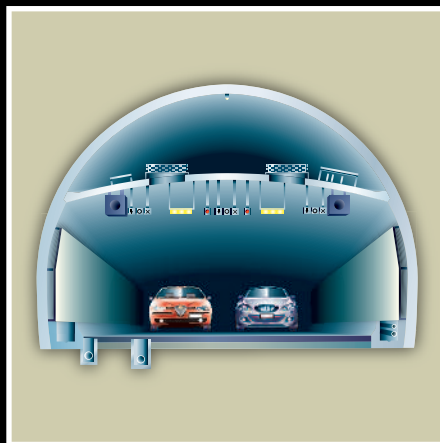
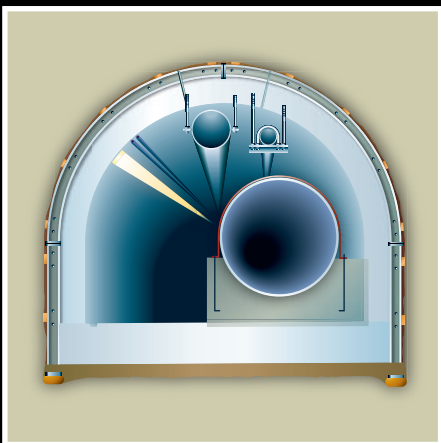
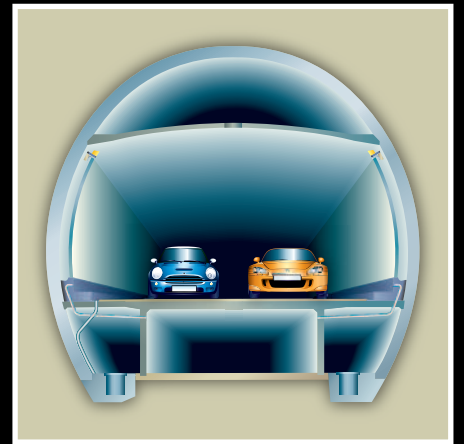
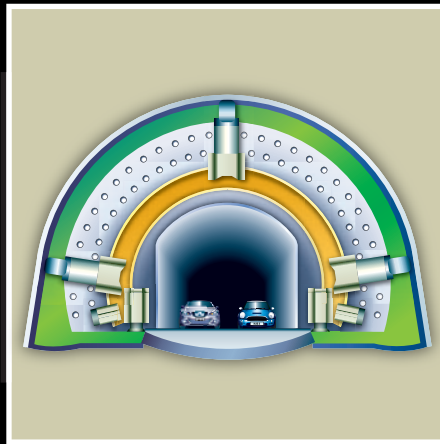
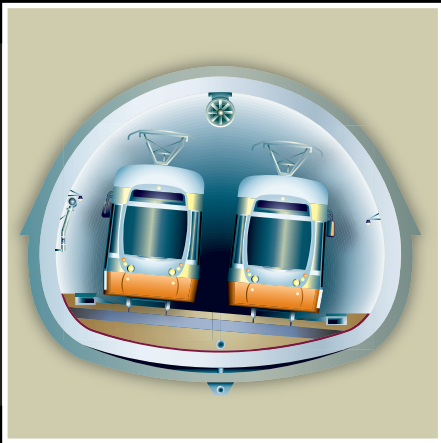


JANUARY 2009

tunnels & tunnelling

INTERNATIONAL



Nick Steining



LEIPZIG: FINAL BREAKTHROUGH AT THE CITY TUNNEL.

After 21 months, five intermediate breakthroughs and a total of 2,489 meters of tunnelling, the City Tunnel of Leipzig has been successfully excavated. The Herrenknecht tunnel boring machine "Leonie" – a Mixshield with a diameter of exactly 9 meters – reached the target shaft on October 31, 2008. The 1,782 meter long twin tube City Tunnel which connects the two terminal stations, Leipzig Main Station and Bavarian Station, underground, is among the largest inner city infrastructure projects in Europe.

In order to guarantee safe tunnelling in the densely built-up Leipzig city center, the Mixshield was equipped with the seismic pre-exploration system SSP (Sonic Softground Probing). This means that boulders and other obstacles in the path of the TBM can be recognized promptly and the necessary dispositions can be arranged for. We congratulate the entire tunnelling team, the "ARGE Tunnel- und Ingenieurbau Leipzig Los B" as well as all other parties involved in the project for this magnificent success.

LEIPZIG | GERMANY

PROJECT DATA



S-326, Mixshield
 Diameter: 9,000mm
 Installed power: 880kW
 Tunnel length: 2,489m
 Geology: clay, river gravel, sand, sandstone, monoliths

CONTRACTOR

ARGE Tunnel- und Ingenieurbau Leipzig Los B (STRABAG AG, Alpine-Bau Deutschland GmbH, Dywidag Bau GmbH, Oevermann GmbH & Co. KG)



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COMMENT

Welcome again to T&T's yearly World Profile of Tunnelling Contractors & Consulting

Engineers. Once again we've had an encouraging response from all corners of the world, all the more pleasing when considering we're in the throws of one of the most crippling global recessions in recent history. Hopefully by now you've come to terms as best you can with the current economic climate and adjusted your plans for 2009 accordingly.

Here at T&T we've noticed an important pattern emerging. Some companies are understandably battoning down the hatches and cutting spending across the board. But others are actually investing more. Here's the basic divide. The companies spending less seem to be the larger multi-disciplinary civil/mining/ construction companies, whose tunnelling division may make up a small yet effective section of the umbrella organisation. The larger spend is coming from those companies who specialise almost purely in tunnelling.

This in no small way backs up the argument that tunnelling may well be as recession proof as any industry can be. As the larger companies cut across the board, they may be missing the important point that investing in their smaller more robust departments, such as tunnelling, could well help see them through tough times. Just because general construction is hitting the skids, as we're seeing in cities such as Dubai, it doesn't mean civil engineering is being put entirely on the shelf. For those larger organisations, I would urge you to look to the underground sector, as it would seem to be in pretty good health. For the rest, carry on the good work and try to make the best of the current downturn. You are better placed than most!



Tris Thomas

S Korea tube extends



Right: Casting underway of sections to form immersed tube elements in South Korea



the immersed tube is more than one-third complete.

Last month South Korean contractor Daewoo E&C successfully placed the sixth element in the channel between Gaduk and Jungjuk islands. After this month's success, it plans to place another four elements in the current season. In the first season the JV placed four elements.

Given the harsh offshore conditions in the area, the contractor has to wait for wave heights of no more than 0.4m for the four-day operation to immerse an element. It is being assisted by specialist forecaster Nowcasting of the Netherlands.

The immersed tube is built from 18 elements – 16 ordinary elements of 180m length (made of 8 x 22.5m long sections) and weighing 48,000t, and two special elements. The elements are being placed at depths of about 15m-50m in the open sea channel.

The tunnel has two cells for two-lane traffic plus emergency lanes, and the external dimensions of the majority of the tunnel elements are approximately 26.5m wide by 10m high. Walls are 1m thick.

Precasting the first four elements took about 11 months, the next four were done three months faster and the remaining batches are targeted to be built in seven months (T&T,

November 2008, p34-37).

The third winter/spring will see the last seven elements placed.

The full tunnel is 3,664m long, including cut and cover portal stretches at either end, and the entire link – including two cable stayed bridges – is 8.2km long. The link, being developed through PPP by a consortium of local contractors led by Daewoo E&C, is scheduled to be completed in 2010. The JV - GK Fixed Link Corp - has a 40-year concession for the toll crossing.

The tunnel is Daewoo's first immersed tube and it worked with Cowi in the design and also Dutch subcontractors. A JV of Halcrow and Tunnel Engineering Consultants (TEC) is technical adviser, particularly on casting operations to ensure watertightness at the unprecedented depth for a concrete immersed tube. Full cross sections are cast in one process.

The elements have pontoons and computerised winches to control the rate of descent as ballast tanks are flooded. Special collars with an external positioning system and jacks ease the elements together in the trench.

The seventh element of the Busan-Geoje immersed tube was placed on the seabed off the South Korean coast this month. It is the second offshore season in construction of the 3,240m long tunnel, and placement

Greece drives metro advances

Metro tunnelling work in Greece is shifting focus with the final breakthrough on the Line 2 extension in Athens metro and main excavation getting underway on the Thessaloniki subway.

Completion of Line 2 tunnelling was marked by hole through last month at Aghios Dimitrios station, which saw the 5.5km long single tube, double-track extension tie-in to the existing network after 4.6km of boring.

A refurbished and adapted Herrenknecht shield was employed on the drive and operated by Seli, which is in the JV subcontractor with Aegek, Aktor and J&P-Avax. Main contractor is a JV of Aktor, Vinci and Siemens. The developer is Attiko Metro.

Geology comprised soft to

medium soft strata, including river deposits, sandy clay, schist and some limestone at the end. The shield was run in EPB mode at depths of 15m-30m, placing 1.5m long rings of 9.18m o.d. and 350mm thickness, and progress was up to 15m per day. However, archaeological finds have delayed completion of the overall project by some months to early 2010 (T&T, October 2008, p8).

As main tunnelling ends in Athens, excavation has just started getting in Thessaloniki for a 7.7km long twin tube metro line with 13 stations. Two 6.12m diameter Herrenknecht EPBMs will be used to bore 5.3m i.d. tunnels eastward through clay, sandy clay and sand, and spots of very weak ground, with cover of up to 28m in the



Final TBM hole through for Line 2 extension of Athens metro

historic city.

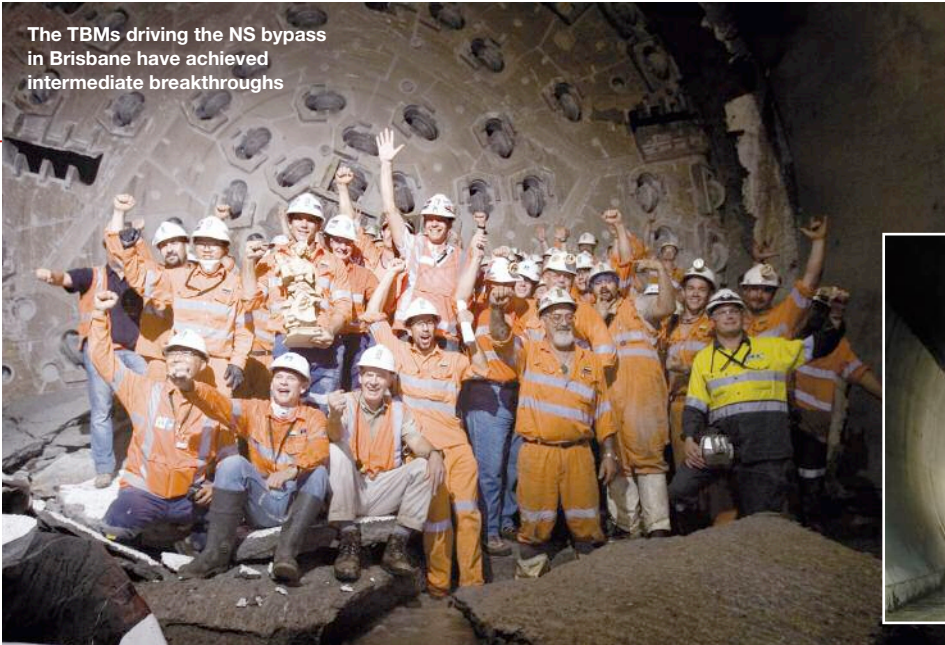
Seli and lead contractor in the construction JV, Aegek, are executing the tunnelling works under a subcontract. Their JV partners are Impregilo, Ansaldo Trasporti and Ansaldo Breda.

The country's metro focus, however, will not remain solely on Thessaloniki. The Government is preparing to extend Line 3 in Athens out to Piraeus, and a budget of US\$682M is assigned.

The 7.6km long underground line will have six stations – Aghia Varvara, Korydallos, Nikea, Maniatika, Piraeus and Dimotiko Theatro.

Shield drives will be used for 6.5km of Line 3, and excavation will also involve 10 shafts. Deadline for expressions of interest is 30 January. The competition was re-launched following major delays to procurement last year when bidders battled to block one another.

The TBMs driving the NS bypass in Brisbane have achieved intermediate breakthroughs



Double breakthrough for Brisbane bypass

The twin TBMs driving the parallel bores for the North-South bypass in Brisbane achieved intermediate breakthroughs in quick succession in December and early this month, and they are on schedule to complete the tubes by mid year.

Driving south from Bowen Hills below Brisbane river to Kangaroo Point, which is nearly 60% along the tunnel alignment, the 12.34m diameter Herrenknecht TBMs each have another 1.5km to bore before terminating at Woolloongabba.

The double shield grippers – “Florence” and “Matilda” –

completed their 2.5km drives of the Clem Jones Tunnel (CLEM7) section of the bypass in nine months and 13 months, respectively. The TBMs are each driving 4.3km lengths, or 90% of the main tunnels, with cover varying from 6m-30m. Geology along the alignment comprises mainly tuff (80MPa-150MPa)

RiverCity Motorway is building the 6.8km long North-South Bypass under a concession. Construction work is being undertaken under a fixed time, fixed price design and construct (D&C) contract by LBB JV, a

partnership of Leighton Contractors, Baulderstone Hornibrook and Bilfinger Berger.

LBB JV's project director, Adam Hudson, said: 'We remain on track to complete all tunnel excavation in the first half of 2009.'

Tunnelling works have also seen a great deal of access, link and some main tube excavations by seven roadheader on the project. The roadheaders began work almost two years ago and the bores are almost complete (*T&T*, July 2008, p25-27).

More than half the 60 cross passages and substation passages

have been excavated. Fit-out of the tunnels began in August last year and is proceeding apace. While Bilfinger designed the segmentally lined tunnels, principal design work on the scheme was done by a JV of Maunsell and Parsons Brinckerhoff.

However, despite successes, Leighton group has reviewed the value of its equity stakes in a number of transport schemes, such as RiverCity, due to the global financial crisis. Writedowns have been taken on a number of investments, including in the bypass project (see p10).

U-turn on Seattle's Alaskan Way bore

The bored tunnel option to replace the central waterfront section of Seattle's Alaskan Way viaduct and seawall has won backing by state and local political leaders in the latest twist in the saga but their recommendation will need legislative approvals.

Backing for the approximately 2.7km long twin tube tunnel came as a surprise as the option had been left on the sidelines in the most recent cost analysis, which late last year produced a shortlist of only two surface alternatives.

Construction of the tunnel is to begin in 2011 and the completed link be opened in 2015. The option is the longest construction period (5.5 years for major works) but,

critically, it was the least disruptive overall for the city and businesses although its impact is on par with other options at the waterfront.

Deep tunnelling would also allow more flexibility in the demolition schedule for the viaduct. In addition, the authorities cited environmental benefits, and improving bored tunnelling technology and economics, as having been important to their preference for the tunnel option.

The estimated total cost of the bored tunnel and associated improvements works to improve the streets, waterfront and transit, and also for the cost of demolishing the viaduct on the SR99, is approximately US\$4.24bn.

The cost to the state is estimated at US\$2.82bn for the demolition, tunnel boring and some road works. King County is to cover US\$190M and US\$15M in annual costs related to transit services, and City of Seattle's budget contribution is US\$937M for utility works, constructing a promenade, introducing a streetcar and other city improvements. A contribution of US\$300M is also due from the Port of Seattle.

Following failure to decide on a replacement option in 2007, a fresh analysis of some original and adjusted concepts (including a smaller bored tunnel) was done of 13 months. Eight surface and tunnel options were studied with

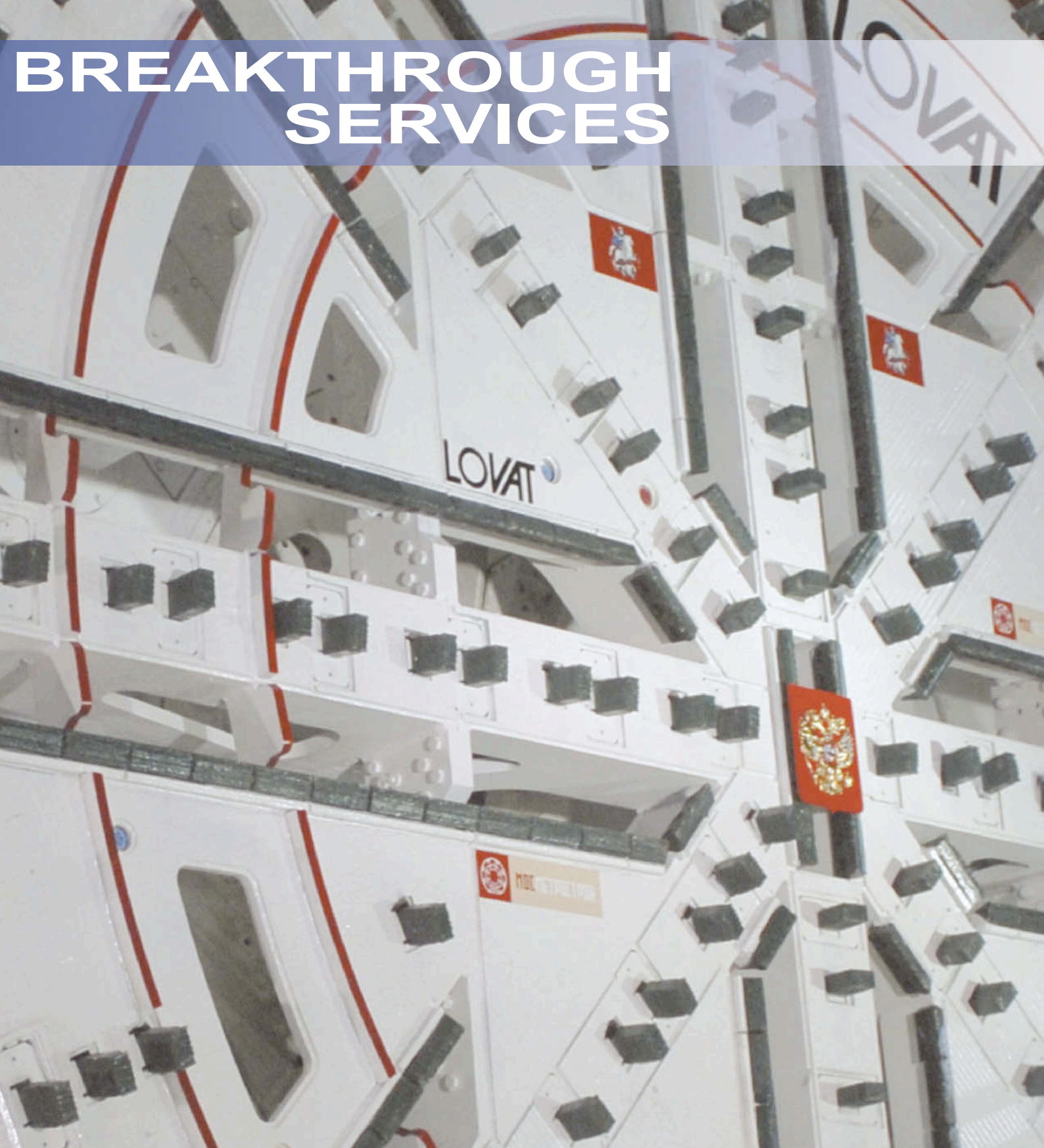
the aim this time to see how the city's overall transport and economy could be improved, not only replace the viaduct and seawall.

All three tunnel options The study, however, dropped all tunnel options (including two cut and cover), although there were merits cited for the bored tunnel.

The eight “core” options for the replacement works on SR 99 on the central waterfront were three surface alternatives (US\$800M-US\$900M), two elevated (US\$1.6bn and US\$2.2bn) and three underground (US\$1.9bn-US\$3.5bn).

In the early 1990s, the viaduct suffered seismic damage.

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TBM's for Shenzhen, Guangzhou metros

With multiple metro lines under development, Shenzhen – on the border of mainland China, next to Hong Kong – saw three NFM Technologies' shields commence excavation on Line 3 in the last two months, and a Lovat TBM is due on site in March.

In total, NFM is to supply 12 shields, each 6.28m diameter, for the expansion of the city's metro network. At present, Shenzhen has two lines in operation – Line 1 and Line 4, which began service at the end of 2004. The city, in Guangdong province, plans to have its major expansion programme completed by 2011.

The first shield was launched in November to excavate the 2,535m of twin tube tunnel in Line 3

Right: NFM TBMs are heavily involved at Shenzhen metro

between Hong Ling station and Lao Jie station, which is to be a key interchange with existing Line 1. The latter station is also a demarcation point for the east-west split of Line 3, and the shield is working at the beginning of the west side.

On the east side, the second and third stations, Cui Zhu and Tian Bei, will be linked by parallel 2,400m long bores excavated by the second NFM shield. Beyond Tian Bei lies the fourth station in the east section, Shui Bei, and the NFM shield launched last month will undertake 1,085m of excavation to link them.

Of the nine other TBM's the



company will supply to the city, one EPBM is currently being assembled on site for excavation works on the extension of Line 2. The other eight machines are being factory assembled for delivery to various sites in the city next year.

Lovat is supplying an EPBM (RME246SE Series 24700) to the metro project, and this follows its

recent delivery of a 6.3m diameter EPBM to the same contractor – China Railway Tunnel Group (CRTG) – for work on subway excavation in Guangzhou, in Guangdong. The latter TBM (RME246SE Series 24600) is scheduled to start driving a 2,500m long bore in mixed conditions below groundwater level from the end of this month.

Pittsburgh 2nd bore finished

Excauation on North Shore Connector light rail project in Pittsburgh has been completed with the hole through early January of the TBM driving the second parallel tube.

However, a significant funding shortfall exists for the entire scheme due to tender costs being greater than expected for many packages, including the tunnelling works.

The client, Port Authority of Allegheny County, is seeking US\$117.8M under the federal stimulus package overseen by President Obama. Overall, the entire project is 27% overbudget at US\$553M. It is trying to avoid shutdown of the project.

The 6.5m diameter TBM was relaunched on the northbound drive in October and achieved an average daily advance rate of 10.4m over the 680m long bore below the Allegheny river.

However, the second bore was much faster than the first,

southbound, drive which was launched a year ago and holed through last July.

Geology on the short runs comprises mainly silts, sands, gravel shales and claystone with lenses of limestone, but the groundwater level reaches 14.5m above the shield.

Following retrieval and dismantling of the Herrenknecht Mixshield (S-374), the parts will be stored locally on behalf of the manufacturer until it decides where to send the machine, said the client.

The full length of the running tunnels, consisting of twin bores plus cut and cover sections, is 1.9km long. A JV of Obayashi and Trumbull is undertaking the tunnelling works, and the shell of the North Side station, in a contract valued at US\$156.5M.

The drives were originally to have been finished around the third quarter of 2008 (T&T, October 2008, p10).

STEC launches own large TBM

Shanghai Tunnel Engineering Corp (STEC) last month launched its first large diameter slurry shield to bore a tube beside the existing DaPu Road tunnel below the river Huangpo in Shanghai.

The 11.22m diameter TBM will drive a tunnel approximately 3km long tunnel below the river Huangpo. Expanding the capacity of the strategic road link is important to the success of the city in hosting World Expo 2010.

The TBM research and development was carried out in house by STEC under the project code "863", the company said, adding that it holds full intellectual property rights to the shield.

STEC added that its work also

proved that there was the production capability of manufacturing such shields with synchronised grouting capability, segment erection, slurry systems and electro-mechanical controls.

The Huangpo drains northwards to the Yangtze river, its mouth close to where the location of the Pudong side of the major bridge and tunnel scheme being built over the river via Changxing and Chongming islands.

Between Pudong and Changxing Island, a JV of STEC and Bouygues recently completed parallel bores using twin Herrenknecht TBMs which, at 15.43m diameter, are the largest ever shields used on a project (T&T, October 2008, p7).

Shield set for HK's Tsuen Wan sewer dig

Excauation is due to commence soon on the Tsuen Wan sewer project in Hong Kong. A 7.27m diameter TBM being supplied by Seli will be used to handle hard rock as well as unstable and squeezing ground at faults.

Seli is a member of the JV, led by Maeda and China Railway Engineering Co (CREC), that has been hired by Hong Kong's Drainage Services Dept to drive the 5.1km long storm relief sewer.

The Italian firm is also supplying the shield and auxiliary equipment,

and perform the excavation, under a separate contract to the JV valued at US\$18.8M. The shield will arrive shortly, after the portal is completed on site.

Geology along the alignment comprises volcanic tuffs and grandiorites. The TBM has 19" cutter discs, cutterhead thrust of 25,200kN and drive power of 2,520kW. The cutterhead speed is up to 7 rev/min.

The concrete segmental lining is 250mm thick, and the finished internal diameter is 6.5m.

The entire contract awarded to the JV is valued at HK\$1.123M (US\$145M) and also includes three intake works, drainage and subsidiary works to be completed by 2011.

Supervision for the client is being performed by Mott Connell.

The contract was awarded to the JV at the end of 2007.

Seli designed and manufactured the double shield universal (DSU) TBM within 10 months, and workshop acceptance was in October.



Seli will drive the Tsuen Wan sewer tunnel in Hong Kong

Hydrojet fix for Soderled

NCC Construction recently completed the latest stage of repairs to the Soderled road tunnel in Stockholm using hydrodemolition and sprayed concrete to remove and replace the reinforced concrete damaged by de-icing salts.

Hydrodemolition was called for by the capital's road management department, which has had the repair works underway in stages on the 1,550m long twin tube tunnel. The works are part of a five-year programme of concrete repairs on the tunnel and adjacent SCL bridge, which were launched in 2005 following discovery of water leakage and corrosion.

The hydrodemolition works were undertaken by specialist local subcontractor E-Shakt using robots supplied by compatriot Conjet. The works removed chloride-damaged concrete to

depths of 30mm-70mm on the walls, and 5mm-10mm on the soffit, and exposed and cleaned rust from rebar where required. Water was supplied to the robots by Conjet Powerpacks at a pressure of approximately 1000 Bar and flow rate of 200 l/min.

Conjet supplied three robots for the works – the 322, 362MPA and 364MPA.

The damaged concrete has been replaced on the soffit with a 35mm thick porcelain-impregnated, fire protecting SCL placed by NCC. To protect the walls, the contractor sprayed approximately a 60mm thick layer of steel fibre reinforced concrete. Additional protection to the walls is being provided by sacrificial precast concrete panels that are 4m long by 2m high, and each can be replaced as required.



Progress at Pinglu

Excauation of the Pinglu water tunnel in China is more than half finished with fair advance rates despite tough geology, and the shield has been prepared to drive the final, 12.15km long bore.

The JV contractor including Alpine Bau, part of FCC group, has achieved an average progress rate of 750m per month on the first, 13km long drive. Following breakthrough late last year, the 4.82m diameter Robbins double shield has been overhauled in underground chamber, at Daliang.

The alignment of the 25.15km long conveyance tunnel in Shanxi province passes through fault zones and coal seams. In total, the tunnel will be lined with 83,450 precast concrete hexagonal segments of 250mm thickness.

The TBM was provided by the

client, having been used on an earlier stage of the scheme and was overhauled and converted prior to the start of the drive in August 2006 (*T&T*, September 2006, p8).

The US\$62.5M contract was awarded in 2005 to Shanxi Sino-Austria Hydraulic Engineering Co, which includes Alpine Bau and local partners, including the Water Irrigation Bureau, the provincial Government, and Shanxi Wanjiashai Construction & Installation. The planned construction period was 42 months to complete this year.

The tunnel is part of the Yellow River Diversion Project, being the north main branch to supply the regions of Pinglu, Shuozhou and Datong. The client is Shanxi Province Wanjiashai Yellow River Project General Corp.



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More progress for Crossrail

Further key steps forward for the £15.9bn (US\$22bn) Crossrail project in London were announced last month that cover additional funding commitments, a dozen firms awarded design framework agreements and a shortlist of firms to be Project Representative.

The City of London Corporation has committed up to £350M (US\$483M) towards the cost of the main line rail transport scheme through the heart of the capital. Funds of £200M (US\$276M) will be directly contributed by the Corporation, which will seek contributions from City businesses for the balance but has guaranteed a third of the remaining sum.

Funding of £150M (US\$207M) has also been committed by Canary Wharf Group (CWG) but is tied specifically to development of the station to be built at the commercial hub in east London. The real estate firm also plan to undertake the design and build work for the new Canary Wharf box station, which has a fixed price budget of £500M (US\$690M) and is to be completed by 2012. CWG will take the cost overrun risk.

BAA also recently committed funds to the project.

In the procurement process, last month a dozen consultants were awarded framework agreements to bid for Crossrail design packages. The agreements last for the entire duration of the project, which has rail services due to commence from 2017.

The 12 parties are: Aedas Group; Atkins; BDP; Capita Symonds; Halcrow; Hyder Consulting (UK); Jacobs Engineering UK; Mott MacDonald; Ove Arup; Parsons Brinckerhoff; Scott Wilson Railways; and, WSP UK.

Last month also saw the project developer, Cross London Rail Links Ltd (CLRL) become a wholly-owned subsidiary of Transport for London (TfL).

CLRL is developing the east-west rail link to be underground through the capital and tie-in to surface lines either side of London. The project involves excavation of a total of 41.5km of 6m i.d. twin tube tunnels and the developer anticipates tunnelling works, due to commence in 2011, will require seven TBMs.

The project won Royal Assent in July 2008. Enabling works for the scheme start this year as do some station works, such as at Canary

Hochtief JV wins X-ray bore job

A joint venture led by Hochtief has been awarded a contract to build a tunnel complex for physics research project involving X-rays near Hamburg, Germany. The US\$267M package of tunnelling work will require approximately 5.8km of bores plus shafts to be constructed with work commencing this month. The job involves sinking six shafts and excavating the tubes at depths up to 26m. Tolerance for the tunnels is 100mm along the length of the complex.

Construction on the projects is due to be finished in April 2013 and the client, Deutsches Elektronen-Synchrotron (DESY) research centre, aims to start operations with the European XFEL X-ray laser facility in 2014. The scheme is funded by ten EU countries, Russia, China and two German states, and is being built to help study viruses, chemistry and planetary physics.

The most recent high energy physics centre to be built in Europe involving major tunnelling works was CERN's Large Hadron Collider. Europe is also a candidate location for the International Linear Collider (ILC), which calls for 72km of tunnels (*T&T*, September 2008, p8).

Wharf. Main construction activities are scheduled to begin in 2010. The bulk of funds for the scheme are being contributed by Government through TfL, and late last month the Department for Transport issued the shortlist of firms invited to bid for its project oversight contract.

The nine parties able to tender to be the Department's project manager for Crossrail are: Arcadis AYH; Atkins; Booz & Co with support from Aecom/ Turner & Townsend; Jacobs Engineering UK with support from KPMG; Mott MacDonald with support from Ernst

& Young/ FirstCo; Nichols Group-Nicholas Arup JV with support from First Class Partnerships/ NITX; Parsons Brinckerhoff with support from Davis Langdon; Parsons Group International with support from Gardiner & Theobald; and, Praxis High Integrity Systems.

Crossrail has been led by executive chair Douglas Oakervee who is set later this year to hand over the reins to Terry Morgan, presently chief executive of Tube Lines. Morgan will become non-executive chair of CLRL.

Colombia picks JV for La Linea

A joint venture of Colombian, Mexican and Spanish firms has been awarded the contract to build the La Linea road and tunnel project in the Andean region of Colombia.

The successful JV – Segundo Centenario – was awarded the contract by the Ministry of Transport having submitted a tender of Pesos 629bn (US\$282M). The tunnel works have been budgeted to cost Pesos 334bn (US\$150M), or slightly more than half of the entire bid value, and the project is to be finished in 2012.

Segundo Centenario JV includes the following firms: Condux; Constructora Herrera Fronpeca; Constructora Carlos Collins; Alvarez y Collins; Promotora Montecarlos Vías; Tunes de Colombia; Construirte; Gayco;

Tecniciviles; HyH Arquitectura; and, Miguel Camilo Castillo Huertas.

The project involves excavation of the 8.8km long La Linea tunnel and associated new road links to improve freight transport between Calarca and Cajamarca in the Central Andean Cordillera. The new link will reduce the travel distance between the cities by more than a quarter to 33km, and the faster journeys (by up to 80 mins) will see heavy vehicles not have to cover another 840m in altitude.

The winning JV beat off seven rival bidding groups that were shortlisted and submitted tenders in the two-stage assessment process. In the first stage there were two groups that failed to pass the technical, legal and financial parts of the assessment. The second stage saw the sealed

tender prices opened from the six remaining JVs.

In total, the bid assessment criteria saw the winning JV have a tally of 1000 points while the runners up – Futura Plan Vial del Pacifico JV and Futura Tunelelexa JV – had 886 and 857 points, respectively, said the Institute for Roads.

The former JV was a Colombian-Brazilian venture that included OAS, Mario Alberto Huertas Cotes, Procopal, Meyan and Ingenieria de Vías. The latter group was a Colombian-Chinese JV that included Vergel y Castellanos, China Railway 18th Bureau Group, Oilquip, Jose Javier Castellanos Bautista and Alfonso Vergel Hernandez.

During the procurement process the Government set a budget cap of Pesos 710bn (US\$319M) and

time limit of 70 months. The winning bid was 11.5% lower than budget. A full length pilot bore preceded the main project to reduce geological and construction risk. The project is part of a larger scheme to improve transport over the Andes between Bogota and the port of Buenaventura.

The La Linea scheme is expected to reduce accidents by three-quarters, bringing them in line with the national average. The Government forecasts that the scheme's benefits will improve the economy by US\$40M per year.

The other five JVs that bid for the contract were an entirely local group, three JVs with foreign partners – two of which had Italian pairings and one Chinese, and a Korean JV (*T&T*, October 2008, p6).



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24-11-2008



Leighton tunnel writedowns

Leighton Holdings has opted for writedowns of some transport business investments in Australia, including three tunnel projects, due to weakening equity valuations caused by the global financial crisis.

The Australian company has stakes in two tunnels in Brisbane and a scheme in Melbourne, the concession schemes having been developed by RiverCity Motorway, BrisConnections and ConnectEast, respectively. In total, combined with Leighton's new views on some other transport stakes, it is to writedown such investments it had at the end of 2008 by Aus\$200M (US\$138M).

RiverCity is building the North-South Bypass Tunnel (NSBT) in Brisbane, which involves

roadheader drives plus 4.3km long twin TBM bores, both of which have achieved intermediate breakthroughs (see p5).

BrisConnections is getting underway with the Airport Link, which runs north from NSBT and will have 5.7km long twin tunnels as part of the project. It has two TBMs on order. ConnectEast built the EastLink road and tunnel in Melbourne, which opened in mid-2008, five months early. The route has 1.6km long twin tubes (T&T, July 2008, p11,12).

Leighton said that for the fiscal year 2008-9, the writedown has been booked against the first six months, ending 31 December 2008. It added that the writedown will reduce after-tax earnings for the period by Aus\$170M (US\$117M).

No details were disclosed on the breakdown of the total writedown between the investments on a pre- or post-tax basis.

The company's parent group, Hochtief, said the lower stock prices did not reflect the real worth of the infrastructure projects. It said 'their business prospects have not changed'. However, it noted that Leighton's board had elected to make the writedown in market capitalisation to reflect the currently

reduced equity levels.

Before accounting for the writedown, Leighton's operating result for H1 is expected to be 8% up at approximately Aus\$270M (US\$186M). By the end of the period work in hand was up 4.8% to Aus\$37bn (US\$25.48bn) over the three months to 31 December.

The other transport equity stakes held by Leighton are in the Devine and Macmahon businesses.

Design JVs chase Fehmarn tunnel

Bids from each of the three shortlisted consortia to design a possible tunnel for the Fehmarn Belt between Denmark and Germany were received last month and are to be assessed over three months to choose a winning tender.

However, as the developer, Femern Baelt A/S, has yet to finalise the choice of method of crossing it had also invited bids to design a cable stayed bridge for the link. It plans to develop the bridge and immersed tube tunnel designs in parallel until such time that a clear advantage for either is determined.

The groups shortlisted to produce the tunnel design for the road and rail crossing over the 19km wide strait are:

- A JV of Cowi and Obermeyer Planen + Beraten with subconsultants Flint & Neill Partnership and Dissing + Weitling;
- A partnership of Grontmij/Carl Bro, Faber Maunsell, Bung, Grontmij/BGS and Capita Symonds; and,
- A JV of Ramboll Danmark, Ove Arup & Partners International and Tunnel Engineering Consultant with subconsultants WTM Engineers, HTG Ingenieburo fur Bauwesen,

Wilkinson Eyre Architects and Schonherr Landskab.

Last year the client noted that the tunnel option was not, at that stage, the favourite because the bridge alternative was cheaper prior to survey and other detailed studies. The tunnel was priced at Euro5.5bn (US\$7.35bn – 2007 currencies) against Euro4.3bn (US\$5.74bn) for the bridge (T&T, September 2008, p6).

The tunnel option will remain in running until about 2011 as further geotechnical and environmental survey work is undertaken.

The envisaged tunnel would be a 18,565m long immersed tube plus 1,890m of ramps. Construction could start in 2012 to enable the link to open in 2018. It would have two 10m wide road cells and two 6.37m wide rail cells, and a ventilation island would be built in the middle of the crossing.

The consortia seeking to design the tunnel are each mostly the same groupings pursuing the bridge option. A fourth shortlisted JV bidding for the bridge is led by Halcrow and Mott MacDonald.

Femern Baelt A/S is a subsidiary of Sund & Baelt A/, which is overseeing development work and design procurement.

SJVN prequals

Indian hydropower developer Satluj Jal Vidyut Nigam (SJVN) has called for prequalification submissions on two projects – Naitwar Mori and Arun III – that call for a total of more than 15km of headrace excavation plus a powerhouse cavern and a series of desilting chambers.

SJVN is seeking to prequalify a turnkey contractor for the Naitwar Mori project in northern India and a consultant for the Arun III scheme in Nepal. The deadlines have been reset a number of times and are 10 February and 20 January, respectively.

The Naitwar Mori project will be built in the state of Uttarakhand and calls for excavation of a 4.3km long headrace tunnel with a 5.6m wide modified horseshoe-shaped cross section. Some excavation will also be required for the partly underground powerhouse.

Site investigation works have included 400m of drilling and 2,300m of geophysical surveys. The

headrace is to be driven through predominantly quartz and chlorite mica schists for the first quarter of the route, and the majority of the alignment is in biotite gneisses with schist bands.

The EPC contract is to be finished within 36 months.

Last year, SJVN was awarded the concession contract to develop Arun III, which will involve major underground excavations:

- four underground desilting chambers, each 110m long by 17m wide by 28m high;
- a surge shaft, 23.4m diameter by 97m deep;
- a 11km long headrace tunnel of 7.5m diameter; and,
- a powerhouse cavern, 161m long by 22m wide by 35m high.

The consultant is wanted to do site investigations and document preparation to take forward the scheme. The work is expected to last about two years.

SJVN is a JV of the Government of India and Himachal Pradesh.

VMT moves up to trading status in China

VMT has moved up its business to trading status in China from a service-only operation.

The Germany-based international company had operated as service-only in China since 2006 to supply guidance systems for tunnelling machines, and also undertake consultation such as for evaluation of segmental lining positioning.

VMT's measurement services also provides precision

measurements of precast concrete segment moulds and the segments cast to construct rings.

Its Shanghai-based trading business has supplied 110 operating systems up to November last year. The new status also enables VMT to offer full distributor rights for US firm Brunson Instrument Co. Separately, VMT is also distributing systems for US company Hamar Laser.

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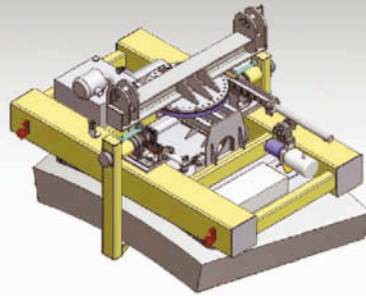
GRABS FOR DOWELS

DOWELS TILTER

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TUNNELLING CONSULTANTS

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	Undisclosed	Preliminary and final design, hydro electric project tunnelling, microtunnelling, monitoring, warning/alarm systems, renovation, site investigation, project management and supervision of works	Metro Line 5, Garibaldi Lagosta Milan, Italy - Preliminary & final design of all underground structural works. Client: Astaldi-Torno; Oudayas Tunnel, Rabat, Maroc – Construction design (joint venture with Egis Tunnels). Client: Impresa Pizzarotti; Genova Voltri-Genova Brignole Railway Line, Italy – Detailed design for structural upgrade. Client: Italferr; Saint Martin La Porte Adit, Turin-Lyon High Speed Rail Tunnel, Italy-France – Supervision of works (JV with Egis Tunnels and Antea). Client: Lyon Turin Ferroviaire; Castellano Rail Tunnel, Bologna Lecce Railway, Italy – Detailed design. Client: Italferr; Integrated Plan Garibaldi Repubblica, Milan, Italy – Final design of 800m long tunnel. 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	a) US\$26.2M b) US\$23.1M	Engineering services for the construction and refurbishment of underground structures in all ground conditions. Planning, project design, site management, expert consulting, state assessment services, project management	Gotthard Base Tunnel, Switzerland – 57km long HSR line: design & construction supervision (JV) for southern sections; Semmering Base Tunnel, Austria – 30km long HSR line: alignment selection & design (JV); Axenbergs Tunnels, Switzerland – Refurb of 3 tunnels (8km) under operation: design & construction supervision; Dobrovského Highway Tunnel, Czech Republic – 1.25km TBM heading: design & construction supervision; Gubrist Highway Tunnel, Switzerland – 3.3km long tunnel: design & construction supervision; Alborz Highway Tunnel, Iran – 6.3km long service tunnel: Design & construction supervision; XFEL, DESY, Germany – 3.4km accelerator tunnel: Design & CM	Zimmeregg Railway Tunnel, Switzerland – Project design for renewal of 1.1km rail tunnel; Milchbuck Highway Tunnel, Switzerland – Refurb of a 1.8km road tunnel: design & site supervision; AYA Tunnel, Singapore – MRT tunnel in soft ground: Design; Flims Bypass, Switzerland – Project management of two tunnels; San Bernardino Highway Tunnel, Switzerland – Project management of 6.6km tunnel refurb; Uetliberg Motorway Tunnel, Switzerland – Design and CM for a 2 x 4.5km long twin tube, 3-lane, motorway 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\$34.8M	All tunnelling and underground projects: Design and project management for all types of tunnels, shafts, caverns and large excavations. Concept to detailed design, major project delivery, sustainability, JCOP benchmarking, advice, insurance assessments, etc.	UK: Crossrail, MDC, UK; Copenhagen Metro, Denmark; Olympics Primary Foul Sewer, UK; Tideway Lee Tunnel, UK; Dublin Interconnector, Ireland; D1 R1 Slovakia; Dublin Metro North, Ireland; M6 Hungary; USA: 2nd Ave Subway, NY; Lake Mead Intake No3, CA; 7 Line Extension, NY; Grand Central Terminal Caverns, NY; East Side Access Project, NY; California HSR, LA; New Crystal Springs Bypass (Polhemus) Tunnel, San Francisco; East Asia: Downtown Line Stages 2 & 3, Singapore; DSD Hong Kong West Drainage Tunnel; Ocean Park Redevelopment Project; DSD Harbour Area Treatment Scheme (HATS), HK; MTR Express Rail Link Tunnels, HK; Australia: Brisbane Airport Link; Northern Busway Project	UK: Olympics Powerlines Underground Project, UK; King's Cross St Pancras Station Redevelopment, UK; CTRL, UK; Tindaya Cavern, Fuerteventura; Cooling the Tube - Post Office Tunnel, UK; Waverley Station Enhancement, UK; LGV Cote D'Azur, France/Italy; East Asia: Downtown Line Stage 1, Singapore; Bugis Station A-E, Singapore; Nicholl Highway Collapse Investigation, Singapore; MTR Express Rail Link, HK; Nam Wan Tunnel, HK; Australia: T2E, NSW; Hobson Bay Sewer, NZ; North West Rail Link, Sydney; CBD Metro, Sydney

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\$1.78bn b) US\$20.6M	Tunnelling design, cavern engineering, settlement assessment, advanced numerical analysis, geotechnical investigation and expert ground characterisation, thermodynamic modelling, ventilation and risk studies	Crossrail MDC2, UK – Design; HK Regional Express Line – Preliminary design; Bond Street Station Upgrade, UK – Design; HK West Island Line – Detailed design; Dubai Metro Red Lines – Detailed design; HK Lai Chi Kok Drainage Tunnel – Detailed design; Victoria Station, UK – Category III design check; Cooling the Tube, UK – Ventilation analysis; Dubai Metro Green Lines – Detailed design; HK Shatin to Central Link – Preliminary design; Metronet BCV and SSL, UK – Assessments & inspection; HK Lai Chi Kok Drainage Tunnel – Detailed design; Belfast Sewers Project, Northern Ireland – Construction supervision; Hindhead Tunnel, UK – Agent; Queensway Tunnel, UK – Refurbishment studies	DLRL Dagenham Dock Extension, UK – Preliminary design of tunnels & stations, preparation of TWA docs; Gautrain Rapid Rail Link Project, SA – Detailed design of 11km of tunnels & 3 stations; Eurotunnel, UK – Specialist support on ventilation studies; Cooling the Tube, Bank, UK ; Liverpool Street Step Free Access, UK ; King's Cross Station Upgrade, UK – Technical advisor; Nanjing Metro Line 2 Ext, China – Technical study; Castle Peak Cable Tunnel, Hong Kong – Construction supervision
Babendererde Ingenieure Markt 2 D-23611 Bad Schwartau Germany Tel: +49 451 300 939 0 Fax: +49 451 300 939 29 Email: office@babeng.com Web: www.babeng.com	Undisclosed	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	Hallandsås, Sweden – 5.6km rail tunnels (Ø10.5m Slurry-TBM), Technical Committee; Hobson Bay Tunnel, NZ – 2.9km water tunnel (Ø4.3 m EPBM), design and data mgmt; Brixlegg Tunnels H3-4 & 8, Austria – 8.9km tunnels (2 x Ø13m Slurry-TBMs); Athens Metro, Line 3 Ext, Greece ; Thessaloniki Metro, Greece – Twin 7.5km TBM and NATM tunnels, design support; River Elbe Crossing, Germany – Twin 5.5km road tunnels, design; Brightwater, US – 4 TBMs, 26km long, design (JV) and data mgmt; Gautrain Rapid Rail Link, SA – 2.8km tunnel (Ø6.7m EPBM); Metro Contract C855, Singapore – 3km, 2 x Ø6.6m Slurry-TBMs, technical support; Pedestrian Tunnel Volkswagen, Germany – Full design services	Teesta (Stage V) HEP, India – Face 7, conventional headrace tunnel 9m, technical assistance; 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\$3.2bn b) US\$50M	planning, investigation, design, risk management, estimating, CM and alternative project delivery for water, wastewater, CSO, and stormwater conveyance tunnels, shafts, microtunneling, pipelines, and other buried infrastructure systems rehabilitation	System Conveyance & Operations Program, Las Vegas, USA – Lead design for 15.4km treated effluent tunnel; Lantau Tunnel, HK – Design of 7.1km rock tunnel; Bi-County Water Tunnel, Washington DC, USA – Design and CM for 11.2km rock tunnel; Cooper River & Daniel Island Tunnels, Charleston, USA – Design and CM for 11.2km soft rock tunnel; Ashley River Tunnel, Charleston, USA – Design, CM and resident engineering for 3.6km tunnel; Jollyville Water Transmission Tunnel, Austin Texas USA – Design; Indianapolis CSO, USA – Preliminary engineering and geotechnical design; Sydney Desalination Works, Australia – Design; Milwaukee Northwest Side Tunnel, Wisconsin, USA – Design, resident engineering for a 16km rock tunnel	Kai Tak Transfer Scheme, Hong Kong – Design and CM of a 1.5km mixed face slurry TBM tunnel for stormwater; Cady Marsh Tunnel, Chicago Metro, USA – Design and resident engineering for 2km flood control tunnel; Lewes CSO, UK – Design-build for 1.2km long conveyance tunnel; Thorn Creek Tunnel, Chicago, USA – Design of 7m dia hard rock connecting tunnel, shaft and gate system; Kansas River Crossing, USA – Design and CM for 2.5m diameter river crossing tunnel and carrier pipe

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\$377M b) US\$10.9M	Immersed tunnels, SCL design, bored tunnels, cut & cover tunnels, tunnel refurbishment, M&E including tunnel ventilation and communication and control systems, tunnel operations, Inspection Entity role under the UK Road Tunnel Safety Regulations 2007	M25 Bell Common Tunnel Refurb, UK – Detailed design; Limerick Southern Bypass, Ireland – Detailed design of 600m long immersed tunnel; E18 Bjorvika Tunnel, Oslo, Norway – Detailed design of 700m long immersed tunnel; Second Tyne Tunnel, Newcastle, UK – Lenders' Technical Adviser on PFI project; Mount Sion Tunnel, A41 Autoroute, France – Lenders' Technical Adviser on PPP project; Tel Aviv Metro (Red Line), Israel – Lenders' Technical Adviser; SCUT 2, A24, Portugal – Lenders' Technical Adviser; Dublin Metro North, Dublin, Ireland – Lenders' Technical Adviser for PPP project; D1 Motorway, Slovakia – Lenders' Technical Adviser for four tunnels (2km, 1.4km, and two 500m long)	M25 Holmesdale Tunnel Refurbishment, UK – Detailed design for two additional lanes and refurbishment of operational systems for 650m long cut & cover tunnel; Docklands Light Railway, Lewisham extension, London, UK – Lenders' Technical Adviser for extension including 1km of bored tunnel and 600m of cut & cover tunnel; London Underground Tunnel Cooling, London, UK – 5 stations on the Central Line and 9 stations on the Northern Line
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 12, 60 Albert Road South Melbourne VIC 3205 Australia Tel: +61 3 8683 1333 Fax: +61 3 8683 1444 Email: cwmel@conwag.com Web: www.conwag.com	a) US\$262M b) US\$19.7M	Hard rock tunnel support design, precast segmental lining design, EPBM tunnelling, ventilation design, tunnel fire engineering, tunnel refurbishment, materials engineering	Project Hobson, Auckland, NZ – 3km long CSO tunnel. Preliminary & detailed design, supervision; Rosedale WWTP Outfall, Auckland, NZ – 3km long outfall. Detailed design; Alkimos Quinns Sewer, WA, Australia – 5km of pipe jacked sewer and 11 shafts. Detailed design; Northern Sewage Project, Stages 1 & 2, Melbourne, Australia – PM for design, planning, financial approvals, tendering & CM; Airport Link, Brisbane, Australia – 6.7km twin tunnel. Concept design, detailed design, EIS, contracts, tender evaluation & construction support; North-South Bypass, Brisbane – 4.7km twin tunnel tollroad. Concept design, detailed design, EIS, contracts, tender evaluation & construction support	Nam Theun 2 Hydropower, Laos – 600m long diversion through a limestone ridge. Detailed design for contractor, primary support & secondary lining; Epping Craigieburn Sewer, Melbourne, Australia – 2.4km pipe jacked tunnel. Feasibility and concept design; Browns Bay Sewer, Auckland New Zealand – 1km pipejacked sewer. Detailed design of tunnel; Eastlink, Melbourne, Australia – Twin 1.5km road tunnels. Detailed design for the contractor including SI, primary and secondary lining and fire engineering
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: office@d2-consult.eu Web: www.d2-consult.eu	a) US\$3.96M b) US\$3.96M	New Austrian Tunnelling Method (NATM), mechanised tunnelling (TBMs), microtunnelling, design, construction supervision, project management, risk management	Lower Inn Valley High Speed Rail Tunnels, Tyrol, Austria – Checking engineer for approximately 30km of double track tunnels (NATM, TBM, open cut); S1 Tunnel Danube Lobau, Vienna, Austria – Design of a 7.8km long 15m diameter twin-tube highway tunnel (with a 6km long TBM drive); Budapest Metro Line 4, Hungary – Project management of a 7.3km long section of TBM running tunnels	Nuremberg-Ingolstadt High Speed Rail Line, Germany – Construction supervision of southern Lot, including three double-track tunnels; Bangkok Metro, Blue Line, Thailand – Design of 2 x 5.2km single track metro tunnels and four underground stations
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: uttoxeter@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	Primary Drainage Works, London, UK - Design of 1.5km of sewers and 15 shafts on a major development site for an international sports arena, together with design of numerous undertrack rail crossings associated with a new commercial site adjacent to the same development; National Grid Transco – North London Cable Tunnels, UK – Development of reference design for approx 20km of 4m diameter cable tunnels and associated shafts; Tunnelling Advice, Middle East – Provision of advice and assistance for the construction of new tunnels in Bahrain, Abu Dhabi, Mecca and Jubail; London Underground Step Free Access Programme, UK – Design of a new lift shaft at Green Park Station	River Exe Estuary Crossing, UK – Design of 3km x 3m diameter sub-aqueous tunnel to carry new gas transmission lines, utilising a slurry TBM for excavation through mudstones and breccias; Thames Tideway, UK – Sub-consultants to Faber Maunsell, assisting in concept design of numerous CSOs; Bristol City Centre Flood Alleviation Scheme, UK – Design of an 850m tunnel in central Bristol undertaken by drill and blast in rocks ranging in strength from weak to very strong. Internal concrete lining is yet to be undertaken
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 Ancey 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 Barmica 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; Encarnação Metro Station, Lisbon, Portugal ; 3rd Development Axis, Slovenia – Studies	Sentvid Tunnel System, Slovenia – Various lots completed. Tunnel length approx. 3.5km (NATM); Tabor and Barmica 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
G 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; Koraln 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

TUNNELLING CONSULTANTS

Company information	(a) Turnover (b) Turnover in tunnelling	Areas of expertise	Tunnel contracts underway	Recent tunnel contracts
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
GeoConSol 17 Everett Street Sherborn MA 01770 USA Tel: +1 508 650 3600 Fax: +1 508 650 3688 Email: pjt@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 Hölzstrasse 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\$12.7M b) US\$10.4M	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; Koralmtunnel, 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 HSR, 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 Katschbergtunnel, 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 geo-technical 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-EI 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
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 Tlelat 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\$0.8M b) US\$0.6M	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 caverns under limited cover	West Island Line, HK – Detailed design of main cavern and intersections for two metro station caverns; Express Rail Link, HK – Review of Preliminary Design of bifurcation caverns; Shatin Central Link, HK – Specialist input to development of cavern options for metro station in cavern; Gilgel Gibe II Hydroelectric Project, Ethiopia – Independent review of tunnelling conditions; Brisbane Airport Link, Australia – Highway cavern review; 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	Tel-Aviv Railway, Israel – Review of tunnel bifurcation and 4 track station caverns; Rosia Montanna, Romania – Review of mine stabilisation; Dublin Metro North, Ireland – Reference design of O'Connell Street Stop; Gautrain, South Africa – Independent Checking Engineer of 3 bifurcation caverns and stations; Gerrards Cross, UK – Review of tunnel collapse; Hong Kong West, HK – Review of alignment and inflow prediction; Dublin Port Tunnel, Ireland – Detailed design of cross overs; DTSS, Singapore – Review of chamber collapse causes

TUNNELLING CONSULTANTS

Company information	(a) Turnover (b) Turnover in tunnelling	Areas of expertise	Tunnel contracts underway	Recent tunnel contracts
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)
GOBA PO Box 180 Sunninghill 2157 South Africa Tel: +27 11 236 3300 Fax: +27 11 807 8535 Email: daniel@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

TUNNELLING CONSULTANTS

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 27 Bleeker Street Millburn NJ 07041 USA Tel: +1 973 379 3400 Fax: +1 973 376 1072 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, risk management tunnel ventilation, fire/life safety	East Side Access, NY, US – CM services; Transbay Terminal, SF, US – PM; Middlesex Tunnel, NY, US – Design and CM for sewer tunnel; North Dorchester Bay CSO, Boston, US – CM services; Calif High Speed Rail, US – On three teams studying sections between LA and SF; LAWA Expansion, US – Design; Dulles MetroRail, US – PM for new rail link; Silicon Valley Rapid Transit, US – Design/programme controls; Cross Sound Link, NY, US – Project and design development for 29km highway tunnel; Niagara Tunnel Project, Canada – Procurement of DB team and CM; Spadina Extension, Canada – PM for new transit line in Toronto; Southeast Collector, York Region, Canada – Design and CM services	Dulles APM Tunnels, US – Design of tunnels and ventilation for tunnel network; Beacon Hill Station/Tunnels, US – Design and CM services; Mission Valley East LRT, US – Design/CM support for light rail tunnel; Lower Northwest Interceptor, CA, US – Design and CM support services for twin subaqueous sewer tunnel crossings; Brightwater Sewer Tunnels, US – Design of precast concrete segmental linings; Elizabethtown Water Tunnel, US – Design/CM

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M5 East tunnel (eastbound) In tunnel air filtration scheme Invitation for Registrations of Interest

The Roads and Traffic Authority (RTA) is the state government agency responsible for the road network in New South Wales, Australia.

The M5 East tunnel is Australia's longest road tunnel with twin 4km, two-lane tunnels running between Earlwood and Arncliffe in Sydney.

Applications are invited from local and international suppliers to identify existing technology and capabilities in air filtration systems that could apply to the M5 eastbound tunnel. The system must operate *within* the road tunnel and remove particulate matter from air in the tunnel.

The invitation for registrations of interest document is available from the RTA website at: www.tenders.nsw.gov.au/rta

Applications are to be lodged electronically.

Applications close at 10am (AEDT) on Monday 2 March 2009.

Further enquiries contact: Ross Taranec
Fax: +61 2 92186262
Email: Ross_Taranec@rta.nsw.gov.au

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TUNNELLING CONSULTANTS

Company information	(a) Turnover (b) Turnover in tunnelling	Areas of expertise	Tunnel contracts underway	Recent tunnel contracts
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; Rheinufertunnel, 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; Fluelen 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
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	Undisclosed	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
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 Dobsinskeho 32 PO Box 92 SK-81005 Bratislava 15 Slovakia Tel: +42 124 5522 116 Fax: +42 124 5640 927 Email: hydrocoop@hydrocoop.sk Web: www.hydrocoop.sk	a) US\$1.94M b) US\$1.3M	Design of trenchless sewers DN2600-3000	Bratislava Waste Water Treatment Plant, Slovakia – Renewal and extension of Petralka waste water treatment plant; Bratislava Waste Water Treatment Plant, Slovakia – Renewal and extension of Vrakuna waste water treatment plant; Galanta Region Sewerage Systems, Slovakia – Sewerage system for 12 villages around Galanta Town	Malokarpatsky Region Sewerage System, Slovakia – Main pressure sewer DN200-DN600, length approx 30km, for transport of waste water to central WWTP
IC Consulanten 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	Undisclosed	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 Kostaraktos 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: salzburg@igt.co.at Web: www.igt.co.at	a) US\$12.6M b) US\$11.9M	Design, construction supervision, consultancy & project management for all underground constructions. Geotechnical measurements & interpretation	Tunnel Bejaia, Algeria – Three road tunnels, total length 2100m. Detail and application design; A10 Tauern tunnel, Austria – 2nd tube, length 6.5km. Detail and application design, reconstruction and adaptation of the 1st tube; Lainzer Tunnel lot LT31, Vienna, Austria – Construction supervision of 3km railway tunnel and emergency exits, side gallery method; Rapid Railway Vienna-Graz, Austria – Preliminary design, feasibility studies, approval design. Tunnel length 23-26km, 2 single-track tubes, TBM or NATM; A14 Tunnel Pfänder, Austria – 2nd tube, length 6.6km. Project management, supervision, TBM-shield	Metro Kadiköy-Kartal, Istanbul, Turkey – Detail design and application design for an 8.6km long section with six underground stations, NATM and TBM; Achraintunnel, Highway Bregenzwald L200, Austria – Detail design and consulting for two three-lane tunnels, length 3340m, cross sections 124.5m ² and 142.4m ² respectively

GRP Tubes for pre-tensioning

ATP's Anchoring System T-SH200

ATP is a firm highly specialized in developing and manufacturing structural composites for tunnel application.

ATP's products are sold and delivered to many European Countries, as well as in the Africa and Middle-East, all the way to the Far-East.

In the area of large infrastructure works (roads, highways, toll-highways, railroads) utilization of GRP (Glass Reinforced Polymeric manufactures) has been limited to pre-consolidation of tunnels face. In traditional applications, the GRP elements act essentially as passive anchors, in other words, as the reinforcing strips of reinforced earths retaining walls; they had never been proposed for pre-tensioning mainly because of problems related to methods of applying and maintaining the pre-tensioning levels.

ATP's T-SH200, thanks to its special steel terminal, eliminates all problems of application of axial tensile loads. The T-SH200 anchoring bolt is a 60 mm OD – 40 mm ID composite tube, with a rough outer surface to improve adhesion, manufactured by "pultrusion" utilizing thermosetting polyester resins and continuous glass fiber reinforcements. The uniqueness of the system is "the Head", proprietary design, realized in steel in a way to allow application and holding tensioning of the bar up to 300 KN (but recommended for 200 KN design load).

Main application of this product is for soil nailing to stabilize cuts and slopes. It can also be utilized as "isolated" anchoring in retaining structures or to contrast hydraulic pressures.

The pre-tensioning anchors T-SH200 of course offer also the traditional advantages of the GRP composites:

- Excellent corrosion resistance;
- Environmental respect: non polluting;
- In case of lime stabilized embankments, metal anchoring would greatly suffer pH > 10-12 conditions, while GRP anchors will offer excellent resistance;
- The electric insulation of GRP avoids necessity to provide and maintain costly "grounding" for protection against dangerous stray currents (as for metals).

The first application of T-SH200 has taken place at site portal of tunneling construction of "Galleria Manganaccia", at the Bologna side entrance. This structure is part of the third lane addition in the project of "Variante di Valico" on the Milano-Napoli A-1 highway, and precisely at the section between Sasso Marconi and Barberino di Mugello close to Florence.



For more information call **ATP srl**: www.atp.sa.it tel.: +39-081-947777


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www.wtc2009.org



TUNNELLING CONSULTANTS

Company information	(a) Turnover (b) Turnover in tunnelling	Areas of expertise	Tunnel contracts underway	Recent tunnel contracts
IL-Laabmayr & Partner Preishartlweg 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	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)	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
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, Colombia – Detailed design and construction supervision; Manso HEP, Colombia – 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 Robinigstrasse 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\$3.95M b) US\$2.3M	Engineering geological investigation, hydrogeological investigation, NATM design and consulting in rock and soft ground, geotechnical consulting	Tschirgant Tunnel Project, A12 Tyrol, Austria – 400m long 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; BEG, Lot 4-3 & Lot 3-6, Stans, Austria – 1 x 700m long and 1 x 840m HSR tunnels, NATM and drill and blast. 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); Brnjek, Brezik and Plasina 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@jacobssf.com Web: www.jacobssf.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

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TUNNELLING CONSULTANTS

Company information	(a) Turnover (b) Turnover in tunnelling	Areas of expertise	Tunnel contracts underway	Recent tunnel contracts
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	Undisclosed	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 Bgota (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 Email: jec@jennyeng.com Web: www.jennyeng.com	Undisclosed	Planning, feasibility, design, project management, construction management, geotechnical engineering, shafts, rehabilitation, asset management	THE Tunnel, NJ/NYC, US – Project controls, design review and CM services for a 28ft diameter, 10-mile long, twin rail tunnel. Construction by TBM, cut & cover, sequential excavation and drill & blast; USDOT-FTA, USA – Project management / oversight services for Denver Light Rail West Corridor, and San Francisco Third Street Light Rail Projects; NYCDEP Rondout-West Branch Tunnel & Shaft Rehabilitation, Upstate NY, USA – CM services for 650ft deep tunnel and shaft rehabilitation	City Water Tunnel No. 3, NYC, USA – Geotechnical engineering and CM services for new rock TBM water tunnels and deep shafts; ConEdison-First Avenue Steam Tunnel, NYC, USA – Design and construction management services for a new 12ft diameter, 4200ft long TBM tunnel Little Walnut Creek South Tunnel, Austin, TX, USA – Design and construction management services for a new bypass tunnel; Lincoln/ Holland Highway Tunnels and PATH Subway Tunnels, NYC, USA – Design and CM services
John Reilly Associates 1101 Worcester Road Framingham MA 01701 USA Tel: +1 Email: 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@jig.com Web: www.jig.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

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TUNNELLING CONSULTANTS

Company information	(a) Turnover (b) Turnover in tunnelling	Areas of expertise	Tunnel contracts underway	Recent tunnel contracts
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 mined stations. Part of Multi-Disciplinary 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 work 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
M 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” (Otopehi) 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\$0.1M	Risk assessments & risk management, health & safety, CE conformity assessments including control systems by ISO 13849-1:2006, machinery & system safety	AlpTransit, Gotthard Base Tunnel, Switzerland – Health and safety engineer, 2nd level support for Consortzio Tunnel Alptransit Ticino, Lot 452 (Faido); Devil's Slide Tunnel, CA, USA – 2nd Level Support Risk Management for the Caltrans construction management team; Concast AG, Worldwide – CE Conformity assessment, risk assessments, user instructions and technical documentation for revamps or new continuous casting machines for steel plants worldwide	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 – Preliminary engineering of large bore tunnel alternative for Tysons Corner. Risk assessment, risk management for Dr G Sauer Corporation; Belchen Road Tunnel, Switzerland – Implementation of a project specific Quality Management System for the Owner for tunnel rehabilitation
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 – Groundwater 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\$1.2bn b) US\$60M	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; A3 Hindhead, UK – Detailed design & supervision; Victoria Station Upgrade, UK – Detailed design; Thames Tideway, UK – Studies into proposed 30km tunnel; Thames Water, London, UK – Design of Ring Main extns; National Grid Tunnels, London, UK – Design & preparation of tender docs; Budapest Metro, Line4, Hungary ; Batapaati Nuclear Waste Storage, Hungary ; Delhi Metro, India ; Mine access tunnels, Chile – Preparation of tender docs; Heathrow Baggage Tunnels, UK – Design & construction supervision; Bunji Hydro Project, Pakistan – Design & supervision; Marina Coastal Expressway, Singapore ; Down Town Line, Singapore	T5, Heathrow, UK – Design & CM of LU extensions and a 4.2km storm water tunnel; Durban Harbour Tunnel, SA – Design & CM; SMART Project, Malaysia – Design & supervision of a 9.7km combined use tunnel; Crossrail, London, UK – Multi-disciplinary development of designs; Brighton & Hove Sewerage, UK – Preliminary design of new tunnels; Cable Tunnel, Singapore ; Interconnector Project, Dublin – Preliminary design; Karahnjukar Hydro Scheme, Iceland – CM for over 60km of hard rock tunnels
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, Zwijndrecht, 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

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; Himmelsschleife 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\$1.45bn b) US\$30M	Project & programme management, design engineering, hard and soft ground tunnelling, shafts, caverns, microtunnels, ground characterisation, hydraulic modelling, electrical and I&C systems; risk mgmt, claims mgmt, disputes resolution	Brightwater, Washington, US – JV design & support during construction of 21km conveyance tunnel and shafts; Lake Mead Intake No. 3, Nevada, US – JV design/support during construction; Lake Hodges to Olivenhain Pipeline, California, US – Design/Owner's engineer; Mill Creek No. 3, Ohio, US – Design & support during construction of 4.6km TBM rock tunnel for CSO conveyance; TARP, Illinois, USA – Design of 396m drill and blast tunnel; Pinalito Hydroelectric Project, Dominican Republic – Design/Owner's engineer for 14.35km headrace tunnel; Neelum-Jhelum Hydroelectric Project, Pakistan – JV design & CM for 47km drill & blast tunnels and powerhouse cavern	Bradshaw Interceptor Section 8, CA, US – Design & support during construction of 2360m soft ground sewer tunnels; CUP McCook Reservoir, Illinois, US – Design & support during construction; Tekeze Hydro Project, Ethiopia – CM & construction engineering for 1450m of drill & blast tunnels; Karahnukar Diversion Tunnels, Iceland – Owner's engineer; Taian-Shandong Pumped-Storage Project, China – Consultant/technical advisor, design and support during construction
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 y	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 & Anistropy" – 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	Undisclosed	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
O 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	a) US\$81.5M b) US\$7.5M	Civil and structural engineering for road, railway and subway tunnels, mined tunnels (NATM), shield tunnels (EPB/slurry/OFS), cut & cover tunnels, immersed tunnels, micro tunneling, tunnel safety, tunnel E & M	Tunnel Lobau S1, Vienna – Double lane road tunnel, 2 x 6000m shield drives, 15m diameter, 1700m cut & cover; Fraport AG, Frankfurt, Tunnel for luggage transport system – 1670m shield drive, 8.7m diameter; NBS Tunnel Goldberg, Masserberg – Double track tunnel for HSR, 1203m NATM; Niederstetten Tunnel – Rehabilitation of a tunnel by installation of a new reinforced concrete internal lining, Length 272m; Albvorlandtunnel, Stuttgart-Ulm, Germany – Single track tunnel for HSR, 2 x 8250m NATM; Tunnel Fritzens, Baumkirchen, Austria – Double track tunnel for HSR, 2370m cover & cut, 430m NATM; Tunnel Wiesing, Jenbach, Austria – Double track tunnel for HSR, 3210m shield driving (slurry)	Metro Hamburg, Line 4 Extension, Germany – Single track tunnel, 2 x 2811m shield drives (slurry); Tunnel Landshuter Allee / Tunnel Feldmoching, Munich, Germany – Single track tunnel for the maglev, 2 x 3765m / 2 x 1370m shield driving (slurry + EPB); Tunnel Thympanon, Greece – Double lane tunnel, 1420m NATM; Tunnel Aigion, Greece – Double track tunnel, 3.275m NATM; Metro 2 Kizilay, Yenikent, Ankara, Turkey – Single track tunnel, 2 x 2.855m NATM, 2 x 950m shield driving (EPB), 2 x 8100m 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
P 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: muntfakh@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
Parsons Corporation 100 West Walnut Street Pasadena California 91124 USA Tel: +1 626 440 4000 Fax: +1 626 440 6337 Web: www.parsons.com	a) US\$3bn b) US\$50M	Tunnel engineering and design, including hard rock and soft ground TBMs, single pass tunnel construction, advanced waterproofing systems, electrical, mechanical, ventilation, and fire and life safety systems	High Speed Rail, San Jose-Merced, CA, US; Trans Hudson Express Tunnel, NY/NJ, US; Caldecott Tunnel, CA, US; Caltrain Extension, CA; Tembi Tunnels, Greece; Al Salam Street Tunnel, Abu Dhabi; Red & Green Metro Lines, Dubai; Palm Island Tunnel, UAE; Brightwater, WA, US; South Cobb Tunnel, GA, US; Dulles Airport People Mover, US; Austin Downtown Tunnel, TX; San Vicente Tunnel, CA, US; Doha Expressway, Qatar; Doha Residential Development, Qatar; SDLAC-JWPCP Tunnel & Ocean Outfall, CA, US; Springs Bypass, Irvington Tunnels, CA, US; Lake Mead Intake No. 3, NV, US; Sandy River Conduit Replacement, OR, US; Central Outfall Sewer Phase 2, LA, US	CTRL, UK – Government's Representative & Technical Advisor (JV); Eisenhower-Johnson Memorial Tunnel, CO, US – Inspection; OCSO Ellis Street Interceptor, CA – PM/CM, design review; Kern River No. 1 Tunnels, CA, US – Design for rehabilitation; Railway Tunnels, Greece – PM/CM, engineering reviews & advisory; Central Outfall Sewer Phase 1, LA – Design for rehabilitation; Coldwater Sanitary Relief Section A, US – Design of wastewater tunnel; International Linear Collider, US – Study, >100km physics tunnels
Plinninger Geotechnik, Dr Kirchweg 16 D-94505 Berried Germany Tel: +49 9905 7070 360 Fax: +49 9905 7070 361 Email: geotechnik@plinninger.de Web: www.plinninger.com	Undisclosed	Geotechnical consulting, especially for rock and soil abrasivity and excavatability including field and laboratory investigations. Geotechnical documentation, instrumentation and field measurements	Kopswerk II, Lot 1, Austria – 5.5km double-shield TBM headrace tunnel, geotechnical documentation, sampling, laboratory investigations, consulting; Aica-Mules Exploratory Tunnel, Italy – 10.5km double shield TBM tunnel (6.3m diameter), plus 1.8km NATM tunnel, geotechnical monitoring supervision	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

TUNNELLING CONSULTANTS

Company information	(a) Turnover (b) Turnover in tunnelling	Areas of expertise	Tunnel contracts underway	Recent tunnel contracts
Pro Iter Via GB Sammartini 5 20125 Milano Italy Tel: +39 02 6787 911 Fax: +39 02 6739 1146 Email: mail@proiter.it Web: www.proiter.eu	a) US\$10M b) US\$2M	Civil engineering design for roads and highways, railways, environment, rock and soft ground tunnel design, geotechnical and geomechanical advice, soil improvement design, soil structure interaction analyses and calculations	Tehran Metro, Line 7, Iran – 13km EPB tunnel (north-south stretch), Ø9m, in urban area; Catania-Syracuse Motorway, Sicily, Italy – Five twin tunnels (12km), geotechnical and geomechanical assessment and design, viaducts foundations and retaining structures design, slope stabilisation; Brenner Base Tunnel, Italy/Austria – First lot of Brenner Base Tunnel, Aica pilot tunnel and Unterplattner service tunnel (approx 12km), detailed design, including both traditional and mechanised driving in hard rock, under overburden of about 1300m	A1 Motorway, Barberino-Florence Section, Italy – Le Croci tunnel (1.6km driven in weak and hard rock) & Case Forno (third lane extension); A1 Motorway, Firenze Sud-Incisa Valdarno Section, Italy – 3rd lane extension, final design of S. Donato tunnel, about 2km long, driven in weak rock; A1 Motorway, Barberino del Mugello-Firenze Nord Section, Italy – Final design of 12 tunnels in hard rock, approx 7km; St Petersburg Metro, Russia – Access tunnel design; Valtellina State Road, Italy – Final design of 3 tunnels
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; Skansenlöpet 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
Rizzo Associates, Paul C 105 Mall Boulevard Suite 270E Monroeville PA 15146 USA Tel: +1 412 856 9700 Fax: +1 412 856 9749 Email: p.cra.pittsburgh@rizzoassoc.com Web: www.rizzoassoc.com	a) US\$43M b) US\$.25M	Excavation planning, geologic studies, instrumentation and monitoring, settlement and bearing capacity, site selection, slope stability analysis, soil structure interaction, test borings, downhole testing, seismic risk analysis	Taum Sauk Outlet Works Inspection and Repair, Ironton, MO, US – Inspection of outlet works and preparation of designs for repairs. Outlet works consist of 450ft of 26ft diameter vertical shaft, 4765ft of 25ft diameter rock tunnel and 1807ft of 18.5ft diameter steel lined tunnel and penstock. Repairs will include shotcreting in vertical shaft, reinforcement of the rock tunnel in selected areas and repair of a portion of the steel lining tunnel	Gualcamayo Tunnel Project, San Juan, Argentina – 3600m of tunnels and a 12,500m ³ cavern for the transportation of minerals out of the Ore Pass Cavern. Ground engineering, geomechanical analysis, anchoring design, and construction management of the cavern and tunnels

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Job of the month

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**CENTRAL PUGET SOUND REGIONAL TRANSIT AUTHORITY
 INVITATION FOR BIDS
 UNIVERSITY LINK LIGHT RAIL TBM TUNNEL UWS TO CHS – LINK CONTRACT U220
 (IFB NO. RTA/LR 1-09)**

The Central Puget Sound Regional Transit Authority (Sound Transit) invites sealed bids for the construction of approximately 11,400 feet of twin-bored running tunnels between the University of Washington Station and Capitol Hill Station and cross passages excavated at intervals between the bored tunnels, including permanent slurry-walls for the UW Station and crossover box structure and excavation of the southern cross-over portion of the box.

A Pre-Bid Conference will be held January 23, 2009 at 9:00 a.m. in Sound Transit's Ruth Fisher Board Room, 401 South Jackson Street, Seattle, Washington. A Networking Session and Site Visit will be conducted following the pre-bid conference. A CD of the Invitation for Bids may be obtained through Sound Transit's contracting opportunities web site at www.soundtransit.ebidsystems.com.

Any and all inquiries concerning the IFB process should be directed to Brian Knight, Lead Contract Administrator, at (206) 689-4942.

Central Puget Sound Regional Transit Authority

By: Brian P. Knight, Lead Contract Administrator

TUNNELLING CONSULTANTS

Company information	(a) Turnover (b) Turnover in tunnelling	Areas of expertise	Tunnel contracts underway	Recent tunnel contracts
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
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\$6M b) US\$6M	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	Devil's Slide, CA, US – Inspection and CM, scheduling and claims services; MUNI Subway, San Francisco, US – Preliminary engineering design, scheduling and cost estimating; East Side Access, CM009, NY, US – Engineering support during construction; University Link, Seattle, US – Final design of SEM tunnels and waterproofing of stations; Silver Line Phase III, Boston, US – Preliminary engineering for NATM section, waterproofing design; Pajares Rail Tunnel, Spain – Detailed design and 3D FE analyses; Tottenham Court Road Station, UK – Detailed design and FE analyses; Bond Street Station, UK – Preliminary design for station upgrade; Metro Red Line, Tel Aviv, Israel – Design oversight	Beacon Hill Station, Central Link, Seattle, US – Final design and construction inspection services for deep soft ground tunnels; North Shore Connector, Pittsburgh, US – Design and construction support services for the waterproofing of two cut & cover stations and associated tunnels; WASA CSO, Washington DC, US – Participate on Expert Review Board; Love Field Tunnel, Dallas, US – Conceptual designs and feasibility studies; Tysons Corner Tunnel, VA, US – Preliminary engineering design of large bore TBM tunnel alternative
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 Grouft, 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 Alencon Link Basingstoke Hants, RG21 7PP United Kingdom Tel: +44 1212 148103 Fax: +44 1212 123088 Email: info@scottwilson.com Web: www.scottwilson.com	a) US\$442M b) US\$4.7M	TBM, drill & blast, pipe jacks, directional drilling, immersed tube tunnels, cut & cover, microtunnelling, SCL tunnels, segmental linings, tunnel inspection, assessment, feasibility, specialist advice, ground probing radar, lining surveys	Tsuen Wan Drainage Tunnel, HK – Detailed Design including segmental lining, in-situ lining, chambers and temporary support; Braamhoek Hydropower, SA – Technical advisor for cavern, tunnels and shafts; Combe Down Mine, Bath, UK – Design and construction supervision; Laliki Tunnel, Poland – Tunnelling advice and supervision; Perpignan-Figueras HSL, Spain/ France – Commercial Advisor and Independent Monitoring and Certification of the works on 44.5km HSR link; Glenfield Tunnel, UK – Specialist advice and detailed design of remedial works; Waverley Line Tunnels, UK – Inspection, assessment and advice of remedial works; Gasworks Tunnel, UK – Inspection, assessment and design of remedial works	Vigoumenitsa-Ioninia Railway, Greece – Detailed design; Cooling the Tube, UK – Outline designs for new ventilation shafts and tunnels; SFA, UK – Feasibility for step free access to Green Park station; Wrens Nest Tunnel, UK – Inspection and preliminary design; Edinburgh Airport Rail Link, UK – Lead consultant; Saudi Landbridge Project, Saudi Arabia – Tunnel design; Worcester Inlet Works, UK – Detailed design; River Trent Crossing, UK – Design and advice regarding pipejacked crossing
SETEC 58 quai de la Rapée F-75583 Paris Cedex 12 France Tel: +33 140 046 783 Fax: +33 140 045 737 Email: tpi@tpi.setec.fr Web: www.setec.fr	a) US\$183M b) US\$12.8M	Engineering services for all types of underground projects, risk analysis, geological & geotechnical studies, ground structure interaction modelling, CFD modelling of fires, electromechanical supervision, site management	Toulon Road Tunnel, France – 1800m NATM bored tunnel; Mont Sion Highway Tunnel (A41), France – 3100m EPBM twin bored tunnel; Bocognano Road Tunnel, Corsica – 400m NATM tunnel; Chavanne Tunnel, Rhin-Rhone high speed rail line, France – 2000m long NATM tunnel; Zaouiat Highway Tunnel, Morocco – 500m long NATM twin bored tunnel; Channel Tunnel Fire Repair Works, France/UK – Repair and refurbishment following fire in September 2008; A8 Motorway Tunnels Renovation, Nice, France	Lyon-Turin Base Tunnel, France/Italy – Twin 52km long high speed rail tunnel under the Alps, studies for reference preliminary design; A86 West Motorway, Paris, France – Detailed design of electromechanical and electrical equipment
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 stones 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

TUNNELLING CONSULTANTS

Company information	(a) Turnover (b) Turnover in tunnelling	Areas of expertise	Tunnel contracts underway	Recent tunnel contracts
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
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	Undisclosed	Civil engineering, cut & cover, D&B, design engineering, electrical & mechanical engineering, environmental monitoring, environmental impact assessment, project management	Marmaray Project, BC1 - Bosphorus Rail Crossing, Istanbul, Turkey – Contract-BC1, tunnels and stations contract design services (tender design phase 1 and detail design phase 2). Detail design for surface and underground stations, cut and cover tunnel, bored tunnel, ventilation buildings, bridge and interchanges, infrastructural facilities, electromechanical design for all structures excluding ventilation	Ankara-Izmir Railway Surveying, Turkey – Design and engineering services for General Directorate of State Railways, Ports and Airports (DLH). Surveying, design and engineering for 600km rail line. Preliminary design for all engineering structures (viaducts, bridges, culverts, underpasses / overpasses, tunnels, etc.) and station facilities, which are to be kept intact, modified or demolished and rebuilt in relation with laying second tracks along existing tracks, EIA report writing, cost estimate, B/Qs and tender documentation
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\$8.5M b) US\$8.5M	Bored tunnels, immersed tunnels, technical systems, tunnels traffic management systems, safety, operation, management and maintenance	Busan koje Link, South Korea – Immersed tunnel for dual-carriage motorway link between Busan and the island Geoje. Total length of the tunnel 3700km. Immersed section 3,240km comprising 18 elements of 180m each; Coatzacoalcos Immersed Tunnel, Mexico – Tunnel for a dual lane motorway comprising 5 elements of 140m each with a total length of 1500m; N201 Diversion Aalsmeer, Uithoorn, The Netherlands – Motorway diversion including a tunnel across the Ringvaart close to Schiphol Airport; North south line extension Metro Amsterdam The Netherlands – Immersed tunnel across the river IJ, a twin bored tunnel (3.8km) and 4 stations in the inner city of Amsterdam	2nd Coentunnel The Netherlands – Immersed tunnel across the Noordzee kanaal in Amsterdam. Located next to the existing Coentunnel; Hubertustunnel, The Hague The Netherlands – Underground road connection: total length ±2000m, the underground part has, inclusive of slip roads, a length of 1700m and consists of a twin bored tunnel with an outer diameter of 10.2m
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); Boziyuk-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

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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\$16.7M b) US\$16.7M	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 – Design of 10km tunnels, 38m i.d. pump station, 28 shafts and outfall; Croydon cable Tunnel, UK – Permanent & temp works design for 10km tunnel; London Water Ring Main, UK – Permanent & temp works design for 4.5km extension between Honor Oak and Brixton and 4km extension between Stoke Newington and New River Head; Hendon-Colindale Cable Tunnel, UK – Permanent & temp works design for a 2.5m id cable tunnel and 2 shafts; AX4 Framework, United Utilities, UK – Permanent & temp works design for 20 shafts; Coppermills Pumping Shaft, UK – Permanent & temp works design for a 30m shaft, connecting tunnel & relining existing 280m tunnel	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; 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
Vector Projetos Rua Cardeal Arcoverde 1749 C.J. 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
WBI Henricistrasse 50 52072 Aachen Germany Tel: +49 241 889 870 Fax: +49 241 889 8733 Email: wbi@wbionline.de Web: www.wbionline.de	a) US\$5M b) US\$5M	Geotechnical consulting, planning, design of NATM and mechanised tunnelling, tenders, construction management and supervision, 3D FE analysis with in-house software, risk and claim management	Tunnel Schwäbisch Gmünd, Germany – Detailed design of 2130m tunnel; U15 Stuttgart, Germany – Feasibility, exploration, planning, tenders, supervision & review engineer for 1055m tunnel; Tunnel Rosenstein, Germany – Ground expertise and design for 2 x 750m two-lane road tunnel; Carmel Tunnels, Haifa, Israel – Tender design, tenders, detailed design, tunnelling expert, tunnel manager/supervision for 2 x 4.7km two-lane road tunnels; Kallidromo Tunnel, Greece – Tender design, detailed design and site supervision for 2 x 9025m long rail tunnel; New Schlüchterner Tunnel, Germany – Geotechnical engineer, consulting services during heading and optimisation of heading for 3995m railway tunnel	Tunnel Leutenbach, Germany – Exploration, expertise, design and tender documents, risk assessment, review engineer, site supervision for 1080, tunnel; Tunnel Höllberg, Germany – Detailed design for 2 x 874m two-lane road tunnel; Katzenberg Rail Tunnels, Germany – Review engineer for 9km tunnel; Schmücketunnel, Germany – Tunnelling expert and review engineer for 2 x 1.7km highway tunnel; Jagdbergtunnel, Germany – Ground expertise, tender design and tender for 2 x 3km three-lane highway tunnel
Zerna Ingenieure Industriestrasse 27 D-44892 Bochum Germany Tel: +49 234 9204 0 Fax: +49 234 9204 150 Email: info@zerna.eu Web: www.zerna.eu	a) US\$21.7M b) US\$1.8M	Design and supervision of shield driven tunnels, microtunnelling and tunnels driven by mining, NATM 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 3.4km. Six stations will be constructed by cut & cover with diaphragm walls. The double track tunnel will be driven by Ø9.4m hydro-shield TBM; Brandenburg International Airport, Berlin, Germany – Open-cut railway tunnel with a total length of 2.6km; Berlin Underground, Line 5 "Unter den Linden", Germany – Two single-track tunnels and 4 stations with a total length of 2.2km; Finnetunnel, Erfurt-Leipzig/Halle Railway, Germany – Two single-track rail tunnels driven by two 10.82m Mixshield TBMs, each with a total length of 6.97km; Hamburg Underground, Line U4, Germany – Total length of approx. 4.1km, including two open-cut stations	B236n Road Tunnel, Berghofen, Germany – Tunnel design, preparation of bid procedure and construction supervision of a 1.3km NATM and cut & cover tunnel in complex ground conditions; Geestmünder Straße Pipe Jack, Cologne, Germany – Pipejacked sewer (DN 3400) below an existing dilapidated sewer as well as Ford factory buildings; North-South City Rail, Cologne, Germany – 4km urban tunnelling project, distinguished by extremely difficult structural and local boundary conditions. Simultaneously application of numerous building techniques



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26th-27th March, 2009

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YOUR EMINENT SPEAKER PANEL (INVITING)

KEY ISSUES TO BE COVERED

- Current condition and future plan about tunnel construction
- Senior experiences of construction in complicated geographical situation
- Lessons and experiences learn from domestic and overseas projects
- Advanced ventilation and disaster prevention systems in tunnels
- Risk analysis and decision-making techniques for large tunnel projects
- Operation and safety management
- Development and application of advanced technologies

Martin Knights
President
International Tunnelling and Underground Space Association
Director of Operations
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International Tunnelling and Underground Space Association
Research Manager
SINTEF Group

Park Chul-whan
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Korea Institute of Geology, Mineral & Materials

Harald Wagner
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D2 Consult Linz

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Associate Chief Engineer
Beijing Jiaoke Highway Surveying, Design and Research Institute

Sun Jun
Academician
Chinese Academy of Sciences
Honorary Professor
Tongji University

Jan Eirik Henning
Senior Engineer
The Norwegian Public Roads Administration

Willy De Lathauwer
Chief Engineer, Director of Roads
Ministry of Communications and Infrastructure

Robert Galler
Chair of Subsurface Engineering
University of Leoben
Representative
ITA Austria

Roland Leucker
Deputy Managing Director
Research Association for Underground Transportation Facilities (STUVA)

Arnold Dix
Chairman of Contractual Practices Group
International Tunnelling and Underground Space Association

Toshihiro Asakura
Professor
Kyoto University

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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\$10bn b) US\$551M	Underground construction: rail, road, metro, sewer, hydro electric, by TBM (EPB, gripper, double-shield, single-shield), conventional (mechanical, Drill & Blast) and cut & cover methods	M30 South Bypass, Madrid, Spain – 3.6km, Ø15m EPB; Pajares Tunnel, Lot 1, Spain – Rail, 2 x 10.5km, Ø10m; L9 Barcelona Metro, Spain – 11km, EPB Ø12m; Bologna Railway, Italy – 2 x 6km, EPB Ø9m; Santoña Sewer Tunnel, Cantabria, Spain – 4 km, D&B, Ø5m; Malata Outfall, Coruña, Spain – 7km, TBM Ø3.5m; Grado Doriga Highway, Asturias, Spain – 2 x 0.9km; Villargordo-Venta del Moro, Valencia, Spain – Rail, 3km; Guadarrama, Spain; Horcajada-Naharros, Spain; Basurto Tunnel, Bilbao, Spain; Timijiraque Tunnel, Spain; L5 Barcelona Metro, Spain; Ojos de agua Hydro Project, Chile; Raico Hydro Project, Chile; Metronorte, Madrid, Spain; Metrotren Gijón, Spain	Plataforma de la LAV León-Asturias, Spain; Plataforma de LAV Vitoria, Bilbao-San Sebastián, Spain; Fase IV Tamaraceite-Tenoya-Arucas costa, Gran Canaria, Spain; Nueva Carretera Icod de los Vinos, Santiago del Teide, Tenerife, Spain; Túnel de la Lobera, Navarra, Spain; Autovía B-40, Olesa de Montserrat- Viladecavalls, Barcelona, Spain; Variante de Camarillas, Spain; Eje Atlántico de Alta Velocidad, Galicia, Spain; Túnel de Sabadell, Spain; Aeropuerto de Málaga, Spain
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	Undisclosed	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 Nuremberg-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 Trockenlostrasse 21 CH-8105 Regensdorf Switzerland Tel: +41 1 870 9222 Fax: +41 1 870 0618 Email: info@amberg.ch Web: www.amberg.ch	Undisclosed	Tunnel surveying, set out, just-in-time profile control, 3D laser scanning for tunnel structure analysis, digital inspection and information management, geotechnical monitoring, geophysical prediction	Gotthard Base Tunnel, Switzerland – (Faido and Bodio Lots) Comprehensive geotechnical monitoring, 3D profile surveys, tunnel scanning and high-resolution images, geometry with GRP 5000 Absolute; Durchmesserlinie Zurich, Switzerland – TBM guidance, 3D profile surveys, tunnel scanning, comprehensive geotechnical monitoring for the ATW consortium; Ceneri Base Tunnel, Switzerland – Automatic monitoring of the A2 Highway above the north portal of the Base Tunnel. Integrated monitoring including total stations, GPS, inclinometers and extensometers; Katzenberg Tunnel, Germany – 9.3km rail tunnel, application of TMS Tunnelscan	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

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TUNNELLING CONTRACTORS

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 726856 Email: info@barhale.co.uk Web: www.barhale.co.uk	a) US\$200.7M b) US\$90M	Tunnelling, microtunnelling, shaft sinking, pipe-jacking, open-cut drainage, steel fabrication, utility networks, maintenance operations, railtrack crossings, slurry treatment, plant innovation, lateral connections	Framework contracts, UK: Thames Water, Anglia Water, Seven Trent Water, Scottish Water; Trade Framework contracts, UK: Network Rail, Wessex Water, Environmental; Bristol City, UK – Insitu concrete relining of city centre tunnel to 2.23m i.d.; London 2012, UK – Design and construction of primary site drainage infrastructure, 2000m primary 1200 spine tunnel and associated structures; Kingston upon Thames, UK – Construction of foul sewers 1000m 1200 and 300m 600mm i.d. by remote tunnelling; Albrighton, UK – Construction of flood alleviation scheme with 1800mm and 600mm remote rock tunnels; Gt Yarmouth, UK – Construction of 600mm and 1500mm soft ground tunnels in mixed ground	Wraysbury Inlet Tunnel Recline, London, UK – Design & construct 2900m of 2.23m i.d. reinforced relining & temporary works; Queen Mother Reservoir, London, UK – Design & construct 1000m of 2.23m i.d. reinforced concrete tunnel lining & 343m of 2.20m i.d. steel welded pipe relining; London, UK – Inspection maintenance & repairs to 32km tunnel system; Westbourne Grove London, UK – Construction of 15m i.d. shafts & 1500mm i.d. tunnelling; Wandsworth, UK – 1200mm i.d. microtunnel & associated shafts
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\$122.9M b) US\$120.9M	NATM (shotcrete tunnelling) & TBM, rock and soft ground tunnelling using the LaserShell, CombiShell & UltraShell methods, value engineering, cut & cover tunnels	Tunnel Jagdberg, A4 Eisenach-Goerlitz, Germany – 3-lane road tunnel, 2 tubes, total 6.14km, 140m vent-shaft, D&B, excavator, NATM; Pfaendertunnel 2nd tube, Austria – 6.74km 2-lane road tunnel, TBM, 31 crosspassages, 4 caverns & 4 inclined tunnels (32.5%), mined, NATM; BBT Exploratory Gallery, South Tyrol, Italy – 10.4km TBM; Alte Mainzer Tunnel Modernisation, Germany – two 2-track rail tunnels (654+240m); SVT Lerum-Partille, Gothenburg, Sweden – 8km sewer gallery; Lainzertunnel LT31, Vienna, Austria – 3.6km 2-track rail tunnel; Arlbergtunnel Upgrade, Austria – 10.3km 2-track rail tunnel, reinstatement & enlargement under operation, ballastless concrete track slab system	Tiergartentunnel, Austria – 671m rail tunnel, 160m access gallery, D&B, NATM; Neuer Ramholtunnel, Germany – 474m rail tunnel, excavator, D&B, NATM; Unterer Finstermuenz tunnel, Austria – Road tunnel 526m, D&B, NATM; Tschambreutunnel, Austria – Road tunnel 564m, drill & blast; Tröingebergertunnel, Sweden – 1.1km railway tunnel, D&B; Katschbergertunnel 2nd tube, Austria – 5.4km road tunnel, D&B; Beacon Hill Station, Seattle, USA – SEM/NATM know-how-transfer, deep binocular station
Bilfinger Berger Tunnelling Division Landsberger Strasse 290a D-80687 Munich Germany Tel: +49 89 74817 252 Fax: +49 89 74817 307 Email: georg.wicklmayr@bilfinger.de Web: www.civil.bilfinger.com	a) US\$5.26bn b) US\$774.7M	Design and build of large international tunnel projects (road, rail, metro, sewer, water & power supply), TBM tunnelling (slurry, EPB, hard rock, double shield), conventional tunnelling (NATM, tunnel excavator, roadheader, drill and blast)	Wehrhahnlinie Duesseldorf Lot 1, Germany – 3.4km, 5 stations; Weinbergtunnel, Switzerland – LOT 3.1 & LOT 3.2; Gotthard Base Tunnel, Sedrun, Switzerland – 18.3km, D&B, 800m access shaft; ESCSO Portland, USA – 8.8km, 7 shafts; E18 Grimstadt-Kristiansand, Norway – 11.5km, D&B; Clem 7, Brisbane, Australia – 6.8km, 4km with TBM, 2.8km with roadheader; Citytunneln Malmö, Sweden – 4.6km, TBM, 280m Station, 6 shafts; North South City Railway Cologne, Germany – 2.7km twin rail link, 6 stations; Wienerwald Tunnel, Austria – 13.1km, 10.8km with TBM, 460m mucking tunnel, ventilation shafts; St Martin la Porte, Lot 1, France – 2km exploratory tunnel, D&B	Descenderie de Modane, France – 2.9km exploratory tunnel, D&B; Kirchenwald Tunnel, Switzerland – 3.1km double tube road tunnel, D&B 2 emergency adits, 1 vent shaft, 2 vent buildings; S-Bahn Hamburg, Germany – 1.75km double tube train tunnel, TBM Ø6.86m, two emergency exits; Metro Subway Vienna, U2-5 Stadium, Austria – 2.2km, TBM Ø6.8m, 3 emergency exits, shafts, station; Hofolding Gallery, Munich, Germany – 17.4km water supply tunnel, TBM Ø3.40m, 5 operational shafts and 2 permanent shafts
Bouygues Travaux Publics 1 avenue Eugene Freyssinet 78061 ST Quentin en Yvelines France Tel: +33 1 3060 5449 Fax: +33 1 3060 4428 Email: bouyguestp@bouygues-construction.com Web: www.bouygues-construction.com	a) US\$1.1bn b) US\$400M	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 – 80km, including 11.7km D&B and 3km TBM; A41 Motorway, France – 18.8km, including 2x3km TBM; Salazie Water Tunnel, La Réunion Island – 8km TBM; Castle Peak Cable Tunnel, Hong Kong – 4.5km TBM; Chong Ming Motorway, China – 2x7km, Ø15m TBM; Tyne Tunnel, UK – Immersed tube tunnel; Les Grands Goulets Road Tunnel, France – 2x1.65km drill & blast; DSD Hong Kong West Drainage Tunnel – 10.5km TBM, 8km D&B, 32 dropshafts; Cairo Metro Line 3, Egypt – 3.5km TBM and 5 stations; Tunnel de Toulon, France – 1.8km roadheader; Andra, France – 500m deep shafts & galleries for nuclear waste storage; Frejus & Jaut Bugey, France – Rehabilitation of railway tunnel for TGV	Tunnel Maurice Lemaire, France – Safety tunnel; Ferden, Tunnel Railway, Loschberg, Switzerland – 2x35km drill & blast; Tima Water Tunnel, France – 1.85km TBM; Oikiluoto Nuclear Power Plant, Finland ; Flamanville Nuclear Power Plant, France ; Masan Bay Bridge Korea ; East Tsing Yi, Hong Kong ; Tanger Port, Morocco – Roll on – Roll off prefabricated caissons; Nelspruit stadium, South Africa ; Highway 2000 Motorway, Jamaica – 34km; Les Gresillons Water Treatment Plant, France ; Pusan Harbour, Korea (Turnkey Contract)

TUNNELLING CONTRACTORS

Company information	(a) Turnover (b) Turnover in tunnelling	Areas of expertise	Tunnel contracts underway	Recent tunnel contracts
CDM 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	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 Poliénas, 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 Industrieweg 124 9032 Wondelgem Belgium Tel: +32 9 254 0111 Fax: +32 9 226 7771 Email: info@denys.com Web: www.denys.com	a) US\$165M b) US\$60M	Pipe jacking, slurry TBM drives, shaft sinking, concrete piles, diaphragm walls	AVorst Sewer, Brussels – Pipe jack sewer DN2000, 1000m, slurry and reservoir of 18,000m ³ ; Sowaer-Bierset Sewer, Liege – Pipe jack sewer DN2000, 2600m, slurry TBM and shaft sinking depth 40m; Mechelen Sewer, Mechelen – Pipe jack sewer DN1600, 740m, slurry TBM, 3 shafts & pumping station; AWW-Water Supply, Antwerp – Pipe jack DN1200, 600m, slurry TBM; Algiers Sewer, Algeria – Pipe jack DN1800, 3000m, inc. 6 shafts; Schuman-Josaphat Rail Extension, Brussels – Pipe jack DN3000, 800m; Aide Sewer, Grace Hollogne & Montegnee – Pipe jack DN1600, 2100m, and 5 deep shafts	Boot, Brussels – Pipe jack sewer DN2500 = 1700m, DN2200 = 3020m, DN1800 = 1900m, DN900 = 180m; Woluwe, Brussels – Pipe jack sewer DN2000 = 1000m, DN2200 = 1300m, DN1600 = 900m, DN1200 = 700m, DN900 = 500m, inc. pumping station; Gas Pipeline, Lyon – Casing tube for pipeline, DN2800, 550m pipe jack under the river Rhone; BAM, Antwerp – Utility tunnel pipe jack, DN1800, 100m
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\$105.3M b) US\$26.3M	Tunnel survey, especially gyro control measurements, fundamental network measurements, 3D laser scanning and surface movement monitoring, online vibration and noise monitoring	Brenner Base Tunnel, Italy – Seismic exploration ahead of the tunnel face, rockburst monitoring, gyro control measurements; Gautrain Tunnels, South Africa – Gyro control measurements; Pajares Tunnel, Spain – Gyro control measurements; Jenbachtunnel, Austria – Gyro control measurements; Pfänder Tunnel, Austria – Online vibration and noise monitoring; Emscher Sewer Tunnel System, Germany – Fundamental network survey, gyro control measurements, 3D laser scanning	Karahnjukar Hydro Power Project, Iceland – Several gyro control measurement campaigns; Roppener Tunnel, Austria – Online vibration and noise monitoring

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TUNNELLING CONTRACTORS

Company information	(a) Turnover (b) Turnover in tunnelling	Areas of expertise	Tunnel contracts underway	Recent tunnel contracts
Dragados Avenida Tenerife 4 San Sebastian de los Reyes 28700 Madrid Spain Tel: +34 91 703 8239 Fax: +34 91 703 8657 E-mail: infoacs@grupoacs.com Web: www.dragados.com	a) US\$9.2bn b) US\$789M	TBMs in hard rock with double shield and soft ground using EPBMs, drill & blast, NATM, roadheaders, ground treatment, soil improvement, monitoring, precast segment manufacture, plan/build/operate tunnel concessions	East Side Access, New York, USA – Four tubes bored by two hard rock TBMs, total length of 7.5km. Grand Central Terminal, construction of two caverns below the station for future ESA station; Pajares Tunnel, Lot 2, Leon, Spain – 5.4km decline tunnel at 6%, followed by twin 4km tunnels (as part of 24km long tunnel for HSR), double shield, Ø10.2m; Line 9 Barcelona Metro, Spain – Subway tunnel, total 15km long, 2 x EPBMs drives, Ø12m; Tunel sur Los Bronces, Chile – Exploratory tunnel drive, 8.3km long at el. 3800m, TBM Ø4.5; Girona Station Access Tunnel, Spain – 2.5km high speed rail tunnel, Ø12m EPB, and cut & cover station; Metro Madrid L11, Spain – Twin track subway extension 4km, plus station	Dos Valires, Andorra – 3km road tunnel by drill & blast; Seville Metro Line 1 – 3km twin tunnel, Ø6m EPBM; Talave Water Tunnel – 7.5km, Ø4m double shield TBM; M-30 Tunnel, Madrid, Spain – Road tunnel, 3.6km long, EPB Ø15m; Pertus Tunnel, French/Spanish border – Twin HSR tunnel, 2 x 8.4km long, 2 x double shields, Ø10m; El Salto Tunnel, Chile – Twin 2km long road tunnels for road concession, drill & blast; Line 3, Barcelona Metro, Spain – Drill & blast extension; Metro Argentina, Buenos Aires – Lines A and H
F Frontier-Kemper Constructors 1695 Allen Road PO Box 6690, Evansville Indiana USA Tel: +1 877 554 8600 Fax: +1 812 428 0337 Email: information@frontierkemper.com Web: www.frontierkemper.com	a) US\$150M b) US\$140M	Shaft and slope sinking, conventional and TBM tunnelling, shaft and tunnel lining, large diameter raise boring, manufacture and installation of hoisting and conveying equipment for mines and tunnels (through FKC-Lake Shore Division)	Brightwater Tunnel, Central Section, Seattle, USA – (JV with Vinci and RCI-Parsons), 31,700' long 14'4" concrete segment lined sewer tunnel by slurry TBM. Two shafts (one frozen) for inlets; City Water Tunnel No 3, Manhattan Portion, Stage 2, New York, USA – (JV with Schiavone and Shea), total of 9 shafts (24B through 33B) at 500 VF deep. Project includes excavation of 27,000lf of tunnel using same TBM at Ø12.25ft. that was used to excavate 18,000lf of tunnel for a previous project. Work also includes concrete lining; Ashlu Creek Hydroelectric Tunnel, Squamish, British Columbia, Canada ; Various mine construction projects	Baumgartner Tunnel, St. Louis, USA – (JV) 20,275ft long, Ø12ft rock tunnel (Wirth TBM), 3 x shafts, 1 x lift station; Metro Gold Line Eastside Ext. LA, USA – (with Traylor Bros) 2 bored tunnels. Construction to include 2 sump structures and 6 cross passages between tunnels; approx. Ø100ft, termination shaft Ø34ft & a screen shaft Ø36ft, all 200ft deep; Weehawken Tunnel & Station, Weehawken, USA – (with Shea & Beton-und Monierbau). Enlarge and equip a 4,160ft long railway tunnel for subway service
G Geotechmin 9 Lyulin Planina Str Sofia 1600 Bulgaria Tel: +3592 9650221 Fax: +3592 9526080 Email: office@geotechmin.com Web: www.geotechmin.com	a) US\$58M b) US\$9.2M	Tunnelling in hard rock, civils, drainage, sewerage tunnels, mine and dressing ore production tunnels, recent experience in metro stations and urban tunnelling	Ellatzite Mine, Etropole, Bulgaria – Drainage adit 840, 2100m, 12.4m ² drill and blast, various support required, 570m, 10.4m ² drill and blast clean water tunnel for environmental protection; Sofia Metro Station 9, Bulgaria – Construction of the vertical access shaft for TBM launch, construction of the Dragan Tsankov connector tunnel, 208m, 72m ² NATM tunnel	Ellatzite Mine, Etropole, Bulgaria – completion of a 1900m, 7.4m ² drainage adit with various support requirements
Guy F Atkinson Construction LLC, 200 Union Blvd Suite 400 CO 80228 USA Tel: +1 303 985 1660 Fax: +1 303 985 1449 Email: bill.cahoone@atkn.com Web: www.atkn.uk	a) US\$3.1bn b) US\$300M	Mining and tunnelling (including shaft sinking) via drill and blast, TBMs and roadheader. Specific expertise in NATM	Highland Boy Drainage Gallery, Kennecott Utah Copper Corp, (Rio Tinto), Salt Lake City, UT, USA ; Detailed engineering, design and procurement support for all permanent facilities, excavation and support of 15ftx15ft x 8000ft long tunnel; North Ore Shoot Shaft Collar Recovery Project, Kennecott Utah Copper Corp, (Rio Tinto), Salt Lake City, UT, USA ; North Ore Shoot shaft collar recovery; Capitol Peak Tunnel Project, Defence Threat Reduction Agency, White Sands Missile Range, NM, USA ; Excavation and maintenance of a tunnel complex by drill and blast	Claremont Tunnel Seismic Upgrade, EBMUD, Oakland, CA, USA ; West APM Tunnel, Dulles International Airport, Washington, DC, USA ; East APM Tunnels and Stations, Dulles International Airport, Washington, DC, USA ; Lime Creek Access Slopes, Martin Marietta Materials, Ames, IA, USA ; Port of Will County (POWC) Decline, Mining International, Joliet, IL, USA ; Balmat Mine, St Lawrence Zinc, Gouverneur, NY, USA ; Leeville Mine, Newmont Gold, Carlin, NV, USA
H Hazama Corporation 2-2-5 Toranomom Minato Ku Tokyo 105-8479 Japan Tel: +81 3 3588 5760 Fax: +81 3 3588 5755 Email: info@hazama.co.jp Web: www.hazama.co.jp	a) US\$2.04bn b) US\$335M	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)

TUNNELLING CONTRACTORS

Company information	(a) Turnover (b) Turnover in tunnelling	Areas of expertise	Tunnel contracts underway	Recent tunnel contracts
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	Hafencity 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
HW Dewatering Hoelscher Wasserbau Kallenberg Strasse 24 D-45141 Essen Germany Tel: +49 201 8311 6016 Fax: +49 201 314 367 Email: info@hw-dewatering.com Web: www.hw-dewatering.com	a) US\$46M b) US\$13.1M	Well drilling, groundwater lowering, dewatering, water treatment	Finnetunnel, High Speed Rail, Erfurt-Leipzig, Germany – Groundwater lowering, dewatering, water treatment; District Heating Tunnel, Copenhagen, Denmark – Groundwater lowering, dewatering, water treatment; Wehrhanlinie, Dusseldorf – Groundwater lowering, dewatering, water treatment	North-South Metro, Cologne, Germany – Groundwater lowering, dewatering, water treatment; Underground line 6, Munich, Germany – Groundwater lowering, dewatering, water treatment; City-Tunnel, Leipzig, Germany – Groundwater lowering, dewatering, water treatment
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; Oenzberg 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\$115.5M b) US\$60.4M	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; Parbati III, Lot 2, India – 9.9km of service & supply tunnels, powerhouse cavern & shafts; Katschberg Tunnel, 2nd Tube, Austria – 4.4km long road tunnel, drill & blast; Extension HEP Hieflau, Austria – 4.9km headrace tunnel in hard rock, DS-TBM Ø6.18m, 700m drill & blast; Tunnel Weising, Austria – 671 D&B tunnel; Eyholz Tunnel, Switzerland – 2 x road tunnels, each 3.5km long, drill & blast; Osterberg Tunnel, Germany – 2 x rail tunnels, each 2.08km long, drill & blast	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 ; Achrain Tunnel, Austria – 3.3km long road tunnel, drill & blast, 140m ² cross section; opswerk II HEP, Austria – Powerhouse cavern (120,000m ³) D&B with auxiliary structures and 1.4km of service and supply tunnels in D&B excavation
John Holland 70 Trenery Crescent Abbotsford Vic 3067 Australia Tel: +61 3 8413 6462 Fax: +61 3 9934 5269 Email: tunnellingho@jhg.com.au Web: www.johnholland.com.au	a) US\$2.23bn b) US\$263.4M	Slurry TBMs, EPBMs, hard rock TBMs, roadheaders, drill & blast, pipe jacking and ground freezing. In 2008, John Holland used 8 different TBM's (3 slurry, 2 EPB, 3 hard rock) and placed orders for a further four TBM's and eleven 300kW roadheaders	Airport Link & Northern Busway, Brisbane – D&C contract comprising 2 x 2.45km road tunnels by 2 x Ø12.5m EPBMs, 2 x 2.2km 3-lane road tunnels by 11 x 300kW roadheaders and a 470m long 2-lane bus tunnel by roadheader; Bluewater Desalination Project, Sydney – D&C contract includes twin Ø4.1m Inlet and Outlet tunnels, each 2.5km long, excavated by 2 x hard rock TBMs; Northern Sewerage Project, Melbourne – 4.7km of Ø4m EPBM tunnel, 4.5km of Ø3m EPBM tunnel, 3.2km of Ø3m. Hard rock TBM tunnel, 8 shafts; Melbourne Sewer Replacement – 2.2km of Ø3m EPBM tunnel and 6 shafts (depth 15m); Sugarloaf Pipeline, Victoria – Alliance contract for 70km pipeline, including 1km of Ø2.4m pipejack	Gold Coast Desalination Plant, South East Queensland – Alliance contract that included twin Ø3.4m Inlet and Outlet tunnels, each 2km, excavated by two slurry TBMs; Kwoolon Southern Link, Hong Kong – D&C contract that included twin 1.1km rail tunnels excavated by an Ø8m Slurry TBM; EastLink Project, Melbourne – D&C contract for the construction of 42km of motorway, which included twin 3-lane road tunnels excavated by 4 x 300kW roadheaders
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

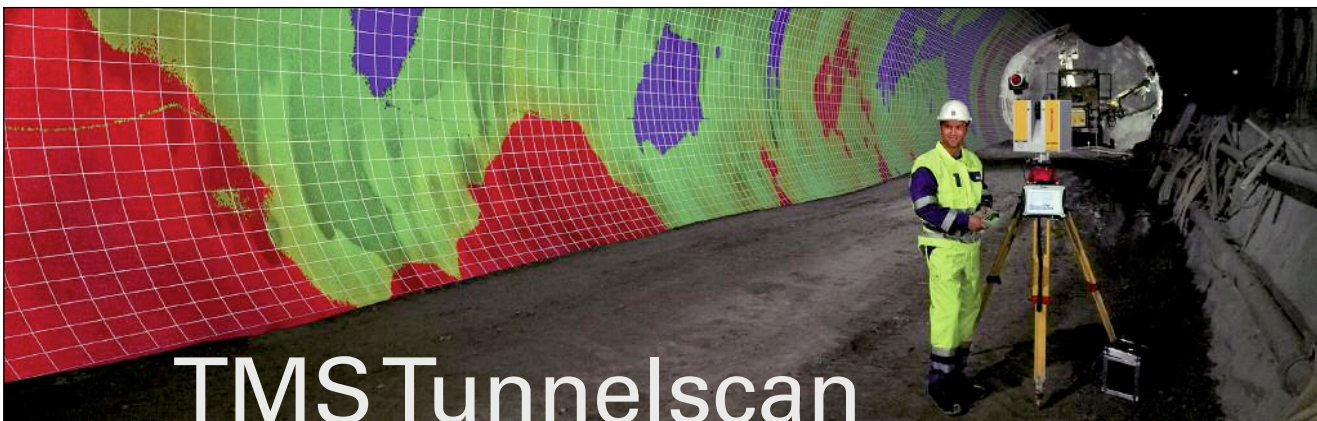
TUNNELLING CONTRACTORS

Company information	(a) Turnover (b) Turnover in tunnelling	Areas of expertise	Tunnel contracts underway	Recent tunnel contracts
K 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	Undisclosed	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\$128M	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, Oregon, US – 29,000ft long, 25ft-diameter slurry TBM tunnel, a precast single pass liner and 9 shafts along the alignment; Devil's Slide Tunnels, Pacifica, US – 4,100ft long, 10m-wide NATM twin-bore highway tunnels with cast-in-place concrete final liner, permanent electrical and mechanical system; Harlem River Tunnel, Bronx to Manhattan, New York, US – Two 165ft-deep shafts connected by a 675ft-long drill & blast horseshoe tunnel; Sandy River Conduit Relocation, Oregon – 30ft-diameter construction shaft to a depth of 85ft; two drilled 9ft-diameter shafts to a depth of 110ft; and a 13ft-diameter modified horseshoe tunnel	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; 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; Wheeler Gulch, Parachute, USA – Construction of 3,200ft long tunnel that is 24ft wide x 20ft tall, using a roadheader
L 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, Hämönsand, Sweden – Construction of a 4540m long railway tunnel; Bjäsöholmen, Hämönsand, 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
M Marti Contractors Civil Engineering & Managing Services Freiburgstrasse 133 CH-3000 Bern 5 Switzerland Tel: +41 31 388 7520 Fax: +41 31 388 7521 Email: contractors@martiag.ch Web: www.martiag.ch	Undisclosed	Underground construction including mechanised full face tunnelling, drill & blast tunnelling, production of segmental concrete linings	Bibra Tunnel, Germany – 6.5km twin rail tunnel excavated by drill & blast; Katzenberg Tunnel, Germany – 9km twin rail tunnel excavated by two Ø11.16m TBMs; Oshlid Tunnel, Iceland – 5.3km road tunnel by drill & blast; Tunnel Boric, Slovakia – 1000m twin road tunnel by drill & blast; Nant de Drance 600 MW Pump storage plant, Switzerland – Access tunnel by TBM, caverns, adits and bypass tunnels by drill & blast; Tunnel de Bure, Switzerland – 3.1km road tunnel excavated by TBM; Galleria Vedeggio-Cassarate, Switzerland – 2350m road tunnel with vent shaft, excavated by drill & blast; Tunnel Graiteri, Switzerland – 2462m road tunnel by roadheader and drill & blast	Isisberg Tunnel, Zurich, Switzerland – 4650m long twin tube highway tunnel, excavated by Ø11.86m TBM; Metro Lausanne, Lot 1700, Switzerland – 665m with roadheader and umbrella jet grouting; Tunnel Raimeux – 3220m by drill & blast, roadheader and jet grouting; Lötchberg Base Tunnel, Switzerland – Lot Steg, 9500m hard rock TBM drive, Ø9.4m. Lot Raron 10,000m with Ø9.4m TBM and 4600m long drill & blast section
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	Undisclosed	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; Weland 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 through mixed ground conditions; 16th Avenue Sanitary Trunk Sewers (Phase II), York Region, Ontario, Canada – Design-build trunk sanitary sewer 7km of Ø2.64m tunnel, including shafts; 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 tunnel
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; Héoinsfjaröargöng Tunnel, Ólafsvör, 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, Klnice, Czech Republic – 1.9km road tunnel, NATM; Libouhec 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

TUNNELLING CONTRACTORS

Company information	(a) Turnover (b) Turnover in tunnelling	Areas of expertise	Tunnel contracts underway	Recent tunnel contracts
Morgan Est Suite 6, Bloxham Court Corporation Street Rugby Warwickshire CV21 2DU United Kingdom Tel: +44 1788 517750 Fax: +44 1788 517762 Email: info@morganest.com Web: www.morganest.com	a) US\$809M b) US\$128M	Tunnels in soft ground & rock utilising EPB, slurry & traditional techniques. Wide experience of SCL & associated techniques, including patented lining & sealing methods. Shaft sinking, upgrading & facility management, precast linings	Belfast Sewerage Scheme, Northern Ireland – D&C project comprising 10km tunnels, Ø38m pumping station, 28 x shafts and marine outfall; Beddington-Rowdown, Croydon Cable Tunnel, UK – D&C of Ø3m Cable Tunnel, 10km. long, 3 Shafts, in water bearing chalk; London Water Ring Main Extensions, UK – D&C projects. Honor Oak to Brixton: 4.5km Ø3.05m tunnel in water-bearing chalk. Two pump shafts up to 50m deep. Stoke Newington and New River Head: 4km Ø2.85m tunnel, 2 Shafts up to 45m deep, in clay and sands; Coppermills Transfer Pumping Shaft – D&C of 15m i.d. 30m deep shaft, 25m tunnel, 280m of relining and major modifications to existing facilities	Kings Cross Station Redevelopment, UK – D&C of new Access Tunnels to Victoria Line, Piccadilly Line and Northern Line, including extensive SCL and cast iron linings; Hendon Cable Tunnel, UK – D&C of Ø2.5m tunnel, 2 shafts 20m deep, in clay; Ross on Wye Flood Alleviation Syphon, UK - Ø2.1m Tunnel, 389m long, in sandstone and mudstone; BT Tunnels Framework, UK – Uplift and maintenance of 25 existing facilities; DLR Extn to Woolwich, UK – Construction of new Station and twin Ø4.2m, 2.1km tunnels
Murphy & Sons, J Hiview House Highgate Road London NW5 1TN United Kingdom Tel: +44 20 7267 4366 Fax: +44 20 7482 3107 Email: tunnels@murphygroup.co.uk Web: www.murphygroup.co.uk	a) US\$674M b) US\$54M	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 Tunnel, East London, UK – Diversion of overhead power lines underground to clear the Olympic site. D&C project includes the driving of two parallel tunnels 6km long (NGC tunnel Ø4.15m & EDF tunnel Ø2.82m) plus 10 shafts. Tunnels driven using 4 Lovat TBM's from one central site; Lower Lea Valley Cable Tunnel, East London, UK – Installation and commissioning of 2 circuits of 132kv power cables, control systems and connections to existing EDF network; Harefield-Southall Gas Pipeline, West London, UK – National Grid Transco project involving tunnelling and shaft sinking works to enable construction of a Ø1220mm welded steel gas main. Three separate drives totalling 2.45km	Bankside To Farringdon Cable Tunnel, London, UK – Comprising of a total of 3km of machine driven tunnel plus 6 shafts carried out from restricted sites in a heavily urbanised area. Cable installation and mechanical and electrical services also included in the scope
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

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 Phone +41 44 870 92 22 www.amberg.ch/at



TUNNELLING CONTRACTORS

Company information	(a) Turnover (b) Turnover in tunnelling	Areas of expertise	Tunnel contracts underway	Recent tunnel contracts
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
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) -	Caverns/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
Obrass Subterranas C/Lopez de Hoyos 135 28002 Madrid Spain Tel: +34 9 1782 3400 Fax: +34 9 1562 4298 Email: central@obrassubterranas.es Web: www.obrassubterranas.es	a) US\$281.6M b) US\$281.6M	All types of tunnelling, including road, rail, metro, hydro, utility and mine access tunnels. Drill & blast, NATM, TBM, EPBM tunnelling, shaft sinking, raise boring	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; Agablanca, Badajoz, Spain – Construction of a 2.8km long mine access tunnel; Soller Tunnel, Madrid, Spain – Construction of a 900m road tunnel
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

TUNNELLING CONTRACTORS

Company information	(a) Turnover (b) Turnover in tunnelling	Areas of expertise	Tunnel contracts underway	Recent tunnel contracts
Pihl & Son, E Nybrovej 116 DK-2800 Kgs Kgs. Lyngby Denmark Tel: +45 4527 7200 Fax: +45 4527 7100 Email: pihl@pihl-as.dk Web: www.pihl-as.com	a) US\$1.19bn b) US\$80M	All underground tunnels and caverns in hard rock with or without groundwater. Drill & blast, slurry and EPB shield and hard rock TBM tunnelling	Changuinola I HPP, Panama – EPC contract for a 103MW hydro project comprising 90m dam with spillway, 4.5km headrace tunnel, powerhouse, switchyard and substations; Malmö City Tunnel (E-201), Malmö, Sweden – Construction of a 4,650m TBM bored twin-tube rail tunnel, Ø8.95m 700m long cut & cover section, excavation for new Triangelen station; E-18 Grimsby-Kristianssand Road, Norway – Construction of a 38km road, including 8 drill & blast tunnels with a total length of 11km; Söderströms tunnelen, Stockholm, Sweden – Construction of a 350m submerged railway tunnel; Tunnel NL-31, Stockholm, Sweden – Construction of a 100m motorway tunnel for the “Norra Länken” road system	KKárahjúkar Hydroelectric Power Station, KAR-15, Iceland – Excavation/Blasting of underground power station, transformer room, 11km access tunnel to power station, control centre, staff facilities, 4x4m cable tunnel, 2 penstocks, tailrace tunnel; Hovstunnelin Road Tunnel, Faroe Islands – Construction (drill & blast) of a 2.5km long road tunnel between Øravík and Hov, in Suðuroy
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 Kunratice, 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; Pízen 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 LT 33, Vienna, Austria – Double-track railway tunnel, length 3.60km; S35 Tunnel Kirchdorf, Kaltenbach, Styria, Austria – Twin tube road tunnel, 7.50km long; Limberg II Powerstation, Salzburg, Austria; Tauern Tunnel 2nd Tube, Austria – 6.5km NATM tunnel in squeezing ground; H3/4 Münster-Wiesing, Tyrol, Austria – Double track rail tunnel, 5.6km long; Waidhofen/Ybbs, Lower Austria – Single tube road tunnel, 1.1km long; Finnertunnel, Germany – Open mode hydrosshield, 2 x 7.7km long railway tunnel; Schaala Local Bypass, Germany – 1.20km long; Osterberg, Germany – NATM twin-tube rail tunnel, 2.2km long; Biel Bypass, Switzerland – EPB Ø12.60m, 6km long	Ganzstein Tunnel 2nd Tube, Styria, Austria – NATM road tunnel, length 2km; Tunnel Brixlegg, Lot H2/1, Tyrol, Austria – 3.47km twin-track rail tunnel + rescue tunnel, NATM; U2/1 Metroline Vienna, Austria – Ground freezing with brine + liquid nitrogen, diaphragm walls, bored piles, groundwater lowering; U2/5 Metroline Vienna, Austria – 1.7km long, Ø6.5m slurry TBM; Wientalsammekanal, Vienna, Austria – 2x30m deep shafts, sewer 2.6km, EPB Ø8,6m; LF Moos, Switzerland – Water storage
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 Incononata 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: pramond@razel.fr Web: www.razel.fr	a) US\$583M b) US\$52.5M	All types of contract management (partnering, BoQ, design & construct), all types of tunnels (rail, road, metro, utility) using all excavation methods (D&B, NATM, soft ground & hard rock TBMs, compressed air, highly squeezing rock)	Gallery of Rizzanese, Corse, France; Line 4 Extension, Paris Metro, France; Lyon/Turin HSR, Saint Martin la Porte, Savoy, France – 2.3km long exploratory gallery, drill & blast; Salazie Upstream Gallery, La Réunion 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	Cap La Houssaye, La Réunion Island, France – Road tunnel; Lyon/Turin HSR, Modane, Savoy, France – 4km long exploratory gallery, drill & blast; Tunnel Ivry Massena, Paris, France – 2km EPBM sewer; Salazie Downstream Gallery, Reunion Island – 10km water transfer tunnel, TBM and drill & blast; 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
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

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TUNNELLING CONTRACTORS

Company information	(a) Turnover (b) Turnover in tunnelling	Areas of expertise	Tunnel contracts underway	Recent tunnel contracts
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\$244M b) US\$225M	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 (DS TBM Ø6.12m); Gigel Gibe II Hydroelectric Project, Ethiopia – 25.8km (2 x DS TBM, Ø6.3m); Beles Multipurpose Project, Ethiopia – 12km headrace and 7.2km tailrace (1 x EPBM Ø8.1m, 1 x DS TBM Ø8.07m); São Paulo Metro, Brazil – 6.4km (EPBM + backup, Ø9.5m); Thessaloniki Metro, Greece – 7.7km (EPBM Ø6.12m); Rome Metro, B1 Line, Italy – 6.6km (2 x EPBM Ø6.8km); Crevola Toce III Hydroelectric Project, Italy – 8.58km headrace (DS Compact Ø4.20m) NATM; Tsuen Wan Tunnel, Hong Kong – 5.1km (DSU Ø7.27m); Sant Just Tunnel, Spain – (DSU TBM Ø5.98m); East Side Access, New York, US – 3.7km tunnel (DSU Ø6.71m) NATM	Settingiano Railway Tunnel, Italy – 2.5km tunnel (EPBM Ø8.73m); Perthus Tunnels, Spain – 2 x 8.3km long (EPBM, Ø10.5m); Vancouver Metro, BC, Canada – 2.5km double-track rail tunnel (EPBM Ø6.1m) segmental lining; Athens Metro, Greece – 5.5km metro tunnel, (EPBM, Ø9.4m) segmental lining; Passirio Hydro Project, Italy – 5.88km headrace tunnel (DS TBM, Ø3.7m) segmental lining; Talave-Cenajo Water Tunnel, Spain – 7.5km tunnel (DS TBM, Ø4.04m) segmental lining
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 lvl 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 Khotsoeng 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
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 & Karmainen, Helsinki, Finland – 2 x highway tunnels: Orosnaki 2 x 653m, Karmainen 2 x 2.2km; 513 Highway Tunnel, Vestec-Lahovice, Prague, Czech Republic – Ring road tunnel for city	Trojna 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; Stierschweiffeldtunnel, 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
Taisei Corporation 1-25-1, Nishi-Shinjuku Shinjuku-ku Tokyo 163-0606 Japan Tel: +81 3 3348 1111 Fax: +81 3 3345 0481 Email: t-to@intl.taisei.co.jp Web: www.taisei.co.jp	a) US\$13.7bn b) US\$800M	All types of underground construction (NATM, cut & cover, immersed tube, pipe & box jacking, TBMs including open, EPB and slurry shields) transportation, hydro, irrigation, utilities, etc.	Algeria East-West Motorway – Four tunnels with a total length of 3.6km; Marmaray Railway Bosphorus Tunnel, Istanbul – Undersea immersed/TBM/NATM tunnel with a total length of 13.3km; Singapore Circle Line, Contract 854 MRT, Singapore – TBM tunnel 10.8km long; Brightwater Conveyance System, WA, USA – Conveyance tunnel for new sewer system, TBM tunnel; Kyogoku Hydroelectric Power Plant, Japan – Underground powerhouse and tunnels	Palm Jumeirah Vehicular Tunnel, Dubai, UAE – Undersea tunnel 1.4km long; D2 Motorway, Bratislava, Slovakia – NATM tunnel 2.4km long; Tokai-Hokuriku Highway Hida Tunnel Phase 4 – NATM and TBM tunnel 10.7km in length; Namikata LPG Storage, Japan – Underground tank and ventilation tunnel
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.	Belfast Sewers Project, Belfast, Northern Ireland – Multiple tunnels & shafts of mixed diameter. Consultancy and on site support services for compressed air, TBM intervention, shaft construction, work in contaminated ground, occupational Safety & Health, Rescue & Extrication and associated training; Los Teques Metro Line 2, Caracas, Venezuela – Twin Ø5.8m tunnels over 11km. Consultancy and on site support services for compressed air, TBM intervention, occupational Safety & Health, Rescue & Extrication and associated training; Project Hobson, Hobson's Bay, Auckland, New Zealand – Sewer replacement, single bore Ø4.3m tunnel. Consultancy and on site support services for compressed air, TBM intervention, occupational Safety & Health, Rescue & Extrication	Caracas Metro Line 4, Venezuela – Twin Ø5.8 tunnels. Consultancy and on site support for compressed air work, TBM intervention, occupational Safety & Health, Rescue & Extrication; Barcelona Metro Line 9, Spain – Twin Ø9.4 tunnels over 9km. Consultancy and on site support for compressed air work; Sao Paulo Metro, Brazil – Twin Ø9.4 tunnels over 12km. Consultancy and on site support for compressed air work; Dubai Metro Red Line, UAE – Twin Ø9.6 tunnels over 4.7km Consultancy and on site support for work in compressed air



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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) US\$233.7M	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)	Modified Detroit River Outfall No2, US – 1.9km tunnel under the Detroit River with a slurry TBM; Brightwater Conveyance Tunnel, BT2 & 3, Seattle, US – Two slurry TBMs drives, 9.7km; Hallandsås, Sweden – Twin 5.6km long rail tunnels; A86 West, East 1 & 2, France – D&B of 4.5km single tube road tunnel, EPB/slurry TBM Ø11.6m; Cairo Metro, Line 3, Phase 1, Egypt – Construction of 5km of tunnels (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 – D&B, including TBM excavation of twin 7.3km 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: postit@yit.fi Web: www.yitgroup.fi	a) US\$2.06bn b) US\$40M	Underground blasting and reinforcement works in hard rock, shaft development works (for existing hoisting shafts in underground mines), underground mine development and production works	Meilahti-Pasila energy tunnel, Helsinki, Finland – 1.5km of energy tunnel excavation and rock reinforcement works; Ring Road I tunnels, Espoo, Finland – Two 4-lane rock and concrete tunnels; Turku Water underground water storage, Turku, Finland – Excavation and rock reinforcement works of 200,000m ³ water storage; City Center shafts, Helsinki, Finland – Shaft excavations for underground parking facilities; Maunula sewage tunnel, Helsinki, Finland – Refurbishment of existing 1km rock tunnel	Kittilä Gold Mine, Finland – 4.5km decline and development tunnels; Tunnel renovation Jyväskylä-Jämsänkoski, Finland – Refurbishment of 2.5km rail tunnels; Extension of Terminal 2, Helsinki-Vantaa Airport, Finland – Baggage tunnel and civil engineering works; Munkkisaari-Vanhankirkon puisto, Helsinki, Finland – 1.5km long tunnel for Helsinki Energy; VUOLI Project, Contracts 2 & 5, Helsinki, Finland – 5km of rail tunnels; Viikinkaari cable tunnel, Helsinki, Finland – 1.5km long tunnel
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	Isisbergertunnel, 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; Schotenberg Tunnel, Germany – 3-lane road tunnel and parallel rescue gallery; Hestenbergtunnel, 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

12-14 FEBRUARY

RGMA-09 Varanasi, India

This International Symposium on Rock Mechanics and Geoenvironment in Mining and Allied Industries is being convened to assess and understand the interface of different aspects of the theory, tools and practices. Contact: Sanjay Kumar Sharma; tel: +91 9450 787 274; email: sksharma.min@itbhu.ac.in; web: <http://www.itbhu.ac.in/min/conferences/>

02-03 MARCH

Shotcrete for South Africa Johannesburg, South Africa

Sponsored by the ITA, one of the themes of this conference is to the merits of introducing a nozzleman certification scheme in South Africa. Presentations will include a review of at least six different nozzleman accreditation schemes being used in other parts of the world. Contact: SAIMM; tel: +27 11 834 1273; email: raymond@saimm.co.za; web: <http://www.saimm.co.za/events>

11-12 MARCH

Multi-System Utility Tunnels (MUT) Haifa, Israel

The first international conference in the developing field of design and construction of underground multi-system utility tunnels (MUTs) will present existing experience regarding planning and construction in Haifa and other towns worldwide. Contact: Diesenhaus Unitours; tel: +972 3 5651324; email: conven4@dienshaus.com; web: <http://www.multilitytunnels.com/>

26-27 MARCH

China Tunnel Summit 2009 Beijing, China

The China Tunnel Summit aims to provide a platform for discussion of new tunneling technologies and challenges in a warm and professional atmosphere. This year's Summit will focus on Safety in Construction and Sustainable Development. Contact: Merisis; tel: +86 21 6247 8608; email: marketing@merisis-asia.com; web: <http://www.merisis-asia.com/tunnel/>

18-20 MAY

8th Iranian Conference on Tunneling and Underground Spaces Tehran, Iran

"Underground Spaces for Safety, Better Environment and Energy" is the theme for this year's conference, which aims to offer a platform for exchange of knowledge and information on state of the art tunnelling development and practices. Contact: IRTA; tel: +98 21 886 304 95; email: info@irta.ir; web: <http://www.irta.ir/conference2009/>

23-28 MAY

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: <http://www.wtc2009.org>

07-10 JUNE

Shotcrete for underground support XI Davos, Switzerland

Engineering Conferences International, in conjunction with the ITA, the Swiss Tunnelling Society and several other European Associations is sponsoring the Shotcrete for Underground Support XI. Bringing together specialists from around the world, state-of-the-art of shotcrete methods will be discussed. Contact: ECI; email: info@engconfintl.org; web: <http://www.engconfintl.org/9as.html>

14-17 JUNE

RETc 2009 Las Vegas, Nevada, USA

RETc is recognised as a leading international tunnelling event for contractors and engineers. Last year, conference attendance exceeded 1500 professionals from more than 30 countries and the exhibition sold out in record time. With a venue of Las Vegas, 2009 is sure to be even more of a success. Contact: SME; web: <http://www.retc.org>

22-25 JUNE

5th Symposium of Strait Crossings Trondheim, Norway

Organised by SINTEF and the Norwegian University of Science and Technology, this major symposium aims to act as a forum for the exchange of information, research, new technology and recent experience. The event will also include an exhibition. Contact: NTNU; email: sc09@adm.ntnu.no; web: <http://www.straitcrossings.com>

09-11 SEPTEMBER

IBTTA 77th Annual Meeting Chicago, USA

The International Bridge, Tunnel and Turnpike Association's (IBTTA) 77th Annual Meeting and Exhibition will bring together more than 1000 toll agency professionals for 3 days of networking and innovations in toll industry. Contact: IBTTA; Tel: +1 202 659 4620; web: <http://www.ibtta.org>

13-16 SEPTEMBER

EURO:TUN 2009 Bochum, Germany

The 2nd International Conference on Computational Methods in Tunnelling is organised by the Institute for Structural Mechanics. Contact: Conference Secretariat; Tel: +49 234 32 29051; web: <http://www.eurotun.rub.de>

16-18 SEPTEMBER

Tunnel Construction and Underground Structures, Ljubljana, Slovenia

Slovenia's 9th International Conference on Tunnel Construction and Underground Structures is sponsored by the Slovenian Society for Underground Structures. Contact: SSUS; tel: +386 1470 4617; email: jakob.likar@ntf.uni-lj.si; web: www.drustvo-dpgk.si

01-03 DECEMBER

STUVA TAGUNG'09 Hamburg, Germany

Every two years the STUVA conference takes place with various topics from the fields of tunnelling and underground construction. The conferences are attended by approximately 1,500 tunnelling experts from more than 30 different countries. An exhibition accompanies the event. Contact: STUVA; email: info@stuva.de web: <http://www.stuva.de/>

BRITISH TUNNELLING SOCIETY

19 FEBRUARY: **Briars Lane Mine Stabilisation**

Members of the team discuss the specification, implementation and validation of chalk mine treatment methodologies. Presented by Chris Milne, Andrew O'Donovan and John Rigby-Jones.

19 MARCH: **Disputes in Tunnelling Contracts**

Speakers will consider the common causes of contractual disagreements on tunnelling schemes. Presented by Nigel Legge, Garry Crossley and Caroline Pope.

17-19 MARCH 2010

ISTSS 2010 Frankfurt, Germany

The 4th International Symposium on Tunnel Safety and Security. Manuscript abstracts should be submitted to the Secretariat by 01 June 2009, poster abstracts by the 01 October 2009. Contact: Anders Lönnermark, SP Technical Research Institute of Sweden; tel: +46 10 516 56 91; email: anders.lonnermark@sp.se; web: <http://www.sp.se/en/units/fire/news/ISTSS2010/>

14-20 MAY

2010 ITA World Tunnel Congress, Vancouver, Canada

Prior to the 2010 Winter Olympics, the International Tunnelling Association (ITA) visits the spectacular city of Vancouver, British Columbia, for its yearly conference and exhibition. Contact: web: <http://www.wtc2010.org>

18-20 MAY

InterTunnel 2010 Turin, Italy

Tunnelling exhibition aimed at companies and suppliers involved in building and equipping tunnels and firms providing the systems and expertise for their safe and efficient operation. Contact: Mack Brooks Exhibitions; web: <http://www.intertunnel.com>

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', Progressive House, 2 Maidstone Road, Sidcup, Kent DA14 5HZ, United Kingdom.**

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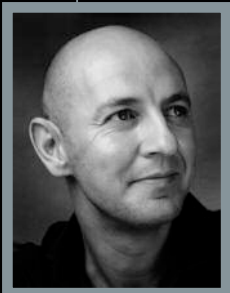
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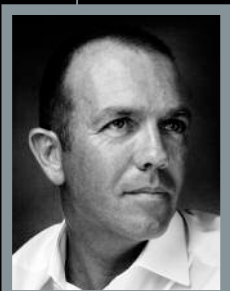
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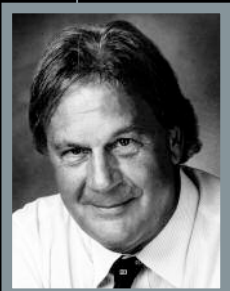
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