Itasca Denver, Inc.
143 Union Blvd., Ste. 525
Lakewood, Colorado 80228 USA
tel: +1.303.969.8033 fax: +1.303.969.8357
e-mail: itasca@itascadenver.com http:www.itascadenver.com

TECHNICAL MEMORANDUM

TO: Julie L'Heureux – De Beers Canada
Jesse Clark – De Beers Canada **1780**

FROM: Houmao Liu
Dong Ding

DATE: 30 August 2013

SUBJECT: Executive Summary of Groundwater Flow Model Update

DESCRIPTION OF GROUNDWATER FLOW MODEL UPDATE

1) Itasca compiled and analyzed hydrogeologic data provided by the engineers at Snap Lake mine.
2) Based on the analysis and input from the engineers at Snap Lake mine, Itasca updated the conceptual groundwater flow model and TDS calculation model.
3) The previous groundwater flow model developed by Hydrologic Consultants, Inc. (HCI) was updated with the new hydrogeologic data.
4) The updated groundwater flow model was calibrated to the measured mine inflow rates from 2004 to 2013.
5) A mixing approach was used to estimate the total dissolved solid (TDS) concentrations in the mine water for comparison with the measured TDS concentrations.
6) The calibrated groundwater flow model was used to predict future mine inflow rates based on the future mine plans provided by the engineers at Snap Lake mine.
7) Four sensitivity runs were conducted to evaluate the sensitivity of the simulated inflow rates on the spatial extent and the hydraulic conductivity of the structural zones.
8) Volumetric mixing approaches were used to estimate TDS concentrations of future mine water.

MODEL LIMITATIONS

The groundwater flow model is well calibrated to the measured inflow rate. However, the predicted results are sensitive to the following major factors:

- Lack of Measured Groundwater Levels: a well-calibrated groundwater flow model should be calibrated to both measured groundwater levels and groundwater flow rate. The lack of measured groundwater levels may limit the confidence level of the groundwater flow model.
- Potential Extent and Hydraulic Conductivity (*K*) Values of Structure Zones: as illustrated in the sensitivity analysis section, the predicted inflow is sensitive to both the extent and *K* values of the structure zones. Though the probability that *K* values of structures is higher than the existing structures is likely to be low, the uncertainty of the potential structures may limit the confidence level of groundwater flow model.
- Limited Sampling Locations for Measured TDS Concentrations: The limited locations where water samples were monitored for TDS may affect the confidence levels of the predicted TDS concentrations. Sensitivity analysis shows that the predicted TDS concentration is highly sensitive to the TDS concentration in the water from the haulage and waste drift (footwall FW).

FINDINGS AND CONCLUSIONS

Based on the data analysis and model simulations, the following conclusions can be made from the current update of the groundwater flow model:

- The updated groundwater flow model is reasonably calibrated to the measured inflow rates from 2004 to July 2013.
- The updated groundwater flow model predicts that the maximum inflow could be approximately 60,000 m^3/day, based on future mining plans and the existing geologic model.
- Most of the water inflow to the mine workings occurs in the excavated ore zone (hanging wall, HW). Snap Lake is the major source of inflow water.
- The predicted inflow rate is sensitive to the spatial extents and hydraulic conductivity of the structure zones.
- TDS concentrations are predicted to range from approximately 600 to 1,500 mg/L depending on the assumed TDS concentrations in the water from the HW and the FW.

RECOMMENDATIONS

Based on our understanding of the existing data, Itasca proposes the following recommendations, which are similar to Itasca (2012), regarding the work to be conducted under the following categories:

Inflow Rate and TDS

- Monitor inflow rates and TDS concentrations to both the HW and FW in order to better understand the hydrogeologic conditions of the rock above and below the dyke.
- Monitor flow rates and TDS concentrations of water hits to refine the spatial extent of the structural zones.
- Monitor inflow rates to different pumping zones. These data can be used to further understand the permeable nature of the structural zones.
- Monitor inflow rates and TDS concentrations over the entire mine and the backfilled area (before and after backfilling).

Groundwater Head and TDS in Underground Workings

- Install long-term underground shut-in holes at selected locations in the hanging wall and the footwall to monitor groundwater heads over time. The measured groundwater heads are critical for understanding the transient groundwater flow conditions during mining and for the model calibration.
- Measure TDS concentrations from these monitoring points to determine any change in TDS concentrations over time. Analysis of the measured TDS concentrations over time can lead to an understanding of the spatial distribution of the TDS, and increase the confidence level in the estimated TDS.

Hydraulic Testing in Underground Workings

- Use the long-term underground shut-in holes to conduct single-hole or cross-hole flow and shut-in tests.
- Monitor both groundwater heads and TDS concentrations during the flow and shut-in tests.

Structural Zones and Faults

- Continue mapping the faults and structural zones.
- Update the geologic structural model when data become available.

Mine Plan

- Develop a mine plan to minimize the ratio of inflow to the FW over the inflow to the HW to reduce TDS concentrations.

Monitoring of the Lake

- Monitor the TDS concentrations in Snap Lake.
- Monitor the TDS concentrations in the mine water discharge to Snap Lake.
- Monitor the discharge rates of mine water to Snap Lake.
- Continue to monitor the inflow and outflow of Snap Lake from the existing monitoring locations.

Update of Groundwater Flow Model

- Update the groundwater flow model based on the data obtained from the above recommended programs.

Itasca Denver, Inc.
143 Union Blvd., Ste. 525
Lakewood, Colorado 80228 USA
tel: +1.303.969.8033 fax: +1.303.969.8357
e-mail: itasca@itascadenver.com http:www.itascadenver.com

TECHNICAL MEMORANDUM

TO: Julie L'Heureux – De Beers Canada
Jesse Clark – De Beers Canada **1780**

FROM: Houmao Liu
Dong Ding

DATE: 30 August 2013

SUBJECT: Prediction of Mine Water Inflow and Concentration of Total Dissolved Solids at Snap Lake

INTRODUCTION

At De Beers Canada's request, Itasca Denver, Inc., (Itasca) has compiled and analyzed hydrogeologic data and updated the groundwater flow model and total dissolved solids (TDS) calculations for Snap Lake mine. The updated model was based on the finite-element groundwater flow model developed by HCI using the *MINEDW* code from 2001 to 2005 (HCI 2001; 2005; 2006). This memorandum briefly summarizes the following tasks associated with the model update:

- The available data for the model update
- Update of the geologic model
- Update of the groundwater model
- Update of the calculation approach for the TDS concentration
- Predicted rate and TDS value of inflow to mine

The model update was initially conducted in December 2012 with a detailed report (Itasca 2012) and then summarized in February 2013 with a technical memorandum (Itasca 2013, "February Model"). This model update ("August Model") was conducted to incorporate additional data consisting of the measured flow rate, TDS values, and geology. The main differences between the February Model and the August Model are as follows:

- **Geologic Structures:** Additional geologic structure zones that were provided by Snap Lake in July 2013 were incorporated into the August Model.

- **Updated Mine Plan:** The updated mine plan for the August Model differs from those used in the February Model.
- **Additional Measured Data for TDS and Flow Rate:** The August Model incorporated the measured flow rate and the measured TDS concentrations of the mine water discharge as of July 2013. In addition, the August Model also included the measured TDS concentrations of water samples collected in 2013.
- **Additional Sensitivity Analyses:** Additional sensitivity analyses were conducted in the August Model to address model uncertainties.

DATA FOR THE MODEL UPDATE

Since the mining operations began, groundwater inflow rates to the mine workings and the TDS concentrations in the mine water discharge have been monitored periodically. Both the measured inflow rates and the TDS concentrations were used in the calibration of the updated groundwater flow model. Water hits during mine operations were mapped by mine personnel. These water hits, along with identified geologic structures, were used to define the structure zones and their associated hydraulic conductivity (K) values. Water levels were monitored from limited shallow piezometers and had little value for the model update. Subsequently, the measured water-level data were not used in the model update.

Various hydraulic tests (e.g., slug tests, packer tests) had been conducted from 2005 to 2012. A total of 146 horizontal conductivity (K_h) values from 35 holes (surface boreholes or underground drill holes) and 564 vertical hydraulic conductivity (K_v) values from 37 holes were obtained from these testings. These measured K values were used as the basis for assigning K_h values to the hydrogeologic units in the model.

Based on additional geologic data that have been gathered from the mining operations, Snap Lake mine personnel provided a comprehensive geologic delineation of faults in the mine area in September 2012 and specified that the Snap Fault, the Crackle Fault, and the 45-Degree Fault are the major water-producing zones. In February 2013, Snap Lake modified and updated the likely extents of faults outside of the mining area by assuming that the Crackle Fault and the Snap Fault extend to the east part of the model boundary, and that the Snap Fault extends to the west along Snap Lake. Additional faults were provided in July 2013. These geologic data were incorporated in the model update.

MODEL UPDATE

UPDATED HYDROGEOLOGIC CONCEPTUAL MODEL

The conceptual hydrogeologic model has been updated using the above-mentioned data. Figure 1 also shows the stratigraphic settings of geologic units from the top to the bottom of the groundwater flow model:

- Lakebed Sediments - a relatively thin veneer of till, possibly glacial outwash and post-glacial organic materials, on the bottom of Snap Lake. In the model, a 2-m-thick lakebed sediments layer is considered to be less permeable than the underlying exfoliation zone.
- Exfoliation Zone - the uppermost portion of the crystalline bedrock, where post-glacial unloading has resulted in tensile fractures, primarily with horizontal orientation. This zone is set to be more permeable than the deeper bedrock.
- Permafrost - the soil at or below the freezing point of water over time. It is a low-permeability unit with a thickness of up to 210 m below ground surface (HCI 2005a).
- Bedrock Above Dyke (BAD) - this unit includes all of the bedrock below the exfoliation zone (or permafrost below the land) and above the kimberlite dyke. The *K* value of this unit is assumed to decrease with depth in the updated model.
- Kimberlite Dyke - the kimberlite dyke layer is about 2 m thick throughout the model domain and has a relatively low hydraulic conductivity. This is different from previous models (HCI 2005a, 2006a; Fracflow 2011a), which assumed that the dyke only exists within the ultimate mine area.
- Bedrock Below Dyke (BBD) - is massive bedrock or country rock beneath the kimberlite dyke. In this model update, the *K* value is considered to decrease with depth.

Though the contact zones above and below the dyke are shown in Figure 1, they are not simulated as less permeable materials as was done in the previous models. There is no field evidence that suggests the contact zone is less permeable than the surrounding rocks.

Based on the geologic data, eight structure zones (Zones 2 through 9) shown in Figure 2 were simulated to represent various faults within the current mining area and the future planned mining area. The structure zones are assumed to be more permeable than the in situ bedrock. Furthermore, based on measured inflow and model calibration, the structure zones below the dyke are considered to be less permeable than those above the dyke. To account for the uncertainty of potential structure zones outside of the future mining area, the structure zones associated with the Snap and Crackle faults are assumed to extend to the model boundary.

UPDATED CONCEPTUAL MODEL FOR TDS CALCULATIONS

The TDS concentrations in the mine water are estimated through the volumetric mixing of inflows to the ore area (hanging wall, HW) and the waste/haulage drifts (footwall, FW). The conceptual model for TDS calculations is shown in Figure 3. In order to estimate TDS, the mine water was simply grouped into two main groundwater components that contribute TDS to the mine water: one from the HW with relatively low TDS concentrations, and the other from the FW with relatively high TDS concentrations. For the water from the FW, the TDS concentrations were assigned with an average measured TDS concentration ("Initial Concentration") and assumed to remain constant over the life of the mine (LOM). For the water from the HW, the TDS was initially assigned with the average measured TDS in the HW. Because the mine water with TDS is discharged to Snap Lake, the TDS concentrations in the lake may exceed the Initial Concentration of the HW; therefore, during the model calibration and prediction, the TDS value of the HW is updated for each modeling time step (one-month intervals) by comparing the Initial Concentration and the estimated TDS concentrations in the lake. The TDS concentrations of the lake are also updated at each modeling time step by mixing the mine water with the lake water. If the initial concentration is less than the TDS concentrations in the lake, the estimated TDS concentrations in the lake are assigned as the HW groundwater.

Figure 4 shows the measured TDS concentrations along the depth obtained in 2012 and 2013. The figure shows that the measured TDS value below the dyke is significantly higher than that above the dyke. Also shown in the figure are the arithmetic and geometric mean of measured TDS values above and below the dyke. As part of sensitivity analyses, both the arithmetic and geometric means of measured TDS values were used in the prediction of the TDS values in the mine water discharge.

UPDATED GROUNDWATER FLOW MODEL

The updated groundwater flow model uses the same code (*MINEDW*), model domain, and the same boundary conditions as the previous versions of the model (HCI 2005a; 2006a). Major inputs of the updated groundwater flow model are summarized in Table 1.

Model Boundary and Boundary Conditions

The extent of the groundwater flow model and the boundary conditions are shown in Figure 5. The nodes associated with the lakes are assigned as constant heads with lake elevations. Permafrost is assumed to exist in the area outside of the lakes. Below the permafrost and lakes, specified heads were assigned along the model boundary for the pre-mining condition. The specified heads were derived from water-level elevations in the surrounding lakes. During mining, the boundary conditions in these layers are converted to variable-flux boundary conditions. This type of boundary condition, as it is incorporated in *MINEDW*, simulates infinite hydrogeologic units that have the same hydraulic properties as the units at the boundary. The variable-flux boundary condition calculates the flow across the boundary as the result of calculated changes in groundwater levels at the boundary. The bottom of the model is assigned as a no-flow boundary.

Model Grid and Discretization

In comparison to the previous models (HCI 2006a; 2006b), the updated groundwater flow model incorporated one additional model layer to simulate the lakebed sediments. In total, there are 14 model layers, 60,802 elements, and 32,790 nodes. The model domain encompasses approximately 105 km^2. Finer discretization with an element size of 50 × 50 m is utilized within the footprint of the ultimate mine, as shown in Figure 6. In addition, this updated model differs from the models prior to 2013 in both horizontal and vertical discretization. Horizontally, the sizes of elements along the faults are modified to follow the estimated fault width. In vertical discretization, the updated model assumes that the geologic units follow the dip of the kimberlite dyke, as shown in Figure 7, instead of assuming that the horizontal geologic units are outside of the mining area as was done in the previous models.

Simulation of Hydrostratigraphic Units

The major hydrostratigraphic units are simulated with hydrogeologic zones in the model, as specified in the conceptual model section. Figure 6 illustrates the hydrogeologic zones used in Layer 6 (the upper bedrock layer) of the groundwater flow model. The hydraulic parameters are summarized in Table 2. As shown in the cross section in Figure 7, the model consists of 14 model layers. The model layer configuration generally follows the west-east dip of the geologic setting. Because permafrost, the dyke, and the exfoliation zones do not exist over the entire model domain, the assignment of the hydrogeologic zones to the bedrock varies within the same model layer and with depth. To simulate the decreasing K values with depth, the bedrock unit above the kimberlite dyke (BUAD) is simulated with eight hydrogeologic zones whose K decreases with depth. Similarly, four hydrogeologic zones with decreasing K values are used to simulate the bedrock unit below the dyke (BUBD). The elevation intervals for these zones are summarized in Table 2.

Simulation of Geologic Structure Zones

As described previously, faults in this project area are simulated as structure zones due to 1) the complexity of the fault features and extensive intersections, and 2) the major water hits (i.e., flow rates > 500 L/min) often occur at the intersections of faults, as depicted in Figure 2. As summarized in Table 2, the K values of all eight structure zones were simulated to decrease with depth. Based on the model calibration, Structure Zones 2, 3, and 5 were determined to have the same hydraulic parameters. Structure Zone 8 was assumed to have the same hydraulic parameters as those of Zone 4. In addition, the *K* values above the dyke are generally greater than those below the dyke, as illustrated in Figure 7.

Simulation of Mining

The excavation of the ore area and the ancillary ramps and drifts are simulated by 3,049 drain nodes in the model, including 1,206 nodes for the excavated ore area and waste/haulage drifts from May 2004 to July 2013 and 1,843 nodes for future mines. The location and schedule of the existing excavated ore area and waste/haulage drifts provided by engineers at Snap Lake mine are shown in Figure 8. The depth of the current ore area varies from 100 mbgs in 2004 to 420 mbgs in July 2013. Future ore excavation and waste/haulage drifts are shown in Figure 9.

Drain nodes for ore areas are assigned along two nodal layers along the dyke (nodal layers 9 and 10). The drain nodes are “turned on” at the specified time when the ore areas are excavated. The purpose of assigning “paired” drain nodes above and below the dyke is to obtain the inflow above and below the dyke for TDS calculations. For the waste/haulage drifts, drain nodes are specified along the drifts in nodal layer 12, which is approximately 30 m below the kimberlite dyke. A leakance factor (10 m^2/day) was assigned to drain nodes to ensure that there is no "barrier" due to the numerical setup to prevent water inflow to the mine workings. Sensitivity tests show that the total inflow to the mine workings using this leakance factor is similar to the value derived from using model-calculated values based on the *K* values and size of the model elements.

No drain nodes were assigned in the effective grouting area. The model assumes that the effective grouting area does not produce any inflow. No effective grouting was simulated for future mining.

MODEL CALIBRATIONS

The calibration of the model update includes calibrating groundwater inflows to the mine workings and TDS concentrations in the discharge.

Groundwater Flow Model Calibration

The groundwater flow model calibration was conducted by varying the *K* values of the bedrock and structure zones, and the areal extents of some structure zones to match the measured groundwater inflow rates to the mine. As shown in Figure 10, the simulated flow rate closely agrees with the measured flow rates to the mine. Moreover, the simulated flow rate to the waste/haulage drifts in November 2012 was approximately 3,450 m^3/day, which is close to the estimated value based on hydro mapping.

ITASCA™
Denver, Inc.

TDS Concentrations Calibration

The calculated TDS concentrations were compared with the measured TDS concentrations in the mine water discharge for the period of 2004 to 2013. The data at the site indicates that the water from the FW contains higher TDS concentrations than that from the HW. Based on the limited measured TDS data, the arithmetic mean and the geometric mean of TDS concentration are calculated to be 247.4 mg/L and 231.9 mg/L for the HW, and 3,170.0 mg/L and 6,187.7 mg/L for the FW. Given the uncertainty of measured TDS concentrations, both TDS concentrations from geometric mean and arithmetic mean are used to calculate TDS concentrations of the mine water discharge over time as part of the sensitivity analysis. Figure 11 shows that the calculated TDS concentrations reasonably agree with the measured values prior to 2009 when the arithmetic mean values were used. However, after January 2009, the calculated TDS concentration agrees closely to the measured value when the geometric mean value is used.

MODEL PREDICTIONS

Assumptions for the Model Prediction

The model predictions are based on the following assumptions:

- The predicted inflow rate is sensitive to structure zones. Two structure zones were assumed to extend to the eastern model boundary to account for the uncertainty of the structure extent outside of the mining area (as shown in Figure 2). The structure zone associated with the Snap Lake fault is also extended to the eastern model boundary.
- The predicted groundwater flow rates over time were made using the areal extent and schedule of future mining provided by the Snap Lake mine personnel.
- Estimated TDS concentrations in the future mine water were made by using the same measured TDS concentrations of the FW and HW waters as shown in Figure 4.

Predicted Inflow to the Mine

The predicted inflow rates to the Snap Lake mine are presented in Figure 10 with the following key findings:

- The maximum predicted inflow rate to the mine will be approximately 60,000 m^3/day in the year 2016.
- The maximum inflow to the waste/haulage drifts is approximately 7,000 m^3/day in about the year 2018.

The main source of the inflow to the mine is from Snap Lake (Figure 12). Table 3 provides the predicted total inflow to the entire mine workings and the inflow rates to the HW and the FW. The inflow to the FW contains the upper part and lower part. As shown in Figure 4, the upper part is below the dyke, and the lower part is associated with waste drift.

Predicted TDS Concentrations in Mine Water Discharge

As shown in Figure 11, the calculated TDS concentrations for mine water discharge range from approximately 600 to 1,500 mg/L during future mining. This concentration fluctuation is mainly attributable to the excavation schedule of the waste/haulage drifts and the assumed TDS concentration from the FW. Figure 11 also shows that the predicted TDS concentrations are sensitive to the FW TDS concentrations used in the model.

Table 4 summarizes the calculated TDS concentration in the mine water discharge using both geometric mean and arithmetic mean values of measured TDS. The TDS value in the HW was initially assigned as the mean value of measured TDS and subsequently assigned with the TDS concentration of Snap Lake when the latter becomes greater than the former.

Discussion of Model Uncertainties

Predicted Inflow Rate

Based on the observations from the mining operations, the main factors that control groundwater inflow to the mine are structures. The *K* values of these structures were derived from model calibration to the measured inflow rates over nine years. As shown in Figure 10, the simulated inflow rate closely agrees with the measured inflow rate. For the structures within the future mining plan (Zone 8 in Figure 2 and Table 2), the *K* values were assigned with highest values of all structures derived from the model calibration. To assess the sensitivities of the predicted inflow rate to the *K* values of the structures within future mining areas, the following two sensitivity simulations were conducted:

- Simulation 1: The *K* values of Zone 8 (see Figure 2 for location) were doubled along the entire depth. The *K* values of Zone 8 above the dyke range from 0.4 to 1.5 m/day. As shown in Figures 13 and 14, the ranges of *K* values above the dyke of Zone 8 correspond to 0.90 and 0.97 cumulative probability values for all the measured horizontal *K* values (Figure 13) and 0.75 and 0.90 cumulative probability values for all the vertical *K* values (Figure 14), respectively. As shown in Figure 15, the predicted maximum inflow from Simulation 1 is about 65,000 m^3/day, which is about 8 percent greater than that from the base-case scenario.
- Simulation 2: A second uncertainty related to future prediction is the *K* values of structures related to the Crackle and Snap Faults (see Figure 2 for locations). In

Simulation 2, the *K* values of structure zones (Zone 4 and Zone 6) related to these two faults outside of the current mining extent were doubled along the entire depth with a range of 0.12 to 1.5 m/day. As shown in Figures 13 and 14, the ranges of *K* values of Zones 4 and 6 correspond to 0.80 and 0.98 cumulative probability values for all the measured horizontal *K* values (Figure 13) and 0.61 and 0.89 cumulative probability values for all the vertical *K* values (Figure 14), respectively. As shown in Figure 15, the predicted maximum inflow from Simulation 2 is about 70,000 m^3/day, which is about 15 percent greater than that from the base-case scenario.

- Simulation 3: The *K* values of Zone 8 (see Figure 2 for location) were increased by an order of magnitude along the entire depth. The *K* values of Zone 8 above the dyke range from 1.8 to 7.2 m/day. As shown in Figures 13 and 14, the ranges of *K* values above the dyke of Zone 8 correspond to 0.98 and >1.0 cumulative probability values for all the measured horizontal *K* values (Figure 13) and 0.90 and 0.97 cumulative probability values for all the vertical *K* values (Figure 14), respectively. As shown in Figure 15, the predicted maximum inflow from Simulation 3 is about 77,000 m^3/day, which is about 28 percent greater than that from the base-case scenario.
- Simulation 4: In Simulation 4, the *K* values of structure zones (Zone 4 and Zone 6) related to the Crackle and Snap faults outside of the current mining extent were increased by an order of magnitude along the entire depth with a range of 0.6 to 7.2 m/day. As shown in Figures 13 and 14, the ranges of *K* values of Zones 4 and 6 correspond to 0.91 and >1.0 cumulative probability values for all the measured horizontal *K* values (Figure 13) and 0.80 and 0.97 cumulative probability values for all the vertical *K* values (Figure 14), respectively. As shown in Figure 15, the predicted maximum inflow from Simulation 4 is about 96,000 m^3/day, which is about 60 percent greater than that from the base-case scenario.

The sensitivity analyses suggest that the predicted inflow rate is sensitive to the *K* values of structure zones. The confidence level of model prediction depends on both the extent and *K* values of structures within the future mining area. As shown in Figures 13 and 14, the probability that the *K* values of structure zones in the future mining areas are one order of magnitude higher than those within the existing mine area, in comparison to the measured data, is less than 0.1 or 10 percent.

<u>Predicted TDS Concentration</u>

The uncertainty of predicted TDS concentrations depends on the measured TDS concentrations. As illustrated in Figure 11, the predicted TDS is highly sensitive to the TDS concentrations from the in situ rock units. Based on the available data, the range of TDS concentrations in the future mine water discharge as shown in Figure 11 is considered to be reasonable.

MODEL LIMITATIONS

As shown in Figure 10, the groundwater flow model is well calibrated to the measured inflow rate. However, as shown in the "Discussion of Model Uncertainties" section, the predicted results are sensitive to the following major factors:

- Lack of Measured Groundwater Levels: a well-calibrated groundwater flow model should be calibrated to both measured groundwater levels and groundwater flow rate. The lack of measured groundwater levels may limit the confidence level of the groundwater flow model.
- Potential Extent and *K* Values of Structure Zones: as illustrated in the sensitivity analysis section, the predicted inflow is sensitive to both the extent and *K* values of the structure zones. Though the probability that *K* values of structures is higher than the existing structures is likely to be low, the uncertainty of the potential structures may limit the confidence level of groundwater flow model.
- Limited Sampling Locations for Measured TDS Concentrations: The limited locations where water samples were monitored for TDS may affect the confidence levels of the predicted TDS concentrations. As shown in Figure 11, the predicted TDS concentration is highly sensitive to the TDS concentration in FW water.

CONCLUSIONS

Based on the data analysis and model simulations, the following conclusions can be made from the current update of the groundwater flow model:

- The updated groundwater flow model is reasonably calibrated to the measured inflow rates from 2004 to July 2013.
- The updated groundwater flow model predicts that the maximum inflow could be approximately 60,000 m^3/day, based on future mining plans and the existing geologic model.
- Most of the water inflow to the mine workings occurs in the excavated ore zone. Snap Lake is the major source of inflow water.
- The predicted inflow rate is sensitive to the spatial extents and hydraulic conductivity of the structure zones.
- TDS concentrations are predicted to range from approximately 600 to 1,500 mg/L depending on the assumed TDS concentrations in the water from the HW and the FW.

RECOMMENDATIONS

Based on our understanding of the existing data, Itasca proposes the following recommendations, which are similar to Itasca (2012), regarding the work to be conducted under the following categories:

Inflow Rate and TDS

- Monitor inflow rates and TDS concentrations to both the HW and the FW in order to better understand the hydrogeologic conditions of the rock above and below the dyke.
- Monitor flow rates and TDS concentrations of water hits to refine the spatial extent of the structural zones.
- Monitor inflow rates to different pumping zones. These data can be used to further understand the permeable nature of the structural zones.
- Monitor inflow rates and TDS concentrations over the entire mine and the backfilled area (before and after backfilling).

Groundwater Head and TDS in Underground Workings

- Install long-term underground shut-in holes at selected locations in the hanging wall and the footwall to monitor groundwater heads over time. The measured groundwater heads are critical for understanding the transient groundwater flow conditions during mining and for the model calibration.
- Measure TDS concentrations from these monitoring points to determine any change in TDS concentrations over time. Analysis of the measured TDS concentrations over time can lead to an understanding of the spatial distribution of the TDS, and increase the confidence level in the estimated TDS.

Hydraulic Testing in Underground Workings

- Use the long-term underground shut-in holes to conduct single-hole or cross-hole flow and shut-in tests.
- Monitor both groundwater heads and TDS concentrations during the flow and shut-in tests.

Structural Zones and Faults

- Continue mapping the faults and structural zones.
- Update the geologic structural model when data become available.

Mine Plan

- Develop a mine plan to minimize the ratio of inflow to the FW over the inflow to the HW to reduce TDS concentrations.

Monitoring of the Lake

- Monitor the TDS concentrations in Snap Lake.
- Monitor the TDS concentrations in the mine water discharge to Snap Lake.
- Monitor the discharge rates of mine water to Snap Lake.
- Continue to monitor the inflow and outflow of Snap Lake from the existing monitoring locations.

Update of Groundwater Flow Model

- Update the groundwater flow model based on the data obtained from the above recommended programs.

REFERENCES

Fracflow. 2011a. Simulation of existing and future mine water inflows and mass loadings to the mine workings. Technical memorandum prepared for De Beers Canada by Fracflow Consultants, 31 May.

HCI. 2005a. Predicted inflow to Snap Lake. Technical memorandum prepared for SRK Consulting by Hydrologic Consultants, Inc., 17 February.

HCI. 2005b. Update on hydrogeologic investigation at Snap Lake mine with focus on conditions in area of proposed crusher. Technical memorandum prepared for SRK Consulting by Hydrologic Consultants, Inc., 25 August.

HCI. 2005c. 2005 hydrogeologic framework of Snap Lake project area and predicted inflow to proposed mine - September 2005 update based on data from P1PP. Prepared by Hydrologic Consultants, Inc., September.

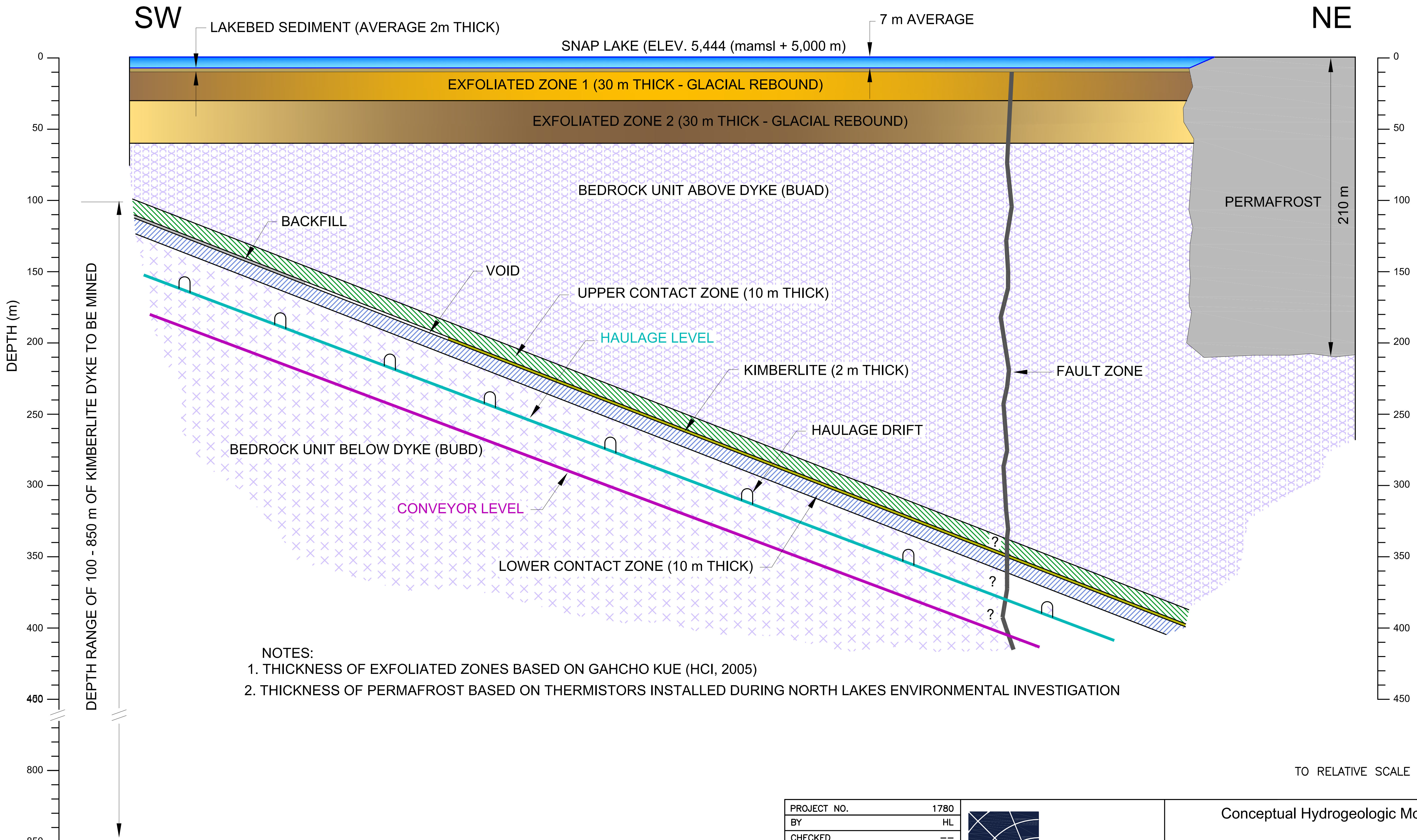
HCI. 2006a. Predicted quantity and quality of mine water discharge from planned Snap Lake mine. Technical memorandum prepared for SRK Consulting by Hydrologic Consultants, Inc., 19 May.

HCI. 2006b. Predicted quantity of mine water discharge from planned Snap Lake mine. Technical memorandum prepared for SRK Consulting by Hydrologic Consultants, Inc., 28 June.

Itasca. 2012. Groundwater flow model update for Snap Lake mine. Draft report prepared for De Beers Canada by Itasca Denver, Inc., 21 December.

Itasca. 2013. Prediction of mine water inflow from groundwater inflow model. Draft technical memorandum prepared for De Beers Canada by Itasca Denver, Inc., 19, February.

Attachments: Figure 1 – Conceptual Hydrogeologic Model
Figure 2 – Faults and Structure Zones Within Model Domain
Figure 3 – Conceptual Model for TDS Calculation
Figure 4 – Measured TDS Values Along Depth
Figure 5 – Model Domain and Boundary Conditions
Figure 6 – Mesh Configuration and Simulated Geology of Model Layer 6
Figure 7 – Simulated Geology Along Model Cross Section A-A'
Figure 8 – Existing Extent of Mining and Waste
Figure 9 – Future Extent of Mining and Waste
Figure 10 – Measured and Predicted Groundwater Inflow to the Mine Workings
Figure 11 – Measured and Simulated TDS Concentrations in the Mine Discharge
Figure 12 – Predicted Total Mine Inflow and Contributions from the Lakes
Figure 13 – Cumulative Probability of Measured Horizontal Hydraulic Conductivity Values
Figure 14 – Cumulative Probability of Measured Vertical Hydraulic Conductivity Values
Figure 15 – Predicted Total Mine Inflow from Sensitivity Simulations
Table 1 – Input for the Snap Lake Model
Table 2 – Hydraulic Parameters Used in the Groundwater Flow Model
Table 3 – Predicted Groundwater Inflow Components to the Mine Workings
Table 4 – Predicted TDS Concentrations of Mine Water Discharge



NOTES:
1. THICKNESS OF EXFOLIATED ZONES BASED ON GAHCHO KUE (HCI, 2005)
2. THICKNESS OF PERMAFROST BASED ON THERMISTORS INSTALLED DURING NORTH LAKES ENVIRONMENTAL INVESTIGATION

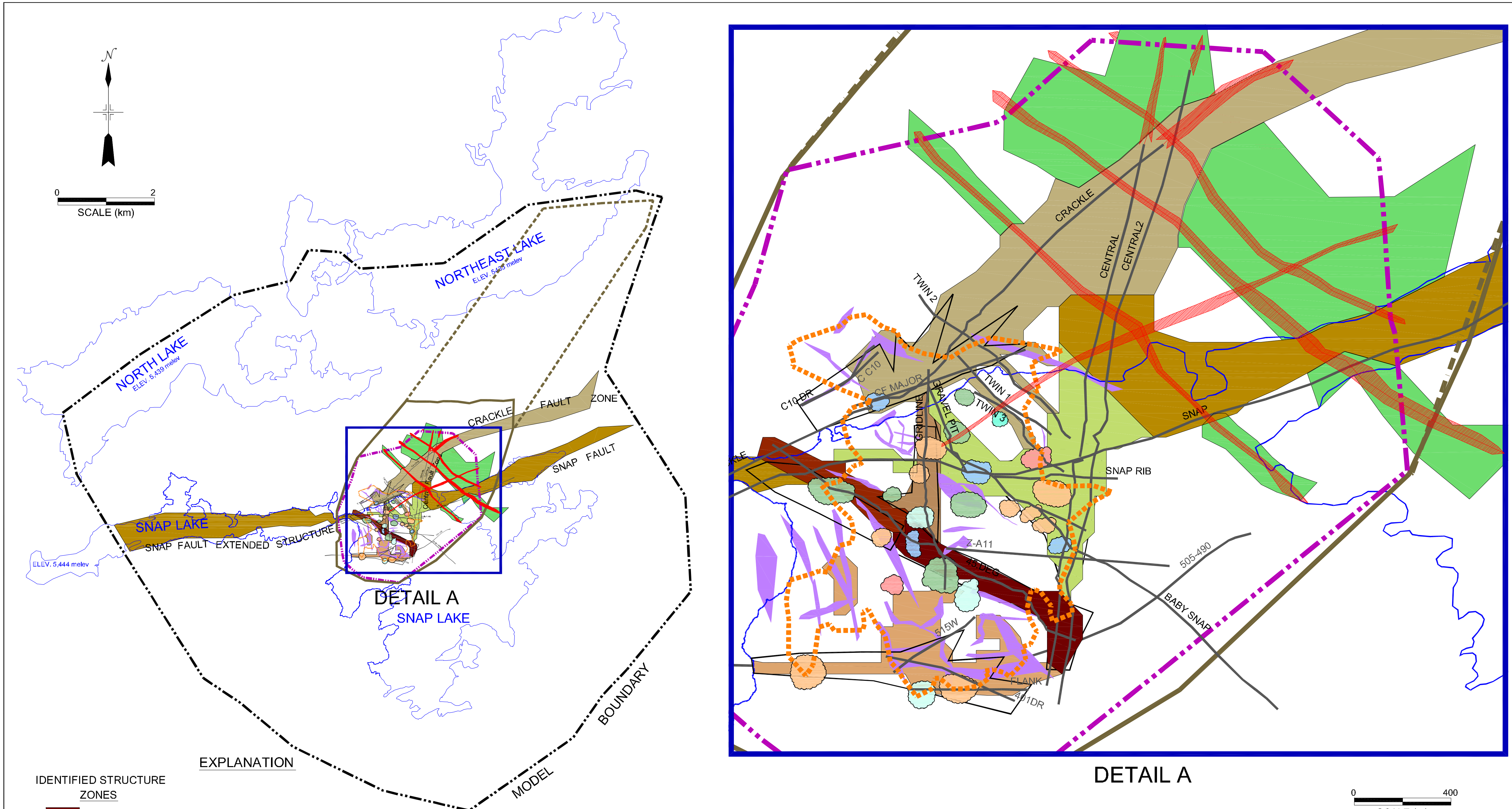
PROJECT NO.	1780
BY	HL
CHECKED	--
DRAWN	SAC
DRAWING NAME	CONC-HG-MODEL
DRAWING DATE	12 AUG 2013
REVISION DATE	--

ITASCA™ Denver, Inc.

Conceptual Hydrogeologic Model

CLIENT:
De Beers Canada - Snap Lake Mine

FIGURE NO.
1



EXPLANATION

IDENTIFIED STRUCTURE ZONES

- ZONE 2
- ZONE 3
- ZONE 4
- ZONE 5
- ZONE 6
- ZONE 7
- ZONE 8
- ZONE 9

KIMBERLITE DYKES

- IDENTIFIED EXTENT
- ASSUMED EXTENT

MINING EXTENT

- EXISTING MINE
- FUTURE MINE

WATER HIT AREAS

FLOW RATE (L/min)

- <300
- 300 - 500
- 500 - 1,000
- 1,000 - 2,000
- >2,000

- FAULT IDENTIFIED PRIOR TO JULY 2012
- ADDITIONAL FAULT IDENTIFIED IN JULY 2013

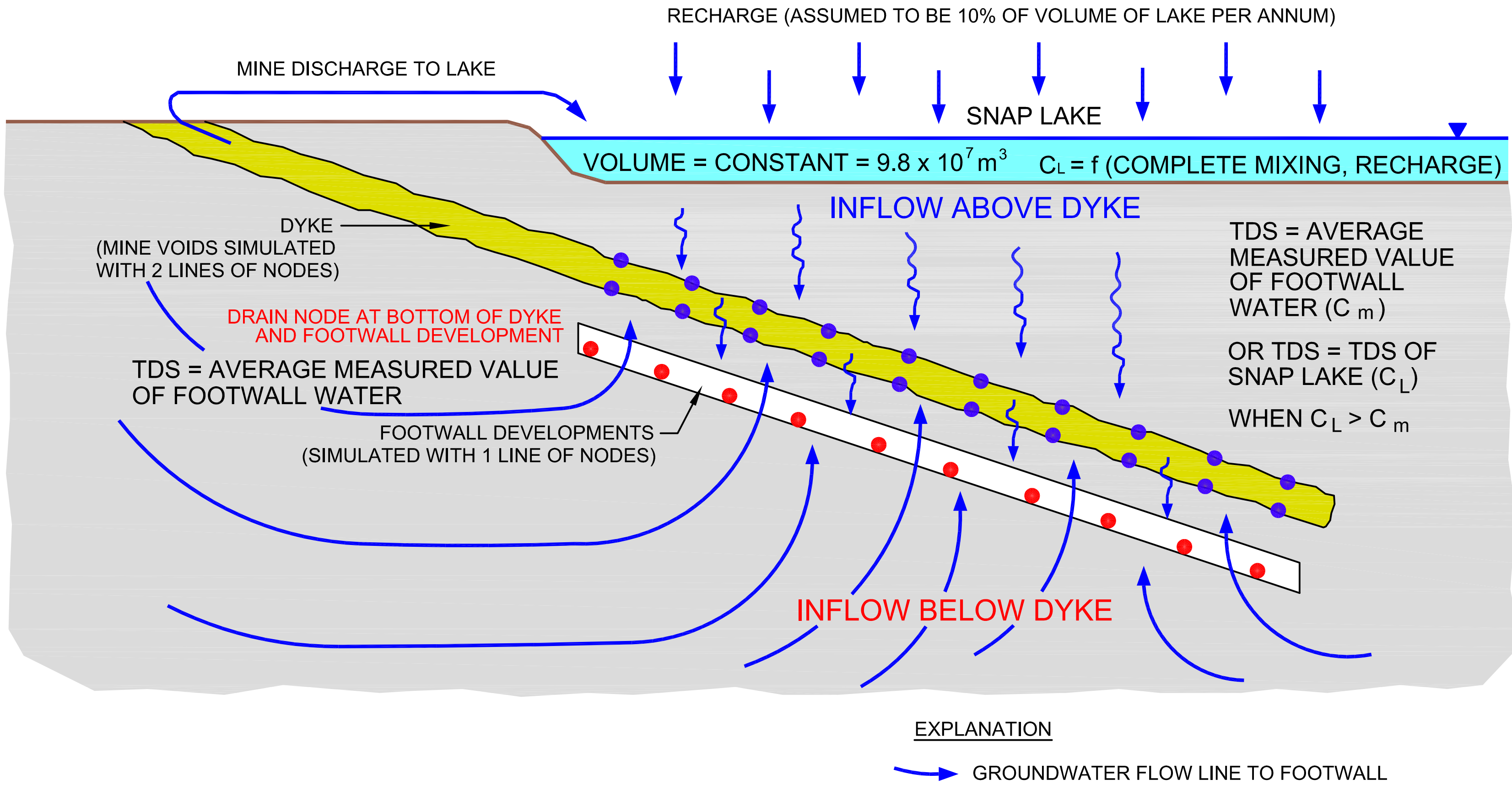
PROJECT NO.	1780
BY	DD
CHECKED	HL
DRAWN	SAC
DRAWING NAME	FAULT-ZONES-2
DRAWING DATE	21 AUG 2013
REVISION DATE	29 AUG 2013

ITASCA™
Denver, Inc.

Faults and Structure Zones Within Model Domain

CLIENT:
De Beers Canada - Snap Lake Mine

FIGURE NO.
2



NOTE: TDS CONCENTRATION IS IN mg/L -
HW CONTACT IS IN MINE ELEVATION (melev)

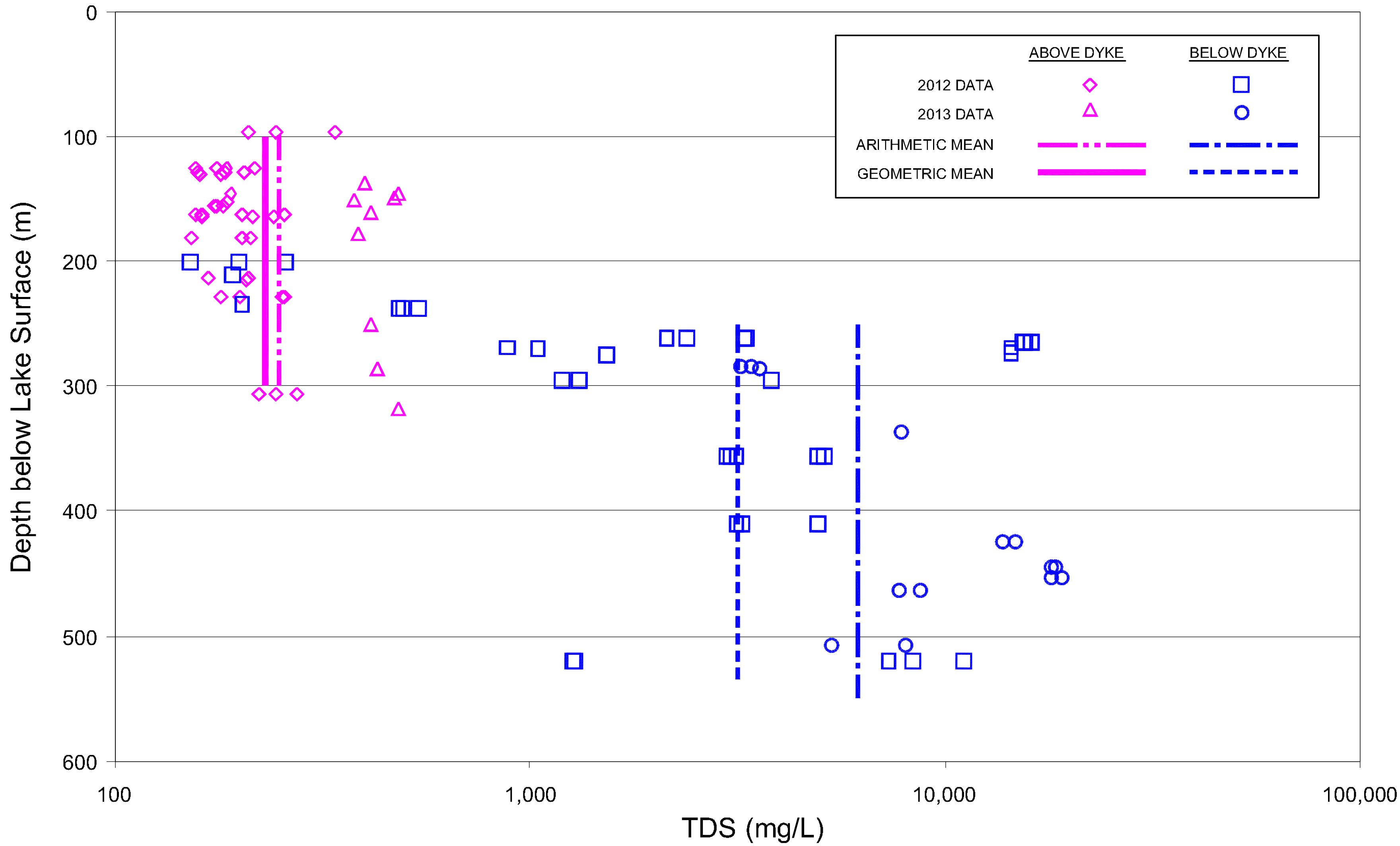
PROJECT NO.	1780
BY	DD
CHECKED	HL
DRAWN	SAC
DRAWING NAME	TDS–CALC
DRAWING DATE	20 AUG 2013
REVISION DATE	4 DEC 2013

ITASCA™
Denver, Inc.

Conceptual Model for
TDS Calculation

CLIENT:
De Beers Canada - Snap Lake Mine

FIGURE NO.
3



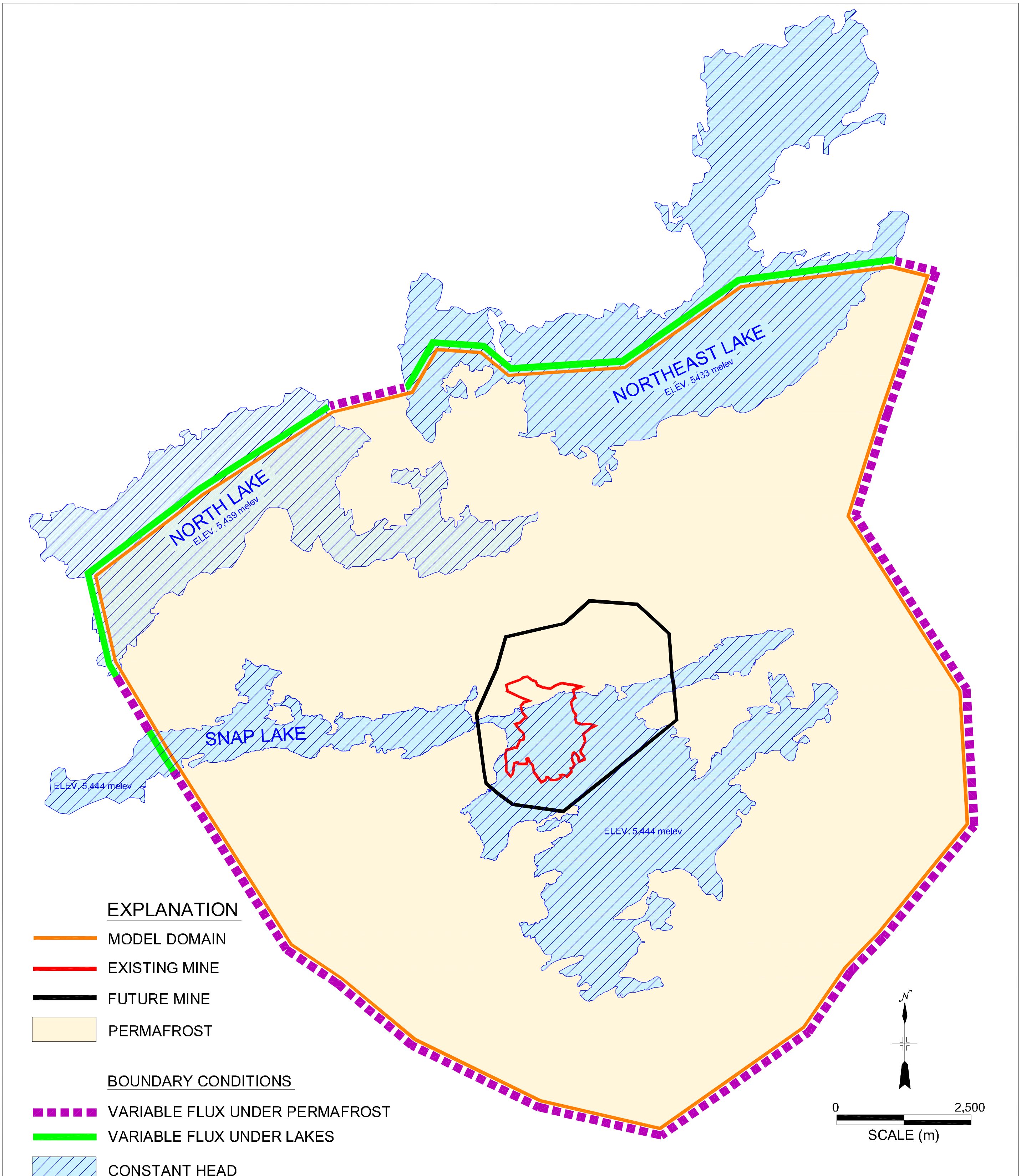
PROJECT NO.	1780
BY	DD
CHECKED	HL
DRAWN	SAC
DRAWING NAME	TDS–VS–DEPTH
DRAWING DATE	21 AUG 2013
REVISION DATE	--

ITASCA™ Denver, Inc.

Measured TDS Values Along Depth

CLIENT:
De Beers Canada - Snap Lake Mine

FIGURE NO.
4



NOTE: LAKE ELEVATIONS ARE MINE ELEVATIONS (mamsl + 5,000 m)

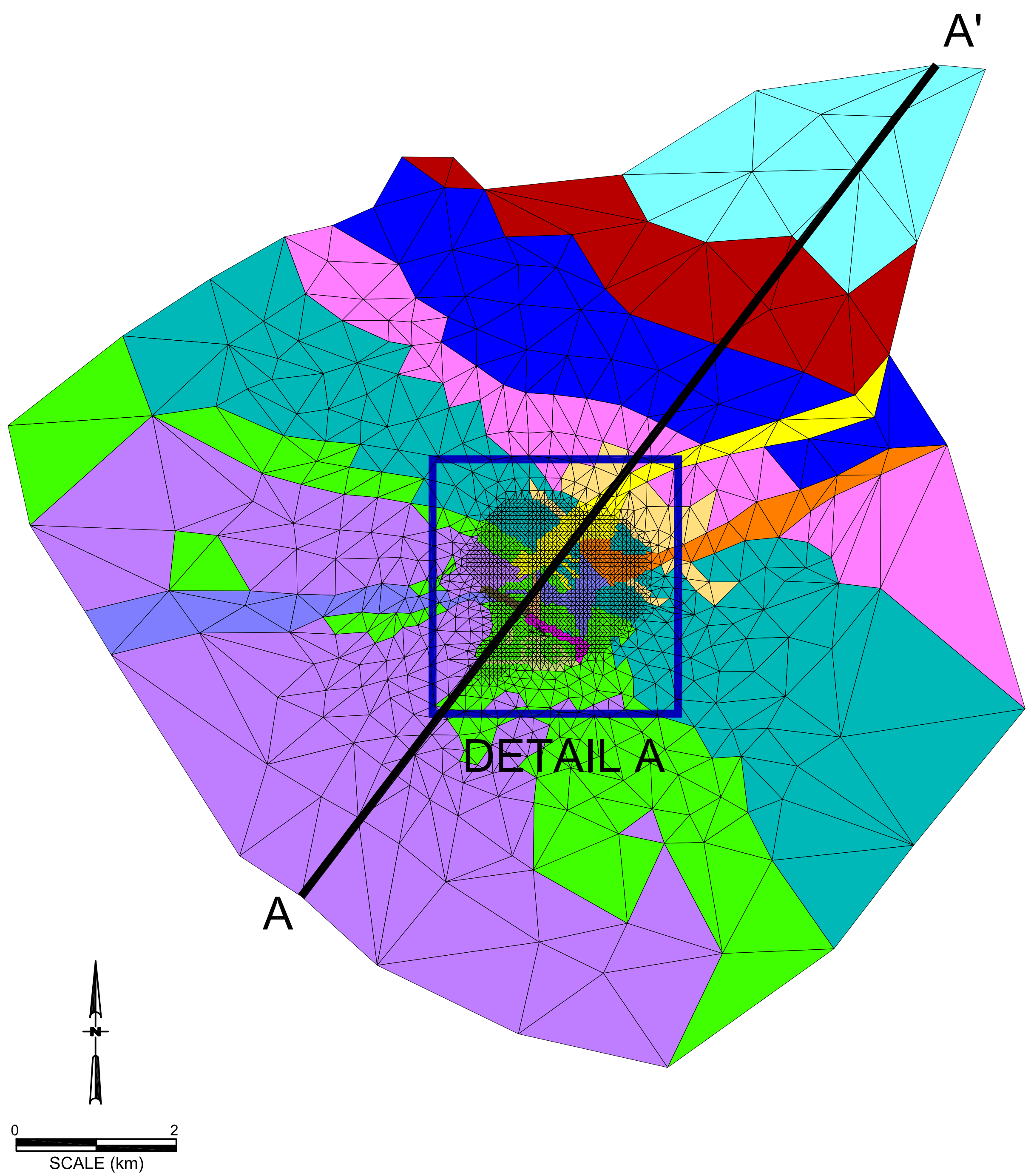
PROJECT NO.	1780
BY	DD
CHECKED	HL
DRAWN	SAC
DRAWING NAME	BOUND–COND
DRAWING DATE	20 AUG 2013
REVISION DATE	--

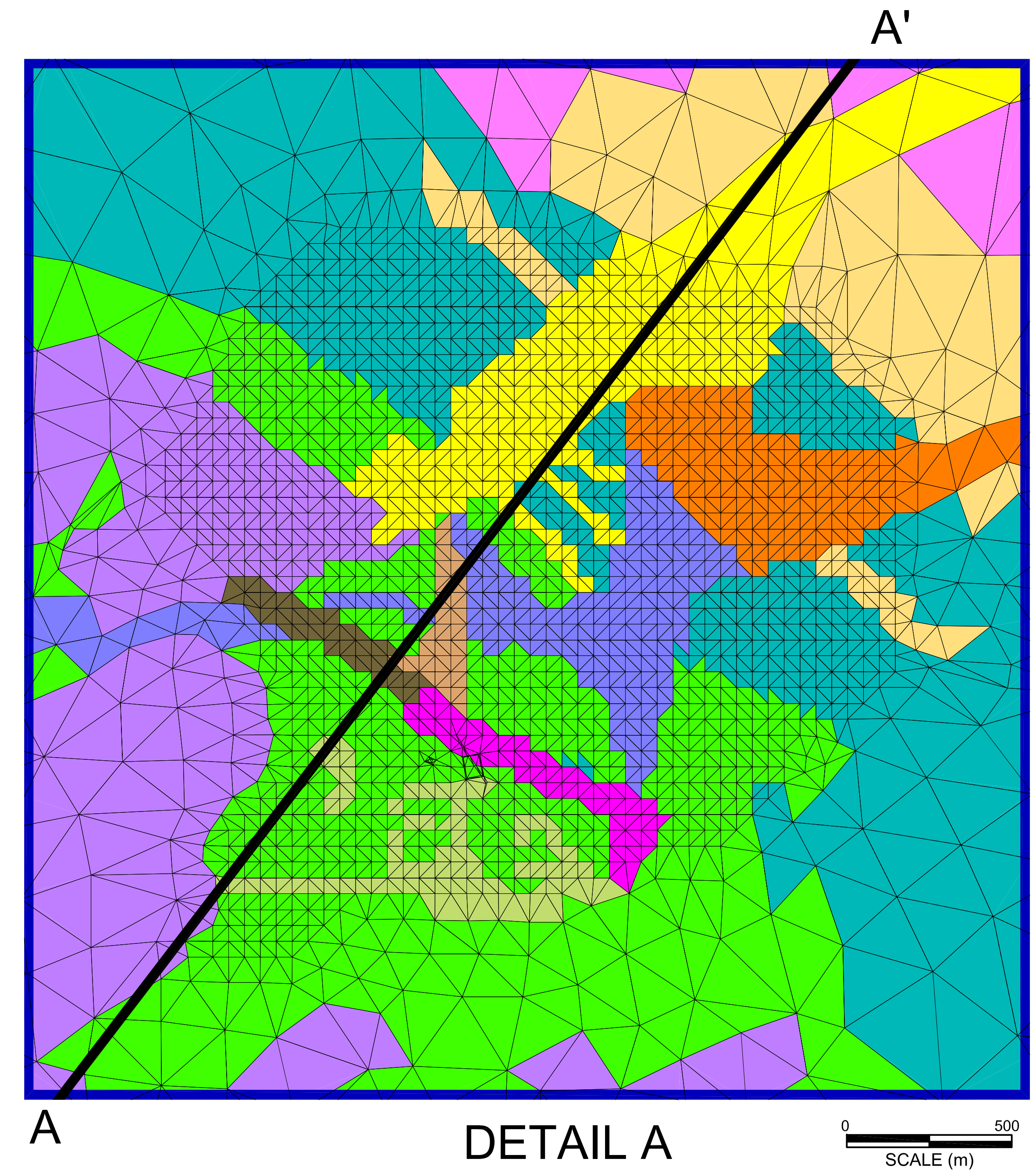
ITASCA™ Denver, Inc.

Model Domain and Boundary Conditions

CLIENT:
De Beers Canada - Snap Lake Mine

FIGURE NO.
5





EXPLANATION

BEDROCK UNIT ABOVE DYKE (BUAD)

- BUAD1
- BUAD2
- BUAD3
- BUAD4
- BUAD5
- BUAD6
- PERMAFROST

STRUCTURE ZONES ABOVE DYKE

- ZONE 2
- ZONE 3
- ZONE 4
- ZONE 5
- ZONE 6
- ZONE 7
- ZONE 8
- ZONE 9

A——A' CROSS SECTION LOCATION (SEE FIGURE 7)

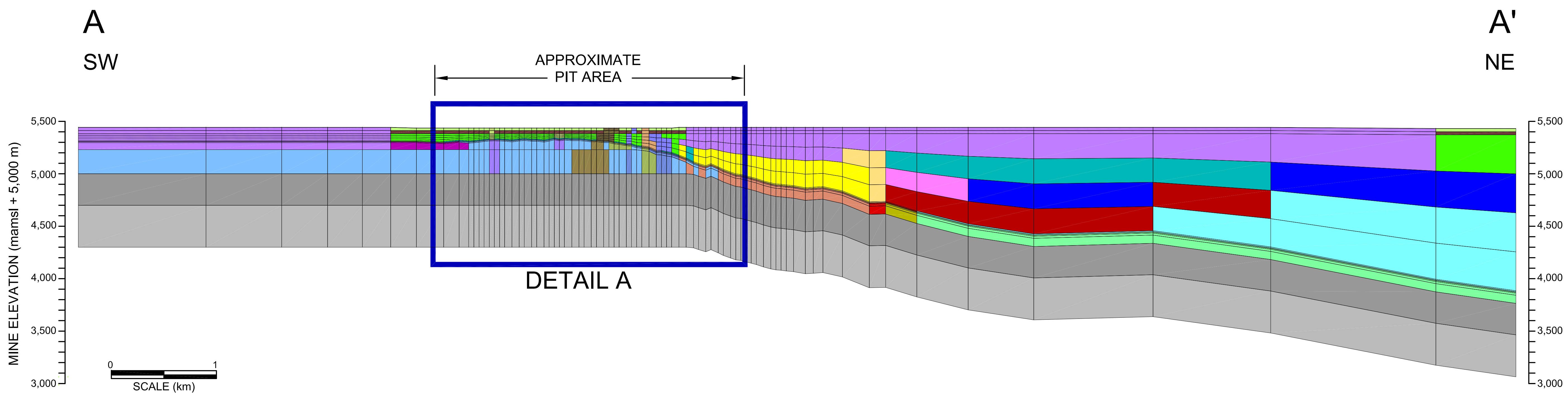
PROJECT NO.	1780
BY	DD
CHECKED	HL
DRAWN	SAC
DRAWING NAME	LAYER6–AUG
DRAWING DATE	19 AUG 2013
REVISION DATE	4 DEC 2013

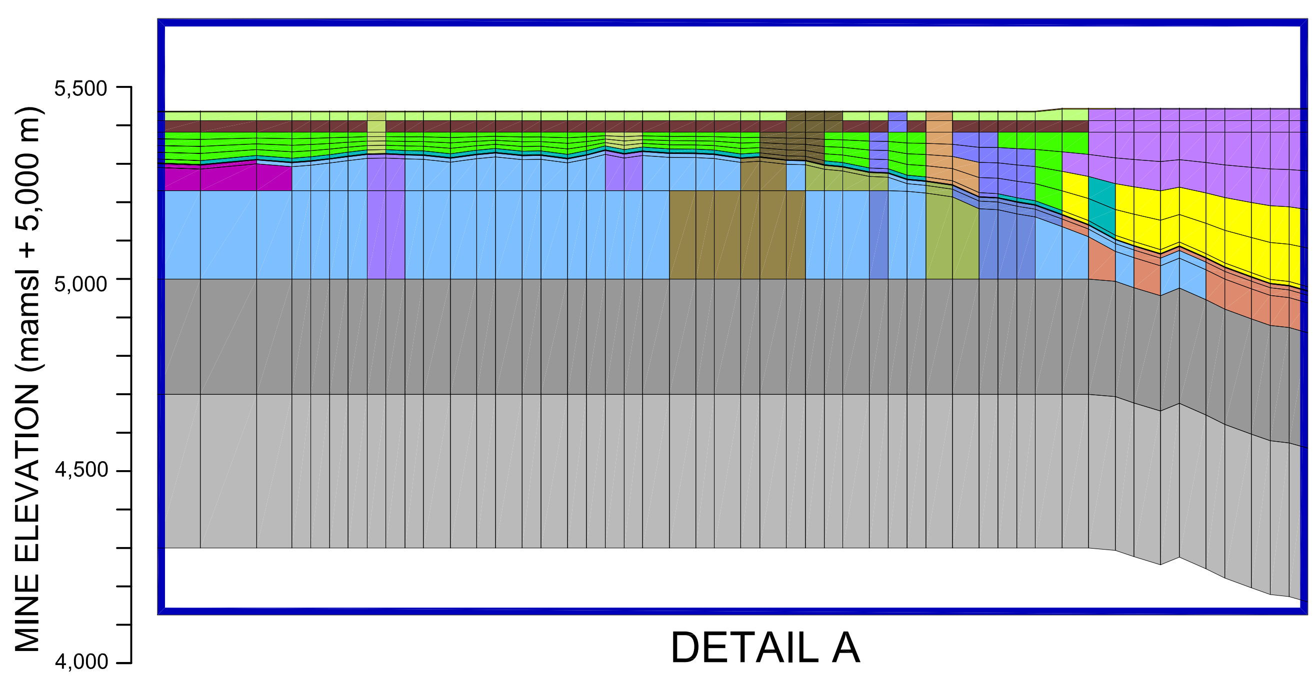
ITASCA™ Denver, Inc.

Mesh Configuration and Simulated Geology of Model Layer 6

CLIENT: De Beers Canada - Snap Lake Mine

FIGURE NO. 6





EXPLANATION

- PERMAFROST
- LAKEBED SEDIMENT
- DEEP BEDROCK
- COUNTRY BEDROCK
- KIMBERLITE DYKE

BEDROCK UNIT ABOVE DYKE (BUAD)

- BUAD1
- BUAD2
- BUAD3
- BUAD4
- BUAD5
- BUAD6

STRUCTURE ZONE ABOVE DYKE

- ZONE 3
- ZONE 5
- ZONE 6
- ZONE 7
- ZONE 8
- ZONE 9

BEDROCK UNIT BELOW DYKE (BUBD)

- BUBD1
- BUBD2
- BUBD3
- BUBD4

STRUCTURE ZONE BELOW DYKE

- ZONE 3
- ZONE 5
- ZONE 6
- ZONE 7
- ZONE 8
- ZONE 9

EXFOLIATED BEDROCK

- EX1
- EX2

NOTE: SEE FIGURE 6 FOR CROSS SECTION LOCATION

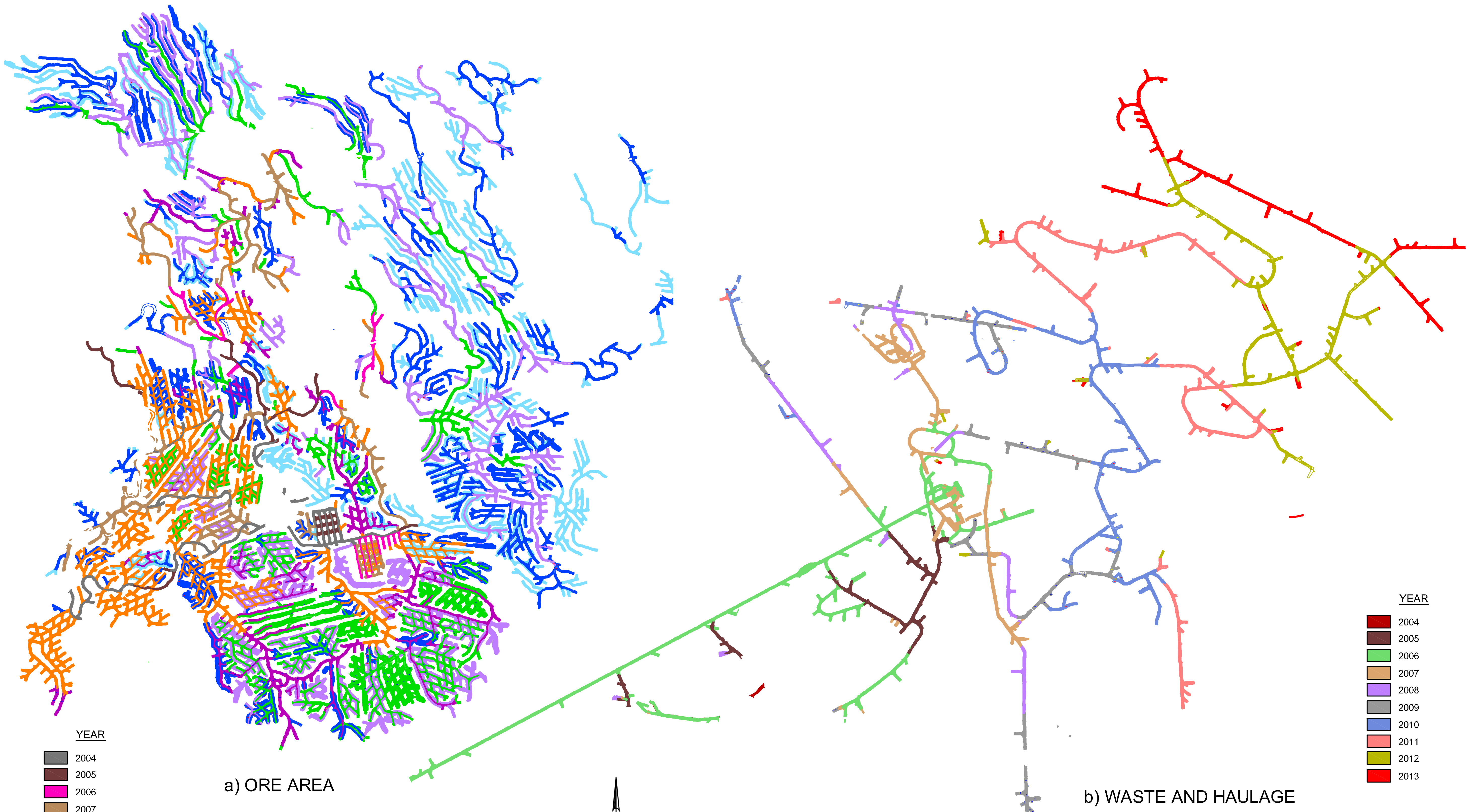
PROJECT NO.	1780
BY	DD
CHECKED	HL
DRAWN	SAC
DRAWING NAME	XSEC–AA–AUG
DRAWING DATE	19 AUG 2013
REVISION DATE	4 DEC 2013

ITASCA™
Denver, Inc.

Simulated Geology along
Model Cross Section A-A'

CLIENT:
De Beers Canada - Snap Lake Mine

FIGURE NO.
7



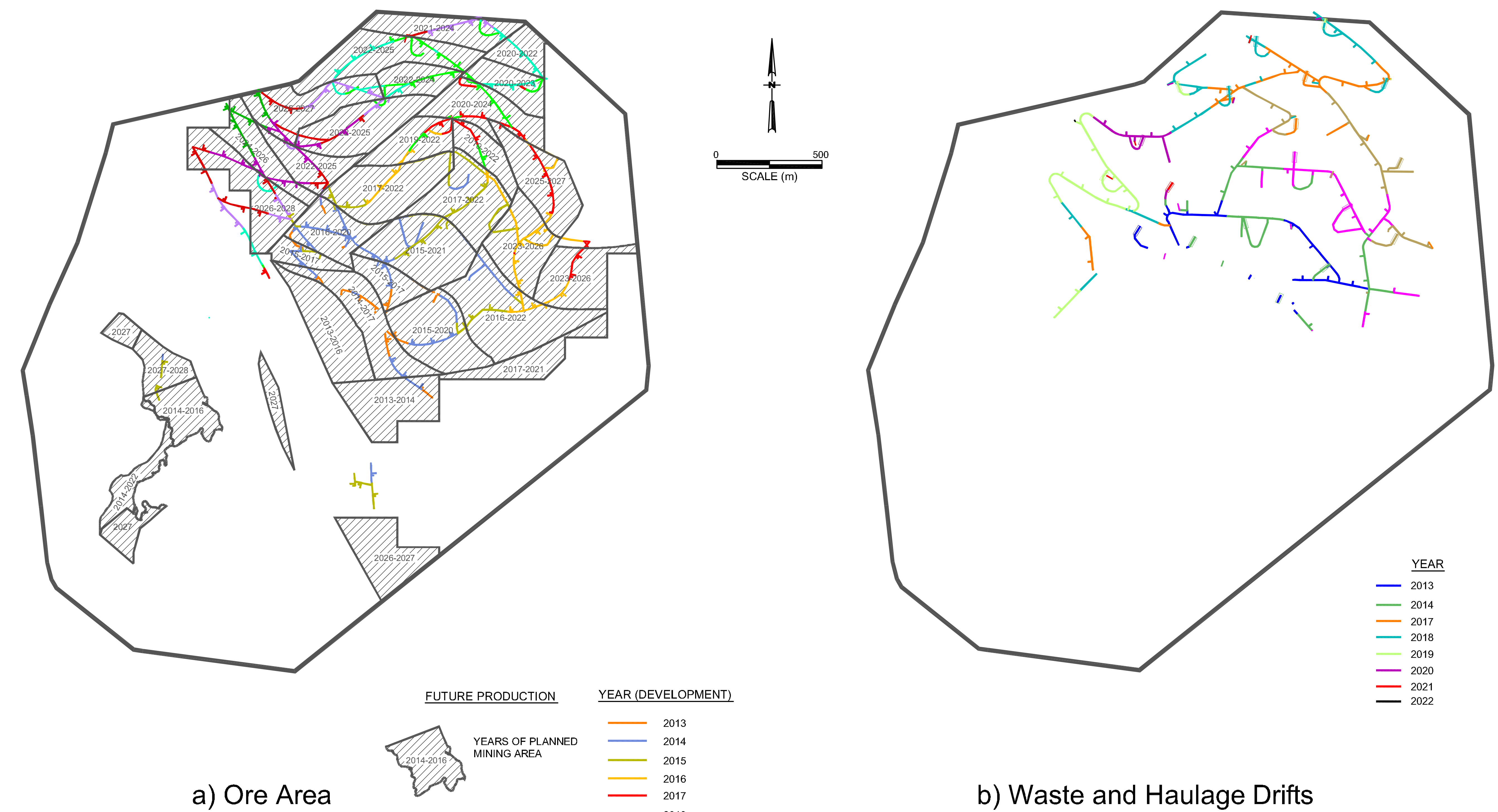
PROJECT NO.	1780
BY	DD
CHECKED	HL
DRAWN	SAC
DRAWING NAME	SIM–MINE–ACTIVITY
DRAWING DATE	12 AUG 2013
REVISION DATE	––

ITASCA™
Denver, Inc.

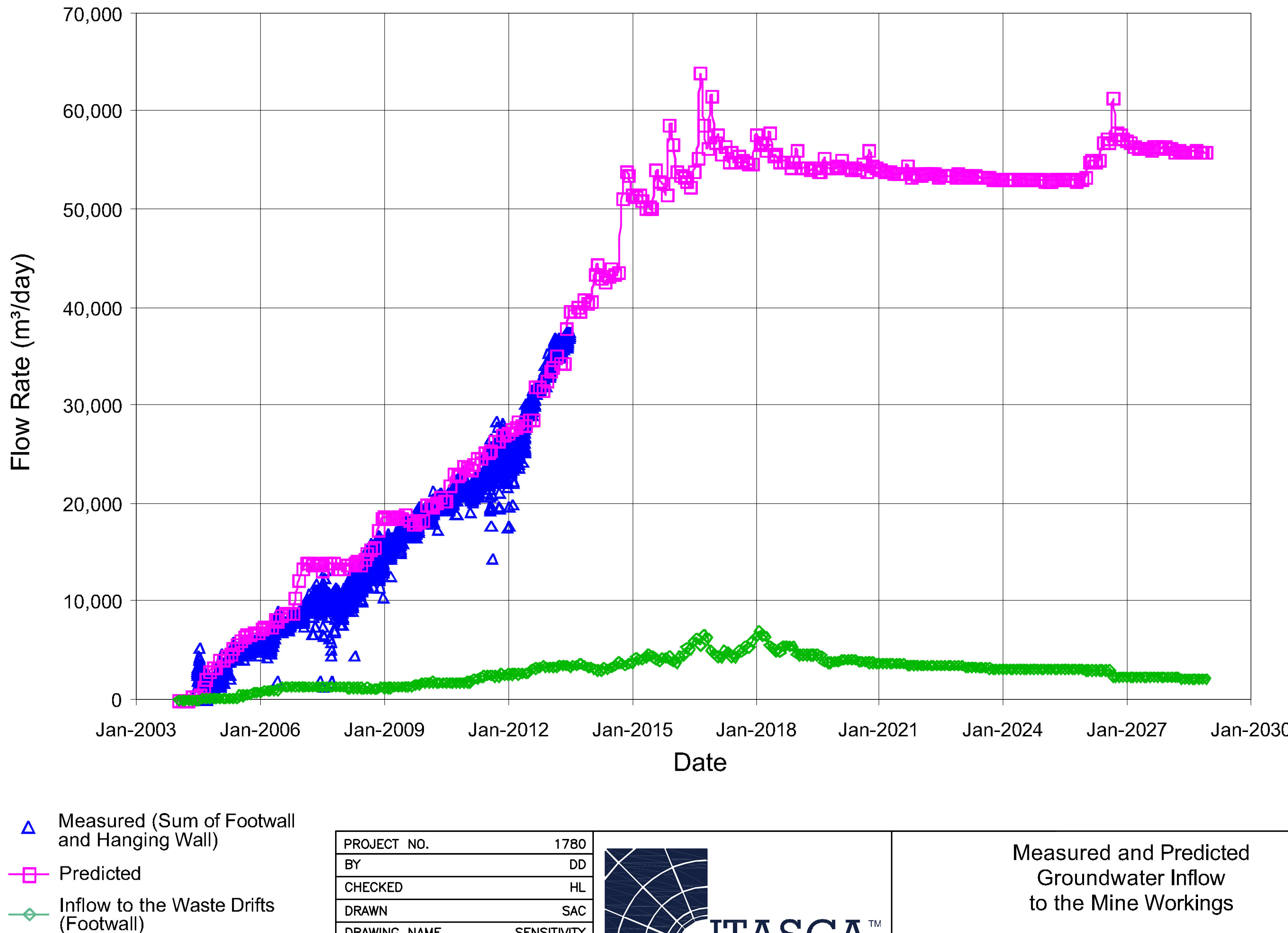
Existing Extent of Mining and Waste

CLIENT:
De Beers Canada - Snap Lake Mine

FIGURE NO.
8



PROJECT NO. 1780	ITASCA™ Denver, Inc.	Future Extent of Mining and Waste	
BY DD			
CHECKED HL			
DRAWN SAC			
DRAWING NAME MINEPLAN-WASTE-ORE			
DRAWING DATE 12 AUG 2013		CLIENT: De Beers Canada - Snap Lake Mine	FIGURE NO. 9
REVISION DATE 29 AUG 2013			



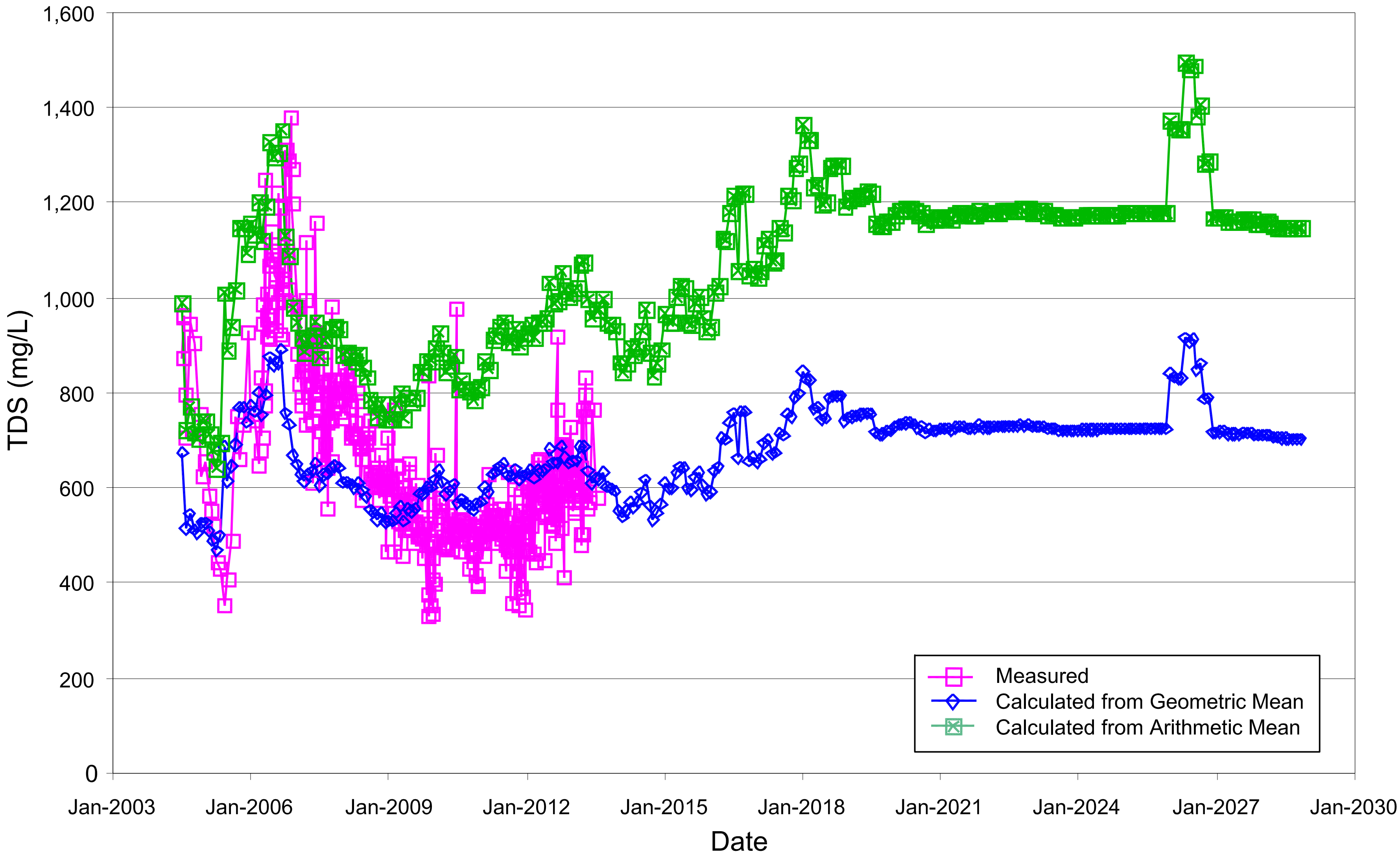
PROJECT NO.	1780
BY	DD
CHECKED	HL
DRAWN	SAC
DRAWING NAME	SENSITIVITY
DRAWING DATE	21 AUG 2013
REVISION DATE	29 AUG 2013

ITASCA™ Denver, Inc.

Measured and Predicted Groundwater Inflow to the Mine Workings

CLIENT: De Beers Canada - Snap Lake Mine

FIGURE NO. 10



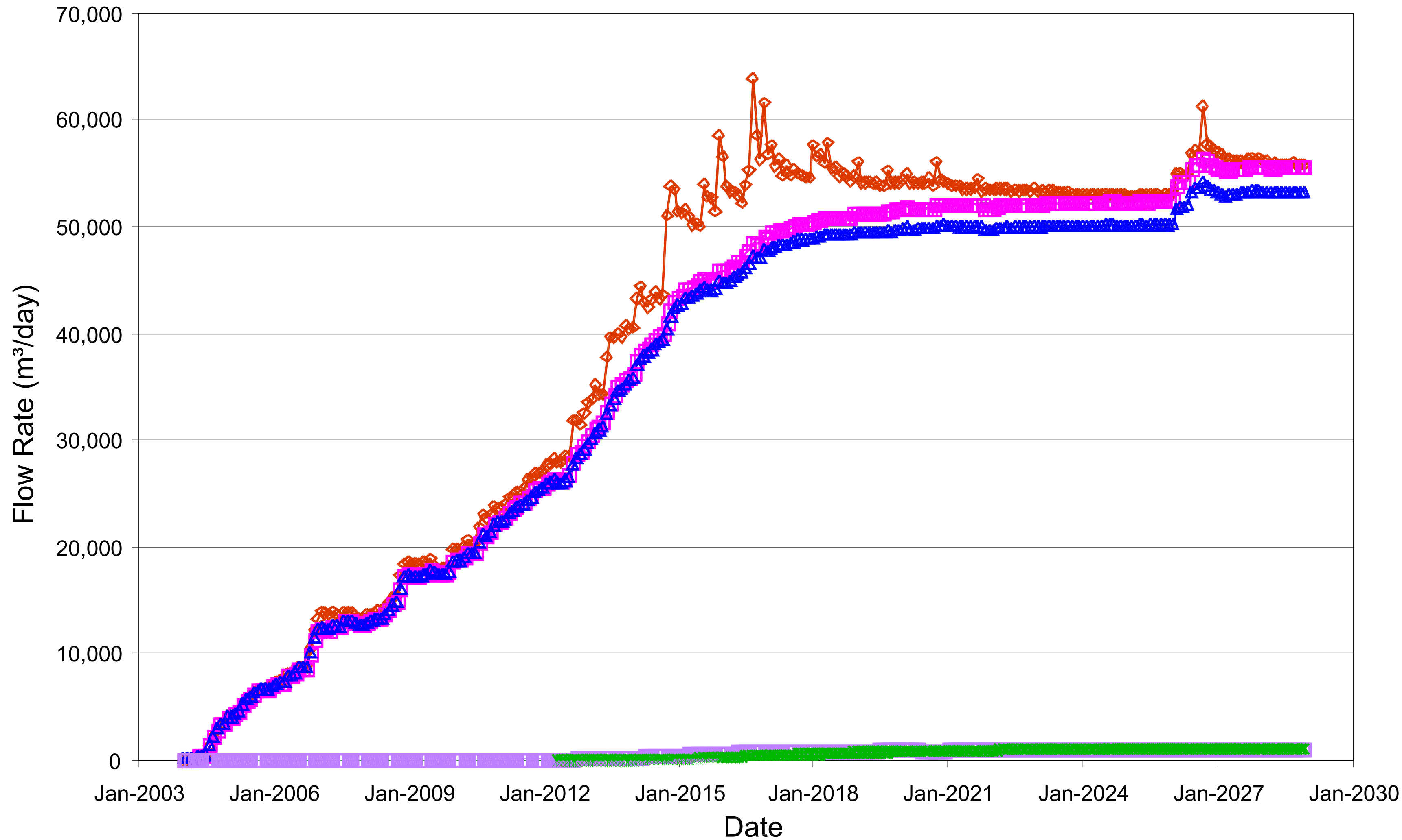
PROJECT NO.	1780
BY	DD
CHECKED	HL
DRAWN	SAC
DRAWING NAME	MEAS–SIM–TDS
DRAWING DATE	21 AUG 2013
REVISION DATE	29 AUG 2013

ITASCA™
Denver, Inc.

Measured and Simulated TDS Concentrations in the Mine Discharge

CLIENT:
De Beers Canada - Snap Lake Mine

FIGURE NO.
11



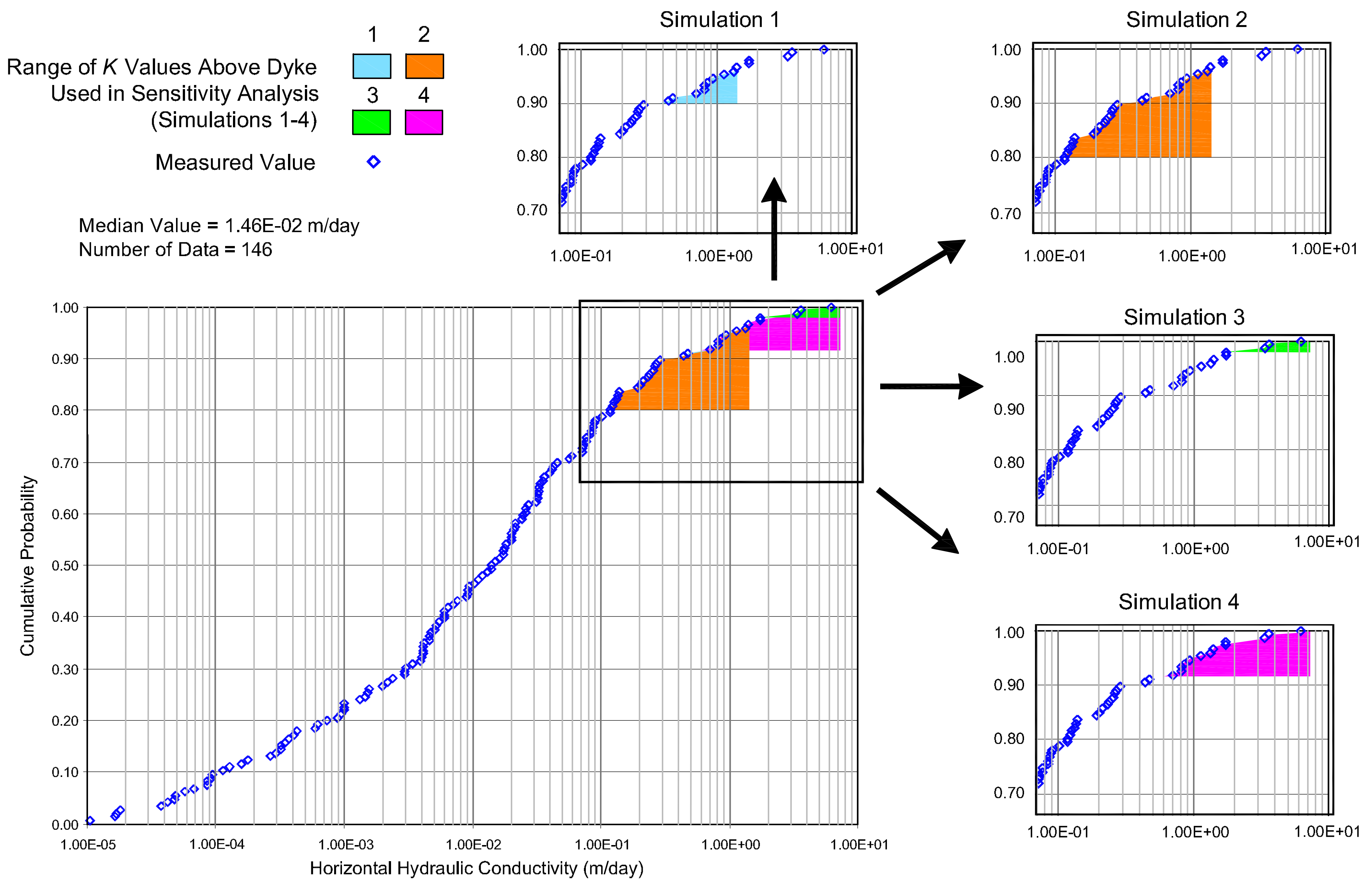
PROJECT NO.	1780
BY	DD
CHECKED	HL
DRAWN	SAC
DRAWING NAME	PRED–TOT–INFLOW
DRAWING DATE	21 AUG 2013
REVISION DATE	4 DEC 2013

ITASCA™ Denver, Inc.

Predicted Total Mine Inflow and Contributions from the Lakes

CLIENT: De Beers Canada - Snap Lake Mine

FIGURE NO. 12



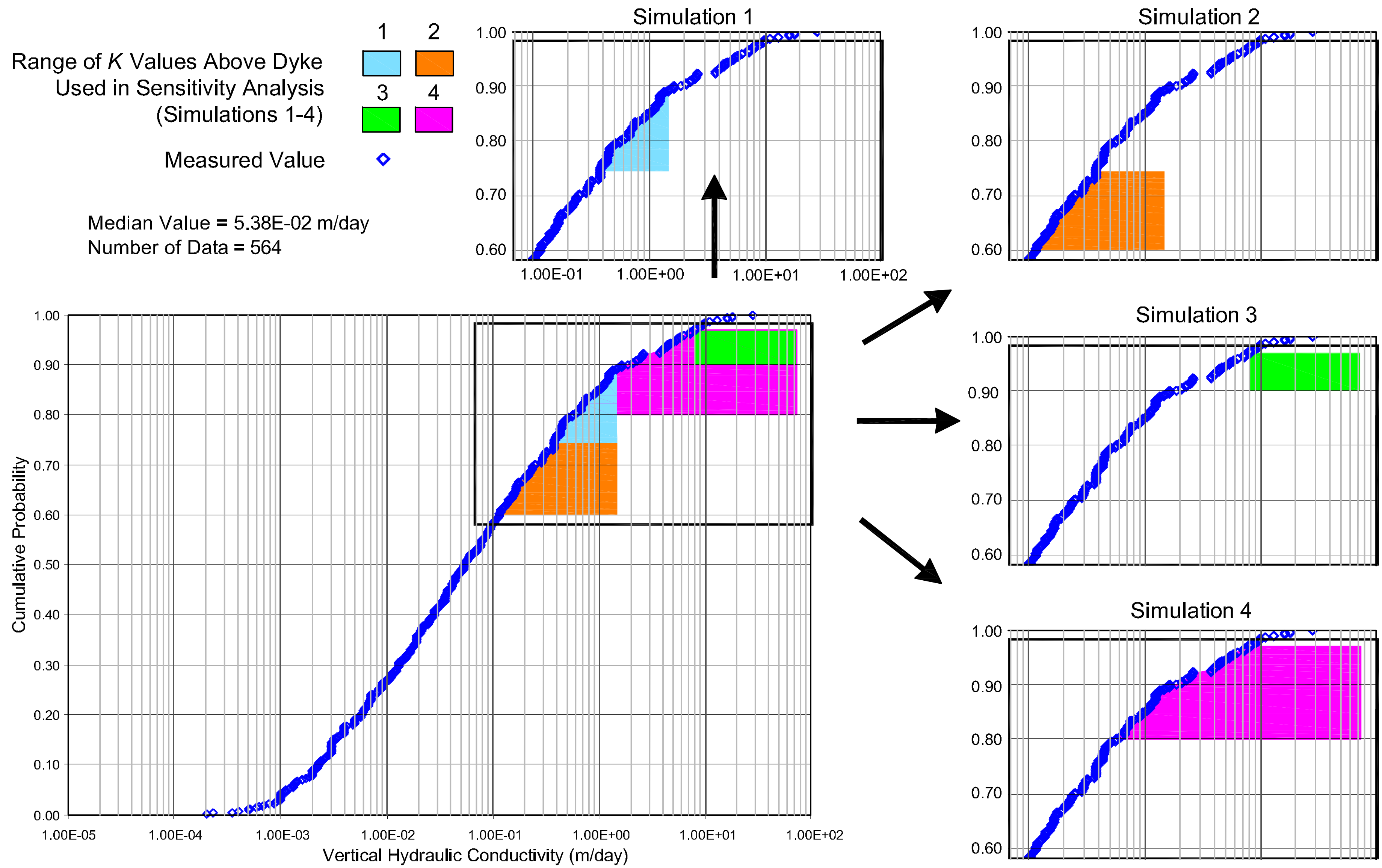
PROJECT NO.	1780
BY	DD
CHECKED	HL
DRAWN	SAC
DRAWING NAME	HORIZ–K–VALUES
DRAWING DATE	22 AUG 2013
REVISION DATE	29 AUG 2013

ITASCA™
Denver, Inc.

Cumulative Probability of Measured Horizontal Hydraulic Conductivity Values

CLIENT:
De Beers Canada - Snap Lake Mine

FIGURE NO.
13



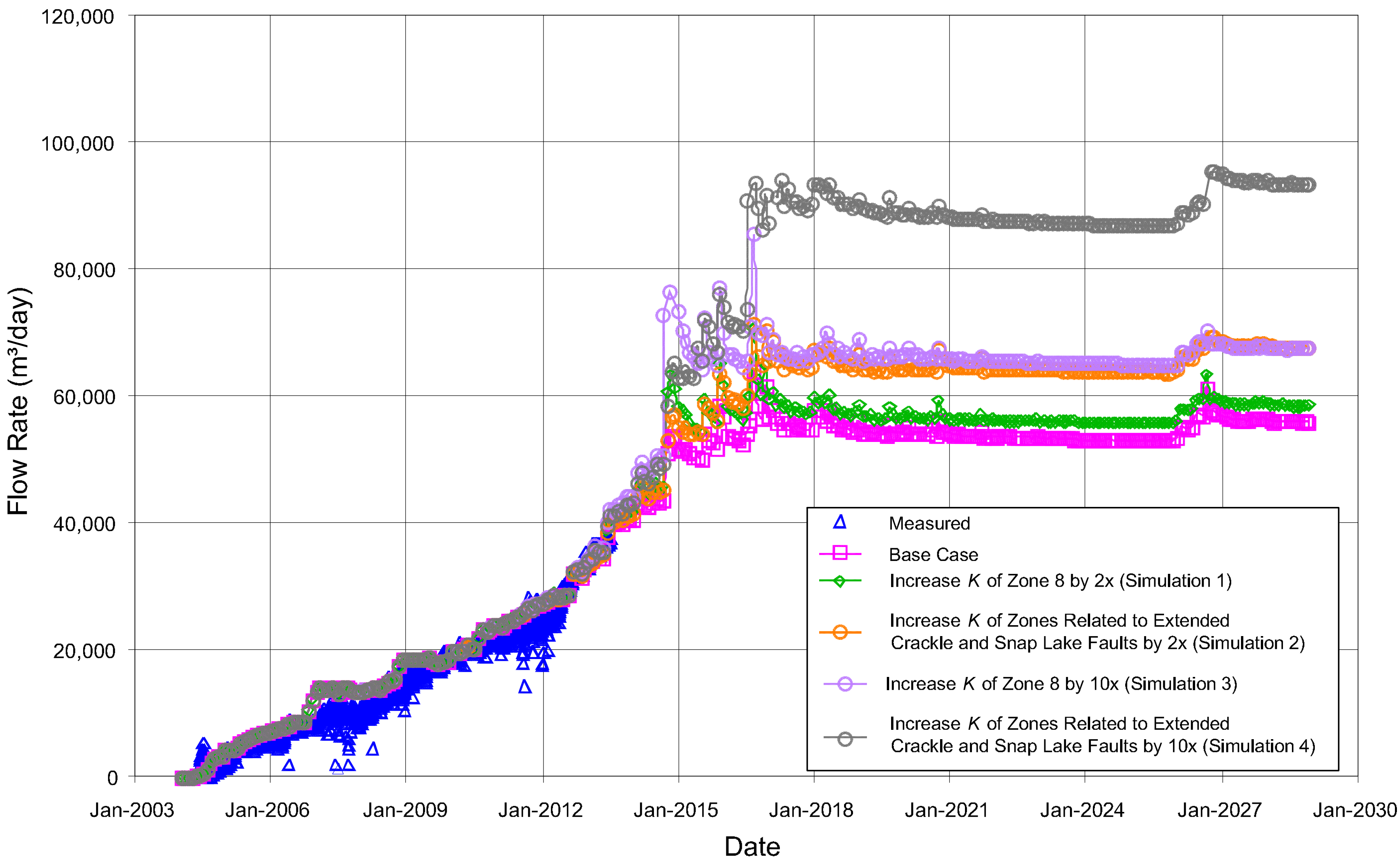
PROJECT NO.	1780
BY	DD
CHECKED	HL
DRAWN	SAC
DRAWING NAME	VERT–K–VALUES
DRAWING DATE	22 AUG 2013
REVISION DATE	29 AUG 2013

ITASCA™
Denver, Inc.

Cumulative Probability of
Measured Vertical
Hydraulic Conductivity Values

CLIENT:
De Beers Canada - Snap Lake Mine

FIGURE NO.
14



PROJECT NO.	1780
BY	DD
CHECKED	HL
DRAWN	SAC
DRAWING NAME	SENS–SIMS
DRAWING DATE	22 AUG 2013
REVISION DATE	29 AUG 2013

ITASCA™
Denver, Inc.

Predicted Total Mine Inflow
from Sensitivity Simulations

CLIENT:
De Beers Canada - Snap Lake Mine

FIGURE NO.
15

TABLE 1

Input for the Snap Lake Model
(Page 1 of 2)

Data Category	File Names	Date	Content
1-Hydrogeologic, General Reports, and Modelling	AMEC Optimisation Study Report	Dec-02	
	090115 Tech Memo FFC-NL-488-GIM-002_Total	Jan-09	Geochemical and Isotop Monitoring, Analysis and Interpretations
	BGC Report 2008	Jun-08	Standard and best practices for inflow preparedness
	DM Rose May 2007	May-07	Snap Lake Diamond Project: structural geology, emplacement, Geostatistics and Hydrogeology
	FINAL Snap Lake North Lakes Oct 2002	Oct-02	Snap Lake Diamond Project: 2002 Environmental Information North Lakes Program
	Phase I Program Interim Results Report Rev06	Feb-05	Snap Lake pre-production development. Phase 1, Results.
	UG water management plan	Dec-06	UG water management plan at Snap Lake
	Additional General Notes On Water Management Plan	Aug-12	We are currently updating our Water management plan.
	Fracflow Model 2011	Jun-11	Model, reports, technical memos, presentations, data
	2007 Annual Hydrogeological Modelling	Mar-07	Part B, Item 5S
	2008 Annual Hydrogeological Modelling	Feb-09	Draft hydrogeological modelling section of the 2008 Annual Report
	2009 Annual Hydrogeological Modelling	Mar-09	Part B, Item 5S
	2011 Annual Hydrogeological Modelling	2011	Part B, Condition 5S
	HCI1780 Snap Lake 9-05 Update Report	Sep-05	Hydrogeologic framework and predicted inflow to proposed mine
2-Geology	Report Winspear Resources Ltd	Feb-00	Bedrock Geology of the Snap Lake Area
	8th International Kimberlite Conference		Structural controls on the morphology of the Snap Lake Kimberlite Dyke
	Gernon_Report	2008	The dynamics of Dyke emplacement at Snap Lake
	Jan 2007 Structural Geology of the Snap Lake Diamond Project	Jan-07	
	June 2007 Structural Geology of the Snap Lake Diamond Project	Jun-07	
	triplepoint snap05 final updated may 05	Feb-05	Snap Lake Kimberlite Dyke, comments on water bearing structures
3-Mine Discharge and Mine Inflow	Data from 2005 to 2012		Flow measurements
	Z12-50DR Water Flow Feb 15, 2012	Feb-12	Flow measurement from a hole, Autocad drawing for location
	Historical Minewater Discharge Data 2004 to 2010		Daily discharge
4-TDS Measurements and Predictions	Snap Lake - TDS Predictions and Mitigation Options 2 July 2008	Jul-08	Snap Lake TDS Loading Predictions and Mitigation Options
	Minewater TDS Profile 2004-2012		
	MW & WTP & SL TDS Profile 2004-2006		Minewater, Water Treatment Plant and Water
5 - Surface Water and Monitoring Data	Stream Selection Sites		Flumes location
	Flumes Measurements 2010 2011		
	Flumes Measurements 2012		
	Data	2006 - 2012	Piezometers data
	Draft Log		Log for SSP03 and SSP06
	Maps	1999, 2010	Piezometers locations
6 - Past and Future Mine Plans	Mine plans for 2009, 2011 and 2013 mining zones	2009, 2011, 2012	Future mine plans
	Memo - Basis for Life-of-Mine Production Plan	Jan-10	Basis for Snap Lake Life-of-Mine Development and Production Plan
	R169510572 Life-of-Mine Production Plan (Rev 1)	Apr-11	Snap Lake Mine re-optimization, Life of Mine Production plan (rev 1)
7 - Regional Topography	Regional topography map		
8 - AutoCAD Drawings		2012	Walls,planned walls, sill elevations, water inflows, major and minor faults, intercept, dewatering system, flowmeters, surface layers
3-D DXF Surfaces	The Mine May 15, 2009.dxf		
	The Mine July 19, 2010.dxf		
	The Mine July 15, 2011.dxf		
	The Mine July 17, 2012.dxf		
Geology	Kymberlit Dyke Surface August 23, 2012.dxf		
	Fault Model August 24, 2012.dxf		
2011 Hydro Modelling for WL	Meeting, Commitments, and Questionnaires		
	3 presentation files		
	Related reports, draft memos, and final memos		
	2010 and 2011		
	3 pdf files for Apr 2011		
	Water quality model, model, model reports, meetings, and emails		
	3D hydro model for WL, and cost estimates		
	2 pdf files		

TABLE 1

Input for the Snap Lake Model

ITASCA Denver, Inc.

Data Category	File Names	Date	Content
Additional Data	Conceptual TDS Correlations.docx	11/15/2012	For TDS calculation
	Data FW.xls	11/15/2012	Footwall TDS measurements
	Minewater TDS Profile 2012.xls	9/21/2012	
	Snap Lake Overall Water Tracking.xlsm	10/31/2012	
	Water Sampling.mdb	11/15/2012	
	Major Structure Dips.xlsx	9/21/2012	
	SL Drawing Summary.docx	9/21/2012	
	LTP_OD_Blocks.dwg	11/9/2012	Future orebody mining plan and development
	LTP_Waste for import.dwg	11/9/2012	Future waste plan
	Effective Grouting November 2012.dwg	11/9/2012	
	SL LTP Drawing Sept 2012.dwg	9/21/2012	
	SL Mine Layout Sept 2012.dwg	9/21/2012	
	SL Structural Zone Sept 2012.dwg	9/21/2012	
	The Mine November 8, 2012.dwg	11/8/2012	
July and August 2013 Data	Inflow Summary_July 2013.xlsx	7/16/2013	Groundwater inflow measurements
	Requested Format.xlsx	7/30/2013	Format that Golders requested
	OreD_FW_Quality_Criteria.xls	8/7/2013	For TDS calculation
	Untreated UG Mine Water.xlsx	8/12/2013	TDS measurements
	SL Structural Zone July 2013.dwg	7/6/2013	Updated Structures
	SBP 2013 Scenario 049.dwg	7/11/2013	
	Stope_schedule.dxf	7/11/2013	
	ORE (OCT 2012 - JUL 2013.dwg	8/8/2013	Mining between September 2013 to July 2013
	WASTE (OCT 2012-JULY 2013).dwg	8/8/2013	Waste drift development between September 2012 to July 2013
	The Mine (Ore) 130730.dwg	7/30/2013	Future orebody mining plan and development
	The Mine (Waste) 130727.dwg	7/27/2013	Future waste plan

TABLE 2

Hydraulic Parameters Used in the Groundwater Flow Model

Hydrogeologic Unit	Hydrogeologic Zone	Hydraulic Conductivity (m/day)			Specific Yield (1/m)	Storativity	Depth/Elevation (m)
		K_x	K_y	K_z			
Lakebed Sediment		5.0E-03	5.0E-03	5.0E-03	5.0E-03	1.0E-06	Depth[1] = 2 m
Permafrost		1.0E-07	1.0E-07	1.0E-07	1.0E-03	1.0E-07	Depth = 210 m
Exfoliated Bedrock	EX1	1.0E-01	1.0E-01	4.0E-02	1.0E-02	1.0E-05	2 m < Depth < 32 m
	EX2	3.0E-02	3.0E-02	3.0E-02	5.0E-03	1.0E-05	32 m < Depth < 62 m
Bedrock Above Dyke	BUAD1	1.0E-03	1.0E-03	1.0E-03	5.0E-03	1.0E-06	Z[2]<5000
	BUAD2	3.5E-02	3.5E-02	3.5E-02	5.0E-03	1.0E-05	Z>5230
	BUAD3	9.0E-03	9.0E-03	9.0E-03	5.0E-03	5.0E-06	Z>5100
	BUAD4	3.0E-03	3.0E-03	3.0E-03	4.0E-03	1.0E-06	Z>5000
	BUAD5	5.0E-04	5.0E-04	5.0E-04	2.0E-03	1.0E-06	Z<4890
	BUAD6	3.0E-04	3.0E-04	3.0E-04	1.0E-03	1.0E-06	Z<4700
Kimberlite Dyke		5.0E-04	5.0E-04	5.0E-04	5.0E-03	1.0E-06	
Bedrock Below Dyke	BUBD1	3.0E-03	3.0E-03	3.0E-03	2.0E-03	1.0E-06	Z>5230
	BUBD2	1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-06	Z>5000
	BUBD3	4.0E-04	4.0E-04	4.0E-04	1.0E-03	1.0E-06	Z<5000
	BUBD4	2.0E-04	2.0E-04	2.0E-04	1.0E-03	1.0E-06	Z<4700
Deep Bedrock		2.0E-04	2.0E-04	2.0E-04	1.0E-03	1.0E-06	
Country Bedrock		1.0E-04	1.0E-04	1.0E-04	1.0E-03	1.0E-06	
Structure Zones Above Dyke	Zone 2, 3, 5	1.5E-01	1.5E-01	1.5E-01	1.0E-02	5.0E-06	Z>5382
		7.5E-02	7.5E-02	7.5E-02	1.0E-02	2.0E-06	Z>5300
		3.8E-02	3.8E-02	3.8E-02	5.0E-03	1.0E-06	Z<5300
	Zone 4, 8	7.2E-01	7.2E-01	7.2E-01	1.0E-02	5.0E-06	Z>5382
		3.6E-01	3.6E-01	3.6E-01	1.0E-02	2.0E-06	Z>5300
		1.8E-01	1.8E-01	1.8E-01	5.0E-03	1.0E-06	Z<5300
	Zone 6	3.0E-01	3.0E-01	3.0E-01	1.0E-02	5.0E-06	Z>5382
		1.5E-01	1.5E-01	1.5E-01	1.0E-02	2.0E-06	Z>5300
		6.0E-02	6.0E-02	6.0E-02	5.0E-03	1.0E-06	Z<5300
	Zone 7	2.4E-01	2.4E-01	2.4E-01	1.0E-02	5.0E-06	Z>5382
		1.2E-01	1.2E-01	1.2E-01	1.0E-02	2.0E-06	Z>5300
		6.0E-02	6.0E-02	6.0E-02	5.0E-03	1.0E-06	Z<5300
	Zone 9	4.2E-01	4.2E-01	4.2E-01	1.0E-02	5.0E-06	Z>5382
		2.0E-01	2.0E-01	2.0E-01	5.0E-03	2.0E-06	Z>5300
		1.0E-01	1.0E-01	1.0E-01	5.0E-03	1.0E-06	Z<5300
Structure Zones Below Dyke	Zone 2	1.5E-03	1.5E-03	1.5E-03	5.0E-03	1.0E-06	Z>5000
	Zone 3, 5	1.5E-03	1.5E-03	1.5E-03	5.0E-03	1.0E-06	Z>5000
		1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-06	Z<5000
	Zone 4, 8	2.0E-03	2.0E-03	2.0E-03	1.0E-03	1.0E-06	Z>5000
		1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-06	Z<5000
	Zone 6	2.0E-03	2.0E-03	2.0E-03	1.0E-03	1.0E-06	Z>5000
		1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-06	Z<5000
	Zone 7	2.0E-03	2.0E-03	2.0E-03	1.0E-03	1.0E-06	Z>5000
		1.0E-03	1.0E-03	1.0E-03	1.0E-03	1.0E-06	Z<5000
	Zone 9	1.2E-03	1.2E-03	1.2E-03	1.0E-03	1.0E-06	Z>5000
		8.0E-04	8.0E-04	8.0E-04	1.0E-03	1.0E-06	Z<5000

Notes:
1. Depth: meters below ground surface.
2. Z: mine elevation (melev).

TABLE 3

Predicted Groundwater Inflow Components to the Mine Workings
(Page 1 of 7)

Date	Total Groundwater Inflow (m^3/day)	Groundwater Flow to the HW (m^3/day)	Groundwater Flow to the FW (m^3/day)			Water Discharge from the Lakes (m^3/day)			
			Upper	Lower	Total	Total	Snap Lake	North Lake	NE Lake
Jan-04	0	0	0	0	0	0	0	0	0
Feb-04	0	0	0	0	0	0	0	0	0
Mar-04	0	0	0	0	0	0	0	0	0
Apr-04	0	0	0	0	0	0	0	0	0
May-04	346	346	0	0	0	298	298	0	0
Jun-04	346	346	0	0	0	298	298	0	0
Jul-04	432	432	0	0	0	399	399	0	0
Aug-04	1382	1210	86	86	173	1362	1362	0	0
Sep-04	2160	1987	86	86	173	2141	2141	0	0
Oct-04	2938	2678	173	86	259	2931	2931	0	0
Nov-04	3283	3024	173	86	259	3283	3283	0	0
Dec-04	3370	3110	173	86	259	3370	3370	0	0
Jan-05	4147	3802	259	86	346	4027	4027	0	0
Feb-05	4147	3802	259	86	346	3999	3999	0	0
Mar-05	4406	4061	259	86	346	4367	4367	0	0
Apr-05	4752	4406	259	86	346	4621	4621	0	0
May-05	5184	4838	259	86	346	5184	5184	0	0
Jun-05	5702	5270	346	86	432	5669	5669	0	0
Jul-05	6048	5270	346	432	778	5875	5875	0	0
Aug-05	6394	5702	259	432	691	6307	6307	0	0
Sep-05	6653	5875	259	518	778	6566	6566	0	0
Oct-05	6653	5789	259	605	864	6653	6653	0	0
Nov-05	6826	5789	259	778	1037	6653	6653	0	0
Dec-05	6826	5789	259	778	1037	6653	6653	0	0
Jan-06	7258	6221	259	778	1037	6998	6998	0	0
Feb-06	7344	6221	259	864	1123	7171	7171	0	0
Mar-06	7517	6394	259	864	1123	7258	7258	0	0
Apr-06	7517	6307	259	950	1210	7258	7258	0	0
May-06	8208	6998	259	950	1210	7949	7949	0	0
Jun-06	8122	6826	259	1037	1296	7949	7949	0	0
Jul-06	8554	6998	259	1296	1555	8208	8208	0	0
Aug-06	8813	7258	259	1296	1555	8640	8640	0	0
Sep-06	8726	7171	259	1296	1555	8640	8640	0	0
Oct-06	8813	7171	259	1382	1642	8640	8640	0	0
Nov-06	10454	8899	259	1296	1555	10022	10022	0	0
Dec-06	12182	10454	346	1382	1728	11405	11405	0	0
Jan-07	13306	11664	259	1382	1642	12182	12182	0	0
Feb-07	13910	12269	346	1296	1642	12355	12355	0	0
Mar-07	13824	12269	259	1296	1555	12269	12269	0	0
Apr-07	13651	12182	173	1296	1469	12182	12182	0	0
May-07	13910	12355	259	1296	1555	12528	12528	0	0
Jun-07	13651	12096	259	1296	1555	12528	12528	0	0
Jul-07	13133	11578	173	1382	1555	12442	12442	0	0
Aug-07	13910	12442	173	1296	1469	13046	13046	0	0

TABLE 3

Predicted Groundwater Inflow Components to the Mine Workings
(Page 2 of 7)

Date	Total Groundwater Inflow (m^3/day)	Groundwater Flow to the HW (m^3/day)	Groundwater Flow to the FW (m^3/day)			Water Discharge from the Lakes (m^3/day)			
			Upper	Lower	Total	Total	Snap Lake	North Lake	NE Lake
Sep-07	13910	12355	259	1296	1555	13046	13046	0	0
Oct-07	13824	12269	259	1296	1555	13046	13046	0	0
Nov-07	13392	11837	259	1296	1555	12874	12787	86	0
Dec-07	13306	11750	259	1296	1555	12787	12701	86	0
Jan-08	13392	11837	259	1296	1555	12787	12701	86	0
Feb-08	13738	12269	259	1210	1469	12960	12874	86	0
Mar-08	13651	12182	259	1210	1469	13133	13046	86	0
Apr-08	13824	12355	259	1210	1469	13219	13133	86	0
May-08	14083	12614	259	1210	1469	13306	13219	86	0
Jun-08	13738	12269	259	1210	1469	13306	13219	86	0
Jul-08	14342	12874	346	1123	1469	13651	13565	86	0
Aug-08	14861	13392	259	1210	1469	14170	14083	86	0
Sep-08	15206	13824	259	1123	1382	14602	14515	86	0
Oct-08	15466	14083	259	1123	1382	14947	14861	86	0
Nov-08	17280	15811	346	1123	1469	16157	16070	86	0
Dec-08	18403	16762	346	1296	1642	17280	17194	86	0
Jan-09	18576	17021	346	1210	1555	17366	17280	86	0
Feb-09	18490	16934	346	1210	1555	17194	17107	86	0
Mar-09	18490	16934	346	1210	1555	17280	17194	86	0
Apr-09	18403	16762	346	1296	1642	17280	17194	86	0
May-09	18576	16848	432	1296	1728	17366	17280	86	0
Jun-09	18490	16934	259	1296	1555	17453	17366	86	0
Jul-09	18922	17194	346	1382	1728	17798	17712	86	0
Aug-09	18230	16589	259	1382	1642	17626	17539	86	0
Sep-09	17885	16243	259	1382	1642	17453	17366	86	0
Oct-09	17971	16157	259	1555	1814	17453	17366	86	0
Nov-09	18058	16243	259	1555	1814	17539	17453	86	0
Dec-09	18230	16330	259	1642	1901	17626	17539	86	0
Jan-10	19786	17712	346	1728	2074	18662	18576	86	0
Feb-10	19786	17626	432	1728	2160	18749	18662	86	0
Mar-10	19613	17366	432	1814	2246	18749	18662	86	0
Apr-10	20045	17885	432	1728	2160	19094	19008	86	0
May-10	20650	18576	432	1642	2074	19440	19354	86	0
Jun-10	20218	18144	432	1642	2074	19526	19440	86	0
Jul-10	20304	18144	432	1728	2160	19526	19440	86	0
Aug-10	21859	19786	432	1642	2074	20390	20304	86	0
Sep-10	23069	20822	518	1728	2246	21168	21082	86	0
Oct-10	22723	20563	432	1728	2160	21082	20995	86	0
Nov-10	23069	20909	432	1728	2160	21427	21341	86	0
Dec-10	23846	21686	432	1728	2160	22118	22032	86	0
Jan-11	23674	21427	432	1814	2246	22378	22291	86	0
Feb-11	23501	21254	432	1814	2246	22464	22291	173	0
Mar-11	24019	21514	432	2074	2506	22723	22550	173	0
Apr-11	24624	22118	432	2074	2506	23242	23069	173	0

TABLE 3

Predicted Groundwater Inflow Components to the Mine Workings
(Page 3 of 7)

Date	Total Groundwater Inflow (m^3/day)	Groundwater Flow to the HW (m^3/day)	Groundwater Flow to the FW (m^3/day)			Water Discharge from the Lakes (m^3/day)			
			Upper	Lower	Total	Total	Snap Lake	North Lake	NE Lake
May-11	24624	21859	432	2333	2765	23501	23328	173	0
Jun-11	25142	22291	432	2419	2851	23846	23674	173	0
Jul-11	25229	22291	432	2506	2938	24106	23933	173	0
Aug-11	25488	22464	518	2506	3024	24192	24019	173	0
Sep-11	26352	23414	518	2419	2938	24538	24365	173	0
Oct-11	26438	23501	518	2419	2938	24797	24624	173	0
Nov-11	26957	23846	518	2592	3110	25315	25142	173	0
Dec-11	26957	24019	432	2506	2938	25488	25315	173	0
Jan-12	27130	24106	432	2592	3024	25661	25488	173	0
Feb-12	27648	24538	518	2592	3110	26006	25834	173	0
Mar-12	27821	24624	518	2678	3197	26179	26006	173	0
Apr-12	28339	25229	518	2592	3110	26438	26266	173	0
May-12	27907	24710	518	2678	3197	26266	26093	173	0
Jun-12	27994	24797	518	2678	3197	26179	26006	173	0
Jul-12	28512	25229	518	2765	3283	26438	26266	173	0
Aug-12	28512	24883	518	3110	3629	26698	26525	173	0
Sep-12	31882	28080	605	3197	3802	27907	27734	173	0
Oct-12	31882	28080	518	3283	3802	28685	28426	259	0
Nov-12	31450	27389	605	3456	4061	28944	28685	259	0
Dec-12	32573	28598	605	3370	3974	29462	29203	259	0
Jan-13	33523	29549	605	3370	3974	29981	29722	259	0
Feb-13	33869	29808	691	3370	4061	30326	30067	259	0
Mar-13	35165	30931	864	3370	4234	30931	30672	259	0
Apr-13	34301	29894	864	3542	4406	31277	31018	259	0
May-13	34301	29894	864	3542	4406	31450	31190	259	0
Jun-13	37843	33523	864	3456	4320	32659	32400	259	0
Jul-13	39658	35424	864	3370	4234	33264	33005	259	0
Aug-13	39658	35338	864	3456	4320	33869	33610	259	0
Sep-13	40003	35683	864	3456	4320	34646	34301	346	0
Oct-13	39658	35251	778	3629	4406	35078	34733	346	0
Nov-13	40781	36634	691	3456	4147	35683	35338	346	0
Dec-13	40435	36374	691	3370	4061	35942	35597	346	0
Jan-14	40608	36634	605	3370	3974	36115	35770	346	0
Feb-14	43286	39571	605	3110	3715	37238	36893	346	0
Mar-14	44410	40781	605	3024	3629	38102	37670	346	86
Apr-14	42941	39312	605	3024	3629	38448	37930	432	86
May-14	42509	38707	605	3197	3802	38707	38189	432	86
Jun-14	43200	39485	605	3110	3715	39053	38534	432	86
Jul-14	43891	40003	605	3283	3888	39485	38966	432	86
Aug-14	43286	39226	605	3456	4061	39830	39312	432	86
Sep-14	43632	39226	605	3802	4406	40003	39485	432	86
Oct-14	51062	46742	691	3629	4320	41040	40435	518	86
Nov-14	53827	49766	605	3456	4061	42163	41558	518	86
Dec-14	53482	49248	605	3629	4234	43027	42336	518	173

TABLE 3

ITASCA™ Denver, Inc.

Predicted Groundwater Inflow Components to the Mine Workings
(Page 4 of 7)

Date	Total Groundwater Inflow (m^3/day)	Groundwater Flow to the HW (m^3/day)	Groundwater Flow to the FW (m^3/day)			Water Discharge from the Lakes (m^3/day)			
			Upper	Lower	Total	Total	Snap Lake	North Lake	NE Lake
Jan-15	51494	47174	605	3715	4320	43373	42682	518	173
Feb-15	51322	46397	605	4320	4925	43546	42854	518	173
Mar-15	51581	46829	605	4147	4752	44064	43373	518	173
Apr-15	50976	46310	605	4061	4666	44237	43459	605	173
May-15	50198	45187	605	4406	5011	44323	43546	605	173
Jun-15	50371	45187	605	4579	5184	44582	43805	605	173
Jul-15	50112	45014	605	4493	5098	44928	44064	605	259
Aug-15	54000	49248	691	4061	4752	45187	44323	605	259
Sep-15	52877	48298	691	3888	4579	45014	44150	605	259
Oct-15	52704	47779	691	4234	4925	45014	44064	691	259
Nov-15	51494	46570	691	4234	4925	45101	44150	691	259
Dec-15	58579	53482	691	4406	5098	45878	44928	691	259
Jan-16	56592	52013	691	3888	4579	45878	44842	691	346
Feb-16	53827	49421	605	3802	4406	45878	44842	691	346
Mar-16	53395	48384	605	4406	5011	46051	45014	691	346
Apr-16	53309	48211	605	4493	5098	46397	45360	691	346
May-16	52963	47002	605	5357	5962	46656	45533	778	346
Jun-16	52272	46483	605	5184	5789	46829	45706	778	346
Jul-16	53914	47434	605	5875	6480	47347	46138	778	432
Aug-16	55296	48384	605	6307	6912	47779	46570	778	432
Sep-16	63850	57715	605	5530	6134	48470	47261	778	432
Oct-16	58579	51322	605	6653	7258	48384	47174	778	432
Nov-16	56333	49421	605	6307	6912	48384	47174	778	432
Dec-16	61603	55987	605	5011	5616	49162	47952	778	432
Jan-17	56765	51494	605	4666	5270	48902	47693	778	432
Feb-17	57629	52531	691	4406	5098	49421	48038	864	518
Mar-17	55728	50717	691	4320	5011	49507	48125	864	518
Apr-17	56419	50803	605	5011	5616	49766	48384	864	518
May-17	54864	49334	691	4838	5530	49680	48298	864	518
Jun-17	55814	50717	691	4406	5098	49766	48384	864	518
Jul-17	54864	49853	691	4320	5011	49853	48470	864	518
Aug-17	55382	49680	691	5011	5702	50026	48643	864	518
Sep-17	55037	49507	691	4838	5530	50285	48816	864	605
Oct-17	54864	48643	691	5530	6221	50285	48816	864	605
Nov-17	54605	48557	691	5357	6048	50371	48902	864	605
Dec-17	54605	47952	691	5962	6653	50371	48902	864	605
Jan-18	57629	50544	691	6394	7085	50544	48989	950	605
Feb-18	56592	48902	691	6998	7690	50630	49075	950	605
Mar-18	56765	49421	778	6566	7344	50717	49162	950	605
Apr-18	55987	48816	778	6394	7171	50976	49334	950	691
May-18	57802	51494	778	5530	6307	50976	49334	950	691
Jun-18	55469	49421	691	5357	6048	50976	49334	950	691
Jul-18	55555	49939	691	4925	5616	50976	49334	950	691
Aug-18	54778	49248	691	4838	5530	50976	49334	950	691

TABLE 3

Predicted Groundwater Inflow Components to the Mine Workings
(Page 5 of 7)

ITASCA™ Denver, Inc.

Date	Total Groundwater Inflow (m^3/day)	Groundwater Flow to the HW (m^3/day)	Groundwater Flow to the FW (m^3/day)			Water Discharge from the Lakes (m^3/day)			
			Upper	Lower	Total	Total	Snap Lake	North Lake	NE Lake
Sep-18	54950	48730	691	5530	6221	50976	49334	950	691
Oct-18	54778	48557	691	5530	6221	50976	49334	950	691
Nov-18	54346	48211	691	5443	6134	50976	49334	950	691
Dec-18	54778	48643	691	5443	6134	51235	49507	950	778
Jan-19	56074	50717	691	4666	5357	51235	49507	950	778
Feb-19	54173	48902	691	4579	5270	51235	49507	950	778
Mar-19	54173	48902	691	4579	5270	51235	49507	950	778
Apr-19	54346	49075	691	4579	5270	51322	49594	950	778
May-19	54000	48730	691	4579	5270	51322	49594	950	778
Jun-19	54173	48902	691	4579	5270	51235	49507	950	778
Jul-19	53914	48643	691	4579	5270	51322	49507	1037	778
Aug-19	53827	48643	691	4493	5184	51322	49507	1037	778
Sep-19	55296	50630	778	3888	4666	51494	49680	1037	778
Oct-19	54173	49680	691	3802	4493	51494	49594	1037	864
Nov-19	54173	49680	691	3802	4493	51581	49680	1037	864
Dec-19	54173	49594	691	3888	4579	51667	49766	1037	864
Jan-20	54432	49853	691	3888	4579	51754	49853	1037	864
Feb-20	55037	50285	691	4061	4752	51926	50026	1037	864
Mar-20	54173	49421	691	4061	4752	51667	49766	1037	864
Apr-20	54173	49421	691	4061	4752	51667	49766	1037	864
May-20	54086	49334	691	4061	4752	51754	49853	1037	864
Jun-20	54173	49421	691	4061	4752	51667	49853	950	864
Jul-20	54000	49334	691	3974	4666	51667	49853	950	864
Aug-20	54605	50026	691	3888	4579	51754	49939	950	864
Sep-20	53827	49248	691	3888	4579	51667	49853	950	864
Oct-20	56074	51581	691	3802	4493	52013	50112	950	950
Nov-20	54432	49939	691	3802	4493	52013	50112	950	950
Dec-20	54346	49939	691	3715	4406	52099	50198	950	950
Jan-21	54086	49680	691	3715	4406	52099	50112	1037	950
Feb-21	53827	49421	691	3715	4406	52099	50112	1037	950
Mar-21	53914	49507	691	3715	4406	52099	50112	1037	950
Apr-21	53827	49421	691	3715	4406	52013	50026	1037	950
May-21	53568	49248	691	3629	4320	52013	50026	1037	950
Jun-21	53568	49162	778	3629	4406	52013	50026	1037	950
Jul-21	53568	49162	778	3629	4406	52013	50026	1037	950
Aug-21	53741	49334	778	3629	4406	52099	50112	1037	950
Sep-21	54518	50112	864	3542	4406	52013	50026	1037	950
Oct-21	53309	48989	778	3542	4320	52013	50026	1037	950
Nov-21	53568	49248	778	3542	4320	51754	49766	1037	950
Dec-21	53482	49075	864	3542	4406	51754	49766	1037	950
Jan-22	53482	49162	864	3456	4320	51754	49766	1037	950
Feb-22	53568	49248	864	3456	4320	51840	49853	1037	950
Mar-22	53568	49248	864	3456	4320	52013	49939	1037	1037
Apr-22	53568	49248	864	3456	4320	52013	49939	1037	1037

TABLE 3

Predicted Groundwater Inflow Components to the Mine Workings
(Page 6 of 7)

Date	Total Groundwater Inflow (m^3/day)	Groundwater Flow to the HW (m^3/day)	Groundwater Flow to the FW (m^3/day)			Water Discharge from the Lakes (m^3/day)			
			Upper	Lower	Total	Total	Snap Lake	North Lake	NE Lake
May-22	53568	49248	864	3456	4320	52099	50026	1037	1037
Jun-22	53309	48989	864	3456	4320	52013	49939	1037	1037
Jul-22	53482	49162	864	3456	4320	52099	50026	1037	1037
Aug-22	53395	49075	864	3456	4320	52099	50026	1037	1037
Sep-22	53482	49162	864	3456	4320	52099	50026	1037	1037
Oct-22	53482	49162	864	3456	4320	52099	50026	1037	1037
Nov-22	53309	48989	864	3456	4320	52099	50026	1037	1037
Dec-22	53654	49334	864	3456	4320	52099	50026	1037	1037
Jan-23	53309	48989	864	3456	4320	52099	50026	1037	1037
Feb-23	53395	49162	864	3370	4234	52099	50026	1037	1037
Mar-23	53222	48989	864	3370	4234	52272	50112	1123	1037
Apr-23	53395	49162	864	3370	4234	52272	50112	1123	1037
May-23	53395	49162	864	3370	4234	52272	50112	1123	1037
Jun-23	53309	49162	864	3283	4147	52272	50112	1123	1037
Jul-23	53222	49075	864	3283	4147	52272	50112	1123	1037
Aug-23	53222	49075	864	3283	4147	52272	50112	1123	1037
Sep-23	53309	49248	864	3197	4061	52272	50112	1123	1037
Oct-23	53136	49075	950	3110	4061	52272	50112	1123	1037
Nov-23	53050	48989	950	3110	4061	52272	50112	1123	1037
Dec-23	53050	48989	950	3110	4061	52272	50112	1123	1037
Jan-24	53050	48989	950	3110	4061	52272	50112	1123	1037
Feb-24	53050	48989	950	3110	4061	52272	50112	1123	1037
Mar-24	53050	48989	950	3110	4061	52272	50112	1123	1037
Apr-24	53050	48989	950	3110	4061	52272	50112	1123	1037
May-24	53050	48989	950	3110	4061	52272	50112	1123	1037
Jun-24	53050	48989	950	3110	4061	52272	50112	1123	1037
Jul-24	53136	49075	950	3110	4061	52358	50198	1123	1037
Aug-24	53050	48989	950	3110	4061	52445	50198	1123	1123
Sep-24	53050	48989	950	3110	4061	52445	50198	1123	1123
Oct-24	53050	48989	950	3110	4061	52358	50112	1123	1123
Nov-24	53050	48989	950	3110	4061	52358	50112	1123	1123
Dec-24	53050	48989	950	3110	4061	52358	50112	1123	1123
Jan-25	52963	48902	950	3110	4061	52358	50112	1123	1123
Feb-25	52963	48902	950	3110	4061	52358	50112	1123	1123
Mar-25	52963	48902	950	3110	4061	52358	50112	1123	1123
Apr-25	53050	48989	950	3110	4061	52445	50198	1123	1123
May-25	53050	48989	950	3110	4061	52445	50198	1123	1123
Jun-25	53050	48989	950	3110	4061	52358	50112	1123	1123
Jul-25	53050	48989	950	3110	4061	52445	50198	1123	1123
Aug-25	53050	48989	950	3110	4061	52445	50198	1123	1123
Sep-25	53136	49075	950	3110	4061	52445	50198	1123	1123
Oct-25	52963	48902	950	3110	4061	52445	50198	1123	1123
Nov-25	53136	49075	950	3110	4061	52445	50198	1123	1123
Dec-25	53050	48989	950	3110	4061	52445	50198	1123	1123

TABLE 3

Predicted Groundwater Inflow Components to the Mine Workings
(Page 7 of 7)

Date	Total Groundwater Inflow (m³/day)	Groundwater Flow to the HW (m³/day)	Groundwater Flow to the FW (m³/day)			Water Discharge from the Lakes (m³/day)			
			Upper	Lower	Total	Total	Snap Lake	North Lake	NE Lake
Jan-26	53309	49248	1037	3024	4061	52531	50285	1123	1123
Feb-26	54950	48816	3110	3024	6134	53914	51667	1123	1123
Mar-26	55037	49075	2938	3024	5962	54173	51926	1123	1123
Apr-26	54864	48989	2851	3024	5875	54173	51926	1123	1123
May-26	55037	49162	2851	3024	5875	54346	52099	1123	1123
Jun-26	56851	49334	4493	3024	7517	55469	53222	1123	1123
Jul-26	57197	49853	4320	3024	7344	55901	53654	1123	1123
Aug-26	56851	49507	4320	3024	7344	55901	53654	1123	1123
Sep-26	61258	54605	4234	2419	6653	56506	54259	1123	1123
Oct-26	57715	51235	4147	2333	6480	56160	53914	1123	1123
Nov-26	57542	52445	2765	2333	5098	55814	53568	1123	1123
Dec-26	57197	52099	2765	2333	5098	55728	53482	1123	1123
Jan-27	56938	53136	1469	2333	3802	55469	53222	1123	1123
Feb-27	56765	52963	1469	2333	3802	55382	53136	1123	1123
Mar-27	56506	52704	1469	2333	3802	55210	52963	1123	1123
Apr-27	56333	52531	1469	2333	3802	55296	53050	1123	1123
May-27	56160	52445	1382	2333	3715	55382	53136	1123	1123
Jun-27	56160	52445	1382	2333	3715	55382	53136	1123	1123
Jul-27	56160	52445	1382	2333	3715	55469	53222	1123	1123
Aug-27	56074	52358	1382	2333	3715	55469	53222	1123	1123
Sep-27	56419	52618	1469	2333	3802	55555	53309	1123	1123
Oct-27	56506	52704	1469	2333	3802	55642	53395	1123	1123
Nov-27	56246	52445	1469	2333	3802	55642	53395	1123	1123
Dec-27	56506	52790	1469	2246	3715	55728	53482	1123	1123
Jan-28	56246	52531	1469	2246	3715	55555	53309	1123	1123
Feb-28	56160	52445	1469	2246	3715	55555	53309	1123	1123
Mar-28	55814	52099	1469	2246	3715	55469	53222	1123	1123
Apr-28	55987	52272	1469	2246	3715	55469	53222	1123	1123
May-28	55901	52272	1469	2160	3629	55555	53309	1123	1123
Jun-28	55901	52272	1469	2160	3629	55555	53309	1123	1123
Jul-28	55901	52272	1469	2160	3629	55555	53309	1123	1123
Aug-28	55901	52272	1469	2160	3629	55555	53309	1123	1123
Sep-28	56074	52445	1469	2160	3629	55555	53309	1123	1123
Oct-28	55814	52186	1469	2160	3629	55555	53309	1123	1123
Nov-28	55901	52272	1469	2160	3629	55555	53309	1123	1123
Dec-28	55814	52186	1469	2160	3629	55555	53309	1123	1123

TABLE 4

Predicted TDS Concentrations of the Mine Water Discharge
(Page 1 of 7)

Date	Using Geometric Mean Value of TDS			Using Arithmetic Mean Value of TDS		
	HW TDS (mg/L)	FW TDS (mg/L)	Calculated TDS in the Mine Discharge (mg/L)	HW TDS (mg/L)	FW TDS (mg/L)	Calculated TDS in the Mine Discharge (mg/L)
	Assigned from Snap Lake[1]	Constant[1]		Assigned from Snap Lake[1]	Constant[1]	
Jan-04	231.9	3770		247.0	6187.7	
Feb-04	231.9	3770		247.0	6187.7	
Mar-04	231.9	3770		247.0	6187.7	
Apr-04	231.9	3770		247.0	6187.7	
May-04	231.9	3770	231.9	247.0	6187.7	247.00
Jun-04	231.9	3770	231.9	247.0	6187.7	247.00
Jul-04	231.9	3770	231.9	247.0	6187.7	247.00
Aug-04	231.9	3770	674.2	247.0	6187.7	989.50
Sep-04	231.9	3770	514.9	247.0	6187.7	722.20
Oct-04	231.9	3770	544.1	247.0	6187.7	771.12
Nov-04	231.9	3770	511.2	247.0	6187.7	715.95
Dec-04	231.9	3770	504.1	247.0	6187.7	703.92
Jan-05	231.9	3770	526.7	247.0	6187.7	742.00
Feb-05	231.9	3770	526.7	247.0	6187.7	742.00
Mar-05	231.9	3770	509.4	247.0	6187.7	712.88
Apr-05	231.9	3770	489.2	247.0	6187.7	679.00
May-05	231.9	3770	467.8	247.0	6187.7	643.00
Jun-05	231.9	3770	499.9	247.0	6187.7	697.00
Jul-05	231.9	3770	686.8	247.0	6187.7	1010.71
Aug-05	231.9	3770	614.4	247.0	6187.7	889.16
Sep-05	231.9	3770	645.4	247.0	6187.7	941.29
Oct-05	231.9	3770	691.4	247.0	6187.7	1018.43
Nov-05	231.9	3770	769.3	247.0	6187.7	1149.28
Dec-05	231.9	3770	769.3	247.0	6187.7	1149.28
Jan-06	231.9	3770	737.3	247.0	6187.7	1095.57
Feb-06	231.9	3770	773.0	247.0	6187.7	1155.47
Mar-06	231.9	3770	760.6	247.0	6187.7	1134.59
Apr-06	231.9	3770	801.2	247.0	6187.7	1202.86
May-06	231.9	3770	753.3	247.0	6187.7	1122.37
Jun-06	231.9	3770	796.5	247.0	6187.7	1194.87
Jul-06	231.9	3770	875.2	247.0	6187.7	1327.00
Aug-06	231.9	3770	856.3	247.0	6187.7	1295.24
Sep-06	231.9	3770	862.5	247.0	6187.7	1305.61
Oct-06	231.9	3770	891.0	247.0	6187.7	1353.47
Nov-06	231.9	3770	758.2	247.0	6187.7	1130.64
Dec-06	231.9	3770	733.8	247.0	6187.7	1089.55
Jan-07	231.9	3770	668.4	247.0	6187.7	979.86
Feb-07	231.9	3770	649.4	247.0	6187.7	947.99
Mar-07	231.9	3770	629.9	247.0	6187.7	915.25
Apr-07	231.9	3770	612.6	247.0	6187.7	886.11
May-07	231.9	3770	627.5	247.0	6187.7	911.10
Jun-07	231.9	3770	635.0	247.0	6187.7	923.71
Jul-07	231.9	3770	650.9	247.0	6187.7	950.42
Aug-07	231.9	3770	605.5	247.0	6187.7	874.20

TABLE 4

Predicted TDS Concentrations of the Mine Water Discharge
(Page 2 of 7)

Date	Using Geometric Mean Value of TDS			Using Arithmetic Mean Value of TDS		
	HW TDS (mg/L)	FW TDS (mg/L)	Calculated TDS in the Mine Discharge (mg/L)	HW TDS (mg/L)	FW TDS (mg/L)	Calculated TDS in the Mine Discharge (mg/L)
	Assigned from Snap Lake[1]	Constant[1]		Assigned from Snap Lake[1]	Constant[1]	
Sep-07	231.9	3770	627.5	247.0	6187.7	911.10
Oct-07	231.9	3770	629.9	247.0	6187.7	915.25
Nov-07	231.9	3770	642.8	247.0	6187.7	936.81
Dec-07	231.9	3770	645.4	247.0	6187.7	941.29
Jan-08	231.9	3770	642.8	247.0	6187.7	936.81
Feb-08	231.9	3770	610.2	247.0	6187.7	882.09
Mar-08	231.9	3770	612.6	247.0	6187.7	886.11
Apr-08	231.9	3770	607.8	247.0	6187.7	878.13
May-08	231.9	3770	600.9	247.0	6187.7	866.51
Jun-08	231.9	3770	610.2	247.0	6187.7	882.09
Jul-08	231.9	3770	594.2	247.0	6187.7	855.31
Aug-08	231.9	3770	581.6	247.0	6187.7	834.09
Sep-08	231.9	3770	553.5	247.0	6187.7	787.00
Oct-08	231.9	3770	548.2	247.0	6187.7	777.95
Nov-08	231.9	3770	532.6	247.0	6187.7	751.90
Dec-08	231.9	3770	547.5	247.0	6187.7	776.86
Jan-09	231.9	3770	528.1	247.0	6187.7	744.30
Feb-09	231.9	3770	529.5	247.0	6187.7	746.63
Mar-09	231.9	3770	529.5	247.0	6187.7	746.63
Apr-09	231.9	3770	547.5	247.0	6187.7	776.86
May-09	231.9	3770	561.0	247.0	6187.7	799.56
Jun-09	231.9	3770	529.5	247.0	6187.7	746.63
Jul-09	231.9	3770	555.0	247.0	6187.7	789.47
Aug-09	231.9	3770	550.5	247.0	6187.7	781.88
Sep-09	231.9	3770	556.7	247.0	6187.7	792.22
Oct-09	231.9	3770	589.1	247.0	6187.7	846.71
Nov-09	231.9	3770	587.4	247.0	6187.7	843.84
Dec-09	231.9	3770	600.8	247.0	6187.7	866.34
Jan-10	231.9	3770	602.7	247.0	6187.7	869.53
Feb-10	231.9	3770	618.2	247.0	6187.7	895.47
Mar-10	231.9	3770	637.1	247.0	6187.7	927.35
Apr-10	231.9	3770	613.2	247.0	6187.7	887.09
May-10	231.9	3770	587.2	247.0	6187.7	843.49
Jun-10	231.9	3770	594.8	247.0	6187.7	856.23
Jul-10	231.9	3770	608.3	247.0	6187.7	878.91
Aug-10	231.9	3770	567.5	247.0	6187.7	810.48
Sep-10	231.9	3770	576.4	247.0	6187.7	825.43
Oct-10	231.9	3770	568.2	247.0	6187.7	811.64
Nov-10	231.9	3770	563.2	247.0	6187.7	803.18
Dec-10	231.9	3770	552.4	247.0	6187.7	785.04
Jan-11	231.9	3770	567.6	247.0	6187.7	810.65
Feb-11	231.9	3770	570.1	247.0	6187.7	814.79
Mar-11	231.9	3770	601.0	247.0	6187.7	866.64
Apr-11	231.9	3770	591.9	247.0	6187.7	851.42

TABLE 4

Predicted TDS Concentrations of the Mine Water Discharge

Date	Using Geometric Mean Value of TDS			Using Arithmetic Mean Value of TDS		
	HW TDS (mg/L)	FW TDS (mg/L)	Calculated TDS in the Mine Discharge (mg/L)	HW TDS (mg/L)	FW TDS (mg/L)	Calculated TDS in the Mine Discharge (mg/L)
	Assigned from Snap Lake[1]	Constant[1]		Assigned from Snap Lake[1]	Constant[1]	
May-11	231.9	3770	629.2	247.0	6187.7	913.95
Jun-11	231.9	3770	633.1	247.0	6187.7	920.61
Jul-11	231.9	3770	643.9	247.0	6187.7	938.64
Aug-11	231.9	3770	651.7	247.0	6187.7	951.75
Sep-11	231.9	3770	626.3	247.0	6187.7	909.16
Oct-11	231.9	3770	625.0	250.1	6187.7	907.00
Nov-11	231.9	3770	640.1	253.7	6187.7	935.16
Dec-11	231.9	3770	617.5	256.9	6187.7	900.29
Jan-12	231.9	3770	626.3	260.3	6187.7	917.93
Feb-12	231.9	3770	629.9	263.8	6187.7	927.04
Mar-12	231.9	3770	638.5	267.4	6187.7	944.37
Apr-12	231.9	3770	620.2	270.8	6187.7	917.07
May-12	231.9	3770	637.2	274.3	6187.7	948.47
Jun-12	231.9	3770	635.9	277.8	6187.7	949.51
Jul-12	231.9	3770	639.3	281.4	6187.7	958.25
Aug-12	231.9	3770	682.2	285.6	6187.7	1033.04
Sep-12	231.9	3770	653.8	290.1	6187.7	989.32
Oct-12	231.9	3770	653.8	294.6	6187.7	993.27
Nov-12	231.9	3770	688.7	299.4	6187.7	1055.40
Dec-12	231.9	3770	663.6	304.1	6187.7	1017.81
Jan-13	231.9	3770	651.4	308.7	6187.7	1001.56
Feb-13	231.9	3770	656.1	313.5	6187.7	1013.52
Mar-13	231.9	3770	657.9	318.5	6187.7	1020.60
Apr-13	231.9	3770	686.4	323.7	6187.7	1072.35
May-13	231.9	3770	686.4	328.9	6187.7	1076.94
Jun-13	231.9	3770	635.8	333.9	6187.7	997.66
Jul-13	234.4	3770	609.6	338.7	6187.7	958.78
Aug-13	237.2	3770	619.6	343.7	6187.7	975.81
Sep-13	239.9	3770	618.7	348.5	6187.7	974.69
Oct-13	242.6	3770	632.1	353.5	6187.7	997.24
Nov-13	245.1	3770	601.3	357.9	6187.7	946.73
Dec-13	247.4	3770	599.1	362.2	6187.7	943.35
Jan-14	249.6	3770	592.2	366.3	6187.7	932.30
Feb-14	251.6	3770	551.8	369.8	6187.7	865.86
Mar-14	253.4	3770	539.1	373.2	6187.7	845.18
Apr-14	255.2	3770	550.6	376.6	6187.7	864.53
May-14	257.1	3770	569.5	380.2	6187.7	896.21
Jun-14	259.0	3770	559.2	383.6	6187.7	879.59
Jul-14	261.0	3770	570.0	387.3	6187.7	897.71
Aug-14	263.2	3770	590.2	391.3	6187.7	931.43
Sep-14	265.7	3770	617.3	395.9	6187.7	976.63
Oct-14	268.2	3770	562.2	400.2	6187.7	885.83
Nov-14	270.3	3770	532.3	404.1	6187.7	836.81
Dec-14	272.6	3770	547.3	408.2	6187.7	861.88

TABLE 4

Predicted TDS Concentrations of the Mine Water Discharge

Date	Using Geometric Mean Value of TDS			Using Arithmetic Mean Value of TDS		
	HW TDS (mg/L)	FW TDS (mg/L)	Calculated TDS in the Mine Discharge (mg/L)	HW TDS (mg/L)	FW TDS (mg/L)	Calculated TDS in the Mine Discharge (mg/L)
	Assigned from Snap Lake[1]	Constant[1]		Assigned from Snap Lake[1]	Constant[1]	
Jan-15	274.9	3770	566.0	412.5	6187.7	893.03
Feb-15	277.9	3770	610.3	417.7	6187.7	966.59
Mar-15	280.7	3770	599.6	422.6	6187.7	949.24
Apr-15	283.3	3770	600.0	427.4	6187.7	950.23
May-15	286.3	3770	631.4	432.6	6187.7	1002.33
Jun-15	289.4	3770	644.8	438.2	6187.7	1024.85
Jul-15	292.4	3770	643.5	443.5	6187.7	1022.96
Aug-15	295.1	3770	598.5	448.1	6187.7	948.91
Sep-15	297.5	3770	596.0	452.5	6187.7	945.13
Oct-15	300.2	3770	622.0	457.3	6187.7	988.30
Nov-15	303.0	3770	632.1	462.2	6187.7	1005.30
Dec-15	305.9	3770	604.7	467.2	6187.7	960.33
Jan-16	308.2	3770	586.2	471.4	6187.7	930.06
Feb-16	310.3	3770	591.6	475.1	6187.7	939.25
Mar-16	313.0	3770	635.0	479.9	6187.7	1011.21
Apr-16	315.8	3770	643.6	484.8	6187.7	1025.68
May-16	319.4	3770	704.6	491.2	6187.7	1126.69
Jun-16	322.9	3770	701.6	497.2	6187.7	1121.99
Jul-16	327.0	3770	737.2	504.4	6187.7	1181.08
Aug-16	331.6	3770	757.4	512.2	6187.7	1214.69
Sep-16	335.3	3770	661.9	518.6	6187.7	1057.39
Oct-16	340.1	3770	760.8	526.8	6187.7	1220.85
Nov-16	344.6	3770	761.0	534.4	6187.7	1221.34
Dec-16	347.6	3770	656.8	539.7	6187.7	1049.74
Jan-17	350.2	3770	665.3	544.3	6187.7	1064.02
Feb-17	352.6	3770	652.7	548.6	6187.7	1043.43
Mar-17	354.9	3770	659.9	552.7	6187.7	1055.60
Apr-17	357.8	3770	694.9	557.7	6187.7	1113.50
May-17	360.6	3770	701.7	562.6	6187.7	1125.09
Jun-17	362.9	3770	672.0	566.7	6187.7	1076.30
Jul-17	365.1	3770	674.1	570.6	6187.7	1080.05
Aug-17	368.0	3770	715.7	575.7	6187.7	1148.89
Sep-17	370.7	3770	709.8	580.4	6187.7	1139.43
Oct-17	374.1	3770	756.2	586.2	6187.7	1216.07
Nov-17	377.3	3770	750.2	591.7	6187.7	1206.54
Dec-17	381.1	3770	790.6	598.1	6187.7	1273.39
Jan-18	385.2	3770	797.7	605.3	6187.7	1285.23
Feb-18	390.0	3770	845.1	613.4	6187.7	1363.71
Mar-18	394.3	3770	827.3	620.8	6187.7	1334.47
Apr-18	398.5	3770	826.7	627.8	6187.7	1333.75
May-18	401.6	3770	766.4	633.3	6187.7	1234.44
Jun-18	404.5	3770	768.9	638.3	6187.7	1238.88
Jul-18	407.0	3770	744.7	642.6	6187.7	1199.25
Aug-18	409.3	3770	746.4	646.6	6187.7	1202.26

TABLE 4

Predicted TDS Concentrations of the Mine Water Discharge
(Page 5 of 7)

Date	Using Geometric Mean Value of TDS			Using Arithmetic Mean Value of TDS		
	HW TDS (mg/L)	FW TDS (mg/L)	Calculated TDS in the Mine Discharge (mg/L)	HW TDS (mg/L)	FW TDS (mg/L)	Calculated TDS in the Mine Discharge (mg/L)
	Assigned from Snap Lake[1]	Constant[1]		Assigned from Snap Lake[1]	Constant[1]	
Sep-18	412.2	3770	789.7	651.8	6187.7	1273.81
Oct-18	415.2	3770	793.6	656.9	6187.7	1280.37
Nov-18	418.0	3770	793.9	661.8	6187.7	1281.10
Dec-18	420.9	3770	793.4	666.6	6187.7	1280.53
Jan-19	422.8	3770	740.8	670.1	6187.7	1194.01
Feb-19	424.7	3770	748.5	673.5	6187.7	1206.86
Mar-19	426.6	3770	750.2	676.7	6187.7	1209.86
Apr-19	428.4	3770	750.8	680.0	6187.7	1211.12
May-19	430.2	3770	754.6	683.2	6187.7	1217.47
Jun-19	432.0	3770	755.2	686.4	6187.7	1218.66
Jul-19	433.8	3770	758.3	689.5	6187.7	1224.11
Aug-19	435.5	3770	755.1	692.5	6187.7	1219.00
Sep-19	436.6	3770	716.8	694.6	6187.7	1156.12
Oct-19	437.6	3770	713.1	696.4	6187.7	1150.11
Nov-19	438.5	3770	714.0	698.1	6187.7	1151.73
Dec-19	439.5	3770	720.1	700.0	6187.7	1162.09
Jan-20	440.5	3770	719.7	701.8	6187.7	1161.60
Feb-20	441.7	3770	728.0	704.0	6187.7	1175.45
Mar-20	442.9	3770	733.7	706.1	6187.7	1184.95
Apr-20	444.0	3770	734.7	708.2	6187.7	1186.87
May-20	445.2	3770	736.2	710.2	6187.7	1189.54
Jun-20	446.3	3770	736.8	712.3	6187.7	1190.66
Jul-20	447.3	3770	733.5	714.2	6187.7	1185.31
Aug-20	448.2	3770	726.0	715.9	6187.7	1173.13
Sep-20	449.2	3770	730.8	717.6	6187.7	1181.34
Oct-20	450.0	3770	715.2	719.1	6187.7	1155.83
Nov-20	450.8	3770	724.0	720.7	6187.7	1170.46
Dec-20	451.5	3770	719.9	722.0	6187.7	1163.89
Jan-21	452.2	3770	721.9	723.4	6187.7	1167.27
Feb-21	452.9	3770	723.8	724.7	6187.7	1170.66
Mar-21	453.6	3770	724.1	726.1	6187.7	1171.17
Apr-21	454.3	3770	725.1	727.4	6187.7	1173.11
May-21	454.9	3770	721.7	728.5	6187.7	1167.67
Jun-21	455.6	3770	727.6	729.8	6187.7	1177.54
Jul-21	456.3	3770	728.3	731.1	6187.7	1178.73
Aug-21	457.0	3770	728.0	732.4	6187.7	1178.46
Sep-21	457.6	3770	724.7	733.6	6187.7	1173.24
Oct-21	458.2	3770	726.0	734.7	6187.7	1175.56
Nov-21	458.7	3770	725.3	735.8	6187.7	1174.43
Dec-21	459.4	3770	731.6	737.0	6187.7	1184.95
Jan-22	459.9	3770	726.8	738.1	6187.7	1177.26
Feb-22	460.5	3770	726.9	739.2	6187.7	1177.53
Mar-22	461.0	3770	727.4	740.2	6187.7	1178.50
Apr-22	461.6	3770	727.9	741.2	6187.7	1179.46

TABLE 4

Predicted TDS Concentrations of the Mine Water Discharge
(Page 6 of 7)

Date	Using Geometric Mean Value of TDS			Using Arithmetic Mean Value of TDS		
	HW TDS (mg/L)	FW TDS (mg/L)	Calculated TDS in the Mine Discharge (mg/L)	HW TDS (mg/L)	FW TDS (mg/L)	Calculated TDS in the Mine Discharge (mg/L)
	Assigned from Snap Lake[1]	Constant[1]		Assigned from Snap Lake[1]	Constant[1]	
May-22	462.1	3770	728.4	742.3	6187.7	1180.41
Jun-22	462.6	3770	730.2	743.3	6187.7	1183.49
Jul-22	463.1	3770	729.8	744.3	6187.7	1183.00
Aug-22	463.6	3770	730.7	745.3	6187.7	1184.63
Sep-22	464.2	3770	730.7	746.3	6187.7	1184.84
Oct-22	464.7	3770	731.2	747.2	6187.7	1185.74
Nov-22	465.2	3770	732.5	748.2	6187.7	1188.06
Dec-22	465.7	3770	731.2	749.2	6187.7	1186.11
Jan-23	466.1	3770	733.4	750.1	6187.7	1189.83
Feb-23	466.5	3770	728.1	750.9	6187.7	1181.19
Mar-23	466.9	3770	729.3	751.7	6187.7	1183.32
Apr-23	467.3	3770	728.8	752.5	6187.7	1182.65
May-23	467.7	3770	729.2	753.2	6187.7	1183.37
Jun-23	468.0	3770	724.6	753.9	6187.7	1175.97
Jul-23	468.3	3770	725.3	754.5	6187.7	1177.23
Aug-23	468.6	3770	725.6	755.1	6187.7	1177.80
Sep-23	468.8	3770	720.1	755.6	6187.7	1168.87
Oct-23	469.0	3770	721.1	756.0	6187.7	1170.64
Nov-23	469.2	3770	721.7	756.5	6187.7	1171.74
Dec-23	469.4	3770	721.8	756.9	6187.7	1172.15
Jan-24	469.6	3770.0	722.0	757.4	6187.7	1172.6
Feb-24	469.7	3770.0	722.2	757.8	6187.7	1173.0
Mar-24	469.9	3770.0	722.4	758.2	6187.7	1173.4
Apr-24	470.1	3770.0	722.5	758.7	6187.7	1173.8
May-24	470.3	3770.0	722.7	759.1	6187.7	1174.2
Jun-24	470.5	3770.0	722.9	759.5	6187.7	1174.6
Jul-24	470.7	3770.0	722.6	759.9	6187.7	1174.3
Aug-24	470.9	3770.0	723.2	760.3	6187.7	1175.3
Sep-24	471.0	3770.0	723.4	760.7	6187.7	1175.7
Oct-24	471.2	3770.0	723.6	761.1	6187.7	1176.1
Nov-24	471.4	3770.0	723.7	761.6	6187.7	1176.5
Dec-24	471.6	3770.0	723.9	761.9	6187.7	1176.9
Jan-25	471.7	3770.0	724.4	762.3	6187.7	1177.9
Feb-25	471.9	3770.0	724.6	762.7	6187.7	1178.3
Mar-25	472.1	3770.0	724.8	763.1	6187.7	1178.6
Apr-25	472.2	3770.0	724.5	763.5	6187.7	1178.3
May-25	472.4	3770.0	724.7	763.9	6187.7	1178.7
Jun-25	472.6	3770.0	724.8	764.3	6187.7	1179.0
Jul-25	472.7	3770.0	725.0	764.6	6187.7	1179.4
Aug-25	472.9	3770.0	725.1	765.0	6187.7	1179.7
Sep-25	473.0	3770.0	724.8	765.4	6187.7	1179.4
Oct-25	473.2	3770.0	725.8	765.7	6187.7	1181.1
Nov-25	473.3	3770.0	725.1	766.1	6187.7	1180.0
Dec-25	473.5	3770.0	725.7	766.4	6187.7	1181.0

TABLE 4

Predicted TDS Concentrations of the Mine Water Discharge
(Page 7 of 7)

Date	Using Geometric Mean Value of TDS			Using Arithmetic Mean Value of TDS		
	HW TDS (mg/L)	FW TDS (mg/L)	Calculated TDS in the Mine Discharge (mg/L)	HW TDS (mg/L)	FW TDS (mg/L)	Calculated TDS in the Mine Discharge (mg/L)
	Assigned from Snap Lake[1]	Constant[1]		Assigned from Snap Lake[1]	Constant[1]	
Jan-26	473.6	3770.0	724.6	766.8	6187.7	1179.4
Feb-26	475.9	3770.0	841.6	770.6	6187.7	1371.9
Mar-26	477.9	3770.0	832.7	774.0	6187.7	1357.3
Apr-26	479.9	3770.0	830.5	777.3	6187.7	1353.7
May-26	481.8	3770.0	831.1	780.6	6187.7	1354.8
Jun-26	485.3	3770.0	916.6	786.5	6187.7	1495.4
Jul-26	488.7	3770.0	907.1	792.1	6187.7	1479.9
Aug-26	492.0	3770.0	912.6	797.6	6187.7	1489.0
Sep-26	494.6	3770.0	848.0	802.0	6187.7	1382.9
Oct-26	496.9	3770.0	862.3	806.0	6187.7	1406.6
Nov-26	497.9	3770.0	786.9	807.6	6187.7	1282.7
Dec-26	498.9	3770.0	789.5	809.3	6187.7	1287.1
Jan-27	498.5	3770.0	717.3	808.8	6187.7	1168.4
Feb-27	498.2	3770.0	717.6	808.3	6187.7	1169.0
Mar-27	497.8	3770.0	718.3	807.9	6187.7	1170.2
Apr-27	497.5	3770.0	718.6	807.4	6187.7	1170.9
May-27	497.1	3770.0	714.0	806.8	6187.7	1163.3
Jun-27	496.6	3770.0	713.6	806.2	6187.7	1162.7
Jul-27	496.2	3770.0	713.2	805.6	6187.7	1162.1
Aug-27	495.8	3770.0	713.1	805.0	6187.7	1162.1
Sep-27	495.5	3770.0	716.4	804.5	6187.7	1167.6
Oct-27	495.2	3770.0	715.8	804.1	6187.7	1166.7
Nov-27	494.9	3770.0	716.5	803.7	6187.7	1167.9
Dec-27	494.5	3770.0	710.2	803.1	6187.7	1157.6
Jan-28	494.1	3770.0	710.8	802.5	6187.7	1158.7
Feb-28	493.7	3770.0	710.8	802.0	6187.7	1158.7
Mar-28	493.3	3770.0	711.8	801.4	6187.7	1160.4
Apr-28	492.9	3770.0	710.7	800.8	6187.7	1158.8
May-28	492.4	3770.0	705.6	800.1	6187.7	1150.5
Jun-28	492.0	3770.0	705.2	799.5	6187.7	1149.8
Jul-28	491.5	3770.0	704.8	798.8	6187.7	1149.2
Aug-28	491.1	3770.0	704.3	798.1	6187.7	1148.6
Sep-28	490.6	3770.0	703.3	797.5	6187.7	1146.9
Oct-28	490.2	3770.0	703.8	796.8	6187.7	1147.9
Nov-28	489.7	3770.0	703.1	796.1	6187.7	1146.7
Dec-28	489.3	3770.0	703.0	795.5	6187.7	1146.6

Note:
1. See Figure 4 for explanation.