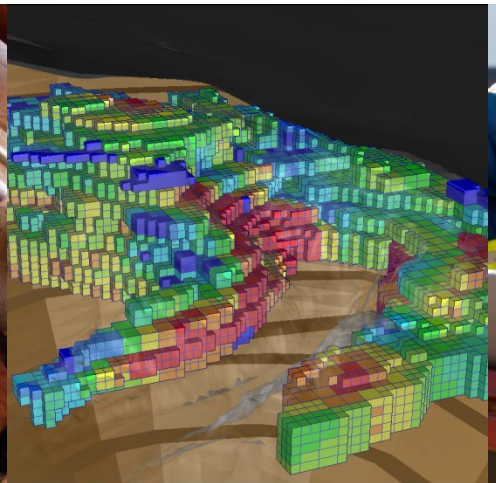
CUBE CONSULTING

GCX 5 Grade Control System

Open Pit





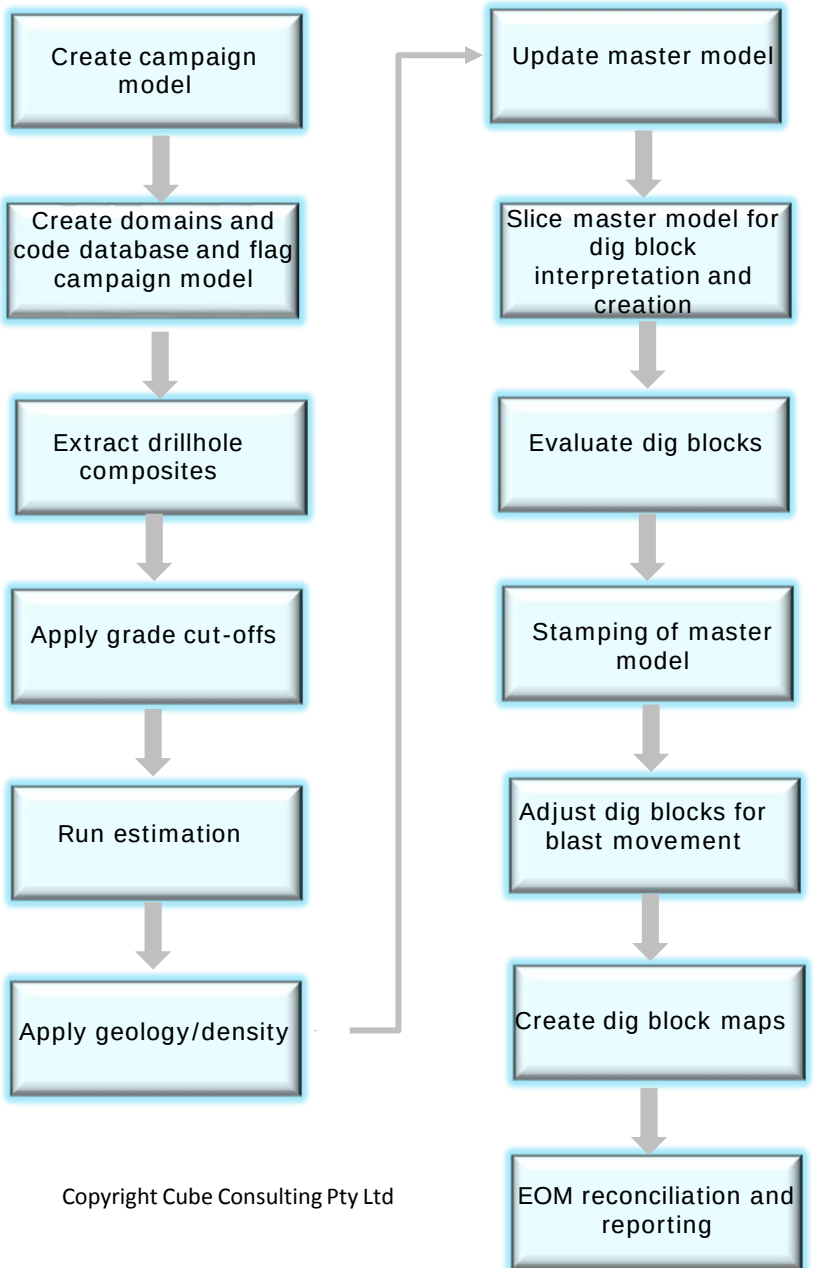

Overview

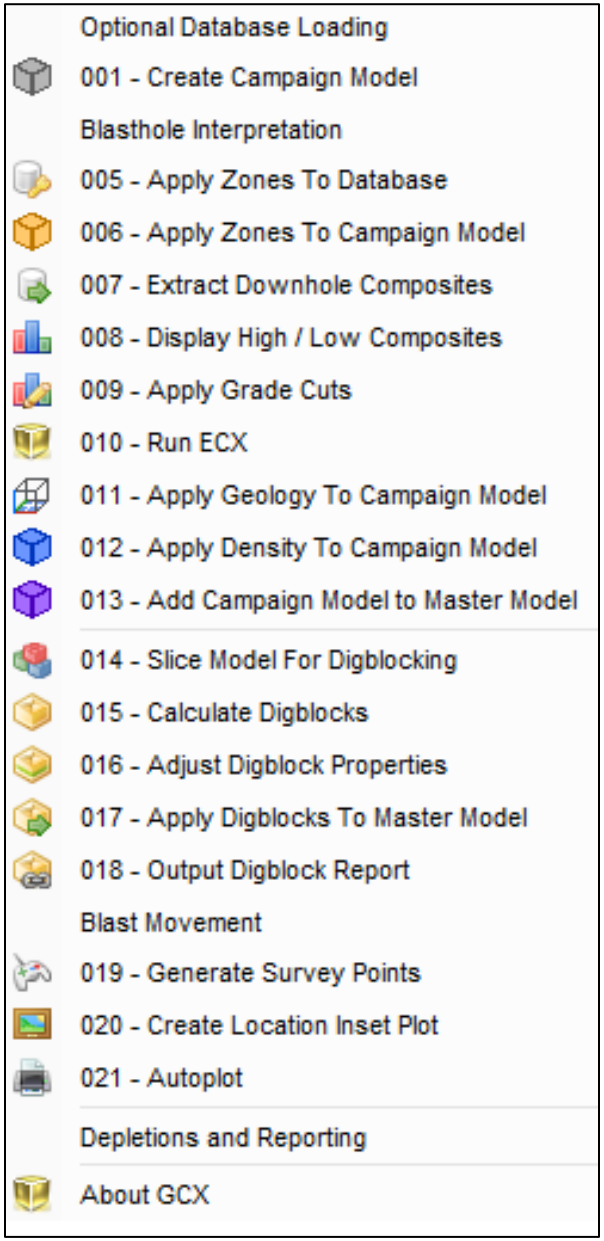
GCX 5 is an auditable grade control system designed for Surpac geological software. GCX 5 provides a logical workflow for grade control geologists to perform their daily tasks ranging from data integration, drill hole and model flagging, estimation and dig-block designing; it is:

- Easy to use
- Decreases work time from assay return to dig block markout
- Based on Surpac functions and is not a 'black-box' system
- Has a logical step-by step process flow
- External controls for self-customisation
- Manages file naming and storage
- Contains various estimation methods
- Produces and stores audit files throughout the process
- Statistical and visualisation tools
- Affordable and short installation times
- High-quality and timely support

GCX is used in nearly 30 operations – open pit and underground - across various commodities in Australia, Africa and Asia.

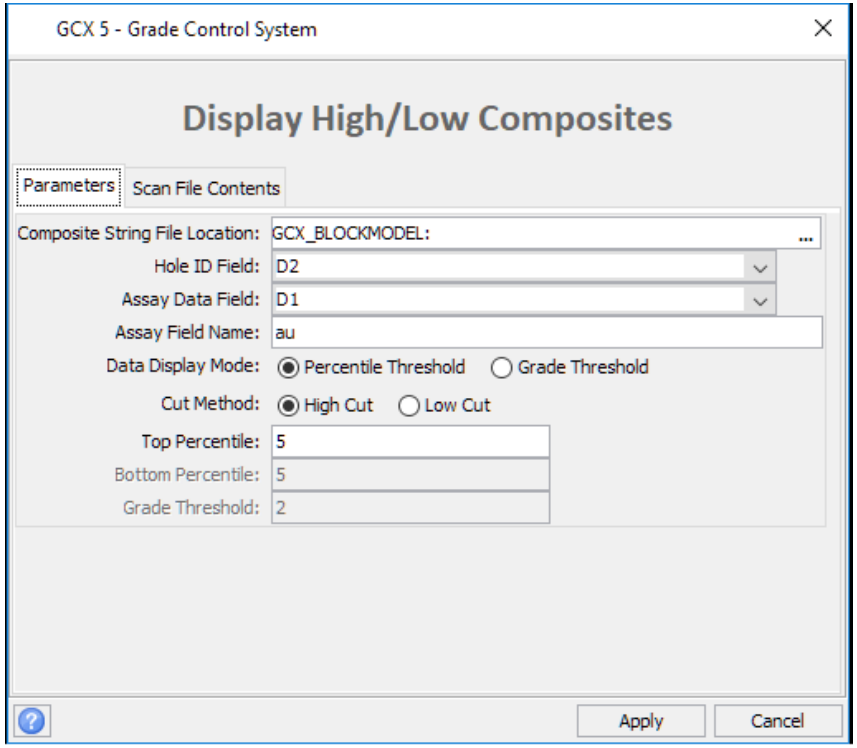
GCX 5 Process Flow





Easy to Use

- Menu system within familiar Surpac environment
- Logical step-by-step process flow with easy to use forms
- Local site terminology incorporated as appropriate



External Controls

- Attributes associated with material types, grade cut-offs, density, weathering and geological domaining are controlled by a series of editable Excel workbooks.

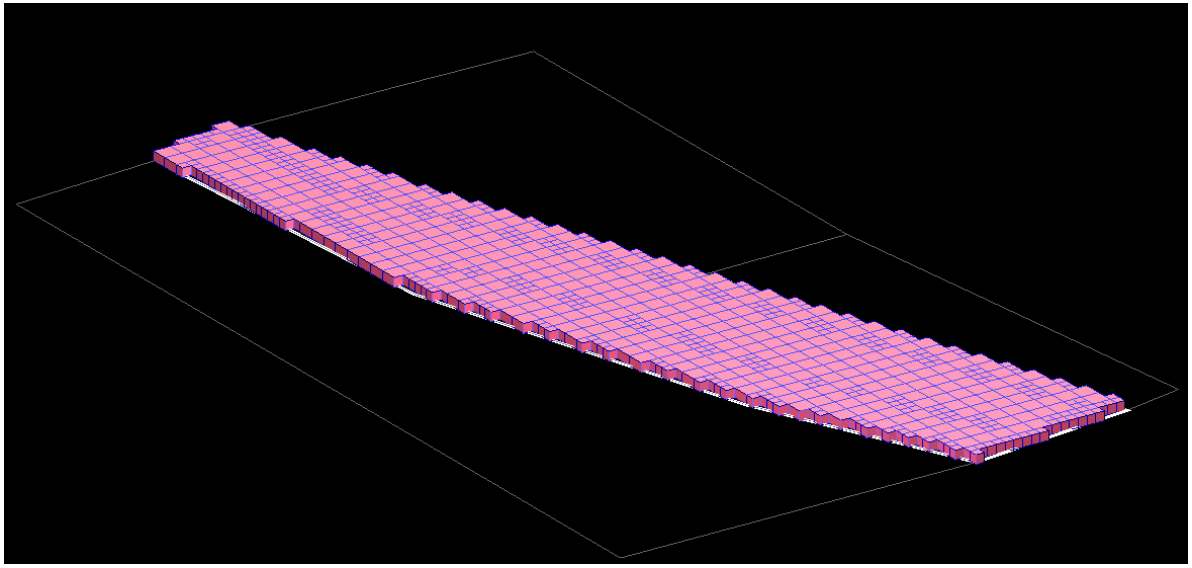
- Multi-element compatible – up to 20 elements

	Table	Element1_Field	Element2_Field	Element3_Field	Element4_Field	Element5_Field	Element6_Field	Element7_Field
							Elevation Composites	
Primary Database	Assay	Cu	Ag	Au	As	Pb	Zn	S
Secondary Database								
String File Field		d1	d2	d3	d4	d5	d6	d7
							Blockmodel Slice	
Blockmodel Attribute		cu_ok	ag_ok	au_ok	as_ok	pb_ok	zn_ok	s_ok
String File Field		d1	d2	d3	d4	d5	d6	d7
							Digblocks	
Blockmodel Attribute		cu_ok	ag_ok	au_ok	as_ok	pb_ok	zn_ok	s_ok
String File Field		d1	d2	d3	d4	d5	d6	d7

	Cu Low Cut	Cu High Cut	Ag Low Cut	Ag High Cut	Au Low Cut	Au High Cut	As Low Cut	As High Cut
Zonecode	%	%	ppm	ppm	ppm	ppm	ppm	ppm
1001	0	100	0	600	0	100	0	999999
1002	0	100	0	600	0	100	0	999999
1003	0	100	0	600	0	100	0	999999
1004	0	100	0	600	0	100	0	999999
1006	0	100	0	600	0	100	0	999999
1007	0	100	0	600	0	100	0	999999
2011	0	100	0	200	0	100	0	999999
2012	0	100	0	200	0	100	0	999999
2013	0	100	0	200	0	100	0	999999
2041	0	100	0	200	0	100	0	999999
2042	0	100	0	200	0	100	0	999999
2043	0	100	0	200	0	100	0	999999

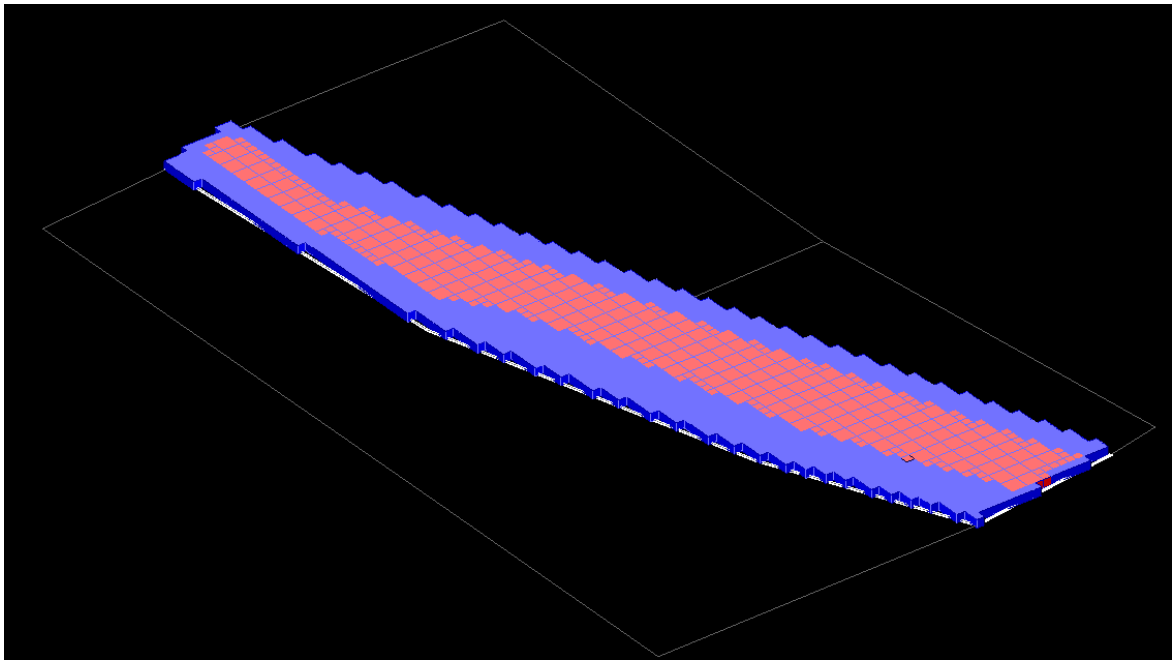
Campaign model area

- Defined using a polygon – suitable for both blast hole and RC grade control environments
- Use of smaller master model sub-set speeds up processing



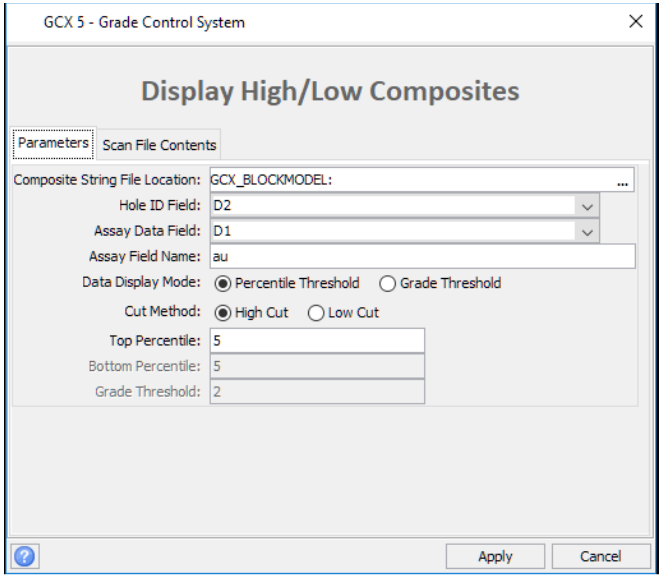
Domain wireframing and model flagging

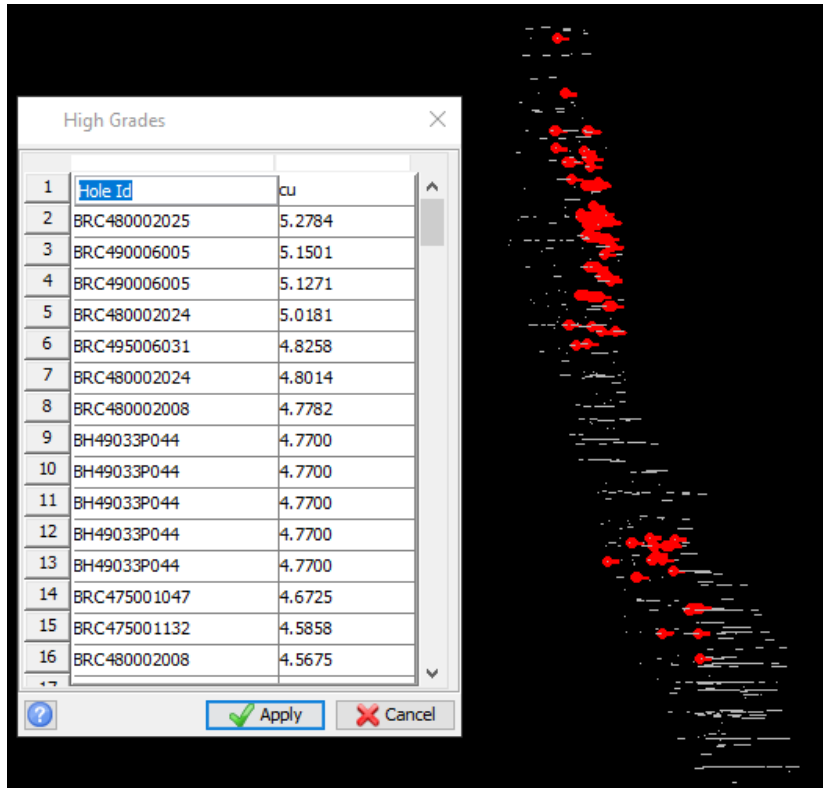
- Visualisation of drilling data can customised to suite e.g. assays, rock types, material types etc. or a combination
- Wireframe generated within process using digitised toe or crest strings
- Campaign model and database flagged according to user generated/adjusted domains



Composite validation, generation and grade cuts

- Extreme grades at either end of the sample population can be displayed and outputted according to user generated inputs





- Drill hole composite intervals and top-cuts can be altered\adjusted by the user

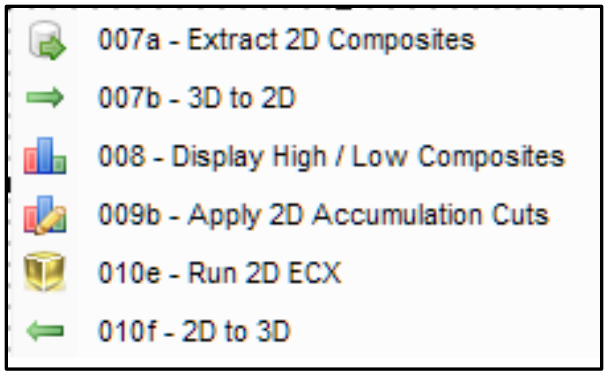
Estimation

- Based on Cube's Estimation Management System – ECX.
- ECX used successfully in numerous code-compliant resource estimations for many commodities around the globe.
- Easy to use, repeatable and auditable.
- Estimation parameter inputs are managed and adjusted using Excel.
- Different estimation scenarios can be run and inputs recorded for later use
- Available estimation methodologies including; OK, IDW, and dynamic search neighbourhoods.

Estimation

- 3D and 2D estimations are available and can be conducted within the same block model.

- 2D estimation allows more accurate, reliable and useable data for narrow lode deposits.

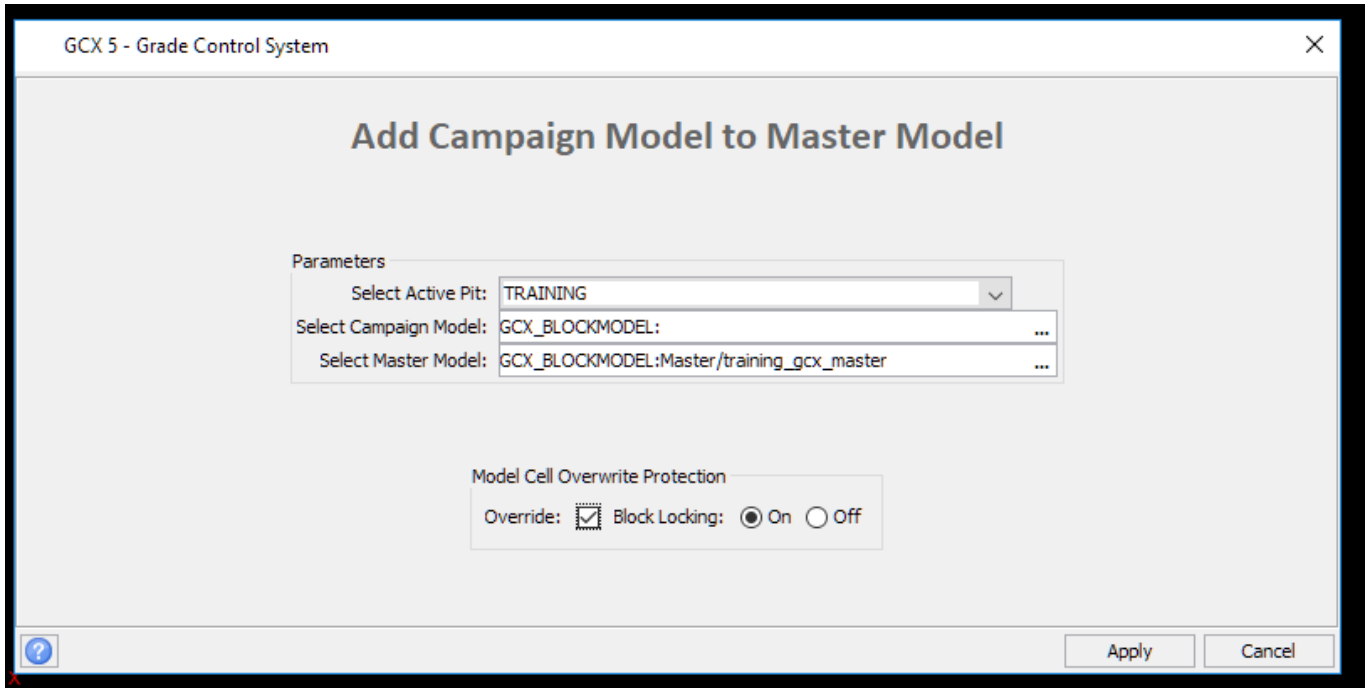


- Outputs a range of useful geostatistical metadata e.g. Slope of Regression, Kriging Efficiency, Kriging Variance, Number of informing samples, etc.

Update master model

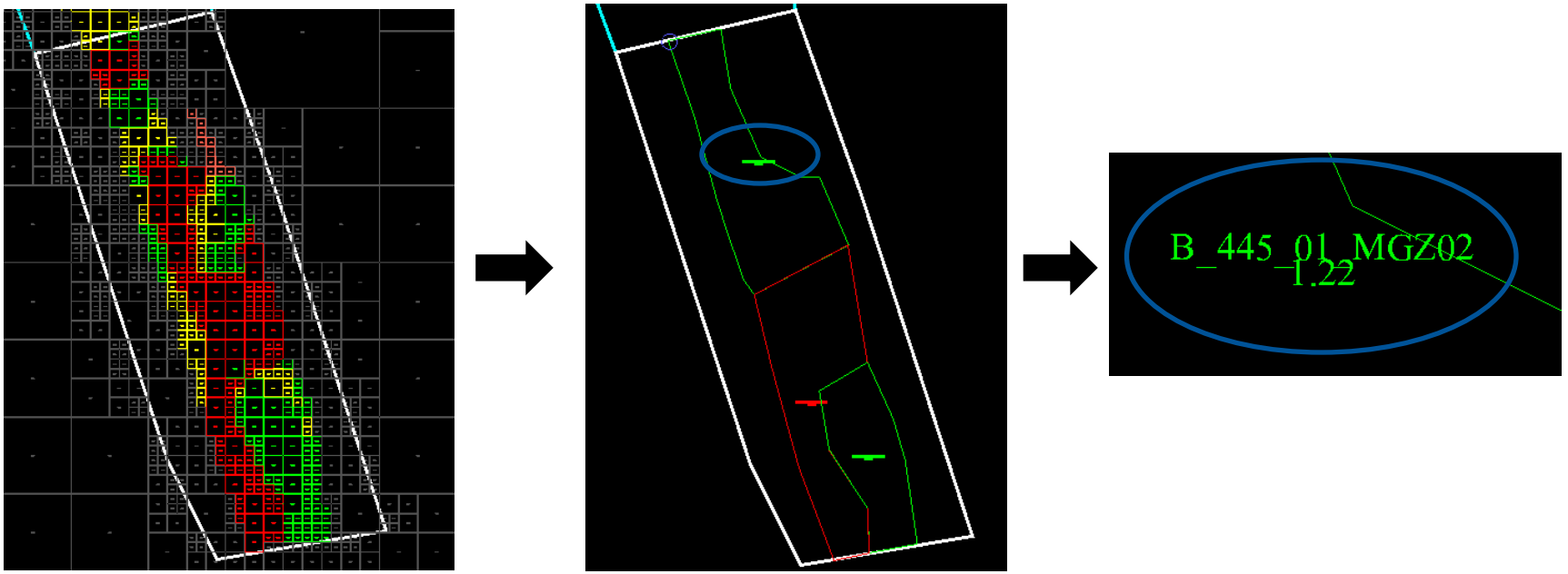
- Master model acts as a repository for all applicable grade control information

- Master model updated from campaign model in one step – with overwrite checks to maintains integrity of model



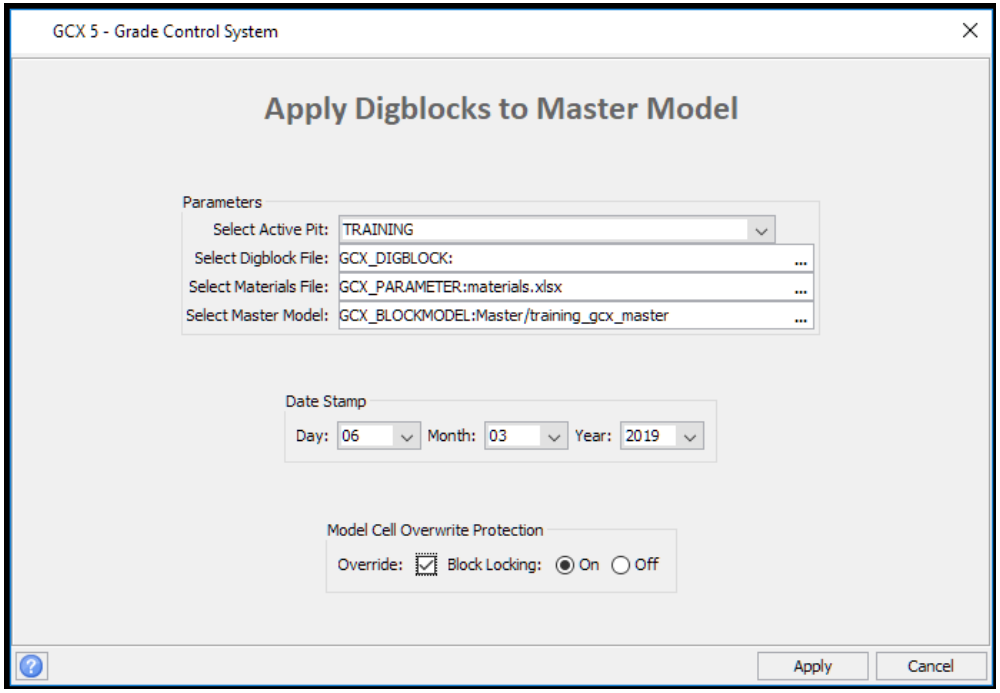
Dig block creation and calculation

- Master model sliced at appropriate RL's with the relevant data displayed
- Dig block file naming and dig block ID's created automatically and assigned to digitised strings
- .xls file created with relevant dig block properties e.g. material type, volume, tonnes, grade etc.



Apply dig blocks to master model

- Stamping of dig block properties, including dates, to the master model.
- Overwriting checkbox ensures integrity of master model
- All estimation and dig block variables stored in one model – ideal for periodic reporting and investigation of reconciliation issues



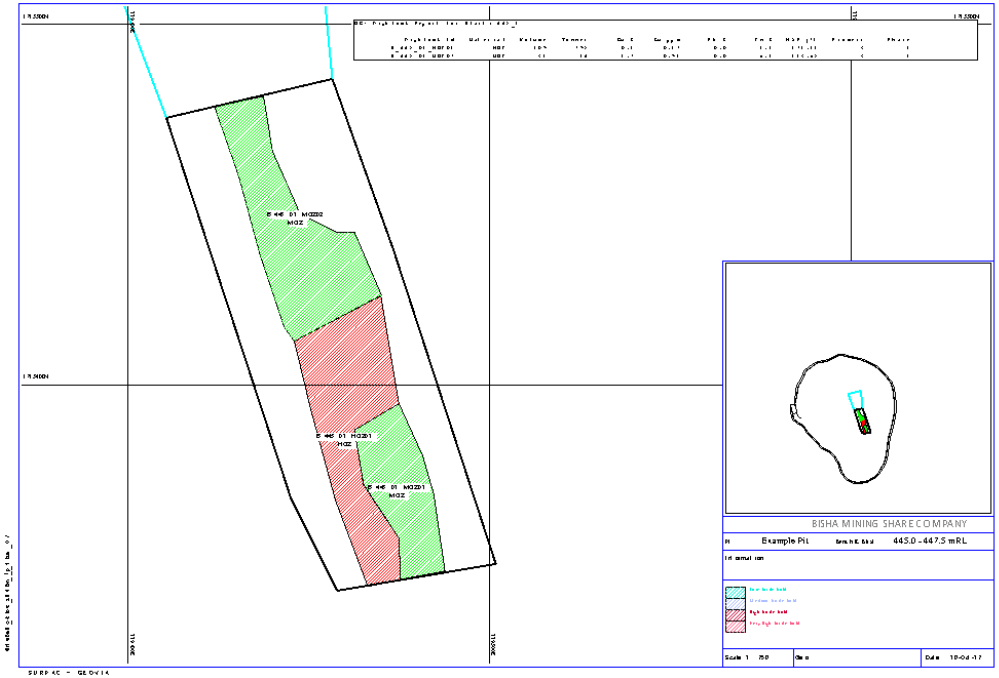
Blast movement and generating survey points

- Uses BVI survey pickup data to adjust dig block spatial locations
- Output of dig block points in various formats, so can be directly imported for use by; survey, CAD software, mine production reporting and mine control systems

ore44501.dxf
ore44501.str
survey_points_445_1.csv
svy_digblocks_445_1.str
digblocks_445_1.str

Dig plan plotting

- Autoplot used as the primary tool
- Macro will compile required string files, location plans, styles files, .not files and entities
- User can adjust as required



Depletions and reporting

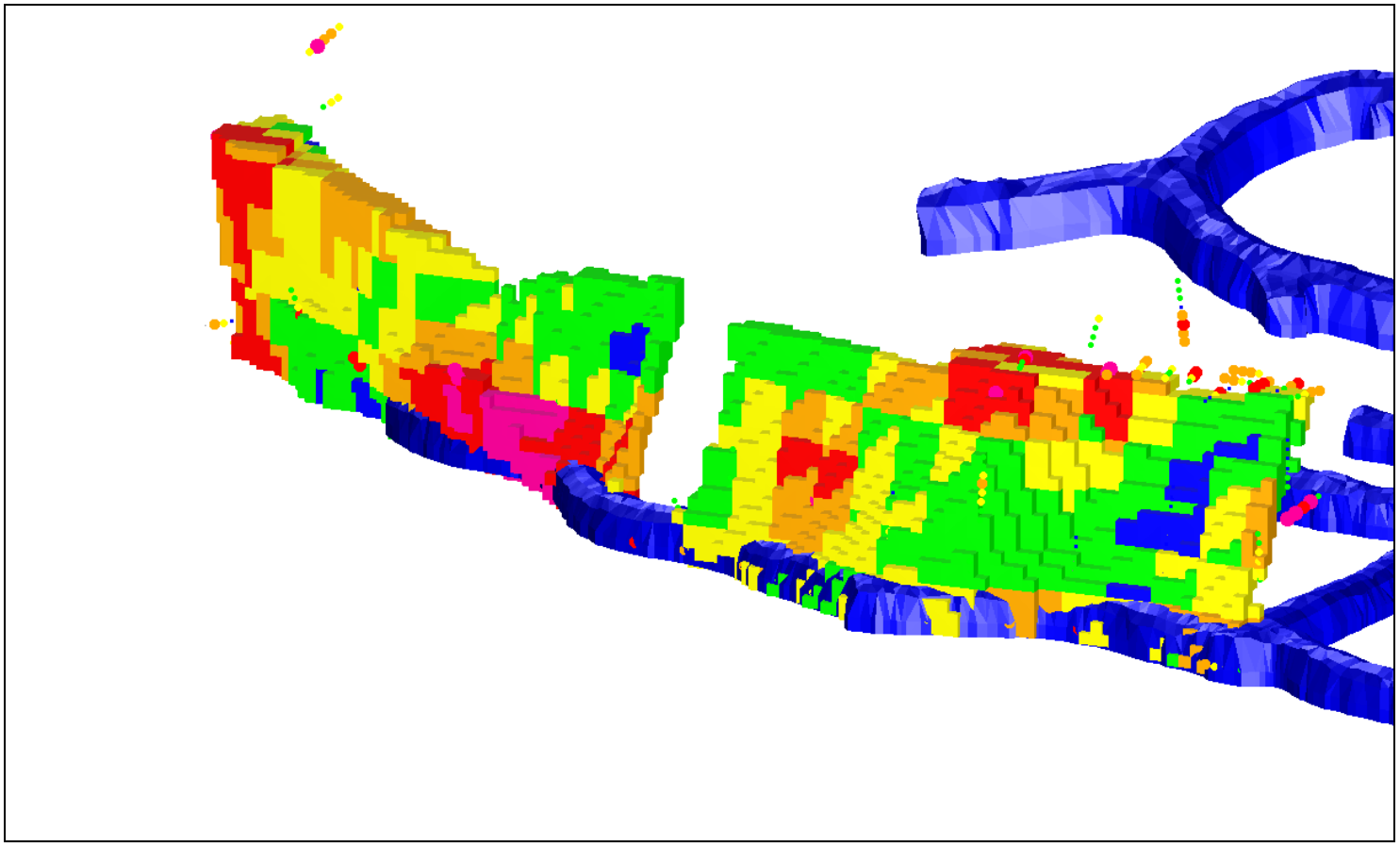
- EOM/periodic reporting
- Can report in finer detail e.g. by bench, by blast
- Can be customised to suite and adjusted by user at any time
- Can compare performance of grade control master model against various other models
- Master model stamping with reporting periods – with option of reporting but not stamping
- Combined models for planning purposes can be generated

Included Options

- Grade distribution graphics display
- Grade tonnage curves
- Block model validation
- DTM creation tools
- Plus others…

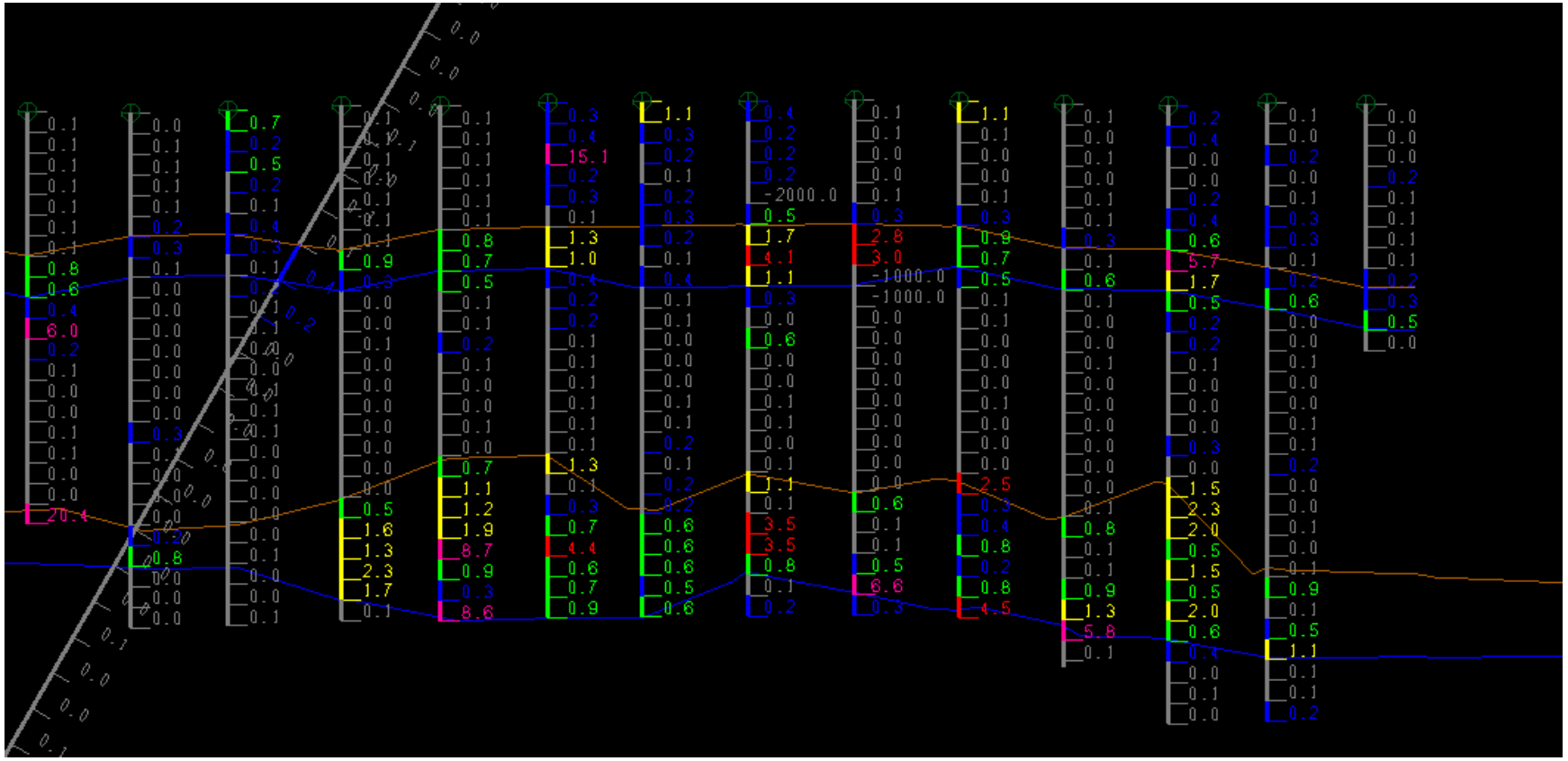
GCX for Underground

GCX 5 is also available for Underground mines



GCX for Paleochannel deposits

GCX 5 is also available for paleochannel deposits – allows for variable digging depths i.e. contour mining



About Cube

Cube Consulting provides specialist consulting services and software systems to the global mining industry. We are a quality team of geologists and mining engineers with a wide range of skills and experience, applicable from advanced exploration projects through to operational mines across multiple commodities.

Established in 2000 in Perth, Western Australia, Cube Consulting has grown to become a world class mining services company, working with our customers to add value to their projects through considered and practical advice.

We provide:

- Geological Services based on extensive operational and field based experience
- Mine Engineering Consulting Services supporting sound commercial decisions
- Technology solutions focused on Mine Grade Control and Reconciliation

Our goal is to ensure our customers succeed through practical and professional advice.

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