, USA – Design-build earth retention package for a mixed use development, including diaphragm walls and soil nailing; Oakwood CSO Tunnel, Detroit, USA – Grouting for sewer tunnel; McCook Reservoir, Stage 1, Chicago, USA – Using an Integral Computerised Grouting System (ICGS), constructing a double line grout curtain to depths of 120m; World Trade Centre Memorial Liner Wall, NYC, USA – Anchored diaphragm wall	Dearborn CSO Grouting Programme, Michigan, USA – Grouting for a sewer tunnel; Miamitown Interceptor Sewer, Ohio, USA – Shaft using overlapping jet grout columns; North Kenmore Shaft, Washington, USA – Diaphragm wall shaft for excavation support for 2 x tunnels and 1 x microtunnel launch; Upper Northwest Interceptor (Sections 3 & 4), Sacramento, USA – Jet grouted 5 shaft eyes for microtunnel drives; New York Law School, USA – Diaphragm wall for underground building expansion
Nishimatsu Construction 1-20-10 Toranomon Minato-Ku Tokyo 105-8401 Japan Tel: +81 3 3502 0232 Fax: +81 3 3580 2745 Email: webmaster@nishimatsu.co.jp Web: www.nishimatsu.co.jp	Undisclosed	Caverns and underground storage, cut & cover, drill & blast, geotechnical instrumentation, grouts/grouting, pipe and box jacking, soft ground tunnelling, turnkey projects	Shimada No 1 Tunnel (Out Bound), 2nd Tomei Expressway, Japan – 2.7km, 175m ² cross section road tunnel; C828, Nicoll Highway Station, Singapore – Construction and completion of station at Nicoll Highway and Boulevard, including 1.4km of dual single-track Ø6.7m metro tunnel; C823, Old Airport Road, Tanjong Katong & Paya Lebar Station, Singapore – 1.7km of dual single-track Ø6.7m metro tunnel; Nam Theun II HEP, CW2, Lao People's Democratic Republic – 1.5km of Ø10m headrace tunnel, 1.1km of Ø8.2m-Ø10.4m pressure tunnel and vertical shafts; Tsengwen Reservoir Trans Basin Water Diversion, Taiwan – 14km headrace tunnel	Dublin Port Tunnel, Ireland – 2.5km of twin two-lane Ø11.8m road tunnels; CTRL Contract 220, UK – 7.5km of twin single track, Ø8.1m railway tunnel; Kaohsiung Metro, Red & Orange Lines, CR2, Taiwan – 6.9km of twin-track Ø5.6m rail tunnel; Suzuka Tunnel Up Line, Japan – 4km of 150m ² cross section road tunnel; SJ46 (Phase 2) Tunnel, Japan – 1.1km of Ø11.4m road tunnel
Novatecna Rua Banibas 142 05460-010 São Paulo Brazil Tel: +55 11 3813 8700 Fax: +55 11 3031 7967 Email: novatecna@novatecna.com.br Web: www.novatecna.com.br	Undisclosed	Tunnel consolidation with horizontal jet grouting, specifically in difficult conditions such as shallow cover and high permeability sandy soils	São Paulo Metro, Line 4 / Yellow (Vila Sonia-Luz), Brazil – This line will connect the Luz District with Vila Sonia District in the west. Performed horizontal jet grouting, forepoling, horizontal drains and vertical jet grouting for several access tunnels, stations and metro tunnels; São Paulo Metro, Line 2 / Green (Ana Rosa-Tamanduatei), Brazil – Extension of Line 2 / Green, stage one includes 3.4km of new line. Performed 20,000m of jet grouting columns in 2005 and continue to work through 2006 and early 2007 for conclusion of the first stage and for the remaining 3.4km of tunnels; Barcelona, Spain – Full scale test for consolidation of a rail tunnel in high-permeability sand soil, by 360° jet grouting and soil cement	Caracas Metro, Venezuela – Long-term work (5 years) on Line 4 of the subway. Performed 50,000m of vertical jet grouting of various column diameters, 40,000m of horizontal jet grouting for soil consolidation of tunnels and stations Plaza Venezuela and Plaza Italia

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TUNNELLING CONTRACTORS

Company information	(a) Turnover (b) Turnover in tunnelling	Areas of expertise	Tunnel contracts underway	Recent tunnel contracts
O Obayashi Corporation Shingawa Intercity Tower B, 2-15-2 Konan Minato-ku Tokyo 108-8502 Japan Tel: +81 3 5769 1254 Fax: +81 3 5769 1962 Email: webmaster@obayashi.co.jp Web: www.obayashi.co.jp	a) US\$12.5bn b) -	Cavems/underground storage, nuclear waste repositories, cut & cover, D&B, geotechnical instrumentation/engineering, grouting, immersed tube tunnelling, pipe and box jacking, soft ground tunnelling, turnkey projects	Dubai Metro, Phase 1, UAE – Design/build contract for 52.1km LRT, includes 4 underground stations, 3.5km long shield tunnel and 1.4km cut & cover tunnel; Central Link Light Rail, C710 Beacon Hill, Seattle, USA – 2.3km LRT construction, including 2 parallel 1.3km long x Ø5.7m EPB tunnel; Metro Gold Line Eastside Extension, USA – Design/build contract for 8.2km subway, twin bored 2.1km long Ø6.4m tunnel and cut & cover sections; West Area CSO Storage Tunnel & Pumping Station, USA – 13km of Ø7.3m TBM tunnel and associated works; Taipei MRT, Xinyi Line, Contract CR580B, Taiwan – 2.3km subway, including twin 1.6km long x Ø6.1m EPB tunnel and 2 underground stations	Second Bangkok International Airport Project, Thailand – Works for runway, taxiway, roadway and drainage works; Uinta Basin Replacement Project, USA – Irrigation dam improvement works including cutoff trench, grout curtain and foundation treatment; Transmission Cable Tunnel, Singapore – Design-build contract for 3.2km long Ø3.7m tunnel for cable transmission
Obras Subterranas Lopez de Hoyos 135 28002 Madrid Spain Tel: +34 9 1782 3400 Fax: +34 9 1562 4298 Email: central@obrasubterranas.es Web: www.obrasubterranas.es	Undisclosed	Drill & blast tunnelling, TBM tunnelling, mining exploitation and development	Mondragon-Elorrio HSR, Vizcaya, Spain – Construction of a 3.5km rail tunnel; Arraiz-Basauri HSR, Vizcaya, Spain – Construction of a 2.5km rail tunnel; La Robla-Pajares HSR, León, Spain – Construction of a 5.1km rail tunnel; Pajares Tunnel, León, Spain – Construction of a 7.5km double shield TBM tunnel; Aranjuez-Ontigola HSR, Madrid, Spain – Construction of a 2.5km rail tunnel; Variante de San Julian HSR, Orense, Spain – Construction of a 2.2km long rail tunnel; Almuñecar-Tamaray, Malaga, Spain – Construction of a 6.2km road tunnel; Nerja-Almuñecar, Malaga, Spain – Construction of a 3.8km road tunnel	San Pedro HSR, Madrid, Spain – Construction of a 12km drill & blast rail tunnel; Guadarrama Tunnel, Madrid, Spain – Construction of a 3km road tunnel; Piqueras Tunnel, Soria, Spain – Construction of a 2.5km drill & blast road tunnel; Central Hidroeléctrica La Muela, Valencia, Spain – Construction of a 1km hydropower tunnel; Aguablanca, Badajoz, Spain – Construction of a 2.8km long mine access tunnel; Soller Tunnel, Madrid, Spain – Construction of a 900m road tunnel
Oxford Hydrotechnics Baynards Green Bicester Oxford OX27 7SR United Kingdom Tel: +44 1869 346001 Fax: +44 1869 345455 Email: info@h2ox.net Web: www.h2ox.net	Undisclosed	Leak sealing, crack injection, resin injection, void filling, ground stabilisation, crack stitching, water ingress control, brick ties, ground water control, resin injection, polyurethane injection	London tunnels, UK – Leak sealing, ongoing; Montfield Tunnel, Network Rail, UK – Joint sealing/leak sealing; British Waterways, UK – Canal wall sealing, resin injection; Thames Water, Lambourne, UK – Sealing leaks in manholes; Anglian Water, UK – Leak sealing at a water treatment plant; Network Rail, UK – Resin injection, brick ties, leak sealing	T5 Baggage Tunnels, Heathrow, UK – Leak sealing & void filling for Laing O'Rourke; British Waterways, UK – Leak sealing, void filling & resin injection; Anglian Water, Lowestoft, UK – Shaft sealing, ground stabilisation; Cardiff, Wales – Shaft sealing for Amec; North Mid Construction, UK – Leak sealing; Skanska – Leak sealing
P Pacific Blasting & Demolition 3183 Norland Avenue Burnaby, BC V5B 3A9 Canada Tel: +1 604 291 1255 Fax: +1 604 291 2813 Email: ronw@pacificblasting.com Web: www.pacificblasting.com	a) US\$65M b) -	Drill and blast tunnelling, rock slope stabilisation including shotcreting, rehabilitation	NVI Mining, Myra Falls Operations, Campbell River, BC, Canada – Development of North Ramp Portal for their new underground mine. Project involved rock slope stabilisation above the new portal location as well as drilling and blasting of the starter tunnel for the new decline; Granville Station Skytrain Tunnel, Vancouver, BC, Canada – Project involved construction of a new tunnel entrance into the existing Granville Skytrain station. Tunnel constructed in soft sandstone from level 7 of the underground parkade at 610 Granville Street, passing 23m below the St Regis Hotel. A cross cut and a decline provided handicapped access into the existing inbound and outbound Skytrain tunnels	Miller Creek Hydroelectric Tunnel, Pemberton, BC, Canada – 1050m long, 2.75m x 3m water diversion tunnel to feed water into a 4.5km long penstock supplying a 26MW power station. Tunnelling was carried out in hard diorite using drill and blast techniques with 60m long portion at the intake end carried out in soft ground using NATM. This is a "green" energy run-of-the-river project
Patel Engineering Patel Estate Road Jogeshwari (West) Mumbai 400 102 India Tel: +91 22 678 2916 Fax: +91 22 678 2455 Email: headoffice@pateleng.com Web: www.pateleng.com	a) US\$167M b) US\$100M	56 years of experience in dams (concrete and roller compacted), tunnels, powerhouses, caverns, microtunnels via TBM (first company in India to use this method), shafts, irrigation and other civil engineering works	>65 civils projects, including: Koyna HEP, Stage IV, Maharashtra, India – Extension of headrace; Parbati HEP, HP, India – 3.5km HRT; Sewa HEP, J&K, India – Underground surge & pressure shafts, penstocks; Teesta HEP, West Bengal, India; Serlui-B HEP, India; Kameng HEP, AP, India – 16.1km HRT, u/g surge & pressure shaft; Priyadarshini Jurala HE Project, India; Single Line BG Tunnels, 1,2 3, 4, 5 & 6, India; Rampur HE Project, Packages I & II, India; Loharinag Pala HE Project, India; Tuirial HEP, Mizoram, India; N/F Railway, Assam, India – Tunnel no 7 & 10, total length 5km; Four National Highways Projects, NHAI, India; Six Lift Irrigation Projects, India;	Microtunnelling works, Mumbai, India – Installation of sewers and water mains at various locations by microtunnelling, pipejacking and horizontal directional drilling at 14 locations in Mumbai
Pihl & Son, E Nybrovej 116 DK-2800 Kgs Lyngby Denmark Tel: +45 4527 7200 Fax: +45 4527 7100 Email: pihl@pihl-as.dk Web: www.pihl-as.com	a) US\$1.34bn b) -	All underground tunnels and caverns in hard rock with or without groundwater. Drill & blast, slurry and EPB shield and hard rock TBM tunnelling	Malmö City Tunnel, Malmö, Sweden – Construction of 4,650m drilled twin-tube rail tunnel (in JV), 8.95m diameter, 700m long downgrade loading platform & excavation for new Triangeln Station, including secant & sheet pile walls with anchors in 3 levels; M3 Bypass Extension, Sealand, Denmark – Contract for new tunnel section (in JV); E18 Grimstad-Kristiansand, Norway – Construction of a 38km long road. Project includes 8 drill & blast tunnels with a total length of 11km and 19 culverts. Tunnels are equipped with ventilation and surveillance and warning systems; Sisimiut, Greenland – 14MW hydro project and 26km transmission line. Includes underground power station, horizontal inlet tunnel & inclined pressure tunnel (in JV)	Kárahnjúkar Hydroelectric Power Station, KAR 15, Iceland – Excavation/blasting of subterranean hydroelectric power station (in JV), transformer room, 1km access tunnel to power station, control centre, staff facilities, 4 x 4m cable tunnel, 2 penstocks, tailrace tunnel

TUNNELLING CONTRACTORS

Company information	(a) Turnover (b) Turnover in tunnelling	Areas of expertise	Tunnel contracts underway	Recent tunnel contracts
Pohl cz Nádražní 25 252 63 Roztoky Czech Republic Tel: +420 233 089 412 Fax: +420 220 912 299 Email: pohl@pohl.cz Web: www.pohl.cz	a) US\$17.5M b) -	Infrastructure, mining & environmental tunnels, NATM, small diameter TBMs, rock & soft ground tunnelling, microtunnelling, pipe jacking, shotcrete, grouting, refurbishment, maintenance & cleaning	Olomouc Sewer System Upgrade, Czech Republic – Microtunnelling of sewer network, 2m dia, segmental lining and grouting. Pipejacking dia 1.4m. Traditional tunnelling of sewer galleries; Prague Smichov, Czech Republic – Power cable tunnel, traditional tunnelling, shotcrete primary lining and cast insitu final lining; Prague Kunratic, Czech Republic – Traditional tunnelling of collector, grouting and shotcreting; Roztoky Sewer Network, Czech Republic – Traditional tunnelling of sewer galleries, including grouting shotcreting and repairs	Prague Flushing Gallery, Vitava River, Czech Republic – Upgrade of concrete tunnel, traditional tunnelling, grouting and shotcreting; Prague Sewer Network, Letenska, Czech Republic – Upgrading of sewer galleries, including traditional tunnelling, grouting shotcreting and repairs; Brno City Centre Collector, Czech Republic – Traditional tunnelling of collector, grouting and shotcreting; Pizen Prazdroj Brewery, Czech Republic – Tunnelling near industrial buildings, galleries and shafts
Porr Tunnelbau Absberggasse 47 1103 Wien Austria Tel: +43 50 626 0 Fax: +43 50 626 1533 Email: tunnelbau@porr.at Web: www.porr.at/tunnelbau	Undisclosed	NATM excavation in hard rock and soft ground, TBM in hard rock, shielded TBM with EPB or slurry, pipe jacking with cutter or all kinds of TBM	Lainzer Tunnel, LT33, Vienna, Austria – Double-track rail tunnel, 3.6km; S35 Tunnel Kirchdorf-Kaltenbach, Styria, Austria – Twin-tube road tunnel, 7.5km; Limbeg II Power Station, Austria; Biel Bypass, Switzerland – 6km long EPB tunnel, 12.6m diameter; Finnetunnel, Germany – Twin 7.5km long rail tunnels, open mode hydroshield; Schaala Local Bypass, Germany – 1.2km long	Tauerntunnel 2nd Tube, Austria – 6.4km, NATM; H3/4 Münster-Wiesing, Tyrol-Austria – Rail tunnel 5.8km; Wienerwald-tunnel, Vienna, Austria – 2 x rail tunnels, each 10.8km, TBM. 1 x tunnel 2.5km long, NATM; Wientalsammelkanal, Vienna, Austria – 2 x 30m deep shafts, sewer 2.6km, EPB Ø8.6m; U2/1, Vienna, Austria – Metro tunnel, ground freezing, diaphragm walls, bored piles; U2/5, Vienna – 1.75km long, Ø6.5m slurry TBM; Tunnel Brixlegg, Lot H2/1, Tyrol, Austria – 3.47km double-track rail tunnel, NATM
Pozzi & Martinenghi Via Alba 84 33100 Udine Italy Tel: +39 0432 480306 Fax: +39 0432 481688 Email: info@pozzi-martinenghi.com	a) US\$8M b) US\$7M	Waterproofing, design of automated scaffolding systems (up to 20m diameter), technical advice on waterproofing specifications, injections, grouting, leak sealing, steel linings, shafts and caverns	Venice Link, Italy – Artificial tunnels, part of the new motorway near Venice, second section; Tabor and Barnica Tunnels, Pod Nanos, Slovenia – Waterproofing works; Foundations, Sofia, Bulgaria – Foundations works for a building site in the city centre	Milan Metro, Italy – Waterproofing of Pero Station and 4 x tunnels. All structures under groundwater level. Double waterproofing membrane with vacuum system, injection of structural joints; Salerno-Reggio Calabria Motorway, Italy – Waterproofing of Costa Inconronata Tunnel near Polla; CERN, Atlas 2, Gex (F), France/Switzerland – Waterproofing of two caverns; Mala Kapela Motorway Tunnel, Croatia – Waterproofing works; Dublin Port Tunnel, Ireland – Tunnel waterproofing, injection & leak sealing
Razel 3 rue René Razel Christ de Saclay 91892 Orsay France Tel: +33 169 856 908 Fax: +33 169 856 843 Email: jguillaume@razel.fr Web: www.razel.fr	a) US\$458M b) US\$46.4M	Design/build railway, road, metro, sewage, water supply, renovation, tunnels using all types of excavation methods (D&B, NATM, soft ground & hard rock TBM, compressed air, highly squeezing rock conditions)	Tunnel Ivry Massena, Paris, France – 2km EPBM sewer; Lyon/Turin HSR, Saint Martin la Porte, Savoy, France – 2.3km long exploratory gallery, drill & blast; Lyon/Turin HSR, Modane, Savoy, France – 4km long exploratory gallery, drill & blast; Cap Ia Houssaye Tunnel, Reunion Island – Twin-tube road tunnel, drill & blast; Salazie Upstream Gallery, Reunion Island – 8km hydraulic tunnel, Ø3.2m by double shield TBM and drill & blast; Railway Tunnels, Algeria – Renovation of 4 x rail tunnels, total length 1.3km	Salazie Downstream Gallery, Reunion Island – 10km water transfer tunnel, TBM and drill & blast; Service Tunnel, Paris, France – Excavated under compressed air; Franchet Tunnel, Savoy, France – road tunnel; Blagis/Cachan Sewer, Hauts de Seine, France – 3.5km long gallery & shafts; Toulouse Metro, France – 4.2km twin-track TBM tunnel, plus 5 x stations with diaphragm walls; La Vache Noire, Arcueil, Val de Marne, France – Service tunnel; Shirmeck, Bas Rhin, France – Road tunnel
SC Sopmet 3 Gutenberg Street Section 5 Bucharest Romania Tel: +40 21 313 3078 Fax: +40 21 312 4717 Web: www.sopmet.ro	a) US\$2.59M b) US\$1.8M	Horizontal directional drilling, auger boring, pipe jacking, pipe ramming	Bucharest-Constanta Railway, Romania – Culverts and slope protection as part of rehabilitation project; Line CF Bucharest, Constanta, Romania – 80m pipejack with 2.2m diameter prefabricated pipe; Line CF Jacobeni-Sadova, Romania – Pipejacking with 2.2m diameter prefabricated pipe; Rehabilitation of Bucharest-Constanta Railway, Pedestrian Tunnel, Baneasa Station, Romania	Line CF Sibot-Curtia, Romania – Pipejacking with 2.2m diameter prefabricated pipe; Line CF Sibiu-Virit, Romania – Pipejacking with 1.4m diameter prefabricated pipe; Rehabilitation of Eroci-Revolutier-Square, Bucharest, Romania – Pedestrian tunnel
SELI Piazza G. Marconi 26/c Palazzo Dell'Arte Antica 00144 Rome Italy Tel: +39 06 592 9241 Tel: +39 06 592 6220 Email: selispa@selitunnel.com Web: www.selitunnel.com	a) US\$200M b) US\$200M	Tunnel construction, tunnel design and design/manufacture of special equipment for underground works. Company section specifically dedicated to overhauling, manufacturing and designing equipment for mechanised tunnelling	Brenner Base Tunnel, Italy – 9.9km rail tunnel (DS TBM Ø6.12m) NATM and segmental lining; Gigil Gibe II Hydroelectric Project, Ethiopia – 25.8km diversion tunnel (2 x double shield TBM, Ø6.3m id, segmental lining); Beles Multipurpose Project, Ethiopia – 12km headrace tunnel and 7.2km tailrace tunnel (1 x EPBM Ø8.1m, 1 x double shield TBM Ø8.07m), segmental lining; São Paulo Metro, Brazil – 6.4km tunnel (EPBM + backup, Ø9.5m), segmental lining; Thessaloniki Metro, Greece – 7.7km tunnel (EPBM Ø6.12m), segmental lining; Rome Metro, B1 Line, Italy – 6.6km of tunnel (2 x EPBM Ø6.8km), segmental lining; Vancouver Metro, BC, Canada – 2.5km double-track rail tunnel (EPBM Ø6.1m), segmental lining; Athens Metro, Greece	Settingiano Railway Tunnel, Italy – 2.5km tunnel (EPBM Ø8.73m), segmental lining; Abdalajis Tunnel, Spain – HSR tunnel, 7.2km long (double shield TBM, Ø10m); Perthus Tunnels, Spain – 2 x HSR tunnels, 8.3km long (EPBM, Ø10.5m); La Joya Tunnel, Costarica – 7.5km water diversion tunnel (double shield TBM, Ø6.18m), segmental lining; San Francisco HEP, Ecuador – 8.4km long headrace tunnel (Ø7.04m double shield TBM); Turin Metro, Line 1, Lot 5, Italy – 2.5km double track tunnel, (EPB shield, Ø8.3m);

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TUNNELLING CONTRACTORS

Company information	(a) Turnover (b) Turnover in tunnelling	Areas of expertise	Tunnel contracts underway	Recent tunnel contracts
Shaft Sinkers Centex Office Park CNR Katherine Street & Centex Close Standton 2148 South Africa Tel: +27 11 445 4300 Fax: +27 11 444 4410 Email: sinkers@shaftsinkers.co.za Web: www.shaftsinkers.co.za	a) US\$150M b) US\$10M	Earth retention systems (rock & soil anchors, diaphragm walls), ground treatment including: Rock grouting (cement, low-mobility & asphalt grouting), soil grouting (jet, compaction, microfine & chemical grouting), deep mixing, slurry trench walls	Impala, RSA – Main shaft with ancillary development & equipping (1,921m deep, Ø10m), 2 x vent shafts (1,703m deep, Ø9m & 1,437m, Ø6.8m), fridge shaft (1,361m deep, Ø6m), main shaft (1,648m deep, Ø10m); Leeuwkop, RSA – Main shaft with ancillary development & equipping (1,648m deep, Ø9.8m), vent shaft (1,260m deep, Ø7.6m); Lonmin, RSA – Roland shaft with 22 lvi haulage development and equipping (6.5m wide x 4m high), Saffy shaft (various), Hossy shaft (various); Phakisa, Phase 3, RSA – Ex Freddie's 4 shaft (2,471m deep, Ø7.1m); Moab Khotsoang Mine, RSA – Vent bypass (Ø7.1m), batch plant operations, excavation of silos and orepasses	Impala, RSA – Sinking of ventilation shaft with ancillary development & equipping (1,451m deep, Ø5.6m); Lonmin, RSA – Development of three declines and Hossy shaft with ancillary development; Black Mountain Deep Shaft Project, RSA – 1,752m, Ø7.4m
Subterra Bežová 1658 147 14 Praha 4 Czech Republic Tel: +420 244 062 626 Fax: +420 244 466 179 Email: info@subterra.cz Web: www.subterra.cz	a) US\$244M b) US\$101M	Tunnel construction with particular expertise in NATM and trenchless technology	Prague Metro Extension, Line 4C2, Czech Republic; New Rail Link Project, Prague, Czech Republic – Linking Prague's central railway stations to the suburban stations; Dobrovského Tunnels, Brno, Czech Republic – Motorway tunnels on the inner urban ring road; 513 Prague Orbital Motorway, Czech Republic – Motorway tunnel; Railway Corridor III Modernisation, Bystrice-Mosty	Railway Corridor III Modernisation, Cervenka-Zabreh; Hnevkov I Rail Tunnel, Railway Corridor II, Czech Republic – Railway tunnel; D47 Motorway, Czech Republic – Klimkovice Tunnel; Zagreb-Rijeka Motorway, Croatia – Tuhobic Tunnel
Skanska BS Kosovska cesta 16 97174 Prievidza Slovakia Tel: +421 46 5190 198 Tel: +421 46 5424 494 Email: skanska.bs@skanska.sk Web: www.skanska.sk	Undisclosed	All forms of tunnelling and underground construction for civil, transportation and environmental projects	Sitina Tunnel, Highway D2, Lamasska cesta-Stare Grunty, Slovak Republic – Twin 1.4km long highway tunnel, cross section 79-108m ² ; WWTP & System, Povazska Bystrica, Slovak Republic – Construction of waste water sewerage system and new sewer collector (21.4km), restoration and completion of waste water treatment plant; Sal'a Waste Water Disposal System, Slovak Republic – Rehabilitation and extension of current sewage network; E18 Highway Tunnels, Orosnaki & Karnainen, Helsinki, Finland – 2 x highway tunnels: Orosnaki 2 x 653m, Karnainen 2 x 2.2km; 513 Highway Tunnel, Vestec-Lahovice, Prague, Czech Republic – Ring road tunnel for city	Trojane Highway Tunnel, Slovenia – Twin tube highway tunnel, 2.9km. Final lining, reinforcement works and main drainage construction; Valik Tunnel, Czech Republic – 329m road tunnel; Avigliana Tunnel, Italy – 1.9km road tunnel with 183m cut & cover section and 6 x emergency bays; Vuossari Tunnels, Helsinki, Finland – 2 x 1.52km double-tube rail tunnel and 14 short interconnection tunnels; WWTP & Waste Water Sewerage System in Banska Bystrica, Phase I, Slovak Republic
Strabag Donau-City Strasse 9 A-1220 Vienna Austria Tel: +43 1 22 422 0 Fax: +43 1 22 422 227 Email: tunnel@bauholding.at Web: www.strabag.com	a) US\$7.2bn b) US\$293M	Caverns/underground storage, nuclear waste repositories, cut & cover, drill & blast, ground stabilisation/improvement, hydro electric projects, mine development, shaft sinking/ drilling, shotcreting, soft ground tunnels	AlpTransit, Lötschberg Base Tunnel, Mitholz Lot, Switzerland – 2.1km of drill & blast high speed rail tunnel, through hard rock; AlpTransit, Gotthard Base Tunnel, Amsteg Lot, Switzerland – 2 x 11.3km of TBM driven railway tunnel, Ø9.55m, in hard rock; Krapina-Macelj, A2 Phyrn Motorway, Croatia – 6 twin tube highway tunnels, drill & blast; Perschling Tunnel, Austria – 3 single tube rail tunnels (Reiserbergtunnel, 1.3km; Stierschweifeldtunnel, 3.3km; and Raingrubentunnel, 2.7km); Niagara Tunnel, Canada – Diversion tunnel for HEP, 10.4km, Ø14.4m, TBM; Tunnel Vomp-Terfens, Lot H5, Austria – 5.8km long railway tunnel, drill & blast excavation	Highway Tunnels, Croatia – Tunnel Gric (2 x 1.2km), Tunnel Brinje (2 x 1.6km), Tunnel Hrastovec (2 x 1.1km), all D&B; Highway Tunnels, Austria – Tunnel Spital (2 x 2.4km), Tunnel Semmering (2 x 3.4km), Kienbergtunnel (2 x 1.4km), Herzogbergtunnel (1 x 1.9km), all D&B; LT22, Vienna, Austria – 1.7km single track rail tunnel; Frankfurt-Cologne HSRL, Germany – 11 tunnels totalling 17.1km; Borcka and Muratli HEPP, East Anatolia, Turkey – All underground works (D&B), including road tunnels
Subterra Bežová 1658 14714 Praha 4 Czech Republic Tel: +420 244 062 626 Fax: +420 244 466 179 Email: vbenes@subterra.cz Web: www.subterra.cz	a) US\$188M b) US\$102M	NATM tunnels, urban utility tunnels, trenchless technology	Prague Metro Extension, Line 4, C2, Czech Republic; The New Rail Link Project, Prague, Czech Republic – Linking Prague's central railway stations to the suburban railway stations; Utility Collector Tunnel, Prague, Czech Republic; Klimkovice Tunnel, Czech Republic – Tunnel on the D47 motorway; Railway Corridor II Modernisation, Cervenka-Zabreh Section, Czech Republic	Extension of the Sewerage and Duct System, Ostrava, Czech Republic; Krasikov 1 and Krasikov 2 Tunnels, Czech Republic – Double track railway tunnels on Railway Corridor II; Mala Huba Rail Tunnel, Czech Republic – Rail tunnel on Railway Corridor II; Anti-Flood Protection, Prague, Czech Republic – Barriers as part of flood protection scheme; Brno Sewerage Network, Czech Republic; 513 Tunnel, Exploratory Gallery, Prague Ring Road, Czech Republic
Tony Ridley Hyperbaric Associates 26 The Street Surlingham, Norwich Norfolk, NR14 7AJ United Kingdom Tel: +44 1508 538 838 Fax: +44 1508 538 936 Email: info@hyperbaric-tunnelling.com Web: www.hyperbaric-tunnelling.com	Undisclosed	Specialist personnel & consultancy for compressed air tunnelling & TBM intervention, all hyperbaric techniques, tunnelling occupational health support & surveillances, site specific training packages for all applications, etc.	Barcelona Metro, Line 9, Barcelona, Spain; São Paulo Metro, Line 4, Brazil; Dubai Metro, UAE; Tahuna & Christchurch Outfall Tunnels, New Zealand: All projects include specialist services in relation to TBM inspection, hyperbaric consultancy, specialist personnel, occupational health & safety support, extrication & rescue, first aid and training	Caracas Metro Line 4, Caracas, Venezuela – TBM repair and maintenance in compressed air plus occupation health, safety, medical and advanced first aid, rescue and extrication support services; CTRL Contracts 320, 220, 250 (Area 200), London, UK – TBM repair and maintenance in compressed air plus occupation health, safety, medical and advanced first aid, rescue and extrication support services



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A concrete roof covers one of the largest (135 feet in diameter) and deepest (160 feet) soft-ground shafts excavated in the US – the West Side Willamette River CSO's Swan Island Pump Station shaft. **JA** provided support-of-excavation design and CM services to the City of Portland. (Photograph courtesy of the Bureau of Environmental Services.)

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TUNNELLING CONTRACTORS

Company information	(a) Turnover (b) Turnover in tunnelling	Areas of expertise	Tunnel contracts underway	Recent tunnel contracts
Traylor Bros PO Box 5165 835 N. Congress Avenue Evansville IN 47716-5165 USA Tel: +1 812 477 1542 Fax: +1 812 474 3223 Email: underground@traylor.com Web: www.traylor.com	a) US\$267M b) US\$117M	EPB, TBM and mechanised shield tunnelling, compressed air, drill & blast, manufacture of precision pre-cast concrete segmental linings	San Vicente to Second Aqueduct Pipeline Project, San Diego, USA – 17.7km water conveyance tunnel. Ø3.2m tunnel will connect existing aqueduct to the San Vicente reservoir. The system will provide additional storage during wet periods, and another water source during dry periods or if the main aqueduct should suffer earthquake damage; LAMTA C0800 Metro Gold Line, LA, USA – Twin 2.3km subway tunnels, excavated with 2 x EPBMs in alluvial geology, 4 x cross passages and 2 x sump structures; San Vicente Pipeline Tunnel Segments, San Diego USA – Manufacture and install precast concrete tunnel segments	NEIS, LA, USA – 8.5km of Ø4m sewer tunnel utilising 3 x TBMs. Of the 3 x drives, 2 in predominantly alluvial soils, below the water table. 3rd drive in siltstone/claystone. 10 x shafts; Dulles Airport Tunnel Segments, USA – Manufacture and supply precast concrete tunnel segments; LAMTA C0800 Metro Gold Line Tunnel Lining Segments, LA, USA – Manufacture and install precast concrete tunnel segments; NEIS Tunnel Lining Segments, LA, USA – Manufacture and install precast concrete tunnel segments
TW Mechanical Headings Shawell Lutterworth Leicestershire LE17 6AS Tel: +44 1788 861 793 Fax: +44 1788 861 793 Email: alex.r.menhinick@carillionplc.com	a) US\$12.2M b) US\$12.2M	Directional drilling, guided boring, auger boring, pipe jacking	Carlisle-Gretna Green, M6 Extension (Guardsmill), UK – Service & drainage crossings for Carillion. 20 x 40m guided auger bores & directional drilling crossings, Ø125mm-600mm; Foul Drainage & Storm Drainage, New Housing, GKL Northern Ltd, UK – Guided boring 225 x Ø450mm foul drainage, 3 x pipejacks Ø1200mm & 1500mm, totalling 200m; Deeside, A5117 Extension (Chester), UK – Service & drainage crossings. 5 x 40m guided auger boring & directional drilling crossings for Carillion, sizes from Ø225mm-750mm. 120m pipejack, Ø1200mm	Carlisle-Gretna Green, M6 Extension (Guardsmill), UK – Service & drainage crossings for Carillion. 20 x 40m guided auger bores & directional drilling crossings; Foul Drainage & Storm Drainage, New Housing, UK – Guided boring 225 x Ø450mm foul drainage, 3 x pipejacks Ø1200mm & 1500mm, totalling 200m; Deeside, A5117 Extension (Chester), UK – Service & drainage crossings. 5 x 40m guided auger boring & directional drilling crossings, sizes from Ø225mm-750mm. 120m pipejack, Ø1200mm
Vinci Construction Grands Projets 5 cours Ferdinand-de-Lesseps 92851 Rueil-Malmaison France Tel: +33 1 4716 4700 Fax: +33 1 4716 3360 Email: info@vinci-construction.co.uk Web: www.vinci-construction.com/projets	a) US\$1.13bn b) -	TBM tunnelling: open shield, EPB, slurry shield, Mixshield; 'All in the tube' concept (devised for the El Azhar road tunnels in Cairo, Egypt, which ensures safety in tunnels without ancillary structures), patented 'dual-layer' segments (2002)	Brightwater Conveyance System, Sections 2 & 3, Seattle, USA – Including 9.7km slurry TBM drive; Hallandsås Railway Tunnel, Sweden – twin 5.6km long rail tunnels; A86 West, East 1 & 2, France – Design build contract for a 4.5km long single tube motorway tunnel, EPB/slurry TBM Ø11.6m, including E&M installations; Cairo Metro, Line 3, Phase 1, Egypt – Construction of 5km of tunnels (Herrenknecht slurry TBM) & 5 stations; Athens Metro, Line 2 Extension, Greece – Detailed design, management & synthesis of 5.7km long structure, including 5.1km TBM tunnel and 4 x stations; Budapest Metro, Line 4, Stage 1 – Design build of Line 4, including TBM excavation of twin 7.3km long tunnels & station	Mitholz tunnel, Switzerland – Triple tube railway tunnel, total length 24km, constructed by drill & blast; Terminal 5 Tunnels, Heathrow Airport, UK – Construction (in JV) of underground works including 7 tunnels, totalling 14km in length, shafts, earthworks, concreting & slurry walls. Tunnels constructed by TBM and SCL methods; Stormwater Management and Road Tunnel (SMART), Kuala Lumpur, Malaysia – Technical assistance
Wayss & Freytag Ingenieurbau Eschborner Landstraße 130-132 D-60486 Frankfurt AM Main Germany Tel: +49 69 7929 400 Fax: +49 69 7929 491 Email: info@wf-ib.de Web: www.wf-ingbau.de	a) US\$335.7M b) -	TBM tunnels, Mixshield, Hydroshield, EPBMs, slurry and hard rock tunnelling, NATM, cut & cover, design-build projects	Hubertus Tunnel, The Netherlands – 1.6km long, Ø9.6m, slurry shield; North-South City Line, Cologne, Germany – Two single-track rail tunnels & 7 x stations, total length 4.9km by 2 x Ø8.39m slurry TBMs; Katzenberg Tunnel, Germany – Two single-track railway tunnels, 2 x Ø9.3m, using 2 x Ø11.12m EPB shields; Moosach Tunnel, Munich, Germany – Two single track rail tunnels and 2 x stations, 2.4km, Ø7.35m slurry shield; Finnetunnel, north of Weimar, Germany – Two single track rail tunnels, 7km using 2 x Ø10.9m slurry shields, converted to open rock after first 1.5km; Diabolo Tunnel, Brussels, Belgium – Two single track rail tunnels, each 1.1km underneath runway; Ems Dollard, Germany/Netherlands	Munich Underground Railway, Line 3 North, Section 2, Germany – Two single track rail tunnels & 2 x stations, 2.4km, Ø7.35m slurry shield; Grouff Tunnel, Luxembourg – Twin 3.26km long drill & blast road tunnel; Vienna Metro, Line U2, Section 2, Austria – 2 x twin bore metro tunnels, 2 x 1.3km NATM; Uetliberg Tunnel, Zurich, Switzerland – 2 x motorway tunnels, 8.2km; North/South Link, Antwerp, Belgium – 2 x single track rail tunnels 1,228m long Ø7.3m
YIT Corporation PO Box 36 Fin-00621 Helsinki Finland Tel: +358 20 433 2399 Fax: +358 20 433 3706 Email: posti@yit.fi Web: www.yitgroup.fi	a) US\$2.1bn b) US\$43.5M	Underground blasting and reinforcement works in hard rock, shaft development works (for existing hoisting shafts in underground mines), underground mine development and production works	Underground Water Storage, Turku, Finland – Excavation of 200,000m ³ for Turku Water; Kittilä Gold Mine, Kittilä, Helsinki, Finland – 4.5km decline & development tunnels for Agnico-Eagle Ltd; Extension of Terminal 2, Helsinki-Vantaa Airport, Finland – Baggage tunnel and civil engineering works for Finavia; Munkkisaari-Vanhankirkonpuisto Energy Tunnel, Helsinki, Finland – 1.5km long tunnel for Helsinki Energy; Tunnel renovation Jyväskylä-Jämsänkoski, Finland – Tunnel renovation works of 2.5km long tunnels for The Finnish Rail Administration (RHK)	VUOLI Project Tunnelling Contracts 2 & 5, Helsinki, Finland – 5km of railroad tunnels for Finnish Road Administration VUOLI Project; Viikinkaari Cable Tunnel, Helsinki, Finland – 1.5km long tunnel for Helsinki Energy; Lempäälä shelter, swimming pool, ski tunnel, Lempäälä, Finland – Excavation of 65,000m ³ for Marjamäen Kalliosuoja Oy; Pitkälampi freshwater tunnel, Helsinki, Finland – 0.5km tunnel for Helsinki Water
Züblin, Ed Albstadtweg 5 D-70567 Stuttgart Germany Tel: +49 711 7883 9704 Fax: +49 711 7883 261 Email: natascha.hentschel@zueblin.de Web: www.zueblin.de	a) US\$2bn b) US\$130.4M	Caverns/underground storage, nuclear waste repositories, cut & cover, drill & blast, ground stabilisation/improvement, hydro electric projects, mine development, shaft sinking/ drilling, shotcreting, soft ground tunnels	Isisbergtunnel, Switzerland – Twin 4.6km hard rock Ø11.6m TBM tunnels; Brixlegg Tunnel, Lot 5, Austria – 7.7km 3-track rail tunnel, NATM; Katzenberg Tunnel, Germany – 2 x 9.38km single-track rail tunnels, 2 x TBM drives, NATM cross passages, cut & cover sections; North/South Line, Amsterdam Metro, Netherlands – 4 x sections of twin single-track tunnel, totalling 6.2km, slurry/EPB shield Ø7.12m. Extensive ground treatment, construction of cross passages in ground freeze; North-South City Line, Lot 2, Cologne, Germany – Two single-track rail tunnels using 2 x Ø8.4m TBMs, total of 5.38km; Kopswerk II HEP, Austria – Underground powerhouse, transformer cavern and total of 1.6km drill & blast tunnel; Wienerwald Tunnel, Austria	AlpTransit, Lötschberg Base Tunnel, Mitholz Lot, Switzerland – 2.1km of drill & blast high speed rail tunnel, through hard rock; Schottenberg Tunnel, Germany – 3-lane road tunnel and parallel rescue gallery; Hestenbertunnel, Germany – 2-lane road tunnel, 734m long, drill & blast; Bierhäuselberg, Austria – 2 x single track rail tunnels, NATM; Munich Subway, U3 Nord, Germany – 2-track and 3-track rail tunnel, approx. 2.8km and station, NATM with extensive ground treatment measures

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Dates & Events

27-31 JANUARY 2008

**Enlightened Underground
Amsterdam, Netherlands**

Netherlands' first annual 'Underground Space Week' includes an international symposium on underground space challenges in urban development (and accompanying exhibition), site visits and National Underground Space Day. Organised by COB (Netherlands Centre for Underground Construction). Contact: COB; web: www.thinkdeep.nl

29 JANUARY

**George A Fox Conference
City University of New York, NYC, USA**

The annual George A Fox Conference, organised by the Society for Mining, Metallurgy and Exploration (SME). Conference programme and registration details TBC. Contact: SME; www.smenet.org

12-14 MARCH

**3rd International Symposium on
Tunnel Safety and Security (ISTSS)
Stockholm, Sweden**

Organised by SP Technical Research Institute of Sweden, this high-profile symposium includes lectures and presentations from the world's leading experts in tunnel safety and security. Contact: SP Institute; email: istss2008@congreg.com; web: www.sp.se/fire/ISTSS2008

20-21 MARCH

**China Tunnel Summit 2008
Shanghai, China**

This two-day seminar includes presentations by a number of eminent speakers from the international tunnelling community. Subjects covered include advanced design concepts, new technologies, operation and management, current research and case histories. Contact: Merisis Consulting; email: boris.ziong@merisis-asia.com

20-22 MARCH

**International Symposium on
Underground Freight
Arlington Texas, USA**

Organised by the University of Texas and the Center for Underground Infrastructure Research and Education (CUIRE). Contact: University of Texas; tel: +1 817 272 0507; email: najafi@uta.edu; web: www.cuire.org

10-12 APRIL

**IS-Shanghai 2008
Shanghai, China**

The 6th International Symposium on Geotechnical Aspects of Underground Construction in Soft Ground, is organised by Tongji University under the auspices of the International Society of Soil Mechanics and Geotechnical Engineering (ISSMGE). For more on this symposium on booming China; Contact: www.tc28-shanghai.org

22-24 APRIL

**5th International Symposium on
Sprayed Concrete - Wet Mix
Lillehammer, Norway**

Organised by the Norwegian Concrete Association, main themes will be design, construction and durability of wet-mix sprayed concrete. Results from the Hanekleiv

investigations, will also be presented. Contact: Email: info@sprayedconcrete.no; Web: www.sprayedconcrete.no

4-7 MAY

**13th Australian Tunnelling Conference
Melbourne, Australia**

"Engineering in a changing environment" is the topic of the 2008 Australasian Tunnelling Society conference. The present buoyant conditions in civil infrastructure and mining Australia and New Zealand promise a great programme. Contact: AusIMM; email: dedwards@ausimm.com.au; web: www.atstunnellingconference2008.com

20-22 MAY

**Intertunnel 2008
Turin, Italy**

This bi-annual international exhibition will focus on major projects in Italy. The show promises to be an excellent networking environment, bringing together experience from tunnelling projects in many countries. Contact: Olivia Griscelli, exhibition director; email: intertunnel@mackbrooks.com; web: www.intertunnel.com

7-11 JUNE

**North American Tunneling Conference
San Francisco, USA**

The 2008 NAT Conference will be held at the Hyatt Regency, San Francisco. Abstract deadline is November 2007. Conference programme and registration details TBC. Contact: Society for Mining, Metallurgy and Exploration (SME); www.smenet.org

23-25 JUNE

**2nd Brazilian Congress of Tunnels and
Underground Structures, Sao Paulo**

The conference will cover 17 tunnelling themes and focus on recent works in the area and will take place at the Centro Fecomercio de Eventos, Sao Paulo. Contact: Tel: +55 11 3522 8164; email: 2cbt@acquacon.com.br

25-27 AUGUST

**Wireless Communication in
Underground & Confined Areas
Québec, Canada**

The second international conference focusing on original research, innovative applications, or analysis of experiments on site, relating to telecommunications in an underground environment (tunnels, metros, mines, etc). Contact: web: www.icwcuca.ca

17-18 SEPTEMBER

**IUT'08 5th International Underground
and Tunnel Fair, Sargans, Switzerland**

Time to go underground again, at what is becoming one of the calendar's premium events. Held in the unique setting of Switzerland's Hagerbach Gallery. On 19 September, technical tours will take place. Contact: web: www.iut.ch

22-27 SEPTEMBER

**2008 ITA World Tunnel Congress
Agra, India**

The 34th ITA General Assembly and Congress will be held at the Hotel Jaypee Palace, in Agra. In view of the large scale tunnelling works to be undertaken in the near future in India, there is much scope for agencies within as well as outside the country, to demonstrate their capabilities. Contact: CBIP; email: sunil@cpib.org; web: www.wtc2008.org

BRITISH TUNNELLING SOCIETY

17 JAN: "Lower Lea Valley Cable Tunnels"

Challenges and achievements during the construction of cable tunnels to free up land for the future 2012 Olympic Village. Presented by various members of the project team. 6pm start, at the ICE.

**20 FEB: "Joint Meeting with MinSouth/
IMMM - To be confirmed"**

5.30pm for a 6pm start, at the Institution of Civil Engineers, Westminster, London.

22-24 OCTOBER

**Underground Infrastructure of Urban
Areas, Wroclaw, Poland**

The conference is organised by the Urban Engineering division of the Institute of Civil Engineering, Wroclaw University of Technology, in association with the ITA, ISTT and EFUC (European Forum on Underground Construction). Contact: tel: +48 71 320 2914; email: andrzej.kolonko@pwr.wroc.pl; web: www.bliw.wroc.pl/uiua/2008

10-12 NOVEMBER

**ICDE 2008, Challenges and Risk
Management of Underground
Construction, Singapore**

The International Conference on Deep Excavations (ICDE) is an ITA sponsored event organised by TUCSS. It aims to be a forum for contractors, engineers and owners to share and discuss experience. Contact: TUCSS; email: info@tucss.org.sg

23-28 MAY 2009

**2009 ITA World Tunnel
Congress Budapest, Hungary**

The 35th ITA General Assembly and Congress will be held in Budapest. With a large amount of tunnelling underway and in planning, the organisers are confident it will be a successful event. Contact: Diamond Congress; email: secretariat@wtc2009.org; web: www.wtc2009.org

A DATE TO REMEMBER...

If you know of a tunnelling related conference, event, seminar or exhibition that is not listed here, we would be delighted to hear from you. Please contact the editor by post, email, fax or through our web site: Tris Thomas, 'Tunnels & Tunnelling International', Wilmington House, Maidstone Road, Sidcup, Kent DA14 5HZ, United Kingdom.

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