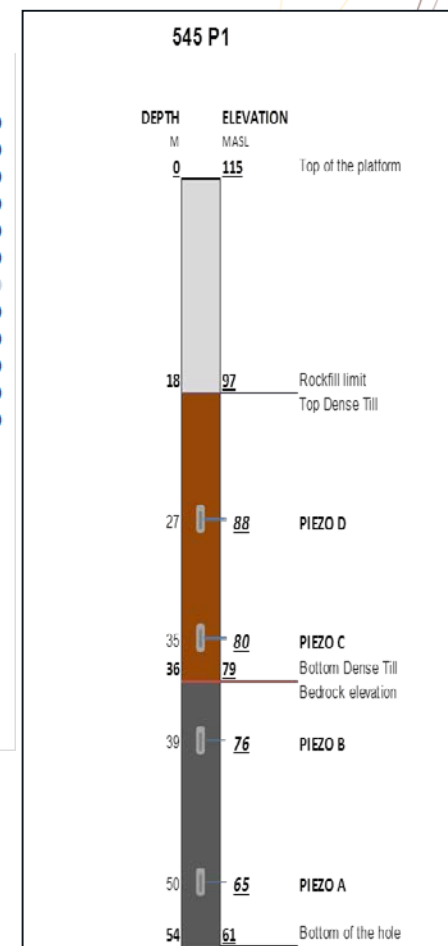
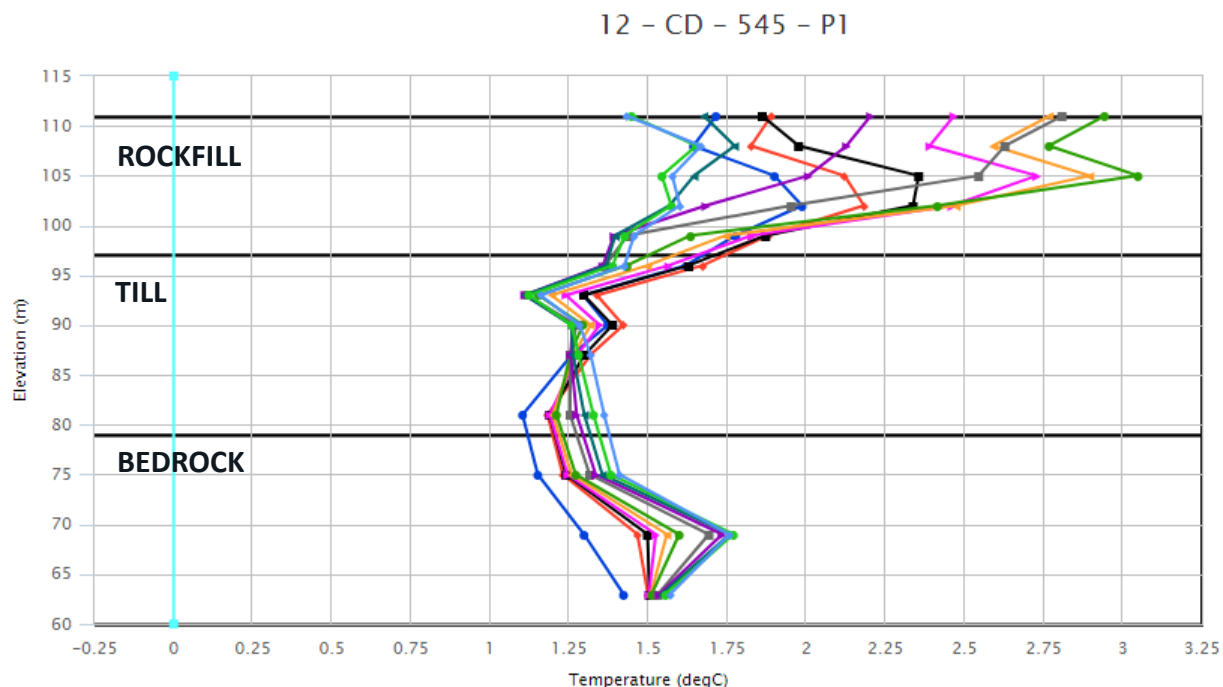
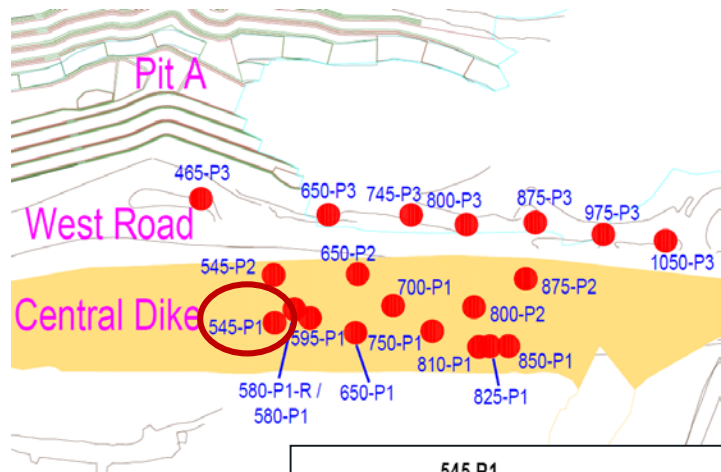


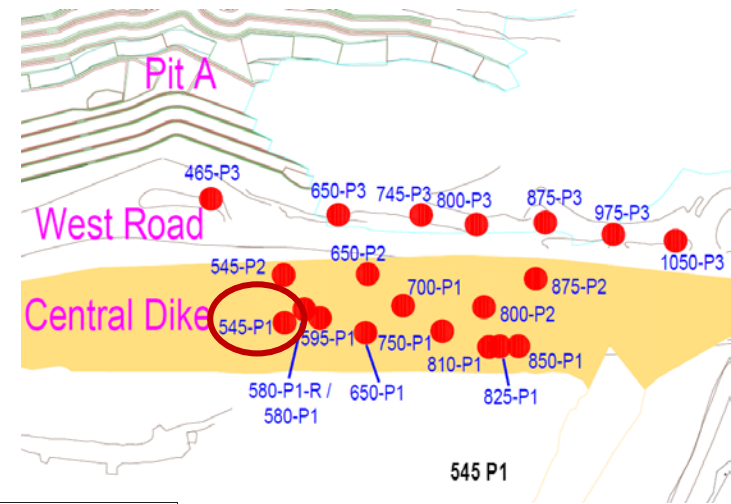
# THERMISTOR 545-P1

- 545-P1 thermistor is showing the same temperature profile than last year. Warmer peak observed at elevation 70m since the installation.
- Temperature in the bedrock/till unit is in between 1.1 and 1.75° C.

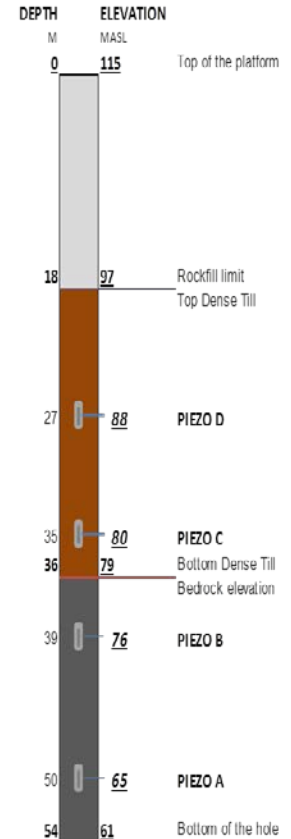
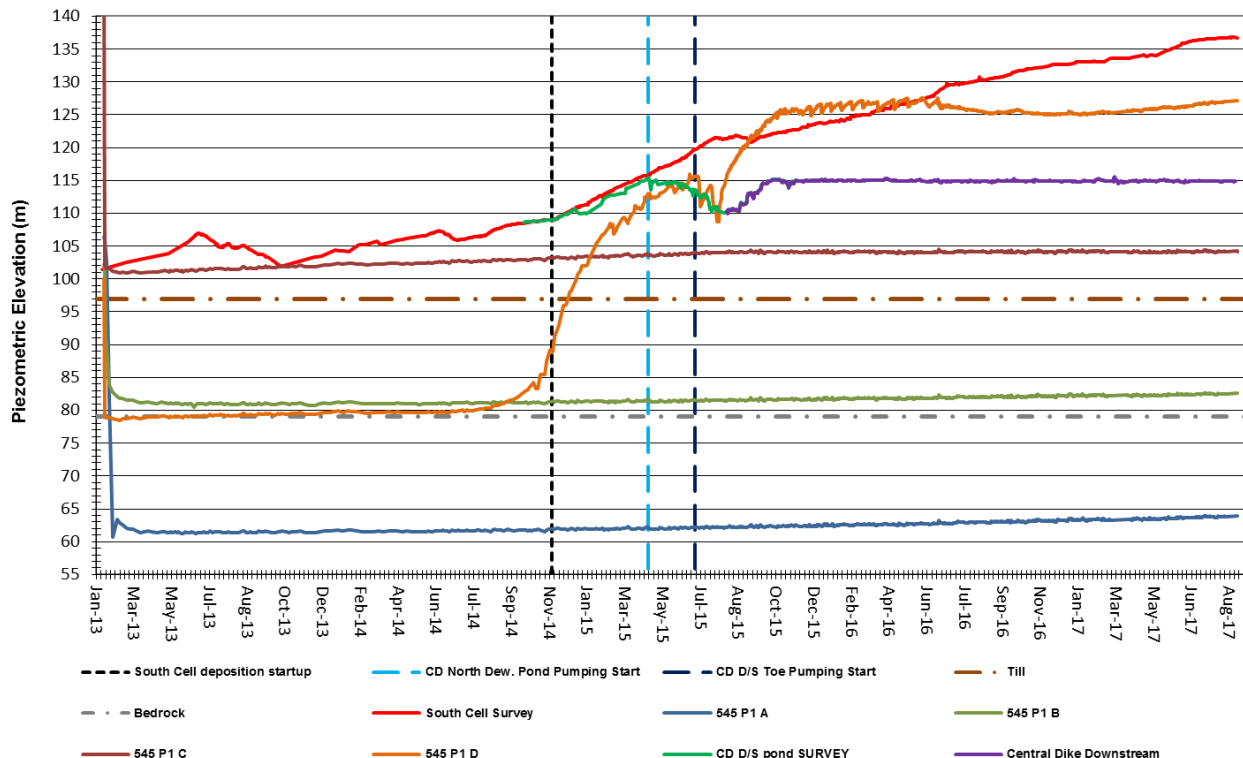


# PIEZOMETER 545-P1

- Piezometer D still constant, no change since August 2015
- Piezometer A is recording suction since its installation
- Identification of the piezo on the field is confusing. Interpretation of the readings must be done with precaution.

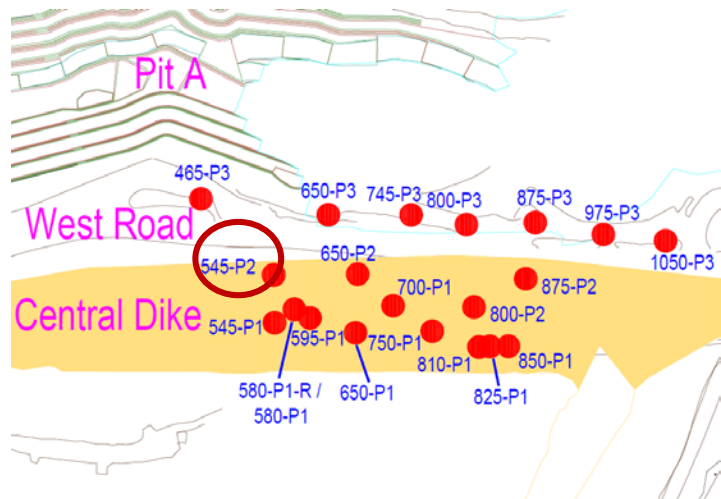


**545-P1 Hole - Piezometrics Elevation and Attenuation Pond Elevation vs Time**

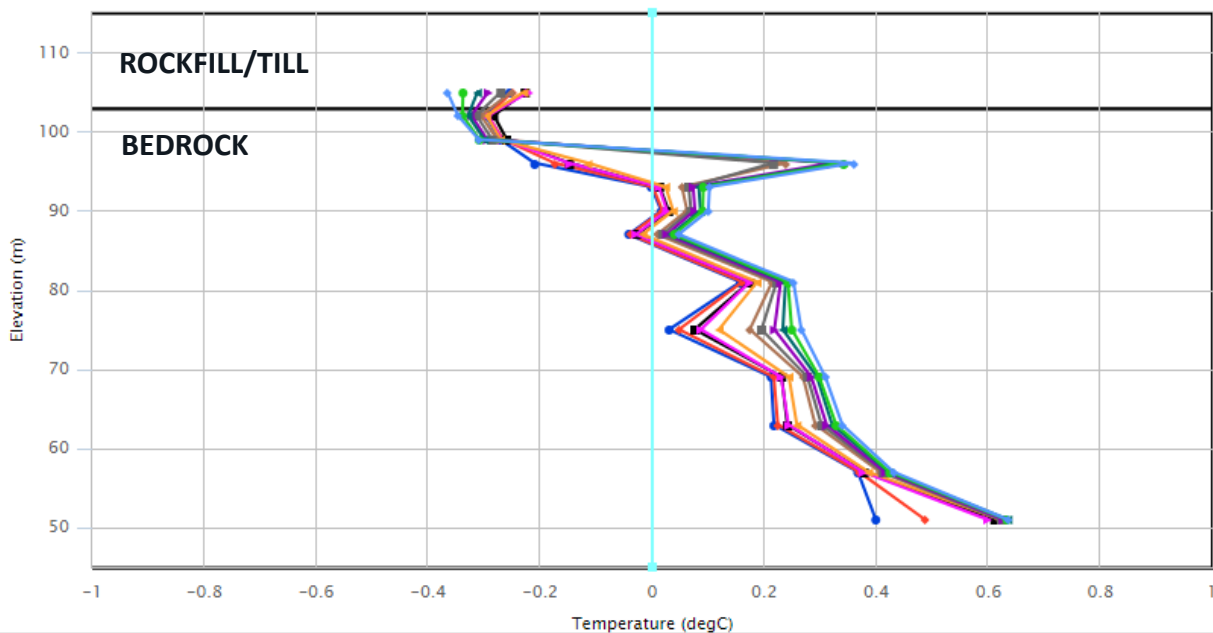


# THERMISTOR 545-P2

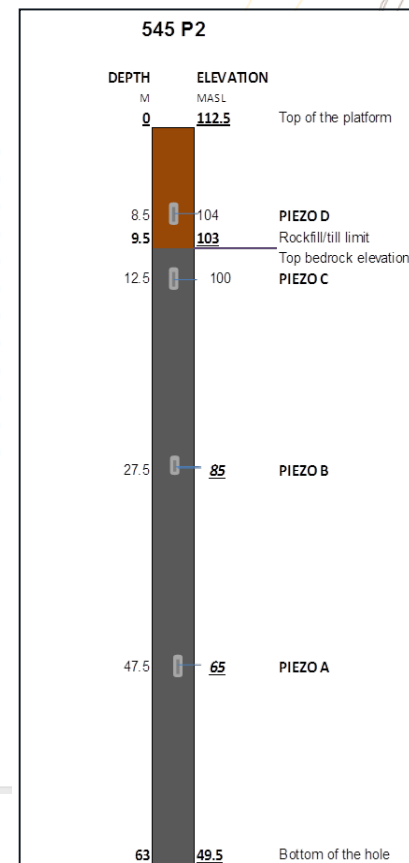
- Temperature peak observed on the bead located at El. 96m from January 2015 to March 2017;
- In January 2015 readings was switched from manual to automatic;
- In March 2017, AVW multiplexer was changed and temperature profile was back to its original profile;
- Investigation still on going – interpretation of data must be done with precaution.



12 - CD - 545 - P2

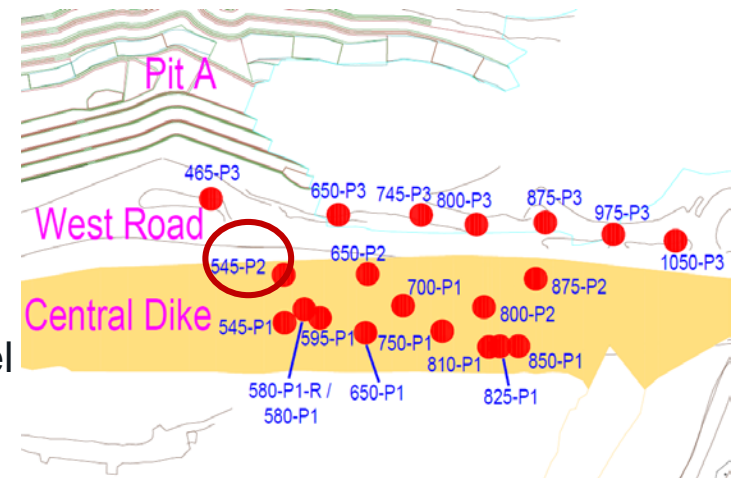


- 2017-08-17 06:00
- 2017-07-18 06:00
- 2017-06-18 06:00
- 2017-05-19 06:00
- 2017-04-19 06:00
- 2017-03-20 06:00
- 2017-02-18 06:00
- 2017-01-19 06:00
- 2016-12-20 06:00
- 2016-11-20 06:00
- 2016-10-21 06:00
- 2016-09-21 06:00
- Limit Profile

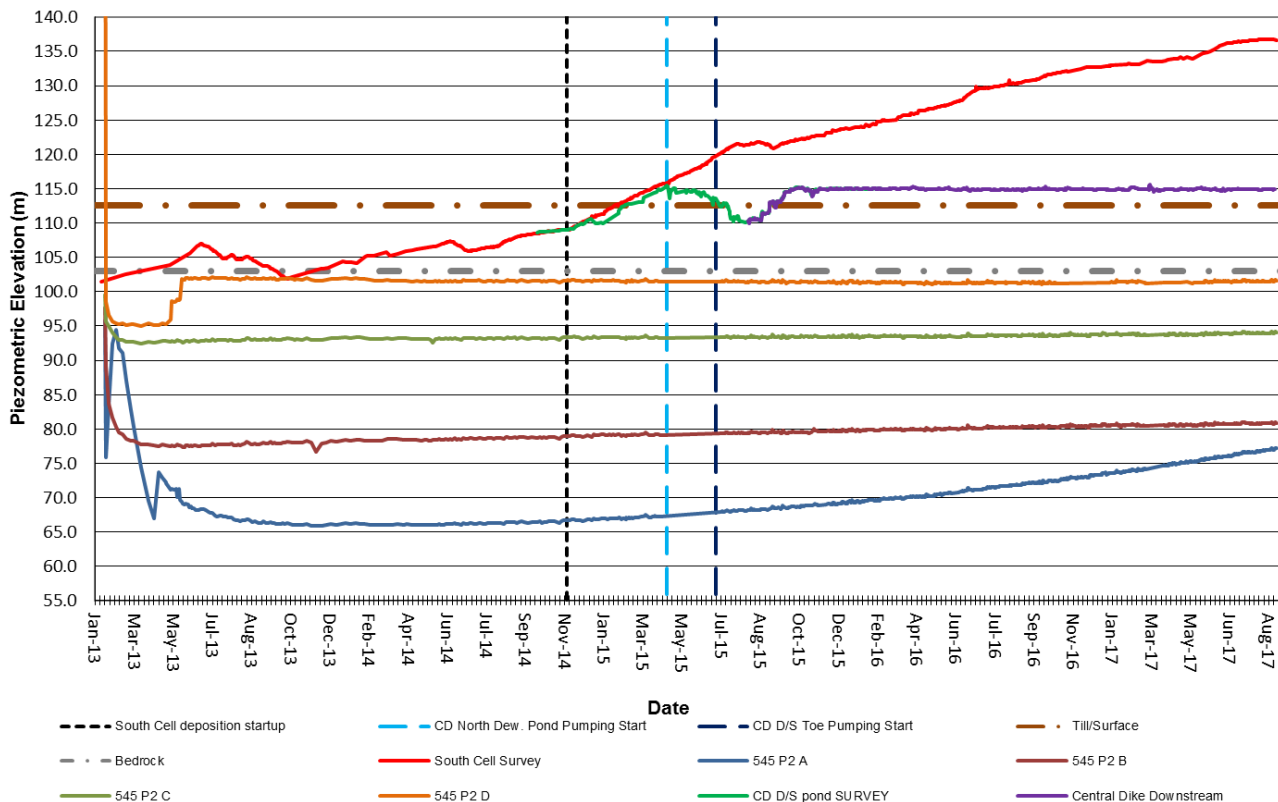


# PIEZOMETER 545-P2

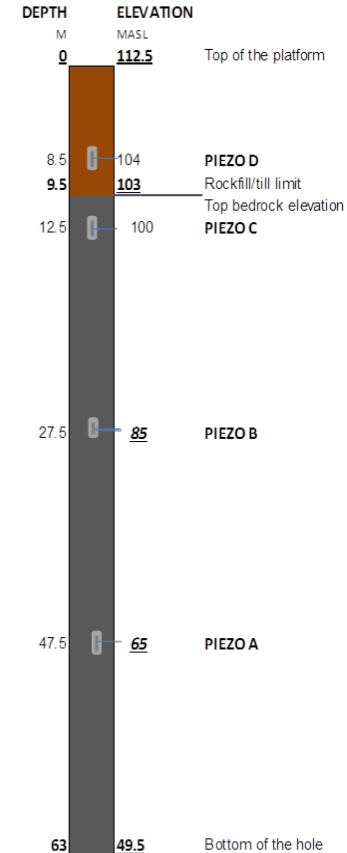
- ➔ Piezometer A reading is increasing with South Cell level
- ➔ Other piezometers are recording suction



**545-P2 Hole - Piezometrics Elevation and Attenuation Pond Elevation vs Time**



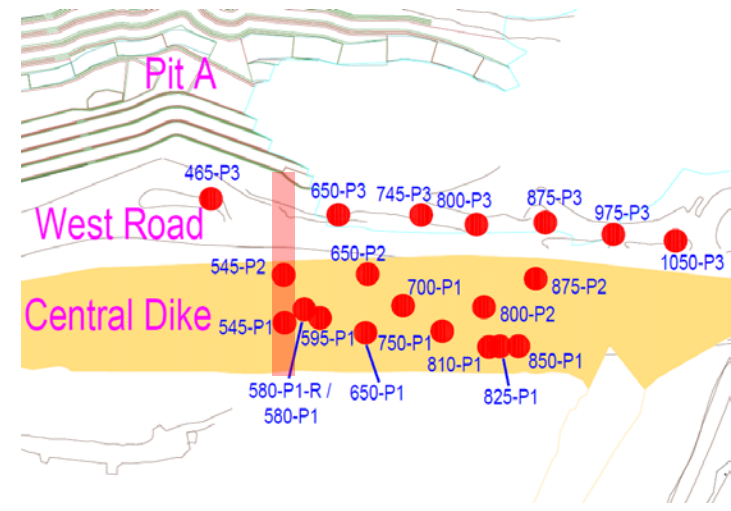
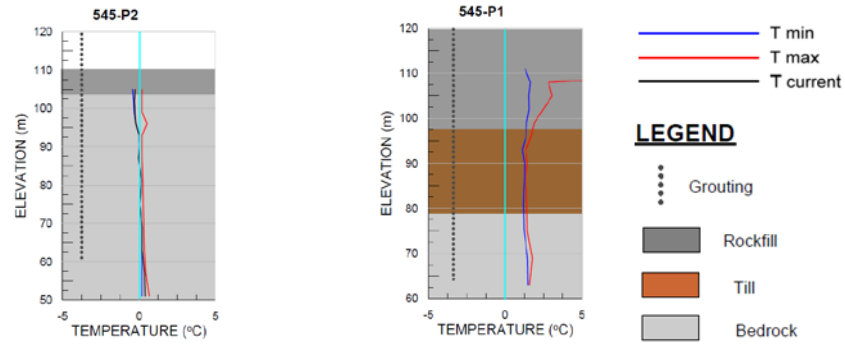
**545 P2**



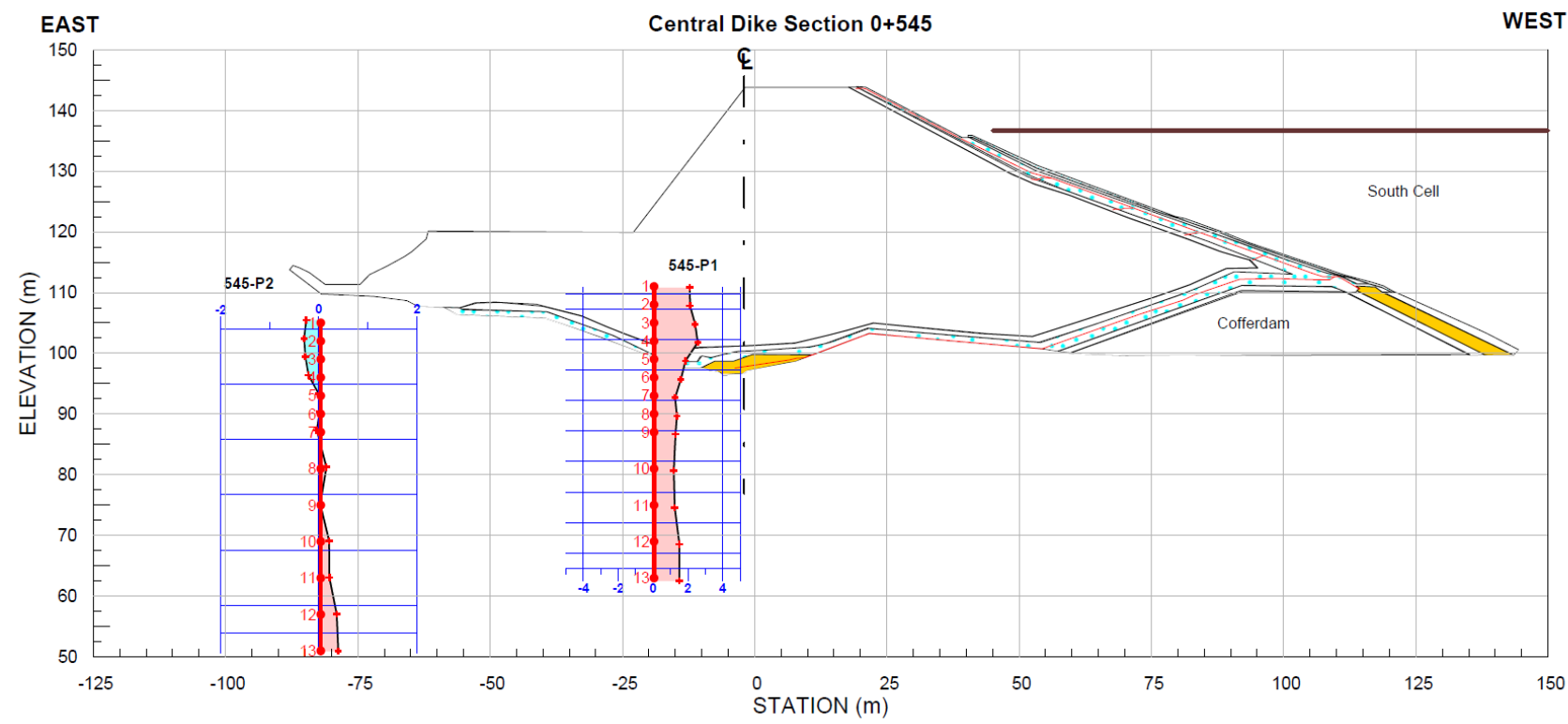


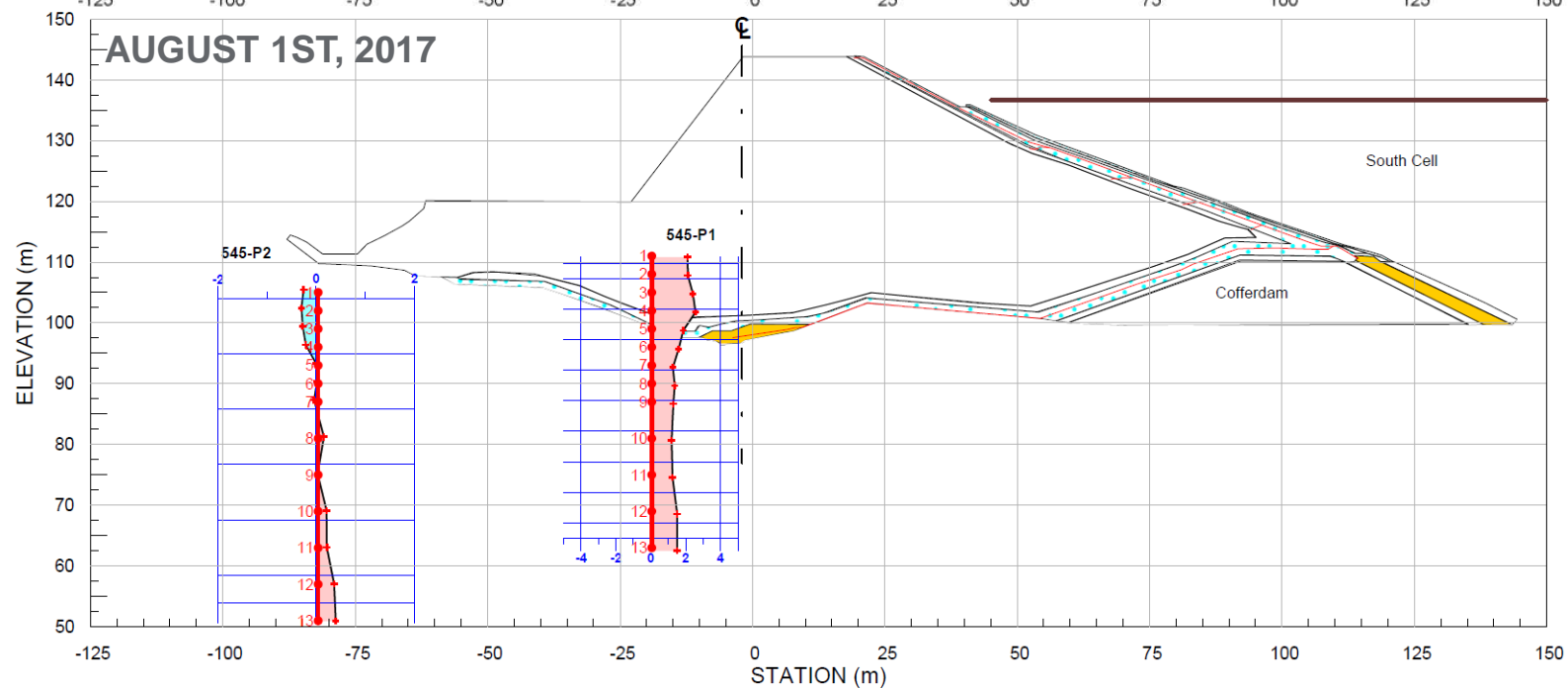
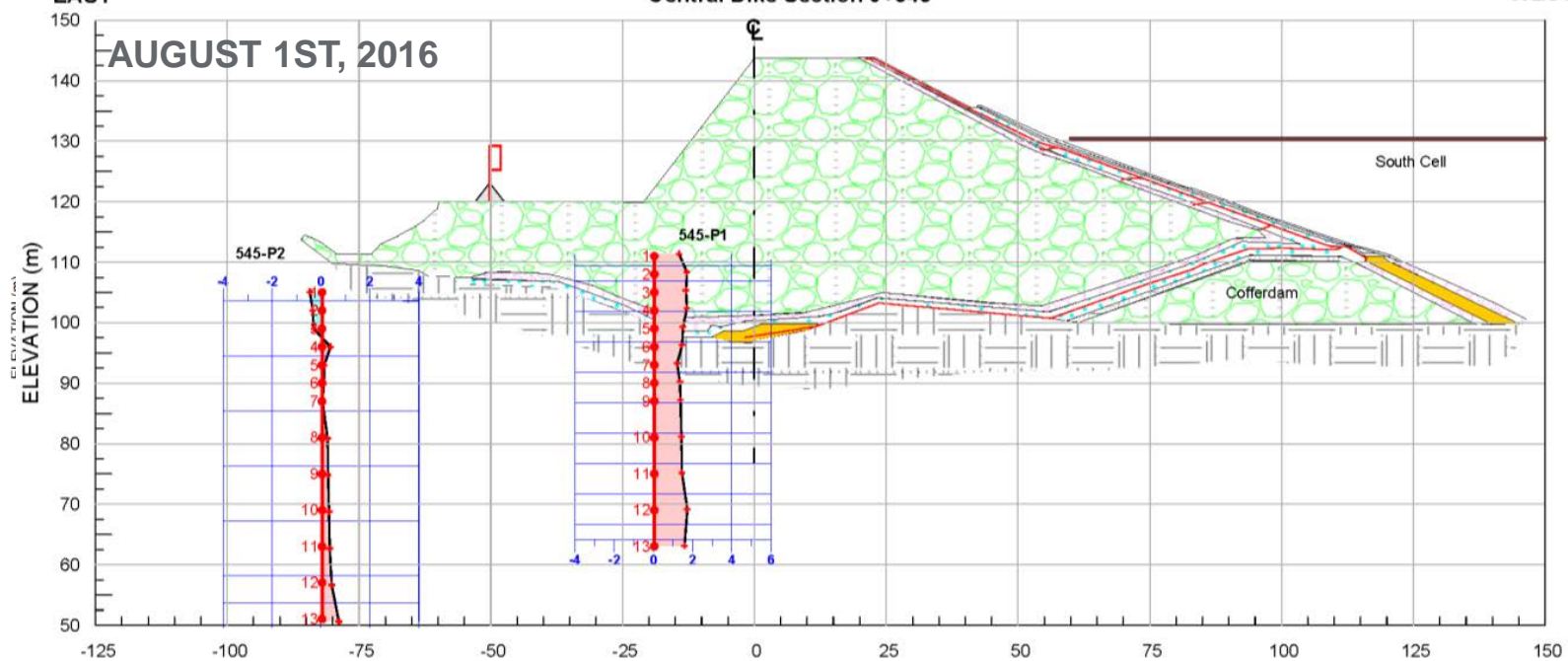
# SECTION 545

## THERMISTOR READINGS FROM AUGUST 2016 - 2017



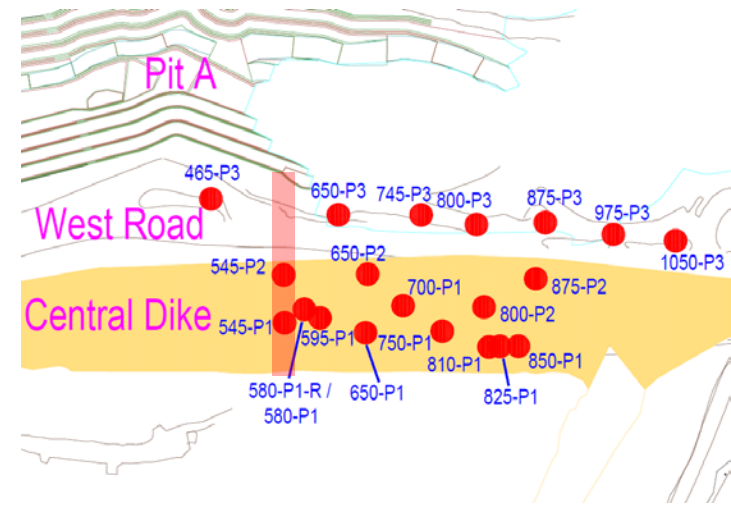
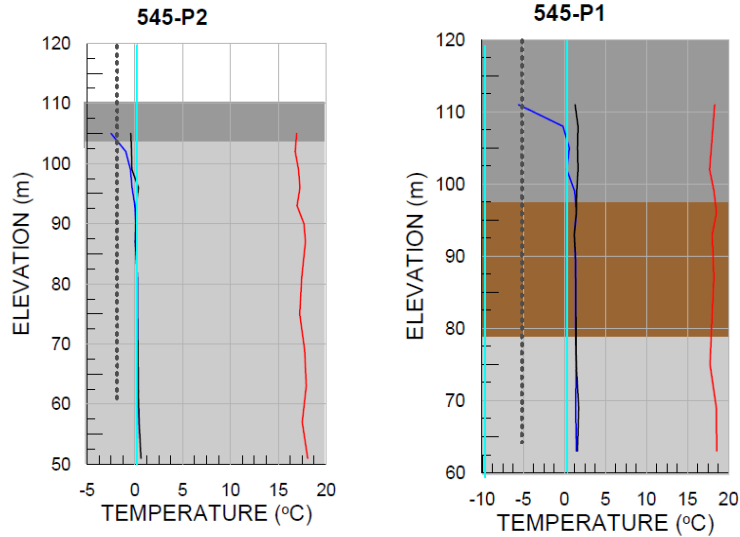
## THERMISTOR READINGS AUGUST 1<sup>ST</sup>, 2017





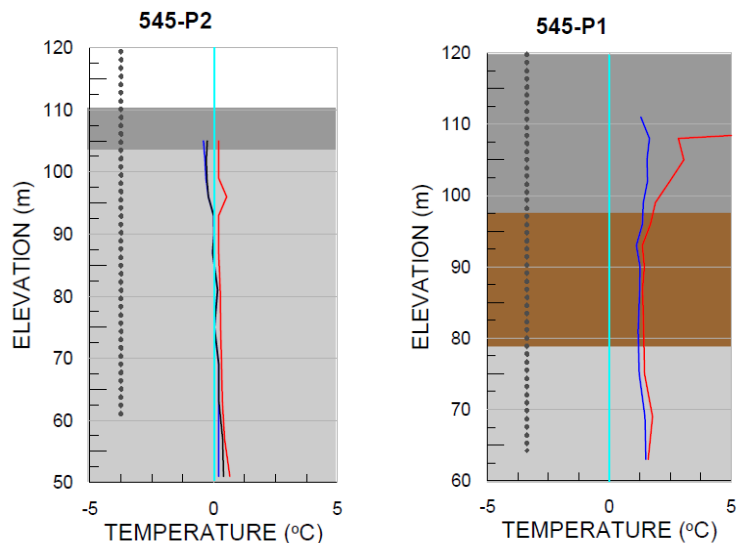
# SECTION 545

## THERMISTOR READINGS FROM AUGUST 2015 - 2016



Max temperature in 2015-2016 was more around 2°C

## THERMISTOR READINGS FROM AUGUST 2016 - 2017



— T min  
— T max  
— T current

### LEGEND

••• Grouting

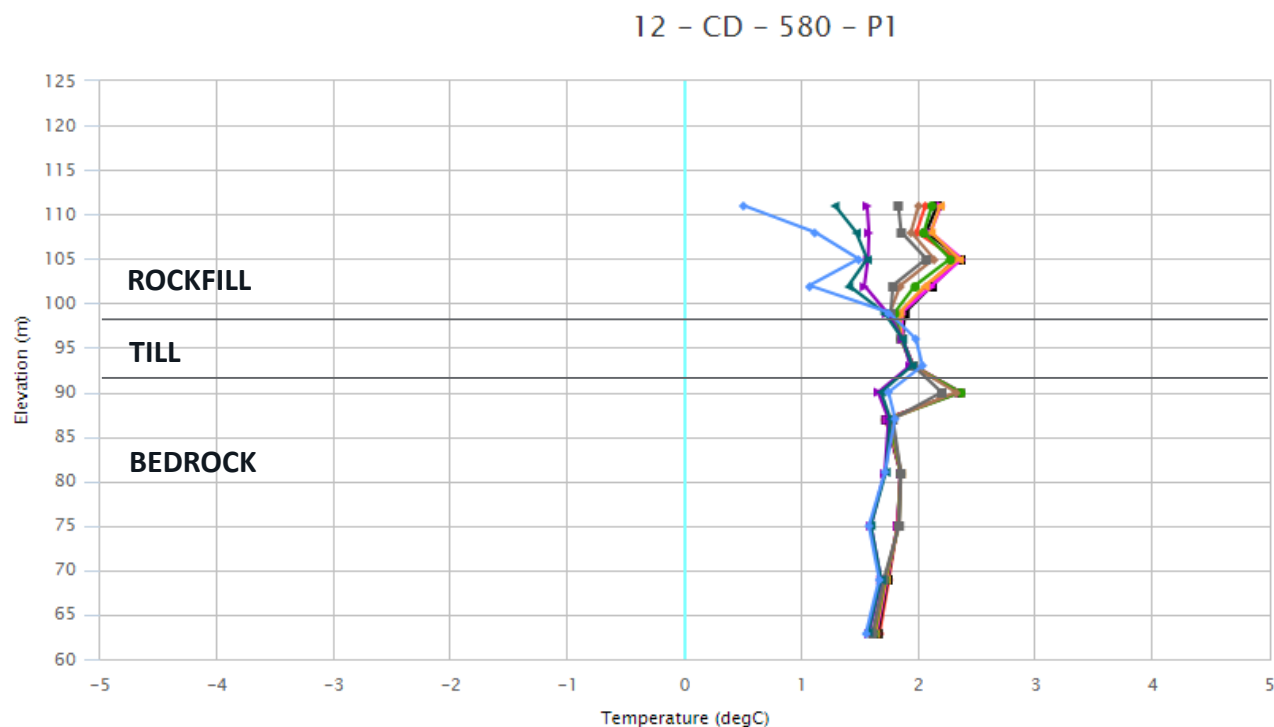
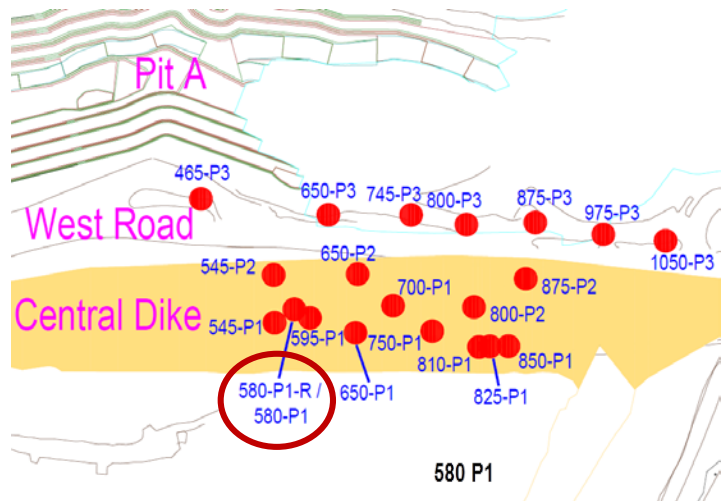
Rockfill

Till

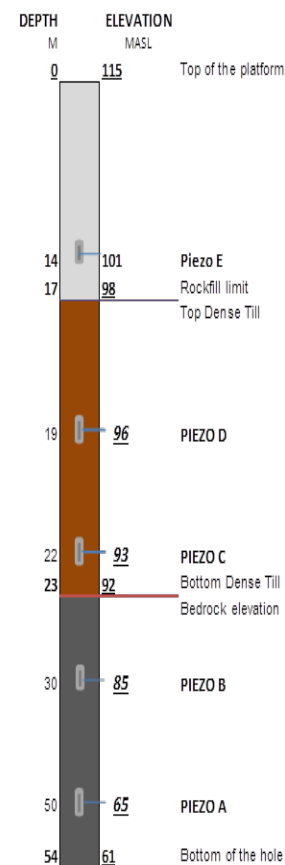
Bedrock

# 580-P1

- Piezometer and thermistance readings are not functional since July 2016
- Replacement hole 580-P1R drilled during 2017 campaign

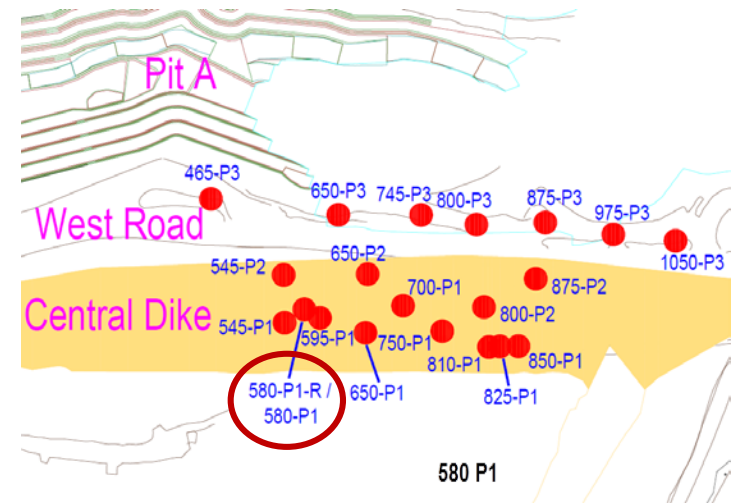


- 2016-07-09 21:00
- 2016-06-09 21:00
- 2016-05-10 21:00
- 2016-04-10 21:00
- 2016-03-11 21:00
- 2016-02-13 12:00
- 2016-01-11 21:00
- 2015-12-12 21:00
- 2015-11-13 18:00
- 2015-10-14 15:00
- 2015-09-15 12:00
- 2015-08-17 12:00
- Limit Profile

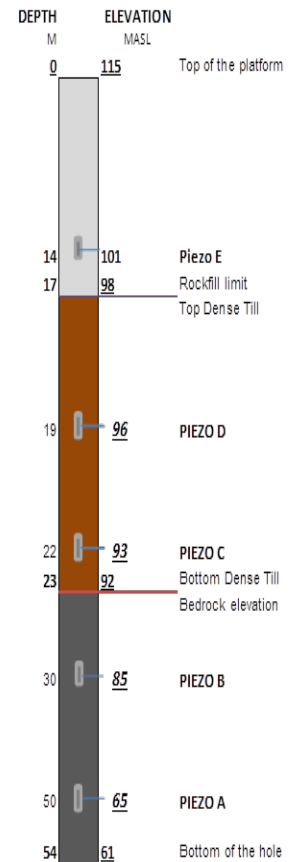
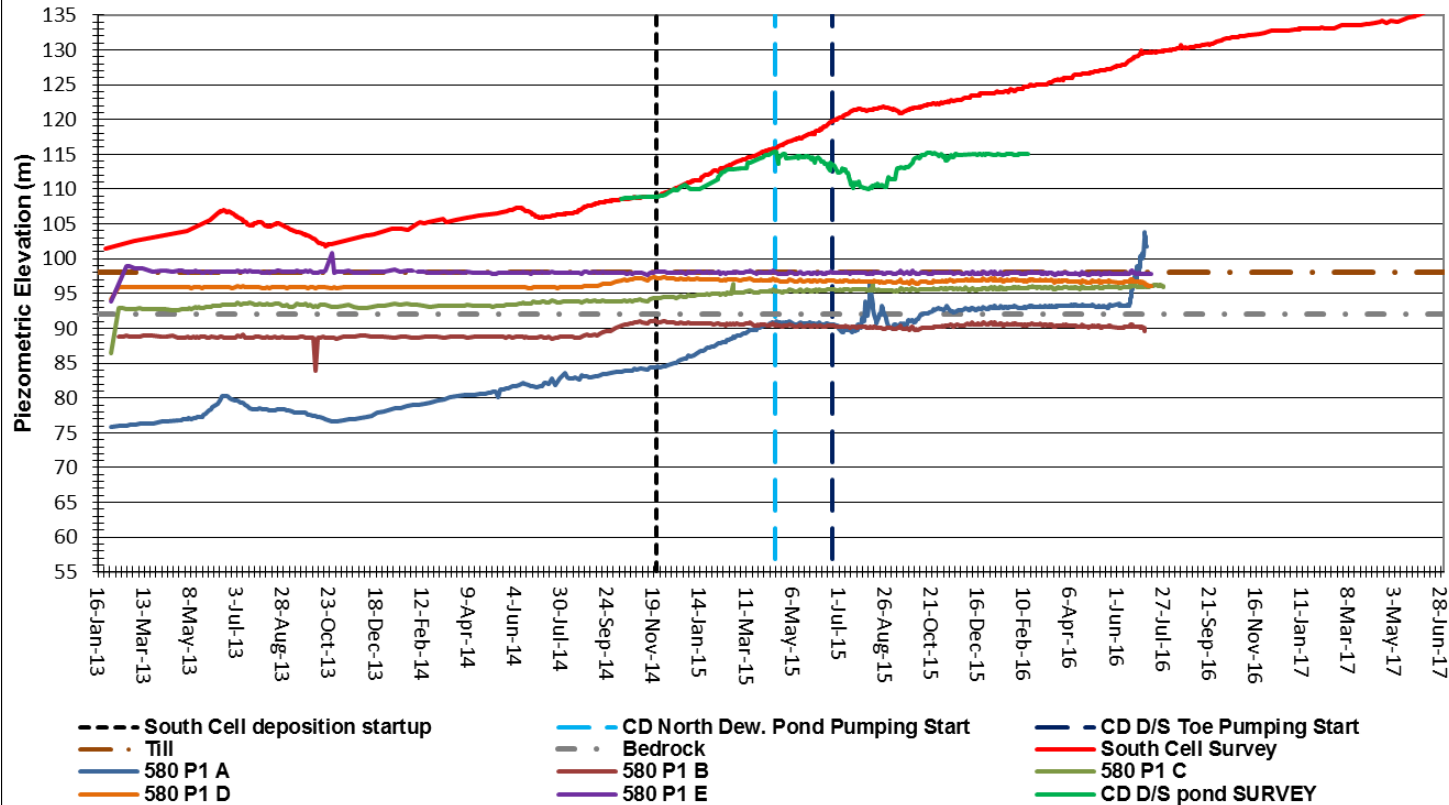


# 580-P1

- Piezometer and thermistor readings are not functional since July 2016
- Replacement hole 580-P1R drilled during 2017 campaign

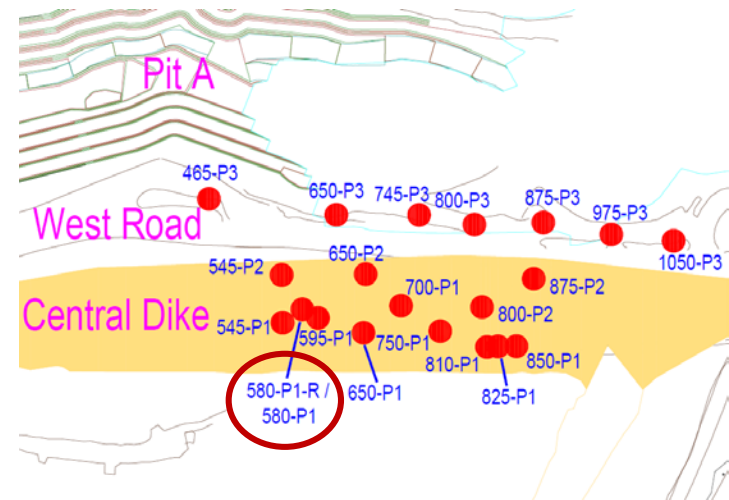


**580-P1 Hole - Piezometrics Elevation and Attenuation Pond Elevation vs Time**

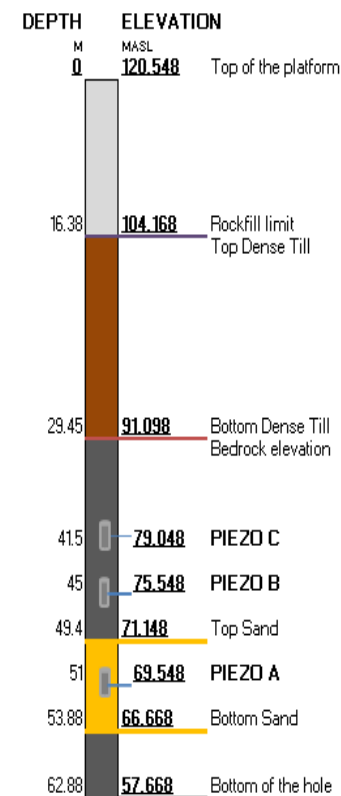
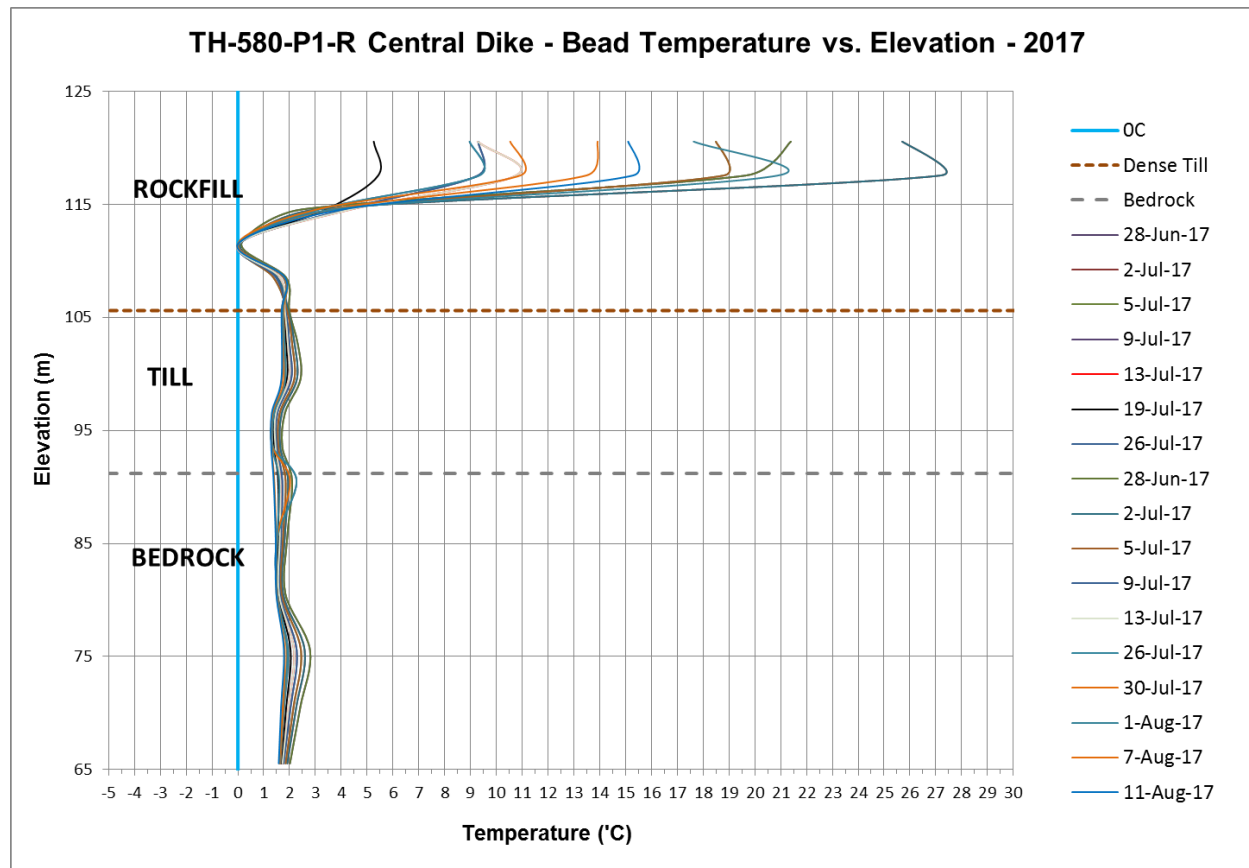


# THERMISTOR 580-P1R

- Stabilisation in progress
- Temperature readings above 0°C
- Similar temperature readings range than 580-P1

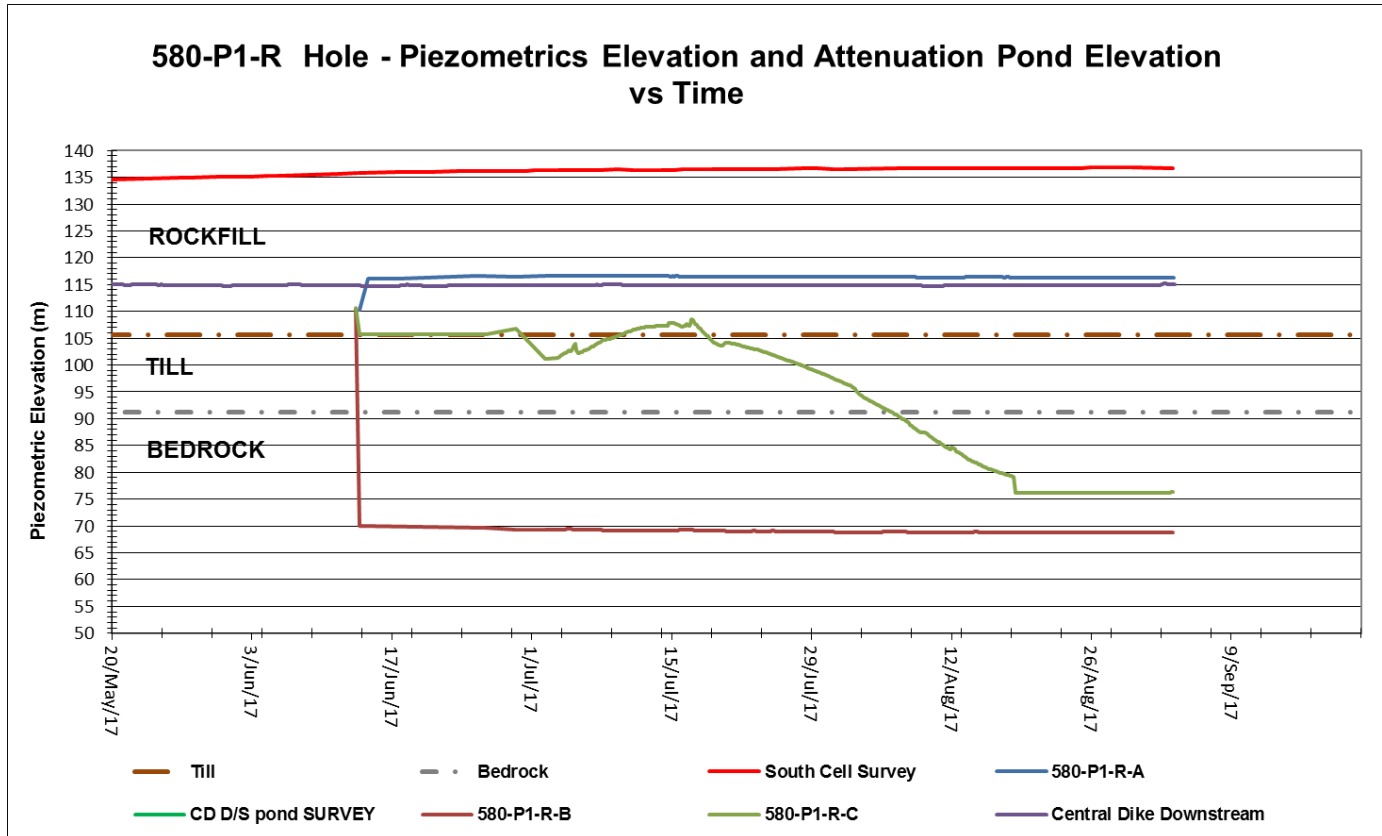
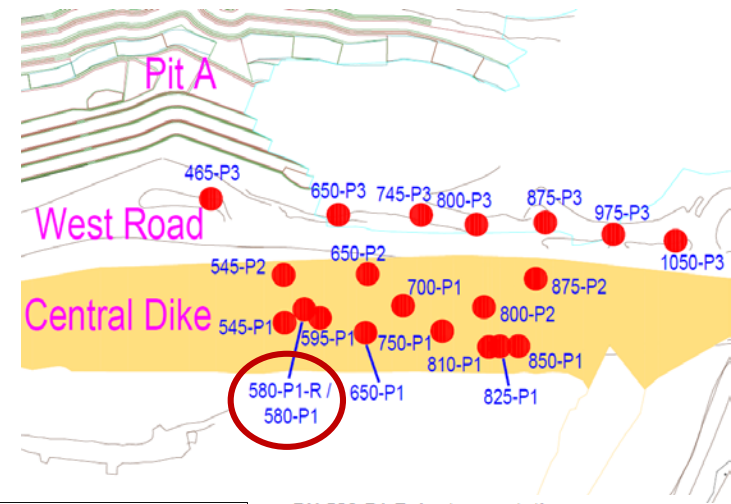


DH 580-P1-R Instrumentation

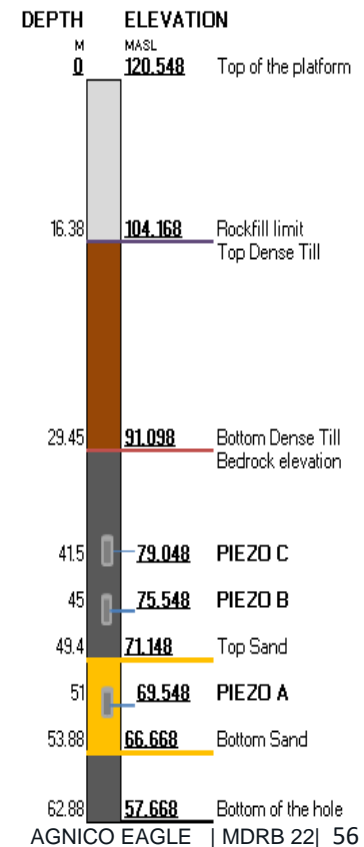


# PIEZOMETER 580-P1R

- Piezo A is located in a sand layer and pressure readings are following the D/S pond regime
- Decrease in piezometric elevation ongoing for Piezo B
- Small data GAP



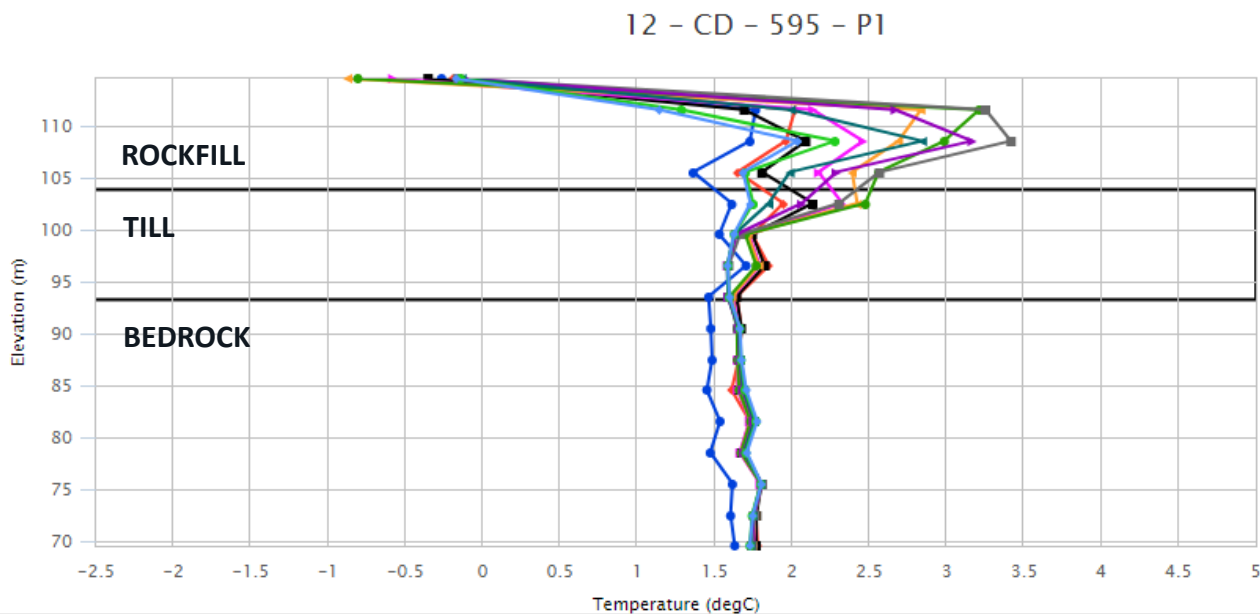
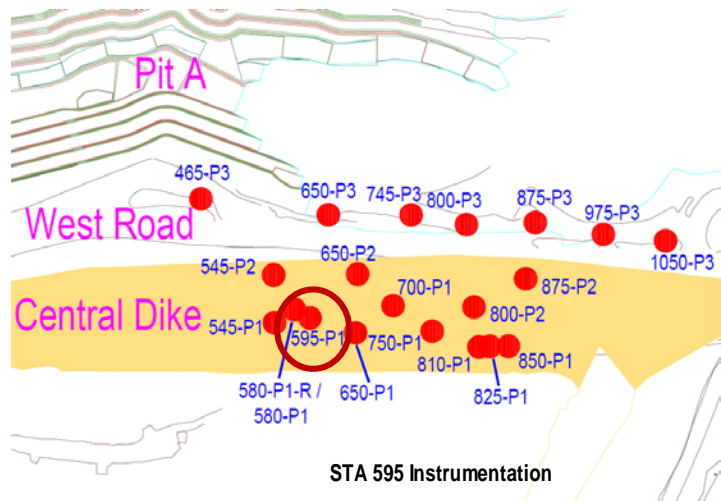
DH 580-P1-R Instrumentation



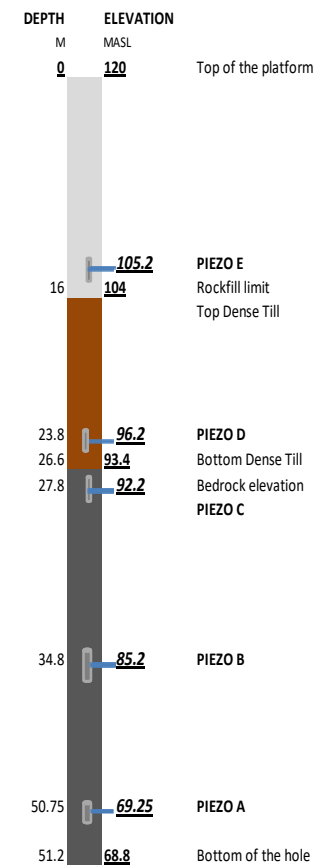


# THERMISTOR 595-P1

- Temperature in the bedrock/till unit is in between 1.5 and 1.75° C.
- Glitch of 0.25° C could be caused by the automatization works done in August 2017.



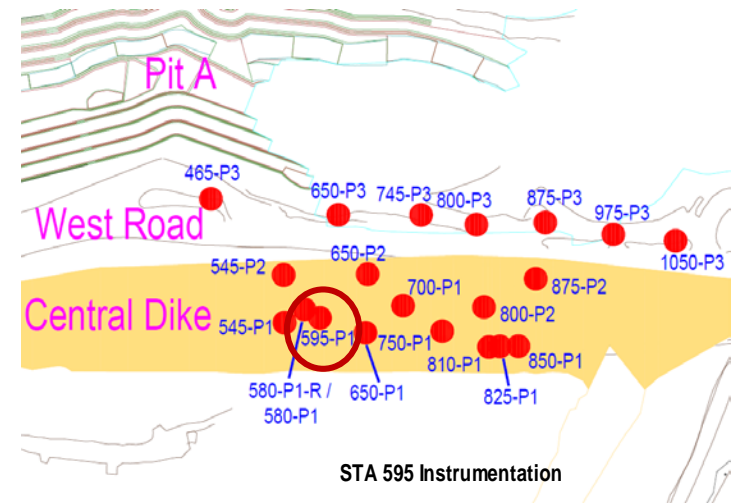
- 2017-09-03 06:00
- 2017-08-04 06:00
- 2017-07-05 06:00
- 2017-06-05 06:00
- 2017-05-06 06:00
- 2017-04-06 06:00
- 2017-03-07 06:00
- 2017-02-05 06:00
- 2017-01-06 06:00
- 2016-12-07 06:00
- 2016-11-07 06:00
- 2016-10-08 06:00



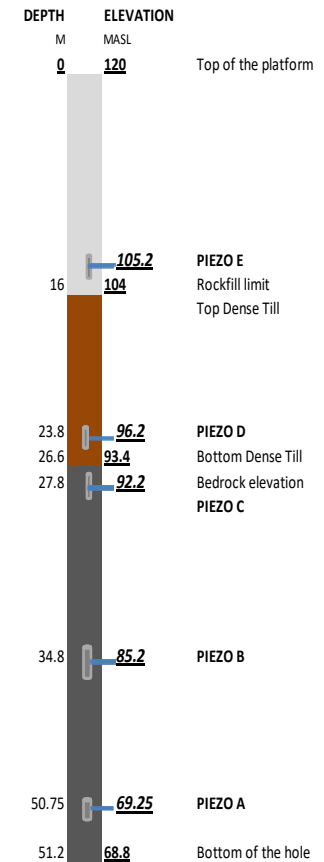
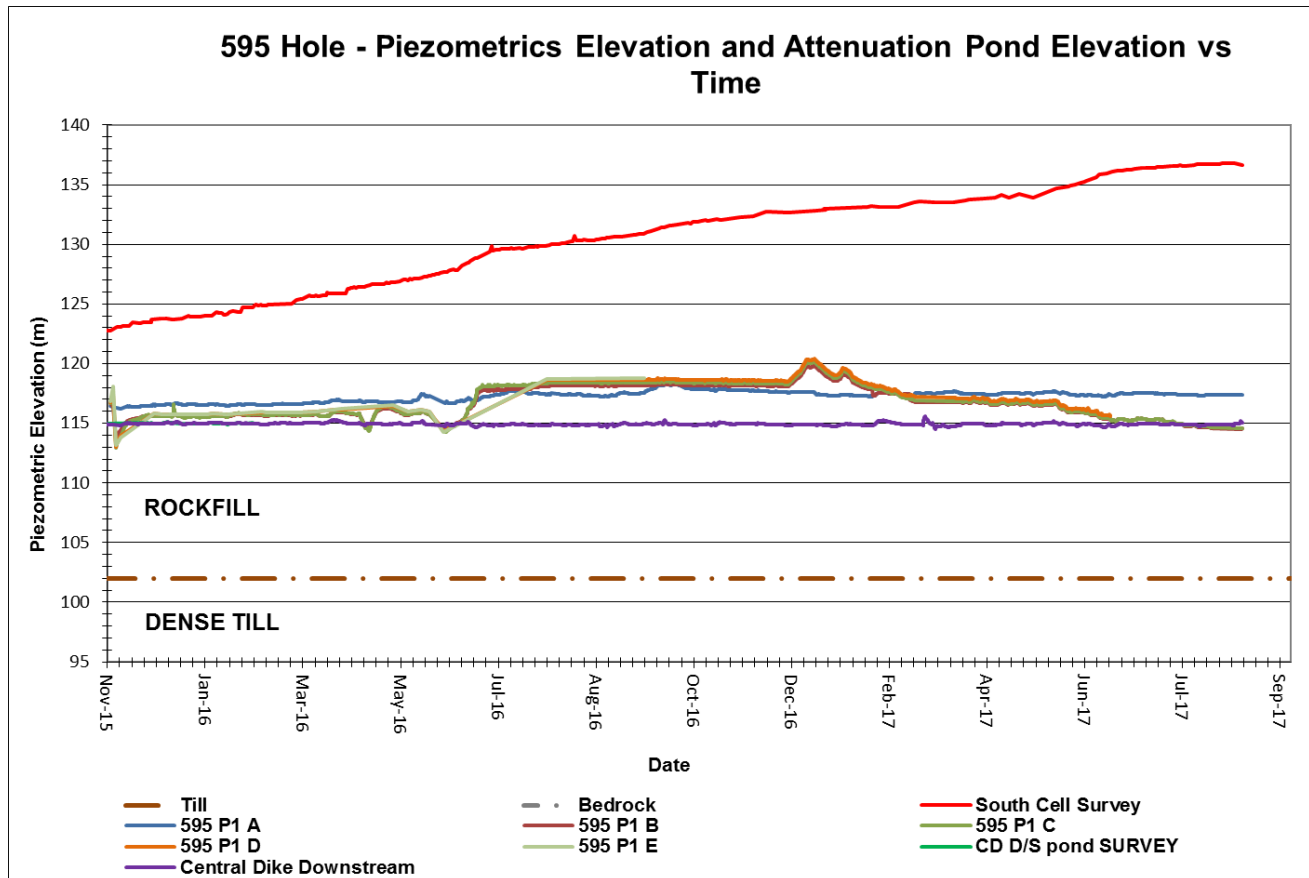
# PIEZOMETER 595-P1

➔ Piezometric readings are fluctuating around D/S pond elevation since the installation.

➔ **Piezo C to E was installed in casing**

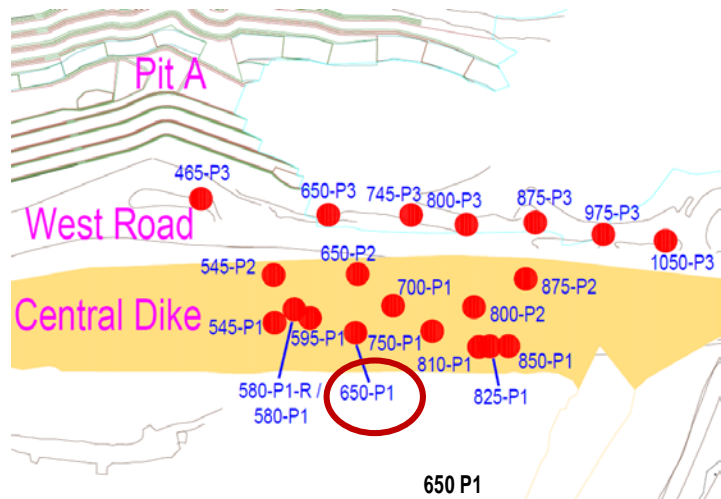


STA 595 Instrumentation

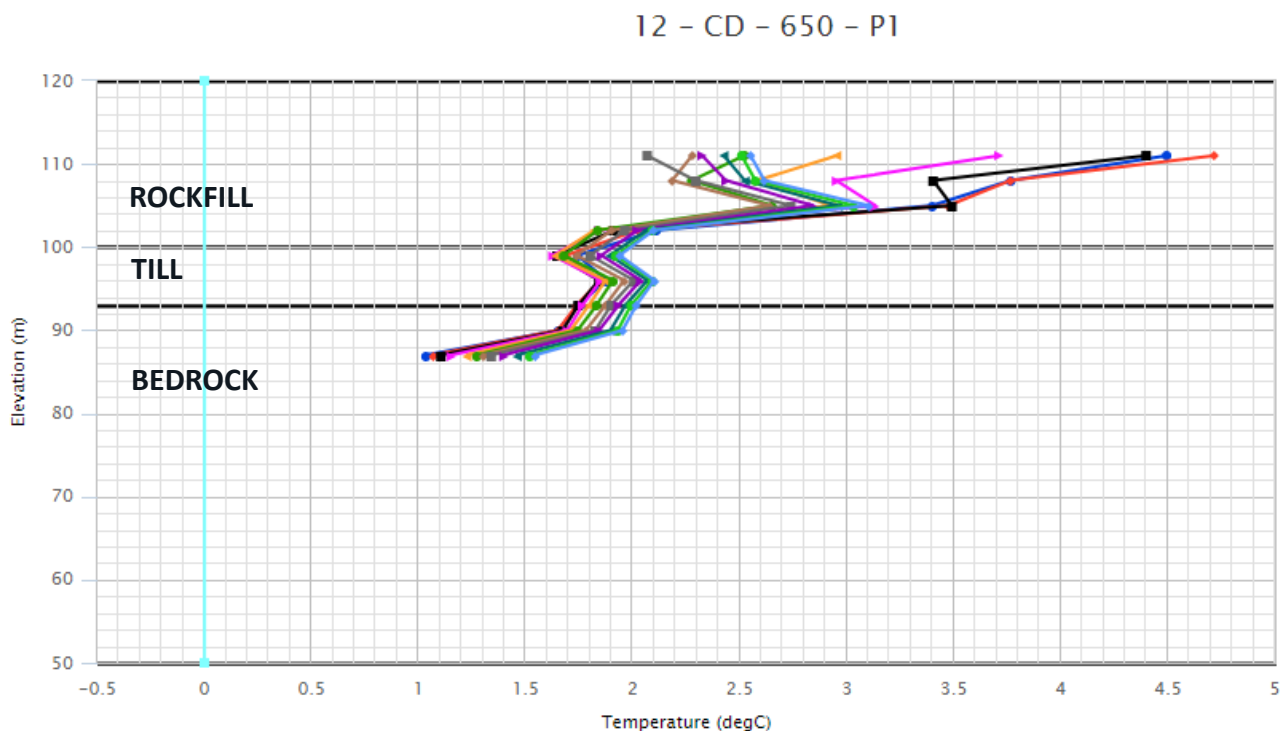


# THERMISTOR 650-P1

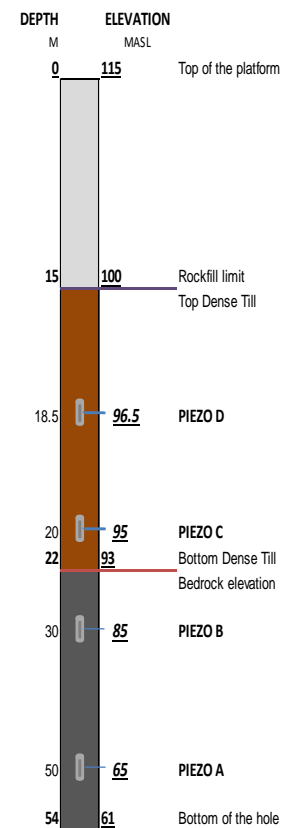
- Thermistance reading not functional since January 2017
- Beads 10 to 12 are not fonctionning since August 2016
- Temperature of the bedrock/till units were in between 1.0 and 2.1° C.



650 P1

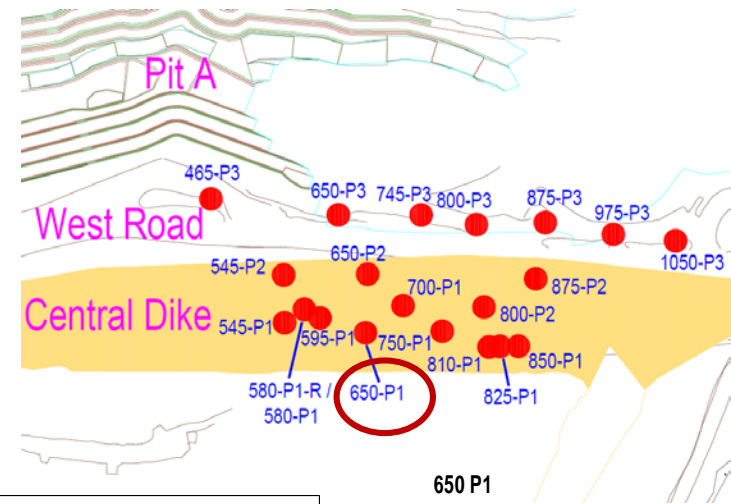


- 2017-01-21 06:00
- 2016-12-22 06:00
- 2016-11-22 06:00
- 2016-10-23 06:00
- 2016-09-23 06:00
- 2016-08-24 06:00
- 2016-07-25 06:00
- 2016-06-25 06:00
- 2016-05-26 06:00
- 2016-04-26 06:00
- 2016-03-27 06:00
- 2016-02-26 06:00
- Limit Profile

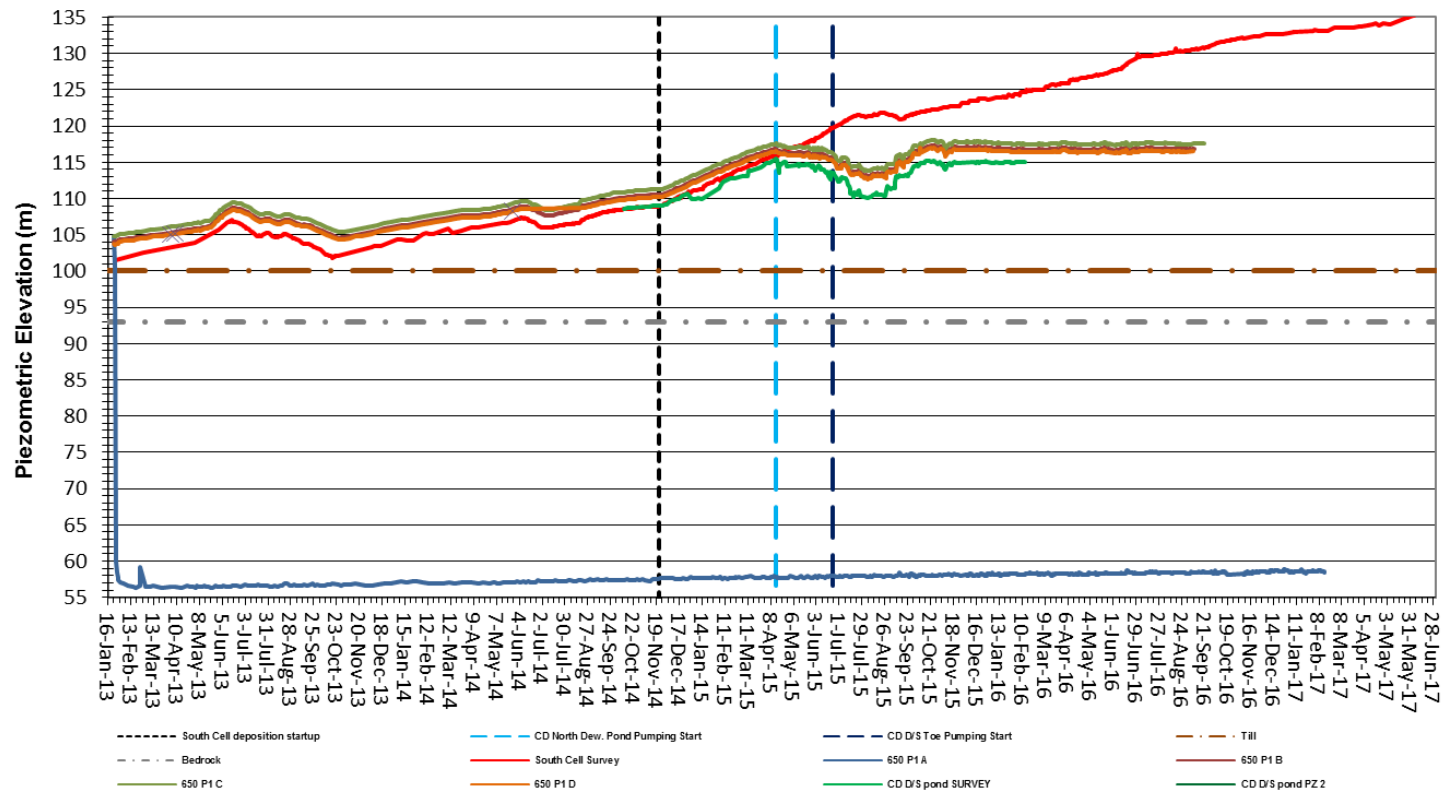


# 650-P1

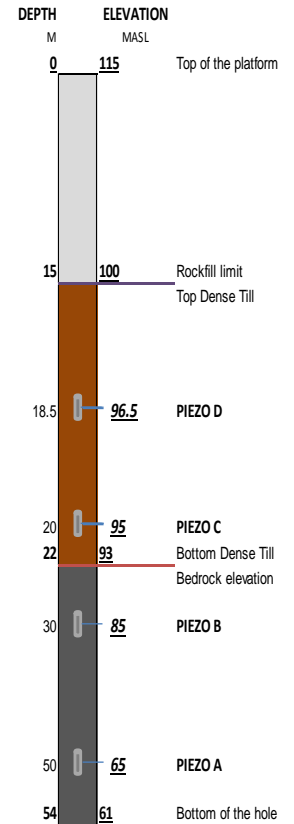
- Piezometer reading not functional since February 2017
- Piezo A was in suction and piezo B to D were following D/S pond regime with readings around 117m.



**650-P1 Hole - Piezometrics Elevation and Attenuation Pond Elevation vs Time**

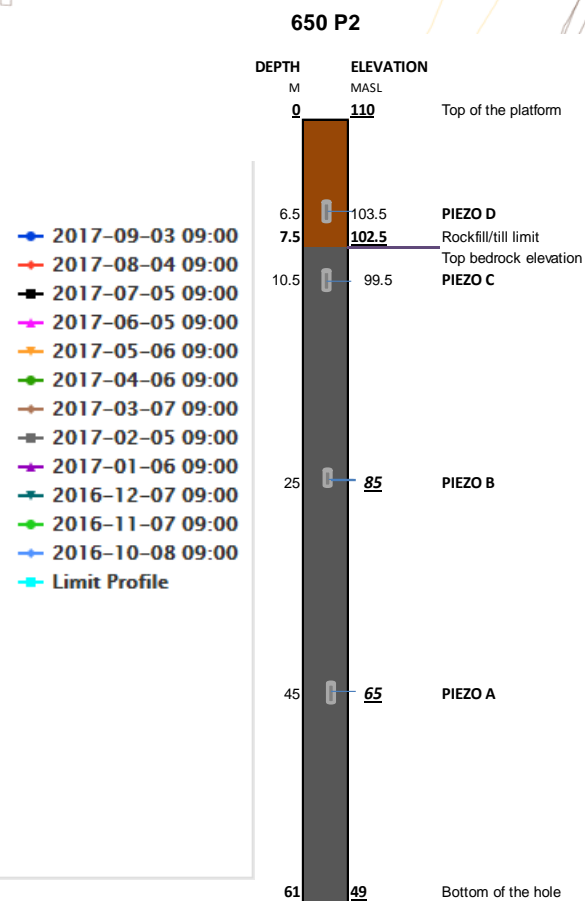
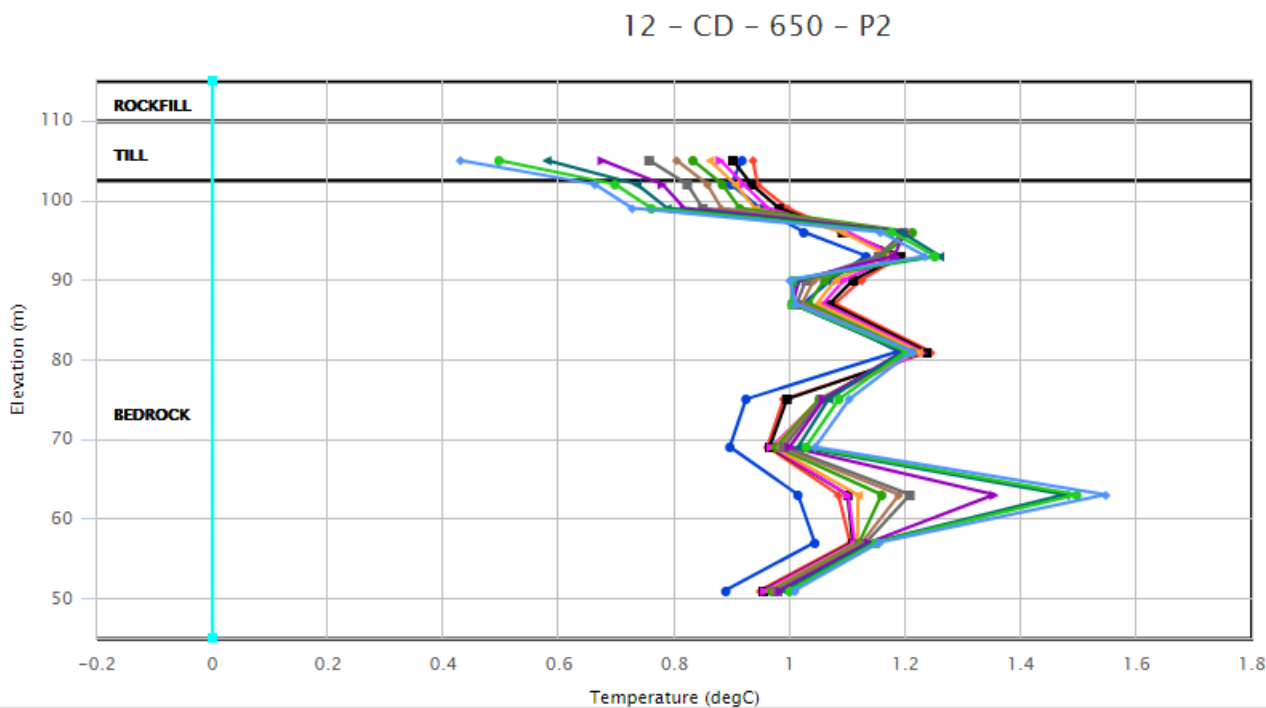
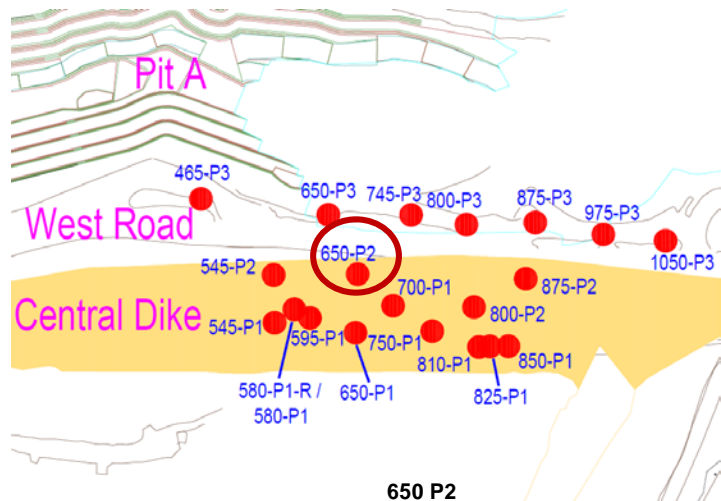


**650 P1**



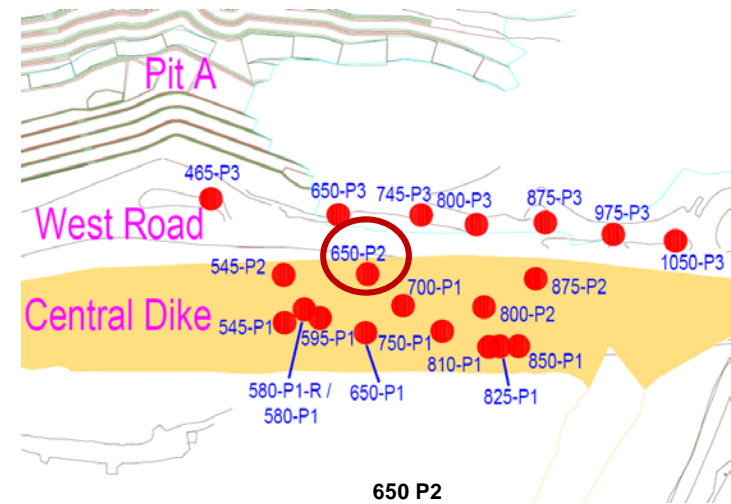
# THERMISTOR 650-P2

➡ Cooling trend observed below El. 80 similar to 2016 readings.

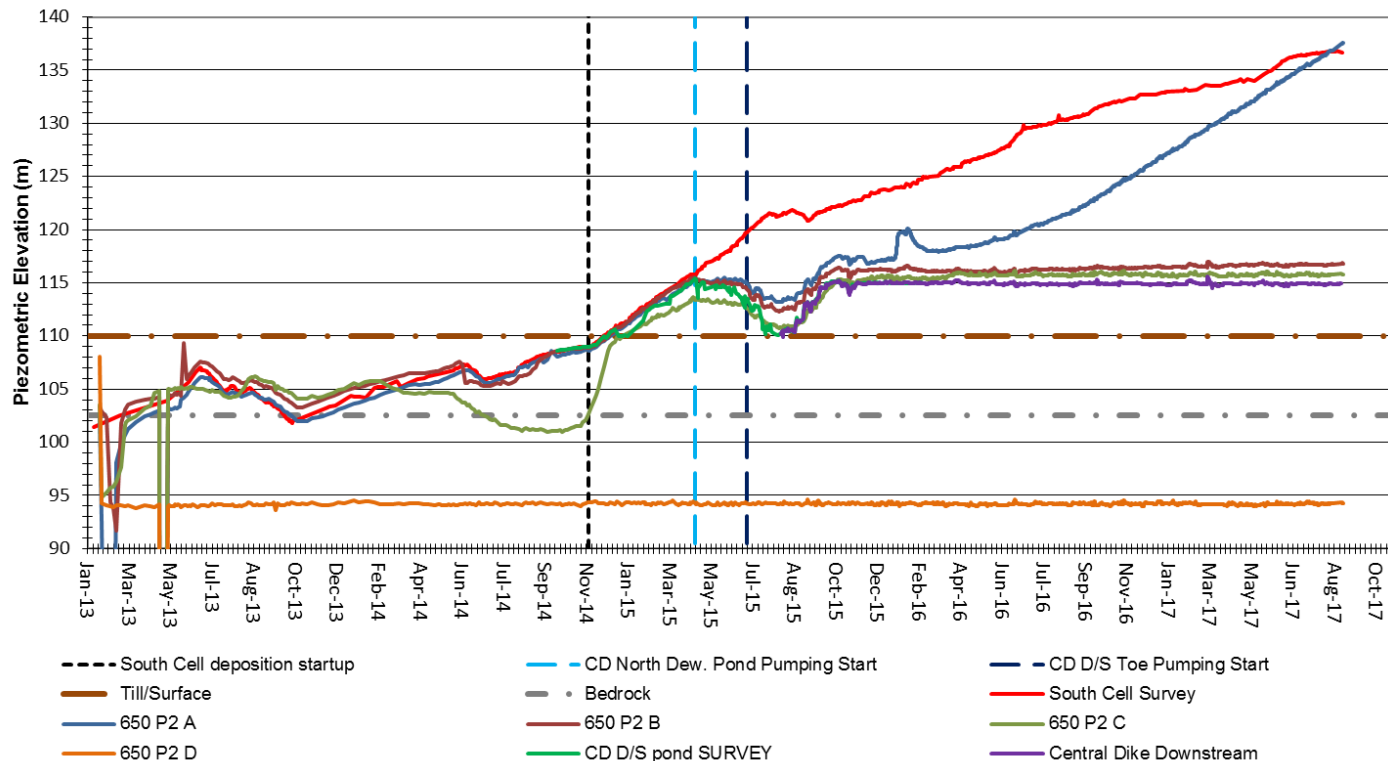


# PIEZOMETER 650-P2

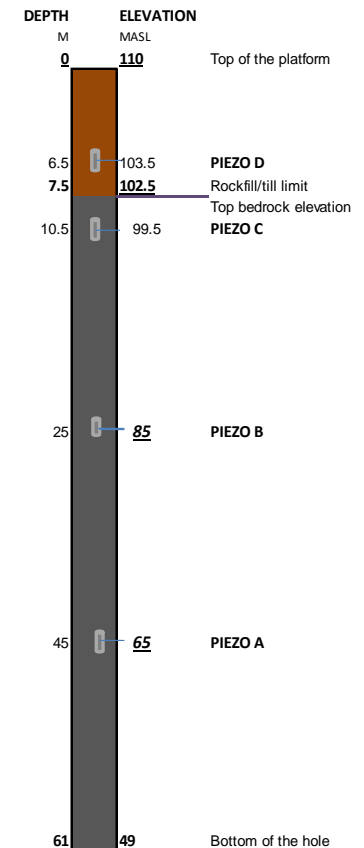
- Piezometer A in bedrock continue its rise and is now over the elevation of the South Cell
- Piezo B-C are following the piezometric regime of the D/S pond
- Piezo D is in suction



**650-P2 Hole - Piezometrics Elevation and Attenuation Pond Elevation vs Time**

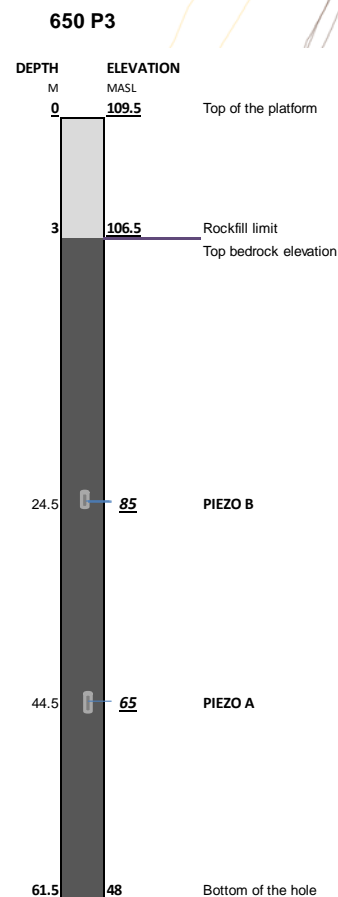
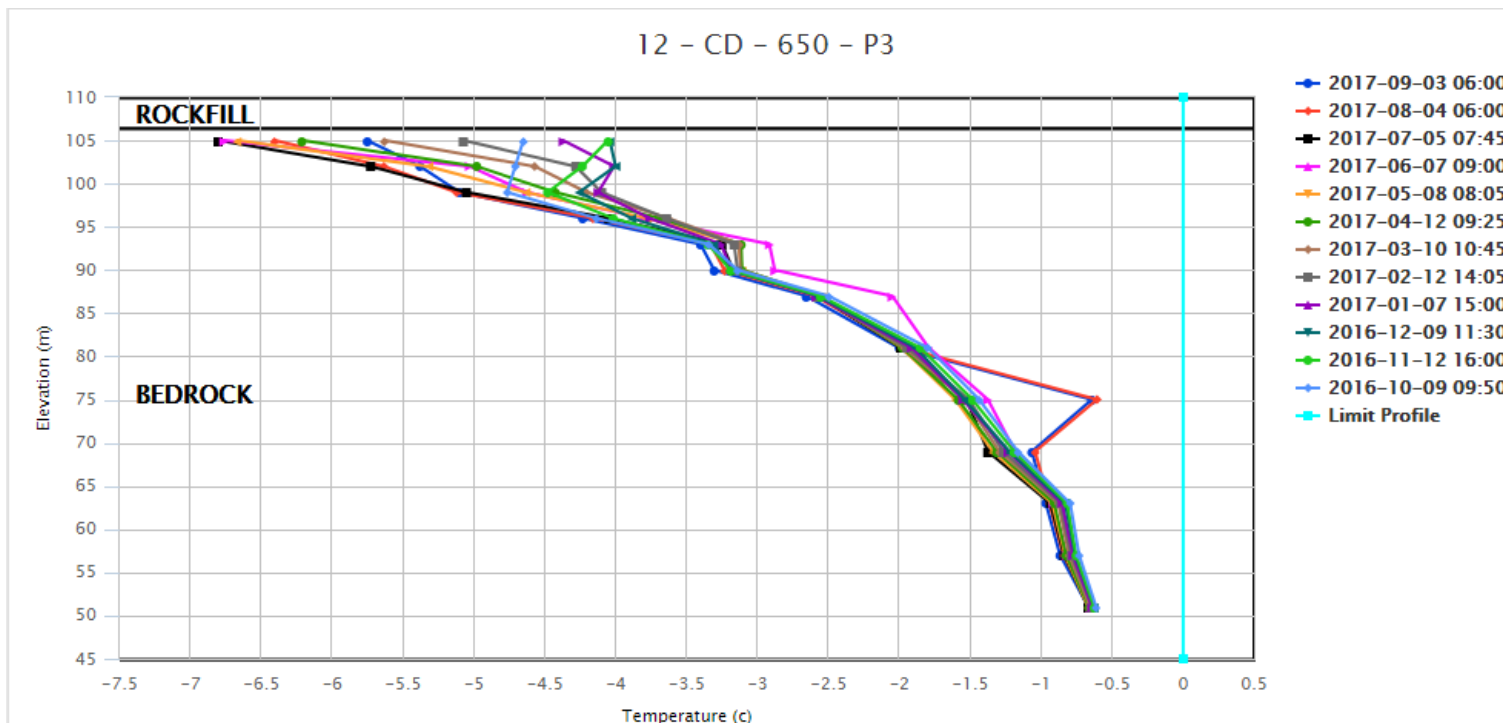
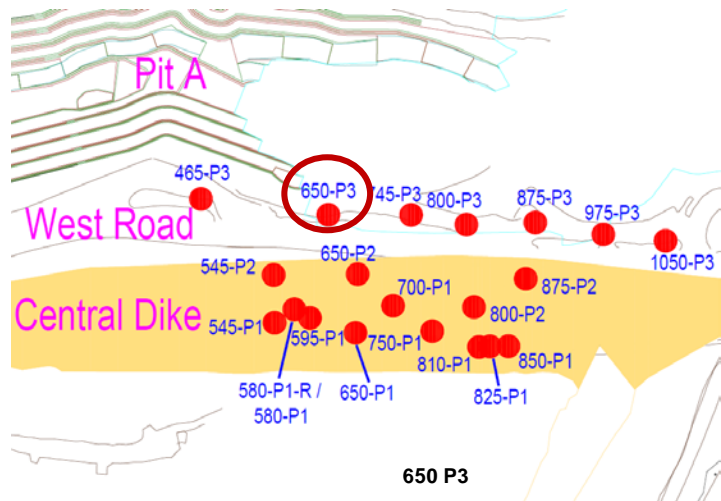


**650 P2**



# THERMISTOR 650-P3

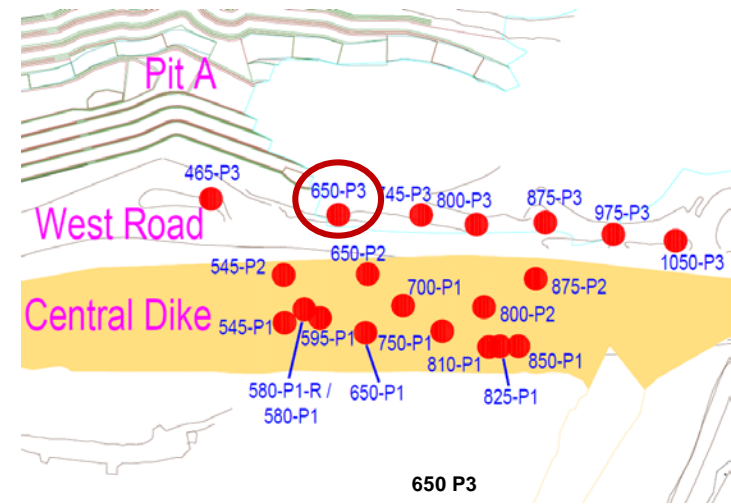
- Bedrock Below 0° C at 650-P3
- Temperature spike at El. 75 m is related to capacitance effect on this specific bead.



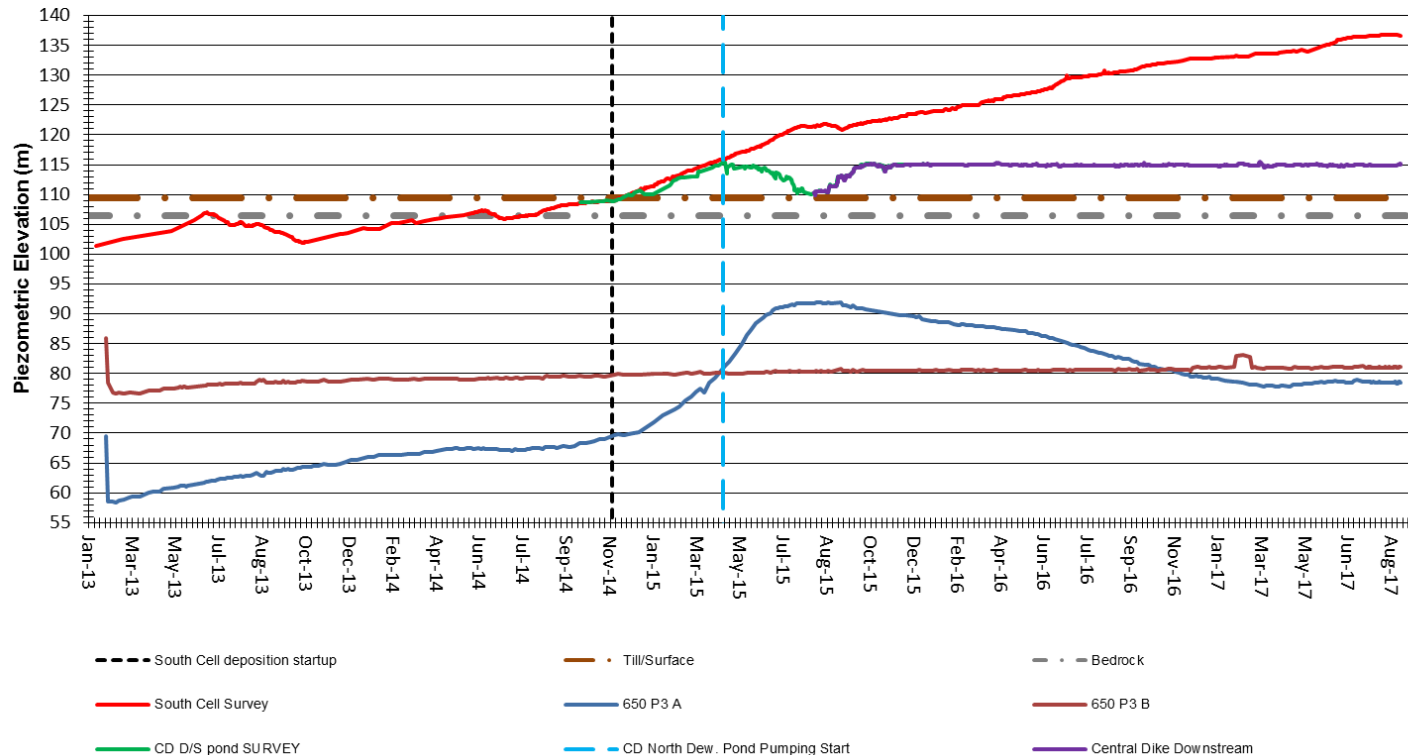


# PIEZOMETERS 650-P3

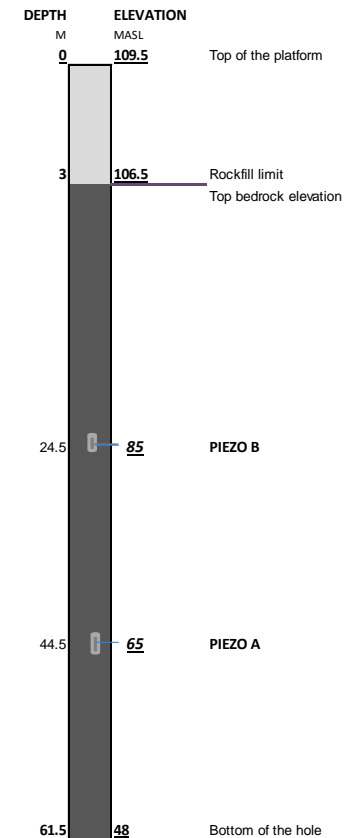
Frozen Piezometers



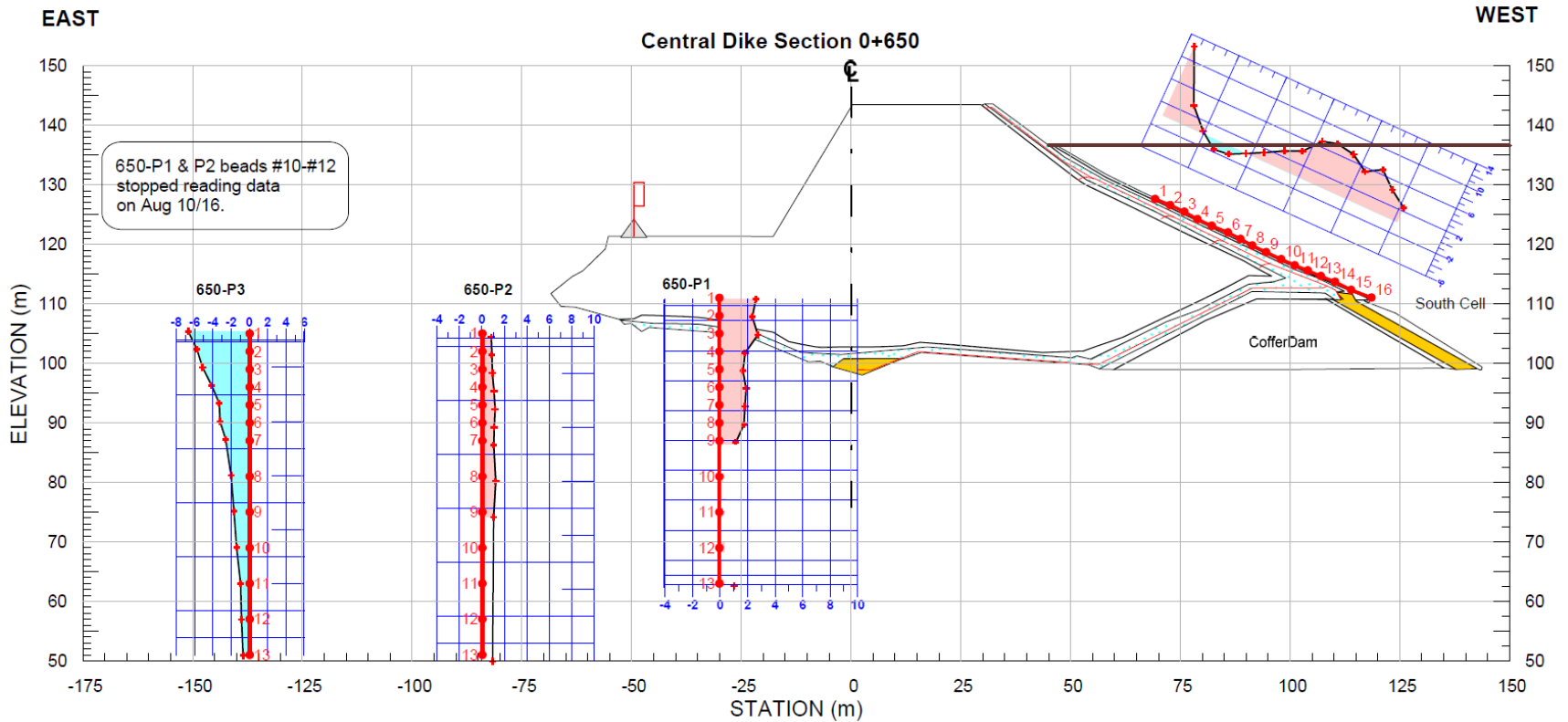
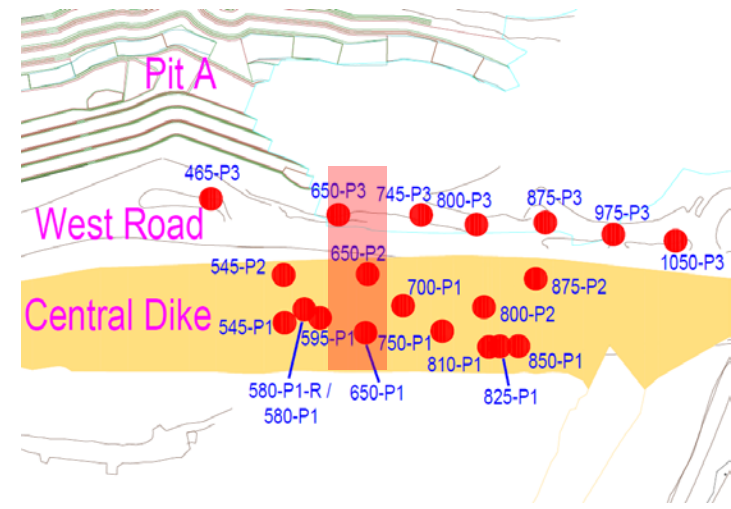
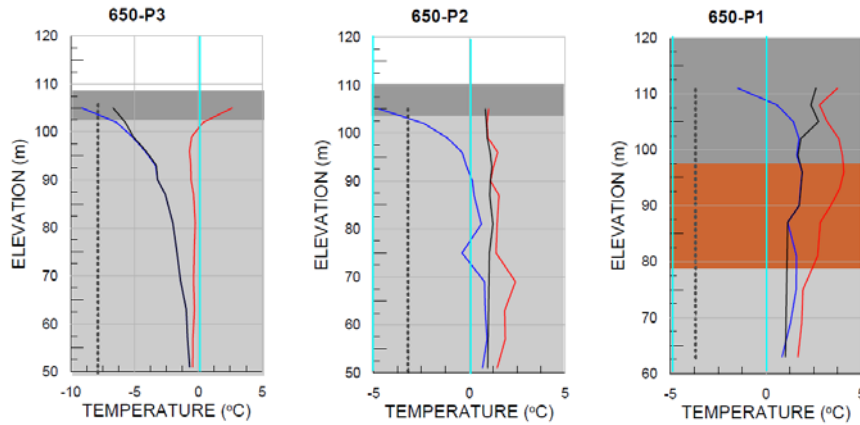
## 650-P3 Hole - Piezometrics Elevation and Attenuation Pond Elevation vs Time



### 650 P3



# SECTION 650

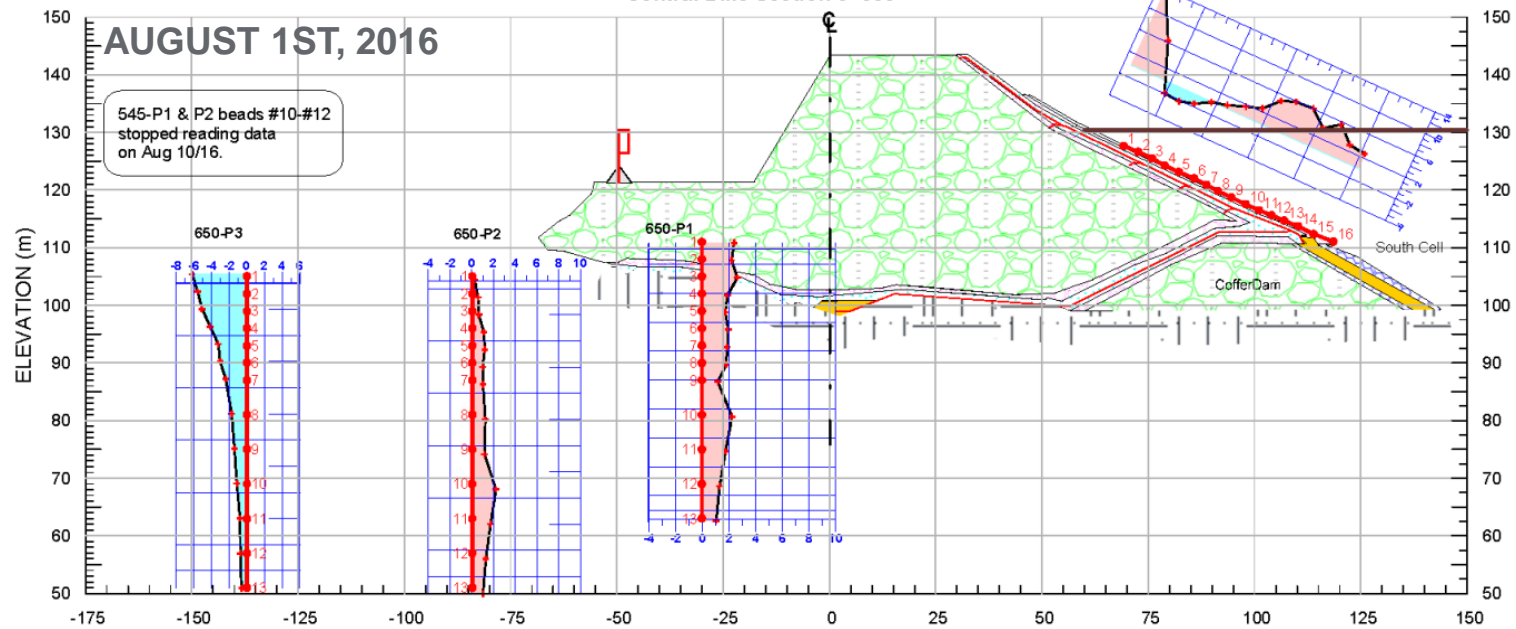


# SECTION 650

EAST

Central Dike Section 0+650

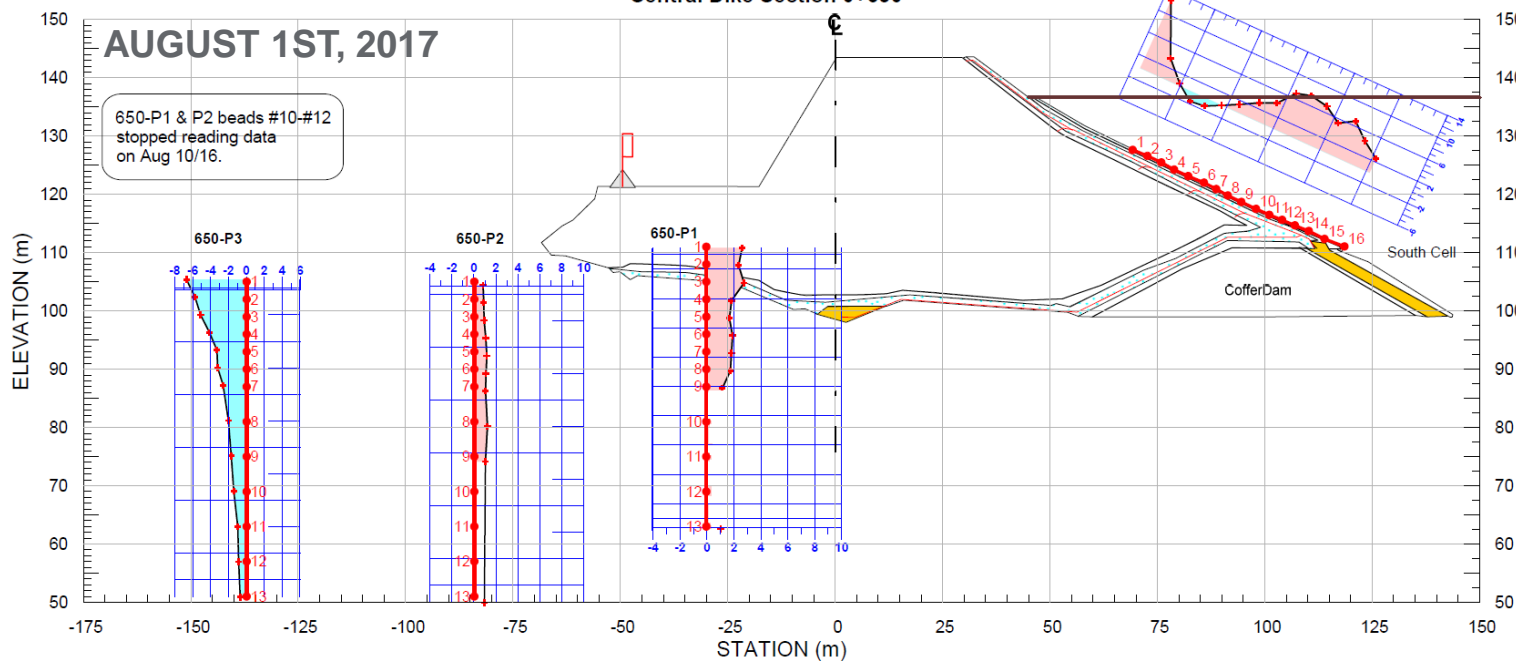
WEST



EAST

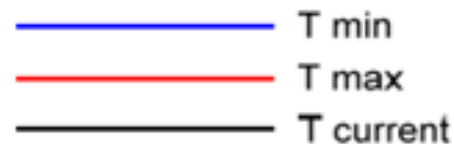
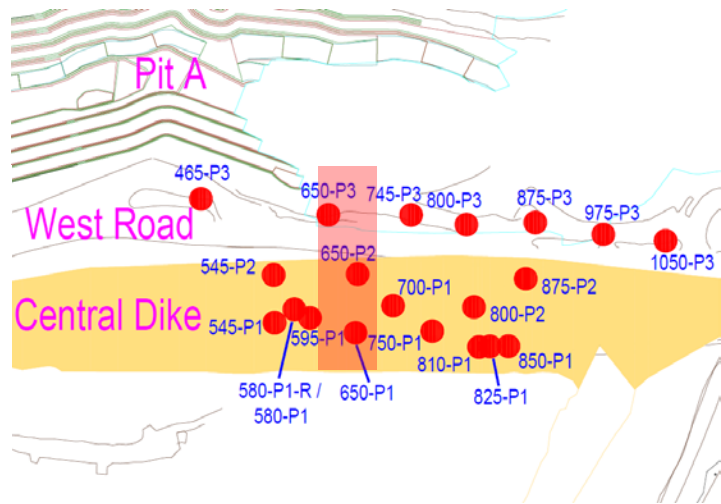
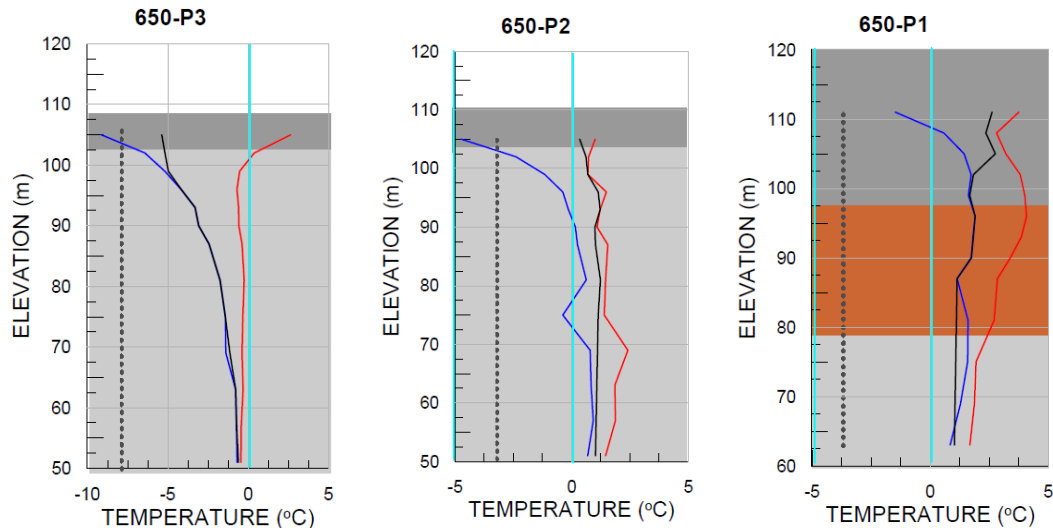
Central Dike Section 0+650

WEST

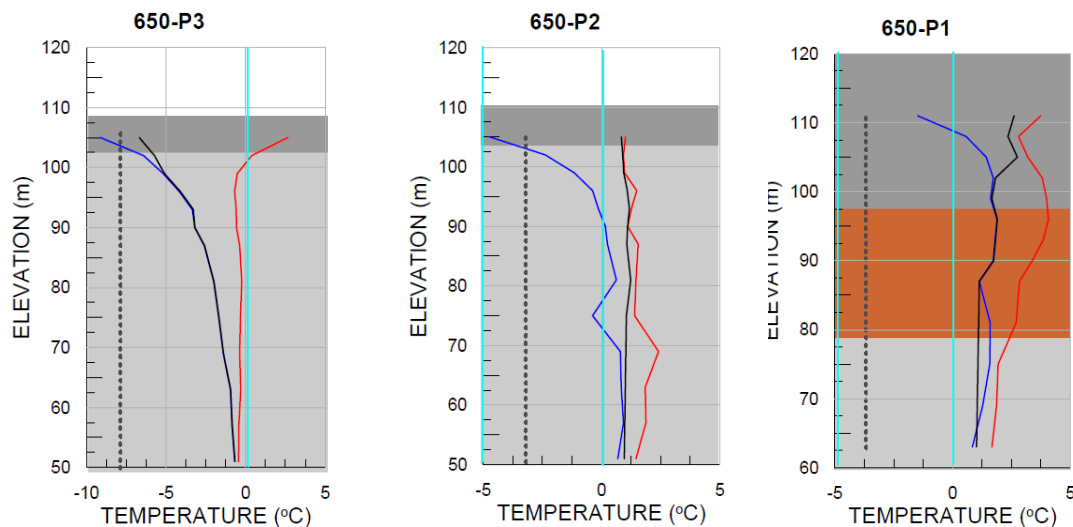


# SECTION 650

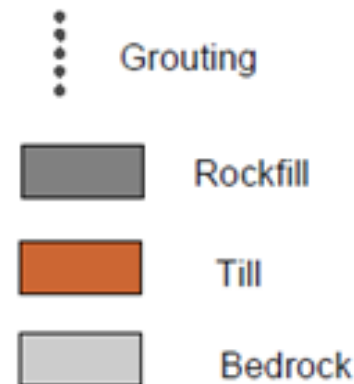
## THERMISTOR READINGS FROM AUGUST 2015 - 2016



## THERMISTOR READINGS FROM AUGUST 2016 - 2017

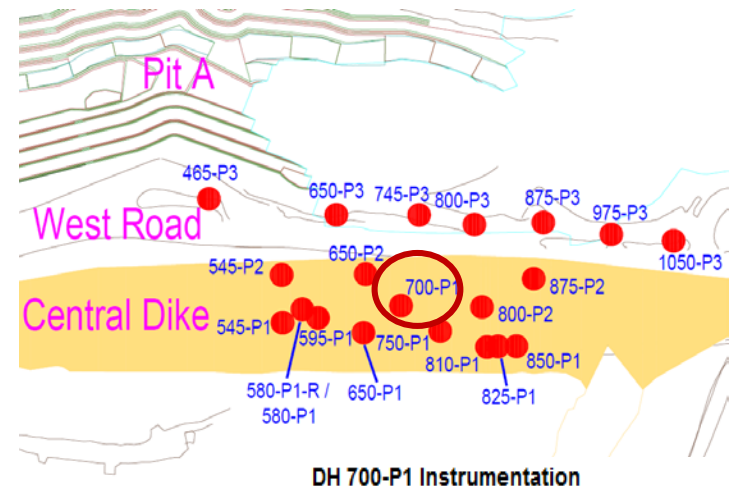


## LEGEND

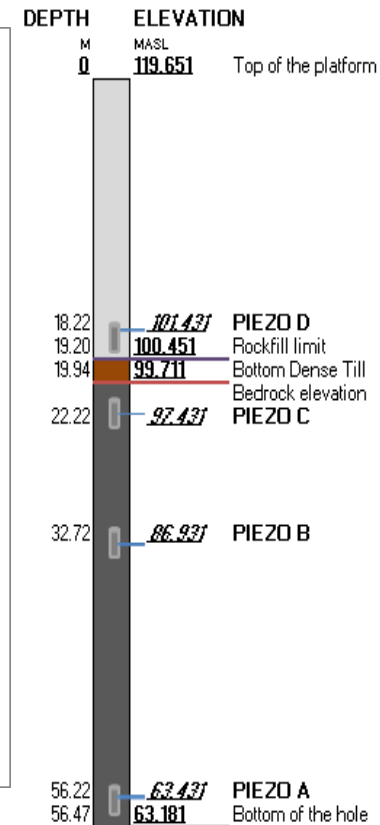
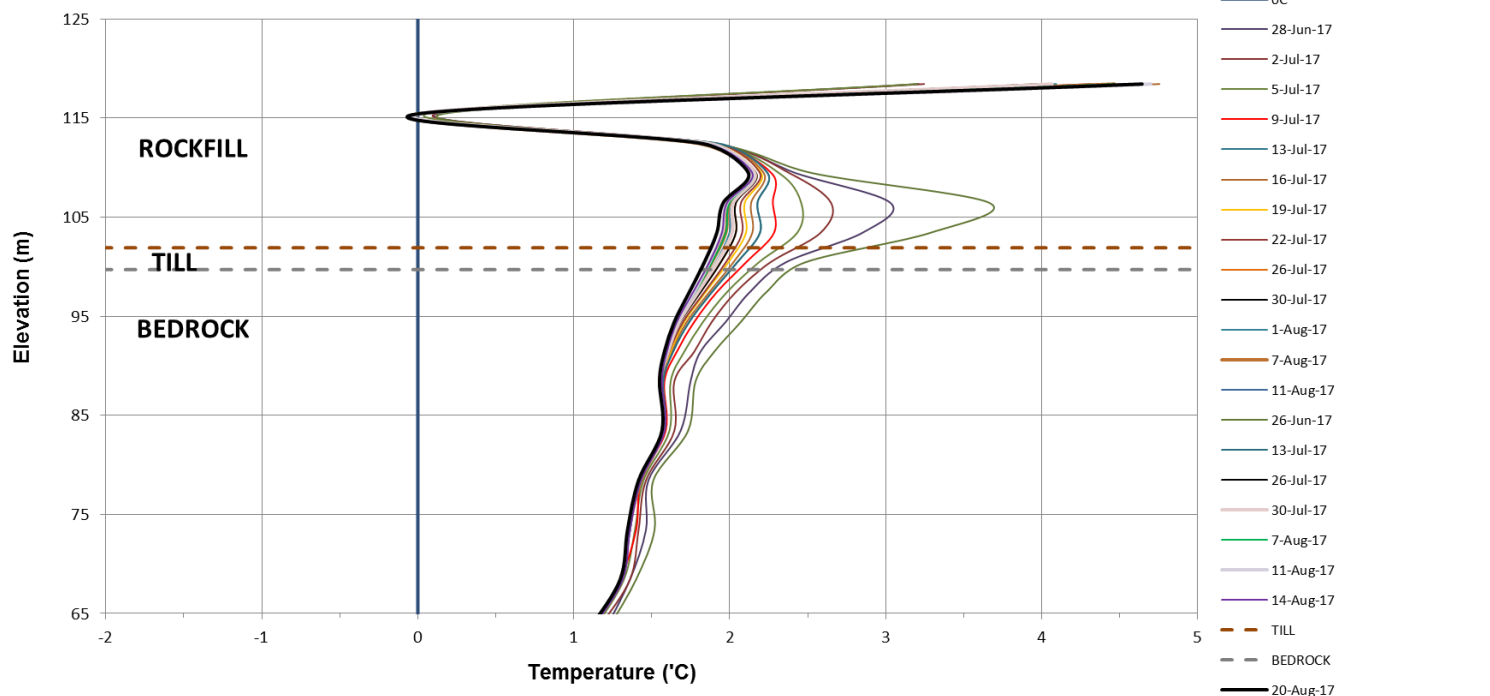


# THERMISTOR 700-P1

- New instrument installed in 2017
- Stabilisation of temperature ongoing
- Till and bedrock temperature readings above 0° C

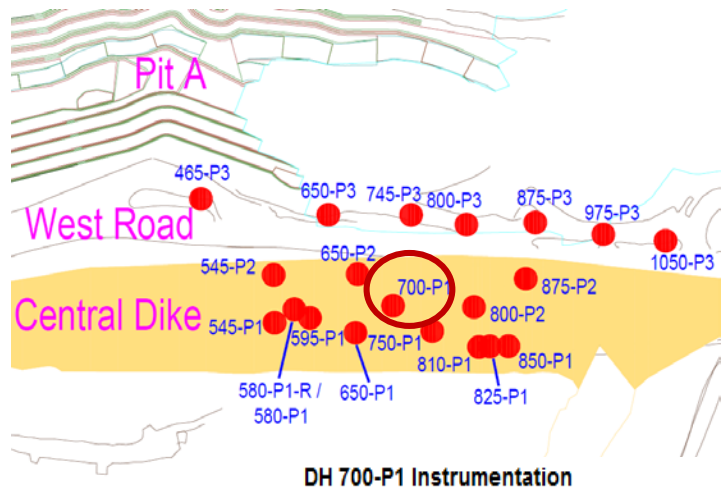


TH-700-P1 Central Dike - Bead Temperature vs. Elevation - 2017

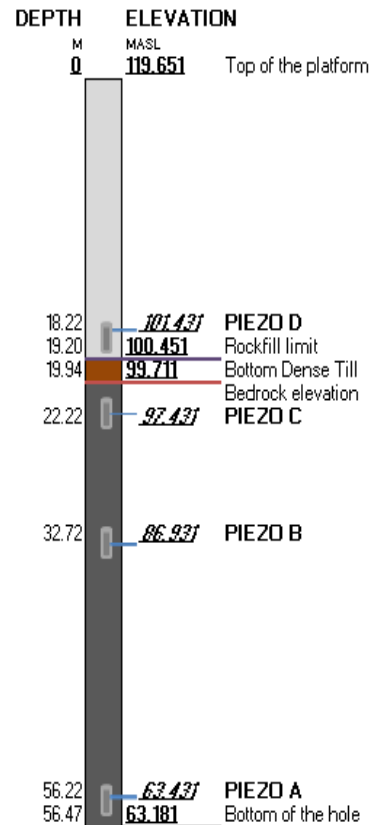
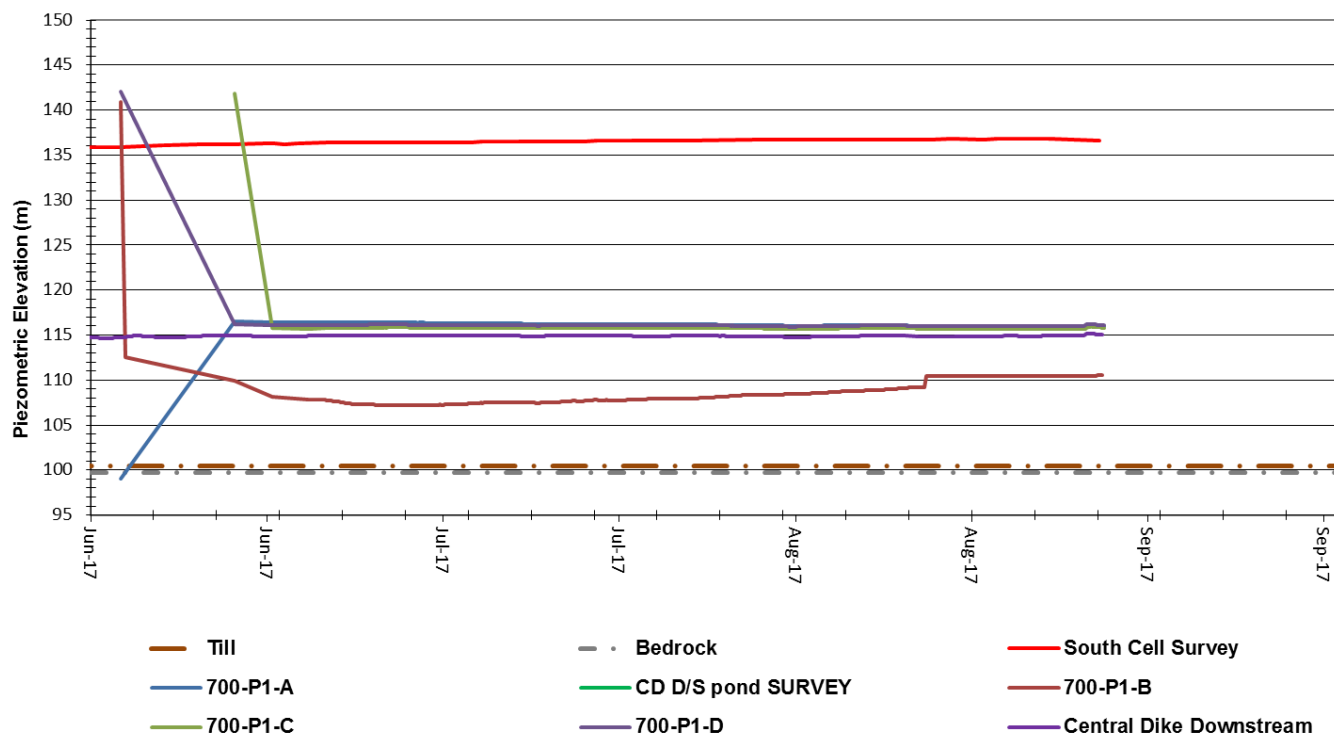


# PIEZOMETER 700-P1

- New instrument installed in 2017
- Stabilization of temperature ongoing
- Reading automatization occurred on the date of the small bump observed on the piezo B
- Piezo A.C and D are showing reading similar to the D/S pond.

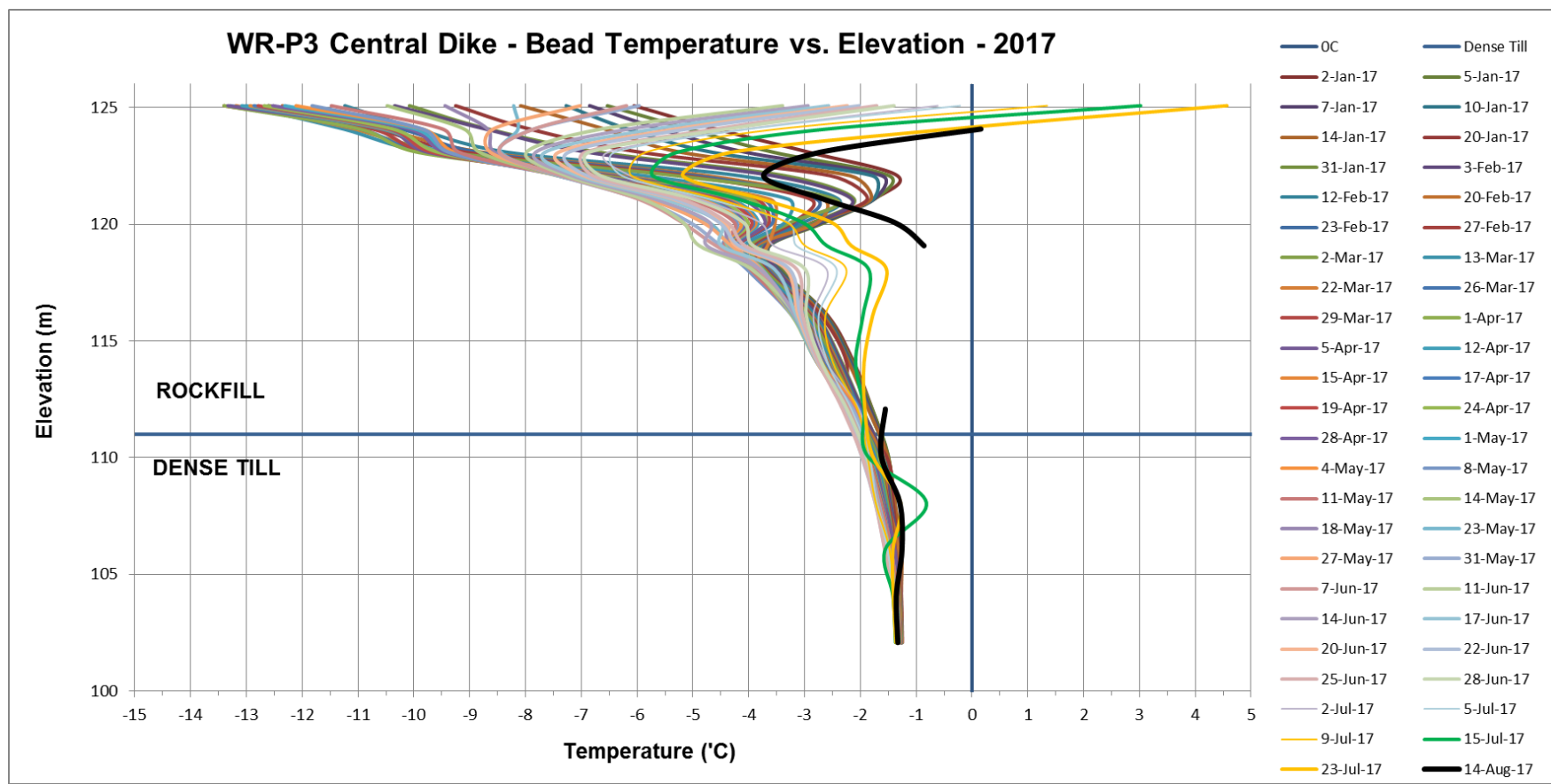
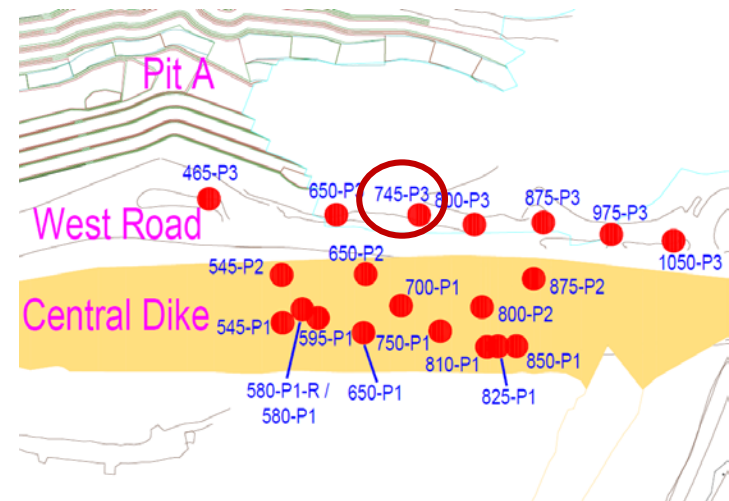


**700-P1 Hole - Piezometrics Elevation and Attenuation Pond Elevation vs Time**



# THERMISTOR 745-P3

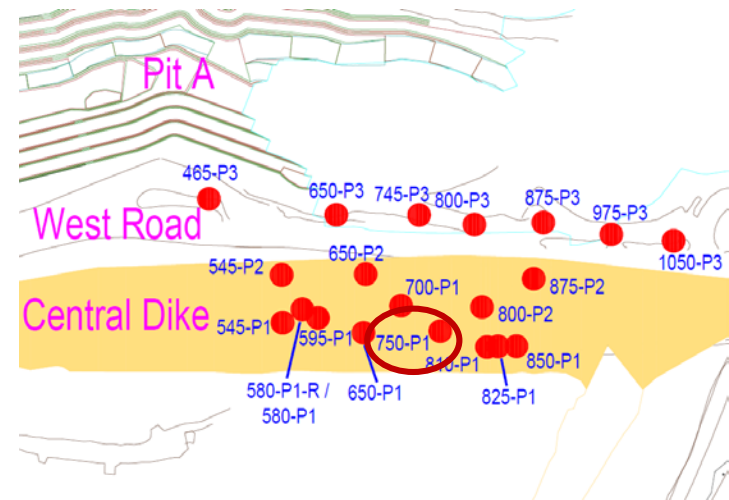
- Thermistor installed to monitor freeze back of the West Road. This thermistor do not reach bedrock
- Rockfill and till below 0° C at 745-P3
- Frozen limit of the northern section of the P3 line



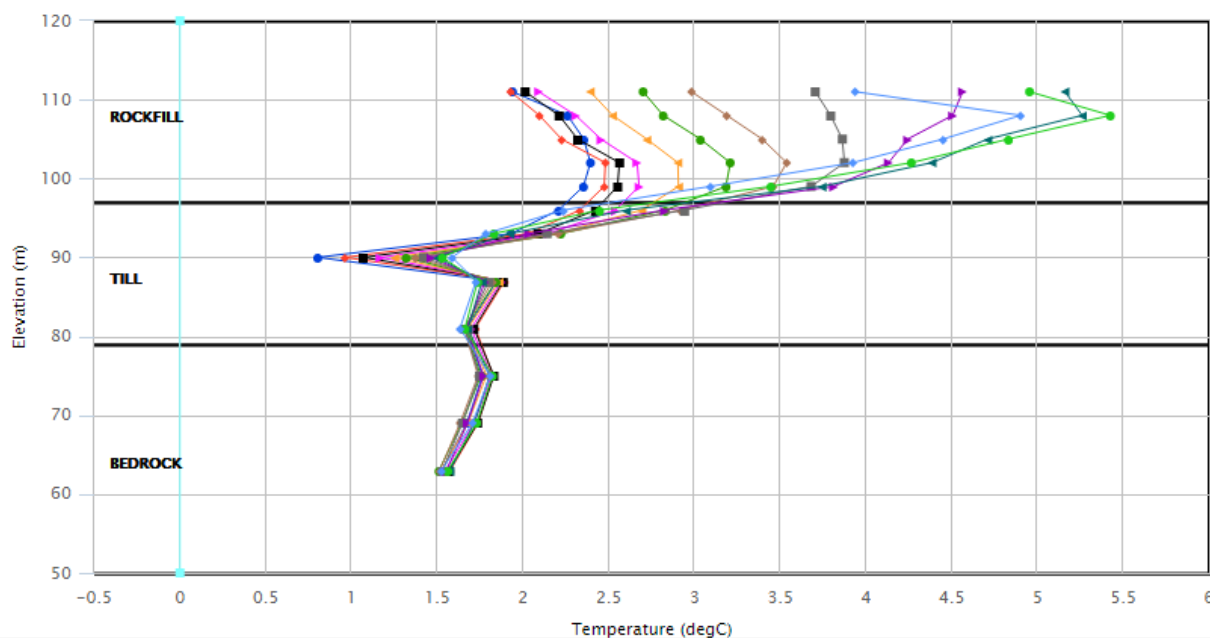


# THERMISTOR 750-P1

- Cooling trend in till layer. The bead located at elevation 90m is in average 1° C cooler than in 2016.

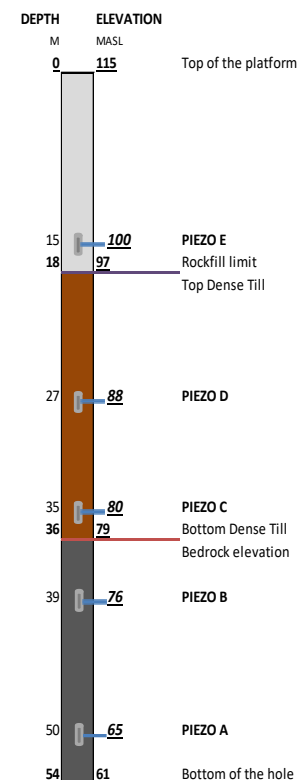


12 - CD - 750 - P1



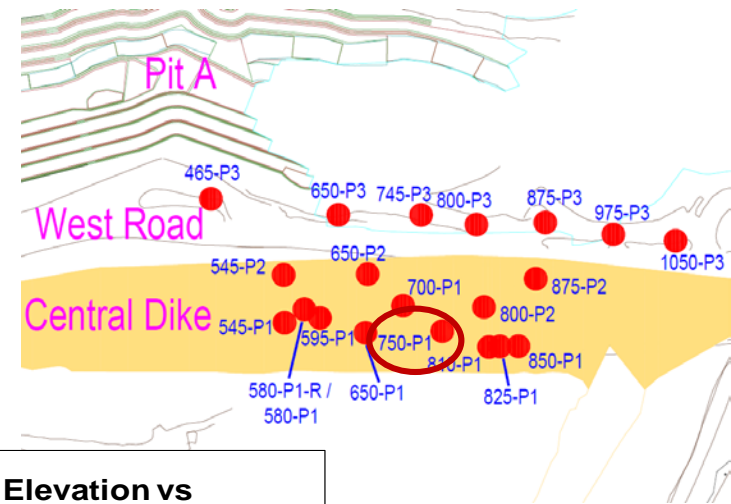
- 2017-09-03 12:00
- 2017-08-04 12:00
- 2017-07-05 12:00
- 2017-06-05 12:00
- 2017-05-06 12:00
- 2017-04-06 12:00
- 2017-03-07 12:00
- 2017-02-05 12:00
- 2017-01-06 12:00
- 2016-12-07 12:00
- 2016-11-07 12:00
- 2016-10-08 12:00
- Limit Profile

750 P1

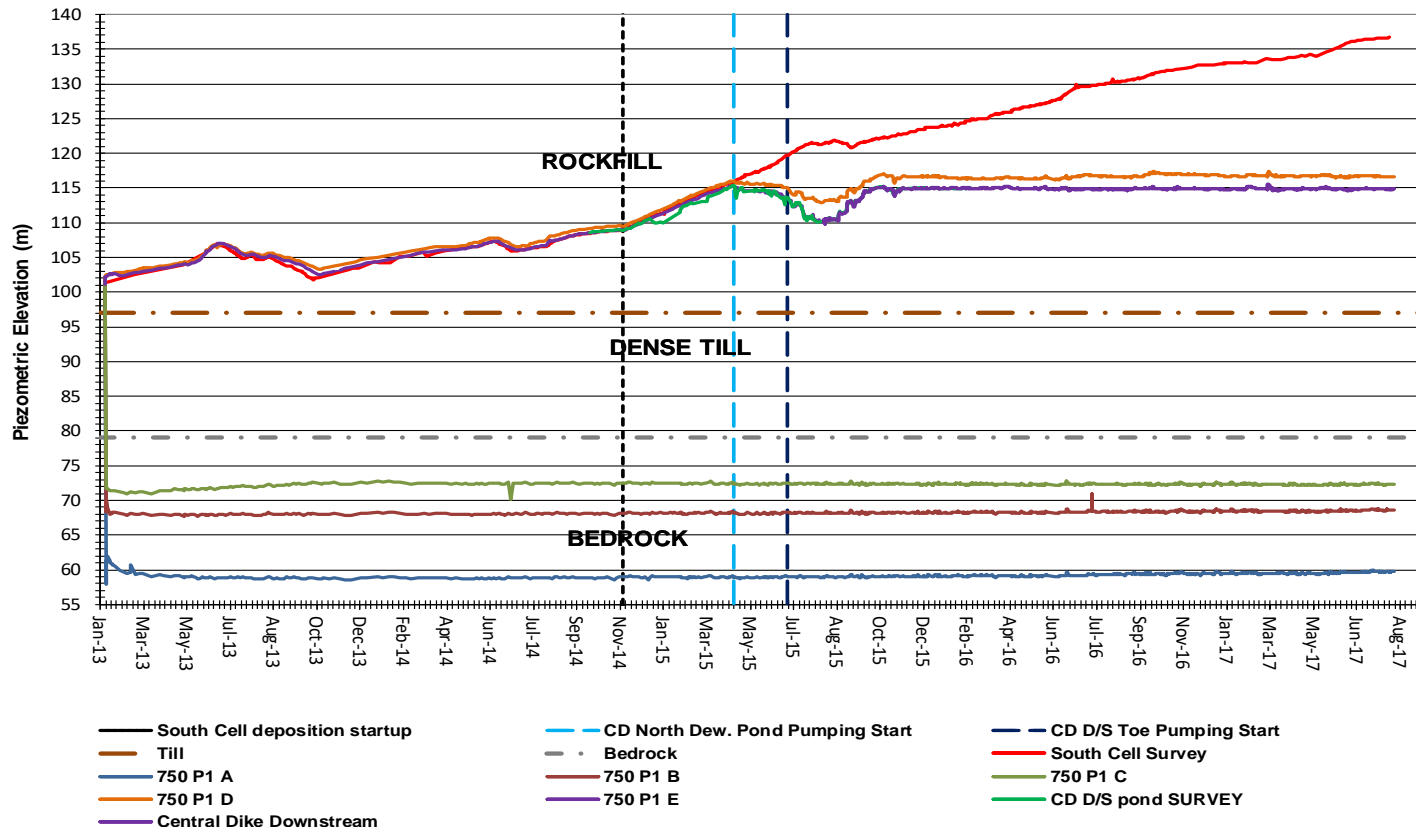


# PIEZOMETER 750-P1

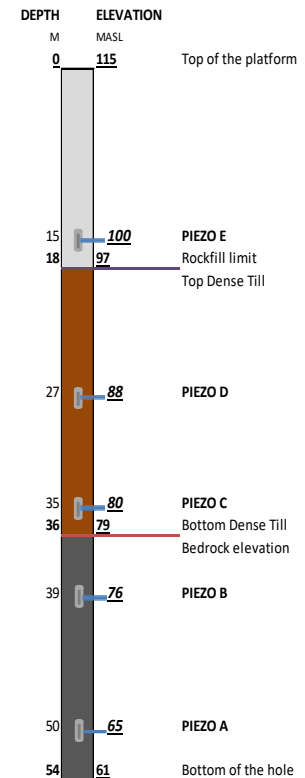
- Piezo A, B and C are in suction
- Piezo D is have a direct reaction to any variation in elevation observe in the D/S pond.



**750-P1 Hole - Piezometrics Elevation and Attenuation Pond Elevation vs Time**

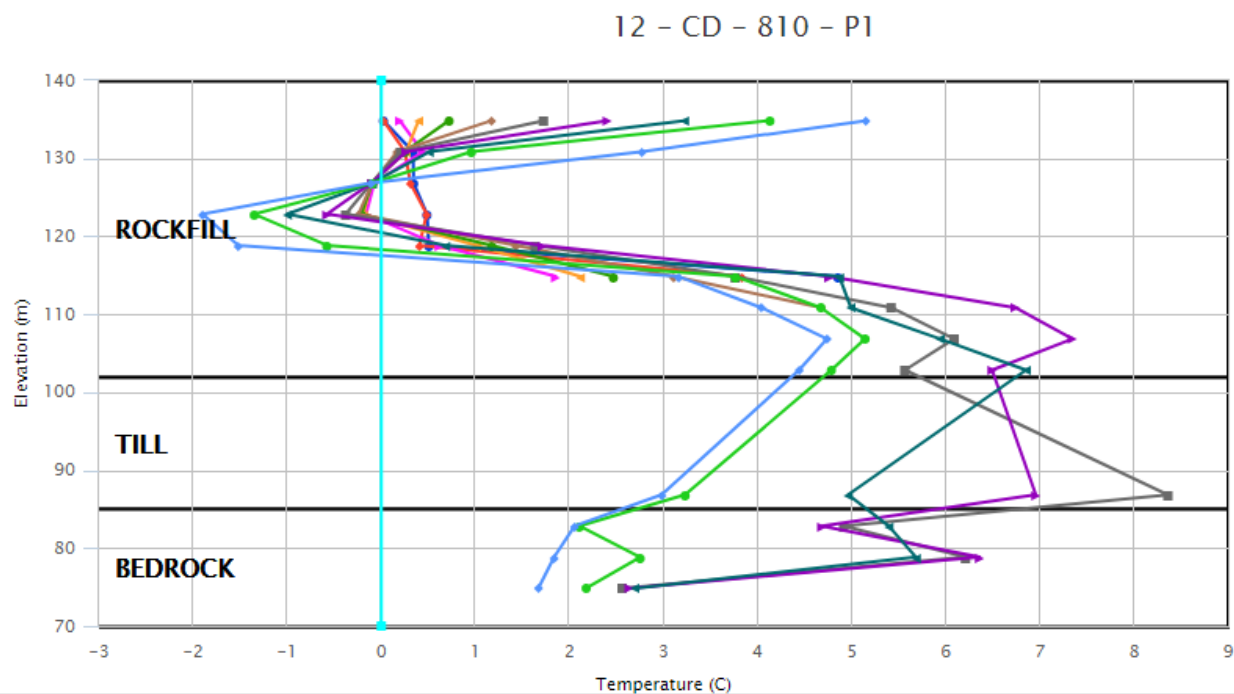
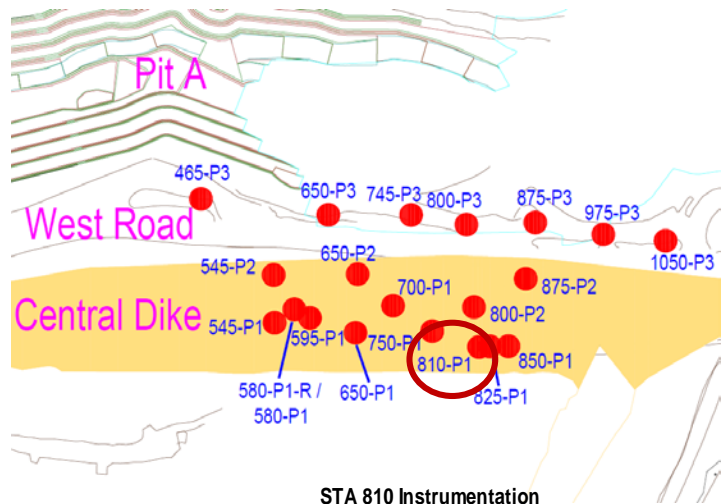


**750 P1**

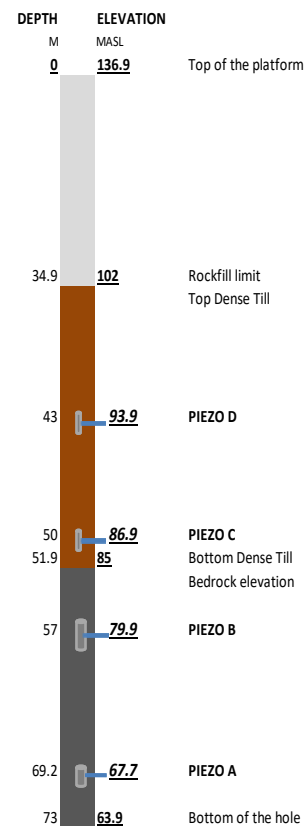


# THERMISTOR 810-P1

- Bead below El. 114.84 m stop working in February 2017
- Higher temperature observed in this hole (might be the instrument progressively failing)

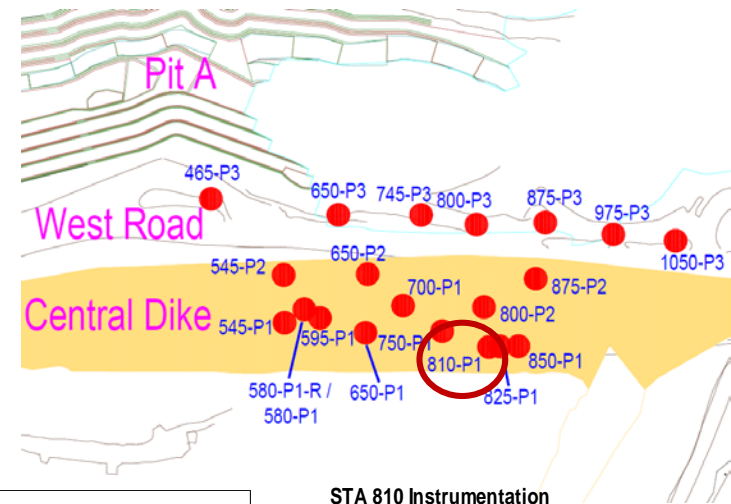


- 2017-09-03 15:00
- 2017-08-04 15:00
- 2017-07-05 15:00
- 2017-06-07 08:15
- 2017-05-08 07:30
- 2017-04-08 07:30
- 2017-03-10 09:45
- 2017-02-09 08:40
- 2017-01-07 16:10
- 2016-12-09 09:10
- 2016-11-11 17:10
- 2016-10-09 08:50
- Limit Profile

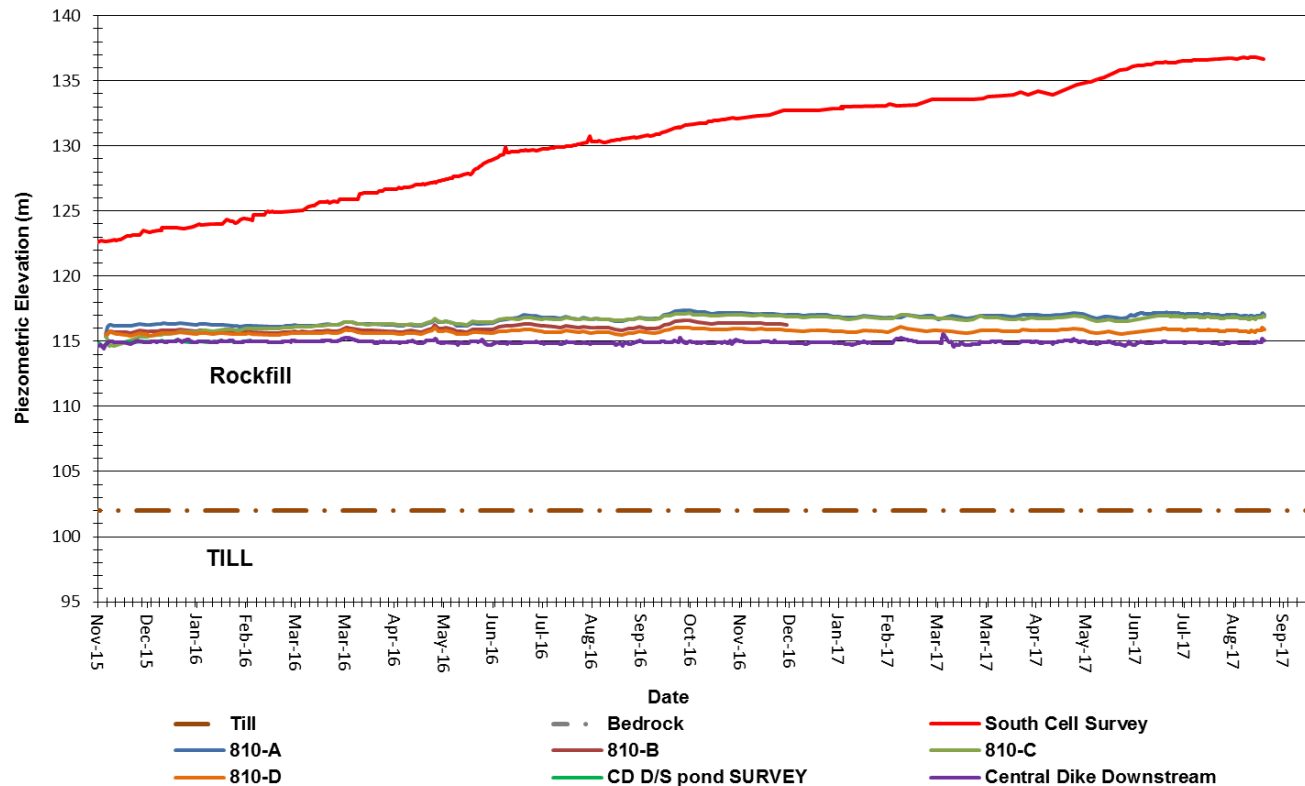


# PIEZOMETER 810-P1

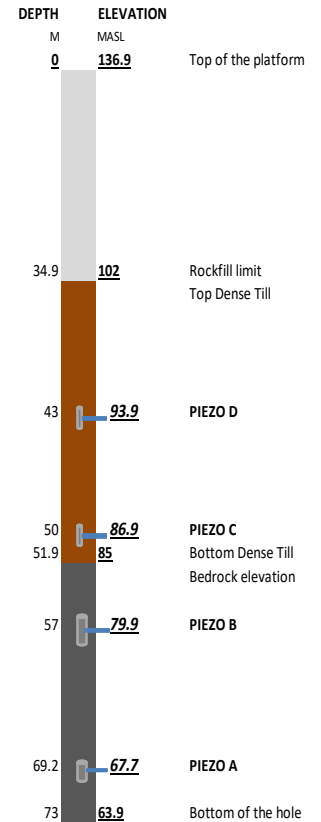
- ➡ Piezo B stop working in January 2017
- ➡ Piezo A, C & D are following the elevation change of the D/S pond



810 Hole - Piezometrics Elevation and Attenuation Pond Elevation vs Time

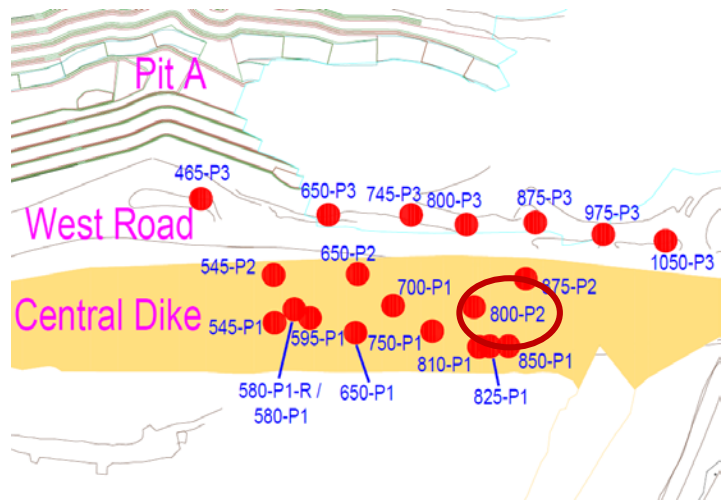


STA 810 Instrumentation



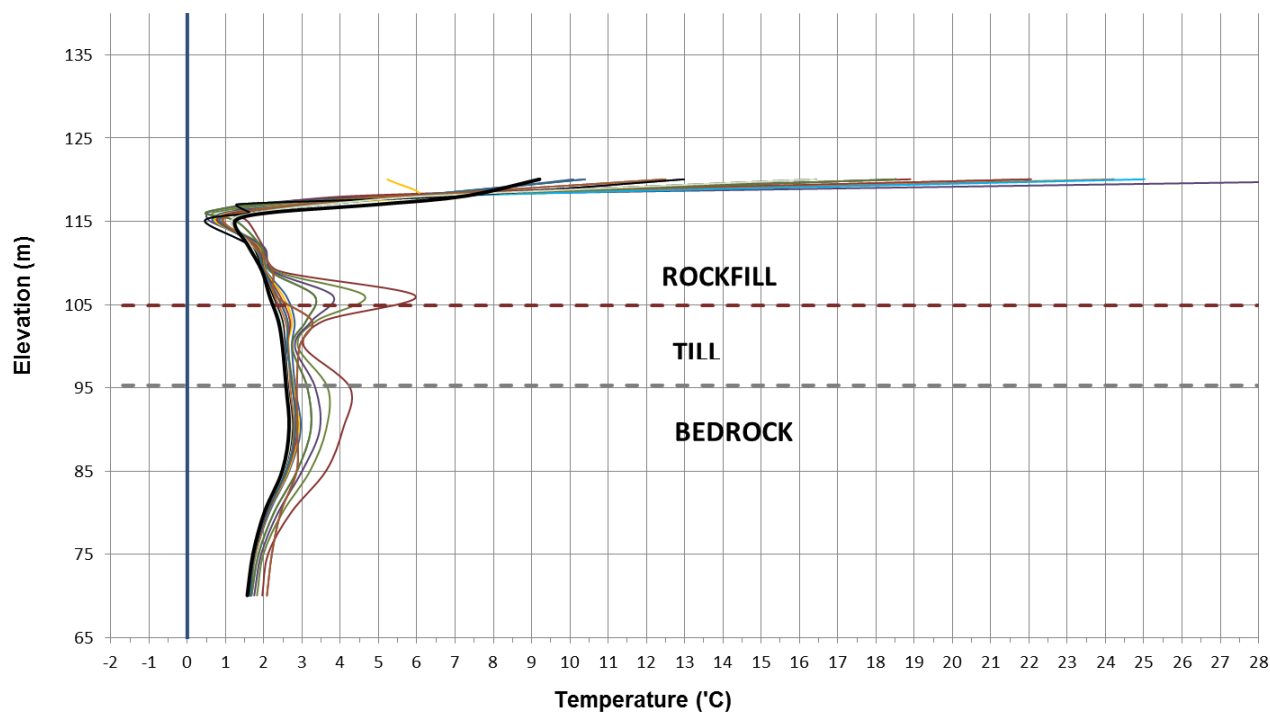
# THERMISTOR 800-P2

- New instrument installed in 2017
- Stabilisation of temperature ongoing
- Temperature above 0 °C

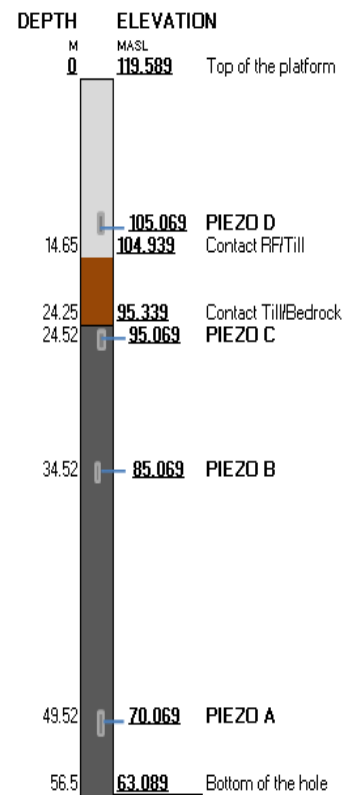


DH 800-P2 Instrumentation

TH-800-P2 Central Dike - Bead Temperature vs. Elevation - 2017

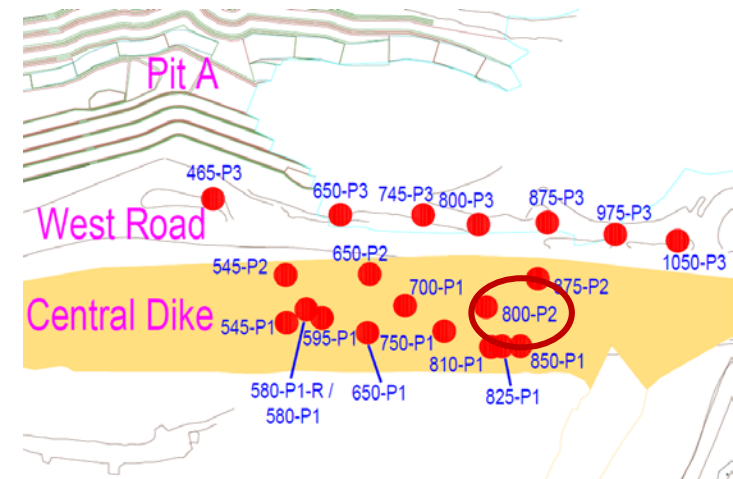


- 0C
- 26-Jun-17
- 28-Jun-17
- 2-Jul-17
- 5-Jul-17
- 16-Jul-17
- 19-Jul-17
- 22-Jul-17
- 26-Jul-17
- 30-Jul-17
- 1-Aug-17
- 7-Aug-17
- 11-Aug-17
- 14-Aug-17
- 5-Jul-17
- 26-Jul-17
- 30-Jul-17
- 7-Aug-17
- 11-Aug-17
- 20-Aug-17
- TILL
- BEDROCK
- 20-Aug-17

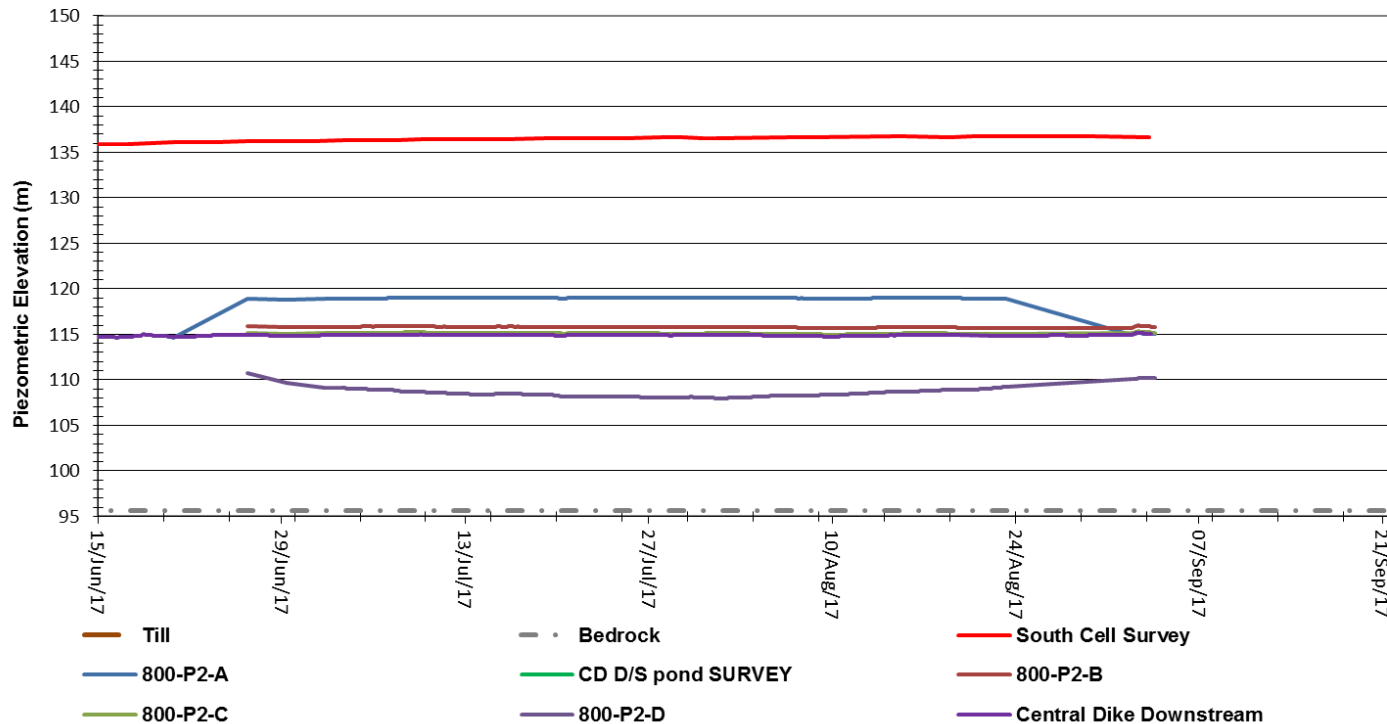


# PIEZOMETER 800-P2

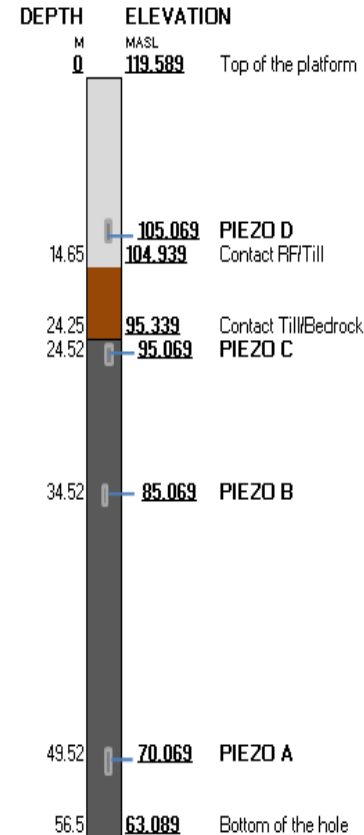
- New instrument installed in 2017
- Stabilisation ongoing
- Piezo A,B and C are showing pressure readings similar to the elevation of the D/S pond.



**800-P2 Hole - Piezometrics Elevation and Attenuation Pond Elevation vs Time**

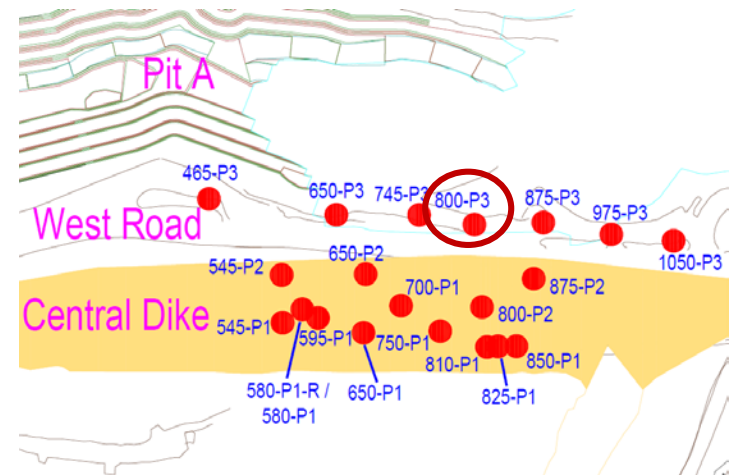


**DH 800-P2 Instrumentation**

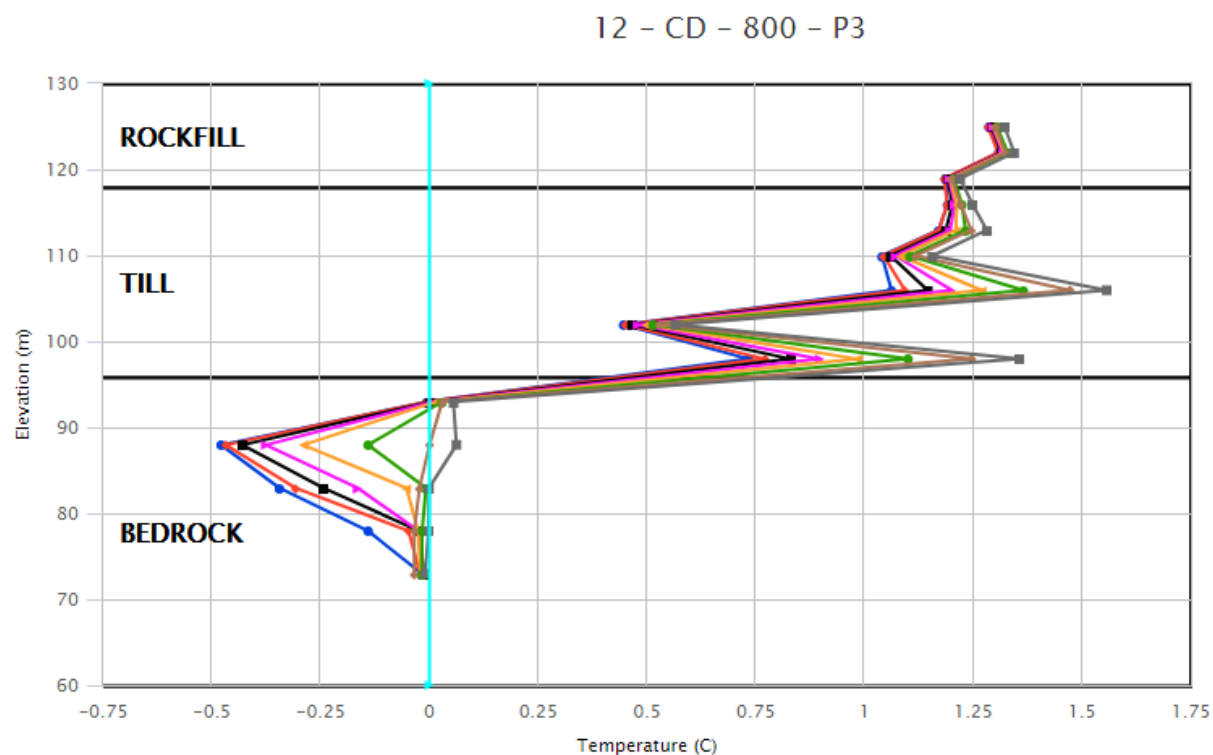


# THERMISTOR 800-P3

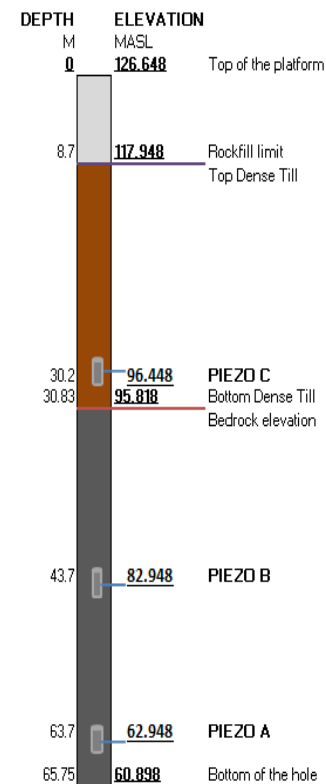
- New instrument installed in 2017
- Stabilisation in progress
- Temperature under 0° C below El. 93 m



DH 800-P3 Instrumentation



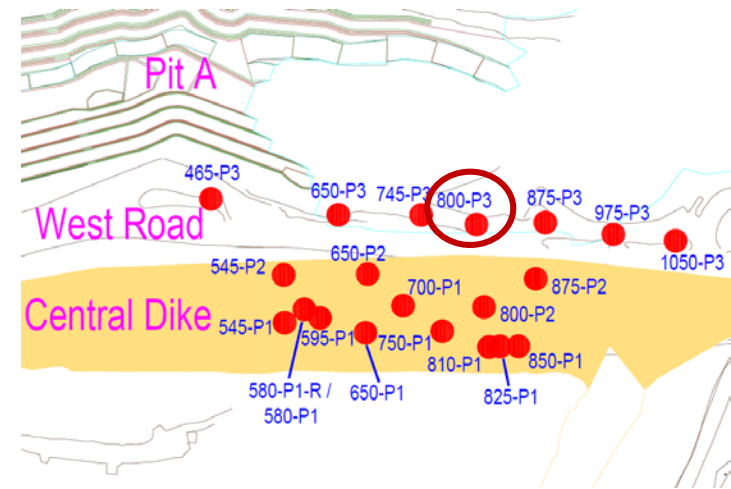
- 2017-09-03 15:00
- 2017-08-27 15:00
- 2017-08-20 15:00
- 2017-08-13 15:00
- 2017-08-06 15:00
- 2017-07-30 15:00
- 2017-07-23 15:00
- 2017-07-20 15:00
- Limit Profile



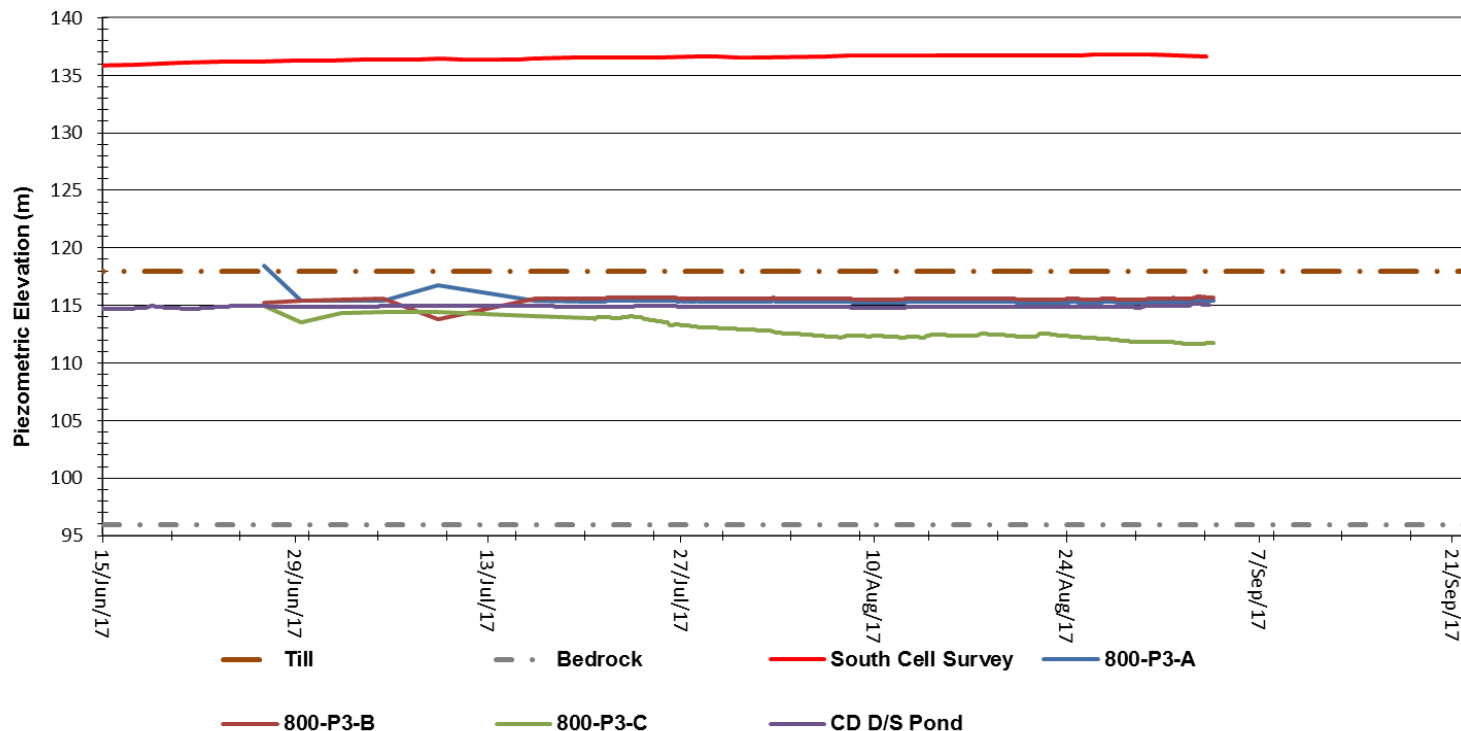


# PIEZOMETERS 800-P3

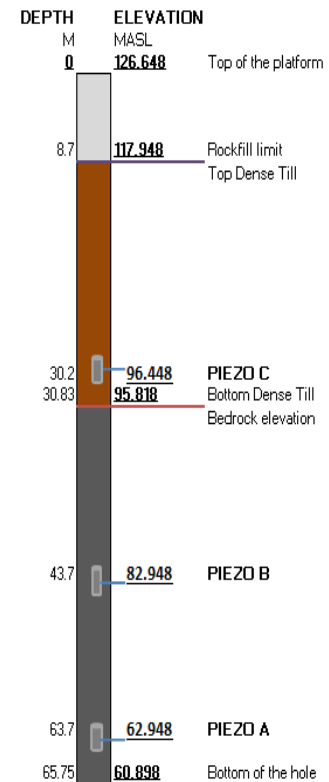
- New instrument installed in 2017
- Stabilization in progress
- Piezo A & B readings are similar to the D/S pond elevation readings
- Piezo C readings is slowly decreasing



**800-P3 Hole - Piezometrics Elevation and Attenuation Pond Elevation vs Time**

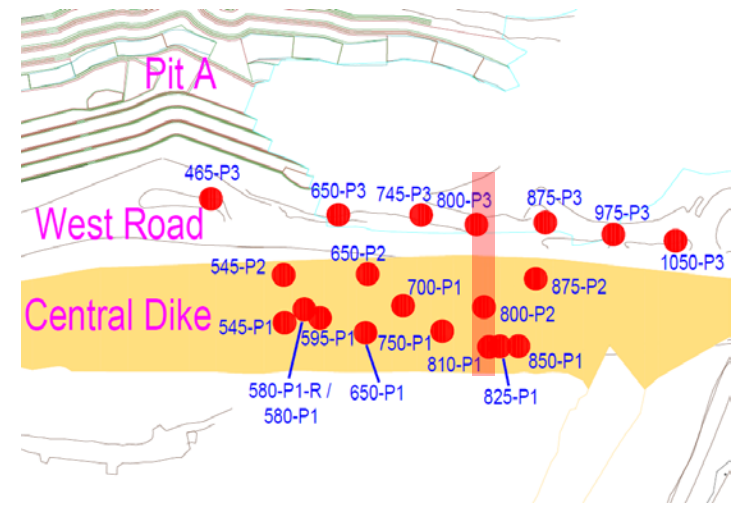
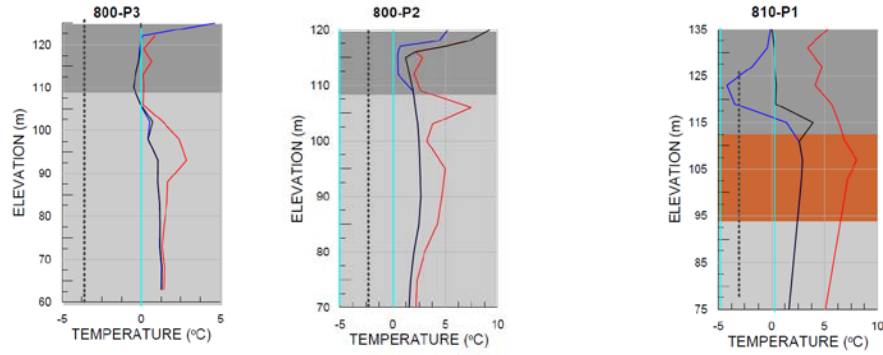


**DH 800-P3 Instrumentation**

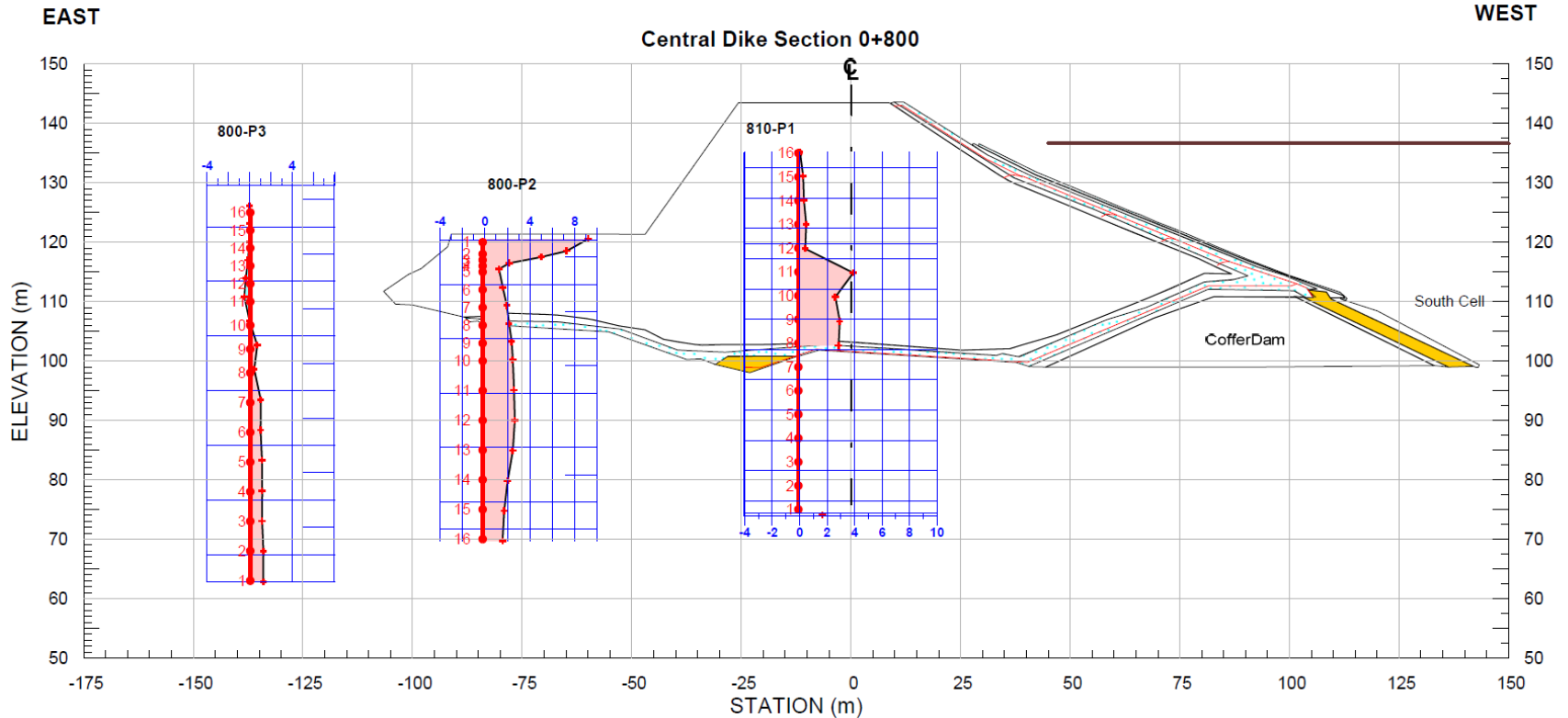


# SECTION 800-810

## THERMISTOR READINGS FROM AUGUST 2016 - 2017

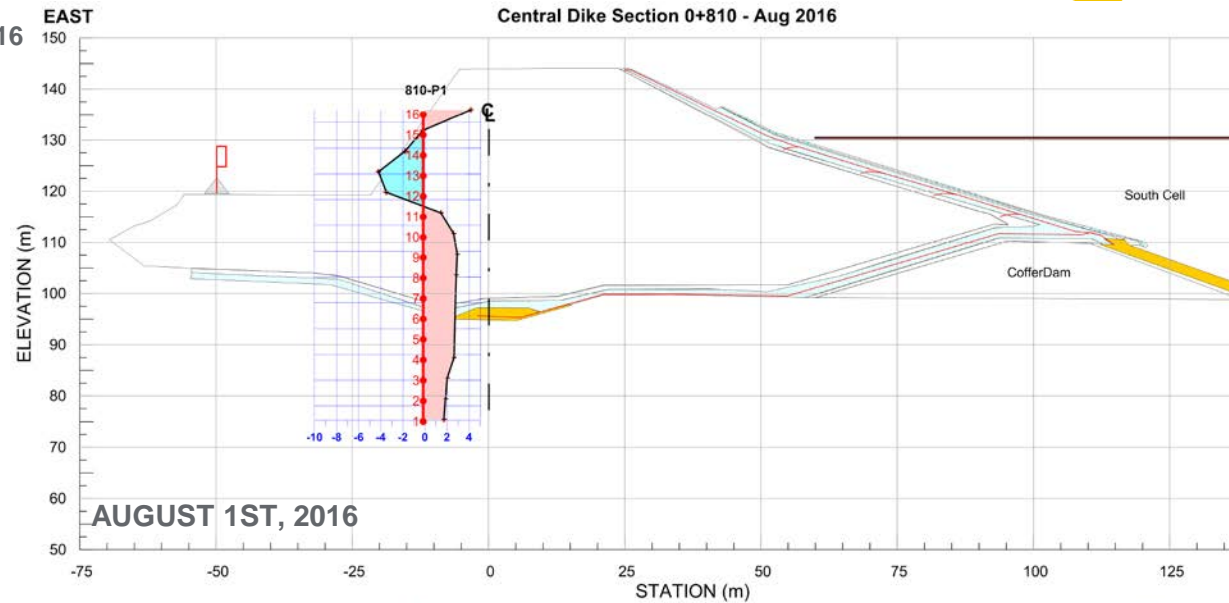
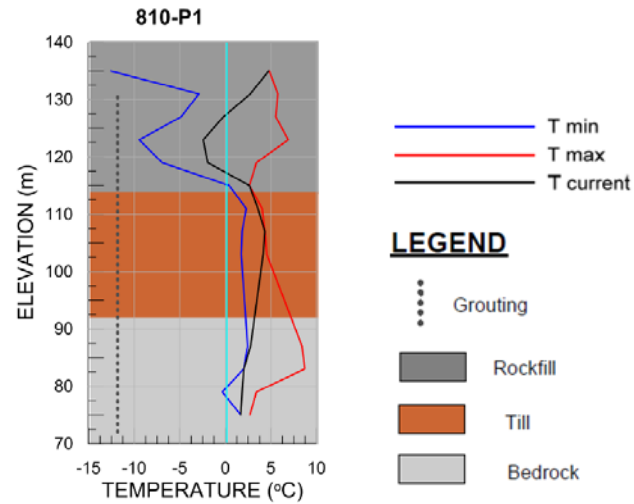


## THERMISTOR READINGS AUGUST 1<sup>ST</sup>, 2017

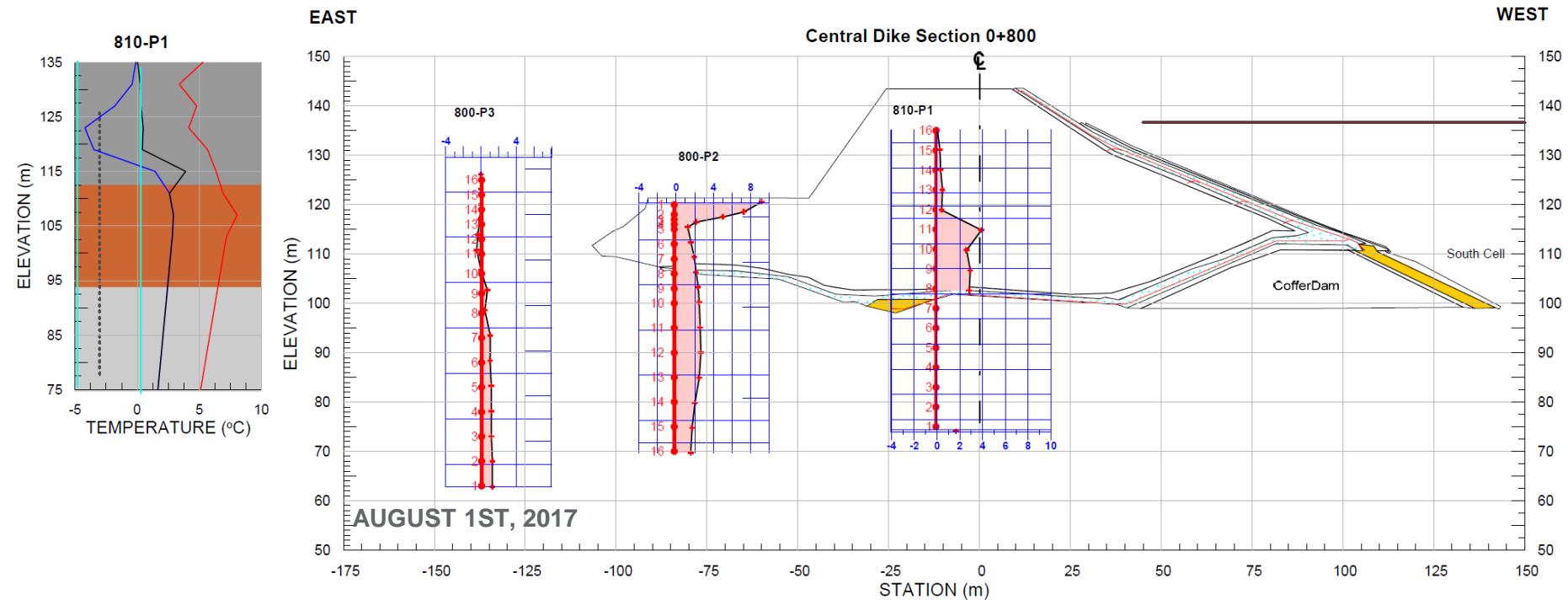


# SECTION 800-810

THERMISTOR READINGS FROM AUGUST 2015 - 2016

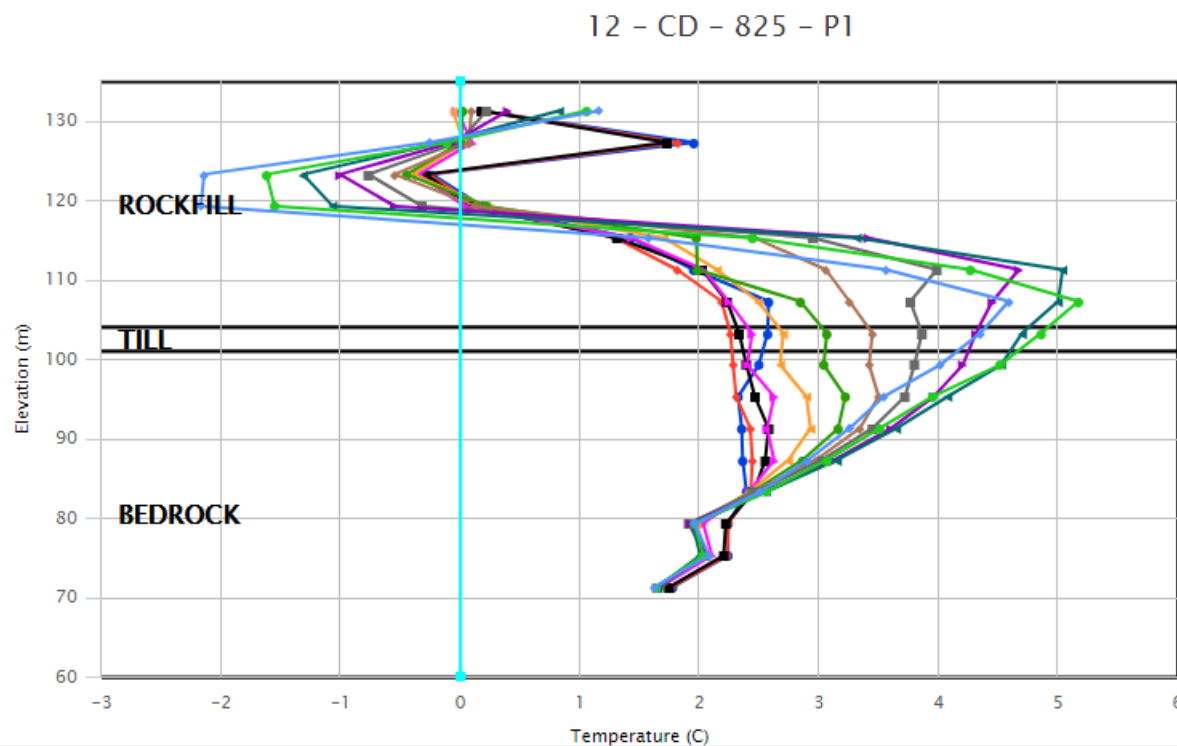
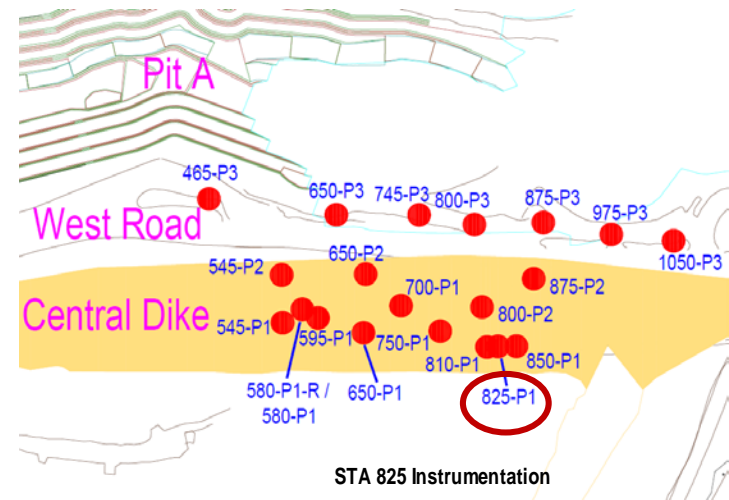


THERMISTOR READINGS FROM AUGUST 2016 - 2017

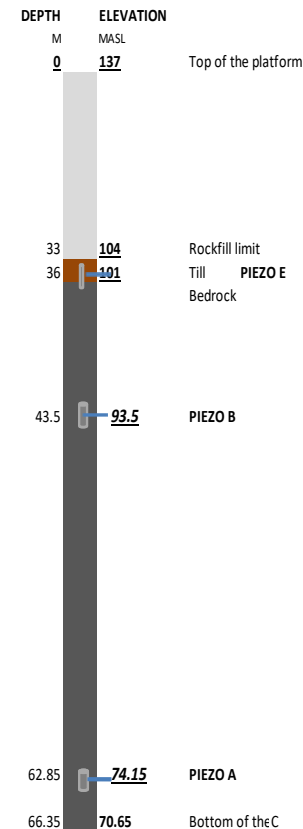


# THERMISTOR 825-P1

- Temperature variation over the year inside the bedrock/till units is higher than in the previous year:
- 2016: [1.5, 3.2]
- 2017: [1.6, 4.5]
- Generally warmer readings recorded over the last year.

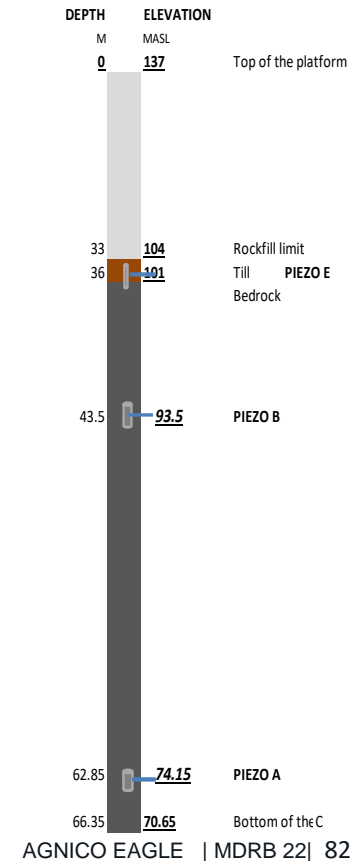
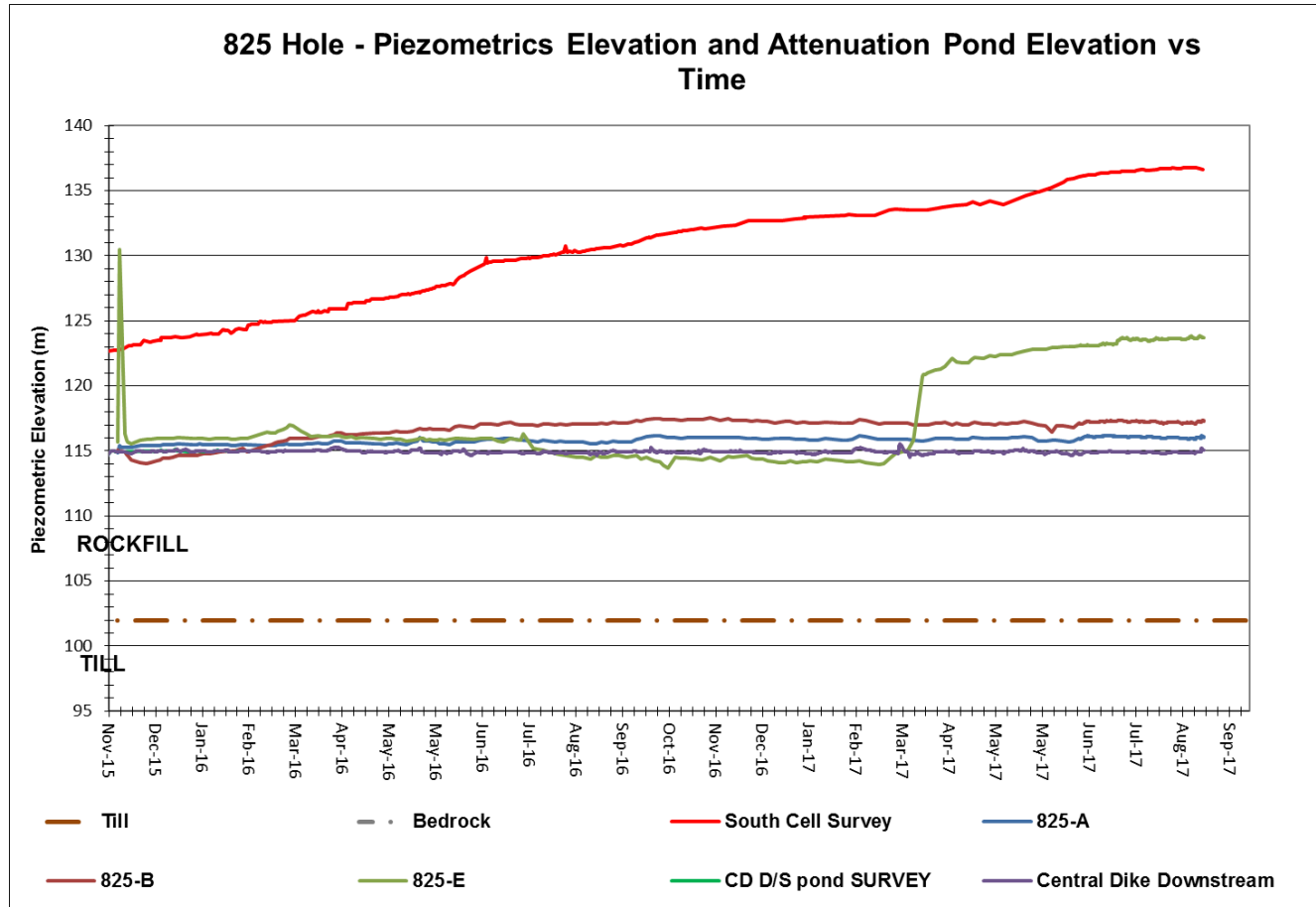
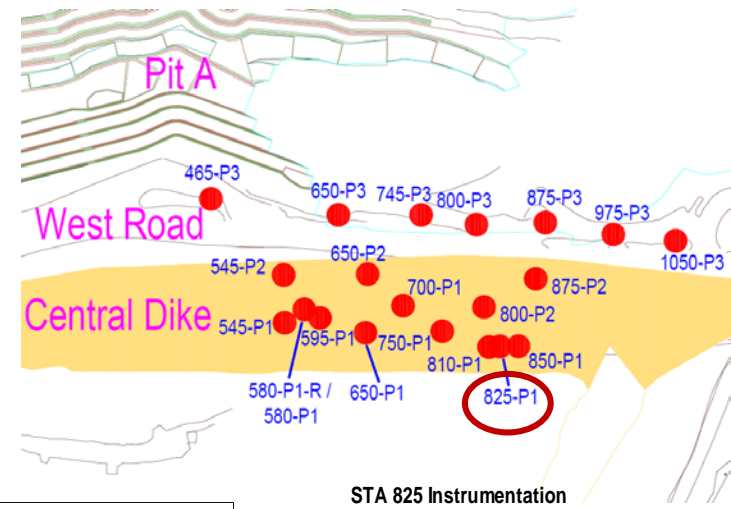


- 2017-09-03 15:00
- 2017-08-04 15:00
- 2017-07-05 15:00
- 2017-06-07 08:15
- 2017-05-08 07:30
- 2017-04-08 07:35
- 2017-03-10 09:45
- 2017-02-09 08:45
- 2017-01-07 16:10
- 2016-12-09 09:40
- 2016-11-11 17:10
- 2016-10-09 08:50
- Limit Profile



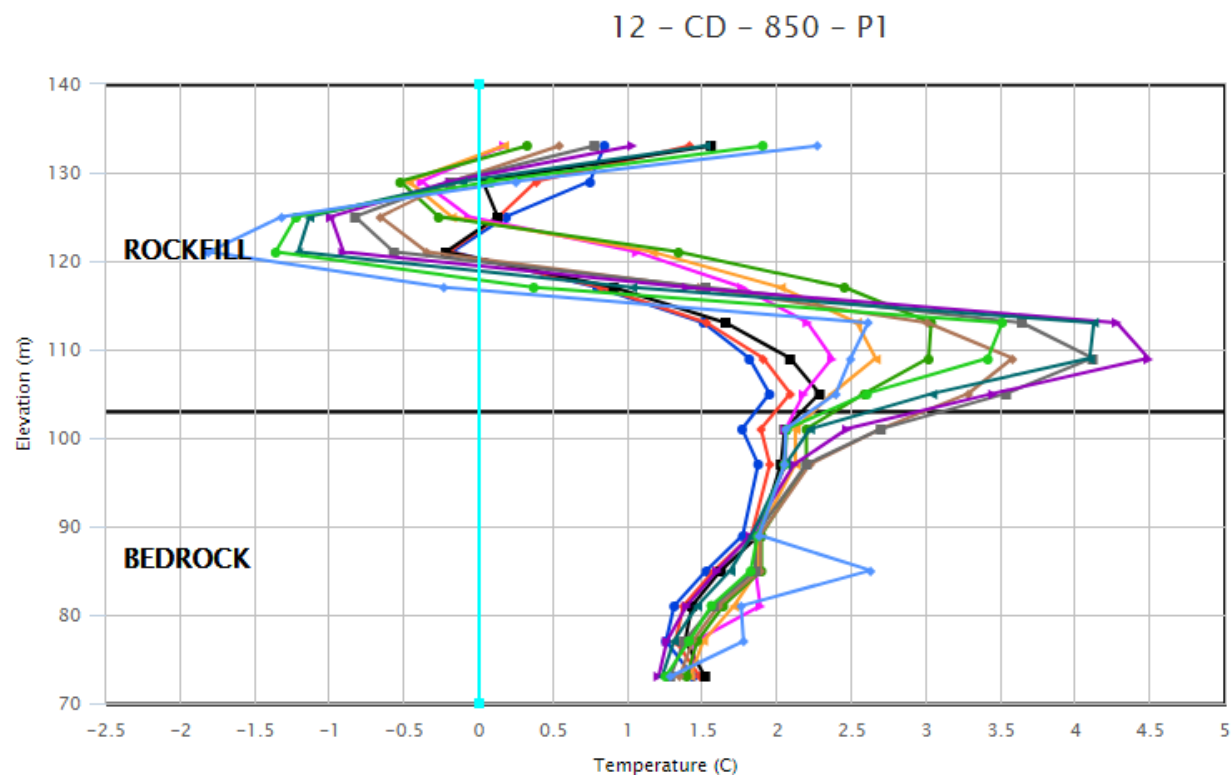
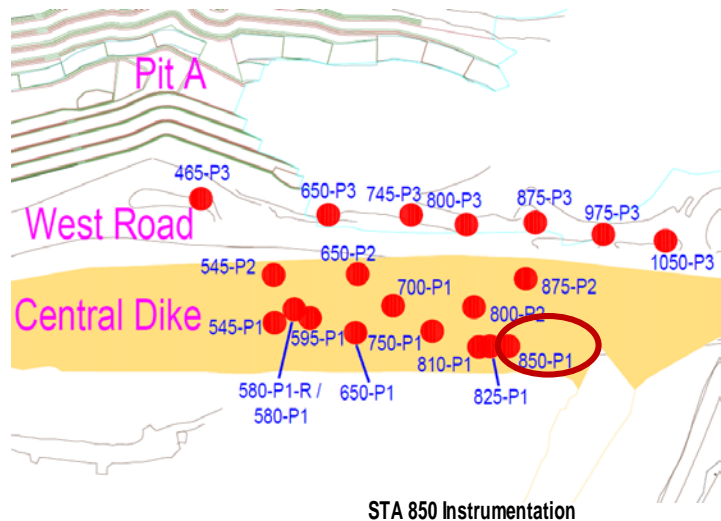
# PIEZOMETER 825-P1

- Increased in piezometric elevation of Piezo E since April 2017. Seem to be connected now with South Cell.
- Piezo A and B showing readings similar to the D/S pond and are reacting directly with elevation change.

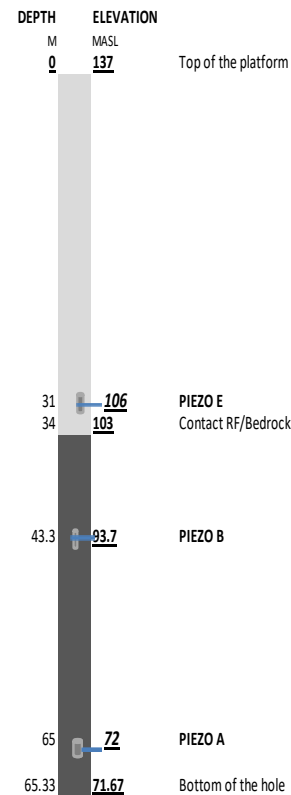


# THERMISTOR 850-P1

- Temperature above 0° C in bedrock at 850-P1
- Similar profile than in 2016

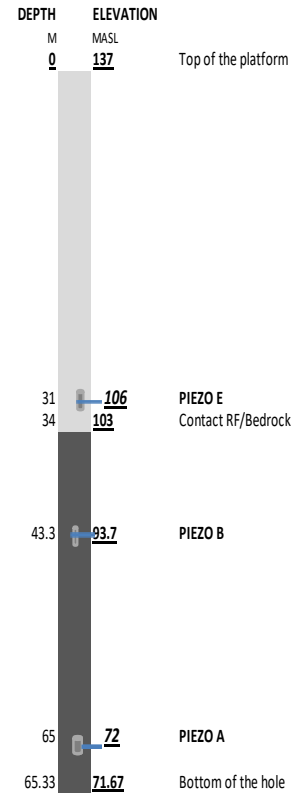
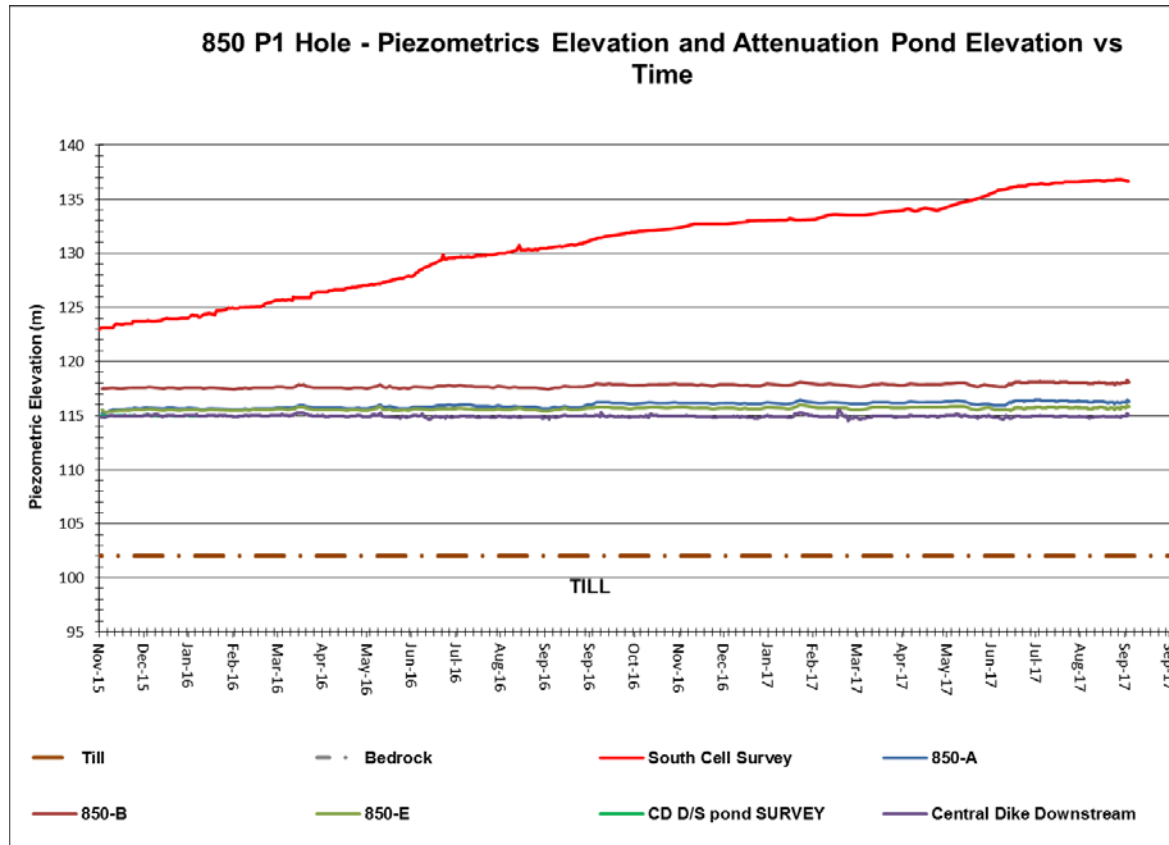
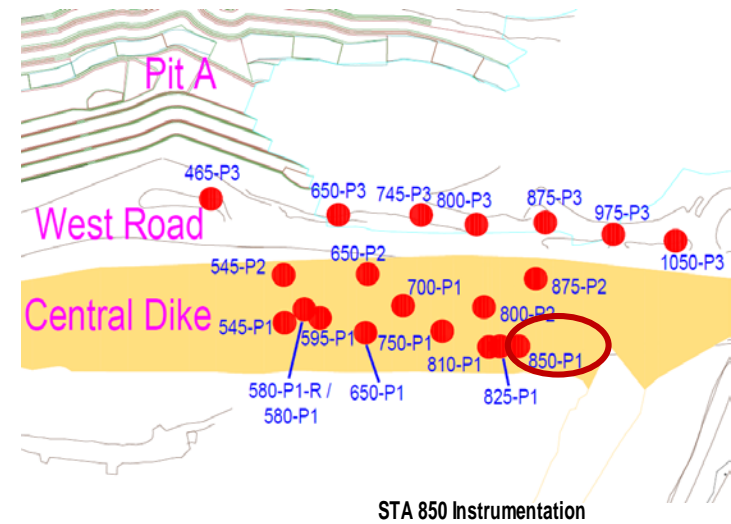


- 2017-09-03 00:00
- 2017-08-04 00:00
- 2017-07-05 00:00
- 2017-06-07 08:30
- 2017-05-08 07:30
- 2017-04-08 07:40
- 2017-03-10 09:45
- 2017-02-09 08:50
- 2017-01-07 16:10
- 2016-12-09 10:00
- 2016-11-11 17:10
- 2016-10-09 08:50
- Limit Profile



# PIEZOMETER 850-P1

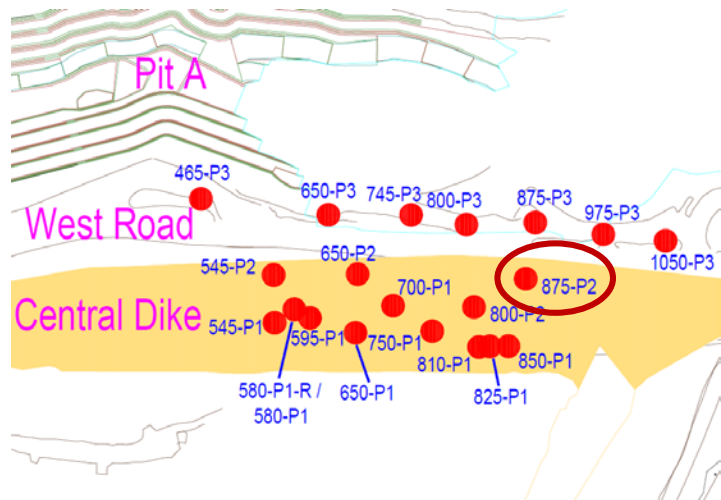
- All piezometer are following the trend of the D/S pond regime
- However piezo B is one of the highest in the piezometer readings that have stable reading (117.5m)





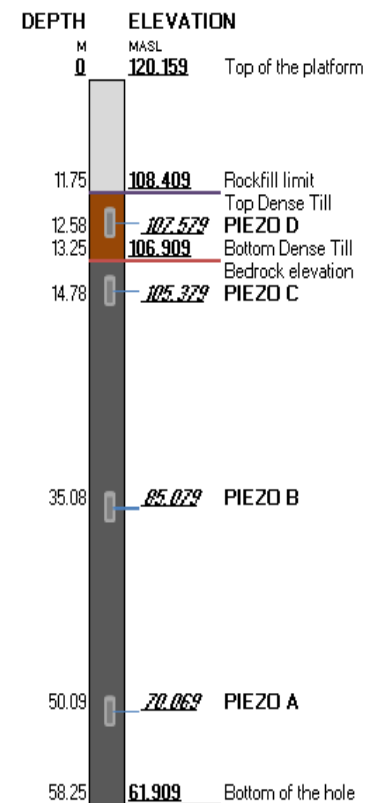
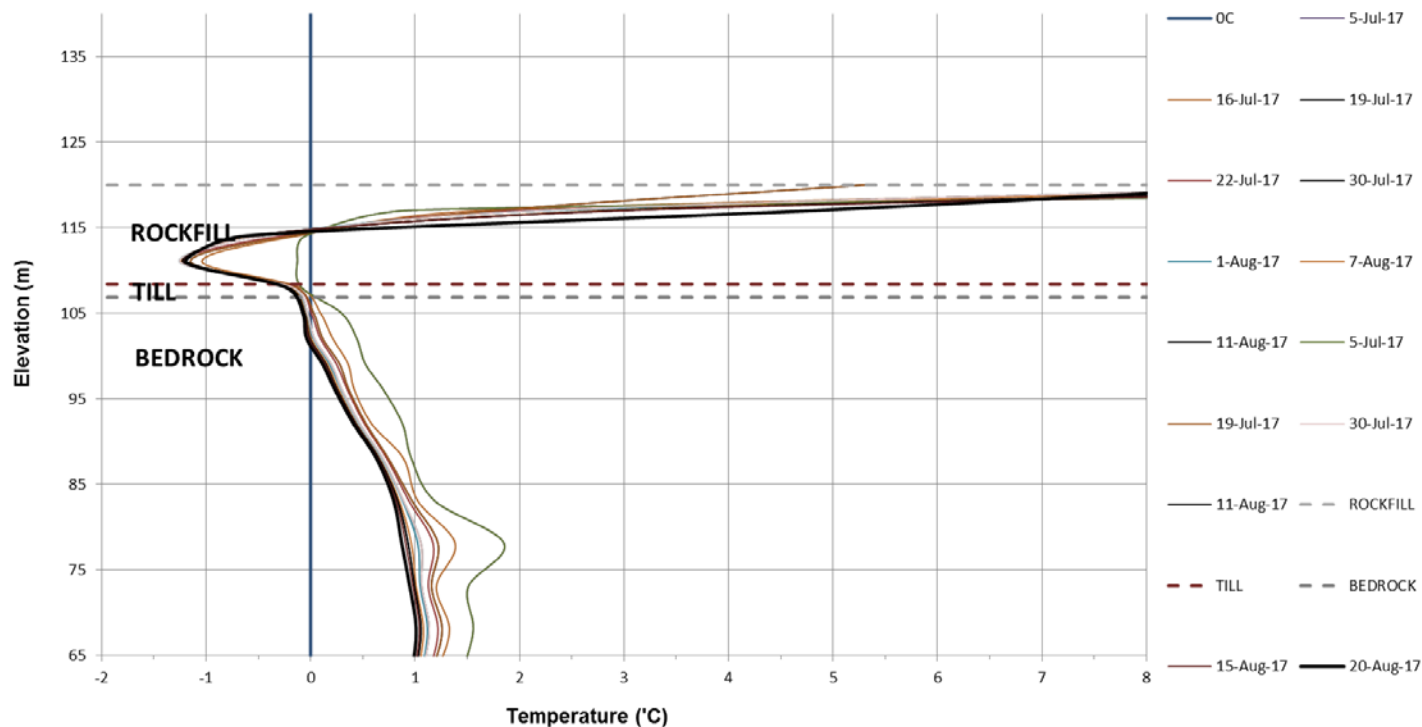
# THERMISTOR 875-P2

- New thermistor installed in 2017
- Stabilisation of temperature ongoing
- Bedrock temperature above 0° C



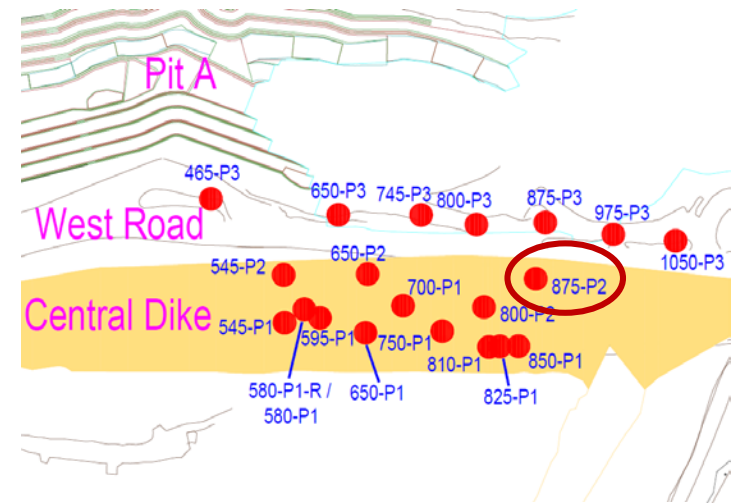
DH 875-P2 Instrumentation

TH-875-P2 Central Dike - Bead Temperature vs. Elevation - 2017

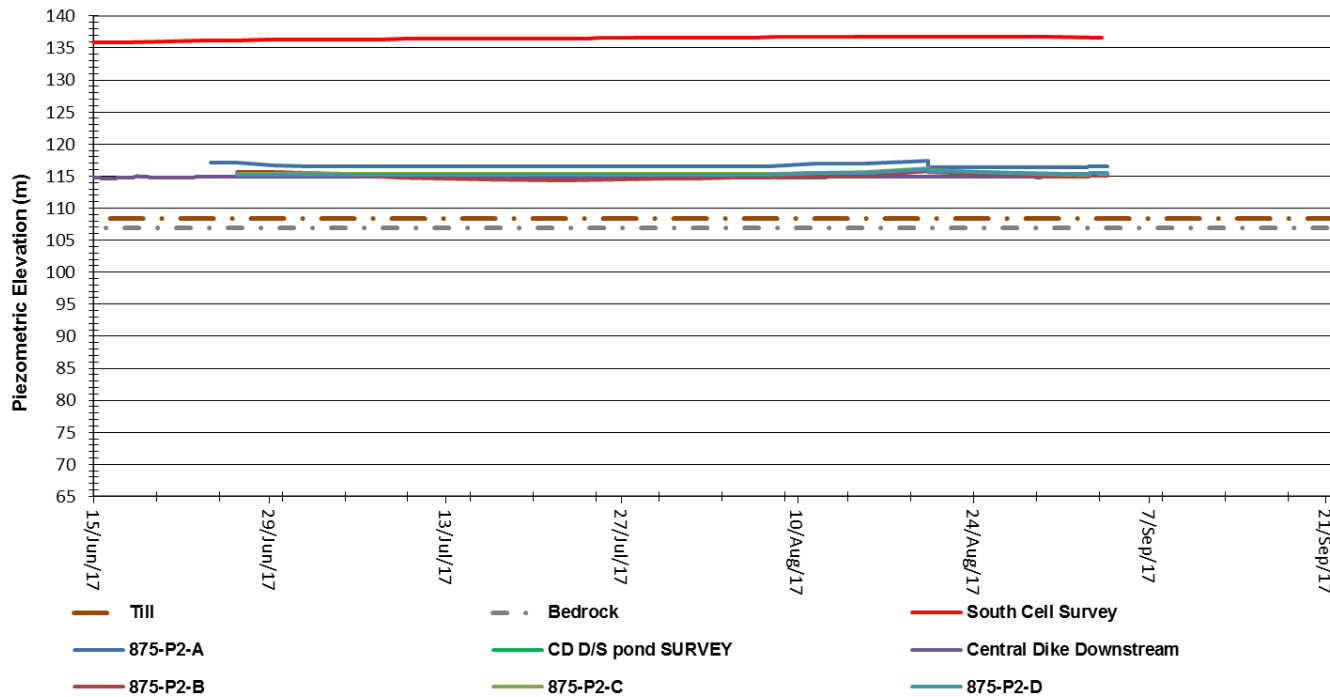


# PIEZOMETER 875-P2

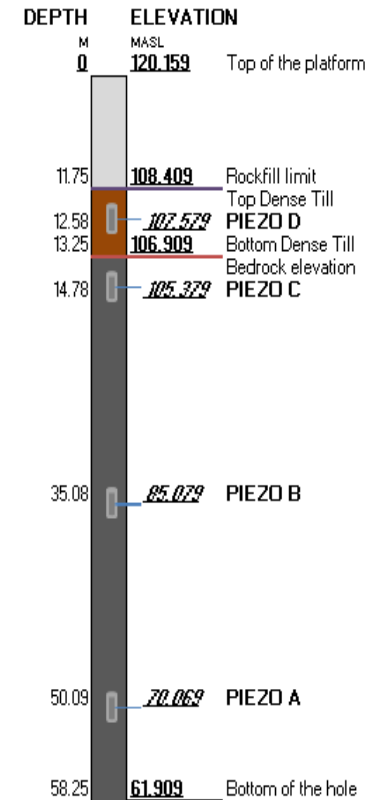
- All piezometer are following the trend of the D/S pond regime
- Small glitch in the data was observed when automatization of the system was completed



**875-P2 Hole - Piezometrics Elevation and Attenuation Pond Elevation vs Time**

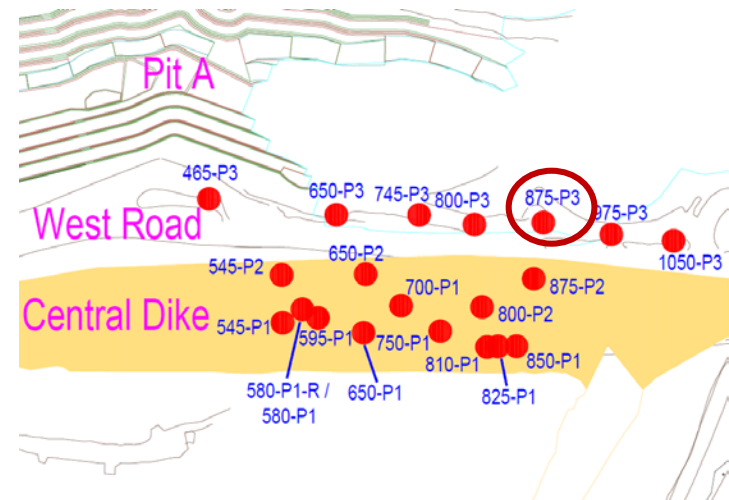


**DH 875-P2 Instrumentation**

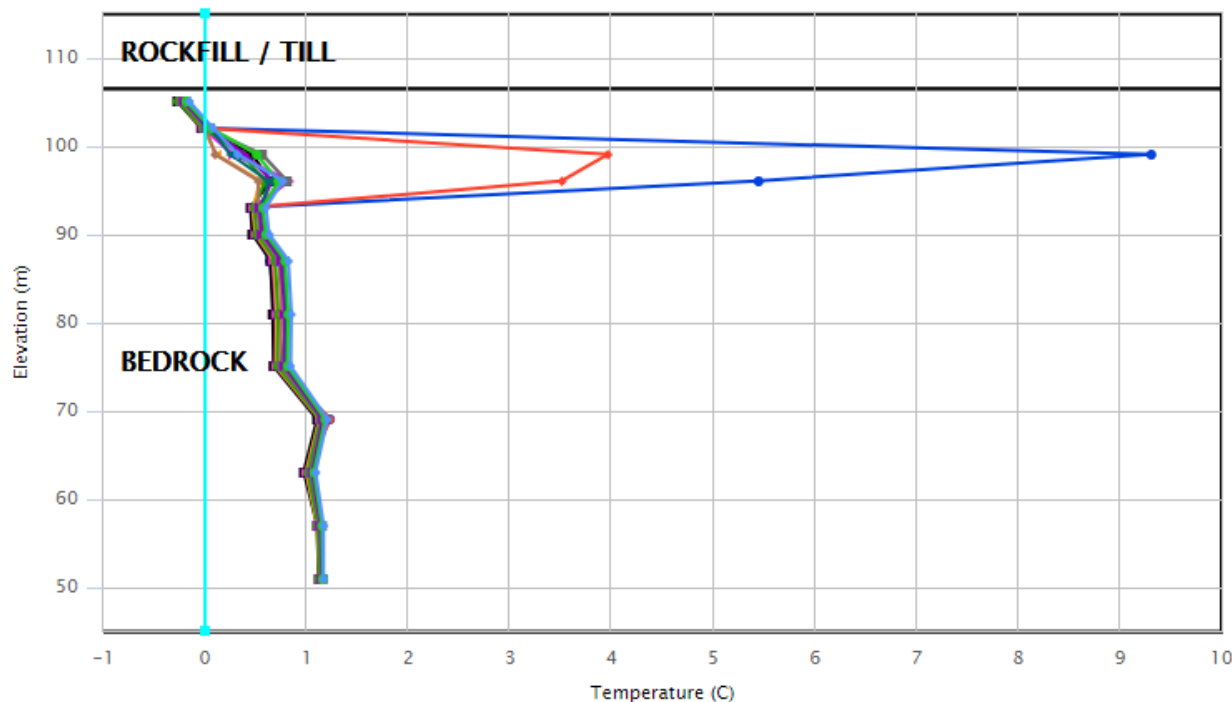


# THERMISTOR 875-P3

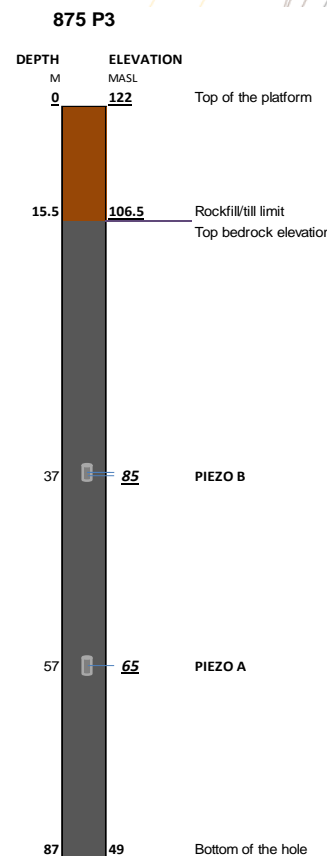
- Temperature above 0° C in bedrock at 875-P3
- Temperature spike at El.96 m and 99 m are related to capacitance effect.



12 - CD - 875 - P3

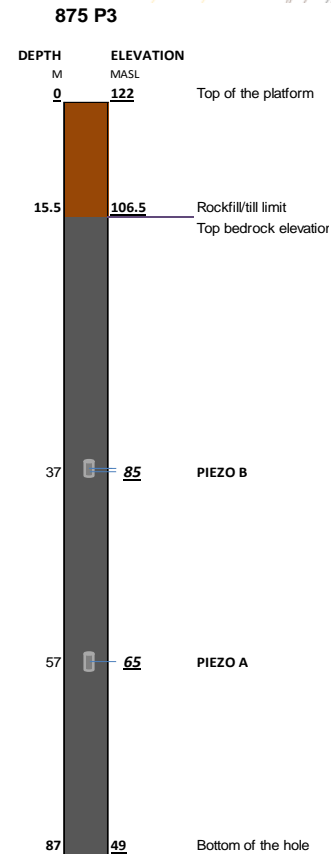
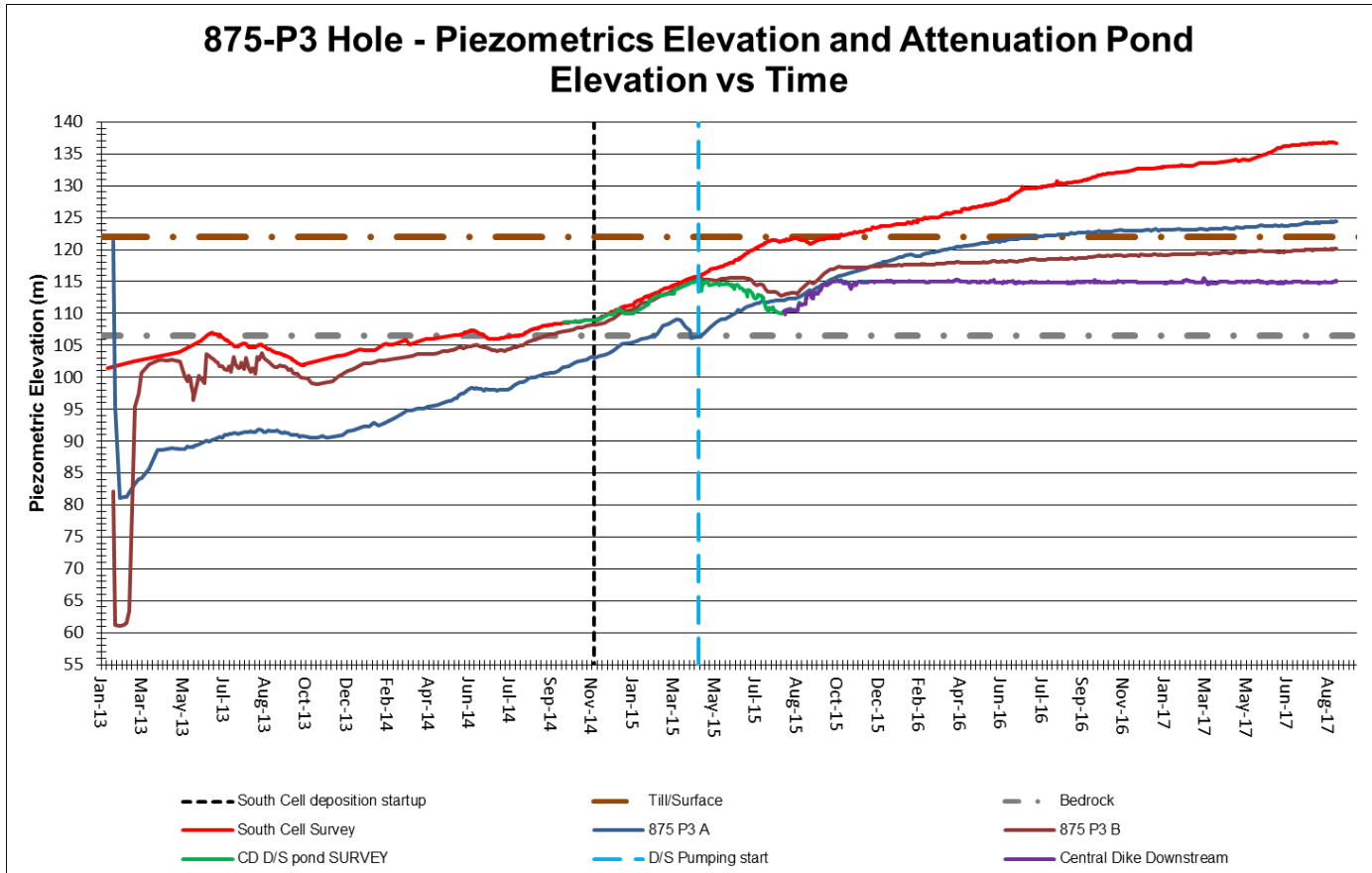
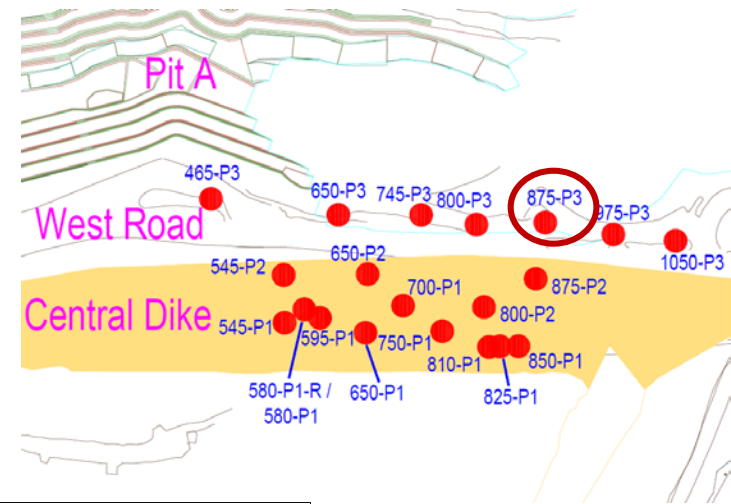


- 2017-09-03 15:00
- 2017-08-04 15:00
- 2017-07-09 08:00
- 2017-06-07 09:15
- 2017-05-08 08:10
- 2017-04-12 09:25
- 2017-03-10 10:45
- 2017-02-20 17:15
- 2017-01-07 15:00
- 2016-12-09 10:40
- 2016-11-12 16:00
- 2016-10-09 09:50
- Limit Profile



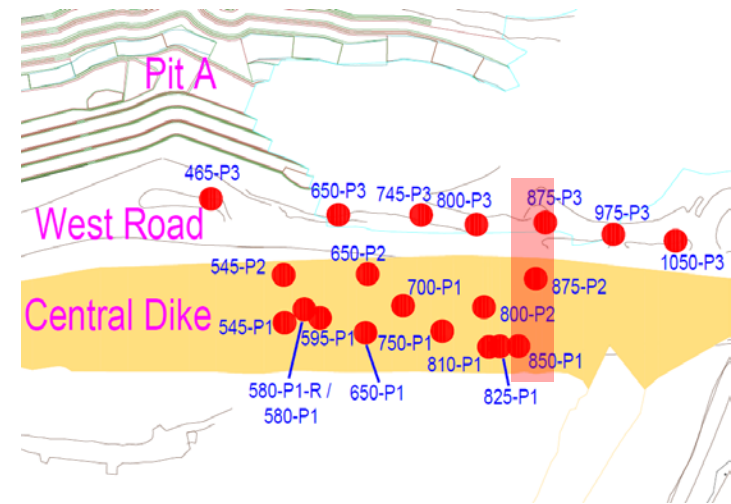
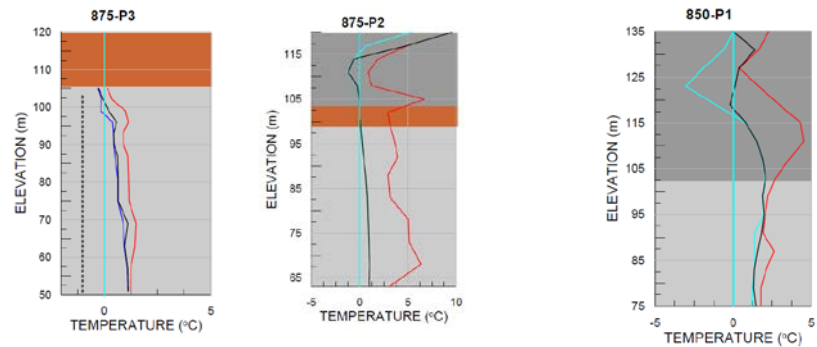
# PIEZOMETER 875-P3

- ➔ Piezometer at 875-P3 are in bedrock and are impacted by increase in South Cell head

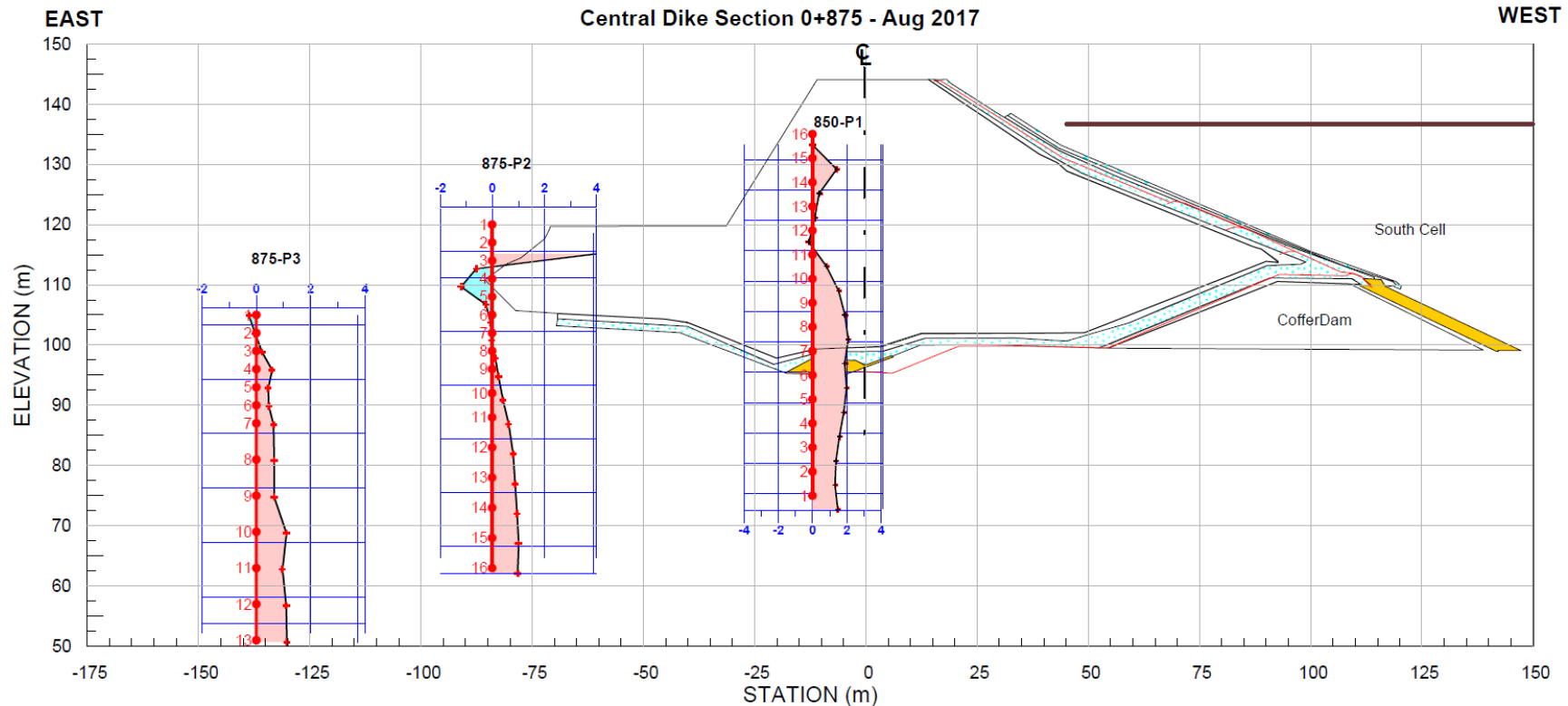


# SECTION 850-875

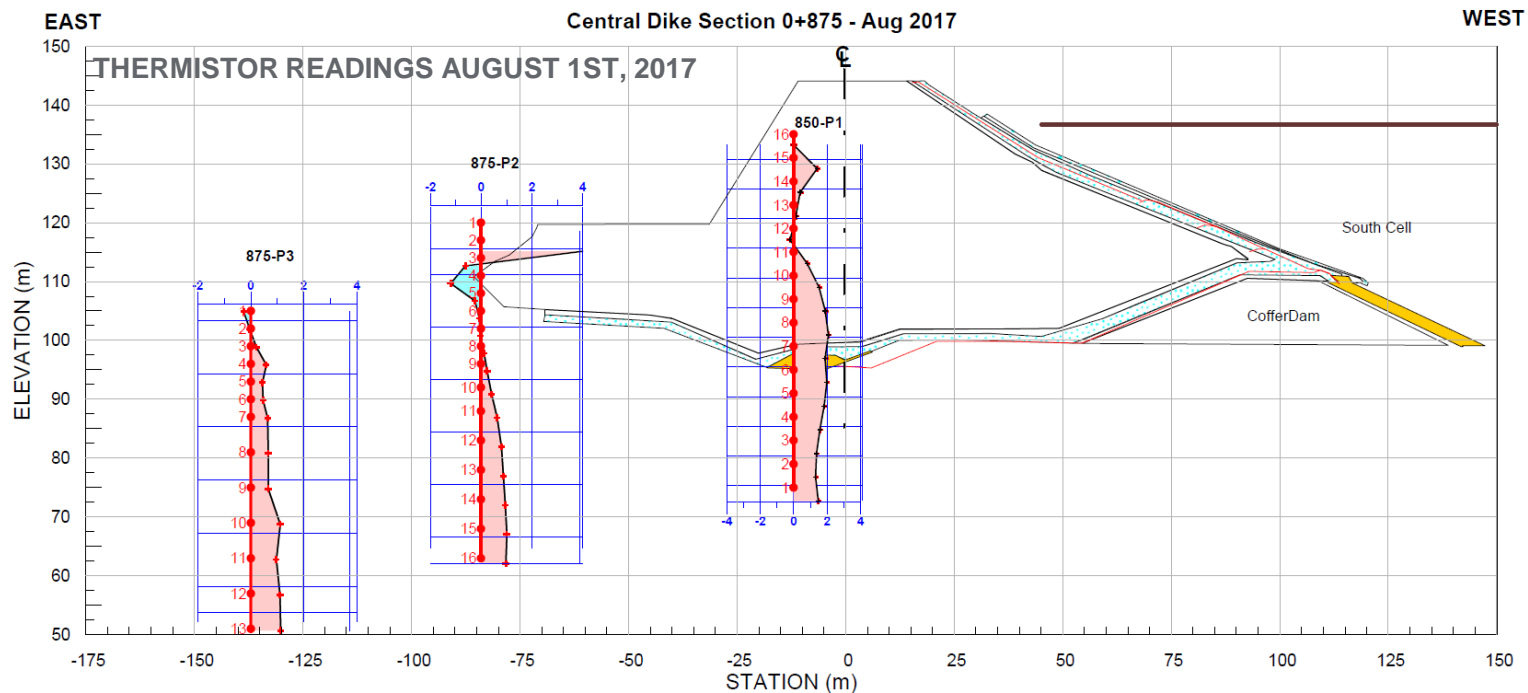
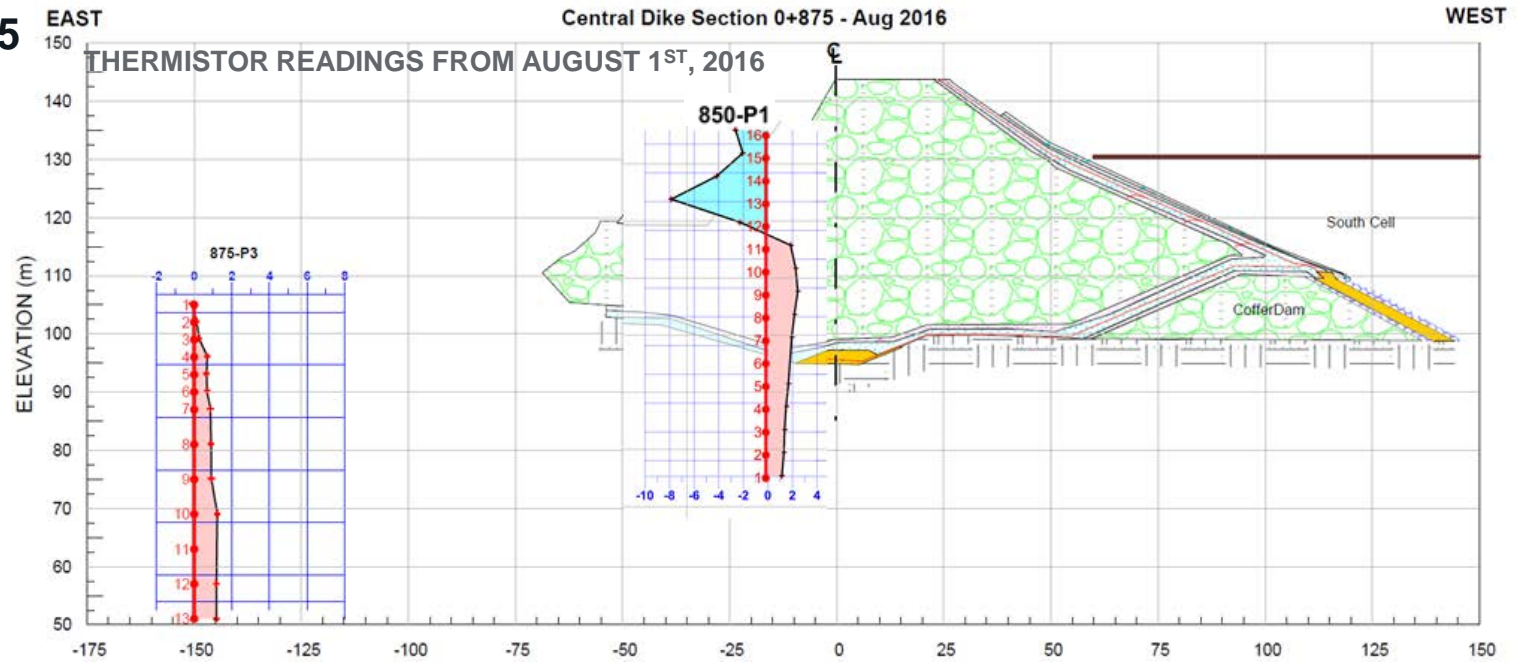
## THERMISTOR READINGS FROM AUGUST 2016 - 2017



## THERMISTOR READINGS AUGUST 1<sup>ST</sup>, 2017

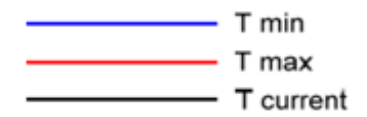
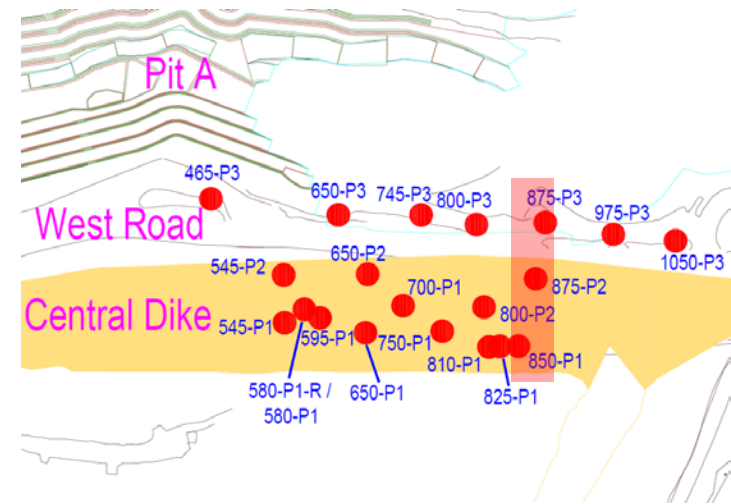
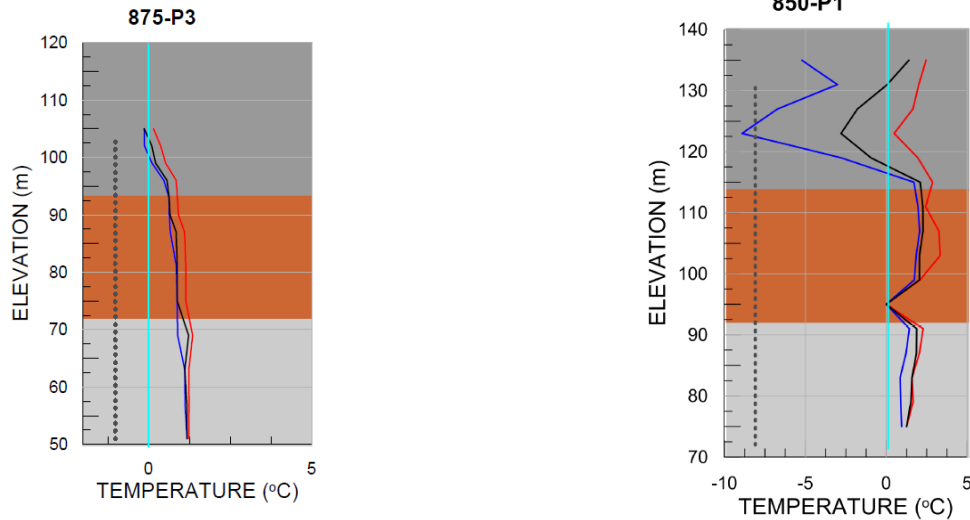


SECTION 850-875

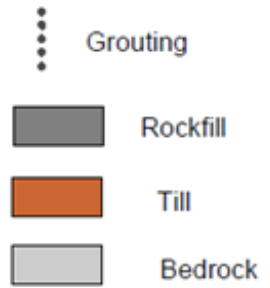


# SECTION 850-875

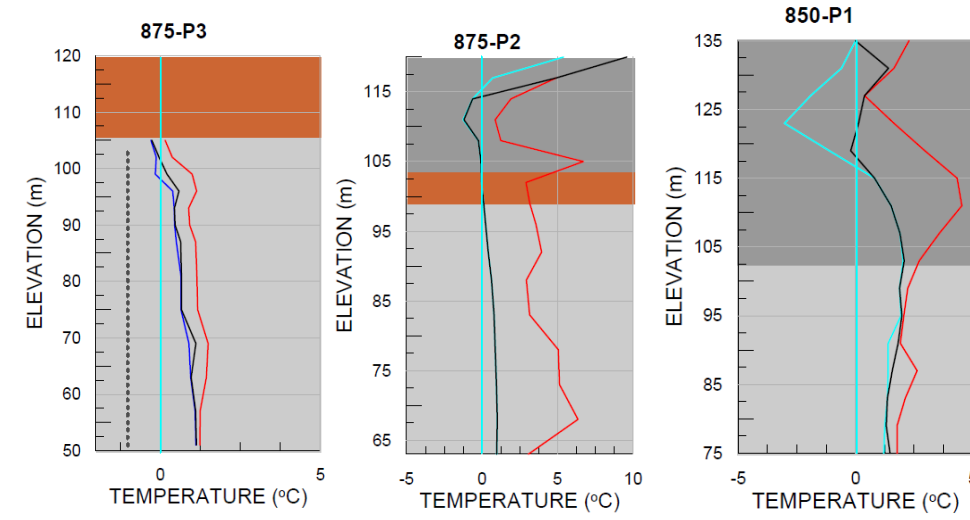
## THERMISTOR READINGS AUGUST 2015-2016



### LEGEND



## THERMISTOR READINGS AUGUST 2016-2017

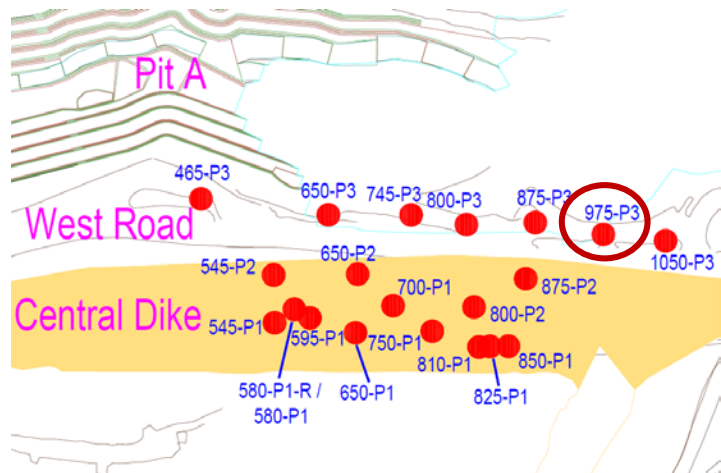


2017 graph are showing the good representation of the bedrock/till/rockfill units



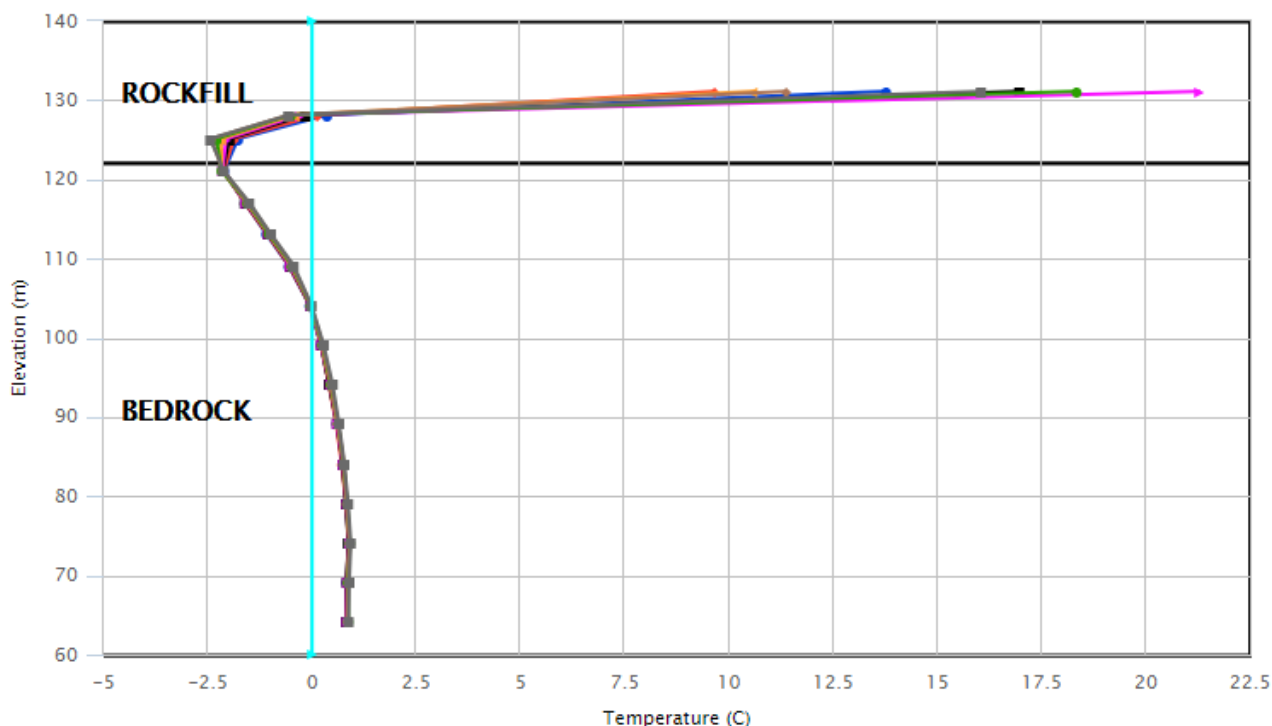
# THERMISTOR 975-P3

- New instrument installed in 2017
- Stabilization of the thermistor mostly done
- Temperature above 0° C in bedrock below El. 105 m

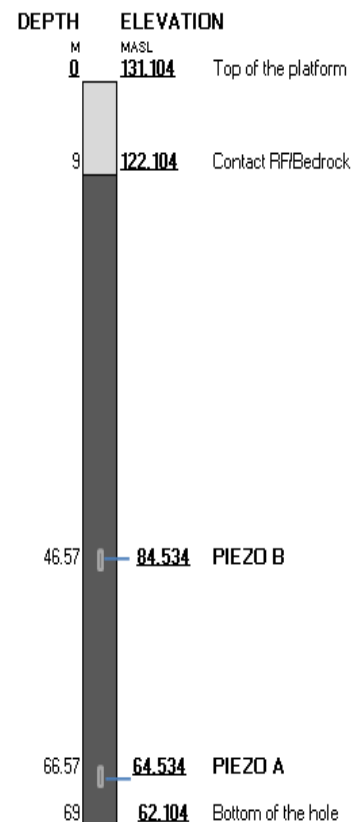


DH 975-P3 Instrumentation

12 - CD - 975 - P3

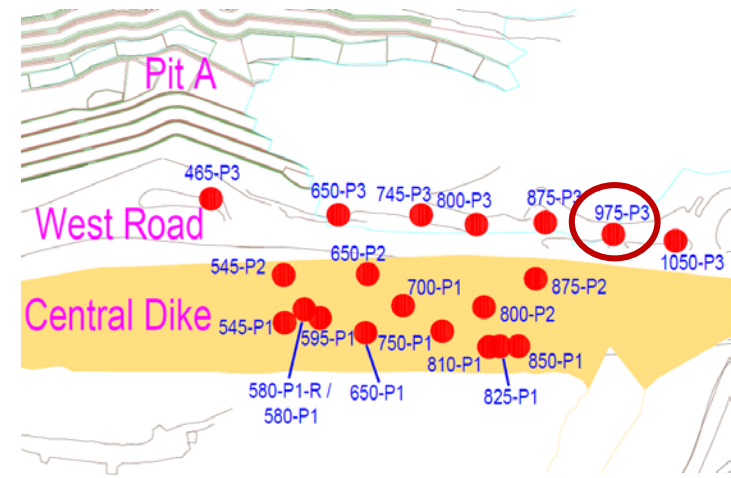


- 2017-09-03 15:00
- 2017-08-27 15:00
- 2017-08-20 15:00
- 2017-08-13 15:00
- 2017-08-06 15:00
- 2017-07-30 15:00
- 2017-07-23 15:00
- 2017-07-22 09:00
- Limit Profile

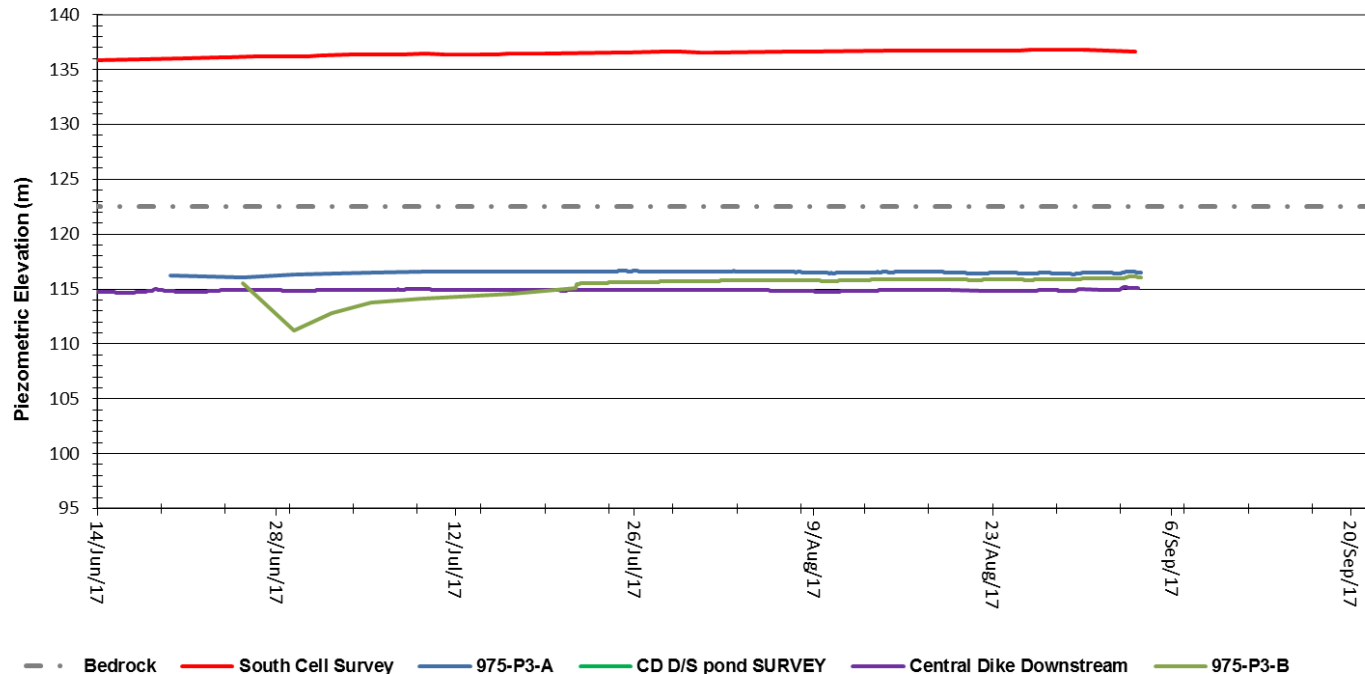


# PIEZOMETER 975-P3

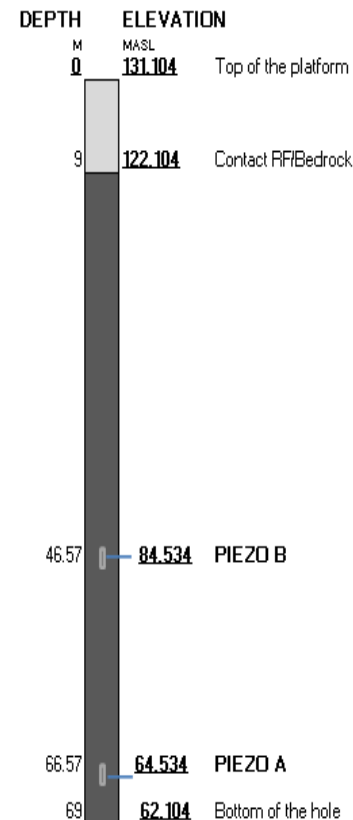
- New instrument installed in 2017
- All piezometer are following the trend of the D/S pond regime



**975-P3 Hole - Piezometrics Elevation and Attenuation Pond Elevation vs Time**

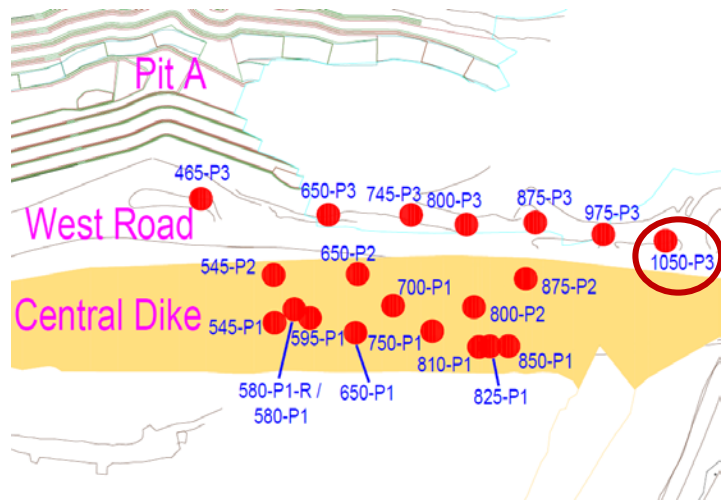


**DH 975-P3 Instrumentation**

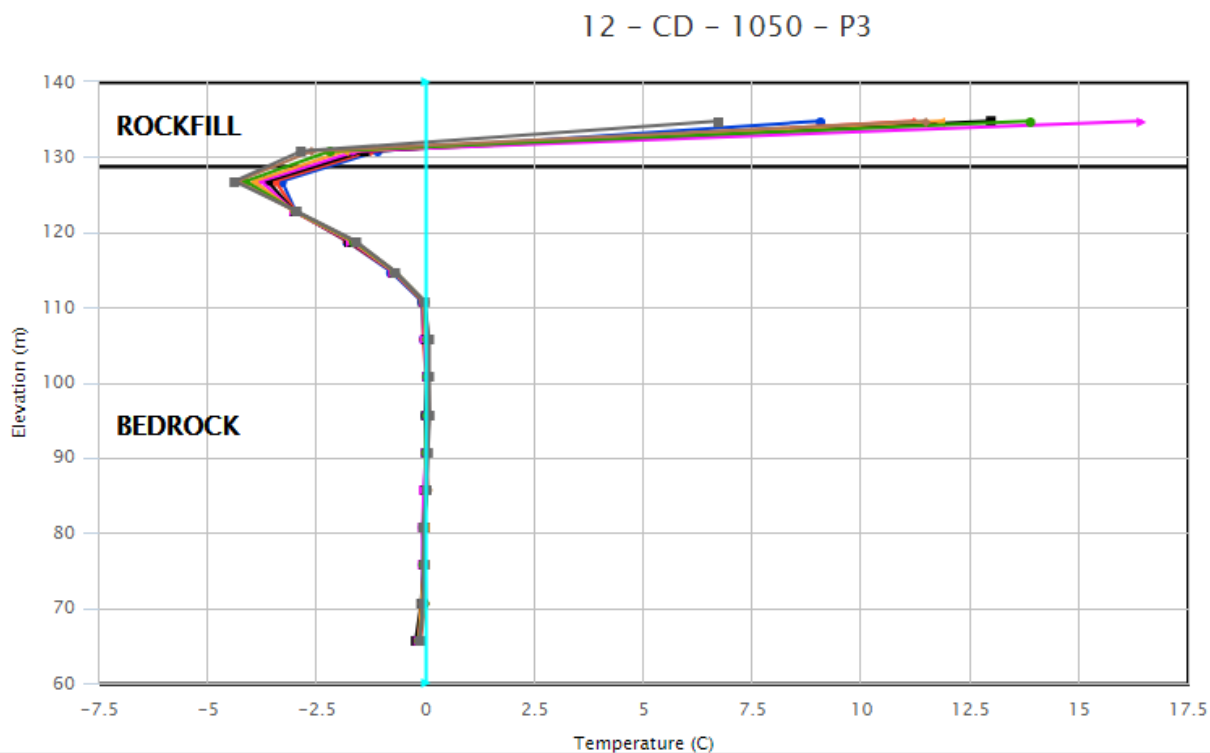


# THERMISTOR 1050-P3

➡ Temperature at 0° C in bedrock



DH 1050-P3 Instrumentation

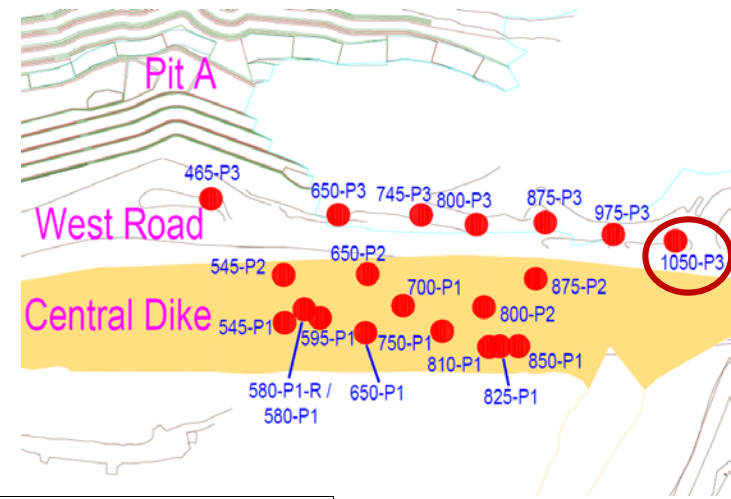


- 2017-09-03 18:00
- 2017-08-27 18:00
- 2017-08-20 18:00
- 2017-08-13 18:00
- 2017-08-06 18:00
- 2017-07-30 18:00
- 2017-07-23 18:00
- 2017-07-20 15:00
- Limit Profile

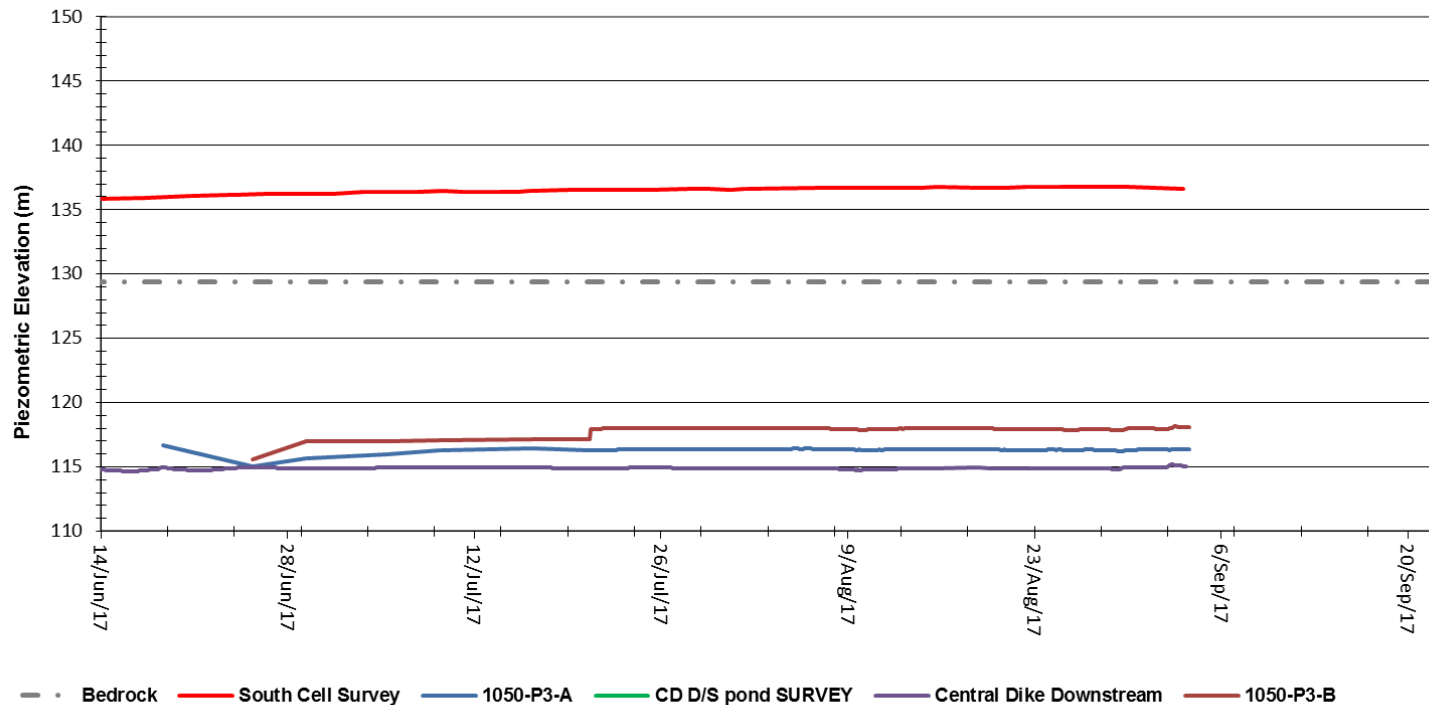
DEPTH M	ELEVATION MASL	
0	134.4	Top of the platform
5.588	128.812	Contact RFB/Bedrock
48.028	86.372	PIEZO B
68.028	66.372	PIEZO A
79.588	54.812	Bottom of the hole

# PIEZOMETER 1050-P3

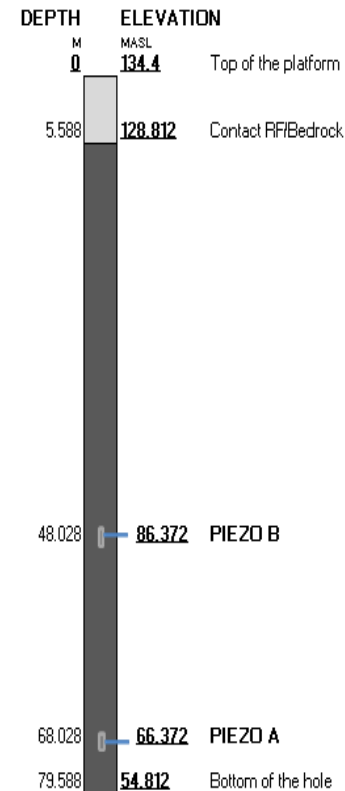
- Piezometers temperature just below the freezing point
- Piezometers are following the trend of the D/S pond elevation.



**1050-P3 Hole - Piezometrics Elevation and Attenuation Pond Elevation vs Time**

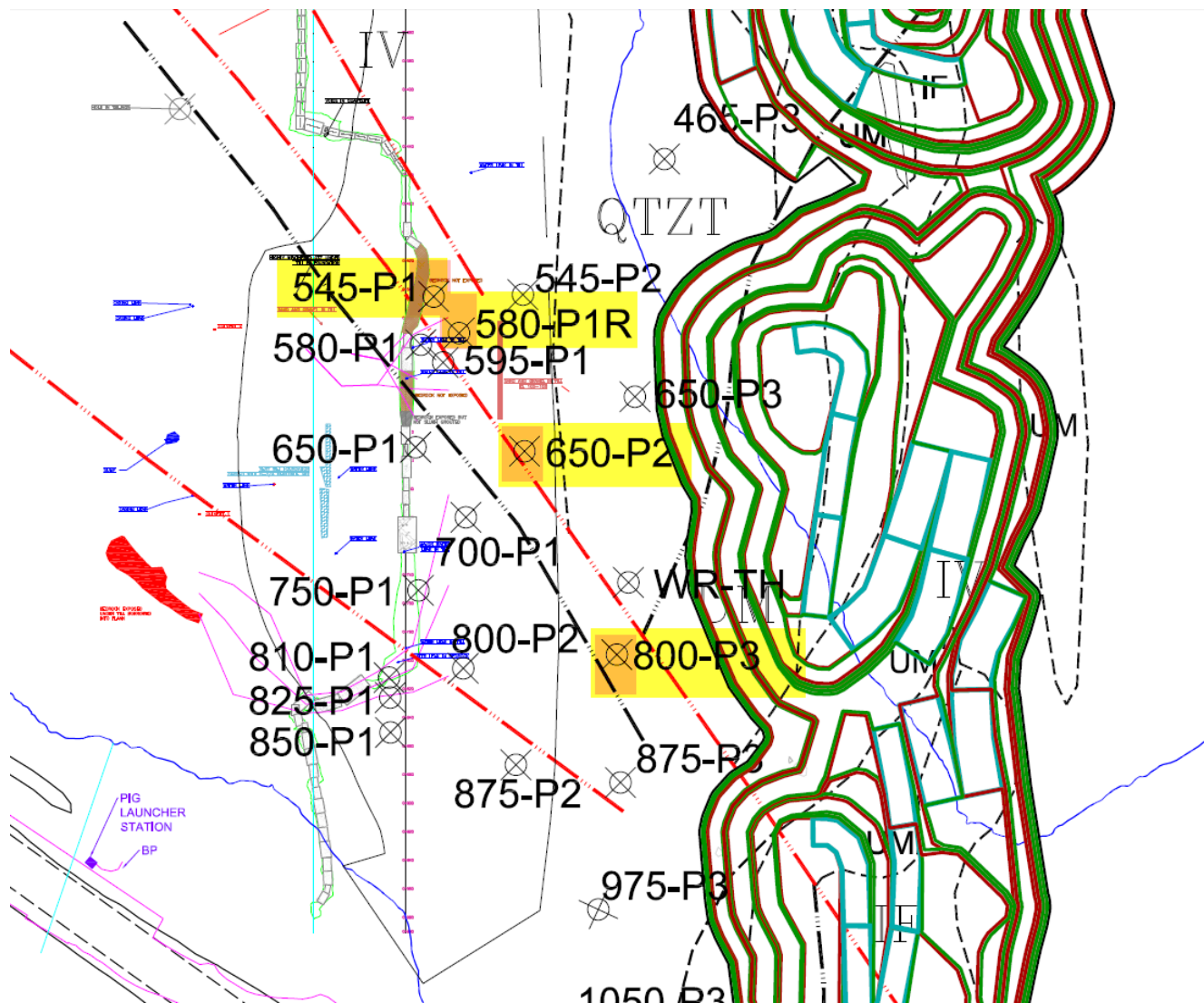


**DH 1050-P3 Instrumentation**



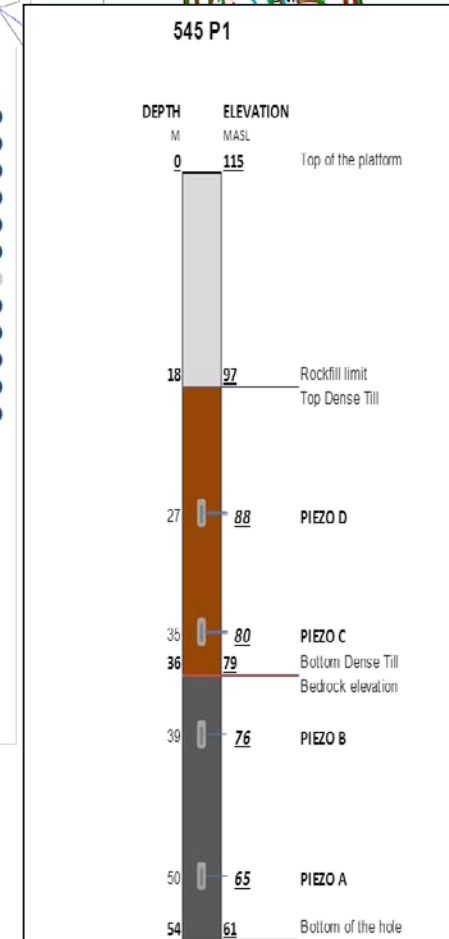
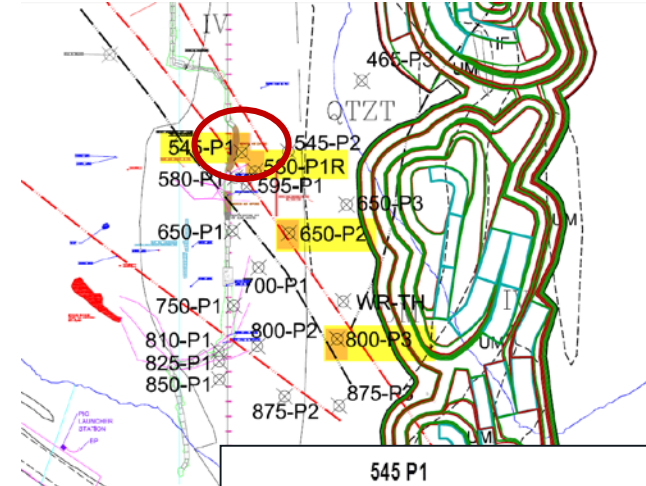
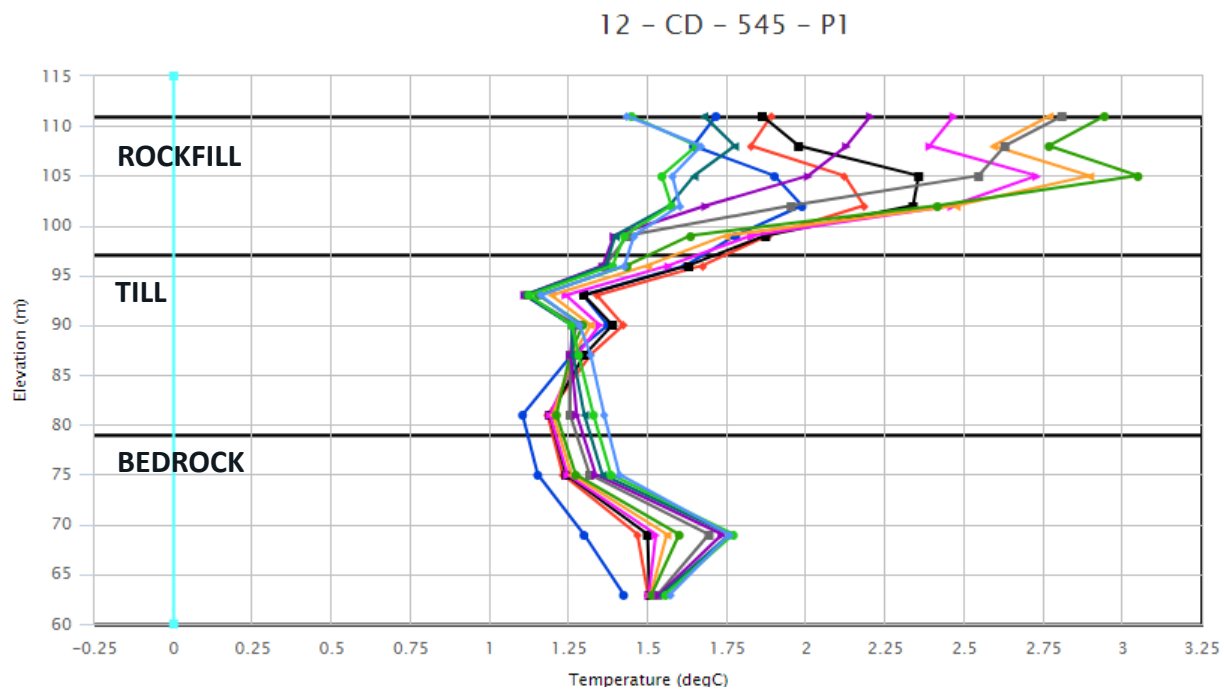
# SECTION 1

## 2<sup>ND</sup> PORTAGE FAULT – FIRST ANOMALIE



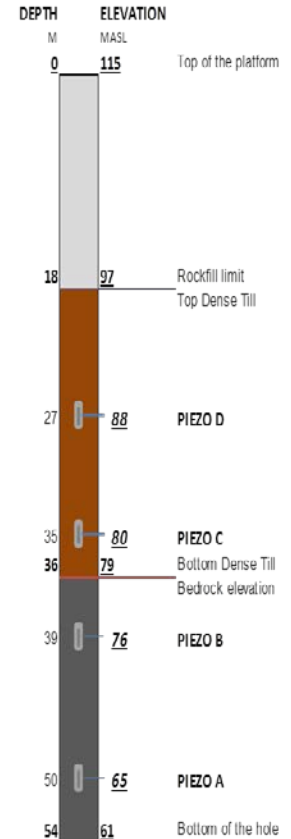
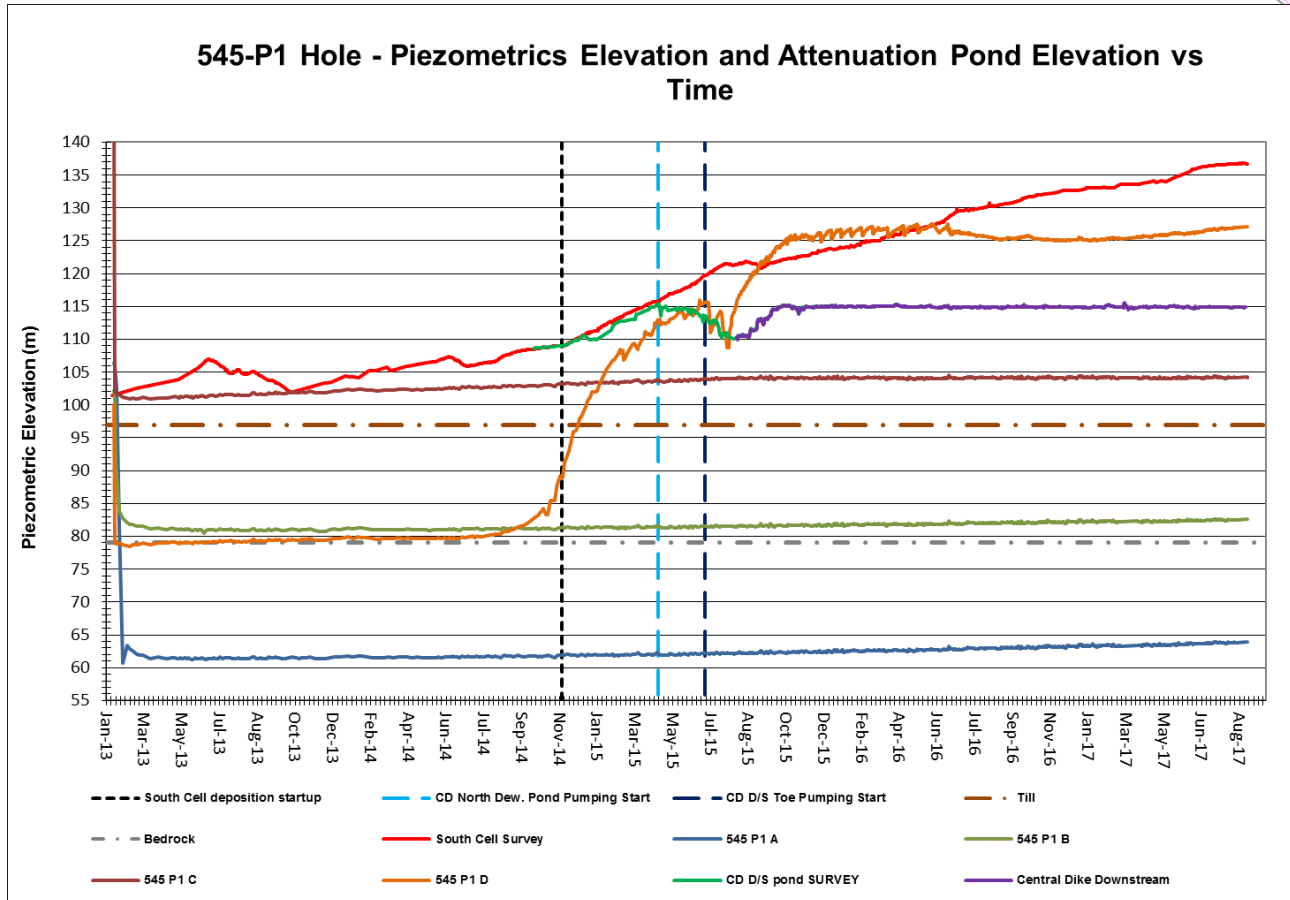
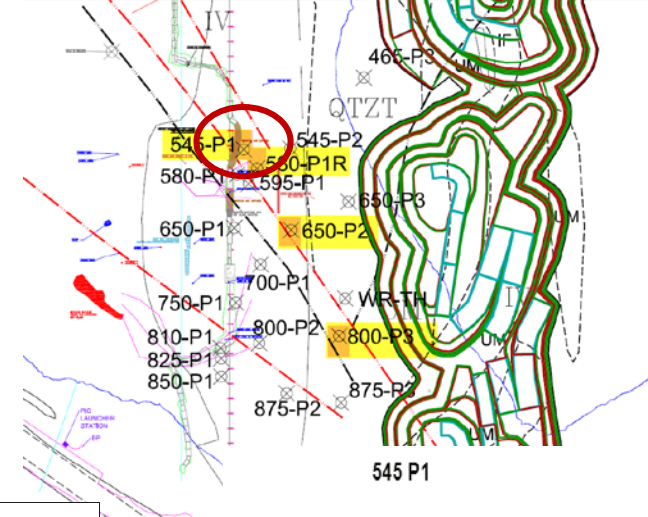
# THERMISTOR 545-P1

- 545-P1 thermistor is showing the same temperature profile than last year. Warmer peak observed at elevation 70m since the installation.
- Temperature in the bedrock/till unit is in between 1.1 and 1.75° C.



# PIEZOMETER 545-P1

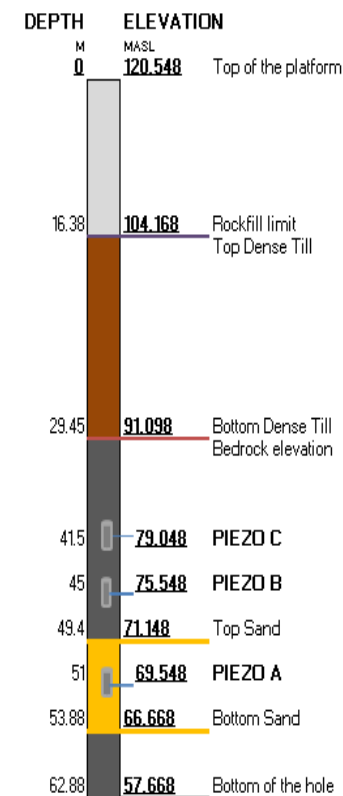
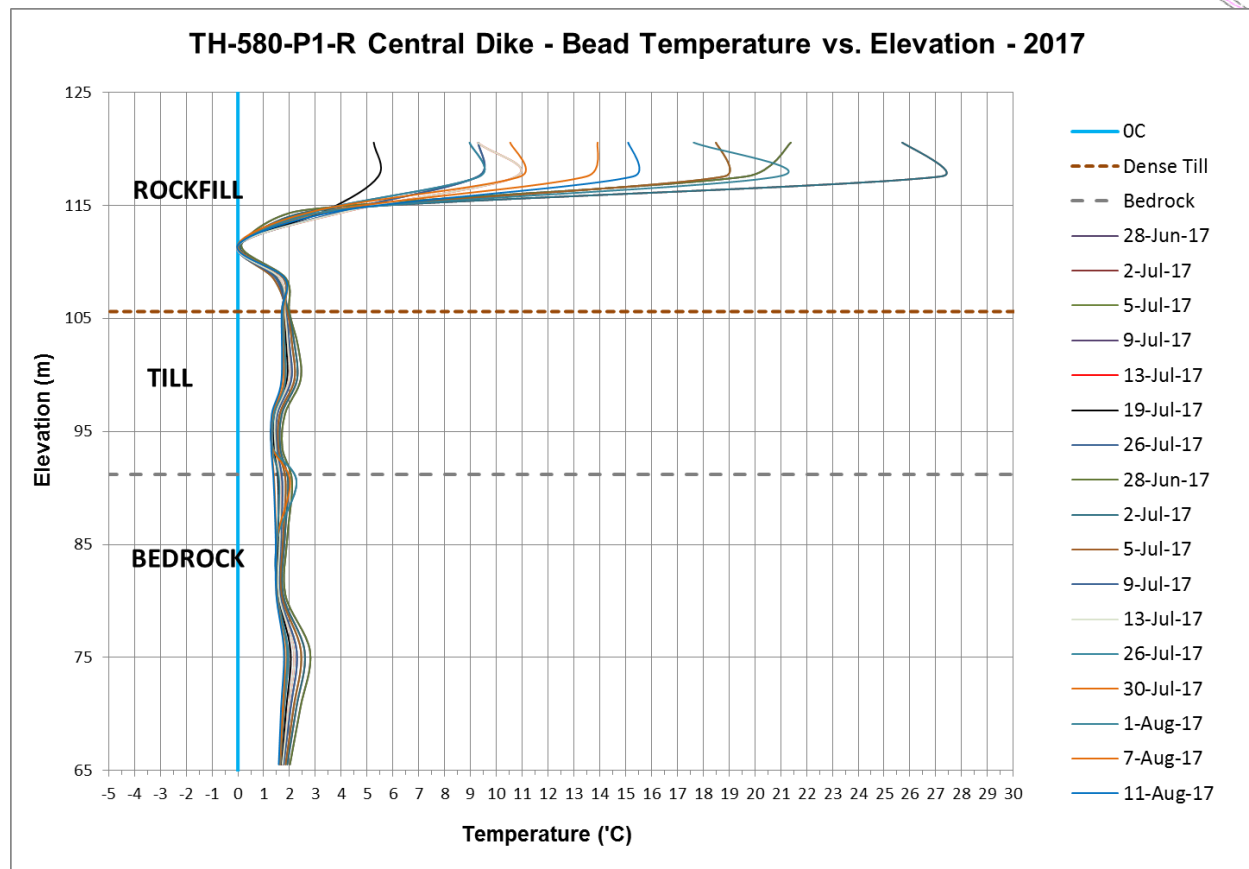
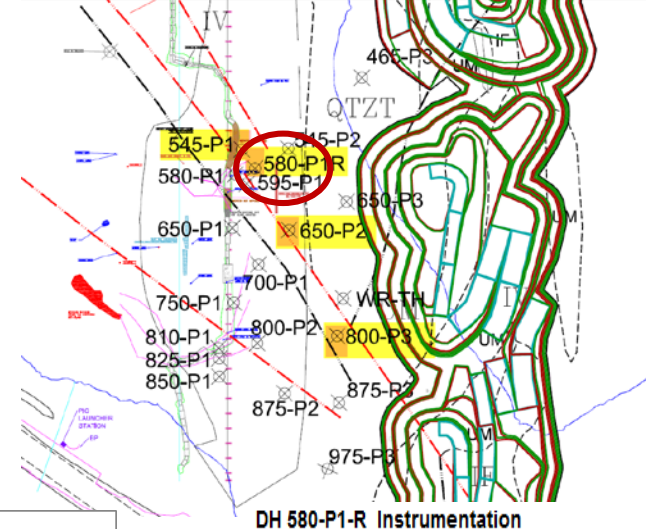
- Piezometer D still constant, no change since August 2015
- Piezometer A is recording suction since its installation
- Identification of the piezo on the field is confusing. Interpretation of the readings must be done with precaution.





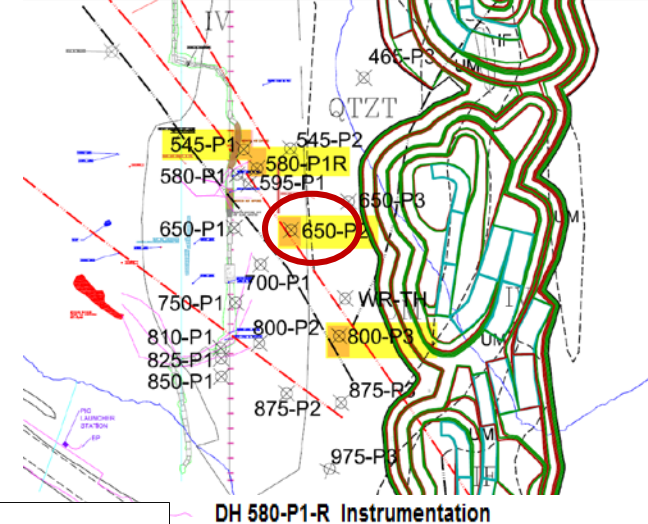
# THERMISTOR 580-P1R

- Stabilisation in progress
- Temperature readings above 0°C
- Similar temperature readings range than 580-P1



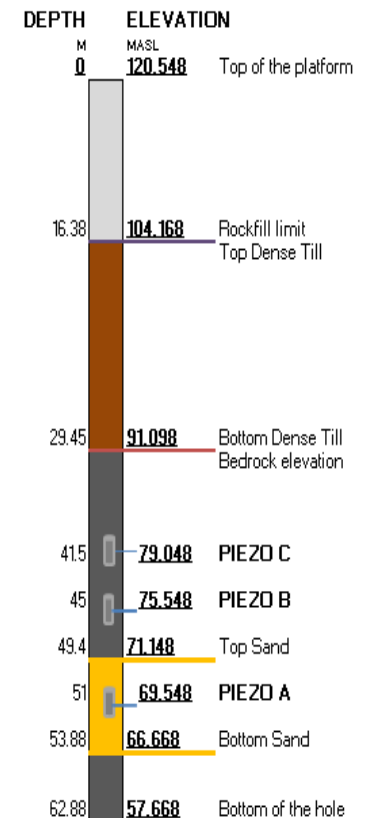
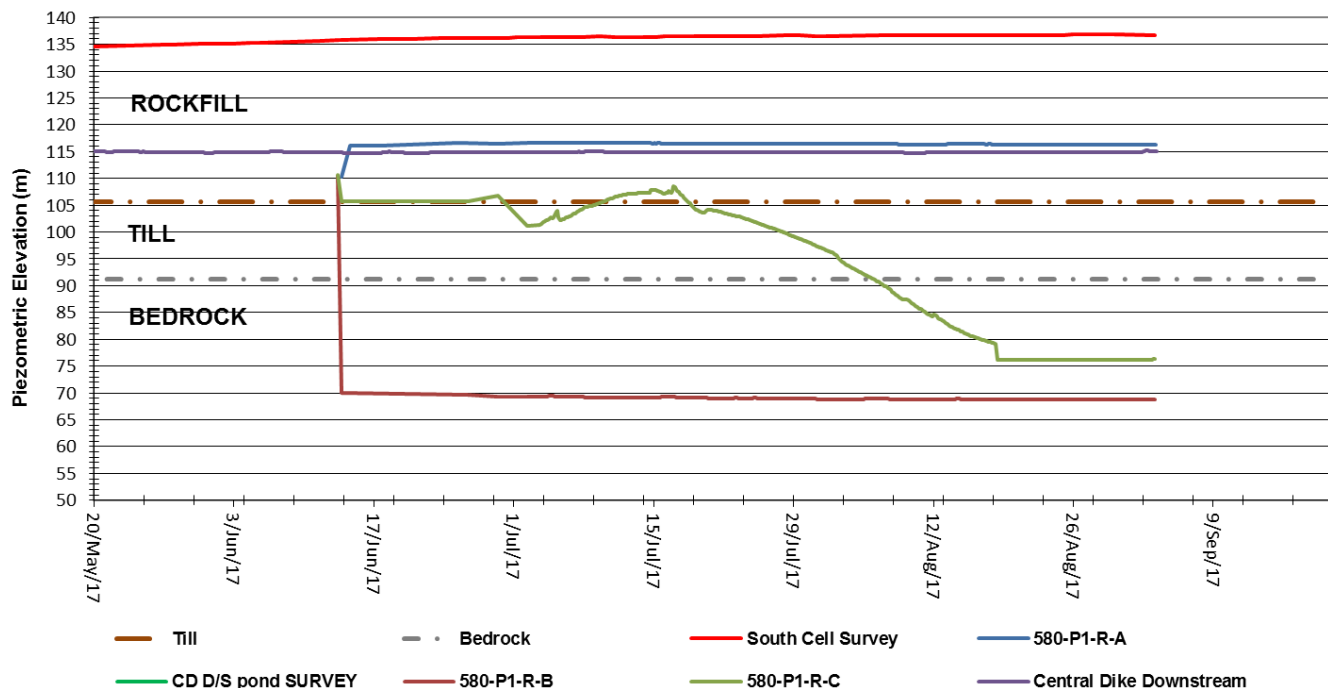
# PIEZOMETER 580-P1R

- Piezo A is located in a sand layer and pressure readings are following the D/S pond regime
- Decrease in piezometric elevation ongoing for Piezo B
- Small data GAP



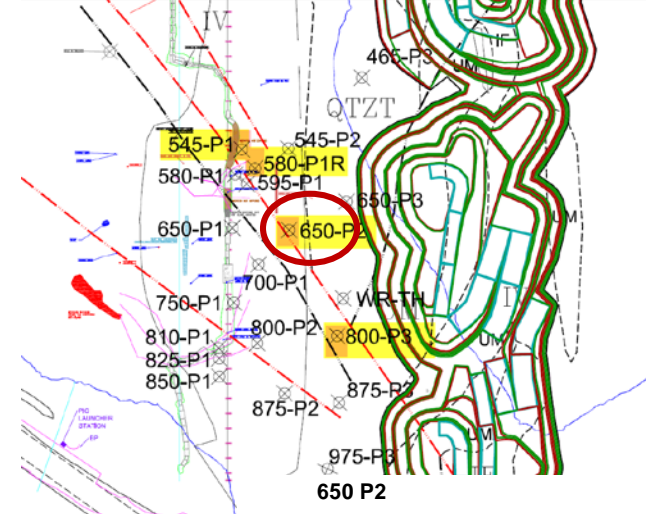
DH 580-P1-R Instrumentation

580-P1-R Hole - Piezometrics Elevation and Attenuation Pond Elevation vs Time

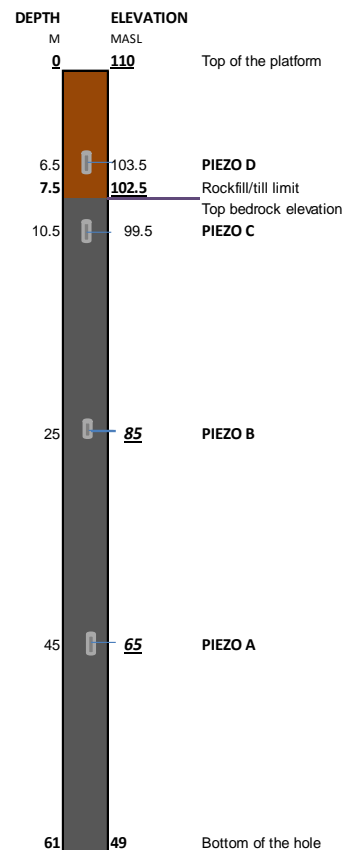


# THERMISTOR 650-P2

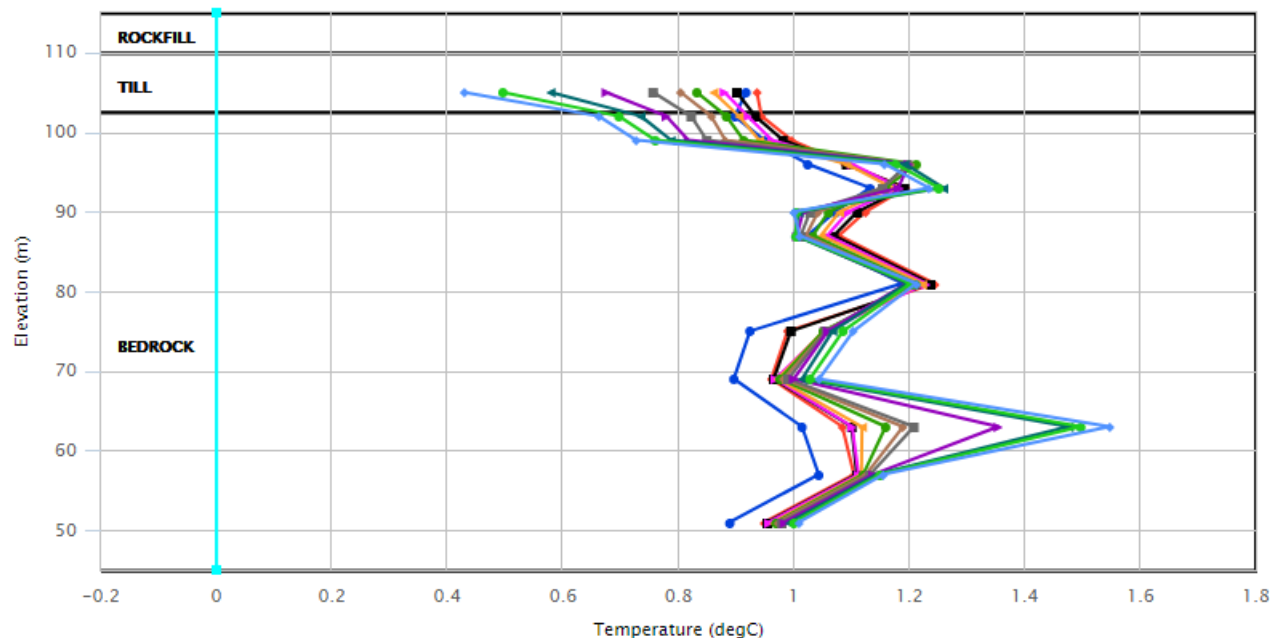
- Cooling trend observed below El. 80 similar to 2016 readings.



650 P2

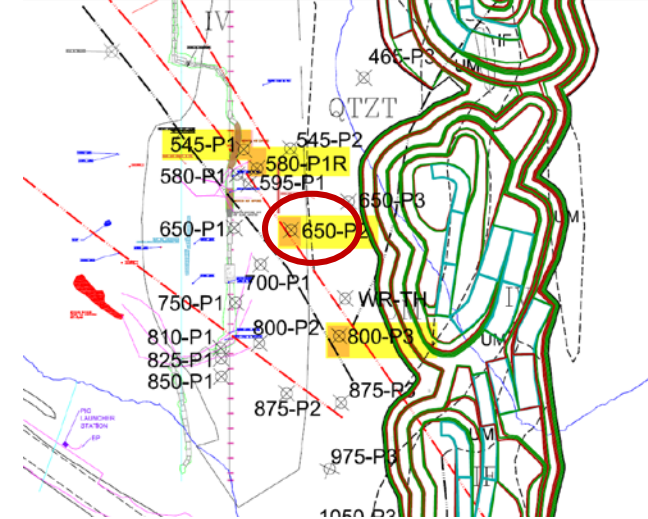


12 - CD - 650 - P2

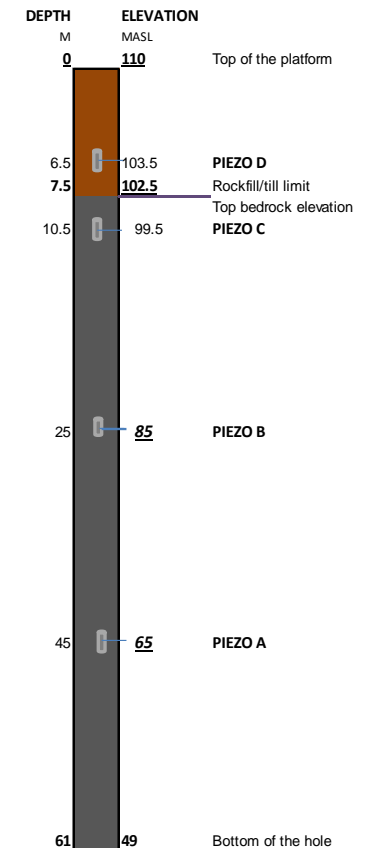
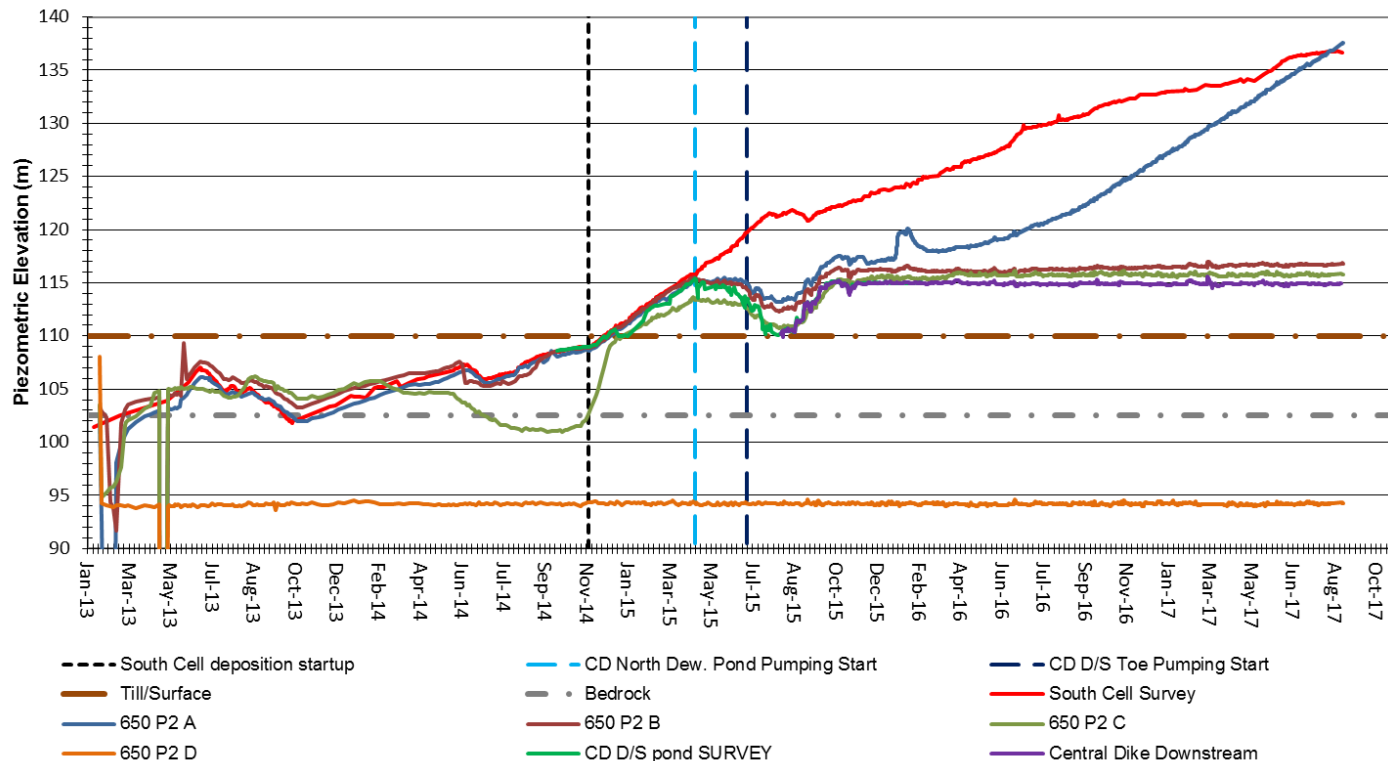


# PIEZOMETER 650-P2

- Piezometer A in bedrock continue its rise and is now over the elevation of the South Cell
- Piezo B-C are following the piezometric regime of the D/S pond
- Piezo D is in suction

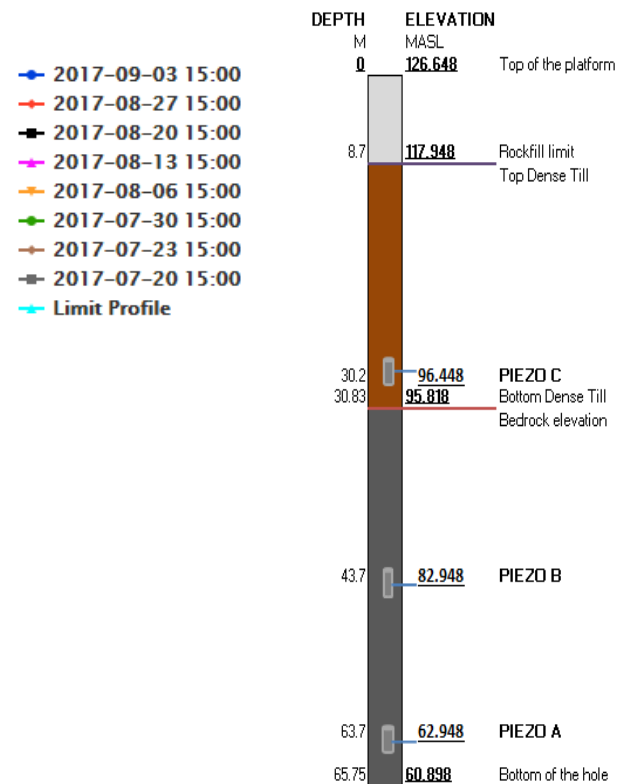
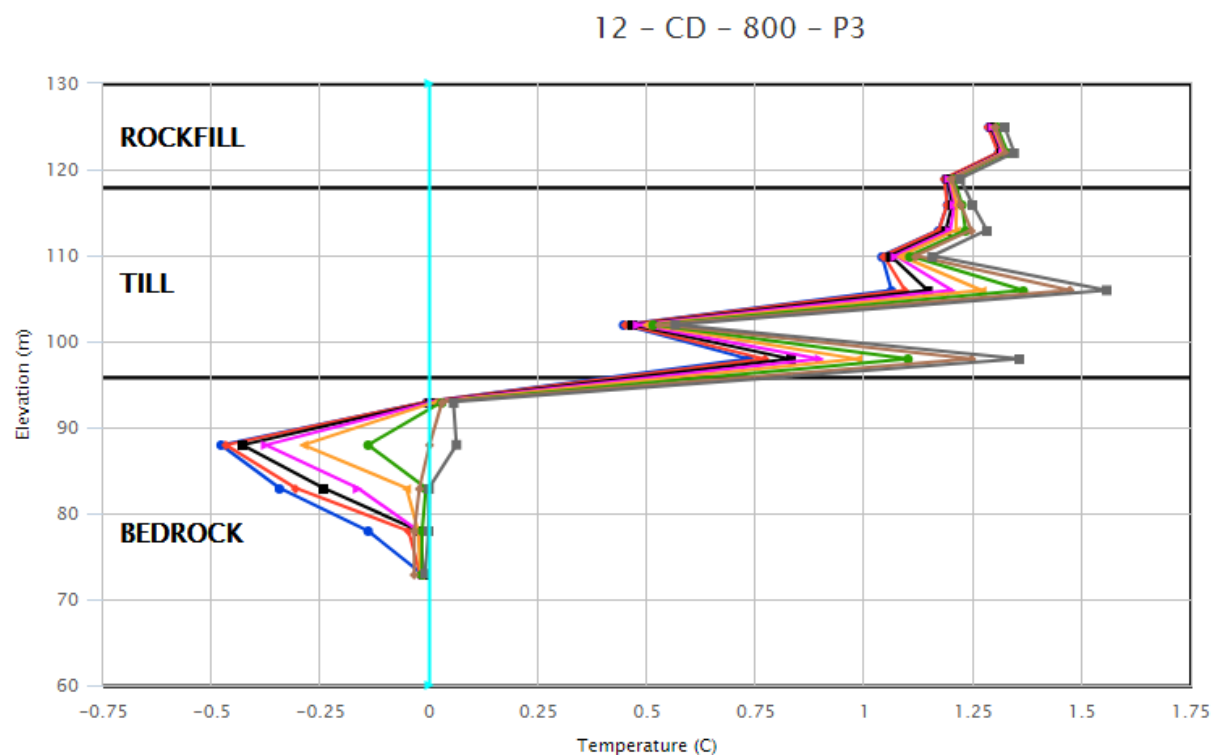
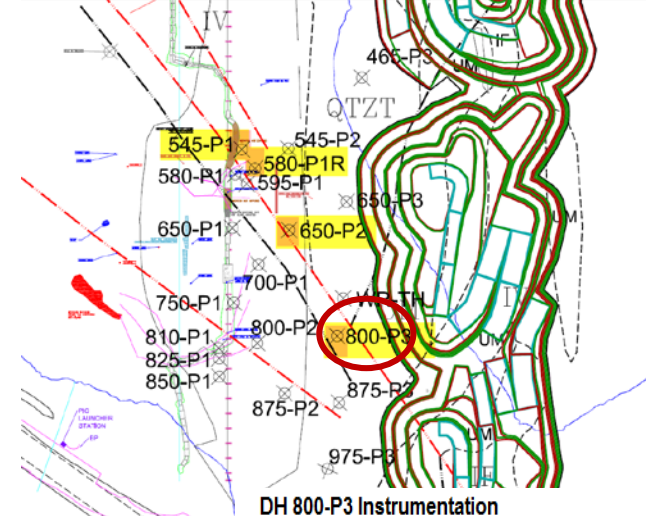


**650-P2 Hole - Piezometrics Elevation and Attenuation Pond Elevation vs Time**



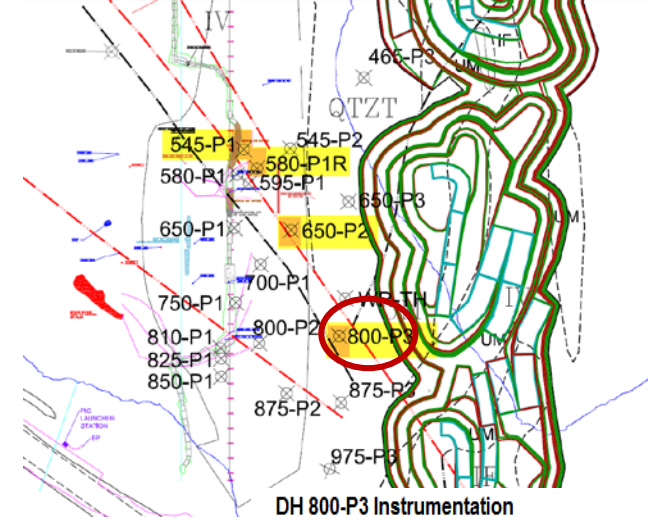
# THERMISTOR 800-P3

- New instrument installed in 2017
- Stabilisation in progress
- Temperature under 0° C below El. 93 m

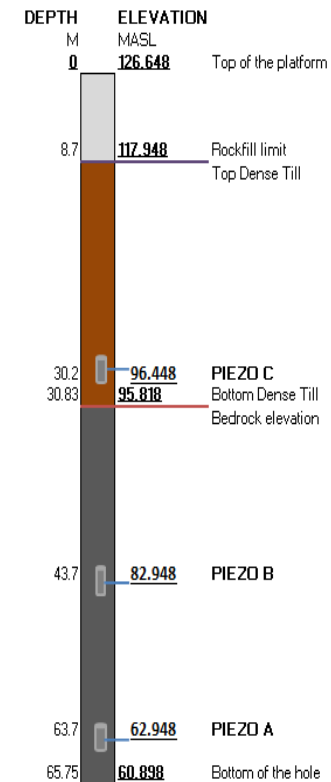
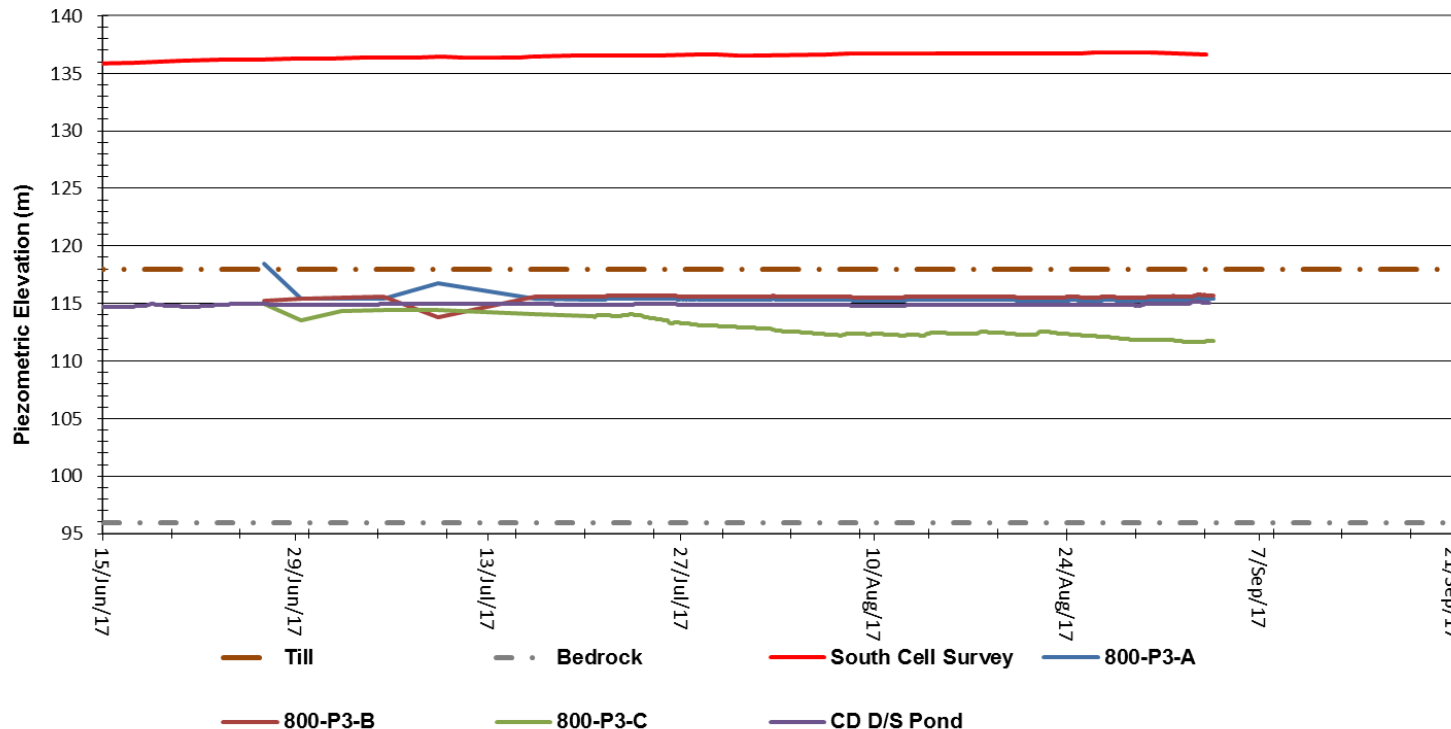


# PIEZOMETERS 800-P3

- New instrument installed in 2017
- Stabilization in progress
- Piezo A & B readings are similar to the D/S pond elevation readings
- Piezo C readings is slowly decreasing



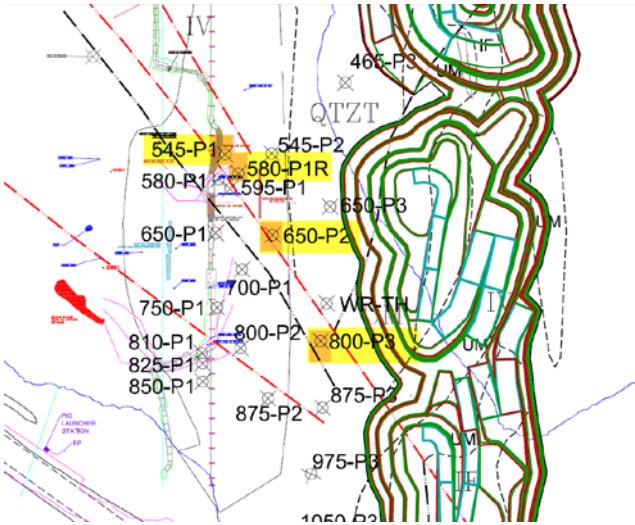
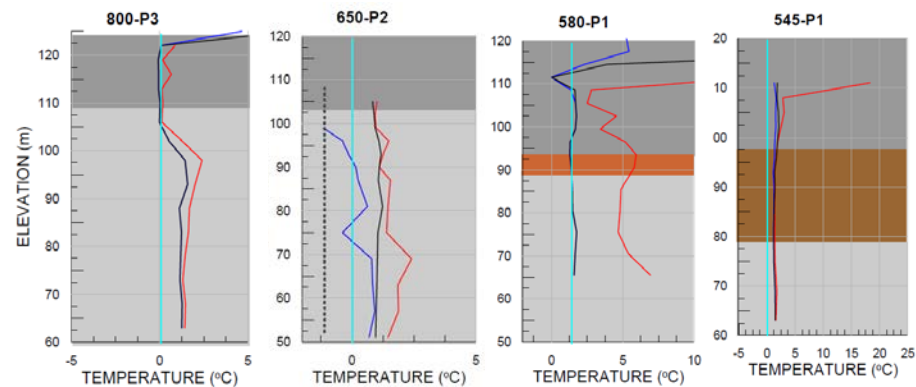
800-P3 Hole - Piezometrics Elevation and Attenuation Pond Elevation vs Time



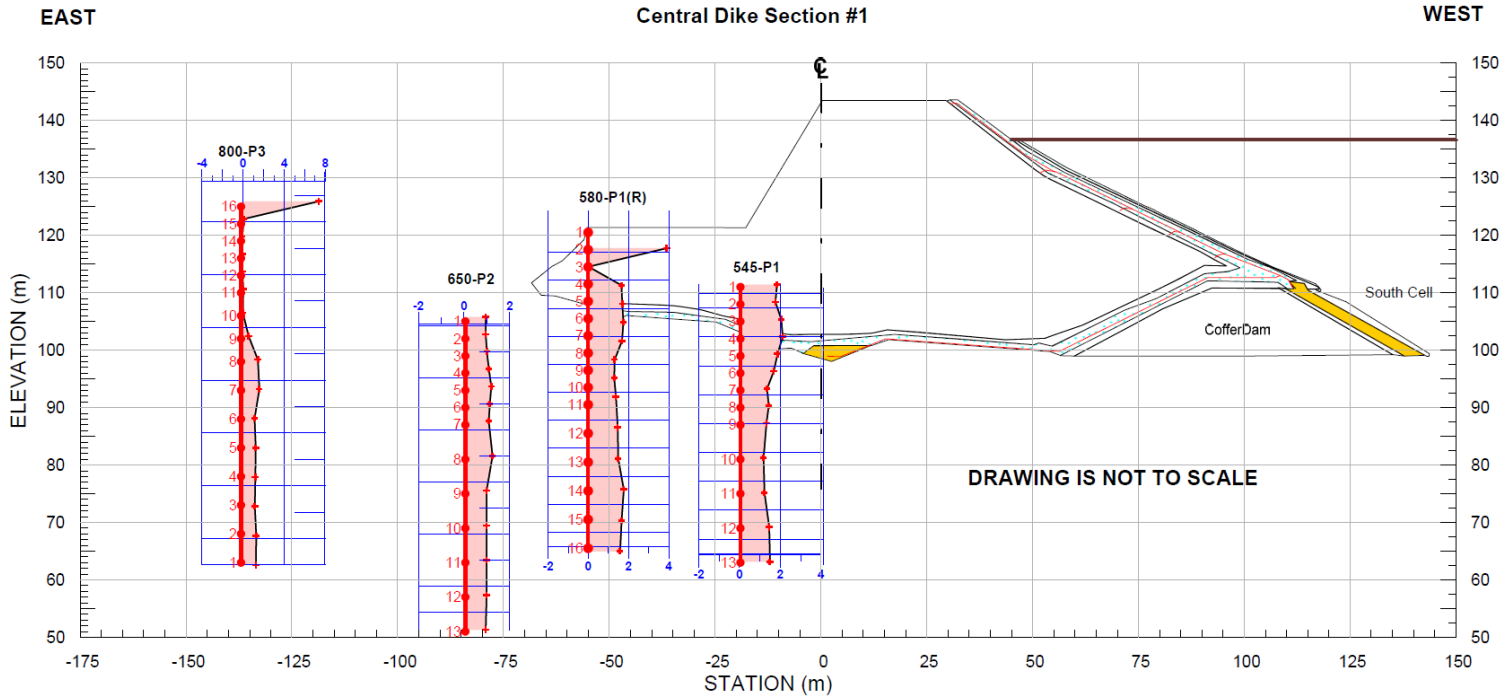


# SECTION 1 – THERMAL PROFILE

THERMISTOR READINGS FROM AUGUST 2016 - 2017



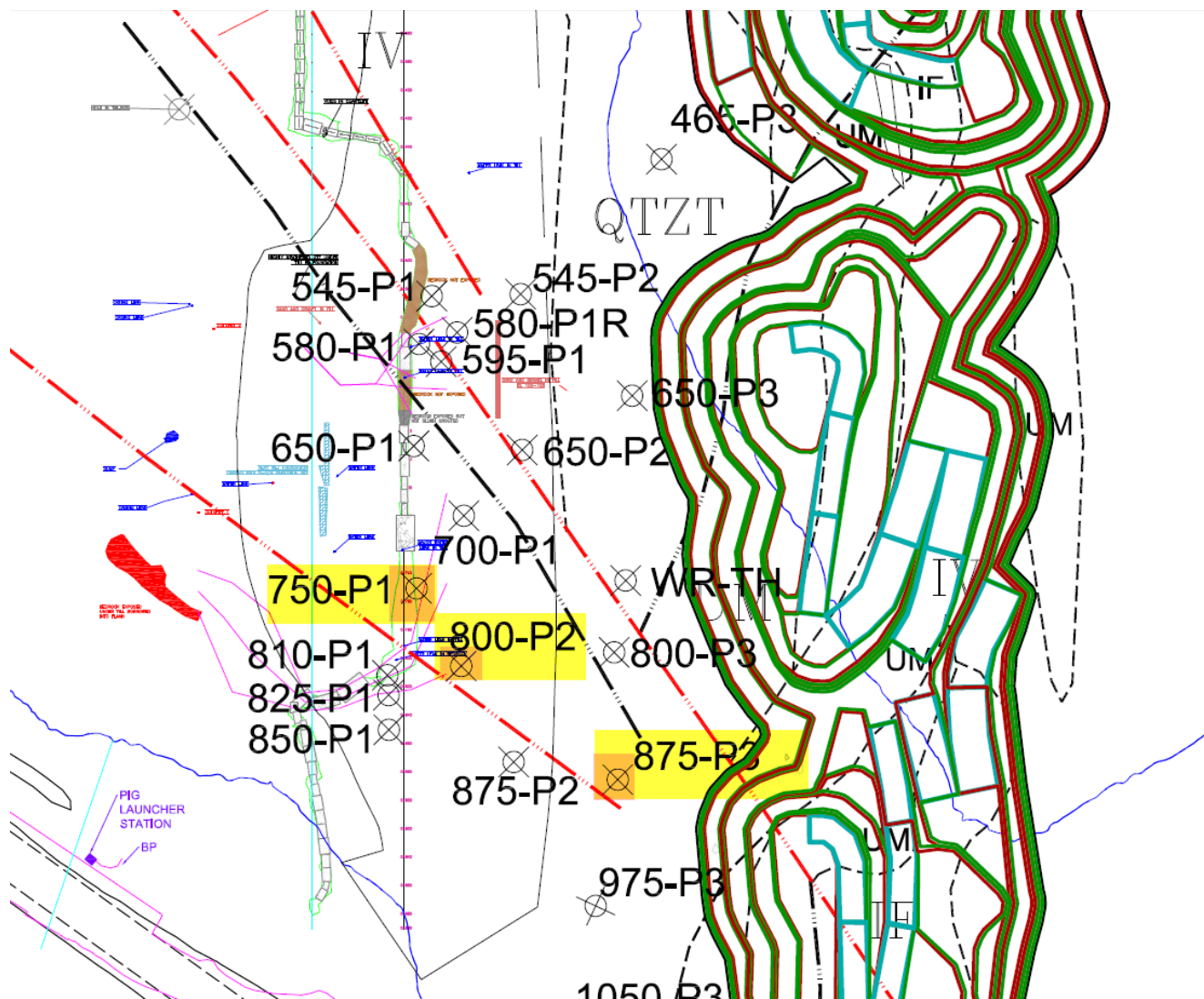
THERMISTOR READINGS AUGUST 1<sup>ST</sup>, 2017





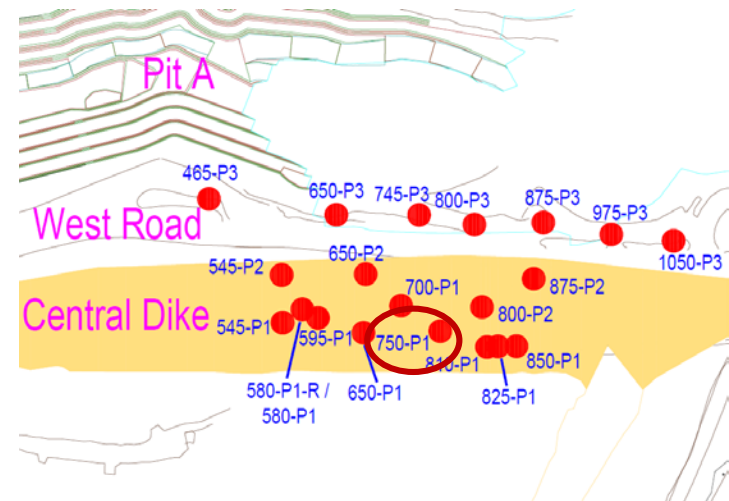
# SECTION 2

## 2<sup>ND</sup> PORTAGE FAULT – SECONDARY ANOMALIE



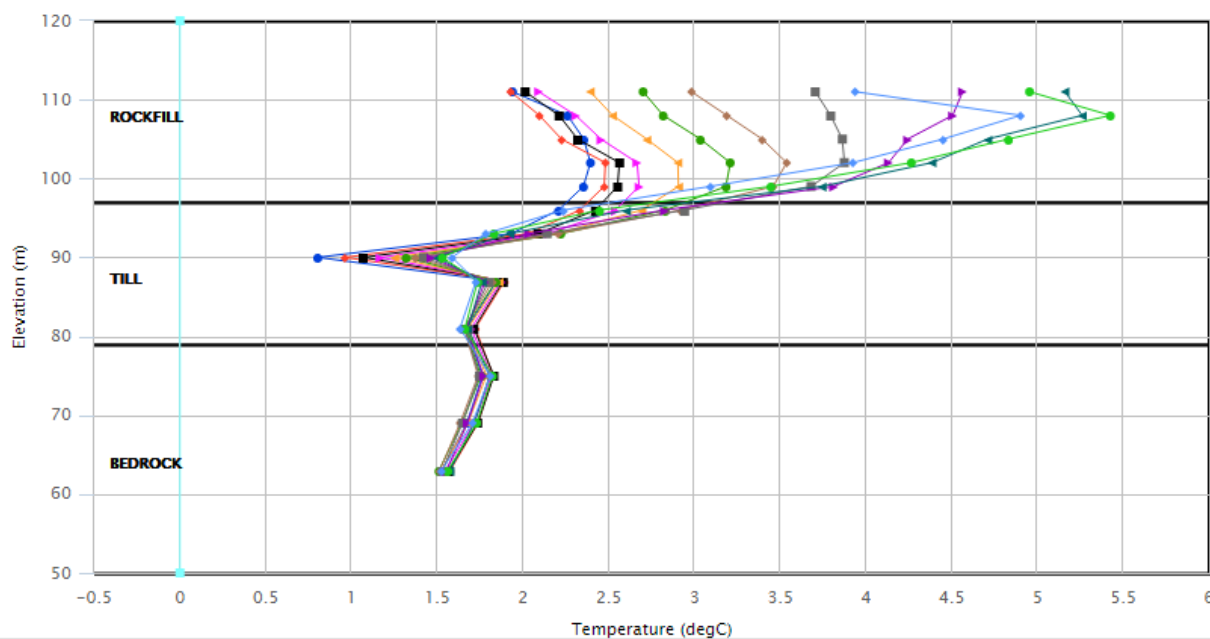
# THERMISTOR 750-P1

- ➔ Cooling trend in till layer. The bead located at elevation 90m is in average 1° C cooler than in 2016.

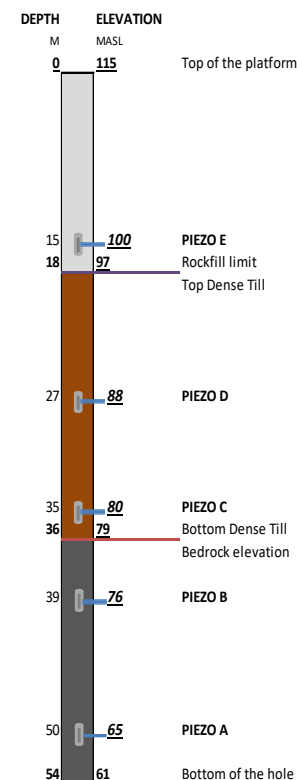


750 P1

12 - CD - 750 - P1

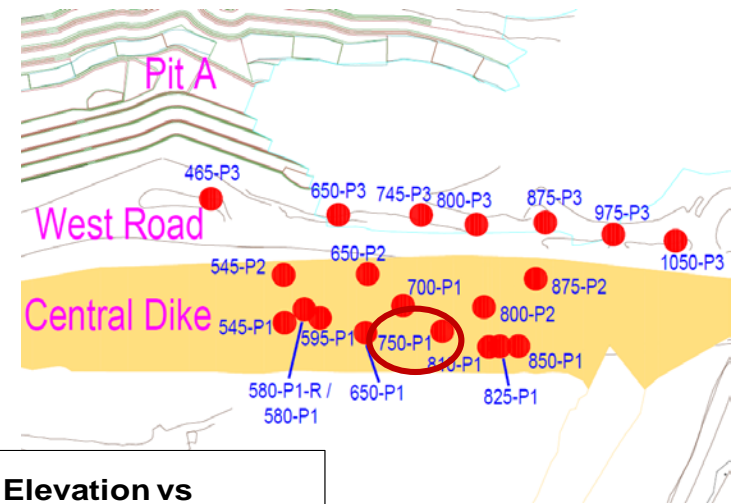


- 2017-09-03 12:00
- 2017-08-04 12:00
- 2017-07-05 12:00
- 2017-06-05 12:00
- 2017-05-06 12:00
- 2017-04-06 12:00
- 2017-03-07 12:00
- 2017-02-05 12:00
- 2017-01-06 12:00
- 2016-12-07 12:00
- 2016-11-07 12:00
- 2016-10-08 12:00
- Limit Profile

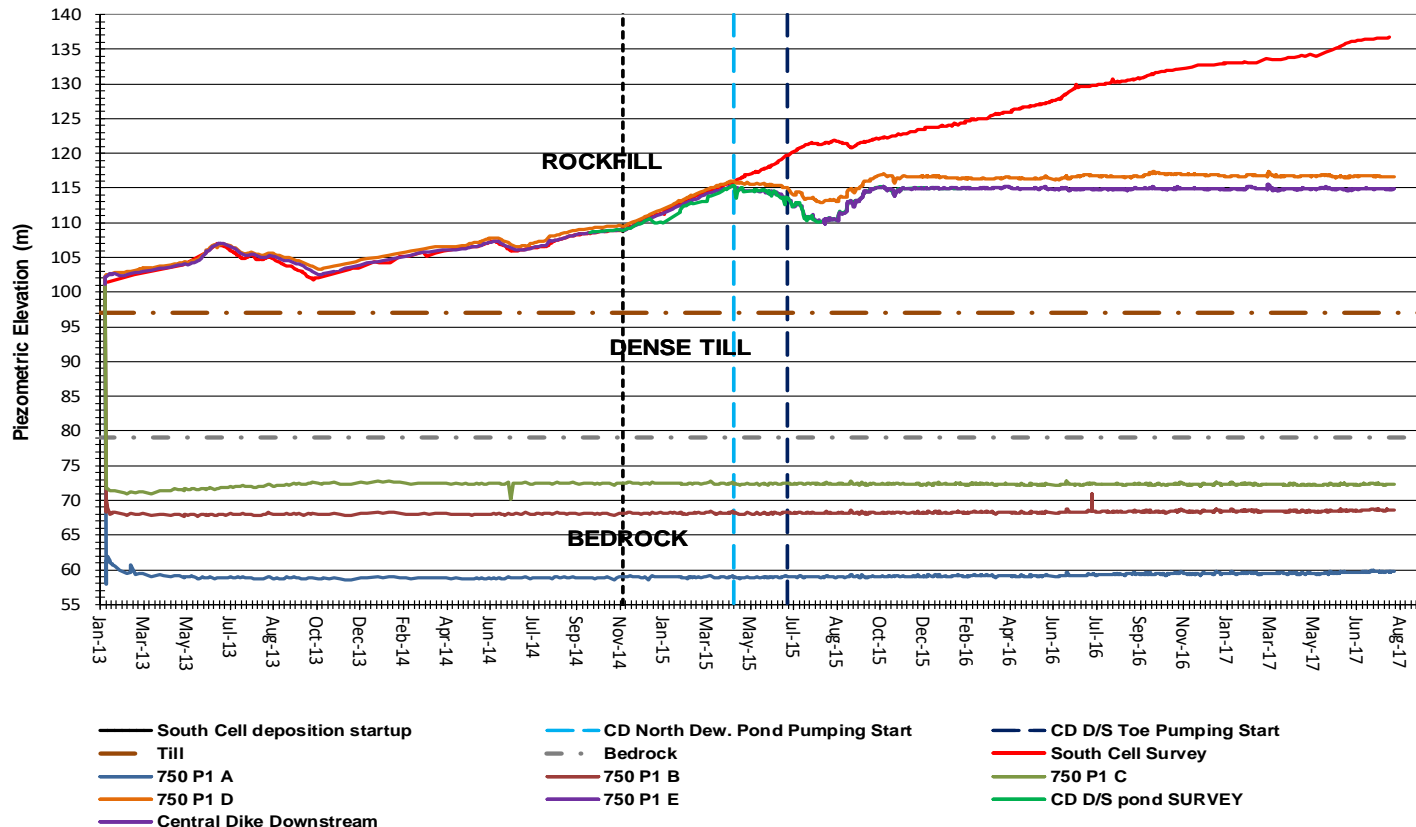


# PIEZOMETER 750-P1

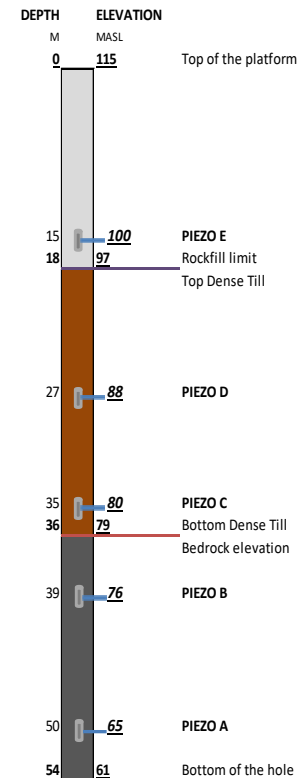
- Piezo A, B and C are in suction
- Piezo D is have a direct reaction to any variation in elevation observe in the D/S pond.



**750-P1 Hole - Piezometrics Elevation and Attenuation Pond Elevation vs Time**

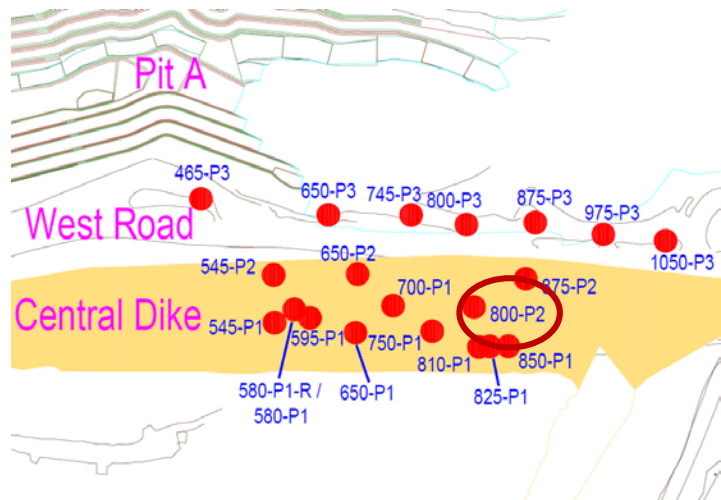


**750 P1**



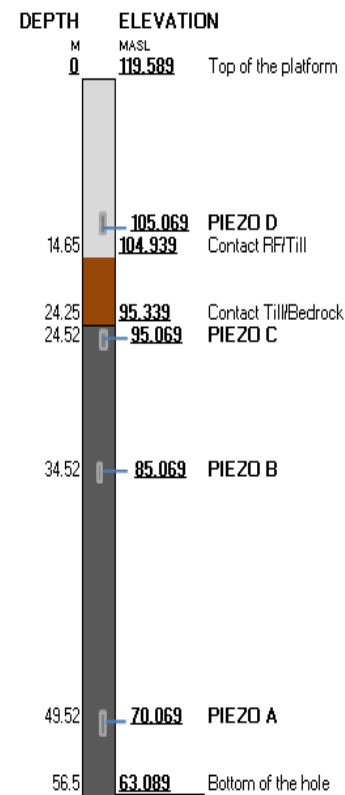
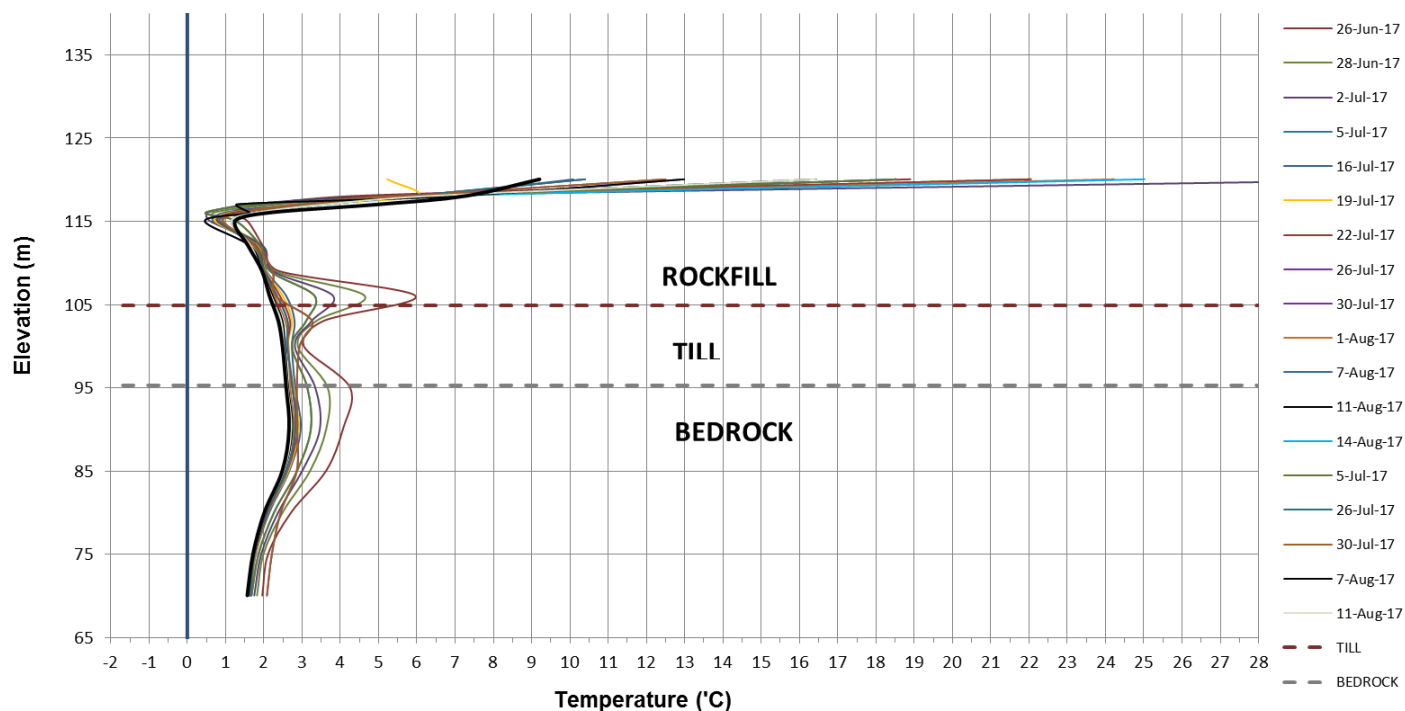
# THERMISTOR 800-P2

- New instrument installed in 2017
- Stabilisation of temperature ongoing
- Temperature above 0 °C



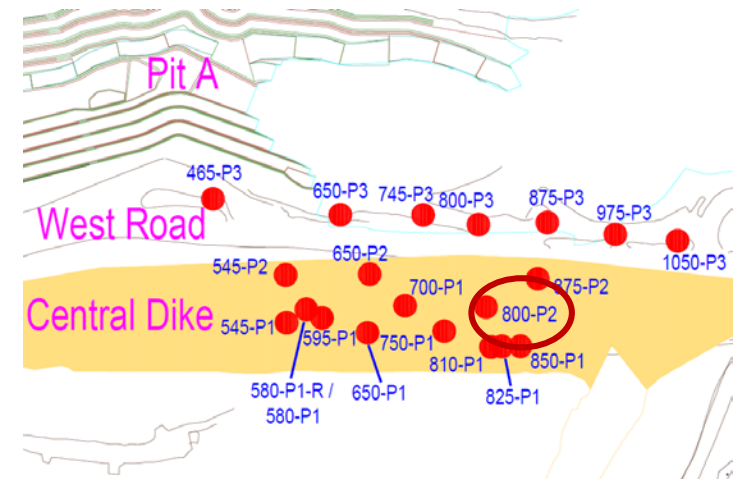
DH 800-P2 Instrumentation

TH-800-P2 Central Dike - Bead Temperature vs. Elevation - 2017

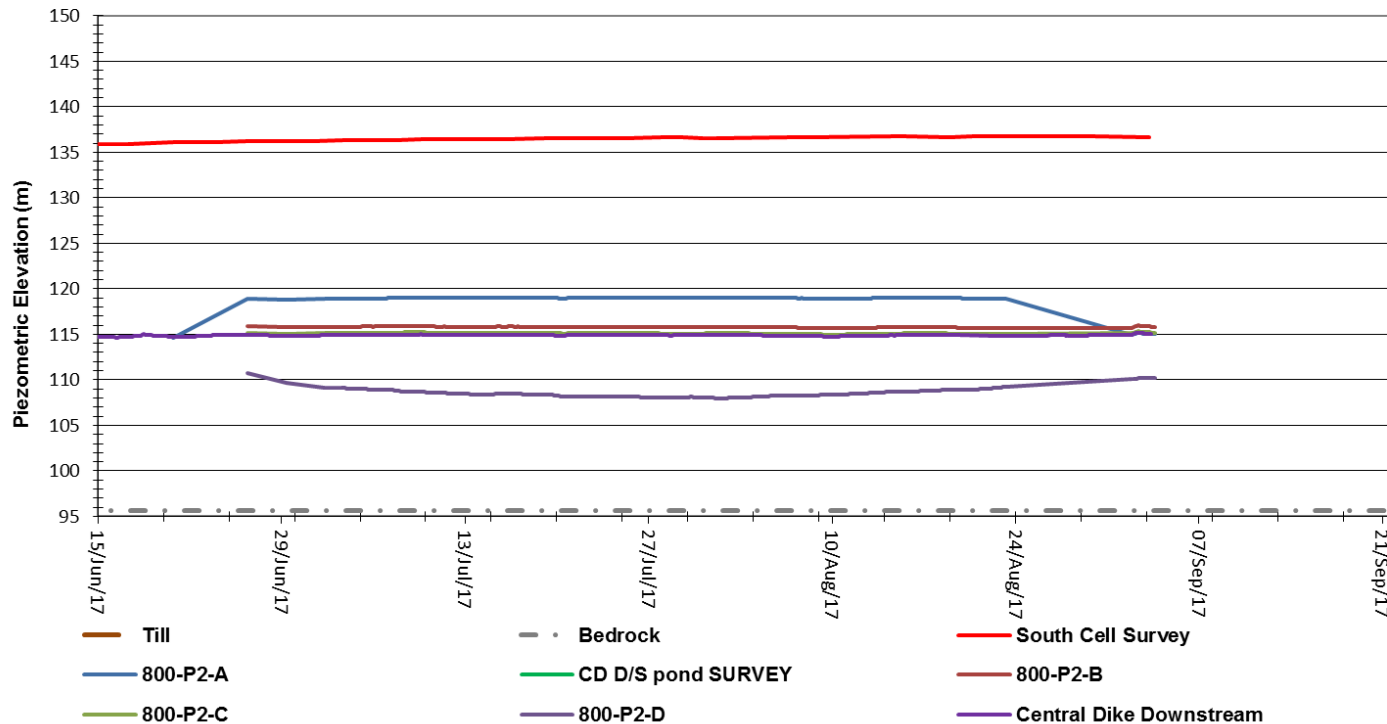


# PIEZOMETER 800-P2

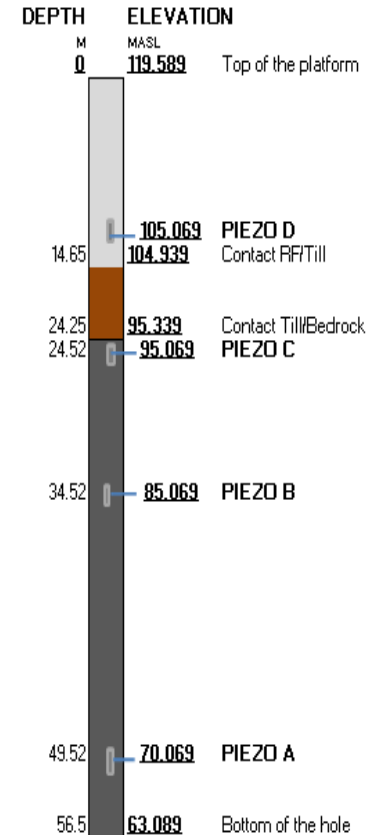
- New instrument installed in 2017
- Stabilisation ongoing
- Piezo A,B and C are showing pressure readings similar to the elevation of the D/S pond.



**800-P2 Hole - Piezometrics Elevation and Attenuation Pond Elevation vs Time**

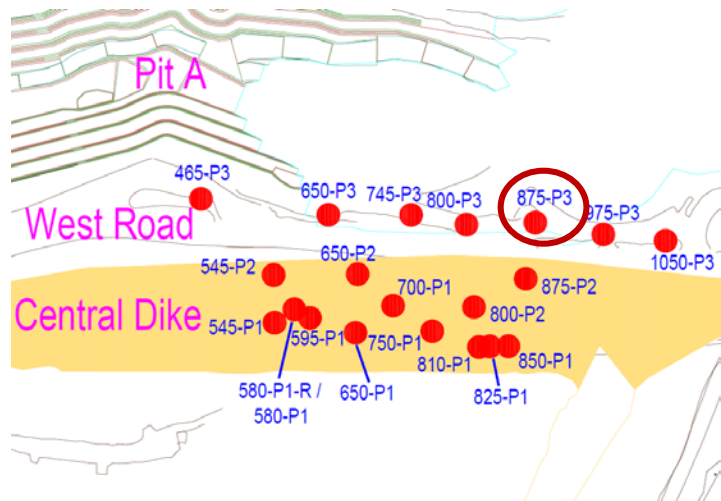


**DH 800-P2 Instrumentation**

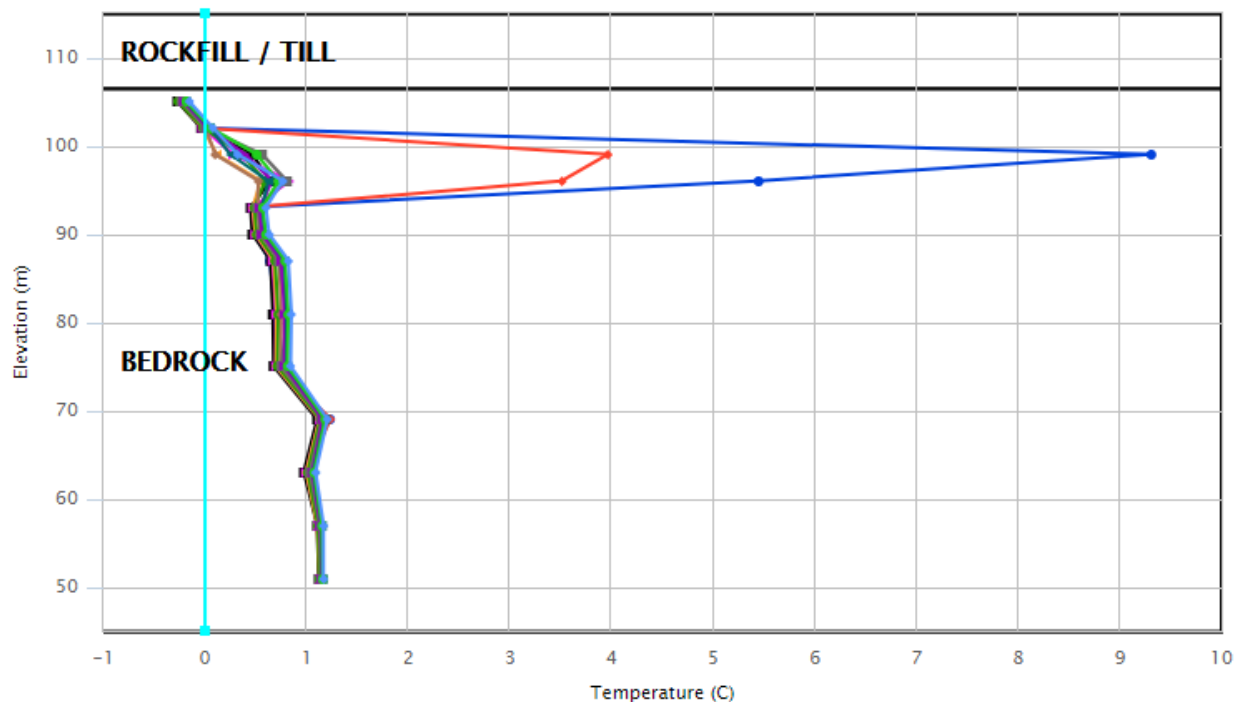


# THERMISTOR 875-P3

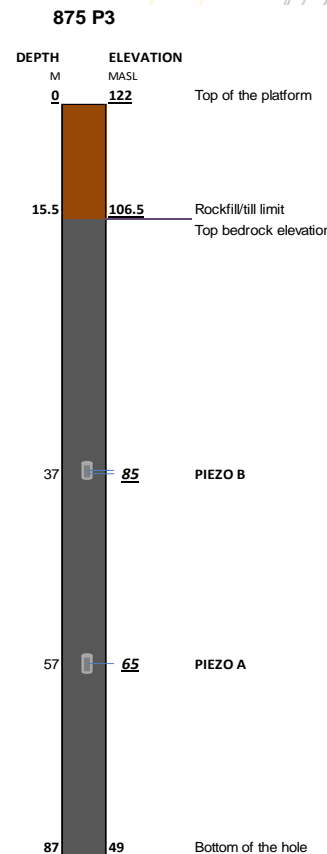
- Temperature above 0° C in bedrock at 875-P3
- Temperature spike at El.96 m and 99 m are related to capacitance effect.



12 - CD - 875 - P3

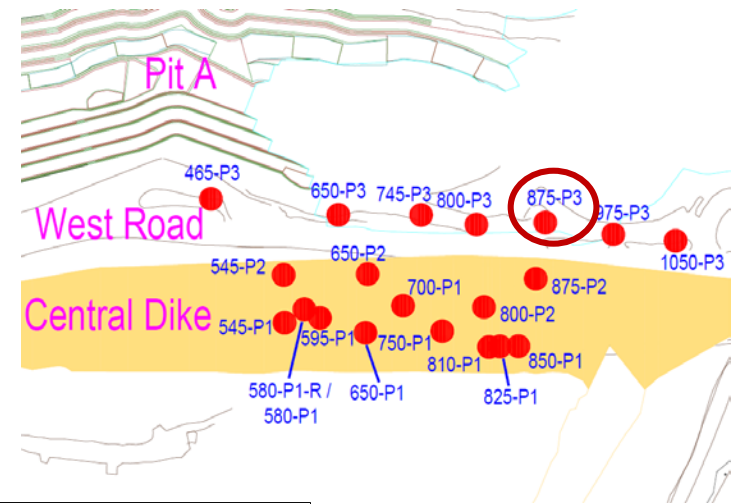


- 2017-09-03 15:00
- 2017-08-04 15:00
- 2017-07-09 08:00
- 2017-06-07 09:15
- 2017-05-08 08:10
- 2017-04-12 09:25
- 2017-03-10 10:45
- 2017-02-20 17:15
- 2017-01-07 15:00
- 2016-12-09 10:40
- 2016-11-12 16:00
- 2016-10-09 09:50
- Limit Profile

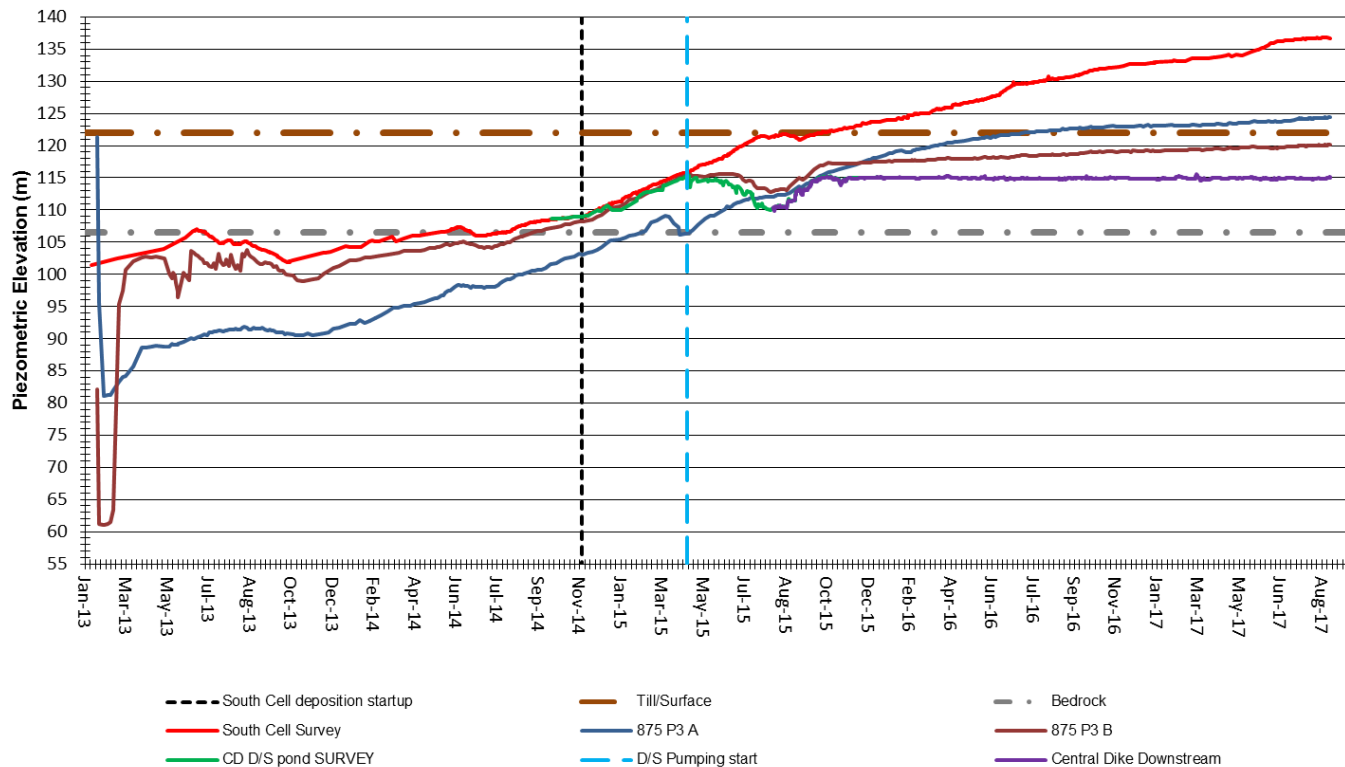


# PIEZOMETER 875-P3

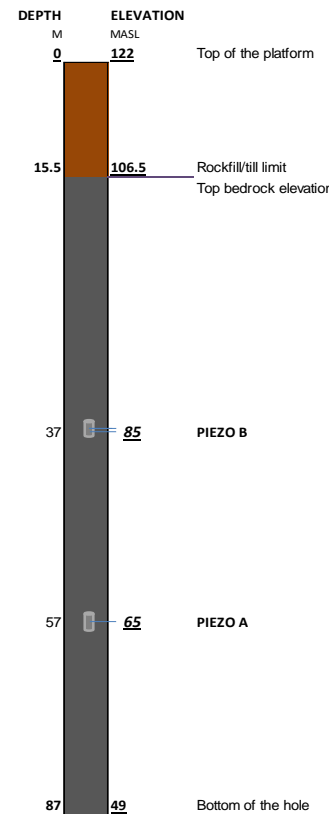
- ➔ Piezometer at 875-P3 are in bedrock and are impacted by increase in South Cell head



**875-P3 Hole - Piezometrics Elevation and Attenuation Pond Elevation vs Time**



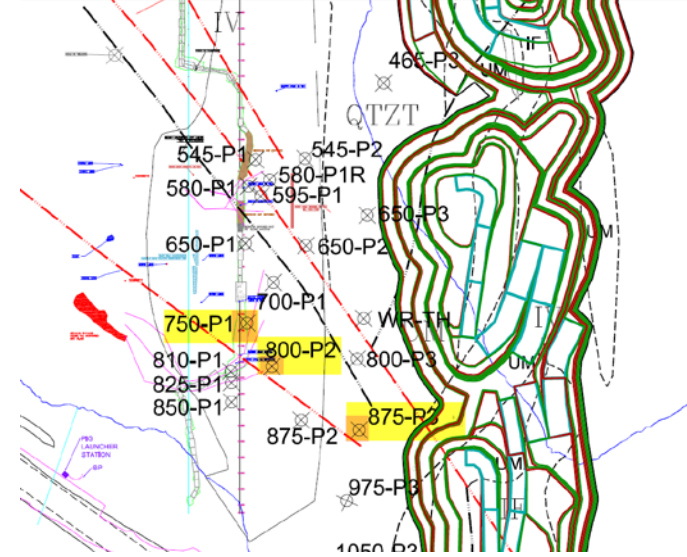
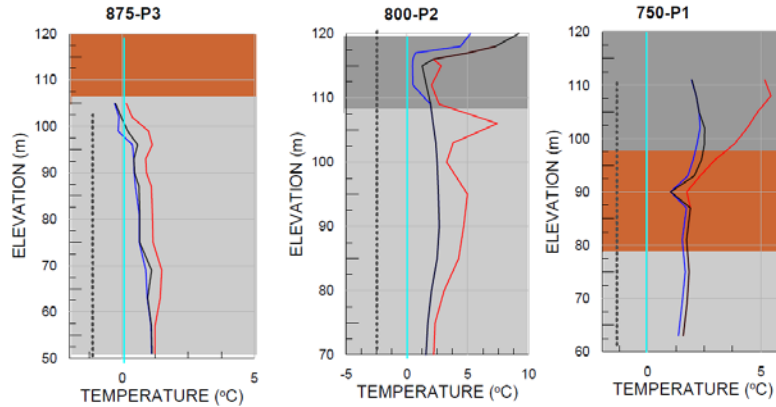
**875 P3**



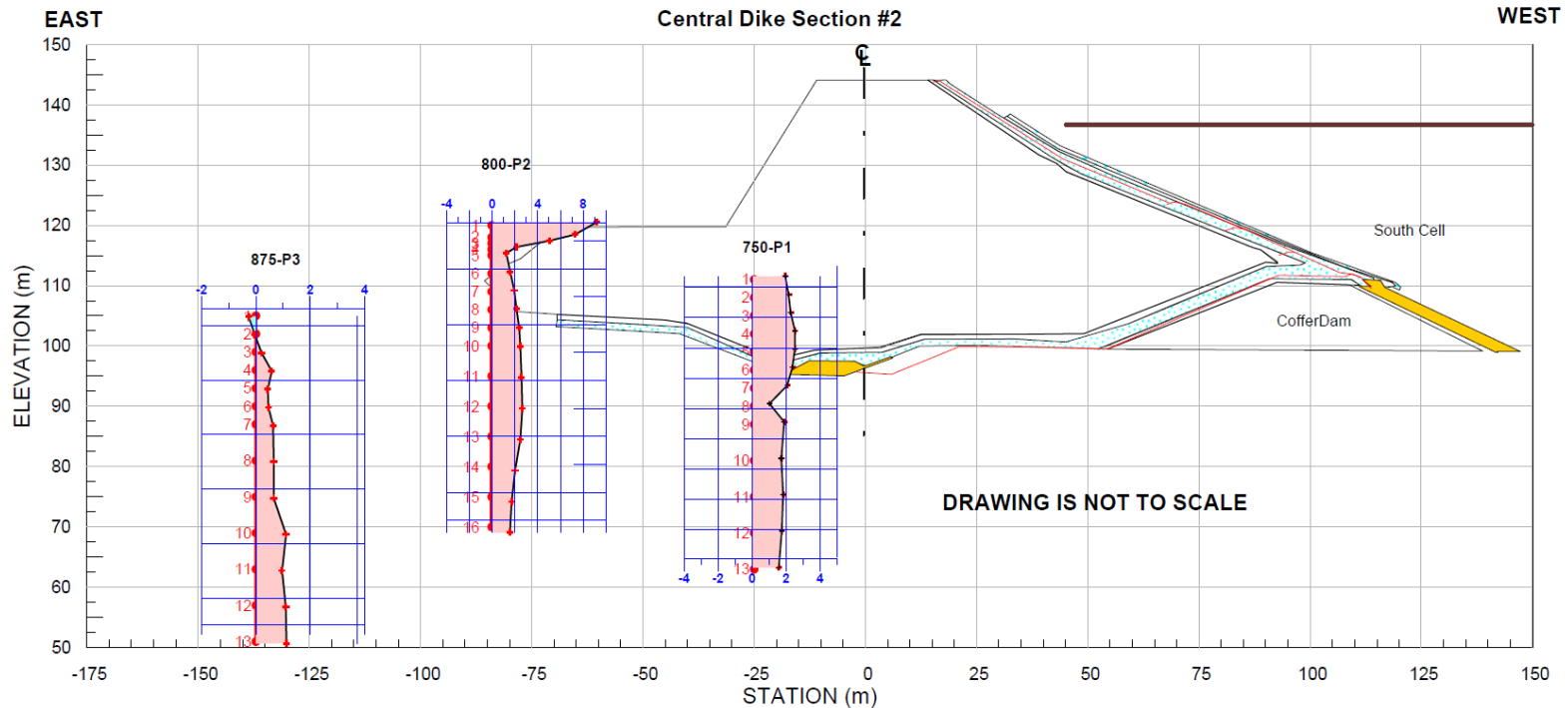


# SECTION 2 – THERMAL PROFILE

## THERMISTOR READINGS FROM AUGUST 2016 - 2017



## THERMISTOR READINGS AUGUST 1<sup>ST</sup>, 2017










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# SECTION 3: ACTION PLAN

# ACTION PLAN

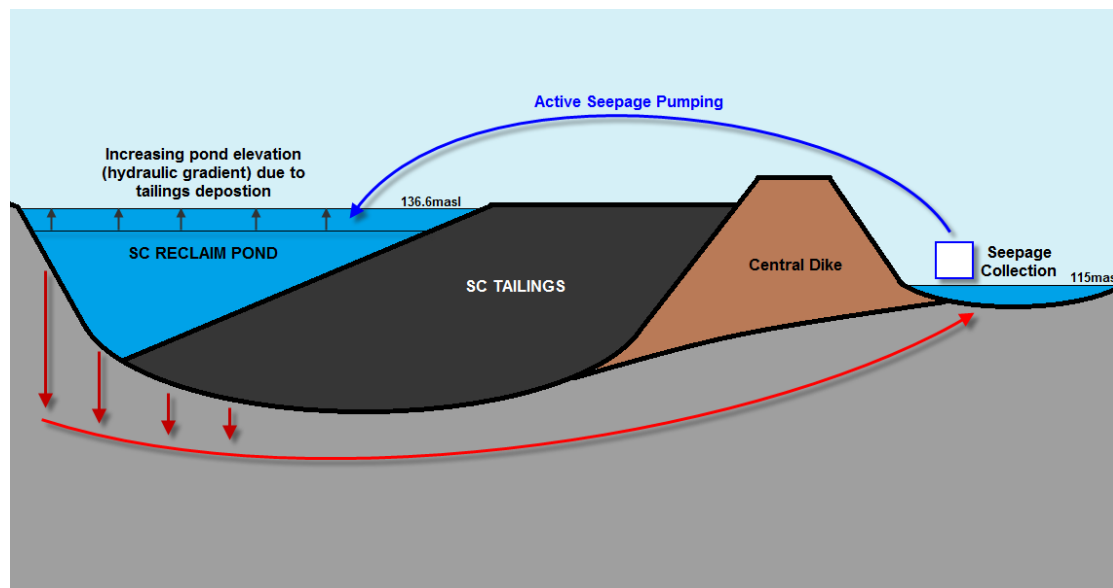
## RECAP OF ACTION TAKEN IN RESPONSE TO INCREASE OF ALERT LEVEL TO ORANGE

- Daily visual inspection of Central Dike 
- Increased frequency of instrumentation review (allowed to spot automatization artefact and capacitance effect on the thermistor) 
- Tailings deposition strategy modified to promote beach along SD4 and fill depression 
- Initiate transfer of water from the South Cell to Goose Pit to reduce water head in between Reclaim pond and the D/S pond 
- Sampling of water and solid in the D/S pond to understand coloration change 

# TRANSFER OF SOUTH CELL WATER TO GOOSE PIT

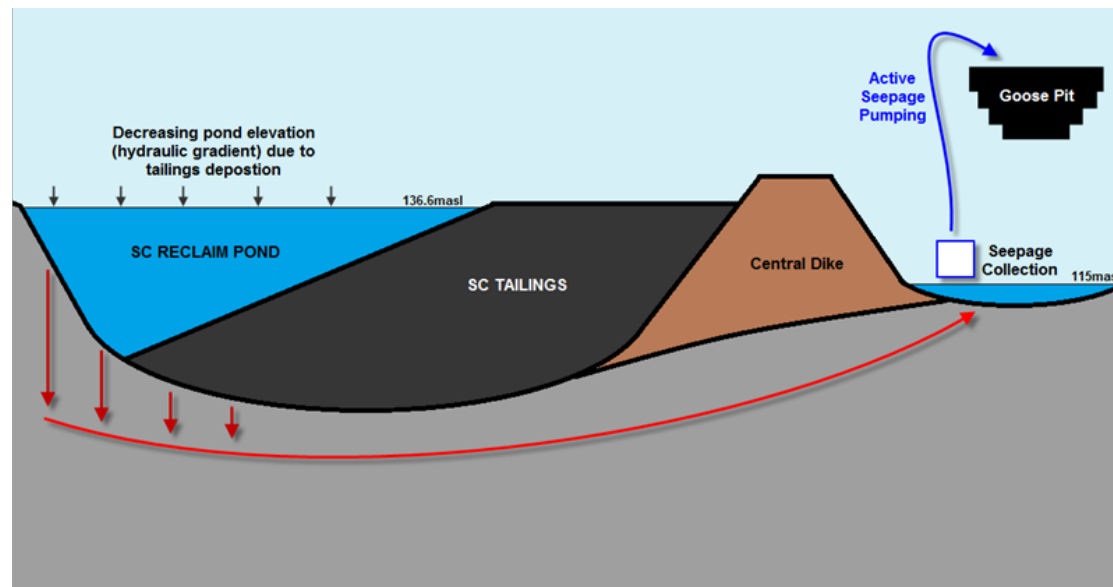
## Original D/S Pond Setup

- Pump water back to South Cell keeping D/S Pond at El. 115m



## Modified D/S Pond Setup

- Addition of a line from D/S Pond to Goose pit
- Water is transferred while keeping D/S Pond at El. 115 m
- Transfer 350 000 m<sup>3</sup> of water is initiated



# ACTION PLAN

## PATH FORWARD

- Develop a response and communication plan in case of deterioration of the situation to red alert
- Geochemical investigation of the precipitate and sediment found inside the D/S pond
- Secure South Cell TSF operation during winter 2018 by the construction of an internal structure
- Implement a strategy to minimize transfer of water in the South Cell for freshet 2018
- Continue developing in-pit deposition as mitigation measure
- Define Phase 2 of the program to assess the Central Dike Seepage

# SOUTH CELL INTERNAL STRUCTURE

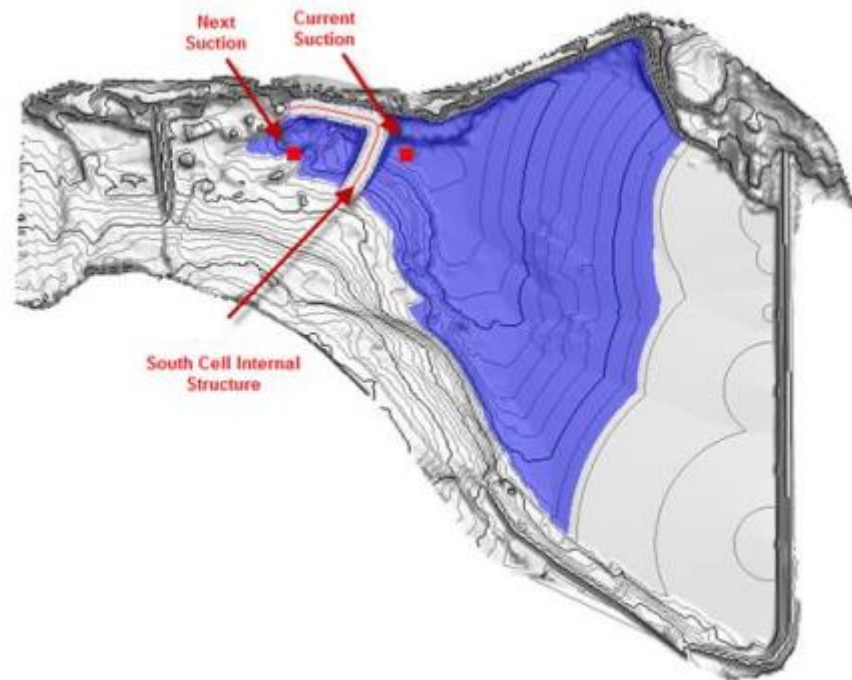
## CONCEPTUAL ENGINEERING

Objective is to secure operation of the South Cell TSF during the winter 2018 by building a permeable rock fill structure in front of the reclaim area.

Crest elevation:	138 m
Crest width:	30 m
Max structure height:	8 m
Volume of rock fill:	62,000 m <sup>3</sup>
Type of material:	Soapstone
Trench bottom elevation:	136 m
Construction time:	Oct 2017

Operational risks mitigated:

- Slurry beach getting too close to the reclaim suction and reclaim water quality issues at the mill;
- Water elevation going higher than freeboard elevation (which would require goose transfers to fix);
- Increases TSF capacity.





# ACTION PLAN

## FUTURE GEOCHEMICAL ANALYSIS

Second solid sampling will be required to confirmed the nature of the sediment found in the D/S pond and the coloration change mechanism.

- Recollect solid samples at the same location as last time, with some slight revisions to the analyses
  - Geochem - total sulphur (Leco), sulphate sulphur, carbonate content (colometry, not total carbon), ICP-MS multi-element scan on aqua regia digest with low detection limits
  - Mineralogy - submit for QEMSCAN modal mineralogy by SGS Burnaby. It will provide better quantification of minerals in this case, or at least remove some of the uncertainty in XRD only results, especially since the iron precipitate is likely poorly ordered and not really detectable by XRD.
- Collect a fresh mill tailings sample





# ACTION PLAN

## PHASE 2 OF SEEPAGE ASSESSMENT

- The need to conduct the following activity will be analysed for Phase 2 of the Central Dike seepage assessment
  - Update of 3D model with 2017 investigation results
  - Update of 2D seepage model with 2017 investigation results
  - Geophysical survey of the South Cell in winter condition
  - Investigate 700-P1 void and instrumentation of the Portage Central Dump



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**THANK YOU**

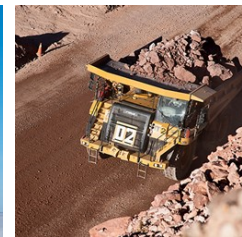
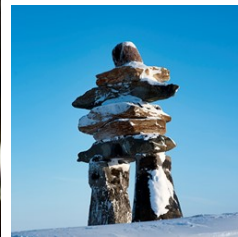


# **APPENDIX C3**

## **TSF North Cell Instrumentation Data**

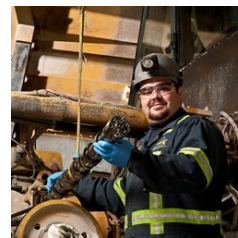


**AGNICO EAGLE**



## **MDRB # 22 P3 – STORMWATER DIKE UPDATE**

**Patrice Gagnon**  
September 4<sup>th</sup> 2017



# STORMWATER DIKE 2017 HIGHLIGHT

## SEQUENCE OF EVENTS

**January 18-25** - SWD 2017 Field Investigation and Instrumentation Campaign

**March 23** - MDRB # 20, Presentation of SWD Dike Assessment

**May 25** - Filling the 2016 cracks with bentonite (from 10+500 to 10+750)

**July 5** - Observation of settlement of 70cm deep and cracks from 10+840 and 10+925

**July 6** - Increased monitoring of the structure implemented – 2 additional prisms (total 18) and 2 extensometers installed in the area

**July 15** - Observation of new cracks at 10+425 and 11+050 (corresponding to limit of South Cell water)

**July 17** - Additional prism installed at 10+425 (total 19 prisms)

**Mid August** – reduced the inspections frequency

# STORMWATER DIKE 2017 HIGHLIGHT

## SUMMARY OF ACTION TAKEN IN RESPONSE TO OBSERVATION OF SETTLEMENT AND CRACK

- Daily visual inspection of Stormwater Dike increased to 1 per day
- Increased frequency of prisms reading to 1 per day
- Weekly/ bi-weekly update to AEM Management and Dike designer
- Installation of additional instrumentation on the crest (3 prisms and 2 extensometers)

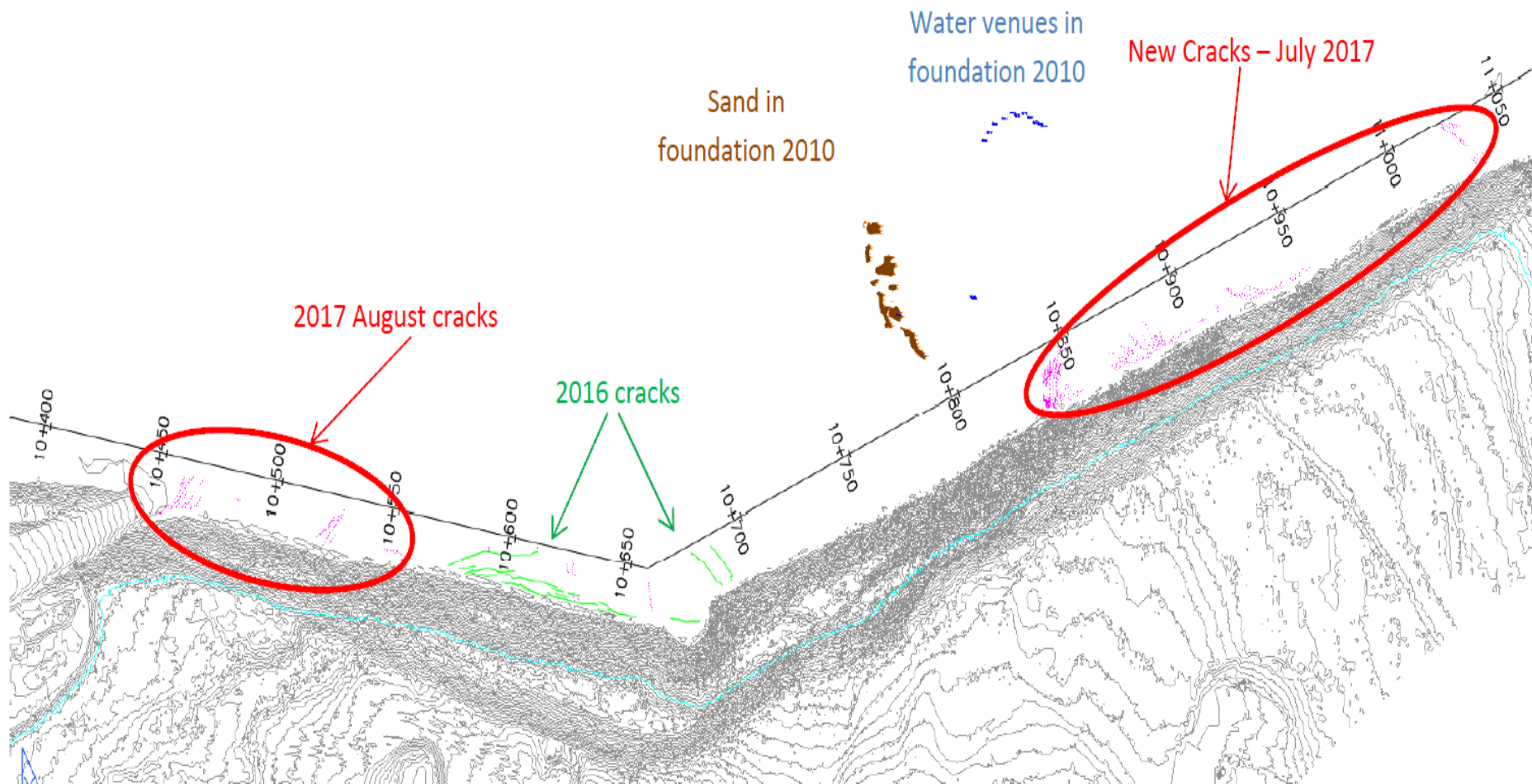


# 2016 CRACKS FILLED WITH BENTONITE

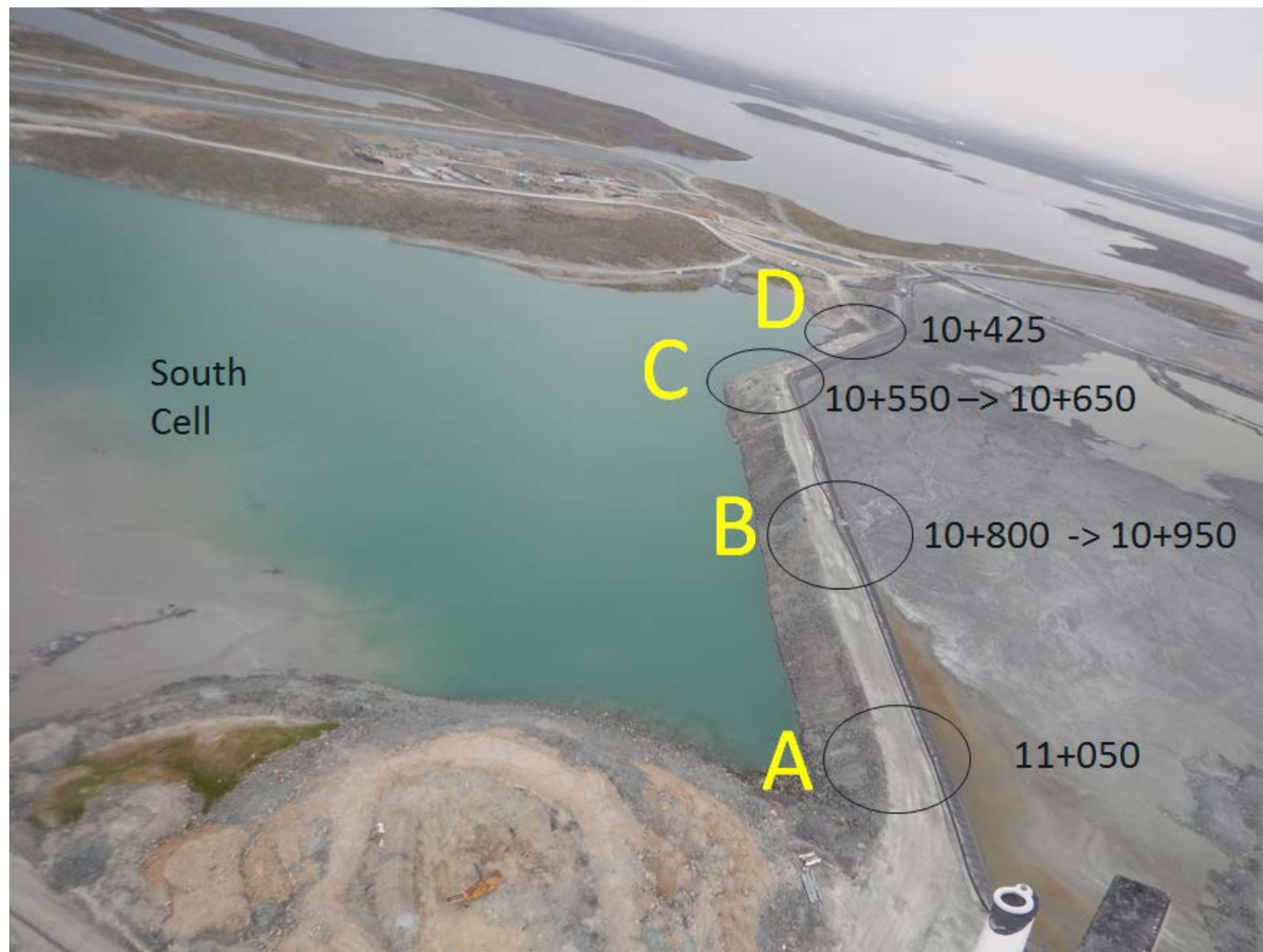




# MOVEMENT ZONES - 2017

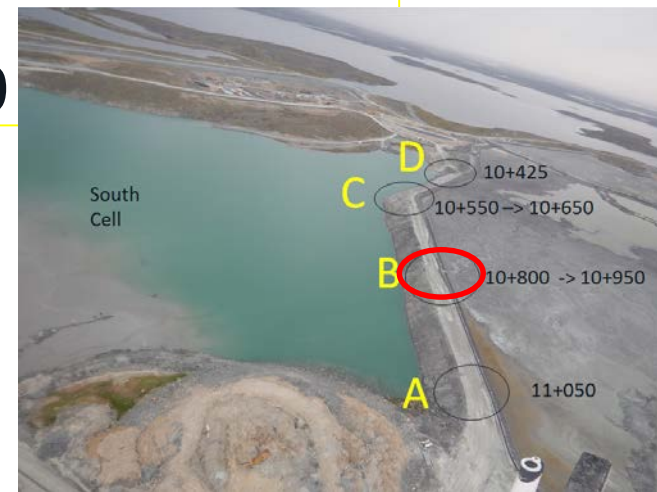


# MOVEMENT ZONES - 2017



# AREA OF MOVEMENT-10+800 TO 10+950

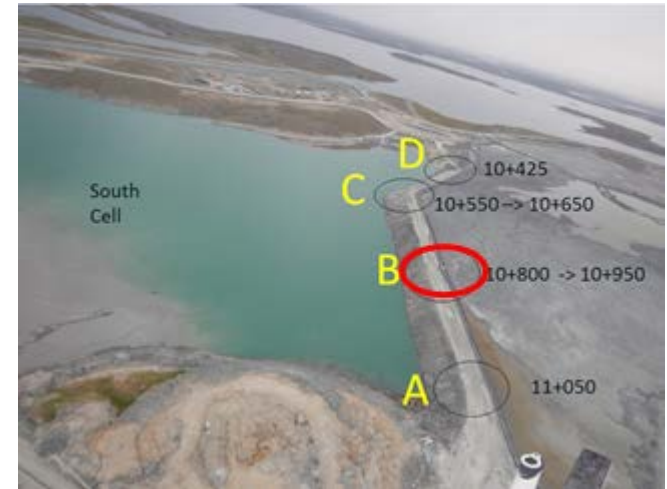
- Observed initially on July 5th 2017
- Depression present in previous year but deeper and larger amplitude this year
- Cracks were not present before





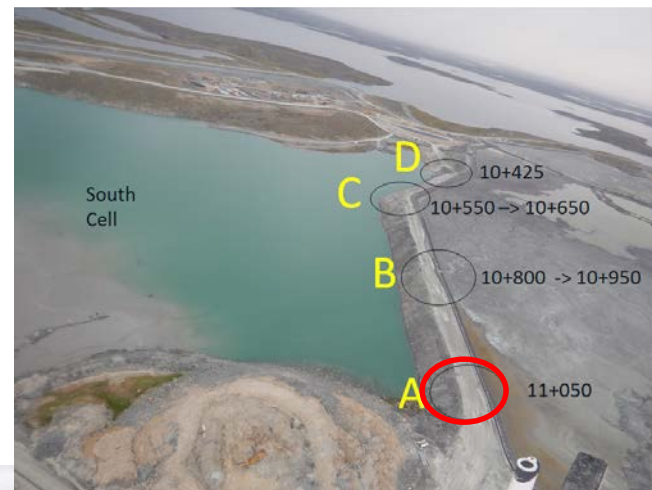
# PICTURE OF MOVEMENT – 10+800 TO 10+950

- Cracks crossing the crest at  $40^\circ$  from CL
  - Did not progressed much during summer
- Longitudinal cracks along the crest
  - Constantly opened to up to 5cm wide



# PICTURE OF MOVEMENT – 11+050

- Observed initially on July 15th 2017
- Appeared when water reached the toe in the area
- Crack width relatively small (<1cm)
- Cracks did not progressed





# PICTURE OF MOVEMENT – 10+550 TO 10+750

