Appendix B

Summary of Hydrogeologic Predictive Analysis for Dendrobium Area 3A

- APPENDIX B -

Summary of Hydrogeologic Predictive Analysis for Dendrobium Area 3

B1 Introduction

An evaluation of the interaction between stored water in Cordeaux Reservoir and the mining of Longwall 5 in Dendrobium Area 2 and Longwall 6 in Area 3 has been undertaken. For this assessment, predictive analysis was conducted to determine the influence of underground coal mining on the hydrogeology of the rockmass between the mining interval and the stored waters within Cordeaux Reservoir.

The aim of the analysis is to provide a reasonable "best estimate" of the permeability of rock unit strata within the rockmass through use of the results of the exploration that has been conducted by BHP Billiton. The aim was to then produce an estimate of seepage water reporting into the workings of Area 3, and particularly to estimate the loss of stored water from the Sandy Creek arm of Cordeaux Reservoir.

The monitoring consists of a significant database of piezometric pressures within the rockmass coupled with downhole packer testing conducted as part of the exploration program. The monitoring within the rockmass also includes arrays of downhole vibrating wire piezometers that were installed during the exploration activities – see Figure HG303 and HG304.

The analysis has been based on the interpreted piezometric surfaces developed throughout the rockmass over Area 2 and Area 3, in combination with the stratigraphic permeability values developed from the downhole packer testing program.

The philosophical challenge with the analysis is that there are a number of variables that come into play which determine the output. These are:

» The permeability of each of the stratigraphic units that contribute to the analysis.

» The head conditions (which drive flow) that apply to each unit across the model.

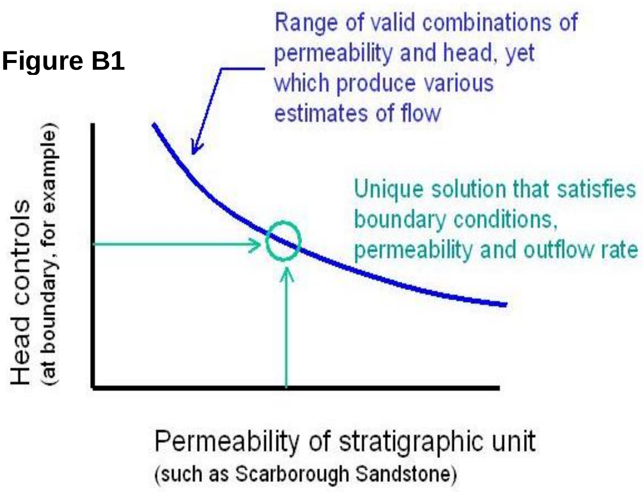
These combine to govern the rate of flow of groundwater through each element of the model, and combine to produce a range of admissible pairs of head and permeability values, as indicated in Figure B1.

The controls available to produce unique solutions include:

» Boundary head values (at some, but unfortunately, not all of the boundaries).

» Piezometric head values (at piezometers installed at the monitoring sites) within the model.

Figure B1



The constraints upon the solutions include:

- The modelling assumes uniformity of permeability throughout each stratigraphic unit. Natural variability within the body of each unit has not been incorporated in the models. Stress-related changes in permeability have also not been incorporated.
  - The downhole field testing has provided a range of permeability values, the range reflecting natural variability throughout the unit. The presence of naturally occurring fractures contributes significantly to this variability. An assessment of variation in the gross permeability of the units has not been included in the analysis. This challenge was addressed through adoption of an approach to match existing piezometric surfaces with a starting point for permeability values that reflects a known (though incomplete) database of packer-derived permeability estimates.
  - Stress-related changes that are a consequence of the longwall mining, particularly where stresses are transferred onto the longwall abutments as a result of the mining. This was identified in the numerical (Phase^2) modelling conducted for Longwall 1 in Area 1 (GHD-LongMac, 2005 & 2005a). These have not been specifically modelled through partitioning of the stratigraphic units.
- Not all boundary head conditions are known and despite the density of data, anomalies in the data collected from the field have been identified (as expected in the natural environment). Other unknown constraints include the nature of the rockmass following mining, and the head conditions at the interface of the longwall caved rockmass and the unaffected rockmass.
- Evapo-transpiration is ignored.
- Broadly, three cases have been used in the back-analysis –pre-mining, post mining of Area 2, and post mining of Longwall 6 in Area 3. For all cases, calibrating with observed flow values is not possible.
- Limitations of the numerical analyses.

The aim is to achieve a unique solution. Pragmatically, this is unlikely to be achieved. This is primarily because there are less boundary conditions and known values than are needed for a unique solution. Nevertheless, the expectation is to achieve a "reasonable" estimate of the interaction of the mining in each of Areas 2 & 3 with the stored water.

One example of the unknown limitations is the permeability of the fractured rockmass in the longwall goaf, which is unknown. The permeability of the fractured rockmass applies in combination with that of the intact rock unit (which is between the longwall and Cordeaux Reservoir) to produce piezometric heads and consequently, estimates of flow through each stratigraphic unit and the rockmass overall. In reality, there is no calibration on the bulk permeability of the rockmass above the longwall. Whilst reasonable estimates can be developed, these are unlikely to be supported by way of field testing, particularly as sensible field results are not practical on a reasonable scale.

[By way of example, the drilling of Elouera DDH9 over the goaf of Elouera Longwall 7, encountered lost drilling fluid that required grouting of the borehole to permit hole advance – see SCT (2005). This conceivably provided a means to estimate the bulk permeability of that fractured rockmass. The ability to measure bulk permeability of a representative portion of the rockmass (which in this case, would necessarily need to be of large volume) was not practical. A large volume of the rockmass is required for testing due to the wide range of scale related permeabilities – ranging from the high permeability of specific open fractures (which will lead to loss of drilling fluid from an investigation borehole, for example) to the large scale where averaging of the rockmass smears the local high permeability effect. Unfortunately, the local high permeability effect is encountered within a borehole scale (which in theory at least can be measured to estimate permeability, though in practice may not), whilst the large scale behaviour is unlikely to be manageable for permeability calculations - it being impractical to measure flow rates, in particular, for example].

It follows, in this example, that a unique combination of permeability and head values frequently can not be identified, and therefore developing a unique estimate of flow is challenging, and perhaps not possible.

This notwithstanding, reasonable estimates of permeabilities of the various rock units, and reasonable estimates of the boundary head conditions, combined with matching of piezometric head at the piezometer locations, can lead to acceptable estimates of permeabilities for the various units, and hence estimates of flow reporting to various parts of the model.

B2 Analytical Model

Numerical modelling of the ground water movement was conducted using the code Seep/W (version 6.20). Seep/W is a two-dimensional finite element program developed by Geo-Slope International Ltd, Canada, and is a tool that can be used to analyse saturated or unsaturated flow systems, with steady or transient flow conditions.

The analysis has been conducted using the geological model and monitoring data available from the exploration of Areas 2 and 3. Section A, which runs along the axis of Longwall 6 through Area 3 and extends over Longwalls 5, 4 and 3 in Area 2, was adopted as the basis for analysis.

A steady state analysis was adopted. The piezometer readings in the area selected for comparison with the analyses were based on equilibrium conditions.

The numerical model developed for the analysis is indicated by the figures attached to this appendix. The model is based on the cross-section presented in drawing G303. The coverage of the model extends from Area 2 in the east (right hand side of the model), across the Sandy Creek arm of Cordeaux Reservoir (towards the middle of the model) and down the axis of Longwall 6, approaching its western end at limit of the model on the left hand side. The model was meshed to produce a reasonably “fine” mesh with manageable element numbers whilst minimising error accumulation during processing, even with low tolerances on “out-of-balance” head values (“vector norm” for nodal forces).

Model statistics:

> Element form: The finite element mesh involved 6-nodal triangular elements with 3-order integration (analogous to guassian points).
>
> Number of elements: 15,900
>
> Number of nodes: 32,220
>
> Tolerance criterion = 1E-12 difference in the vector norm (computed as the square root of the sum of each nodal head value squared) between successive iterations (which controls convergence of the solution more so than the iteration limit) and/or a limit of 1000 iterations.

Boundary conditions that have defined the model are:

- The boundary conditions around the perimeter of the model were assigned in acknowledgement of:
  - Rainfall across the entire width of the ground surface of the model based on the average rainfall from late 2003 to mid 2007.
  - The piezometric values recorded in monitoring and exploration boreholes about Area 2 and Area3.
  - The water level in the Sandy Creek arm of Cordeaux Reservoir, which has defined the head available to drive water through the model.
  - The piezometric pressures recorded in exploration holes about Area 3.
- No outflow values are available to assist in calibration of the model.

Flow at critical sections of the model is measured by way of 'flux sections' at locations of interest. These include: outflow from Cordeaux Reservoir; inflow into Longwall 5; inflow into Longwall 6; and across the width of various stratigraphic units. The positions of the flux sections chosen are shown on the graphical output figures attached to this appendix. The flux sections also serve as a means of quality control of the operation of the model.

B3 Philosophy of the Analysis process

The outline of the philosophy for the seepage analyses for Section A is as follows:

- Water level in the Cordeaux reservoir adopted in our models was based on the information reported on SCA website: www.sca.nsw.gov.au. Adopted reservoir water level was RL 299.3 m in which the reported storage level was around the end of July and early August 2007.
- Reservoir at FSL was 303.7m.
- Rainfall was adopted as an average rainfall 3.3 mm per day for the period between December 2003 to June 2007. The data is from Sydney Catchment Authority pluviograph records for Cordeaux Pump Station, as downloaded from the SCA website.
- The analytical model has adopted a length of about 3190 m of Section A and it covered both sides of the Sandy Creek arm of Cordeaux reservoir, specifically as the aim was estimation ground water flow around the reservoir.
- Initial (ie first pass) permeability estimates for the stratigraphic units were adopted from the values provided as a result of the back-analysis of Longwall 1 in Area 1 (GHD-LongMac, 2006). The permeability values for the Hawkesbury Sandstone, Newport/Garie Formations and Bald Hill Claystone were based on the latest packer test results (2007) as these units were not represented in the back-analysis of Area 1.
- The development of the analytical runs for analysis of the pre-mining situation attempted to match the piezometer monitoring results from boreholes: DDH24, DDH38, DDH41, DDH55, DDH84, DDH85, & DDH86 which are located around Section A.
- Piezometer readings for piezometer tips installed in the coal seams and rock units (HBSS, BGSS, SBSS, BUCO & WWCO) were selected for the pre-mining back-analysis for comparison with the results between of the analytical seepage (Seep/W) results.

» The ratio of vertical to horizontal permeability for all coal and rock units for the pre-mining models was chosen as $k_v/k_h = 0.1$

» Initially, pre-mining models were chosen with boundary head controls for all coal and rock units for both the LHS & RHS of the model. The base of the model was assumed to be a no-flow boundary. The top boundary (ground surface) was a rainfall infiltration of 3.3 mm/day (~ q = 3.82E-8 m/s) with pressure review for all nodes. The reservoir water level was either RL 299.3m or RL 303.7m (FSL).

» Review of the initial pre-mining results detected that the predicted piezometric water level at the LHS and RHS boundaries were challenging. No-flow boundaries consequently were adopted for both LHS & RHS of the model except for head controls on BUCO & WWCO on the LHS and for the RHS with head controls on BGSS, SBSS, BUCO & WWCO. These head control values and the permeabilities of BUCO and WWCO were then iteratively adjusted to get a reasonable match with the piezometer monitoring results.

» Two Cases have been adopted in the pre-mining models: Case 1 assumed the water level in Cordeaux reservoir RL 299.3 m (the reservoir level at a date comparable with the equilibrium piezometric values adopted) and Case 2 was at FSL.

» Permeabilities obtained from the final pre-mining Cases 1 & 2 (above) were used for all subsequent post-mining analyses.

» Due to the effects of mining in Areas 2 & 3, fractured and shear zones will be generated around the mining areas and reservoir. These zones include: constrained, fractured, caved, and rib zones. A set of adjustments for the permeability values and ratio between horizontal and vertical permeability values were adopted for the various subsidence zones, as listed in Table B1.

» Boundary conditions for the post mining Area 2 were: no flow on the LHS boundary except head control for BUCO & WWCO being the same as the pre-mining boundary condition. The top and base boundaries of the model were assumed as per the pre-mining condition. The RHS boundary adopted a no-flow condition. Zero pressure head control was adopted for the Shaft 3 site at the Wongawilli level and the base of Longwall 5 (Area 2 mining). Head control for the two coal seam BUCO & WWCO below the Cordeaux reservoir were adopted as RL162 and Wongawilli RL156 respectively. Each coal seam piezometric surface was concave upwards about these locations. A summary of the boundary conditions is provided in Table B2 and the locations where boundary conditions were applied are shown in Figure B1.

» Four Cases were adopted in the post mining Area 2 analysis scenarios:

  o Case 1: Water level in Cordeaux Reservoir was at RL 299.3 m

  o Case 2: As per Case 1 but with the presence of the top 30 m thickness of fractured BGSS extending over an area between the reservoir and the rib zone. The horizontal permeability of this fractured BGSS assumed to be increased 3 times faster than the original BGSS permeability. This fractured layer was to model potential shearing within the rockmass as a consequence of subsidence.

  o Case 3: As per Case 1 but the reservoir water level was at FSL

  o Case 4: As per Case 2 with the reservoir at FSL

» Modelling for mining of Areas 2 &3 adopted the following boundaries conditions:

  - Top and base of the model were adopted as per the pre-mining boundary conditions
  - LHS & RHS boundaries were no-flow boundaries
  - Zero pressure head control was specified at: the base of the Wongawilli Seam across Areas 2 & 3 where mining had occurred; Ventilation Shaft 3 at Wongawilli Seam level; and at the four headings between Area 2 and Area 3 below the reservoir which will serve Area 3.

  The boundary conditions are again summarised in Table B2.

» With a similar philosophy, four cases were adopted for analysis of the post mining situation for both Area 2 & Area 3, as follows:

  - Case 1: Water level in Cordeaux Reservoir was adopted as RL 299.3 m
  - Case 2: As per Case 1 with the presence of the top 30 m of fractured BGSS between the reservoir and the rib zone.
  - Case 3: As per Case 1 but the reservoir water level at FSL
  - Case 4: As per Case 2 with the reservoir at FSL

B4 Permeability Values adopted for Analysis

The permeability values for each stratigraphic unit were initially developed from the downhole packer testing-derived permeability database.

The permeability values were progressively varied during the course of the back-analysis process for the pre-mining condition. The values derived from the back analyses are shown in Table B3. The final permeability values estimated from the back-analyses were then adopted as the basis for further analytical work, and were used for: the parts of the model affected by mining; and as the basis for parts of the model modified by mining influences. The basis for the modifications is provided within Figures HG314 to HG316.

B5 Analytical Process and Results

The output has also been presented graphically in Figures B2 to B7 and tabulated in Table B4. These provide the predicted results of piezometric pressure head at the piezometer locations. The figures are attached and present the values of piezometric pressure across the model at locations where instrumentation was available, together with an outline of the top and bottom of the stratigraphic unit.

Selected graphic output are provided in Figures B8 to B17, which are attached. These include images showing contours of pressure head wherein it is noted that the zero pressure head contour represents the phreatic surface. The figures also show the positions of the adopted flux sections ie "windows" through which flow is calculated. Table B5 shows summary results of water movement through selected flux sections. These cover both the pre-mining and post mining cases. The table also includes a measure of non-dimensioning of the flow through its reference to the flow feeding into the reservoir at FSL prior to the commencement of mining. The non-dimensioned values are presented in Figures HG317, HG318 & HG319.

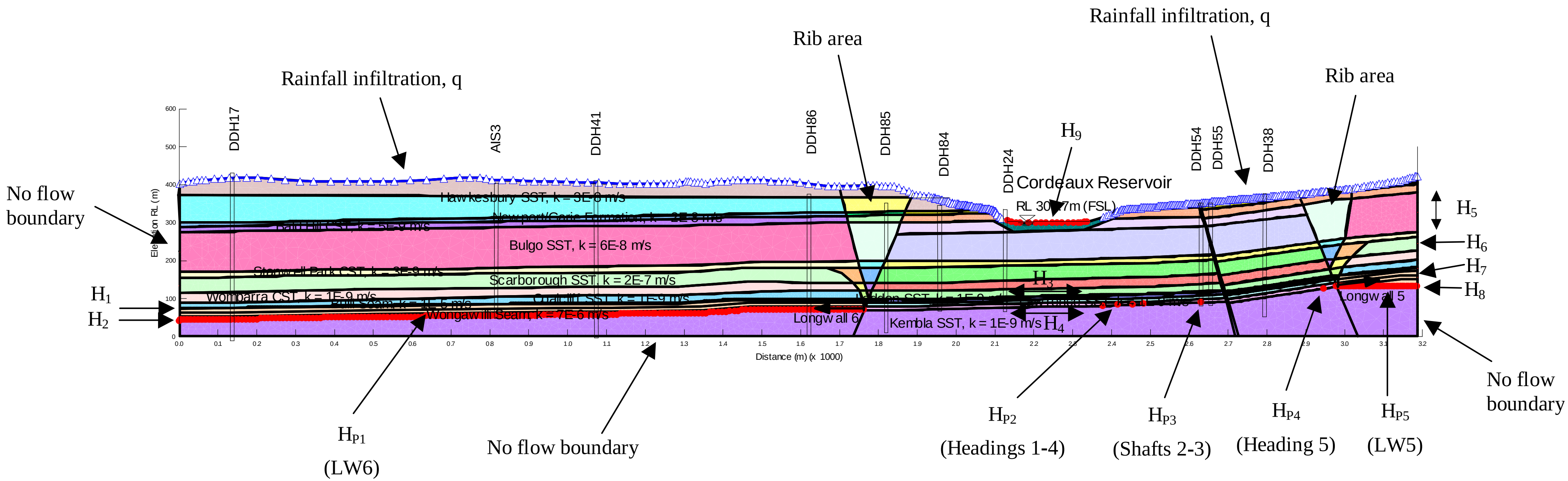
Flow reporting into various parts of the model

The movement of groundwater about the model is a function of head controls on the receiving end, but also is controlled by inflow. The inflow into the model has various sources – the reservoir, the head controlled boundaries (side plus various locations throughout the model) and rainfall across the width of the model. The penetration of the rainfall depth is a function of suctions below the surface. As a consequence, as the suctions are modified through the development of unsaturated zones within the model (principally over the longwall goafs), the rate of infiltration varies from model to model.

Attachments to Appendix B

Figures

Tables

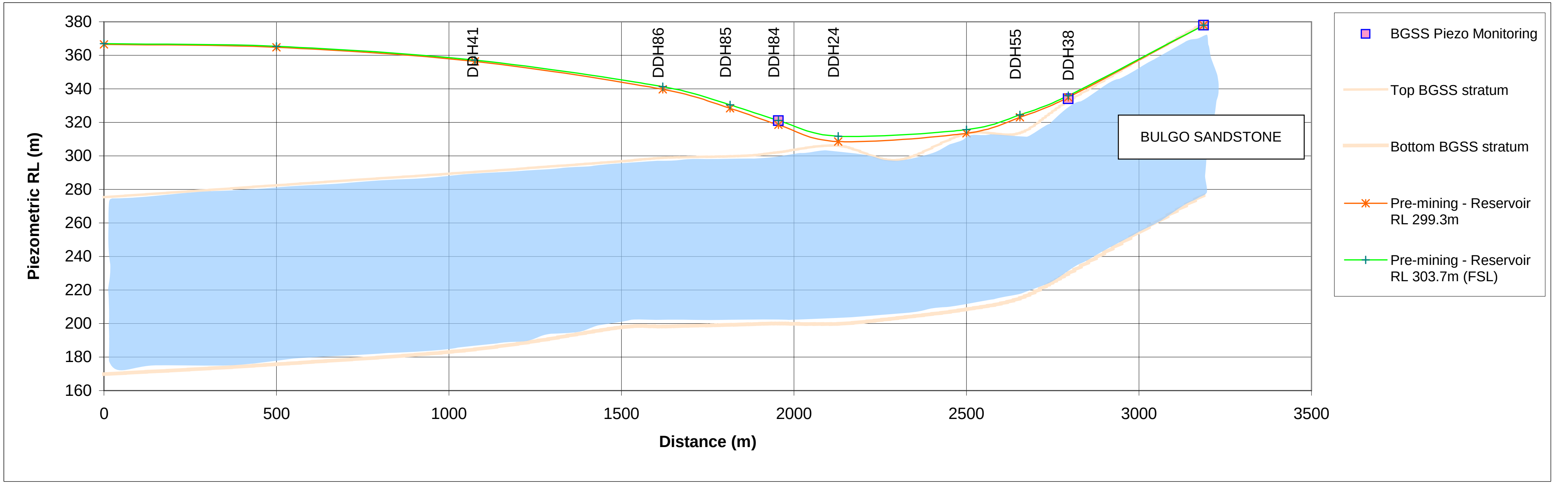


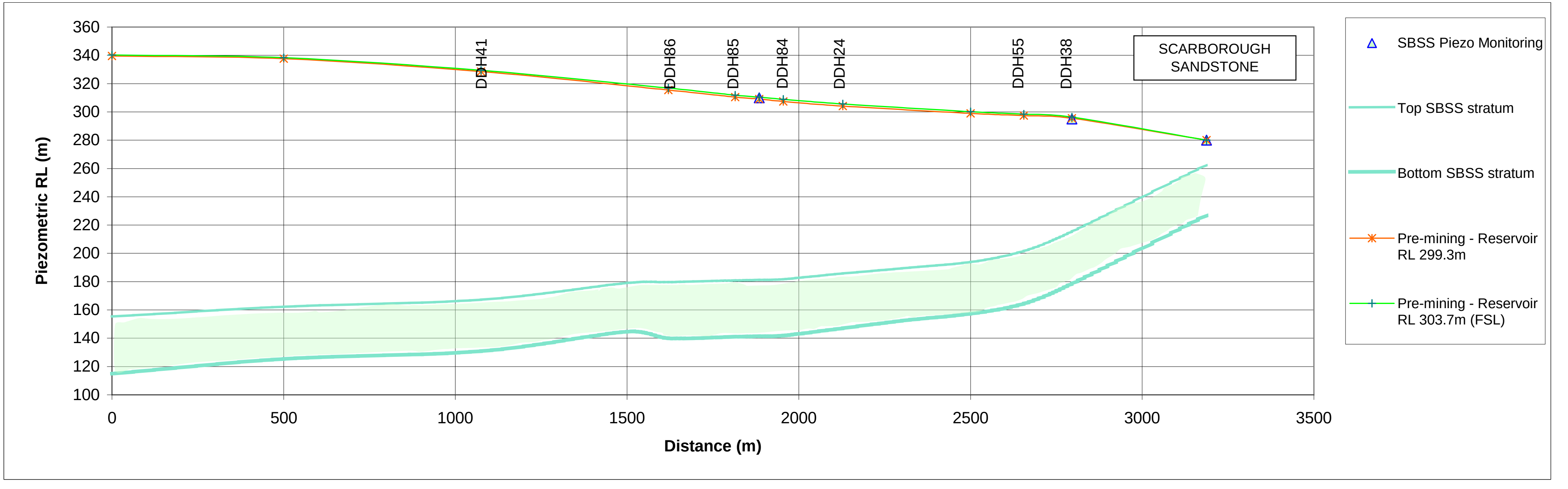
<u>Notes:</u>

i. Head controlled boundaries are H_1 to H_9.

ii. Zero pressure head controlled boundaries are H_{p1} to H_{p5}.

Figure B1: Key diagram illustrating boundary conditions.





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Client: BHP BILLITON

DENDROBIUM MINE - AREA 3

PRE-MINING CALIBRATION FOR BULGO AND SCARBOROUGH SANDSTONES

job no 21/11716/03

file ref Seepage Analysis Results No1.xls

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scale as shown date 24 October 2007

Figure B2

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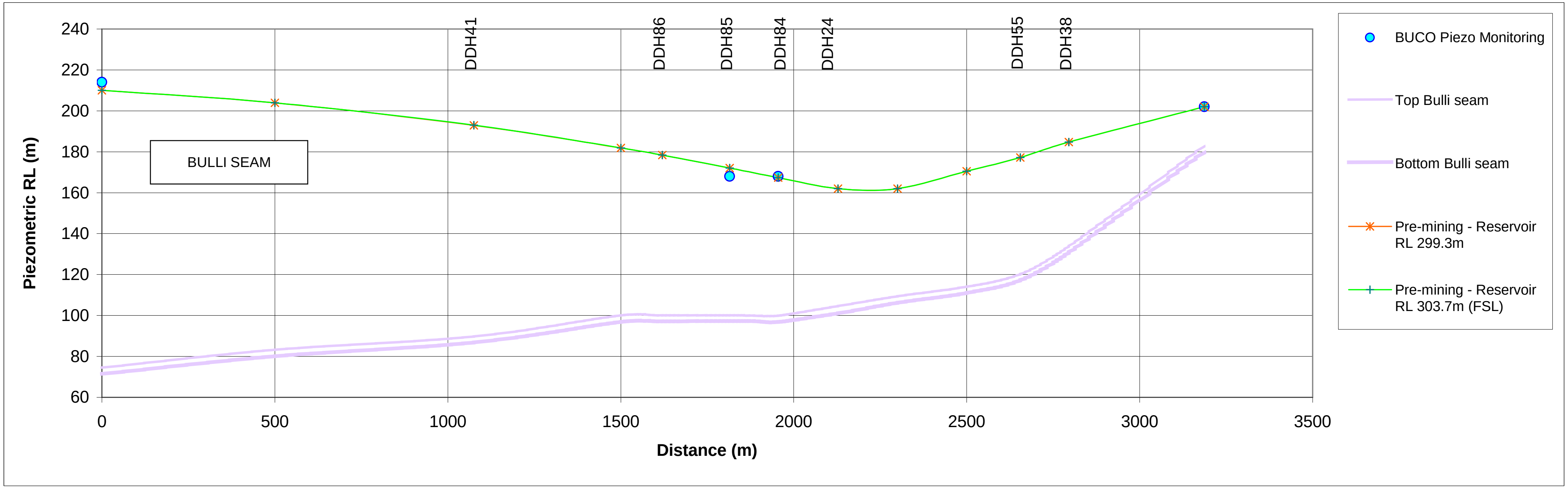

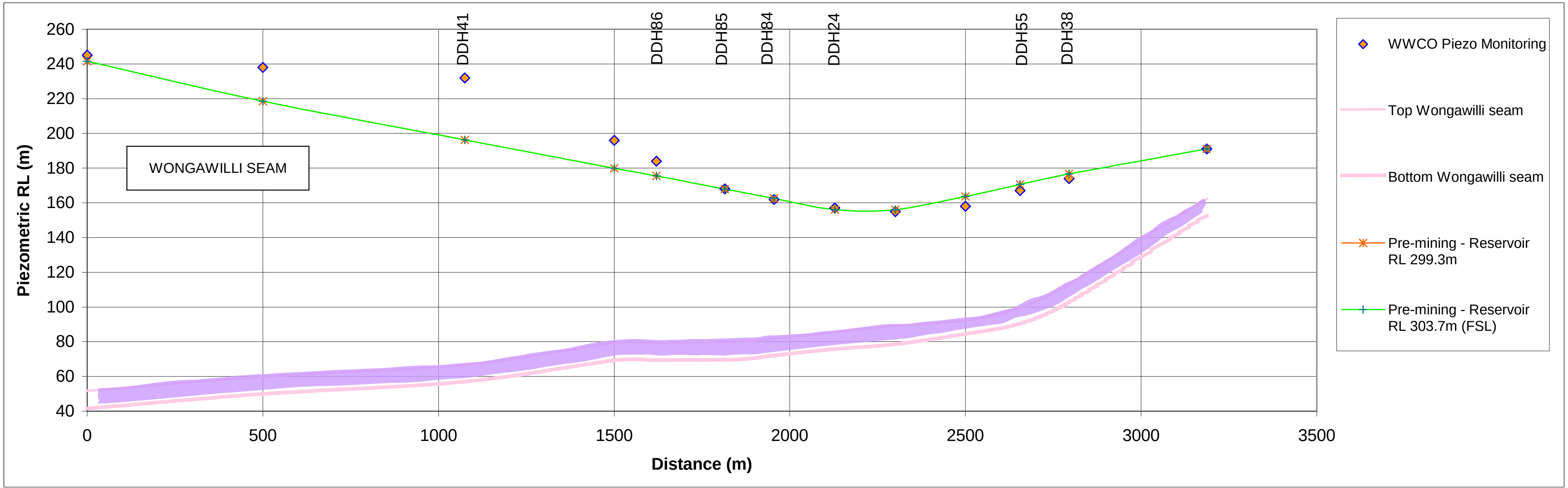

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Client: BHP BILLITON
DENDROBIUM MINE - AREA 3
PRE-MINING CALIBRATION FOR BULLI AND WONGAWILLI COAL SEAMS

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Figure B3

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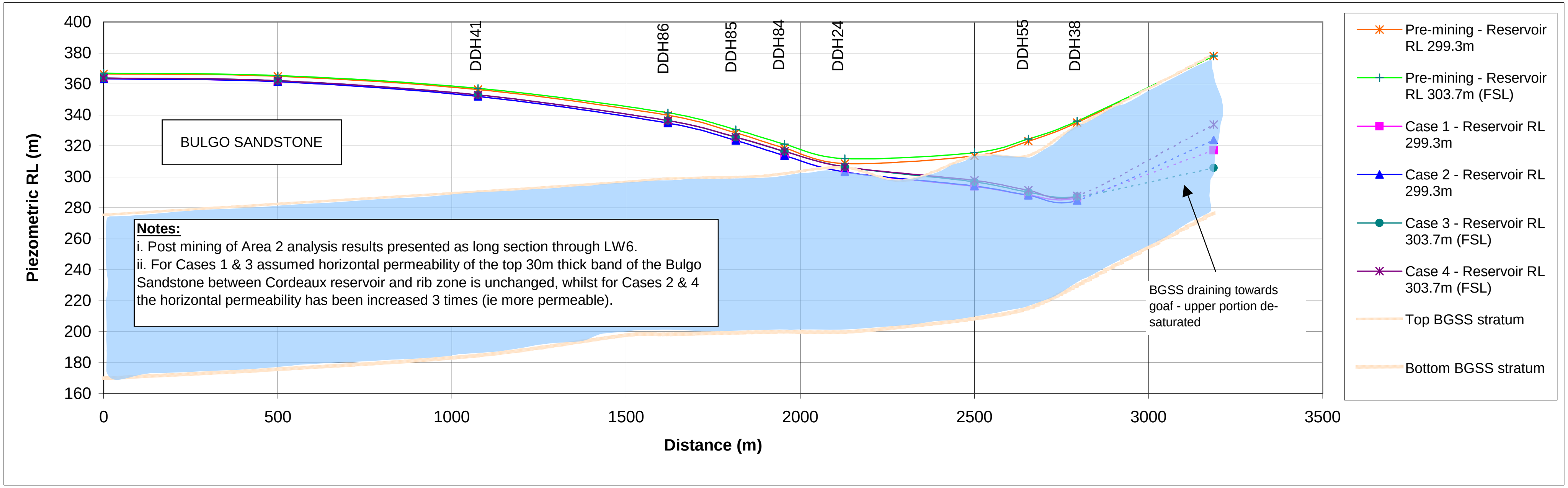

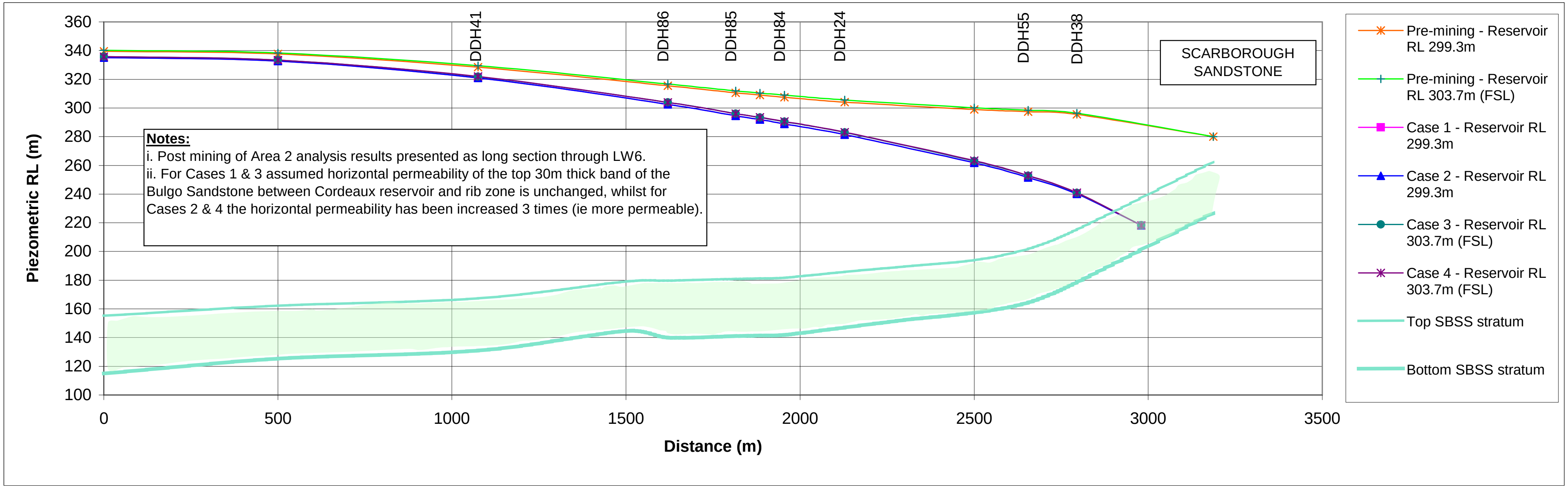

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Client: BHP BILLITON
DENDROBIUM MINE - AREA 3
BULGO AND SCARBOROUGH PIEZOMETRIC PRESSURE SURFACE POST MINING OF AREA 2

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Figure B4

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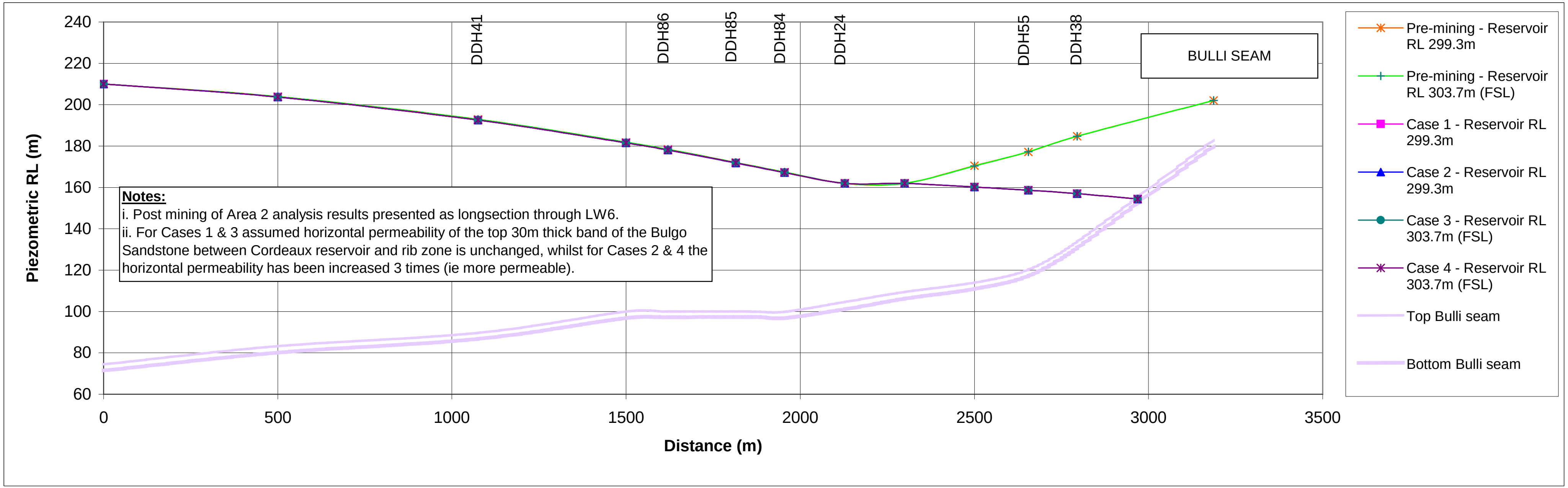

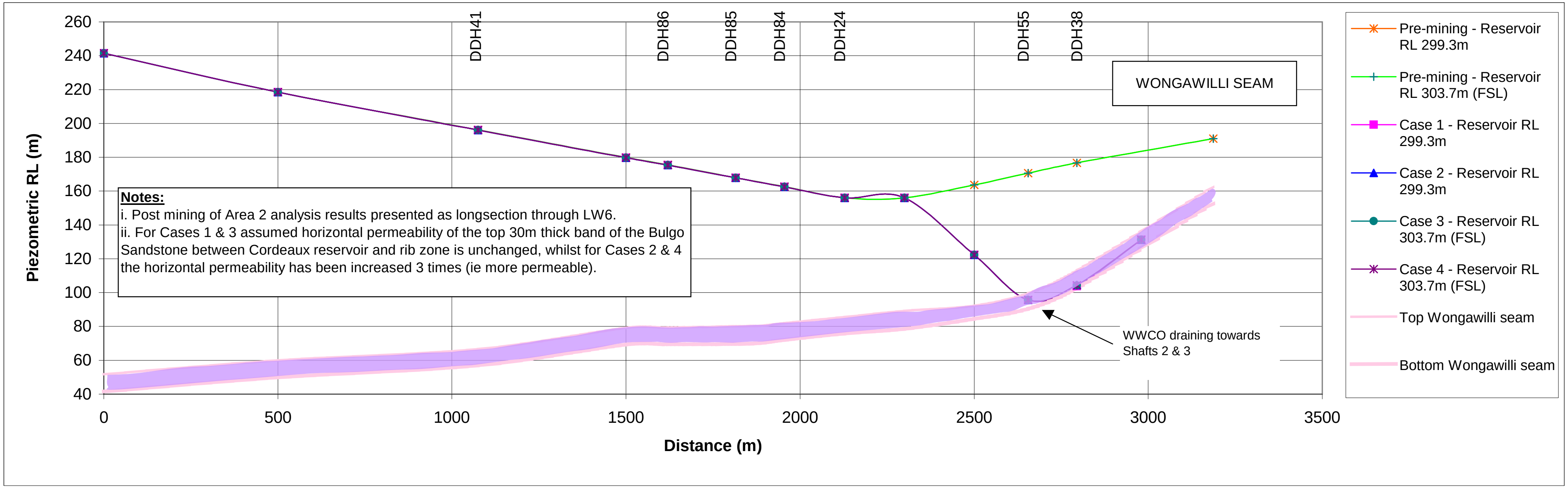

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Client: BHP BILLITON
DENDROBIUM MINE - AREA 3
BULLI AND WONGAWILLI SEAM PIEZOMETRIC PRESSURE SURFACE POST MINING OF AREA 2

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Figure B5

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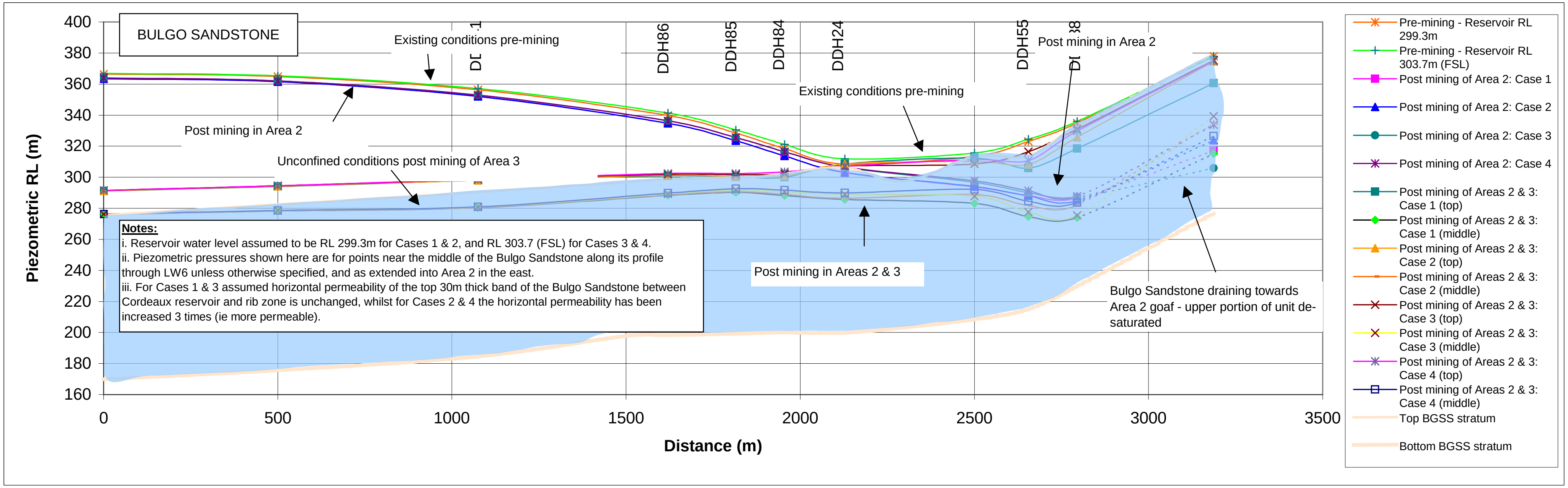

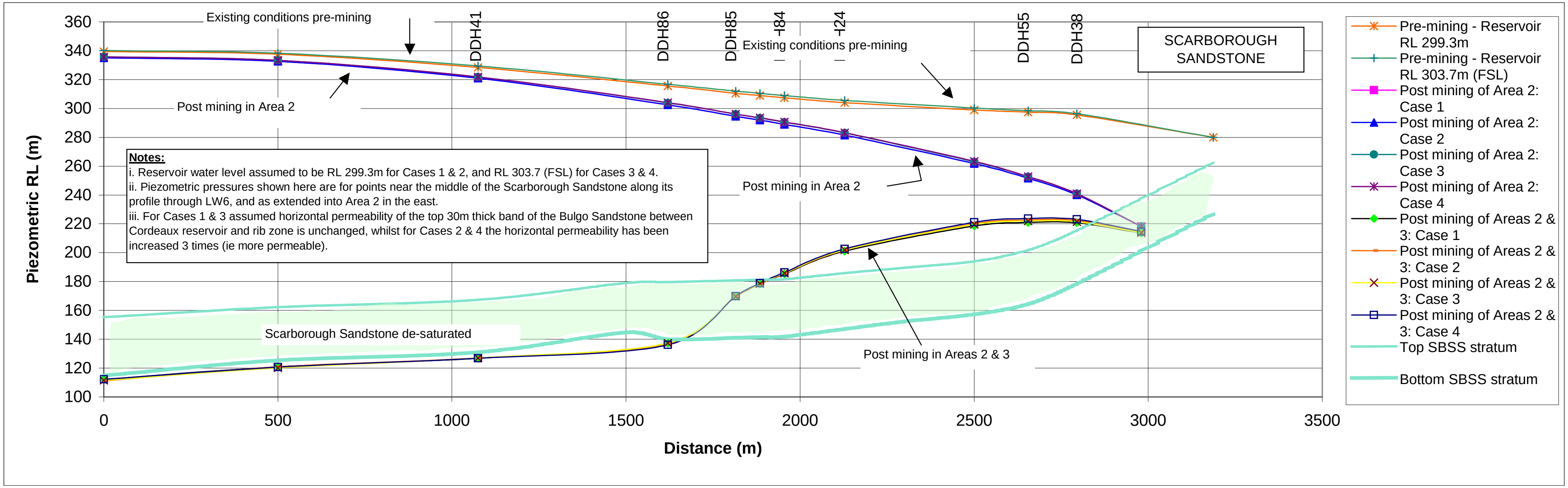

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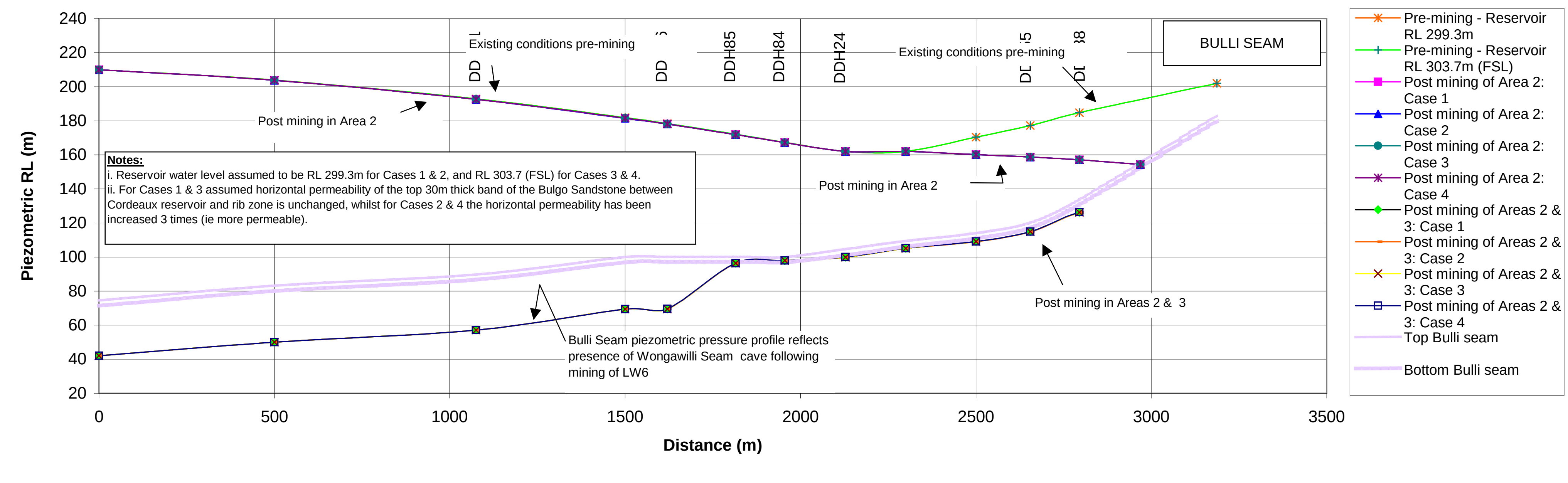
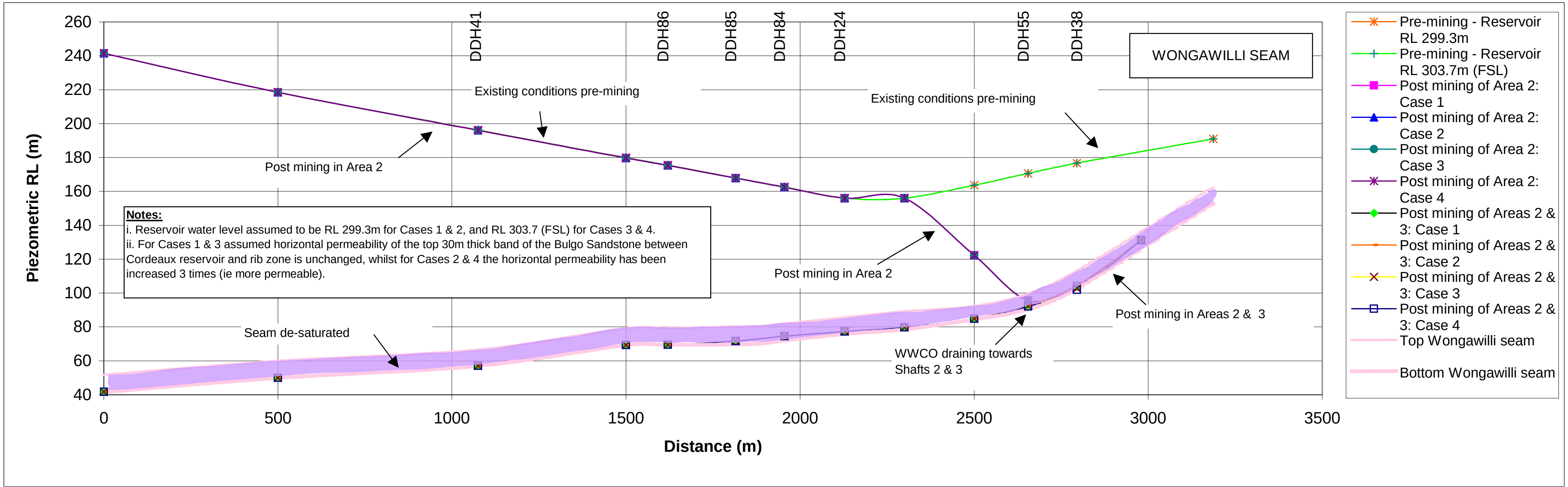
Client: BHP BILLITON
DENDROBIUM MINE - AREA 3
BULGO AND SCARBOROUGH PIEZOMETRIC PRESSURE SURFACE POST MINING OF AREAS 2 AND 3

job no 21/11716/03
file ref Seepage Analysis Results No1.xls

scale as shown date 24 October 2007

Figure B6





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Client: BHP BILLITON
DENDROBIUM MINE - AREA 3
BULLI AND WONGAWILLI SEAM PIEZOMETRIC PRESSURE SURFACE POST MINING OF AREAS 2 AND 3

job no 21/11716/03
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Figure B7

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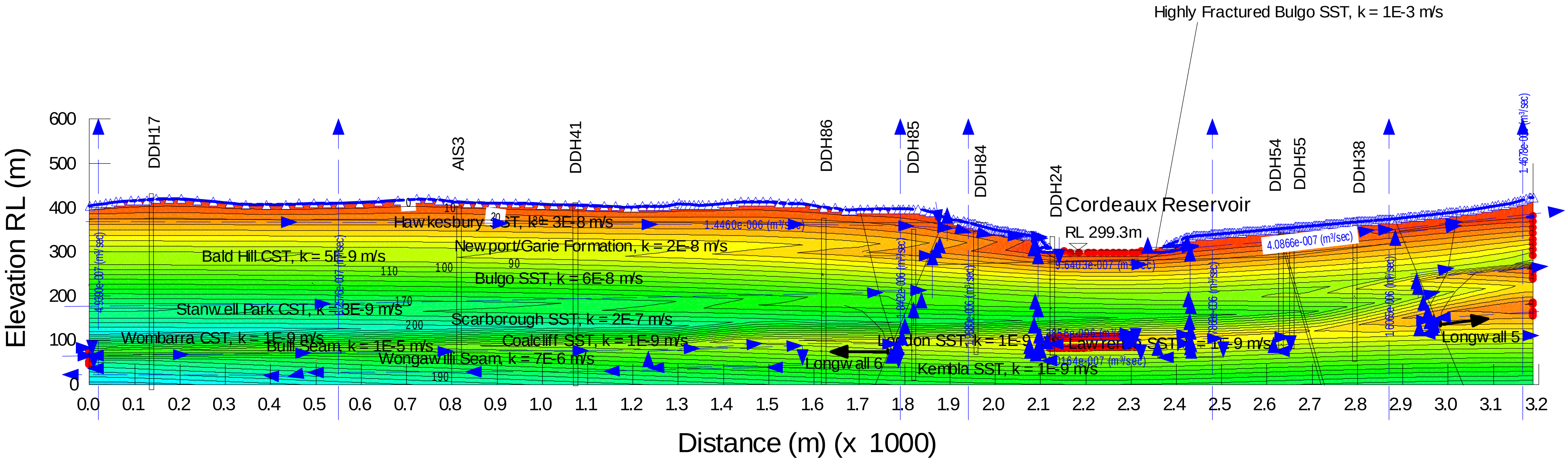
Pre-mining Case 1: Contours of pressure head and flux sections.

Figure B8

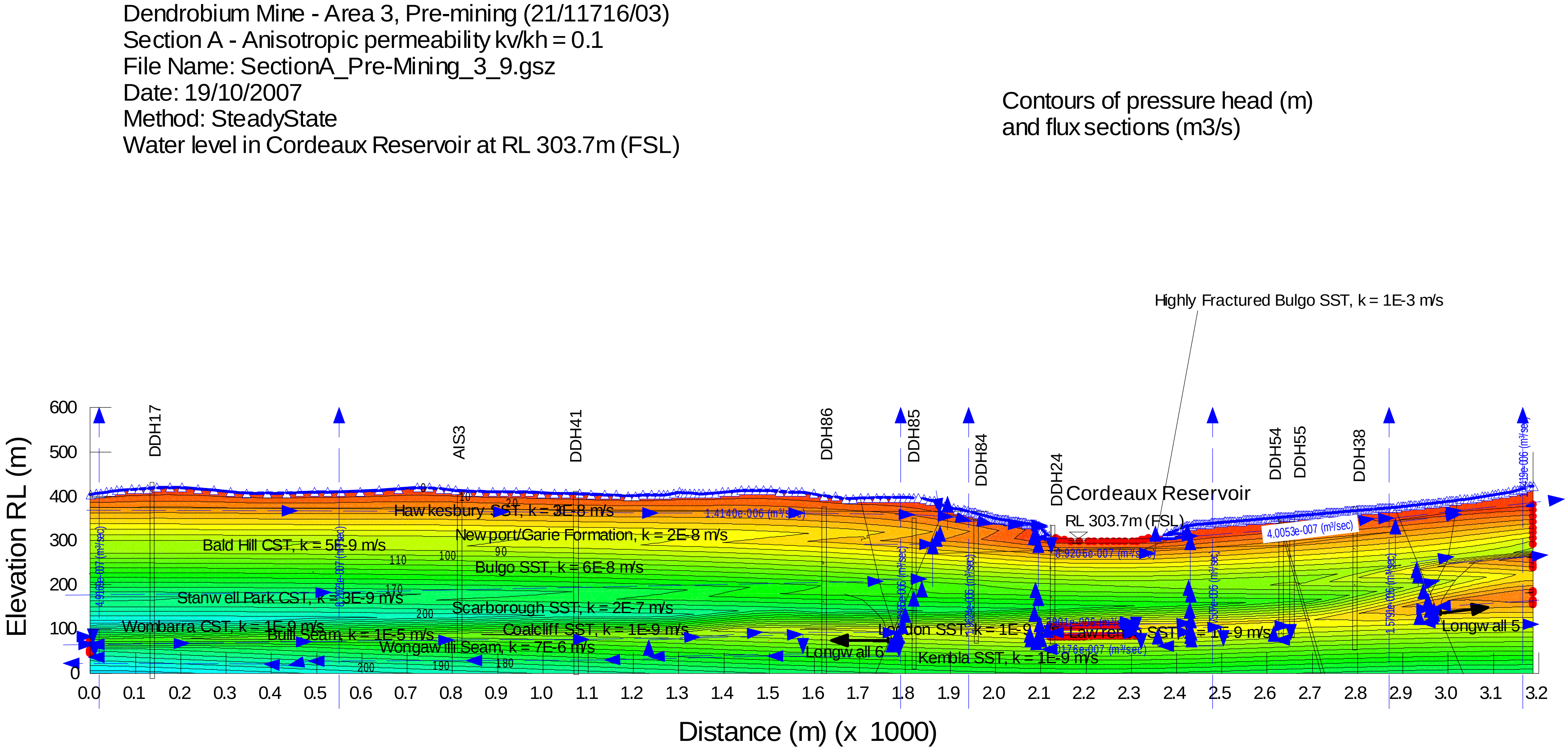
Dendrobium Mine - Area 3, Pre-mining (21/11716/03)
Section A - Anisotropic permeability kv/kh = 0.1
File Name: SectionA_Pre-Mining_3_8.gsz
Date: 22/10/2007
Method: SteadyState
Water level in Cordeaux Reservoir at RL 299.3m

Contours of pressure head (m)
and flux sections (m3/s)



Pre-mining Case 2: Contours of pressure head and flux sections

Figure B9

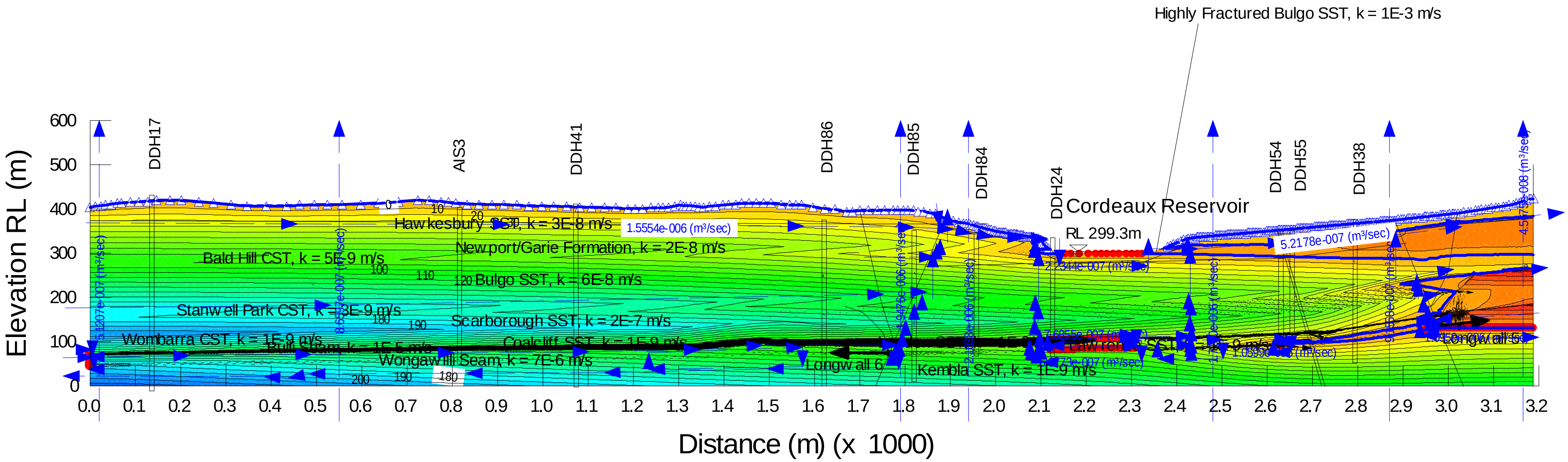


Post mining of Area 2 - Case 1: Contours of pressure head and flux sections

Figure B10a

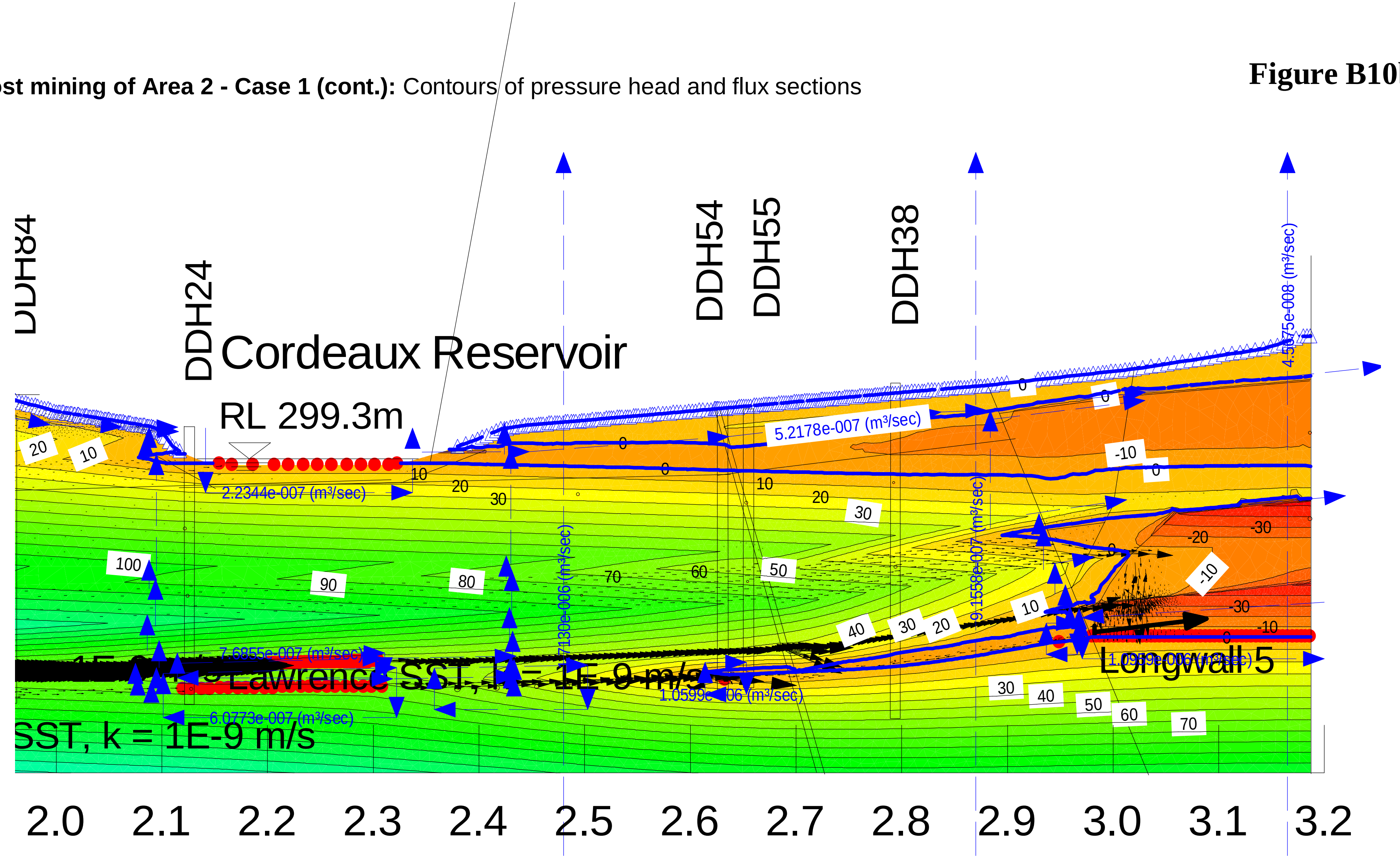
Dendrobium Mine - Area 3, Post-mining (21/11716/03)
Section A & Area 2 Mining
File Name: SectionA_Post Mining Area2_BGSSunchanged_6_1.gsz
Date: 22/10/2007
Method: SteadyState
Water level in Cordeaux Reservoir at RL 299.3m
Permeability of upper BGSS (30m) unchanged

Contours of pressure head (m)
and flux sections (m3/s)



Post mining of Area 2 - Case 1 (cont.): Contours of pressure head and flux sections

Figure B10b



Post mining of Area 2 - Case 2: Contours of pressure head and flux sections

Figure B11a

Dendrobium Mine - Area 3, Post-mining (21/11716/03)
Section A & Area 2 Mining
File Name: SectionA_Post Mining Area2_BGSSvaried_4_1.gsz
Date: 22/10/2007
Method: SteadyState
Water level in Cordeaux Reservoir at RL 299.3m
Permeability of upper BGSS (30m) varied

Contours of pressure head (m)
and flux sections (m3/s)

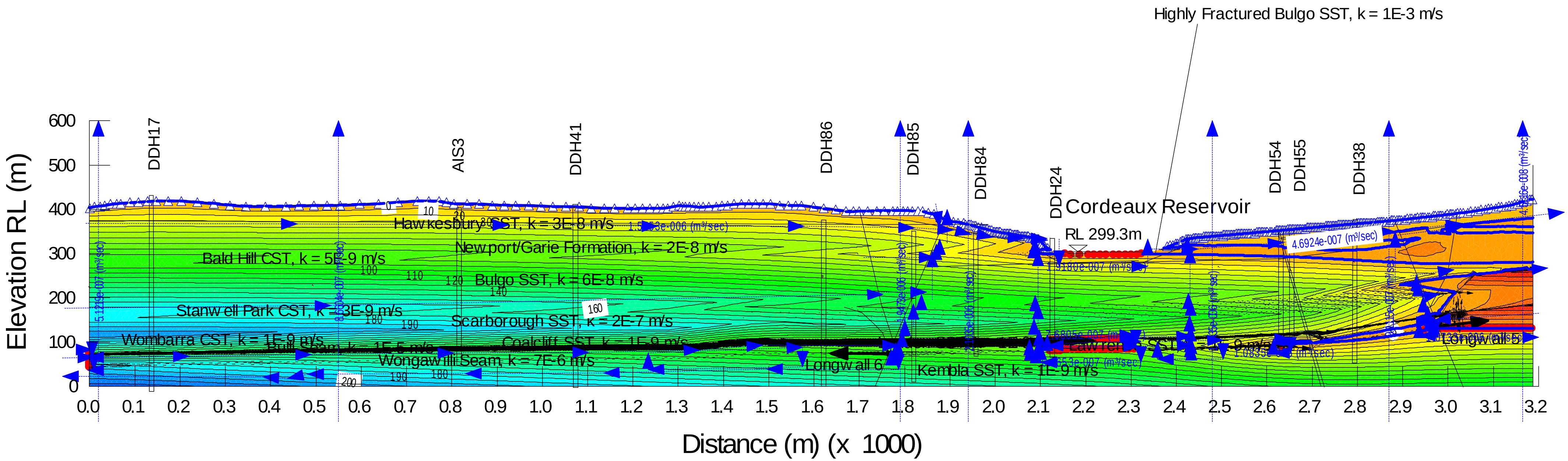
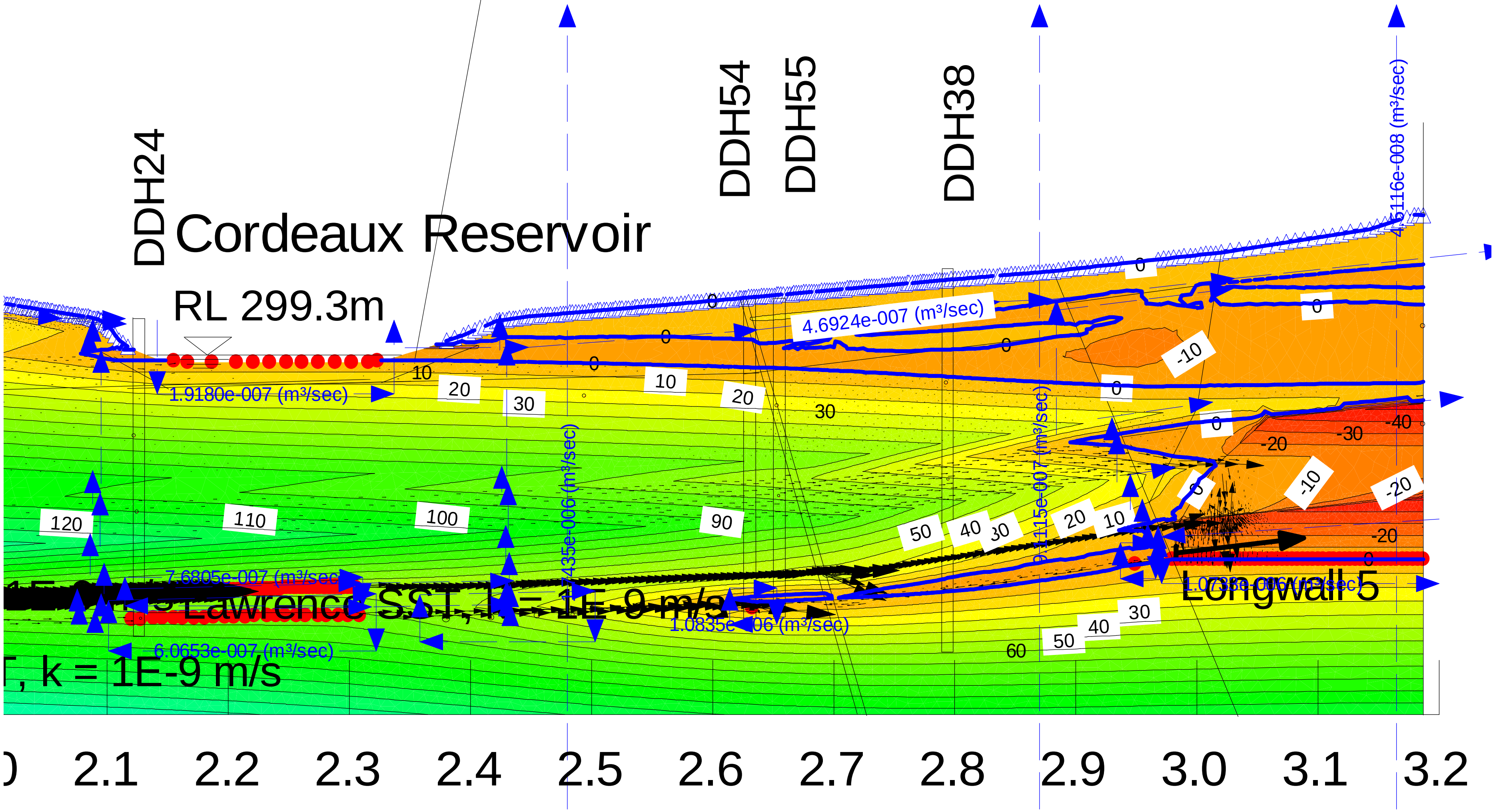


Figure B11b

Post mining of Area 2 - Case 2 (cont.): Contours of pressure head and flux sections

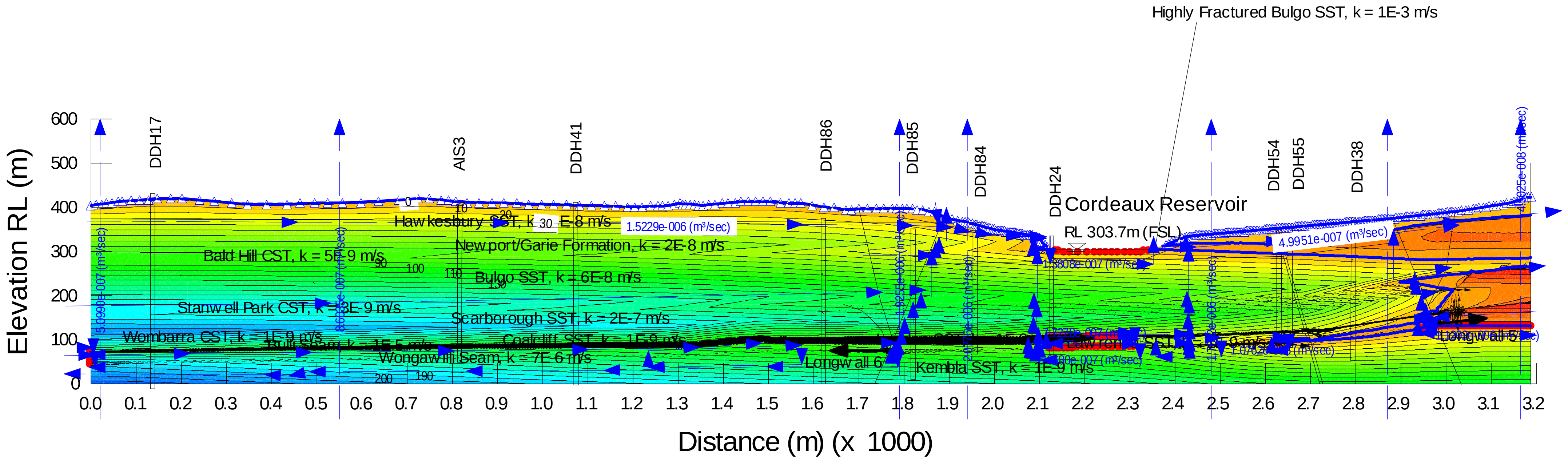


Post mining of Area 2 - Case 3: Contours of pressure head and flux sections

Figure B12a

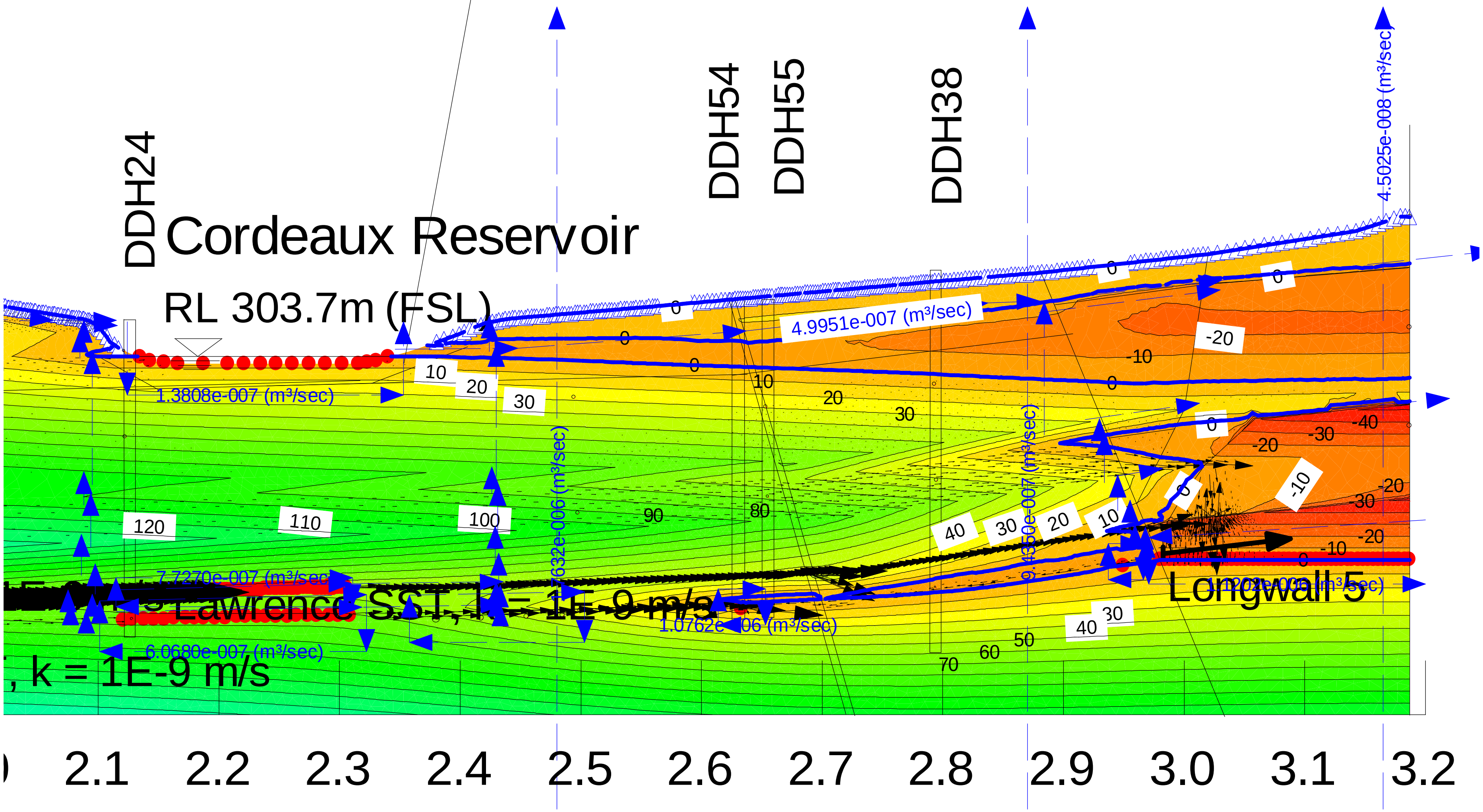
Dendrobium Mine - Area 3, Post-mining (21/11716/03)
Section A & Area 2 Mining
File Name: SectionA_Post Mining Area2_BGSSunchanged_6_2.gsz
Date: 19/10/2007
Method: SteadyState
Water level in Cordeaux Reservoir at RL 303.7m (FSL)
Permeability of upper BGSS (30m) unchanged

Contours of pressure head (m)
and flux sections (m3/s)



Post mining of Area 2 - Case 3 (cont.): Contours of pressure head and flux sections

Figure B12b

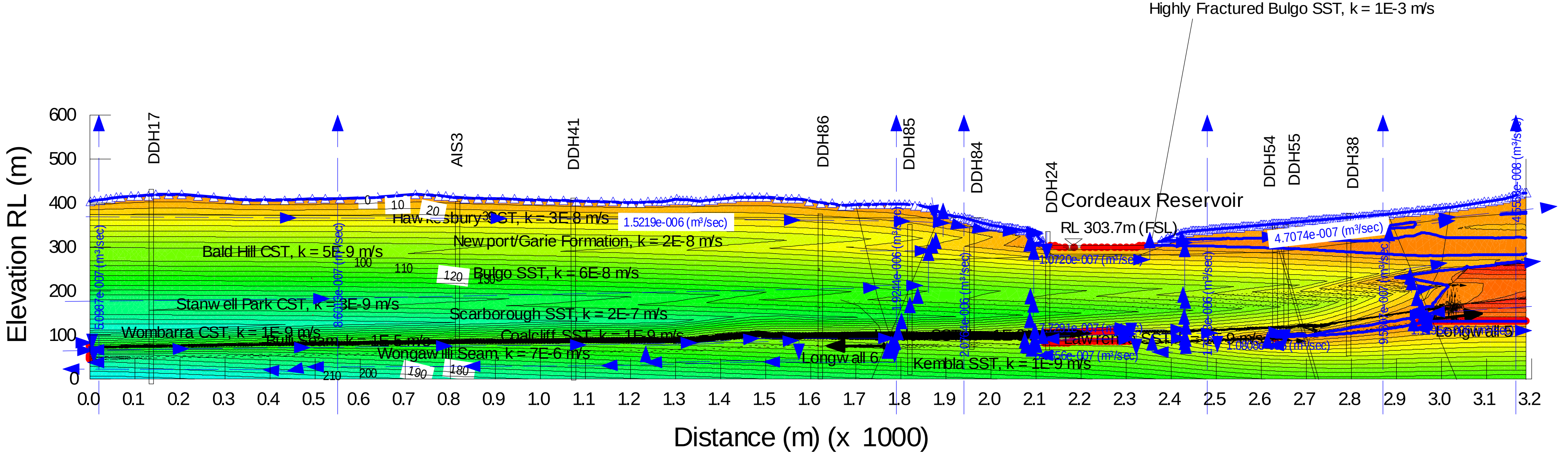


Post mining of Area 2 - Case 4: Contours of pressure head and flux sections

Figure B13a

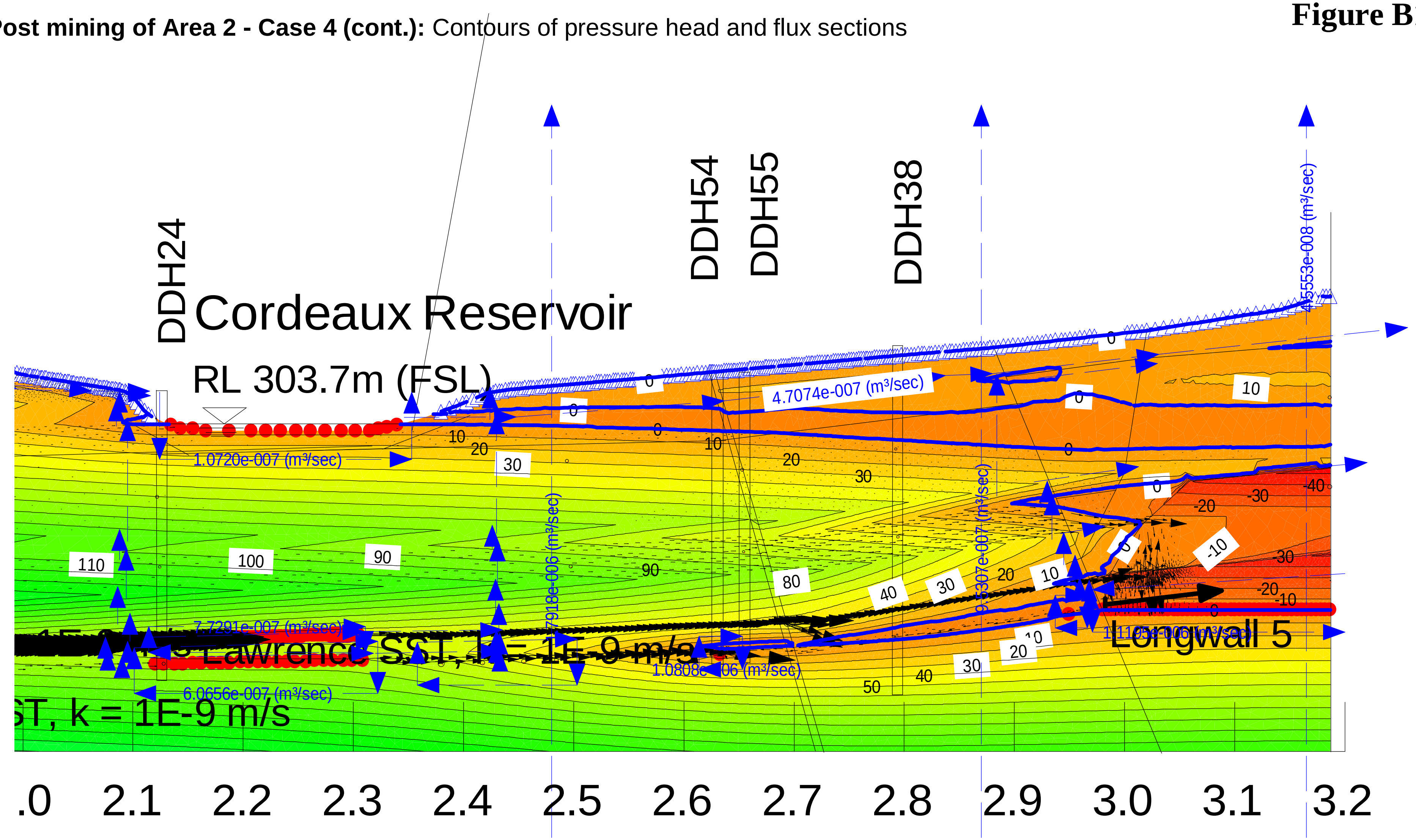
Dendrobium Mine - Area 3, Post-mining (21/11716/03)
Section A & Area 2 Mining
File Name: SectionA_Post Mining Area2_BGSSvaried_4_2.gsz
Date: 22/10/2007
Method: SteadyState
Water level in Cordeaux Reservoir at RL 303.7m (FSL)
Permeability of upper BGSS (30m) varied

Contours of pressure head (m)
and flux sections (m3/s)



Post mining of Area 2 - Case 4 (cont.): Contours of pressure head and flux sections

Figure B13b

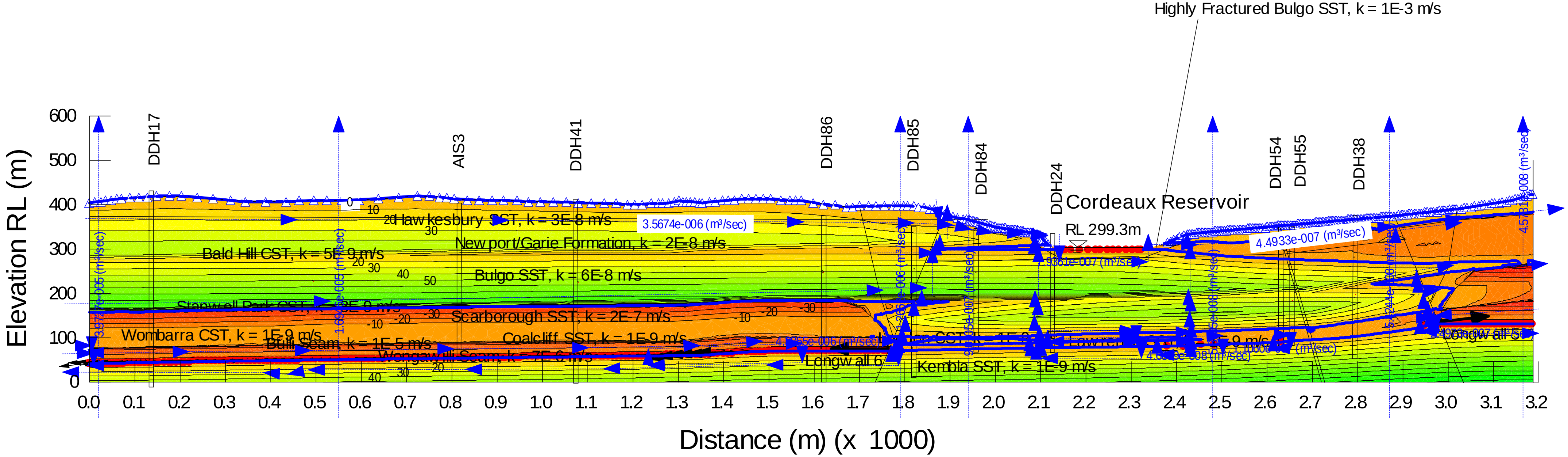


Post mining of Areas 2 & 3 - Case 1: Contours of pressure head and flux sections

Figure B14a

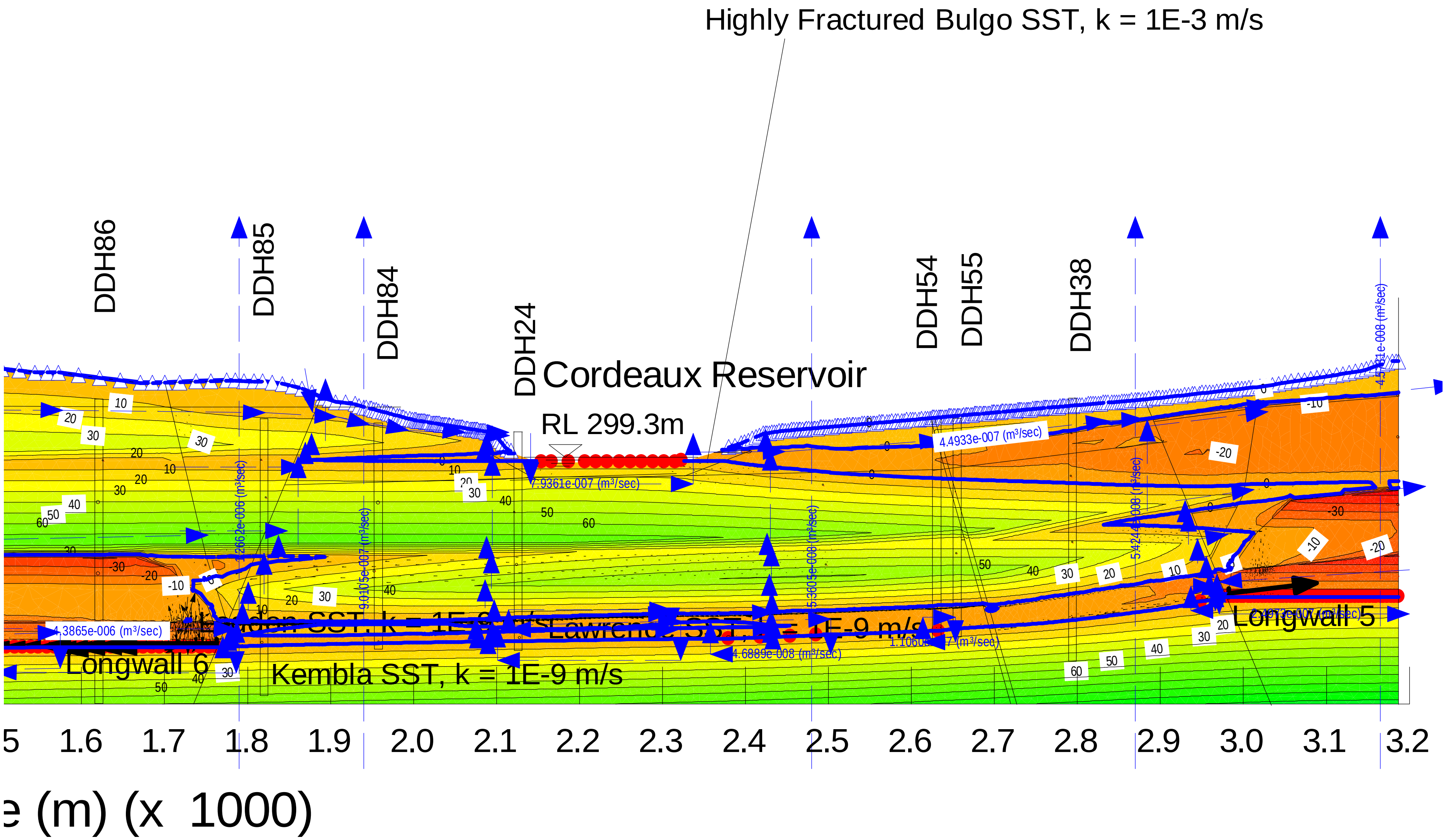
Dendrobium Mine - Area 3, Post-mining (21/11716/03)
Section A - Areas 2 & 3 Mining
File Name: SectionA_Post Mining Areas 2&3_BGSSunchanged_2_1.gsz
Date: 22/10/2007
Method: SteadyState
Water level in Cordeaux Reservoir at RL 299.3m
Permeability of upper BGSS (30m) unchanged

Contours of pressure head (m)
and flux sections (m3/s)



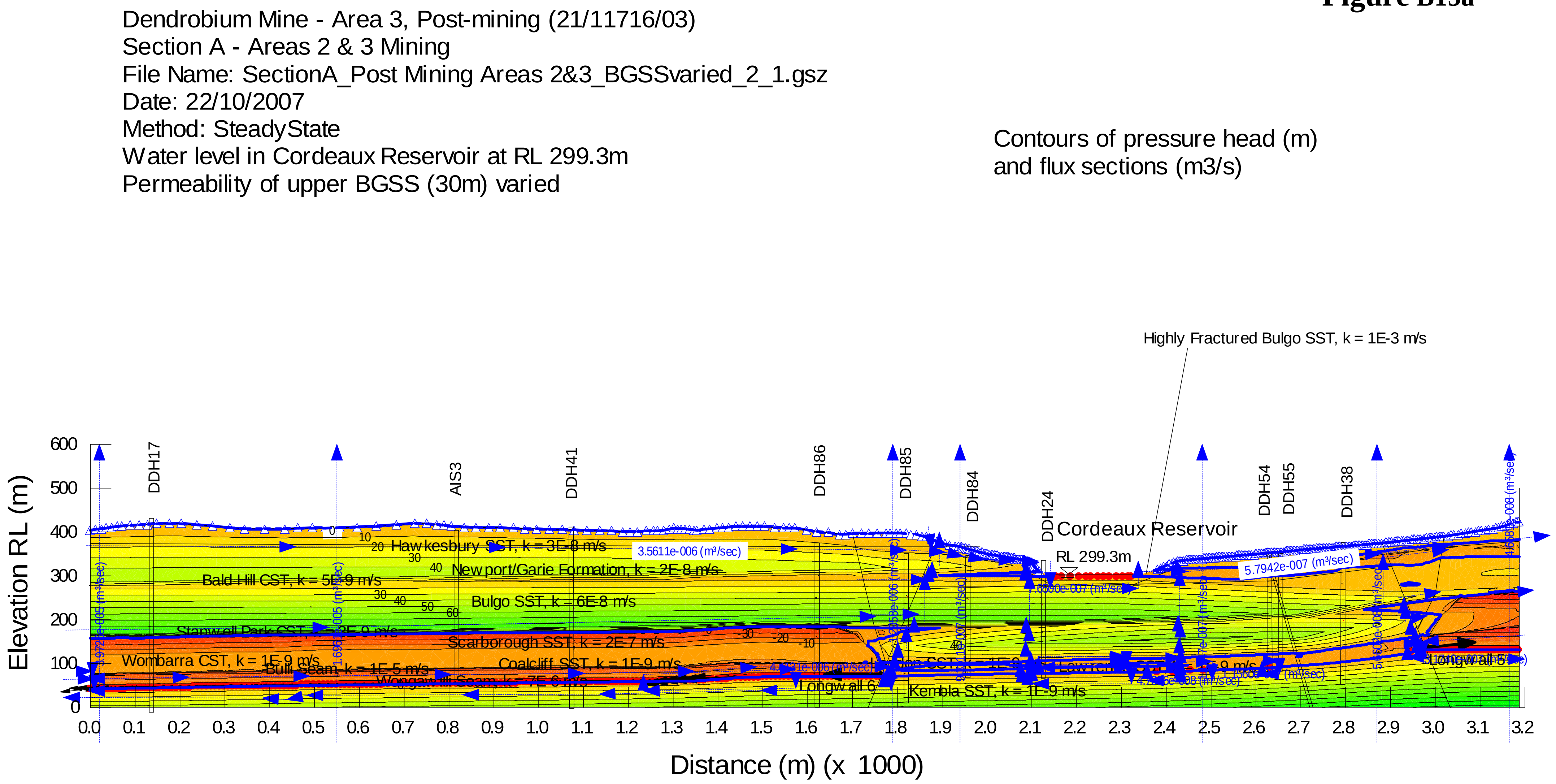
Post mining of Areas 2 & 3 - Case 1 (cont.): Contours of pressure head and flux sections

Figure B14b

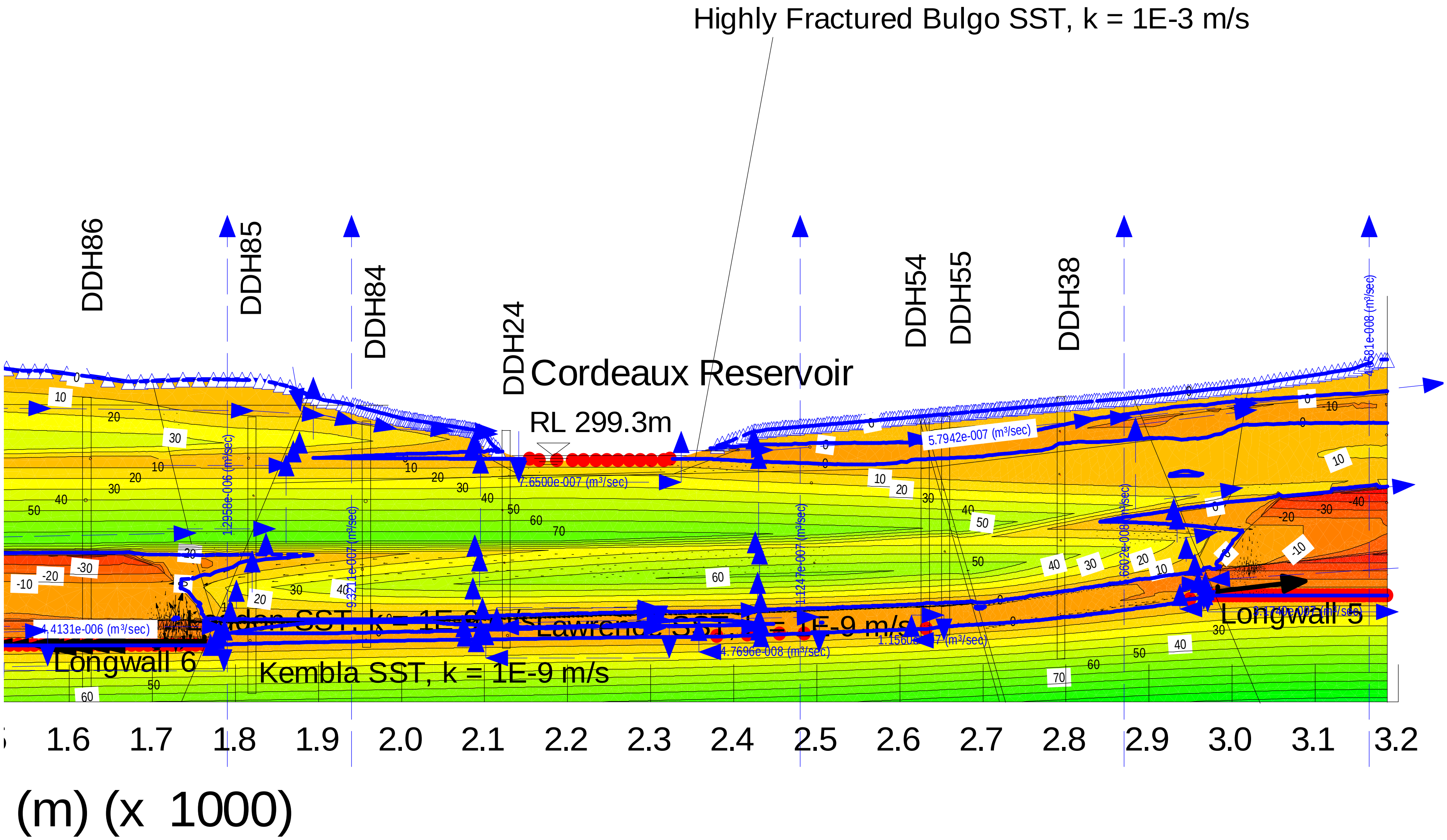


Post mining of Areas 2 & 3 - Case 2: Contours of pressure head and flux sections

Figure B15a



Post mining of Areas 2 & 3 - Case 2 (cont.): Contours of pressure head and flux sections

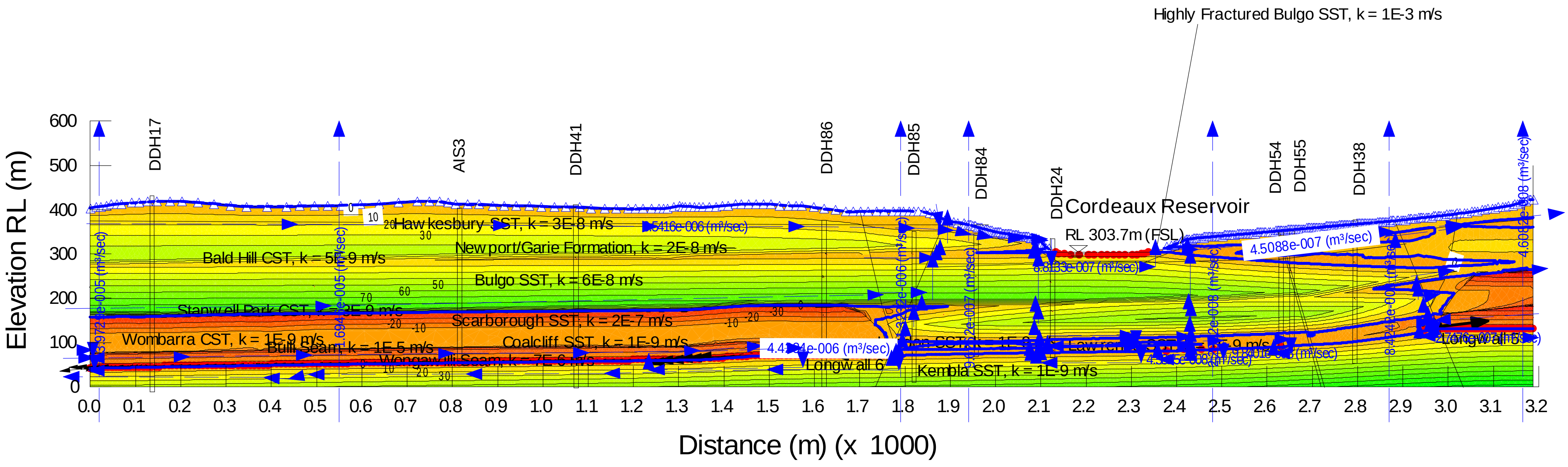


Post mining of Areas 2 & 3 - Case 3: Contours of pressure head and flux sections

Figure B16a

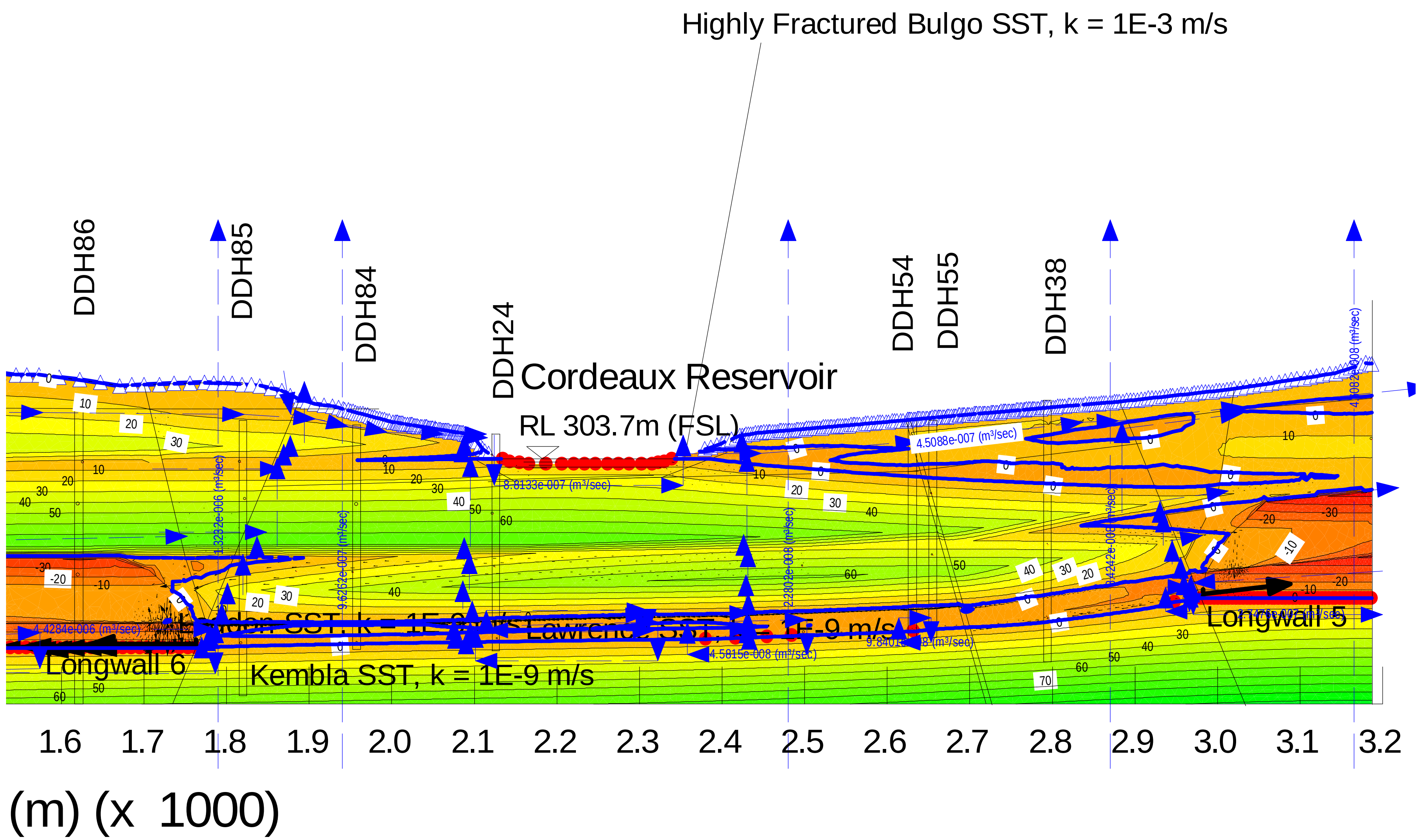
Dendrobium Mine - Area 3, Post-mining (21/11716/03)
Section A - Areas 2 & 3 Mining
File Name: SectionA_Post Mining Areas 2&3_BGSSunchanged_2_2.gsz
Date: 19/10/2007
Method: SteadyState
Water level in Cordeaux Reservoir at RL 303.7m (FSL)
Permeability of upper BGSS (30m) unchanged

Contours of pressure head (m)
and flux sections (m3/s)



Post mining of Areas 2 & 3 - Case 3 (cont.): Contours of pressure head and flux sections

Figure B16b



Post mining of Areas 2 & 3 - Case 4: Contours of pressure head and flux sections

Figure B17a

Dendrobium Mine - Area 3, Post-mining (21/11716/03)
Section A - Areas 2 & 3 Mining
File Name: SectionA_Post Mining Areas 2&3_BGSSvaried_2_2.gsz
Date: 22/10/2007
Method: SteadyState
Water level in Cordeaux Reservoir at RL 303.7m (FSL)
Permeability of upper BGSS (30m) varied

Contours of pressure head (m)
and flux sections (m3/s)

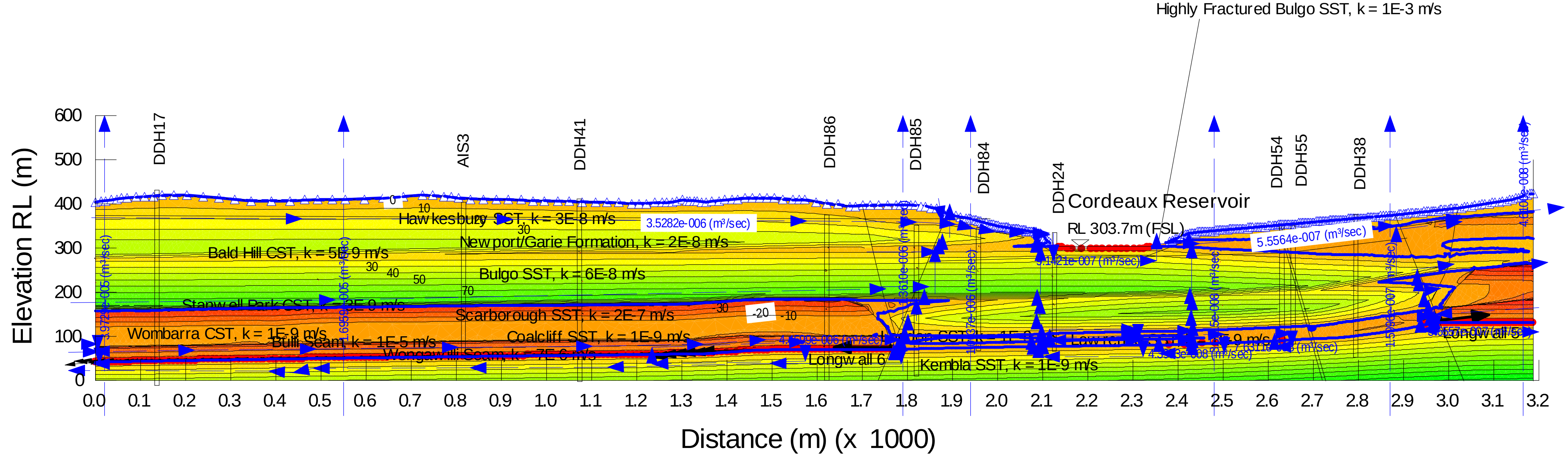
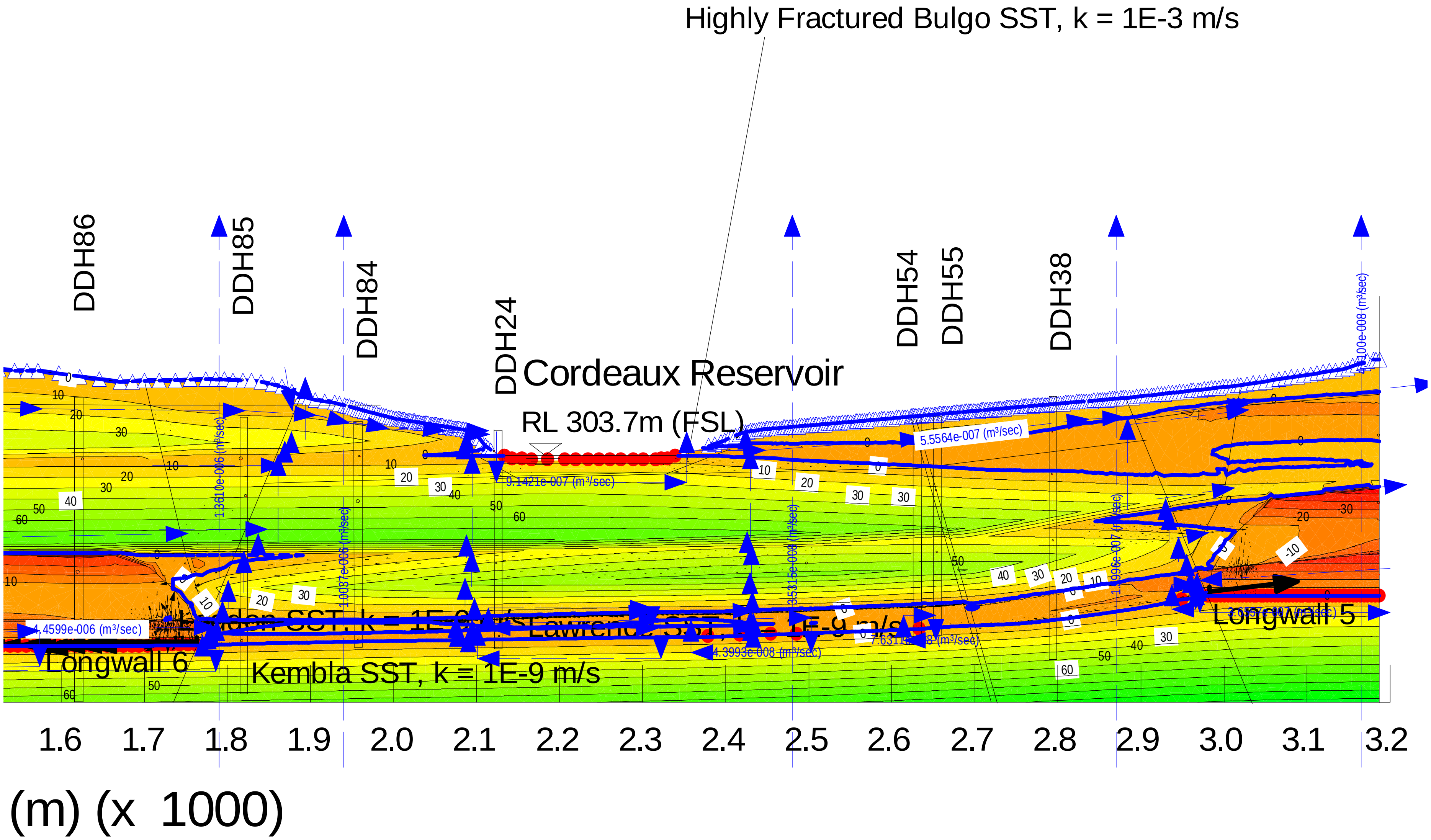


Figure B17b

Post mining of Areas 2 & 3 - Case 4 (cont.): Contours of pressure head and flux sections



PROJECT: DENDROBIUM MINE - AREA 3
JOB No.: 21/11716/03

Table B1: Permeabilities adopted in seepage analyses.

Zone Type	Rock/Coal Type	Material ID	Pre-mining			Area 2 Mining						Areas 2 & 3 Mining					
			Cases 1 & 2			Cases 1 & 3			Cases 2 & 4			Cases 1 & 3			Cases 2 & 4		
			k_H (m/s)	k_V (m/s)	k_V/k_H	k_H (m/s)	k_V (m/s)	k_V/k_H	k_H (m/s)	k_V (m/s)	k_V/k_H	k_H (m/s)	k_V (m/s)	k_V/k_H	k_H (m/s)	k_V (m/s)	k_V/k_H
Unchanged	HBSS	1	3.00E-08	3.00E-09	0.100	3.00E-08	3.00E-09	0.100	3.00E-08	3.00E-09	0.100	3.00E-08	3.00E-09	0.100	3.00E-08	3.00E-09	0.100
	NP/GR FM	2	2.00E-08	2.00E-09	0.100	2.00E-08	2.00E-09	0.100	2.00E-08	2.00E-09	0.100	2.00E-08	2.00E-09	0.100	2.00E-08	2.00E-09	0.100
	BACS	3	5.00E-09	5.00E-10	0.100	5.00E-09	5.00E-10	0.100	5.00E-09	5.00E-10	0.100	5.00E-09	5.00E-10	0.100	5.00E-09	5.00E-10	0.100
	BGSS	4	6.00E-08	6.00E-09	0.100	6.00E-08	6.00E-09	0.100	6.00E-08	6.00E-09	0.100	6.00E-08	6.00E-09	0.100	6.00E-08	6.00E-09	0.100
	SPCS	5	3.00E-09	3.00E-10	0.100	3.00E-09	3.00E-10	0.100	3.00E-09	3.00E-10	0.100	3.00E-09	3.00E-10	0.100	3.00E-09	3.00E-10	0.100
	SBSS	6	2.00E-07	2.00E-08	0.100	2.00E-07	2.00E-08	0.100	2.00E-07	2.00E-08	0.100	2.00E-07	2.00E-08	0.100	2.00E-07	2.00E-08	0.100
	WBCS	7	1.00E-09	1.00E-10	0.100	1.00E-09	1.00E-10	0.100	1.00E-09	1.00E-10	0.100	1.00E-09	1.00E-10	0.100	1.00E-09	1.00E-10	0.100
	CCSS	8	1.00E-09	1.00E-10	0.100	1.00E-09	1.00E-10	0.100	1.00E-09	1.00E-10	0.100	1.00E-09	1.00E-10	0.100	1.00E-09	1.00E-10	0.100
	BUCO	9	1.00E-05	1.00E-06	0.100	1.00E-05	1.00E-06	0.100	1.00E-05	1.00E-06	0.100	1.00E-05	1.00E-06	0.100	1.00E-05	1.00E-06	0.100
	LDSS	10	1.00E-09	1.00E-10	0.100	1.00E-09	1.00E-10	0.100	1.00E-09	1.00E-10	0.100	1.00E-09	1.00E-10	0.100	1.00E-09	1.00E-10	0.100
	LRSS	11	1.00E-09	1.00E-10	0.100	1.00E-09	1.00E-10	0.100	1.00E-09	1.00E-10	0.100	1.00E-09	1.00E-10	0.100	1.00E-09	1.00E-10	0.100
	WWCO	12	5.00E-07	5.00E-08	0.100	5.00E-07	5.00E-08	0.100	5.00E-07	5.00E-08	0.100	5.00E-07	5.00E-08	0.100	5.00E-07	5.00E-08	0.100
	KBSS	13	1.00E-09	1.00E-10	0.100	1.00E-09	1.00E-10	0.100	1.00E-09	1.00E-10	0.100	1.00E-09	1.00E-10	0.100	1.00E-09	1.00E-10	0.100
	Highly Fractured BGSS	14	1.00E-03	1.00E-05	0.010	1.00E-03	1.00E-05	0.010	1.00E-03	1.00E-05	0.010	1.00E-03	1.00E-05	0.010	1.00E-03	1.00E-05	0.010
Constrained	HBSS	15				9.00E-08	3.00E-09	0.033	9.00E-08	3.00E-09	0.033	9.00E-08	3.00E-09	0.033	9.00E-08	3.00E-09	0.033
	NP/GR FM	16				6.00E-08	2.00E-09	0.033	6.00E-08	2.00E-09	0.033	6.00E-08	2.00E-09	0.033	6.00E-08	2.00E-09	0.033
	BACS	17				1.50E-08	5.00E-10	0.033	1.50E-08	5.00E-10	0.033	1.50E-08	5.00E-10	0.033	1.50E-08	5.00E-10	0.033
	BGSS	18				1.80E-07	6.00E-09	0.033	1.80E-07	6.00E-09	0.033	1.80E-07	6.00E-09	0.033	1.80E-07	6.00E-09	0.033
	SPCS	19				9.00E-09	3.00E-10	0.033	9.00E-09	3.00E-10	0.033	9.00E-09	3.00E-10	0.033	9.00E-09	3.00E-10	0.033
	SBSS	20				6.00E-07	2.00E-08	0.033	6.00E-07	2.00E-08	0.033	6.00E-07	2.00E-08	0.033	6.00E-07	2.00E-08	0.033
	WBCS	21				3.00E-09	1.00E-10	0.033	3.00E-09	1.00E-10	0.033	3.00E-09	1.00E-10	0.033	3.00E-09	1.00E-10	0.033
	CCSS	22				3.00E-09	1.00E-10	0.033	3.00E-09	1.00E-10	0.033	3.00E-09	1.00E-10	0.033	3.00E-09	1.00E-10	0.033
	BUCO	23				3.00E-05	1.00E-06	0.033	3.00E-05	1.00E-06	0.033	3.00E-05	1.00E-06	0.033	3.00E-05	1.00E-06	0.033
	LDSS	24				3.00E-09	1.00E-10	0.033	3.00E-09	1.00E-10	0.033	3.00E-09	1.00E-10	0.033	3.00E-09	1.00E-10	0.033
	LRSS	25				3.00E-09	1.00E-10	0.033	3.00E-09	1.00E-10	0.033	3.00E-09	1.00E-10	0.033	3.00E-09	1.00E-10	0.033
	WWCO	26				1.50E-06	5.00E-08	0.033	1.50E-06	5.00E-08	0.033	1.50E-06	5.00E-08	0.033	1.50E-06	5.00E-08	0.033
Fractured	SBSS	27				2.00E-05	2.00E-05	1.000	2.00E-05	2.00E-05	1.000	2.00E-05	2.00E-05	1.000	2.00E-05	2.00E-05	1.000
	WBCS	28				1.00E-07	1.00E-07	1.000	1.00E-07	1.00E-07	1.000	1.00E-07	1.00E-07	1.000	1.00E-07	1.00E-07	1.000
	CCSS	29				1.00E-07	1.00E-07	1.000	1.00E-07	1.00E-07	1.000	1.00E-07	1.00E-07	1.000	1.00E-07	1.00E-07	1.000
Caved	BUCO	30				1.00E-03	1.00E-03	1.000	1.00E-03	1.00E-03	1.000	1.00E-03	1.00E-03	1.000	1.00E-03	1.00E-03	1.000
	LDSS	30				1.00E-03	1.00E-03	1.000	1.00E-03	1.00E-03	1.000	1.00E-03	1.00E-03	1.000	1.00E-03	1.00E-03	1.000
	LRSS	30				1.00E-03	1.00E-03	1.000	1.00E-03	1.00E-03	1.000	1.00E-03	1.00E-03	1.000	1.00E-03	1.00E-03	1.000
	WWCO	30				1.00E-03	1.00E-03	1.000	1.00E-03	1.00E-03	1.000	1.00E-03	1.00E-03	1.000	1.00E-03	1.00E-03	1.000
Rib	HBSS	31				3.00E-08	9.00E-09	0.300	3.00E-08	9.00E-09	0.300	3.00E-08	9.00E-09	0.300	3.00E-08	9.00E-09	0.300
	NP/GR FM	32				2.00E-08	6.00E-09	0.300	2.00E-08	6.00E-09	0.300	2.00E-08	6.00E-09	0.300	2.00E-08	6.00E-09	0.300
	BACS	33				5.00E-09	1.50E-09	0.300	5.00E-09	1.50E-09	0.300	5.00E-09	1.50E-09	0.300	5.00E-09	1.50E-09	0.300
	BGSS	34				6.00E-08	1.80E-08	0.300	6.00E-08	1.80E-08	0.300	6.00E-08	1.80E-08	0.300	6.00E-08	1.80E-08	0.300
	SPCS	35				3.00E-09	9.00E-10	0.300	3.00E-09	9.00E-10	0.300	3.00E-09	9.00E-10	0.300	3.00E-09	9.00E-10	0.300
	SBSS	36				*2.00E-07*	*2.00E-07*	*1.000*	*2.00E-07*	*2.00E-07*	*1.000*	*2.00E-07*	*2.00E-07*	*1.000*	*2.00E-07*	*2.00E-07*	*1.000*
	WBCS	37				*1.00E-09*	*1.00E-09*	*1.000*	*1.00E-09*	*1.00E-09*	*1.000*	*1.00E-09*	*1.00E-09*	*1.000*	*1.00E-09*	*1.00E-09*	*1.000*
	CCSS	38				*1.00E-09*	*1.00E-09*	*1.000*	*1.00E-09*	*1.00E-09*	*1.000*	*1.00E-09*	*1.00E-09*	*1.000*	*1.00E-09*	*1.00E-09*	*1.000*
Rock Mass between Cordeaux Reservoir and Rib Zone	BGSS (Upper layer of 30m thick)	39				6.00E-08	6.00E-09	0.100	**1.80E-07**	6.00E-09	0.033	6.00E-08	6.00E-09	0.100	**1.80E-07**	6.00E-09	0.033

Notes:

1. Contrained Zone: Horizontal permeability (k_H) increases by a factor of 3 from the Unchanged Zone values and the vertical permeability (k_V) remains the same as the Unchanged Zone values.

2. Fractured Zone: k_H increases by two orders of magnitude (x 100) from the Unchanged Zone values and the ratio $k_V/k_H = 1$.

3. Caved Zone: $k_H = k_V = 1x10^{-3}$ m/s.

4. Rib Zone: k_H remains the same as Unchanged Zone and the permeability ratio of upper Rib Zone is $k_V/k_H = 0.3$ and lower one is $k_V/k_H = 1$.

PROJECT: DENDROBIUM MINE - AREA 3
JOB No.: 21/11716/03

<u>Table B2:</u> Boundary conditions for seepage analyses.

Mining State	Case Number	Total Head* (m)									Pressure Head (m)					Rainfall Infiltration**, q (m/s)
		H_1 (BUCO)	H_2 (WWCO)	H_3 (BUCO)	H_4 (WWCO)	H_5 (BGSS)	H_6 (SBSS)	H_7 (BUCO)	H_8 (WWCO)	H_9 (Reservoir)	H_{P1} (LW6)	H_{P2} (Headings 1-4)	H_{P3} (Shafts 2-3)	H_{P4} (Heading 5)	H_{P5} (LW5)	
Pre-mining	1	210	241.5	162	156	378	280	202	191	299.3						3.82E-08
	2	210	241.5	162	156	378	280	202	191	303.7						3.82E-08
Post mining in Area 2	1	210	241.5	162	156	NF	NF	NF	NF	299.3			0	0	0	3.82E-08
	2	210	241.5	162	156	NF	NF	NF	NF	299.3			0	0	0	3.82E-08
	3	210	241.5	162	156	NF	NF	NF	NF	303.7			0	0	0	3.82E-08
	4	210	241.5	162	156	NF	NF	NF	NF	303.7			0	0	0	3.82E-08
Post mining in Areas 2 & 3	1	NF	NF			NF	NF	NF	NF	299.3	0	0	0	0	0	3.82E-08
	2	NF	NF			NF	NF	NF	NF	299.3	0	0	0	0	0	3.82E-08
	3	NF	NF			NF	NF	NF	NF	303.7	0	0	0	0	0	3.82E-08
	4	NF	NF			NF	NF	NF	NF	303.7	0	0	0	0	0	3.82E-08

<u>Note:</u>
* NF is no flow boundary condition.
** Rainfall infiltration is applied with nodal pressure veriews allowed.

PROJECT: DENDROBIUM MINE - AREA 3
JOB No.: 21/11716/03

Table B3: Pre-mining permeabilities adopted for the back anlysis with an anisotopic permeability ratio (vertical on horizontal) of k_V/k_H = 0.1

Rock/Coal Type	Pre-mining Horizontal Permeability, k_H* (m/s)				
	Runs 1 to 12	Run 13	Runs 14 to 16	Run 17	Runs 18 to 23 (Cases 1 & 2)
Hawkesbury Sandstone (HBSS)	3.00E-08	3.00E-08	3.00E-08	3.00E-08	3.00E-08
Newport & Garie Formations (NP/GR FM)	2.00E-08	2.00E-08	2.00E-08	2.00E-08	2.00E-08
Bald Hill Claystone (BACS)	5.00E-09	5.00E-09	5.00E-09	5.00E-09	5.00E-09
Bulgo Sandstone (BGSS)	6.00E-08	6.00E-08	6.00E-08	6.00E-08	6.00E-08
Stanwell Park Claystone (SPCS)	3.00E-09	3.00E-09	3.00E-09	3.00E-09	3.00E-09
Scarborough Sandstone (SBSS)	2.00E-07	2.00E-07	2.00E-07	2.00E-07	2.00E-07
Wombarra Claystone (WBCS)	1.00E-09	1.00E-09	1.00E-09	1.00E-09	1.00E-09
Coalcliff Sandstone (CCSS)	1.00E-09	1.00E-09	1.00E-09	1.00E-09	1.00E-09
Bulli Coal Seam (BUCO)	2.00E-06	2.00E-06	2.00E-06	**4.00E-06**	**1.00E-05**
Loddon Sandstone (LDSS)	1.00E-09	1.00E-09	1.00E-09	1.00E-09	1.00E-09
Lawrence Sandstone (LRSS)	1.00E-09	1.00E-09	1.00E-09	1.00E-09	1.00E-09
Wongawilli Coal Seam (WWCO)	1.00E-06	**1.00E-07**	**5.00E-07**	**5.00E-07**	**5.00E-07**
Kembla Sandstone (KBSS)	1.00E-09	1.00E-09	1.00E-09	1.00E-09	1.00E-09
Highly fractured BGSS	1.00E-03	1.00E-03	1.00E-03	1.00E-03	1.00E-03

Note:
* Permeability ratio kv/kh = 0.1 for all Runs except kv/kh = 1.0 for Run 9 & kv/kh = 0.01 for Run 10.

PROJECT: DENDROBIUM MINE - AREA 3
JOB No.: 21/11716/03

Table B4: Total head estimated from the seepage analyses for selected locations along Setion A.

Mining Status	Case No.	Rock/Coal Strata	Total Head (m)															
			LHS		DDH41		DDH86	DDH85		DDH84	DDH24			DDH55	DDH38			RHS
		Modelling Distance, x (m)	0	500	1075	1500	1620	1815	1885	1955	2128	2300	2500	2655	2795	2969	2980	3187
Pre-mining	1	HBSS	404.2	408.7	404.9	412.2	401.5	396.5		361.6			340.9	354.7	367.3			422.0
		BGSS	366.5	364.8	356.4		339.8	328.4		318.5	308.6		313.5	323.0	335.0			378.0
		SBSS	339.6	337.7	328.5		315.5	310.5	309.0	307.5	304.1		298.9	297.4	295.6			280.0
		BUCO	210.0	203.9	192.9	181.8	178.4	172.1		167.4	162.0	162.0	170.5	177.2	184.7			202.0
		WWCO	241.5	218.6	196.2	179.9	175.5	167.9		162.6	156.0	156.0	163.7	170.7	176.6			191.0
	2	HBSS	404.2	408.7	404.9	412.2	401.5	396.5		361.6			340.9	354.7	367.3			422.0
		BGSS	366.9	365.4	357.2		341.3	330.5		321.1	311.8		315.6	324.5	335.9			378.0
		SBSS	340.2	338.3	329.4		316.8	311.9	310.5	308.9	305.6		300.2	298.5	296.4			280.0
		BUCO	210.0	204.0	193.0	181.9	178.5	172.1		167.4	162.0	162.0	170.5	177.2	184.7			202.0
		WWCO	241.5	218.6	196.2	179.9	175.5	167.9		162.6	156.0	156.0	163.7	170.7	176.6			191.0
Post Mining in Area 2	1	HBSS	404.2	408.7	404.9	412.2	401.5	396.5		361.6			340.9	354.7	367.3			422.0
		BGSS	363.4	361.5	352.0		334.7	323.5		313.7	303.0		293.7	288.3	286.5			317.1
		SBSS	335.1	332.7	320.9		302.6	294.5	291.9	289.0	281.4		261.7	251.6	240.1		218.1	
		BUCO	210.0	203.7	192.6	181.5	178.1	171.9		167.2	162.0	162.0	160.2	158.7	157.0	154.4		
		WWCO	241.5	218.5	196.1	179.8	175.3	167.8		162.6	156.0	156.0	122.3	95.5	103.8		131.3	
	2	HBSS	404.2	408.7	404.9	412.2	401.5	396.5		361.6			340.9	354.7	367.3			422.0
		BGSS	363.4	361.5	352.0		334.7	323.5		313.7	303.1		294.0	288.1	284.8			323.9
		SBSS	335.1	332.7	320.9		302.6	294.6	291.9	289.0	281.4		261.7	251.6	240.2		218.2	
		BUCO	210.0	203.7	192.6	181.5	178.1	171.9		167.2	162.0	162.0	160.2	158.7	157.0	154.3		
		WWCO	241.5	218.5	196.1	179.8	175.3	167.8		162.6	156.0	156.0	122.3	95.7	104.6		131.3	
	3	HBSS	404.2	408.7	404.9	412.2	401.5	396.5		361.6			340.9	354.7	367.3			422.0
		BGSS	363.8	362.0	352.8		336.2	325.6		316.4	306.4		296.7	290.1	287.2			305.8
		SBSS	335.7	333.3	321.9		303.9	296.0	293.4	290.5	283.0		263.1	252.7	240.9		218.3	
		BUCO	210.0	203.8	192.6	181.5	178.2	171.9		167.3	162.0	162.0	160.2	158.7	157.0	154.4		
		WWCO	241.5	218.5	196.1	179.8	175.4	167.8		162.6	156.0	156.0	122.3	95.7	104.3		131.3	
	4	HBSS	404.2	408.7	404.9	412.2	401.5	396.5		361.6			340.9	354.7	367.3			422.0
		BGSS	363.9	362.0	352.8		336.3	325.6		316.5	306.5		297.7	291.4	287.8			333.7
		SBSS	335.7	333.4	321.9		304.0	296.1	293.5	290.6	283.2		263.3	252.9	241.0		218.1	
		BUCO	210.0	203.8	192.6	181.5	178.2	171.9		167.3	162.0	162.0	160.2	158.7	157.0	154.4		
		WWCO	241.5	218.5	196.1	179.8	175.4	167.8		162.6	156.0	156.0	122.3	95.7	104.4		131.3	
Post Mining in Areas 2 & 3	1	HBSS	404.2	408.7	404.9	412.2	401.5	396.5		361.6			340.9	354.7	367.3			422.0
		BGSS (top)	291.2	294.1	297.9		301.0	300.2		300.0	308.6		312.4	305.8	318.4			360.5
		BGSS (middle)	275.9	278.3	280.3		288.4	290.3		288.2	285.7		283.1	274.7	274.1			315.2
		SBSS	112.2	120.8	126.9		137.4	169.6	178.2	185.4	201.0		218.5	221.0	220.7		213.7	
		BUCO	42.0	50.0	57.1	69.4	69.5	96.3		97.9	99.9	105.1	109.1	114.9	126.2	133.2		
		WWCO	41.7	50.0	57.1	69.4	69.5	71.7		74.6	77.3	79.8	84.9	92.6	103.7		131.3	
	2	HBSS	404.2	408.7	404.9	412.2	401.5	396.5		361.6			340.9	354.7	367.3			422.0
		BGSS (top)	291.2	294.2	298.1		301.2	300.5		300.7	308.6		310.1	308.3	325.8			374.5
		BGSS (middle)	276.0	278.3	280.5		288.7	290.7		289.0	286.5		288.9	281.7	282.1			334.5
		SBSS	111.2	120.8	126.9		136.9	169.6	178.4	185.7	201.7		220.0	222.7	222.3		214.5	
		BUCO	42.0	50.0	57.1	69.4	69.5	96.3		97.8	99.8	105.0	109.0	114.7	126.1	133.3		
		WWCO	41.7	50.0	57.1	69.4	69.5	71.7		74.6	77.3	79.8	84.9	92.7	104.5		131.3	
	3	HBSS	404.2	408.7	404.9	412.2	401.5	396.5		361.6			340.9	354.7	367.3			422.0
		BGSS (top)	291.5	294.5	298.4		301.9	301.6		302.2	307.2		308.6	316.5	331.0			375.3
		BGSS (middle)	276.3	278.6	280.8		289.3	291.9		290.6	288.9		287.7	277.6	275.4			339.2
		SBSS	111.6	120.2	126.9		137.3	169.8	178.5	185.8	201.9		219.6	221.9	221.4		213.8	
		BUCO	42.0	50.0	57.1	69.4	69.5	96.3		97.9	99.9	105.1	109.1	114.9	126.3	133.3		
		WWCO	41.7	50.0	57.1	69.4	69.5	71.7		74.6	77.3	79.8	84.8	92.4	102.8		131.3	
	4	HBSS	404.2	408.7	404.9	412.2	401.5	396.5		361.6			340.9	354.7	367.3			422.0
		BGSS (top)	291.5	294.5	298.6		302.4	302.5		303.6	307.2		311.4	310.8	329.7			374.7
		BGSS (middle)	276.2	278.6	281.0		289.8	292.7		291.6	289.9		292.2	284.6	283.6			326.5
		SBSS	112.1	120.7	126.9		136.1	169.9	178.8	186.3	202.7		221.1	223.7	223.1		214.7	
		BUCO	42.0	50.0	57.1	69.4	69.5	96.4		97.9	100.0	105.2	109.1	114.9	126.3	133.3		
		WWCO	41.7	50.0	57.1	69.4	69.5	71.7		74.6	77.3	79.8	84.8	92.1	101.9		131.3	

PROJECT: DENDROBIUM MINE - AREA 3
JOB No.: 21/11716/03

Table B5: Selected flux sections estimated from the seepage analyses.

Flux Section Q_{out} (m3/s/m run)

Mining Status	Case No.	Water Level at Cordeaux Reservoir, RL (m)	LHS Rainfall Infiltration	LW 6	Base of Constrained Zone	Before LHS Rib Zone					Rib Zone (Downwards Flow)				After LHS Rib Zone							LHS of Cordeaux Reservoir							Cordeaux Reservoir	Immediately Below Reservoir			Headings 1 to 4	Shaft 3	RHS of Cordeaux Reservoir							Before RHS Rib Zone				LW 5	RHS Rainfall Infiltration
						Top HBSS	Bottom HBSS	NP/GR FM	BACS	BGSS	Base of Top HBSS	Base of Bottom HBSS	Top BGSS	Base BGSS	HBSS	NP/GR FM	BACS	BGSS	SBSS	BUCO	WWCO	All Strata	HBSS	NP/GR FM	BACS	Top BGSS	Entire BGSS	SBSS		Base of BGSS	BUCO	WWCO			All Strata	BACS	Top BGSS	Entire BGSS	SBSS	BUCO	WWCO	BGSS	SBSS	BUCO	WWCO		
Pre-mining	1	299.3	1.45E-06										6.57E-08	3.71E-08	1.83E-07	2.51E-08	7.86E-09	4.20E-07	1.89E-07	9.15E-07	1.88E-07	1.99E-06					5.52E-07	1.47E-07	9.64E-07		2.39E-06	4.02E-07			1.79E-06	9.07E-09		4.22E-07	8.35E-08	1.28E-06	1.86E-07	4.41E-07	2.06E-07	1.15E-06	1.64E-07		4.09E-07
	2	303.7 (FSL)	1.41E-06		7.89E-07	2.14E-08	5.36E-08	1.40E-08	3.81E-09	3.34E-07	2.14E-07	1.30E-07	6.35E-08	3.80E-08	1.85E-07	2.50E-08	7.73E-09	3.99E-07	1.84E-07	9.17E-07	1.88E-07	1.96E-06	5.43E-08	3.99E-08	3.69E-08	2.64E-07	5.11E-07	1.46E-07	8.92E-07	3.57E-08	2.39E-06	4.02E-07			1.75E-06	2.00E-08	3.04E-07	3.90E-07	9.17E-08	1.28E-06	1.86E-07	4.27E-07	2.19E-07	1.15E-06	1.64E-07		4.01E-07
Post mining of Area 2	1	299.3	1.56E-06										7.91E-08	5.61E-08	1.78E-07	2.47E-08	7.26E-09	4.09E-07	3.25E-07	9.01E-07	1.87E-07	2.10E-06					4.99E-07	3.52E-07	2.23E-07		7.69E-07	6.08E-07		1.06E-06	1.71E-06	3.35E-11		1.50E-07	4.25E-07	2.80E-07	8.17E-07	8.29E-08	7.22E-07	2.60E-07	1.24E-07	1.10E-06	5.22E-07
	2	299.3	1.56E-06										7.91E-08	5.61E-08	1.78E-07	2.47E-08	7.26E-09	4.09E-07	3.25E-07	9.01E-07	1.87E-07	2.10E-06					4.99E-07	3.52E-07	1.92E-07		7.68E-07	6.07E-07		1.08E-06	1.74E-06	3.51E-10		1.81E-07	4.25E-07	2.81E-07	8.16E-07	1.11E-07	7.16E-07	2.59E-07	1.25E-07	1.07E-06	4.69E-07
	3	303.7	1.52E-06		8.83E-07	2.04E-08	5.17E-08	1.41E-08	4.68E-09	3.33E-07	2.23E-07	1.40E-07	7.68E-08	5.70E-08	1.80E-07	2.45E-08	7.13E-09	3.87E-07	3.20E-07	9.02E-07	1.88E-07	2.08E-06	5.30E-08	3.93E-08	3.23E-08	2.16E-07	4.58E-07	3.51E-07	1.38E-07	1.60E-07	7.73E-07	6.07E-07		1.08E-06	1.76E-06	2.29E-09	8.96E-08	1.93E-07	4.34E-07	2.80E-07	8.16E-07	1.10E-07	7.40E-07	2.60E-07	1.25E-07	1.12E-06	5.00E-07
	4	303.7	1.52E-06										7.68E-08	5.69E-08	1.80E-07	2.45E-08	7.14E-09	3.87E-07	3.19E-07	9.02E-07	1.88E-07	2.08E-06					4.58E-07	3.50E-07	1.07E-07		7.73E-07	6.07E-07		1.08E-06	1.79E-06	4.26E-09		2.23E-07	4.34E-07	2.80E-07	8.16E-07	1.21E-07	7.46E-07	2.60E-07	1.25E-07	1.12E-06	4.71E-07
Post mining of Areas 2 & 3	1	299.3	3.57E-06	4.39E-06									5.18E-07	4.19E-07	5.34E-08	1.84E-08	4.67E-09	5.40E-08	9.93E-07	1.86E-07	5.44E-08	9.01E-07					7.73E-08	6.20E-07	7.94E-07				4.69E-08	1.11E-07	5.36E-08	2.19E-09		2.73E-07	2.09E-07	9.77E-08	3.10E-08	3.70E-08	2.11E-07	4.96E-09	1.26E-07	2.50E-07	4.49E-07
	2	299.3	3.56E-06	4.41E-06									5.15E-07	4.20E-07	5.42E-08	1.83E-08	4.35E-09	4.49E-08	1.01E-06	1.88E-07	5.52E-08	9.32E-07					8.94E-08	6.38E-07	7.65E-07				4.77E-08	1.16E-07	1.13E-07	6.62E-10		2.27E-07	2.23E-07	9.90E-08	3.10E-08	1.75E-08	2.44E-07	5.01E-09	1.26E-07	3.17E-07	5.79E-07
	3	303.7	3.54E-06	4.43E-06	2.85E-06	3.53E-08	1.01E-07	1.52E-08	1.68E-08	5.83E-08	4.83E-07	5.44E-07	5.14E-07	4.23E-07	5.65E-08	1.83E-08	4.30E-09	1.65E-08	1.02E-06	1.88E-07	5.50E-08	9.63E-07	4.29E-08	3.55E-08	7.89E-09	5.45E-08	1.28E-07	6.34E-07	8.81E-07	4.92E-07			4.58E-08	9.84E-08	2.28E-08	1.12E-10	2.45E-07	3.01E-07	2.08E-07	9.86E-08	3.10E-08	3.86E-08	2.30E-07	5.05E-09	1.26E-07	2.75E-07	4.51E-07
	4	303.7	3.53E-06	4.46E-06									5.12E-07	4.25E-07	5.82E-08	1.82E-08	4.01E-09	3.67E-09	1.03E-06	1.90E-07	5.52E-08	1.00E-06					1.55E-07	6.51E-07	9.14E-07				4.40E-08	7.63E-08	3.53E-08	4.54E-09		3.04E-07	2.22E-07	1.00E-07	3.10E-08	5.94E-08	2.67E-07	5.20E-09	1.26E-07	3.66E-07	5.56E-07

Flux Section Q_{out} (l/d/m run)

Mining Status	Case No.	Water Level at Cordeaux Reservoir, RL (m)	LHS Rainfall Infiltration	LW 6	Base of Constrained Zone	Before LHS Rib Zone					Rib Zone (Downwards Flow)				After LHS Rib Zone							LHS of Cordeaux Reservoir							Cordeaux Reservoir	Immediately Below Reservoir			Headings 1 to 4	Shaft 3	RHS of Cordeaux Reservoir							Before RHS Rib Zone				LW 5	RHS Rainfall Infiltration
						Top HBSS	Bottom HBSS	NP/GR FM	BACS	BGSS	Base of Top HBSS	Base of Bottom HBSS	Top BGSS	Base BGSS	HBSS	NP/GR FM	BACS	BGSS	SBSS	BUCO	WWCO	All Strata	HBSS	NP/GR FM	BACS	Top BGSS	Entire BGSS	SBSS		Base of BGSS	BUCO	WWCO			All Strata	BACS	Top BGSS	Entire BGSS	SBSS	BUCO	WWCO	BGSS	SBSS	BUCO	WWCO		
Pre-mining	1	299.3	124.9										5.7	3.2	15.8	2.2	0.7	36.3	16.3	79.0	16.3	171.8					47.7	12.7	83.3		206.2	34.7			154.4	0.8		36.5	7.2	110.7	16.1	38.1	17.8	99.7	14.2		35.3
	2	303.7	122.2		68.2	1.8	4.6	1.2	0.3	28.8	18.5	11.3	5.5	3.3	16.0	2.2	0.7	34.4	15.9	79.2	16.3	169.5	4.7	3.4	3.2	22.8	44.2	12.6	77.1	3.1	206.5	34.7			151.3	1.7	26.3	33.7	7.9	110.8	16.1	36.9	18.9	99.7	14.2		34.6
Post mining of Area 2	1	299.3	134.4										6.8	4.8	15.3	2.1	0.6	35.3	28.1	77.8	16.2	181.8					43.1	30.4	19.3		66.4	52.5		91.6	148.0	0.0		13.0	36.7	24.2	70.6	7.2	62.4	22.4	10.7	94.7	45.1
	2	299.3	134.4										6.8	4.8	15.3	2.1	0.6	35.3	28.1	77.8	16.2	181.8					43.1	30.4	16.6		66.4	52.4		93.7	150.7	0.0		15.6	36.8	24.3	70.5	9.6	61.8	22.4	10.8	92.7	40.5
	3	303.7	131.6		76.3	1.8	4.5	1.2	0.4	28.8	19.3	12.1	6.6	4.9	15.5	2.1	0.6	33.4	27.6	78.0	16.2	179.5	4.6	3.4	2.8	18.6	39.6	30.3	11.9	13.8	66.8	52.4		93.0	152.3	0.2	7.7	16.7	37.5	24.2	70.5	9.5	63.9	22.4	10.8	96.8	43.2
	4	303.7	131.5										6.6	4.9	15.5	2.1	0.6	33.4	27.6	78.0	16.2	179.4					39.6	30.2	9.3		66.8	52.4		93.4	154.8	0.4		19.2	37.5	24.2	70.5	10.5	64.4	22.4	10.8	96.8	40.7
Post mining of Areas 2 & 3	1	299.3	308.2	379.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	44.7	36.2	4.6	1.6	0.4	4.7	85.8	16.0	4.7	77.9					6.7	53.5	68.6				4.1	9.6	4.6	0.2		23.6	18.1	8.4	2.7	3.2	18.2	0.4	10.9	21.6	38.8
	2	299.3	307.7	381.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	44.5	36.3	4.7	1.6	0.4	3.9	87.4	16.3	4.8	80.5					7.7	55.1	66.1				4.1	10.0	9.7	0.1		19.6	19.3	8.6	2.7	1.5	21.1	0.4	10.9	27.4	50.1
	3	303.7	306.0	382.6	246.1	3.1	8.7	1.3	1.4	5.0	41.7	47.0	44.4	36.5	4.9	1.6	0.4	1.4	87.8	16.2	4.8	83.2	3.7	3.1	0.7	4.7	11.0	54.8	76.1	42.5			4.0	8.5	2.0	0.0	21.2	26.0	18.0	8.5	2.7	3.3	19.9	0.4	10.9	23.7	39.0
	4	303.7	304.8	385.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	44.3	36.7	5.0	1.6	0.3	0.3	89.3	16.4	4.8	86.7					13.4	56.2	79.0				3.8	6.6	3.1	0.4		26.2	19.2	8.7	2.7	5.1	23.1	0.4	10.9	31.6	48.0

Relative Flux Ratio to Cordeaux Reservoir FSL Pre-mining

Mining Status	Case No.	Water Level at Cordeaux Reservoir, RL (m)	LHS Rainfall Infiltration	LW 6	Base of Constrained Zone	Before LHS Rib Zone					Rib Zone (Downwards Flow)				After LHS Rib Zone							LHS of Cordeaux Reservoir							Cordeaux Reservoir	Immediately Below Reservoir			Headings 1 to 4	Shaft 3	RHS of Cordeaux Reservoir							Before RHS Rib Zone				LW 5	RHS Rainfall Infiltration
						Top HBSS	Bottom HBSS	NP/GR FM	BACS	BGSS	Base of Top HBSS	Base of Bottom HBSS	Top BGSS	Base BGSS	HBSS	NP/GR FM	BACS	BGSS	SBSS	BUCO	WWCO	All Strata	HBSS	NP/GR FM	BACS	Top BGSS	Entire BGSS	SBSS		Base of BGSS	BUCO	WWCO			All Strata	BACS	Top BGSS	Entire BGSS	SBSS	BUCO	WWCO	BGSS	SBSS	BUCO	WWCO		
Pre-mining	1	299.3	1.62										0.07	0.04	0.21	0.03	0.01	0.47	0.21	1.03	0.21	2.23					0.62	0.16	1.08		2.67	0.45			2.00	0.01		0.47	0.09	1.44	0.21	0.49	0.23	1.29	0.18		0.46
	2	303.7	1.59		0.88	0.02	0.06	0.02	0.00	0.37	0.24	0.15	0.07	0.04	0.21	0.03	0.01	0.45	0.21	1.03	0.21	2.20	0.06	0.04	0.04	0.30	0.57	0.16	1.00	0.04	2.68	0.45			1.96	0.02	0.34	0.44	0.10	1.44	0.21	0.48	0.25	1.29	0.18		0.45
Post mining of Area 2	1	299.3	1.74										0.09	0.06	0.20	0.03	0.01	0.46	0.36	1.01	0.21	2.36					0.56	0.39	0.25		0.86	0.68		1.19	1.92	0.00		0.17	0.48	0.31	0.92	0.09	0.81	0.29	0.14	1.23	0.58
	2	299.3	1.74										0.09	0.06	0.20	0.03	0.01	0.46	0.36	1.01	0.21	2.36					0.56	0.39	0.21		0.86	0.68		1.22	1.95	0.00		0.20	0.48	0.31	0.91	0.12	0.80	0.29	0.14	1.20	0.53
	3	303.7	1.71		0.99	0.02	0.06	0.02	0.01	0.37	0.25	0.16	0.09	0.06	0.20	0.03	0.01	0.43	0.36	1.01	0.21	2.33	0.06	0.04	0.04	0.24	0.51	0.39	0.15	0.18	0.87	0.68		1.21	1.98	0.00	0.10	0.22	0.49	0.31	0.91	0.12	0.83	0.29	0.14	1.26	0.56
	4	303.7	1.71										0.09	0.06	0.20	0.03	0.01	0.43	0.36	1.01	0.21	2.33					0.51	0.39	0.12		0.87	0.68		1.21	2.01	0.00		0.25	0.49	0.31	0.91	0.14	0.84	0.29	0.14	1.26	0.53
Post mining of Areas 2 & 3	1	299.3	4.00	4.92									0.58	0.47	0.06	0.02	0.01	0.06	1.11	0.21	0.06	1.01					0.09	0.69	0.89				0.05	0.12	0.06	0.00		0.31	0.23	0.11	0.03	0.04	0.24	0.01	0.14	0.28	0.50
	2	299.3	3.99	4.95									0.58	0.47	0.06	0.02	0.00	0.05	1.13	0.21	0.06	1.04					0.10	0.71	0.86				0.05	0.13	0.13	0.00		0.25	0.25	0.11	0.03	0.02	0.27	0.01	0.14	0.36	0.65
	3	303.7	3.97	4.96	3.19	0.04	0.11	0.02	0.02	0.07	0.54	0.61	0.58	0.47	0.06	0.02	0.00	0.02	1.14	0.21	0.06	1.08	0.05	0.04	0.01	0.06	0.14	0.71	0.99	0.55			0.05	0.11	0.03	0.00	0.27	0.34	0.23	0.11	0.03	0.04	0.26	0.01	0.14	0.31	0.51
	4	303.7	3.95	5.00									0.57	0.48	0.07	0.02	0.00	0.00	1.16	0.21	0.06	1.13					0.17	0.73	1.02				0.05	0.09	0.04	0.01		0.34	0.25	0.11	0.03	0.07	0.30	0.01	0.14	0.41	0.62

Flux sections realtive to average rainfall over ground surface ("Catchment" Length, L1 = 2948m)

Reference flow = 1.13E-04 (m3/s/m run)

Relative Flux Ratio to the Average Rainfall over Ground Surface

Mining Status	Case No.	Water Level at Cordeaux Reservoir, RL (m)	LHS Rainfall Infiltration	LW 6	Base of Constrained Zone	Before LHS Rib Zone					Rib Zone (Downwards Flow)				After LHS Rib Zone							LHS of Cordeaux Reservoir							Cordeaux Reservoir	Immediately Below Reservoir			Headings 1 to 4	Shaft 3	RHS of Cordeaux Reservoir							Before RHS Rib Zone				LW 5	RHS Rainfall Infiltration
						Top HBSS	Bottom HBSS	NP/GR FM	BACS	BGSS	Base of Top HBSS	Base of Bottom HBSS	Top BGSS	Base BGSS	HBSS	NP/GR FM	BACS	BGSS	SBSS	BUCO	WWCO	All Strata	HBSS	NP/GR FM	BACS	Top BGSS	Entire BGSS	SBSS		Base of BGSS	BUCO	WWCO			All Strata	BACS	Top BGSS	Entire BGSS	SBSS	BUCO	WWCO	BGSS	SBSS	BUCO	WWCO		
Pre-mining	1	299.3	0.0128										0.0006	0.0003	0.0016	0.0002	0.0001	0.0037	0.0017	0.0081	0.0017	0.0177					0.0049	0.0013	0.0086		0.0212	0.0036			0.0159	0.0001		0.0037	0.0007	0.0114	0.0016	0.0039	0.0018	0.0102	0.0015		0.0036
	2	303.7	0.0126		0.0070	0.0002	0.0005	0.0001	0.0000	0.0030	0.0019	0.0012	0.0006	0.0003	0.0016	0.0002	0.0001	0.0035	0.0016	0.0081	0.0017	0.0174	0.0005	0.0004	0.0003	0.0023	0.0045	0.0013	0.0079	0.0003	0.0212	0.0036			0.0155	0.0002	0.0027	0.0035	0.0008	0.0114	0.0017	0.0038	0.0019	0.0102	0.0015		0.0036
Post mining of Area 2	1	299.3	0.0138										0.0007	0.0005	0.0016	0.0002	0.0001	0.0036	0.0029	0.0080	0.0017	0.0187					0.0044	0.0031	0.0020		0.0068	0.0054		0.0094	0.0152	0.0000		0.0013	0.0038	0.0025	0.0073	0.0007	0.0064	0.0023	0.0011	0.0097	0.0046
	2	299.3	0.0138										0.0007	0.0005	0.0016	0.0002	0.0001	0.0036	0.0029	0.0080	0.0017	0.0187					0.0044	0.0031	0.0017		0.0068	0.0054		0.0096	0.0155	0.0000		0.0016	0.0038	0.0025	0.0072	0.0010	0.0064	0.0023	0.0011	0.0095	0.0042
	3	303.7	0.0135		0.0078	0.0002	0.0005	0.0001	0.0000	0.0030	0.0020	0.0012	0.0007	0.0005	0.0016	0.0002	0.0001	0.0034	0.0028	0.0080	0.0017	0.0185	0.0005	0.0003	0.0003	0.0019	0.0041	0.0031	0.0012	0.0014	0.0069	0.0054		0.0096	0.0157	0.0000	0.0008	0.0017	0.0039	0.0025	0.0072	0.0010	0.0066	0.0023	0.0011	0.0099	0.0044
	4	303.7	0.0135										0.0007	0.0005	0.0016	0.0002	0.0001	0.0034	0.0028	0.0080	0.0017	0.0184					0.0041	0.0031	0.0010		0.0069	0.0054		0.0096	0.0159	0.0000		0.0020	0.0039	0.0025	0.0072	0.0011	0.0066	0.0023	0.0011	0.0099	0.0042
Post mining of Areas 2 & 3	1	299.3	0.0317	0.0390									0.0046	0.0037	0.0005	0.0002	0.0000	0.0005	0.0088	0.0016	0.0005	0.0080					0.0007	0.0055	0.0070				0.0004	0.0010	0.0005	0.0000		0.0024	0.0019	0.0009	0.0003	0.0003	0.0019	0.0000	0.0011	0.0022	0.0040
	2	299.3	0.0316	0.0392									0.0046	0.0037	0.0005	0.0002	0.0000	0.0004	0.0090	0.0017	0.0005	0.0083					0.0008	0.0057	0.0068				0.0004	0.0010	0.0010	0.0000		0.0020	0.0020	0.0009	0.0003	0.0002	0.0022	0.0000	0.0011	0.0028	0.0051
	3	303.7	0.0315	0.0393	0.0253	0.0003	0.0009	0.0001	0.0001	0.0005	0.0043	0.0048	0.0046	0.0038	0.0005	0.0002	0.0000	0.0001	0.0090	0.0017	0.0005	0.0085	0.0004	0.0003	0.0001	0.0005	0.0011	0.0056	0.0078	0.0044			0.0004	0.0009	0.0002	0.0000	0.0022	0.0027	0.0018	0.0009	0.0003	0.0003	0.0020	0.0000	0.0011	0.0024	0.0040
	4	303.7	0.0313	0.0396									0.0045	0.0038	0.0005	0.0002	0.0000	0.0000	0.0092	0.0017	0.0005	0.0089					0.0014	0.0058	0.0081				0.0004	0.0007	0.0003	0.0000		0.0027	0.0020	0.0009	0.0003	0.0005	0.0024	0.0000	0.0011	0.0032	0.0049

Flux sections realtive average rainfall over reservoir ("Catchment" length, L2 = 239m)

Reference flow = 9.13E-06 (m3/s/m run)

Relative Flux Ratio to the Average Rainfall over Reservoir

Mining Status	Case No.	Water Level at Cordeaux Reservoir, RL (m)	LHS Rainfall Infiltration	LW 6	Base of Constrained Zone	Before LHS Rib Zone					Rib Zone (Downwards Flow)				After LHS Rib Zone							LHS of Cordeaux Reservoir							Cordeaux Reservoir	Immediately Below Reservoir			Headings 1 to 4	Shaft 3	RHS of Cordeaux Reservoir							Before RHS Rib Zone				LW 5	RHS Rainfall Infiltration
						Top HBSS	Bottom HBSS	NP/GR FM	BACS	BGSS	Base of Top HBSS	Base of Bottom HBSS	Top BGSS	Base BGSS	HBSS	NP/GR FM	BACS	BGSS	SBSS	BUCO	WWCO	All Strata	HBSS	NP/GR FM	BACS	Top BGSS	Entire BGSS	SBSS		Base of BGSS	BUCO	WWCO			All Strata	BACS	Top BGSS	Entire BGSS	SBSS	BUCO	WWCO	BGSS	SBSS	BUCO	WWCO		
Pre-mining	1	299.3	0.1584										0.0072	0.0041	0.0201	0.0027	0.0009	0.0460	0.0207	0.1002	0.0206	0.2177					0.0604	0.0161	0.1056		0.2613	0.0440			0.1957	0.0010		0.0462	0.0091	0.1403	0.0204	0.0483	0.0225	0.1264	0.0179		0.0448
	2	303.7	0.1549		0.0864	0.0023	0.0059	0.0015	0.0004	0.0366	0.0234	0.0143	0.0070	0.0042	0.0203	0.0027	0.0008	0.0437	0.0201	0.1004	0.0206	0.2149	0.0059	0.0044	0.0040	0.0289	0.0560	0.0160	0.0977	0.0039	0.2618	0.0440			0.1918	0.0022	0.0333	0.0428	0.0100	0.1404	0.0204	0.0468	0.0240	0.1264	0.0179		0.0439
Post mining of Area 2	1	299.3	0.1703										0.0087	0.0061	0.0194	0.0027	0.0008	0.0448	0.0356	0.0987	0.0205	0.2305					0.0546	0.0386	0.0245		0.0842	0.0666		0.1161	0.1876	0.0000		0.0164	0.0466	0.0307	0.0895	0.0091	0.0791	0.0285	0.0136	0.1200	0.0572
	2	299.3	0.1703										0.0087	0.0061	0.0194	0.0027	0.0008	0.0448	0.0356	0.0986	0.0205	0.2305					0.0546	0.0386	0.0210		0.0841	0.0664		0.1187	0.1910	0.0000		0.0198	0.0466	0.0308	0.0893	0.0122	0.0784	0.0284	0.0136	0.1175	0.0514
	3	303.7	0.1668		0.0967	0.0022	0.0057	0.0015	0.0005	0.0365	0.0244	0.0153	0.0084	0.0062	0.0197	0.0027	0.0008	0.0424	0.0350	0.0988	0.0205	0.2276	0.0058	0.0043	0.0035	0.0236	0.0502	0.0384	0.0151	0.0175	0.0846	0.0665		0.1179	0.1931	0.0003	0.0098	0.0211	0.0476	0.0307	0.0894	0.0120	0.0811	0.0285	0.0136	0.1227	0.0547
	4	303.7	0.1667										0.0084	0.0062	0.0197	0.0027	0.0008	0.0424	0.0349	0.0988	0.0205	0.2274					0.0502	0.0383	0.0117		0.0847	0.0664		0.1184	0.1963	0.0005		0.0244	0.0475	0.0307	0.0893	0.0133	0.0817	0.0285	0.0136	0.1227	0.0516
Post mining of Areas 2 & 3	1	299.3	0.3907	0.4805									0.0567	0.0458	0.0059	0.0020	0.0005	0.0059	0.1088	0.0203	0.0060	0.0987					0.0085	0.0679	0.0869				0.0051	0.0121	0.0059	0.0002		0.0299	0.0229	0.0107	0.0034	0.0041	0.0231	0.0005	0.0138	0.0273	0.0492
	2	299.3	0.3900	0.4834									0.0564	0.0460	0.0059	0.0020	0.0005	0.0049	0.1108	0.0206	0.0060	0.1021					0.0098	0.0698	0.0838				0.0052	0.0127	0.0123	0.0001		0.0249	0.0244	0.0108	0.0034	0.0019	0.0267	0.0005	0.0138	0.0348	0.0635
	3	303.7	0.3880	0.4850	0.3119	0.0039	0.0111	0.0017	0.0018	0.0064	0.0529	0.0596	0.0562	0.0463	0.0062	0.0020	0.0005	0.0018	0.1113	0.0206	0.0060	0.1054	0.0047	0.0039	0.0009	0.0060	0.0140	0.0695	0.0965	0.0538			0.0050	0.0108	0.0025	0.0000	0.0269	0.0330	0.0228	0.0108	0.0034	0.0042	0.0252	0.0006	0.0138	0.0301	0.0494
	4	303.7	0.3864	0.4885									0.0561	0.0465	0.0064	0.0020	0.0004	0.0004	0.1133	0.0208	0.0061	0.1100					0.0170	0.0713	0.1001				0.0048	0.0084	0.0039	0.0005		0.0332	0.0243	0.0110	0.0034	0.0065	0.0292	0.0006	0.0138	0.0400	0.0609

Flux sections realtive to the Longwall 6 output flux of Case 3 of Post mining Areas 2 & 3

Reference flow = 9.13E-06 (m3/s/m run)

Relative Flux Ratio to the Longwall 6 output flux of Case 3 of Post mining Areas 2 & 3

Mining Status	Case No.	Water Level at Cordeaux Reservoir, RL (m)	LHS Rainfall Infiltration	LW 6	Base of Constrained Zone	Before LHS Rib Zone					Rib Zone (Downwards Flow)				After LHS Rib Zone							LHS of Cordeaux Reservoir							Cordeaux Reservoir	Immediately Below Reservoir			Headings 1 to 4	Shaft 3	RHS of Cordeaux Reservoir							Before RHS Rib Zone				LW 5	RHS Rainfall Infiltration
						Top HBSS	Bottom HBSS	NP/GR FM	BACS	BGSS	Base of Top HBSS	Base of Bottom HBSS	Top BGSS	Base BGSS	HBSS	NP/GR FM	BACS	BGSS	SBSS	BUCO	WWCO	All Strata	HBSS	NP/GR FM	BACS	Top BGSS	Entire BGSS	SBSS		Base of BGSS	BUCO	WWCO			All Strata	BACS	Top BGSS	Entire BGSS	SBSS	BUCO	WWCO	BGSS	SBSS	BUCO	WWCO		
Pre-mining	1	299.3	0.3266										0.0148	0.0084	0.0414	0.0057	0.0018	0.0949	0.0426	0.2066	0.0425	0.4490					0.1246	0.0332	0.2177		0.5388	0.0907			0.4036	0.0020		0.0953	0.0189	0.2893	0.0420	0.0996	0.0465	0.2606	0.0370		0.0923
	2	303.7	0.3193		0.1782	0.0048	0.0121	0.0032	0.0009	0.0754	0.0483	0.0294	0.0143	0.0086	0.0418	0.0056	0.0017	0.0900	0.0415	0.2070	0.0425	0.4431	0.0123	0.0090	0.0083	0.0597	0.1154	0.0330	0.2015	0.0081	0.5397	0.0907			0.3954	0.0045	0.0687	0.0881	0.0207	0.2895	0.0420	0.0964	0.0494	0.2606	0.0370		0.0904
Post mining of Area 2	1	299.3	0.3512										0.0179	0.0127	0.0401	0.0056	0.0016	0.0923	0.0734	0.2034	0.0423	0.4752					0.1127	0.0795	0.0505		0.1736	0.1372		0.2394	0.3869	0.0000		0.0339	0.0960	0.0633	0.1844	0.0187	0.1631	0.0587	0.0280	0.2475	0.1178
	2	299.3	0.3512										0.0179	0.0127	0.0401	0.0056	0.0016	0.0923	0.0734	0.2034	0.0423	0.4752					0.1126	0.0795	0.0433		0.1735	0.1370		0.2448	0.3939	0.0001		0.0409	0.0961	0.0634	0.1842	0.0251	0.1617	0.0586	0.0281	0.2423	0.1060
	3	303.7	0.3439		0.1995	0.0046	0.0117	0.0032	0.0011	0.0753	0.0503	0.0316	0.0174	0.0129	0.0406	0.0055	0.0016	0.0874	0.0722	0.2037	0.0423	0.4693	0.0120	0.0089	0.0073	0.0487	0.1035	0.0792	0.0312	0.0360	0.1745	0.1370		0.2430	0.3981	0.0005	0.0202	0.0435	0.0981	0.0632	0.1842	0.0248	0.1671	0.0587	0.0281	0.2529	0.1128
	4	303.7	0.3437										0.0173	0.0129	0.0406	0.0055	0.0016	0.0873	0.0720	0.2037	0.0423	0.4688					0.1034	0.0790	0.0242		0.1745	0.1370		0.2441	0.4047	0.0010		0.0503	0.0980	0.0632	0.1842	0.0274	0.1684	0.0587	0.0281	0.2529	0.1063
Post mining of Areas 2 & 3	1	299.3	0.8056	0.9907									0.1169	0.0945	0.0121	0.0041	0.0011	0.0122	0.2243	0.0419	0.0123	0.2035					0.0174	0.1399	0.1792				0.0106	0.0250	0.0121	0.0005		0.0617	0.0473	0.0221	0.0070	0.0084	0.0476	0.0011	0.0285	0.0564	0.1015
	2	299.3	0.8042	0.9966									0.1162	0.0948	0.0122	0.0041	0.0010	0.0101	0.2285	0.0425	0.0125	0.2105					0.0202	0.1440	0.1728				0.0108	0.0261	0.0254	0.0001		0.0514	0.0503	0.0224	0.0070	0.0040	0.0551	0.0011	0.0285	0.0717	0.1308
	3	303.7	0.7999	1.0000	0.6432	0.0080	0.0228	0.0034	0.0038	0.0132	0.1090	0.1229	0.1160	0.0955	0.0127	0.0041	0.0010	0.0037	0.2294	0.0424	0.0124	0.2174	0.0097	0.0080	0.0018	0.0123	0.0289	0.1432	0.1990	0.1110			0.0103	0.0222	0.0051	0.0000	0.0554	0.0680	0.0470	0.0223	0.0070	0.0087	0.0520	0.0011	0.0285	0.0621	0.1018
	4	303.7	0.7967	1.0072									0.1157	0.0959	0.0131	0.0041	0.0009	0.0008	0.2335	0.0429	0.0125	0.2267					0.0350	0.1469	0.2065				0.0099	0.0172	0.0080	0.0010		0.0685	0.0501	0.0227	0.0070	0.0134	0.0603	0.0012	0.0284	0.0826	0.1255