ROCK TESTS REQUIRED FOR PREDICTION OF EXCAVATABILITY & MACHINE PERFORMANCE, 
UTILIZING THE BEST AVAILABLE PREDICTOR MODELS.

**DIAMOND DRILLING**
CERCHAR Abrasivity Index
Sklerograft Hardness

**ROTARY DRILLING**
Sievers J-number Drillability test
Specific Energy (in Uniaxial Compression test)
Swedish Brittleness Number
Uniaxial Compressive Strength

**PERCUSSIVE DRILLING (DTH)**
CERCHAR Abrasivity Index
Sievers J-number Drillability test
Norwegian Abrasion Value (with Tungsten Carbide work-piece)
Rock Impact Hardness Number (RIHN)
Sklerograft Hardness
Swedish Brittleness Number

**PERCUSSIVE DRILLING (TOP HAMMER)**
CERCHAR Abrasivity Index
Coefficient of Rock Strength (CRS)
Sievers J-number Drillability test
Norwegian Abrasion Value (with Tungsten Carbide work-piece)
Specific Energy (in Uniaxial Compression test)
Stamp Test
Swedish Brittleness Number

**BLASTABILITY**
Rock Density
Ultrasonic P-wave and S-wave Pulse Velocities
Tensile Strength
Point-Load Strength Index
Uniaxial Compressive Strength
Elastic Modulus & Poisson’s Ratio
Discontinuities Spacings & Orientations
Rock Mass Description: Block Size
**TRENCHING**
Sklerograf Hardness
Schmidt Hammer Hardness
Point Load Strength Index
Tensile Strength
Ultrasonic Wave Velocities
Uniaxial Compressive Strength.
Specific Energy (in Uniaxial Compression test)
Goodrich Drillability
N.C.B. Cone Indenter Index
Plasticity Index
CERCHAR Abrasivity Index

Plus Geological Factors :
Defect Spacing
Fracture Index
Petrographic Description - Quartz content
Field Seismic Velocities

**ROADHEADERS**
CERCHAR Abrasivity Index
N.C.B. Cone Indenter Index
Goodrich Drillability
Plasticity Index
Specific Energy (in Uniaxial Compression test)
Tensile Strength
Uniaxial Compressive Strength

Plus Geological Factors :
Cutterhead Power
Machine Weight
Average Joint Spacing
Petrographic Description - Quartz content
RQD

**RAISE & SHAFT BORERS**
CERCHAR Abrasivity Index
Morris / Dresser Drillability / RBi
Uniaxial Compressive Strength
Specific Energy (in Uniaxial Compression test)
Tensile Strength
Sievers J-number Drillability test
Swedish Brittleness Number
Norwegian Abrasion Value (with Disc Cutter steel work-piece)
**TUNNEL BORING MACHINES**
Sklerograf Hardness
Tensile Strength
Punch Shear Test
Fracture Toughness
CERCHAR Abrasivity Index
Uniaxial Compressive Strength.
Specific Energy (in Uniaxial Compression test).
Sievers J-number Drillability test
Swedish Brittleness Number
Norwegian Abrasion Value (with Disc Cutter steel work-piece)
Morris Test
Stamp Test
Porosity

**Plus Machine Factors**
TBM Diameter
Cutterhead Power
Cutterhead Speed (r.p.m.)
Cutterhead Thrust (kN)
Cutterhead Torque (kNm)
Number of Disc Cutters
Disc Cutter Diameter
Face Cutter Spacing
Propel Ram Stroke Length
Time per Regrip
Time per Cutter Changed

**Plus Geological Factors:**
Amphibole content. Mica content. Quartz content.
Average grain size.
Average Spacing of the 3 most significant joint sets.
Strikes and dips of the 3 most significant joint sets.
Direction of tunnel axis.
Rock Type.
Q-system rock mass classification.
Expected in-situ stress field magnitude and orientation of principal stress axes, relative to tunnel axis.

**STRAIN BURST INDEX**
Tensile Strength
Fracture Toughness
Ultrasonic Wave Velocities
Uniaxial Compressive Strength.
Specific Energy (in Uniaxial Compression test).