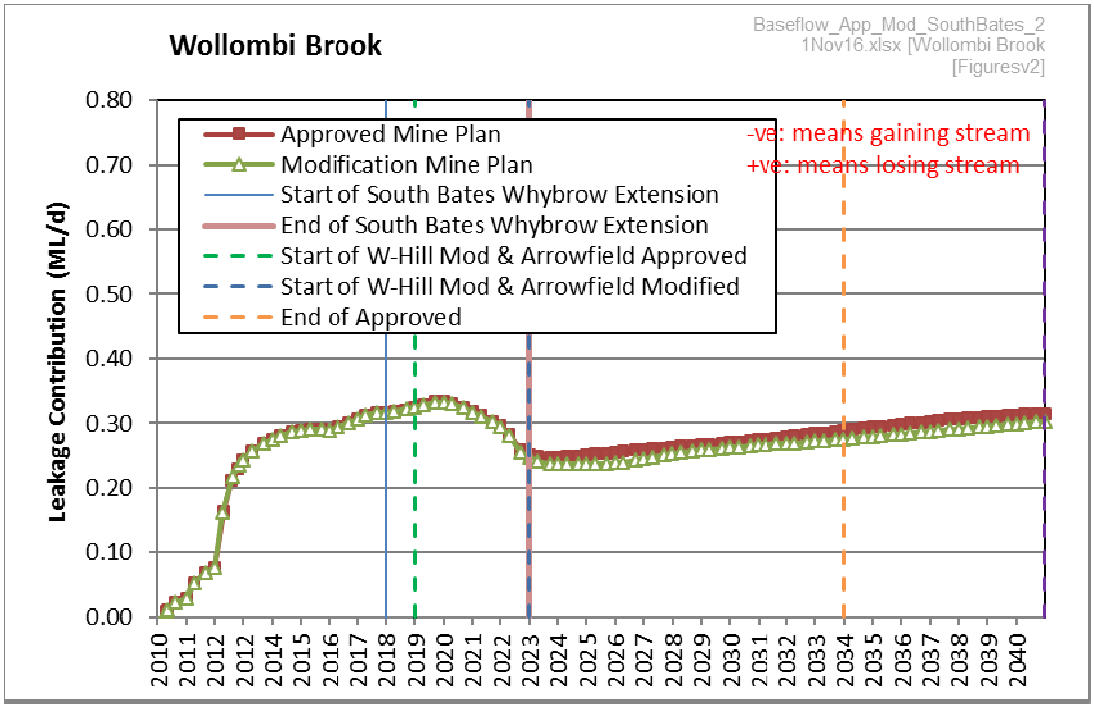


Figure 38 **Predicted Groundwater-Surface Interaction on Wollombi Brook**

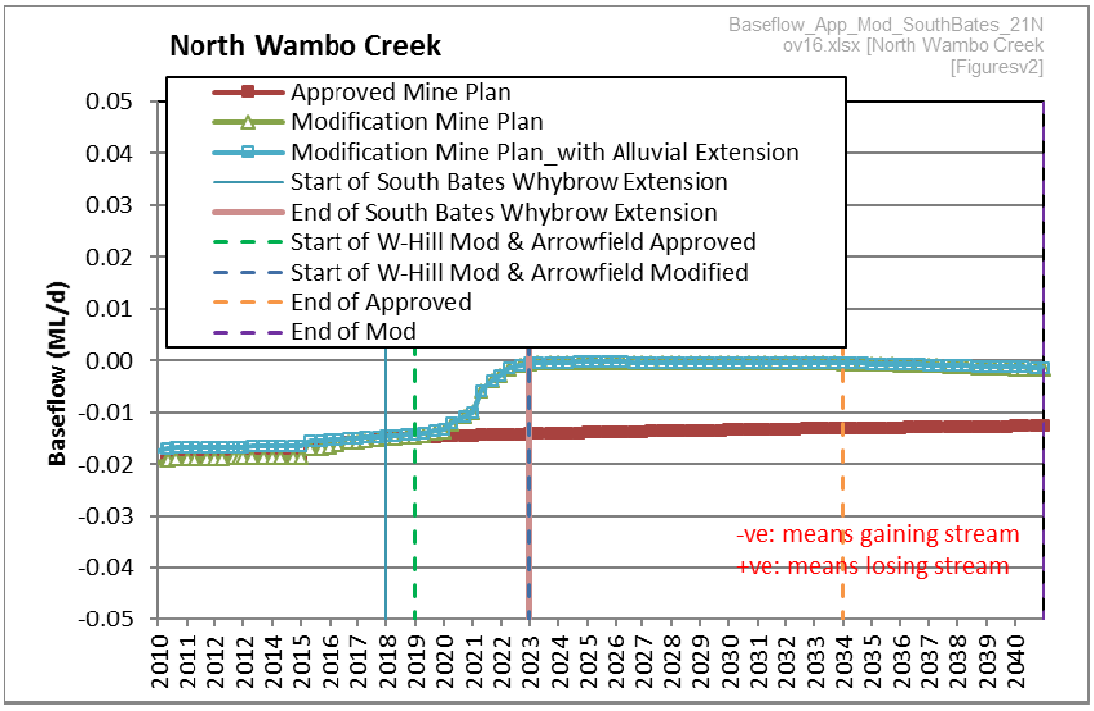


Figure 39 **Predicted Groundwater-Surface Interaction on North Wambo Creek**

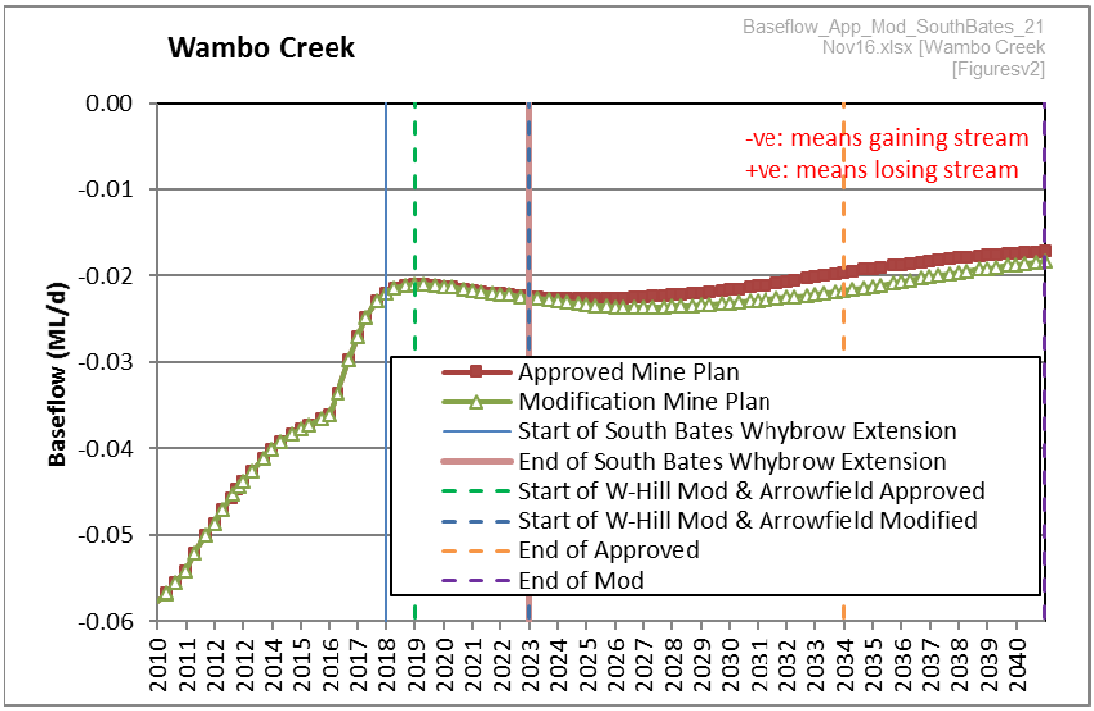


Figure 40 **Predicted Groundwater-Surface Interaction on Wambo Creek**

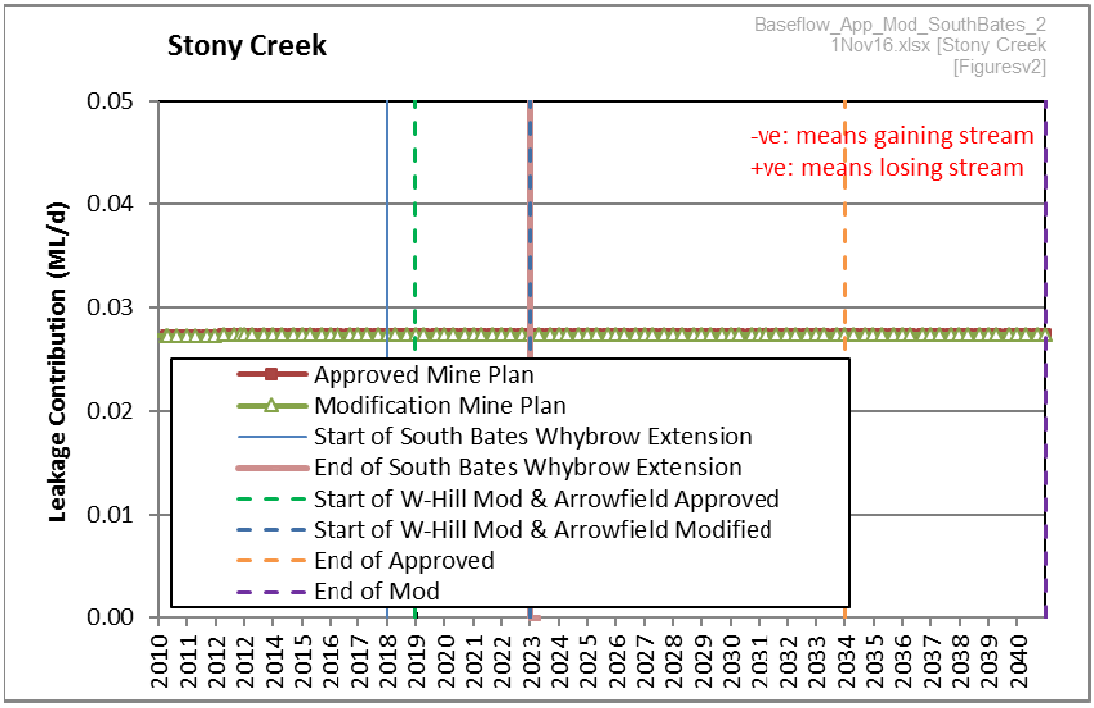


Figure 41 **Predicted Groundwater-Surface Interaction on Stony Creek**

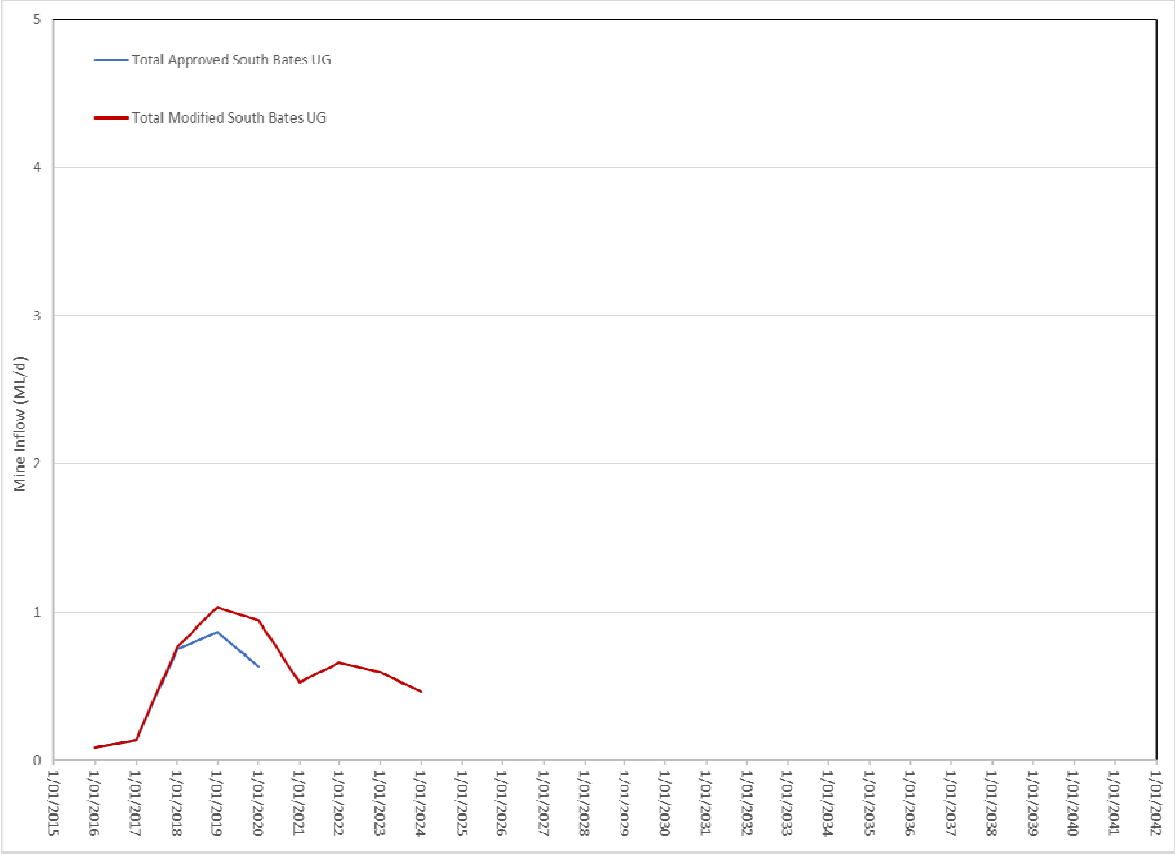


Figure 42 Combined Predicted South Bates Underground Mine Inflow

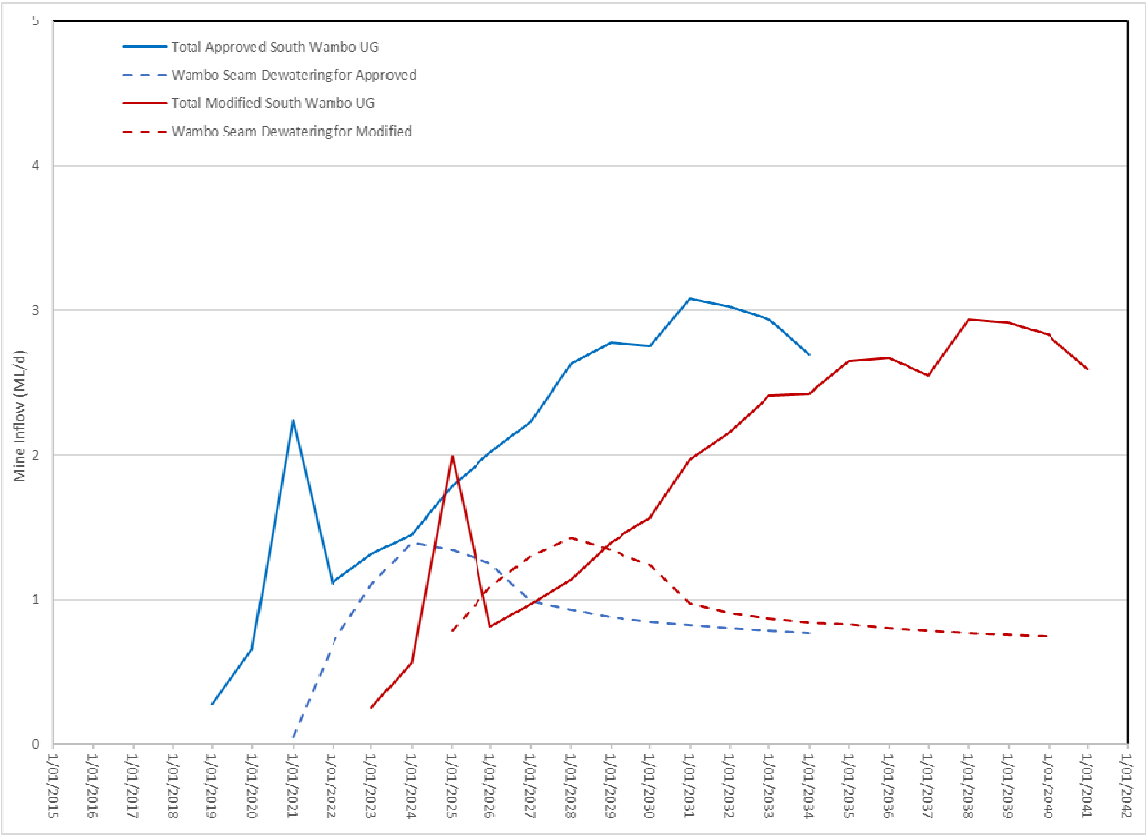


Figure 43 Combined Predicted South Wambo Underground Mine Inflow and Wambo Seam Dewatering

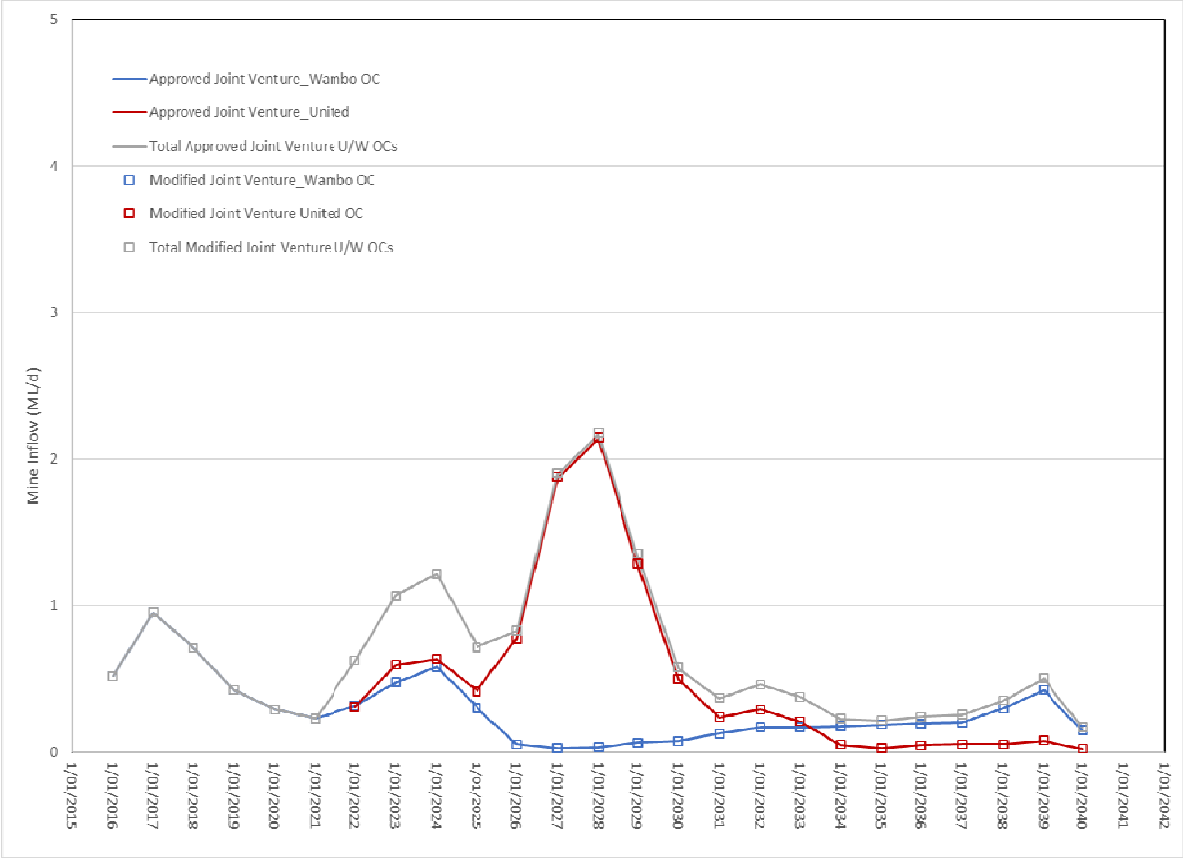


Figure 44 Joint Venture United/Wambo Open Cuts Mine Inflow

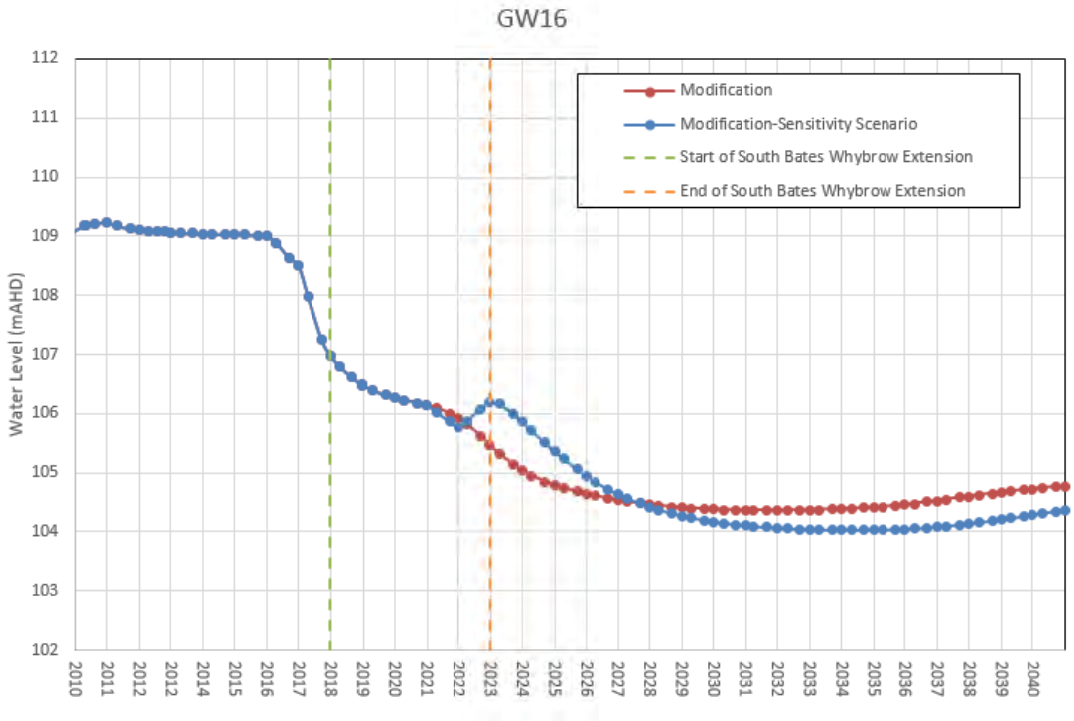


Figure 45 Groundwater levels at GW16 for Fracture Height Sensitivity Runs a) Fracturing to the Surface as Shown in Figure D1 (blue line) b) Fracturing to Layer 2 Only Above Longwalls 22 to 25 (red line)

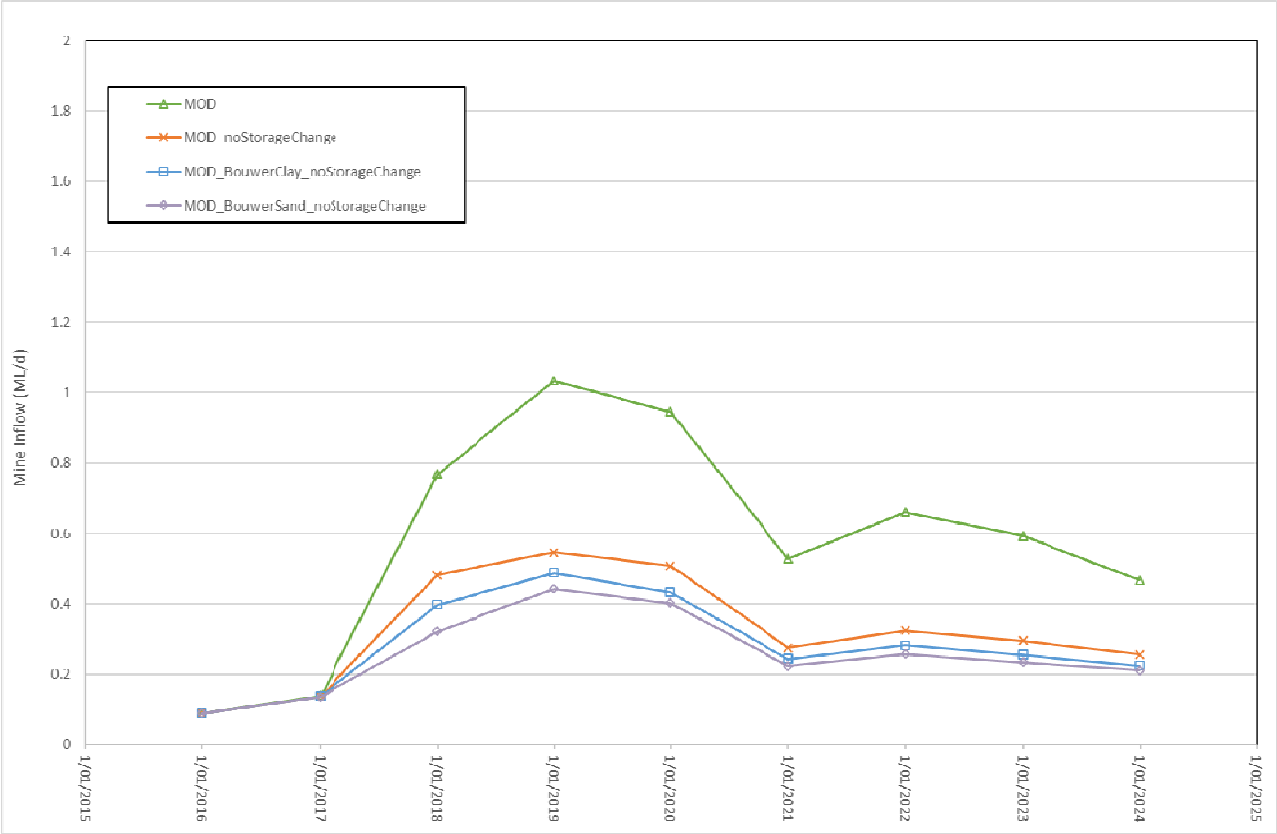


Figure 46 Total Modified South Bates Underground Mine Inflow for Unsaturated Zone Parameters Sensitivity Runs

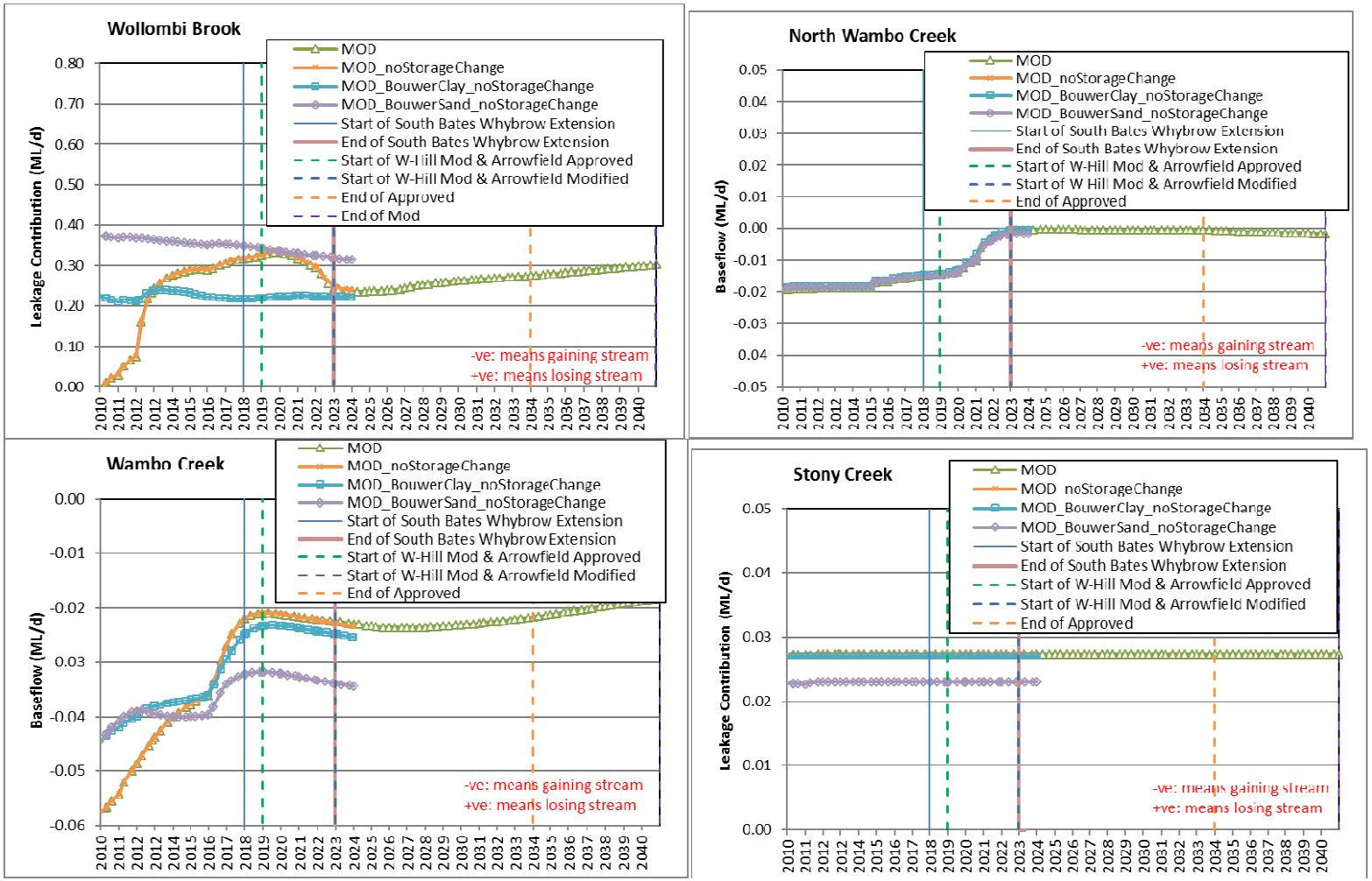


Figure 47 Predicted Groundwater-Surface Water Interaction for Unsaturated Zone Parameters Sensitivity Runs

Figure 48 Groundwater levels at GW16 for Unsaturated Zone Parameters Sensitivity Runs

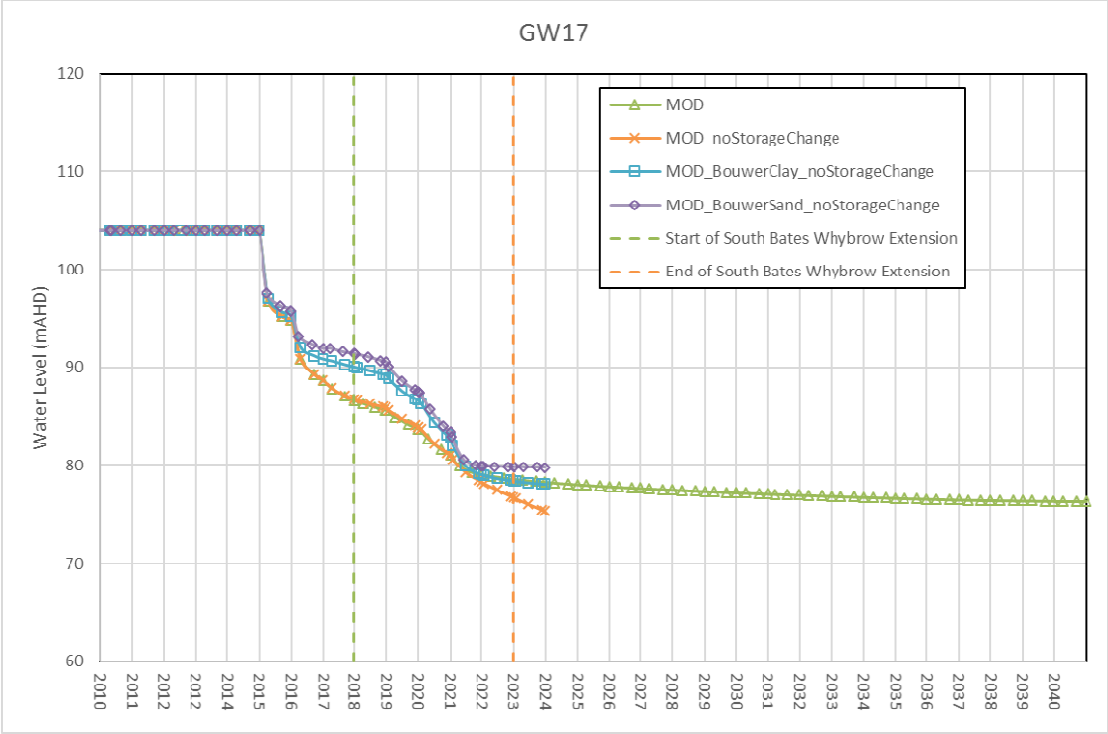


Figure 49 Groundwater levels at GW17 for Unsaturated Zone Parameters Sensitivity Runs

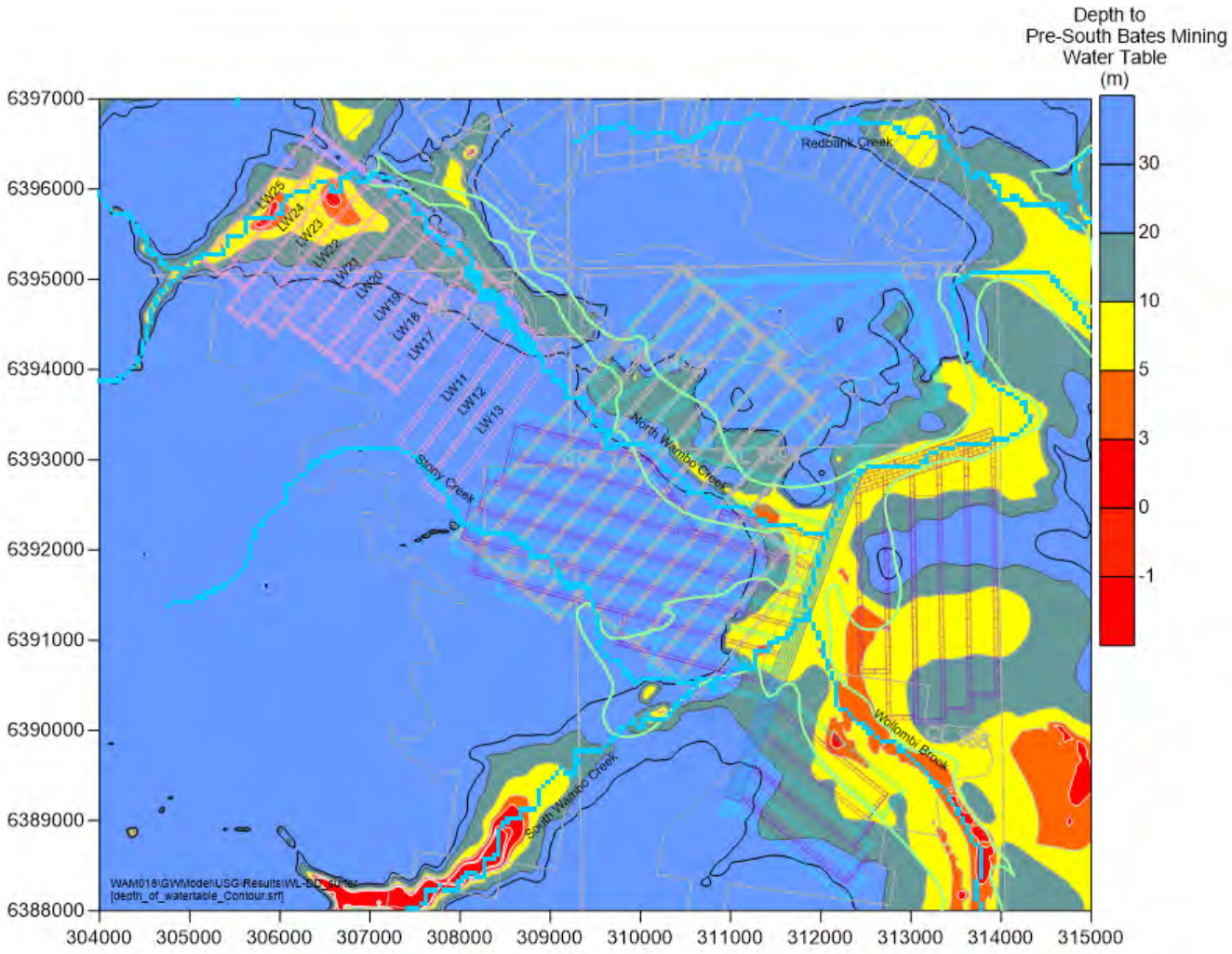


Figure 50 Depth to Water Table Pre-South Bates Mining (Stress Period 31)

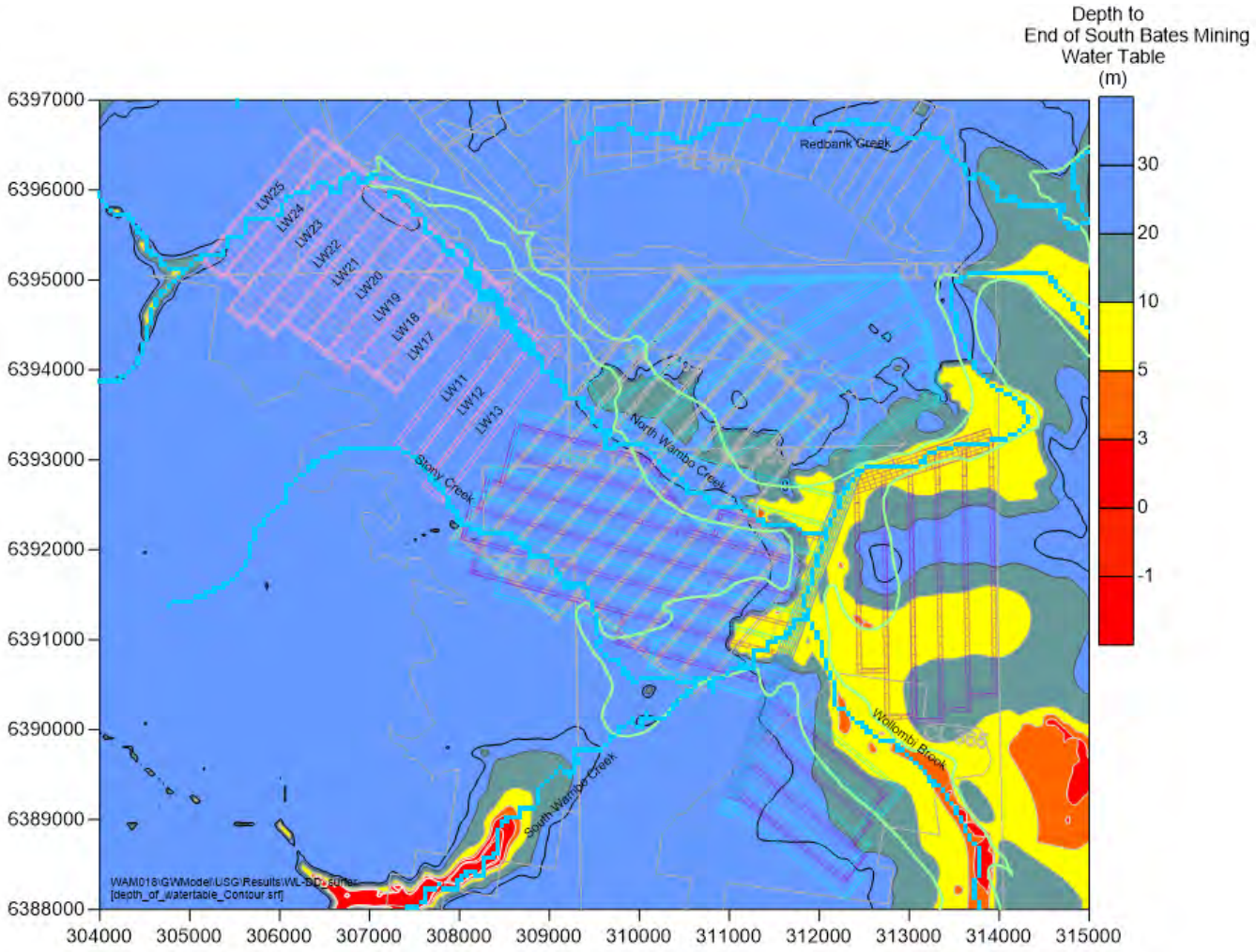


Figure 51 Depth to Water Table at the end of South Bates Mining (Stress Period 39)

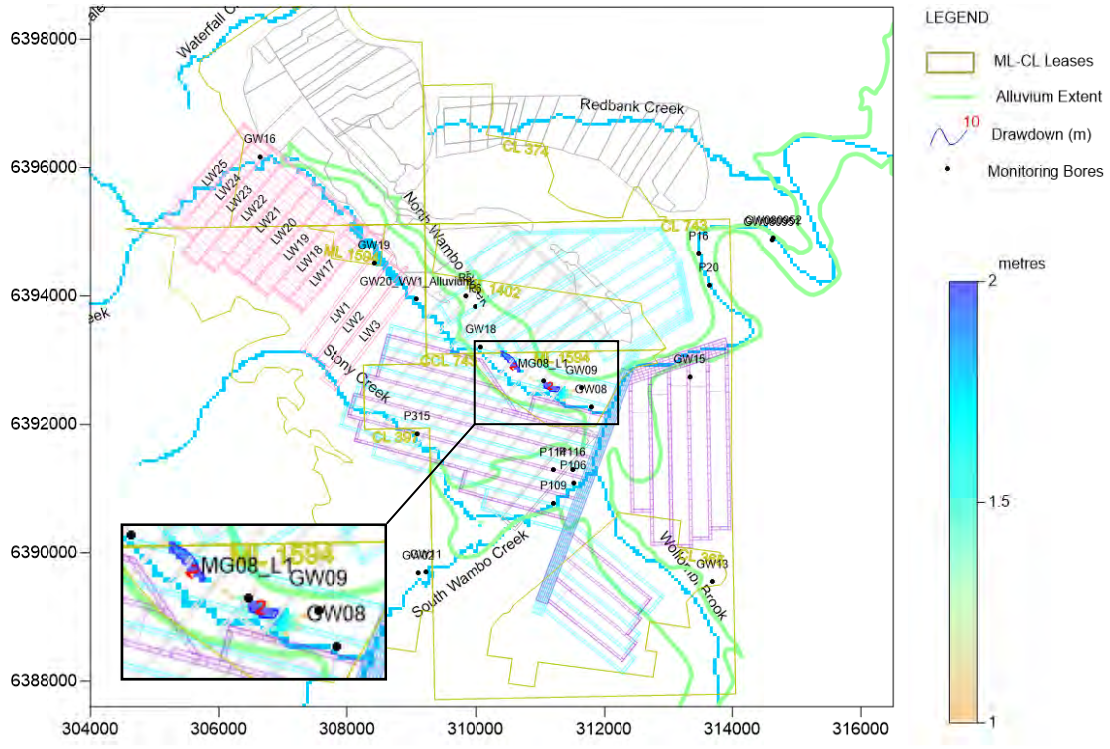


Figure 52 Cumulative Maximum Drawdown (m) in Alluvium / Regolith during the Model Prediction Period (SP32-SP56) for Modification Scenario

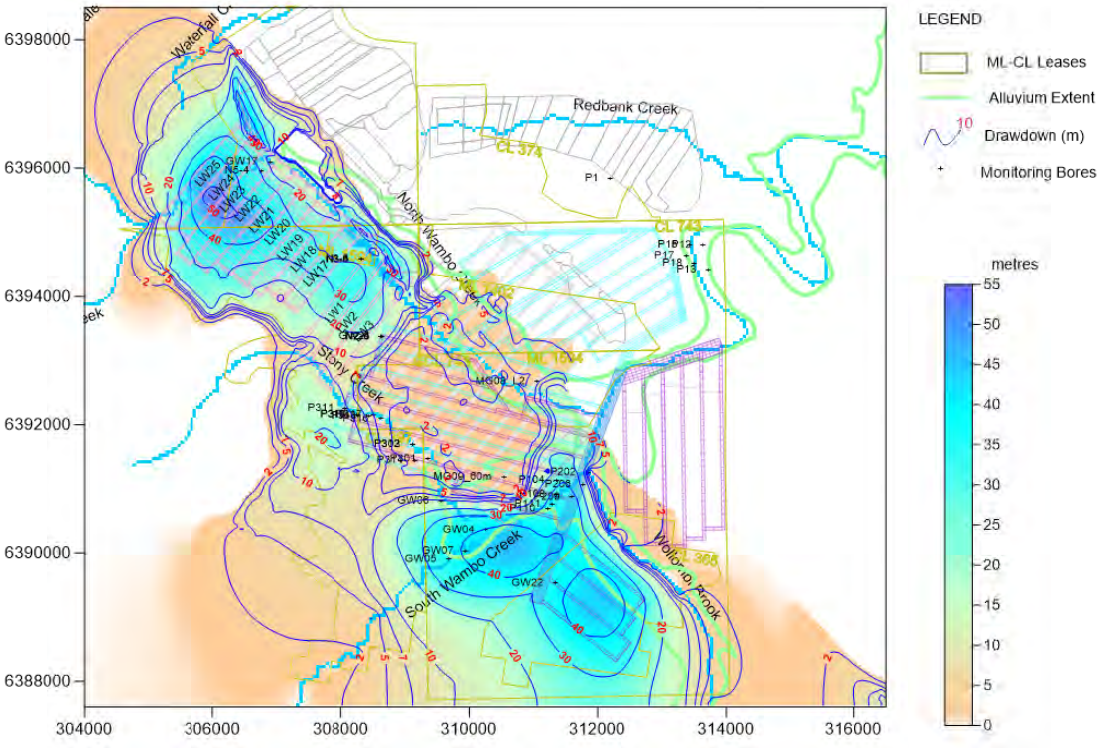


Figure 53 Cumulative Maximum Drawdown (m) in Whybrow Seam Overburden during the Model Prediction Period (SP32-SP56) for Modification Scenario

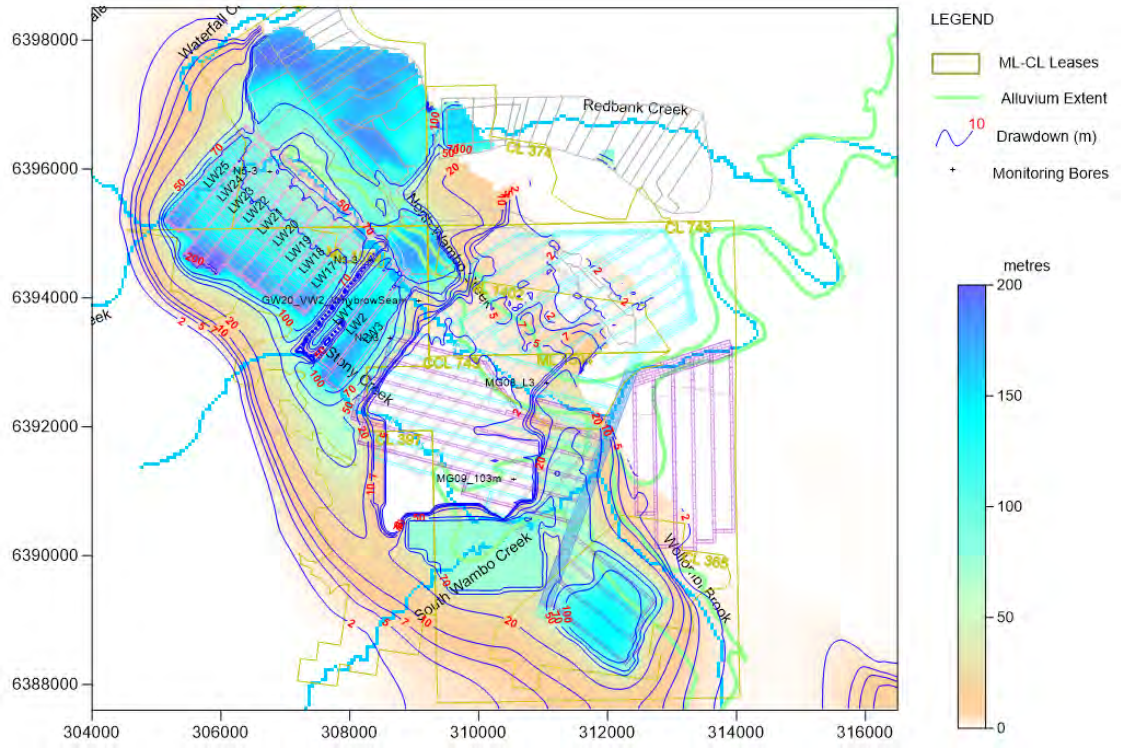


Figure 54 Cumulative Maximum Drawdown (m) in Whybrow Seam during the Model Prediction Period (SP32-SP56) for Modification Scenario

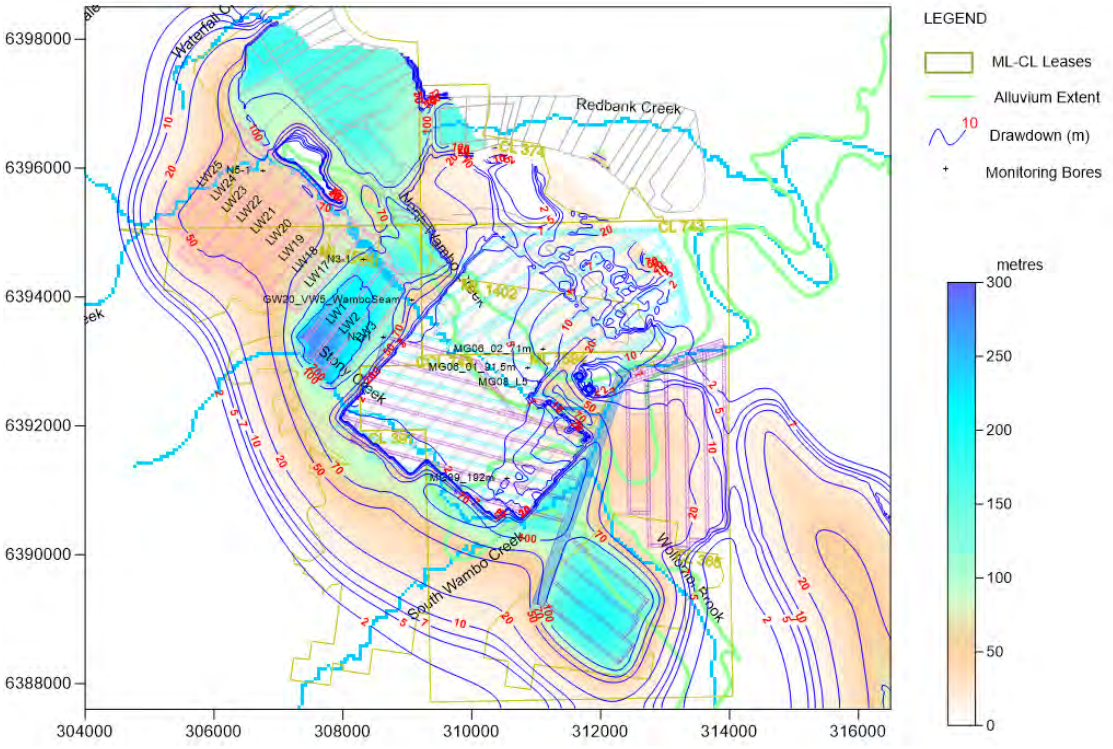


Figure 55 Cumulative Maximum Drawdown (m) in Wambo Seam during the Model Prediction Period (SP32-SP56) for Modification Scenario

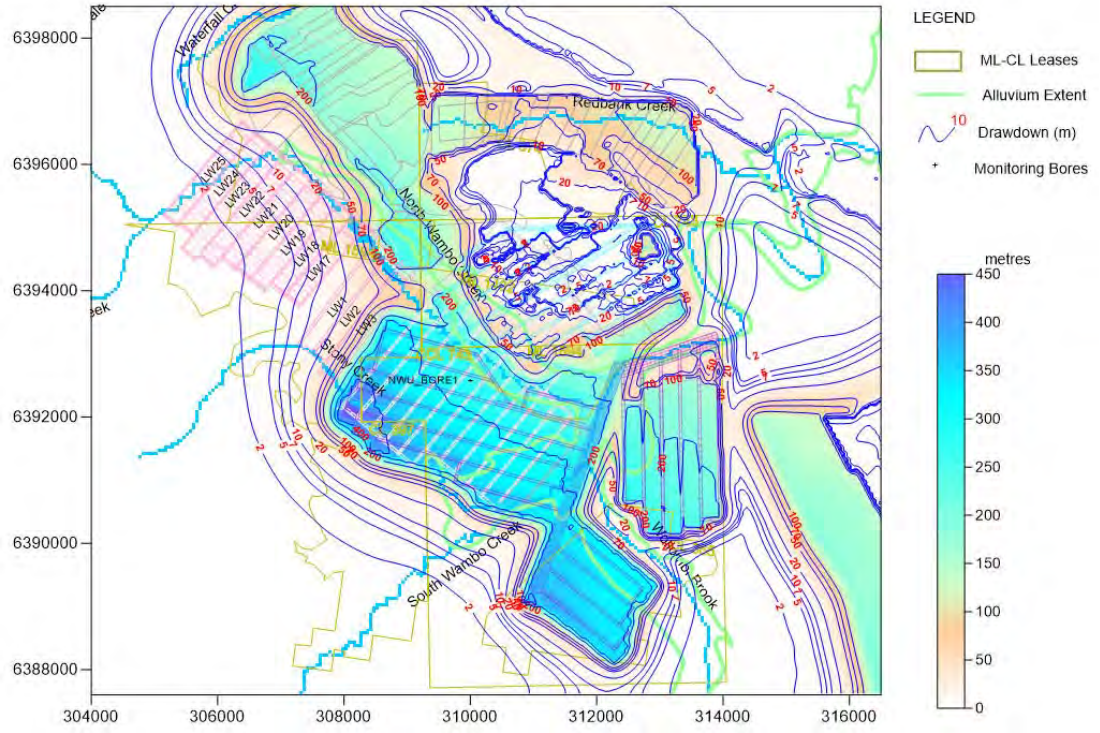


Figure 56 Cumulative Maximum Drawdown (m) in Woodlands Hill Seam during the Model Prediction Period (SP32-SP56) for Modification Scenario

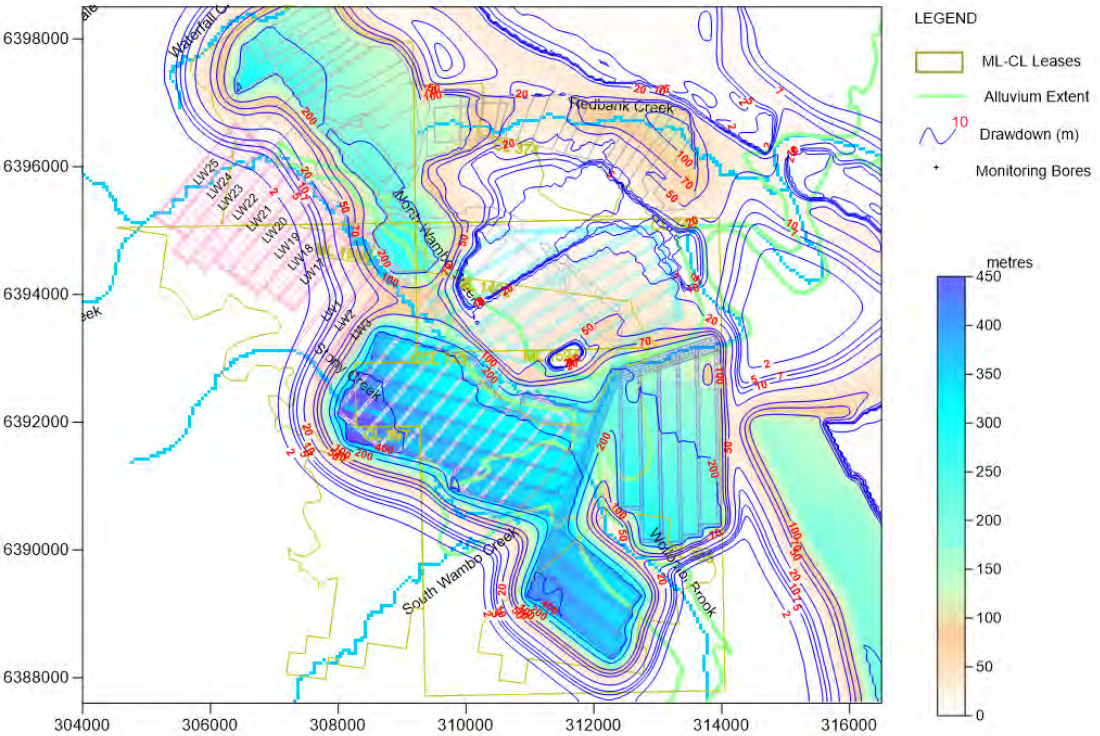


Figure 57 Cumulative Maximum Drawdown (m) in Arrowfield Seam during the Model Prediction Period (SP32-SP56) for Modification Scenario

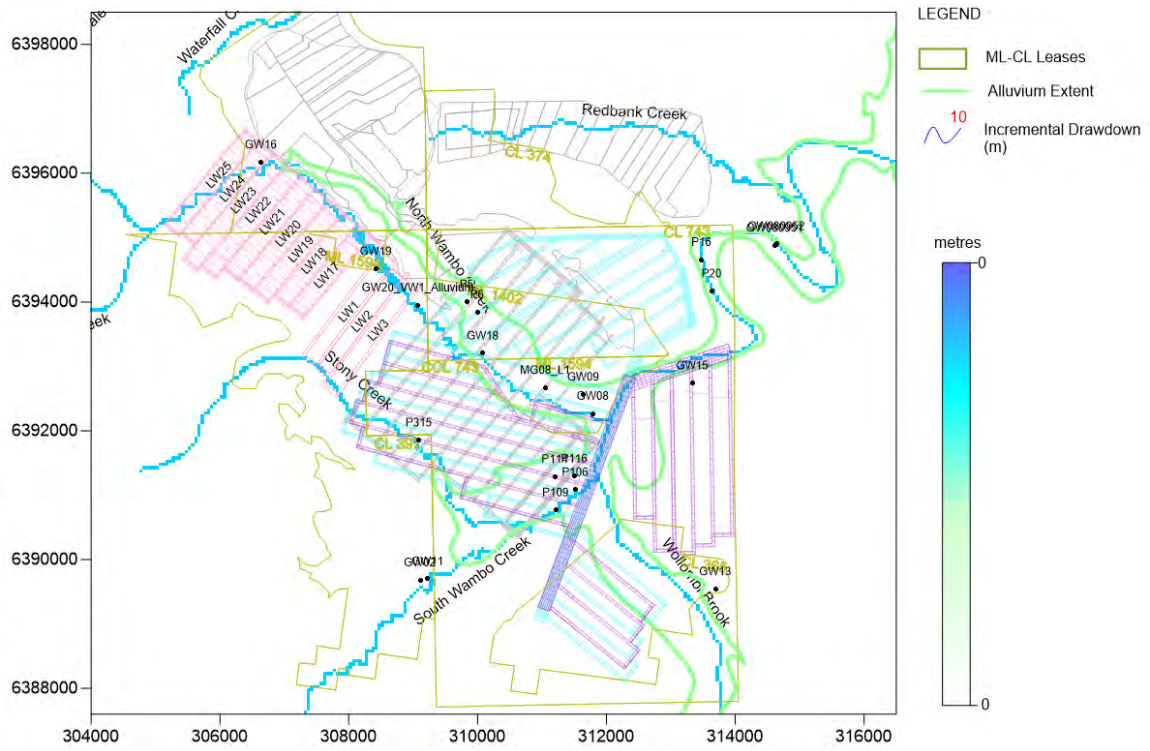


Figure 58 Difference between Maximum Drawdown (m) in Alluvium / Regolith during the Model Prediction Period (SP32-SP56) for Modification and Approved Scenarios

('+' and '-' means Modification Scenario Maximum Drawdown more than Approved Scenario and Modification Scenario Maximum Drawdown less than Approved Scenario, respectively)

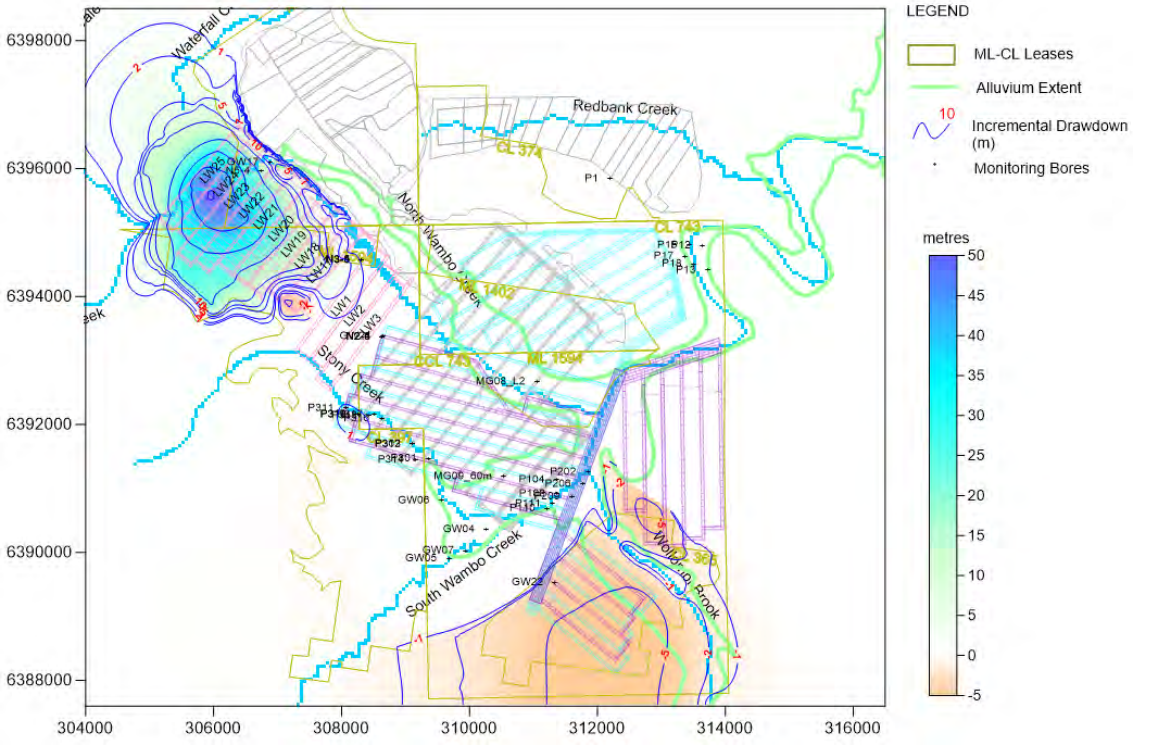


Figure 59 Difference Between Maximum Drawdown (m) in Whybrow Seam Overburden during the Model Prediction Period (SP32-SP56) for Modification and Approved Scenarios

('+' and '-' means Modification Scenario Maximum Drawdown more than Approved Scenario and Modification Scenario Maximum Drawdown less than Approved Scenario, respectively)

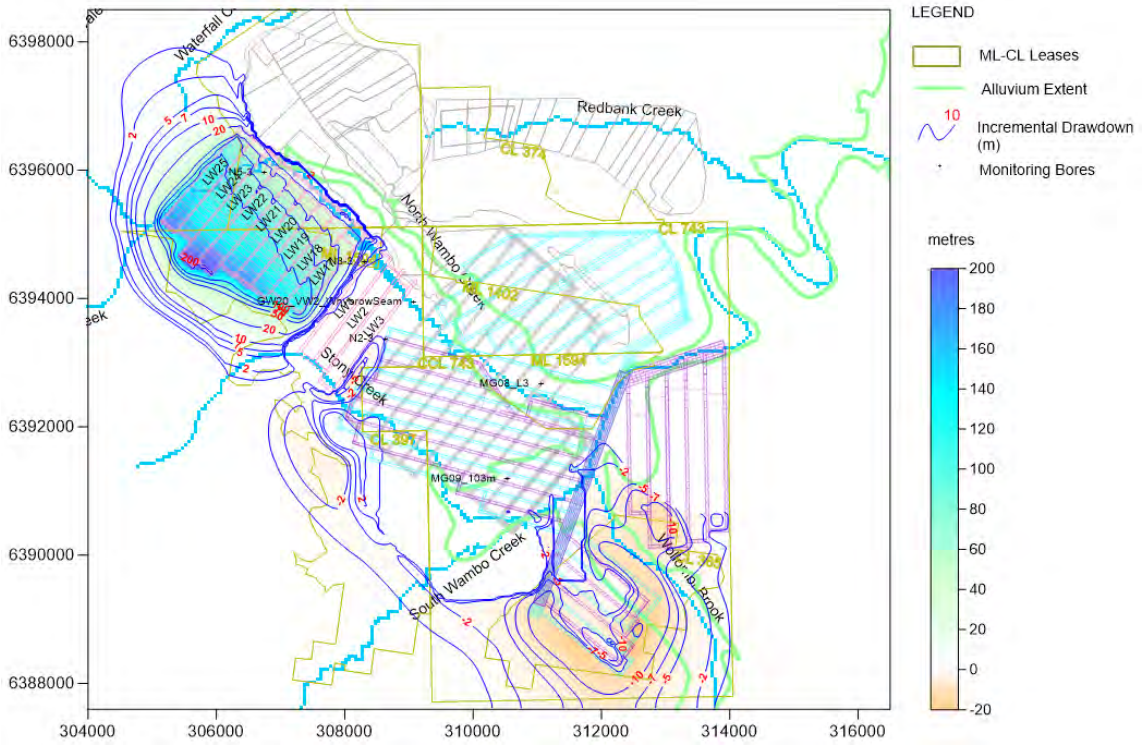


Figure 60 Difference Between Maximum Drawdown (m) in Whybrow Seam during the Model Prediction Period (SP32-SP56) for Modification and Approved Scenarios

('+' and '-' means Modification Scenario Maximum Drawdown more than Approved Scenario and Modification Scenario Maximum Drawdown less than Approved Scenario, respectively)

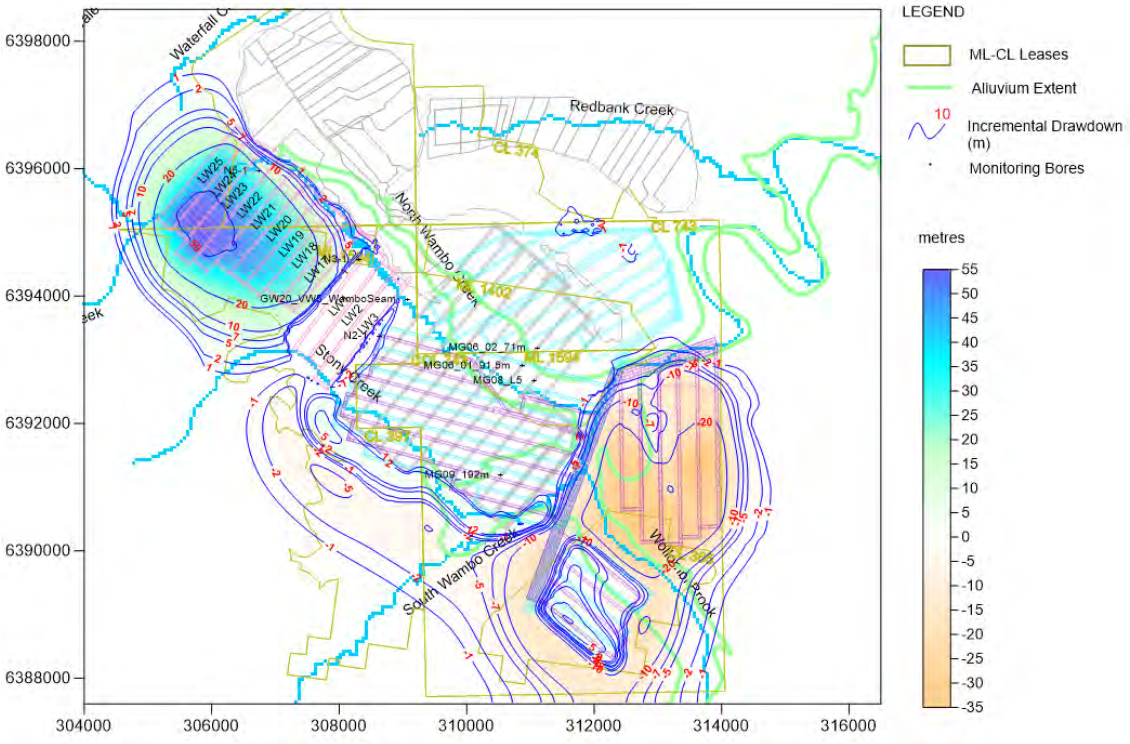


Figure 61 Difference Between Maximum Drawdown (m) in Wambo Seam during the Model Prediction Period (SP32-SP56) for Modification and Approved Scenarios

('+' and '-' means Modification Scenario Maximum Drawdown more than Approved Scenario and Modification Scenario Maximum Drawdown less than Approved Scenario, respectively)

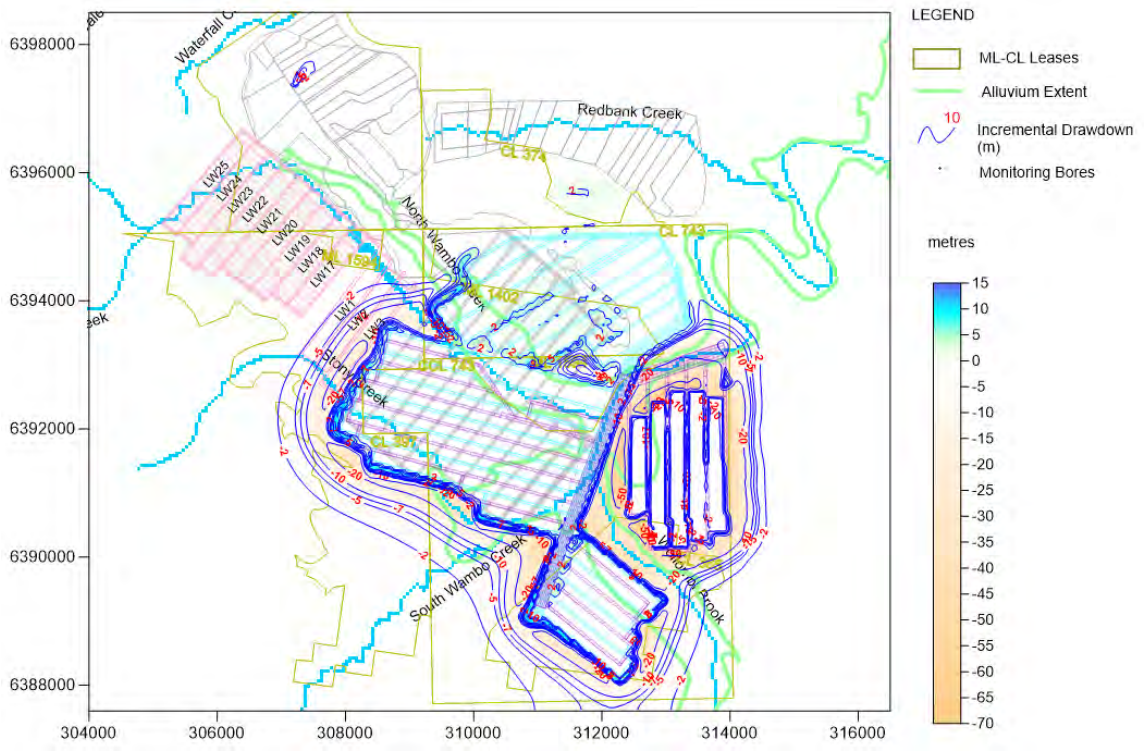


Figure 62 Difference between Maximum Drawdown (m) in Woodlands Hill Seam during the Model Prediction Period (SP32-SP56) for Modification and Approved Scenarios

('+' and '-' means Modification Scenario Maximum Drawdown more than Approved Scenario and Modification Scenario Maximum Drawdown less than Approved Scenario, respectively)

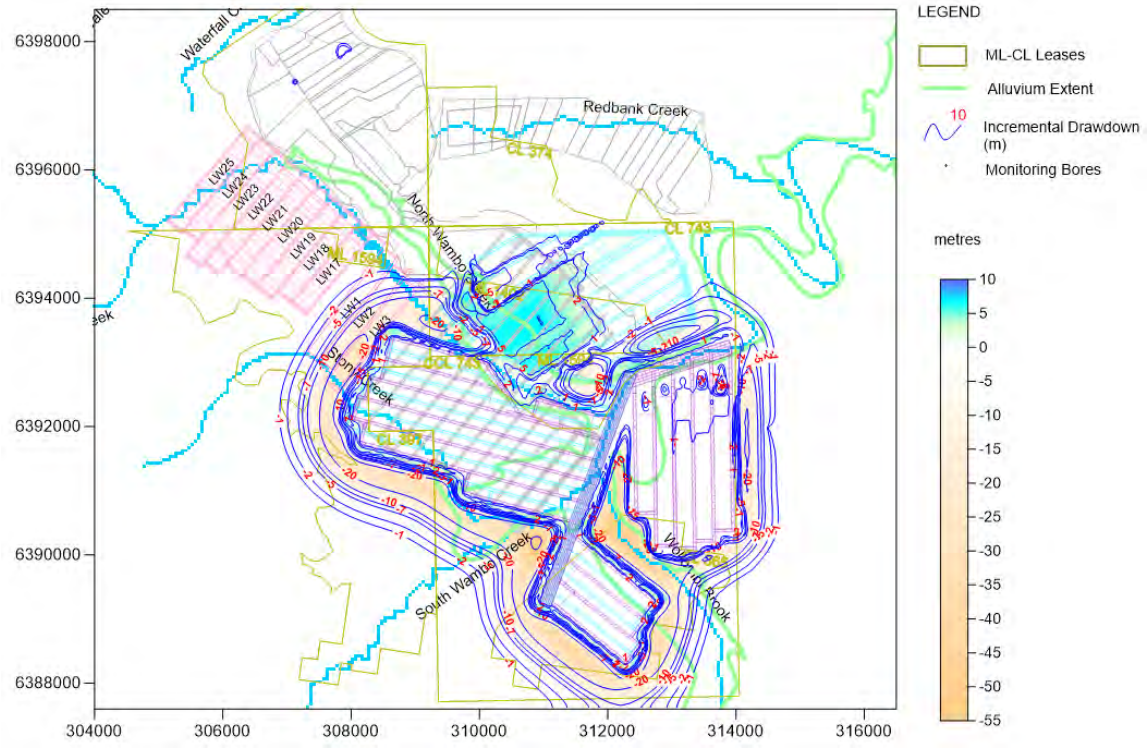


Figure 63 Difference between Maximum Drawdown (m) in Arrowfield Seam during the Model Prediction Period (SP32-SP56) for Modification and Approved Scenarios

('+' and '-' means Modification Scenario Maximum Drawdown more than Approved Scenario and Modification Scenario Maximum Drawdown less than Approved Scenario, respectively)

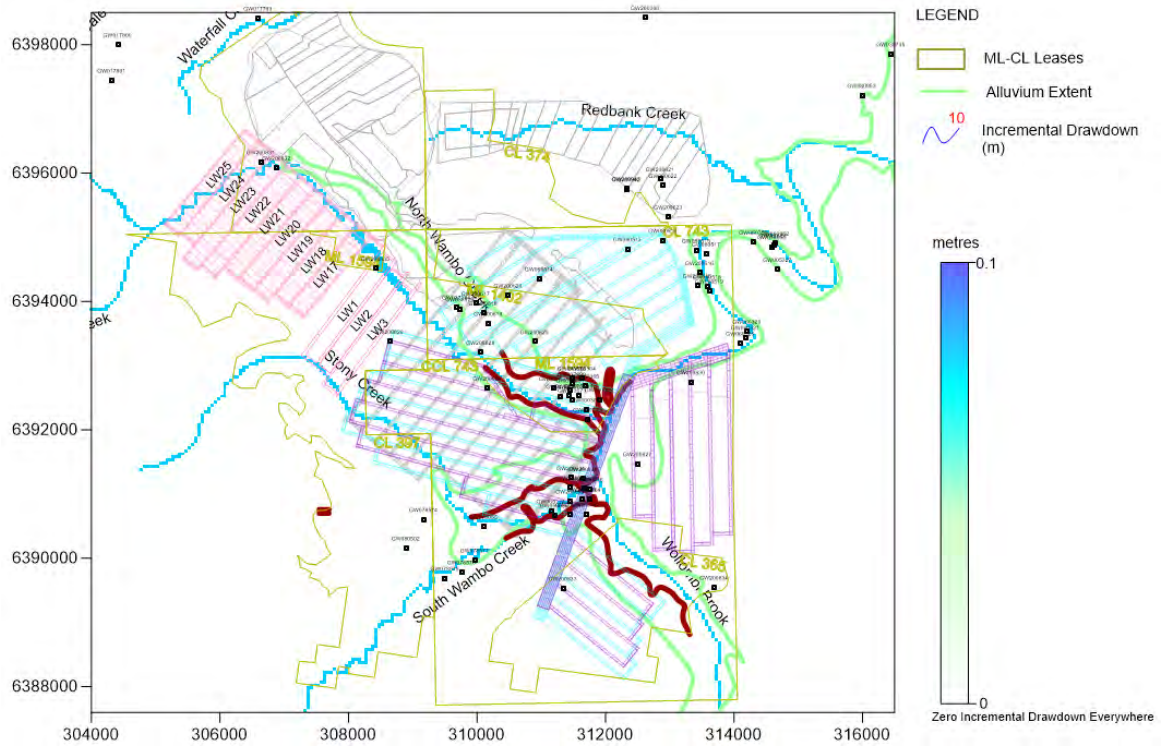


Figure 64 Proximity of Registered Bores to Incremental Maximum Drawdown (m) in Alluvium / Regolith during the Model Prediction Period (SP32-SP56)

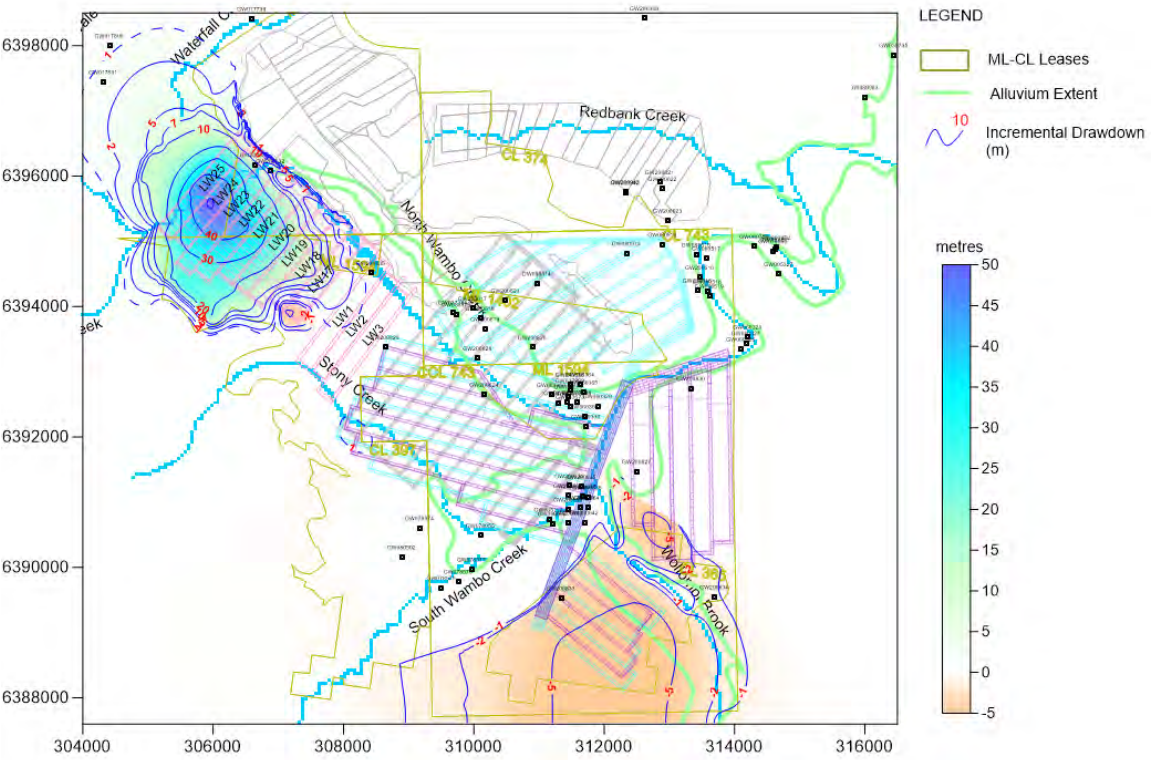


Figure 65 Proximity of Registered Bores to Incremental Maximum Drawdown (m) in Triassic Sandstone and Permian Overburden during the Model Prediction Period (SP32-SP56)

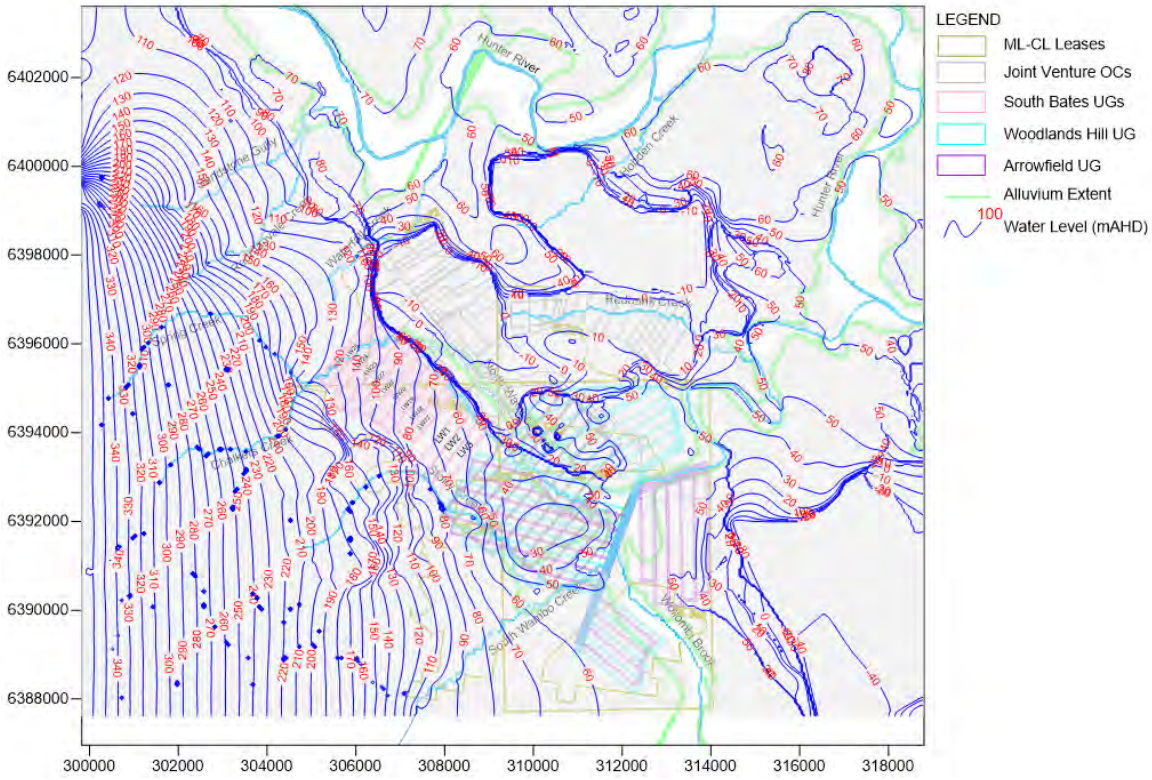


Figure 66 Recovered Water Table (mAHD) in Alluvium / Regolith (Model Layer 1) after 200 Years

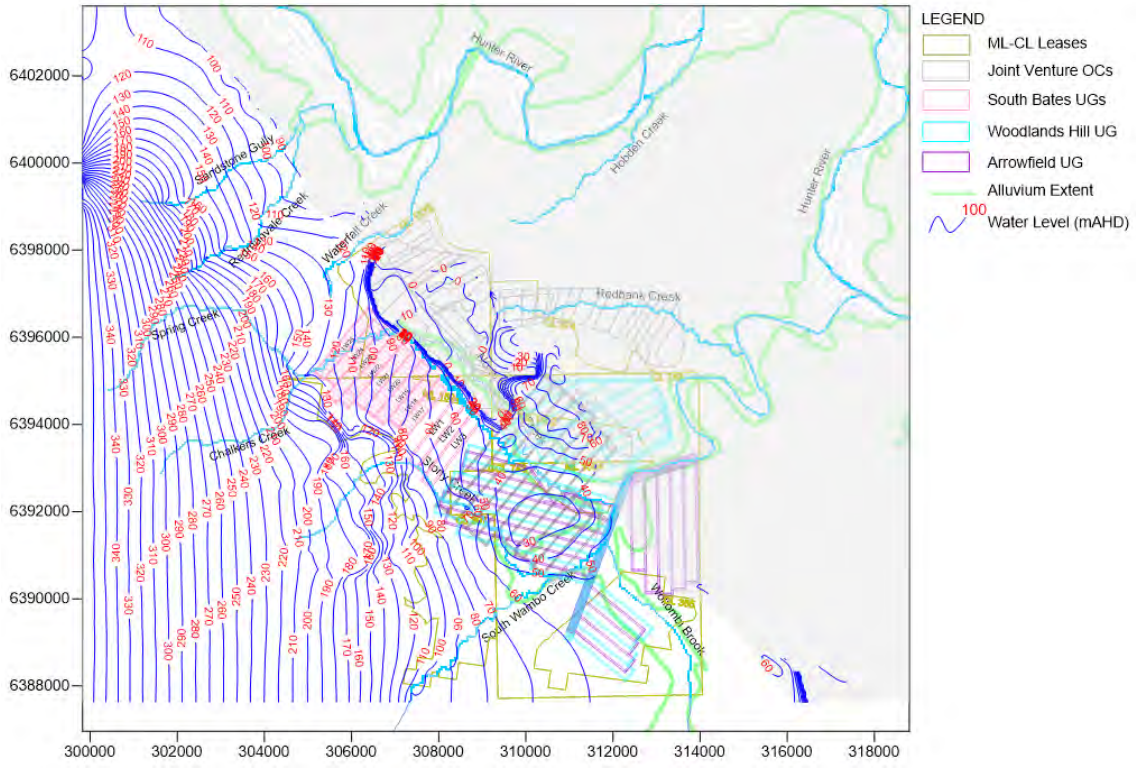


Figure 67 Recovered Groundwater Levels (mAHD) in Whybrow Seam Overburden (Model Layer 2) after 200 Years

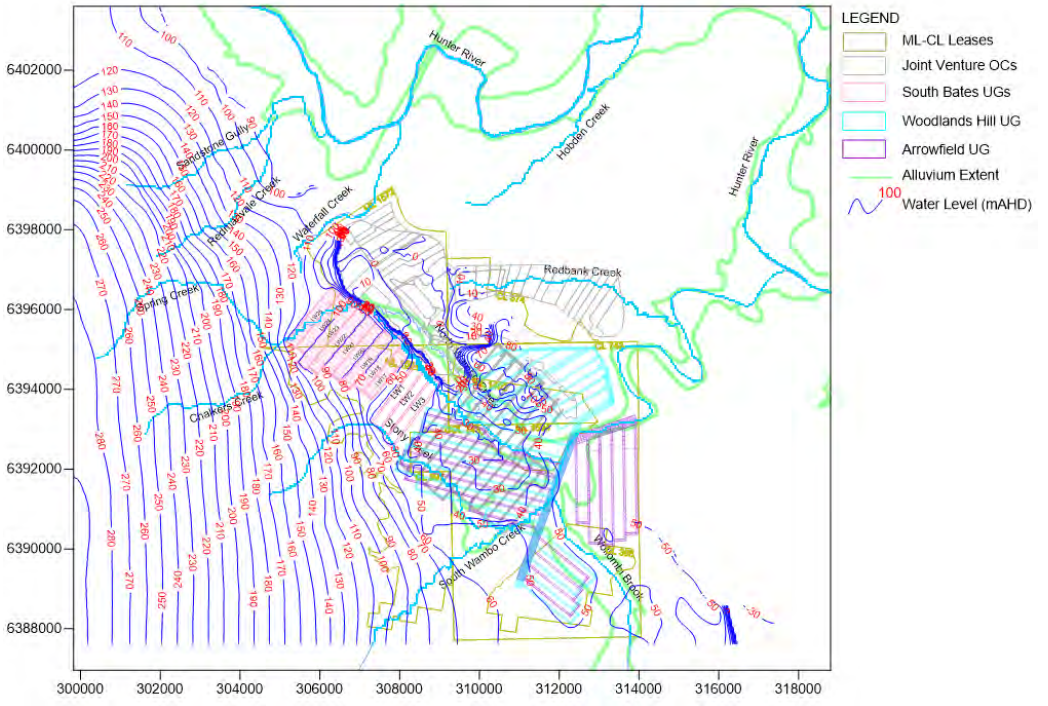


Figure 68 Recovered Groundwater Levels (mAHD) in Whybrow Seam (Model Layer 3) after 200 Years

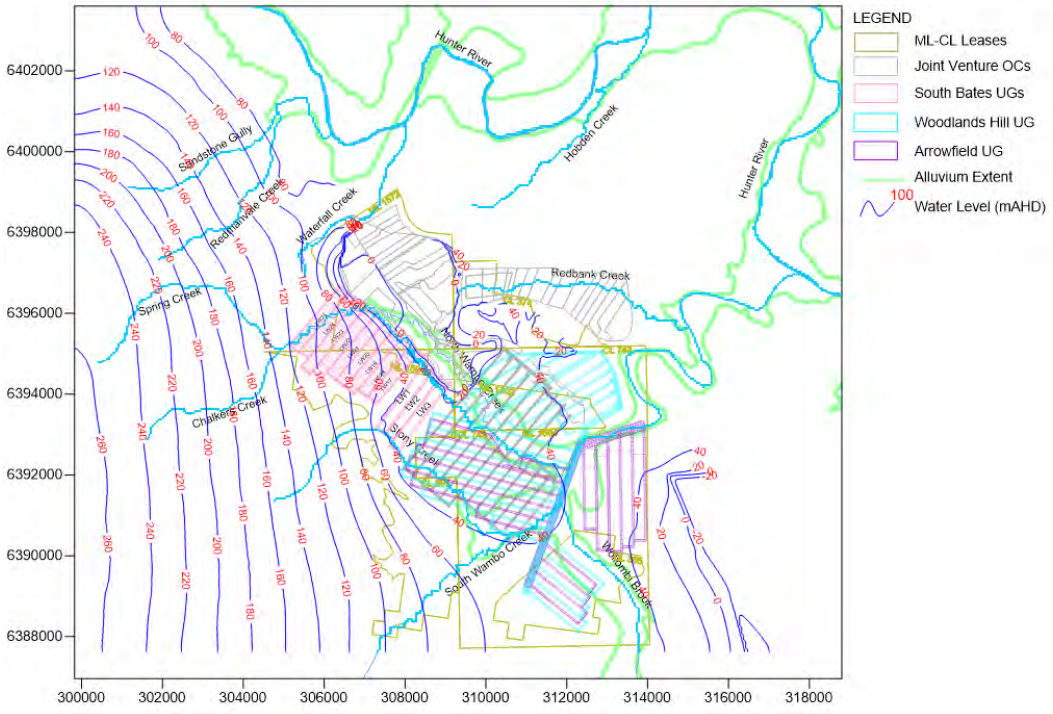


Figure 69 Recovered Groundwater Levels (mAHD) in Wambo Seam (Model Layer 5) after 200 Years

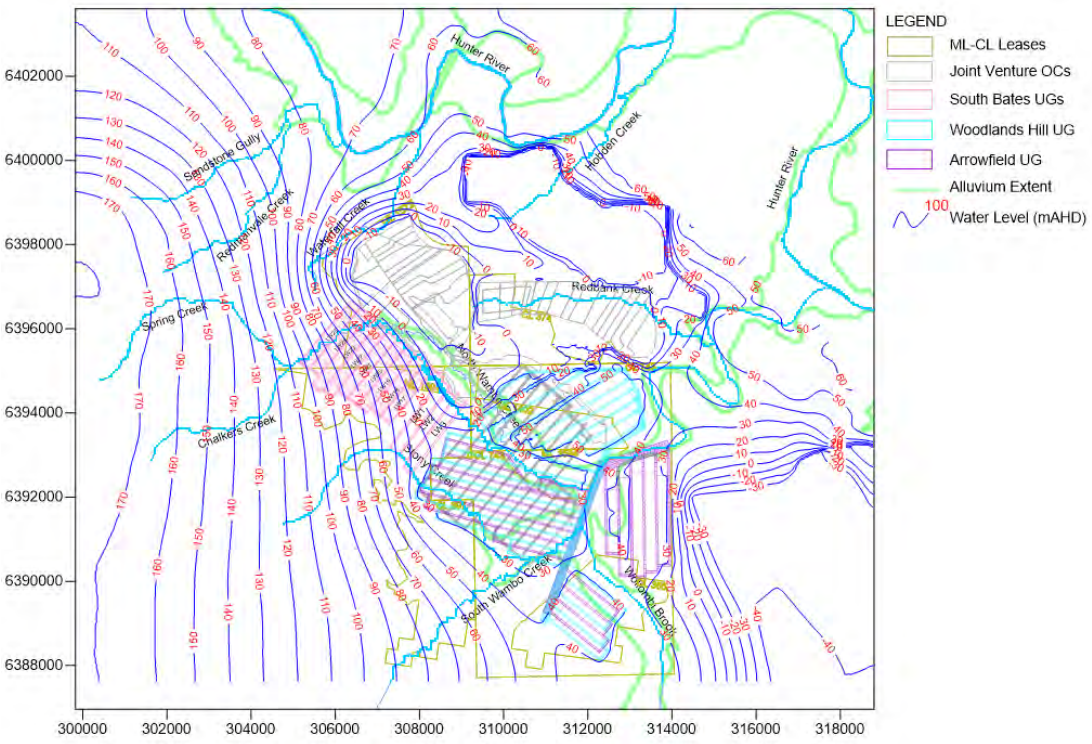


Figure 70 Recovered Groundwater Levels (mAHD) in the Woodlands Hill Seam (Model Layer 9) after 200 Years

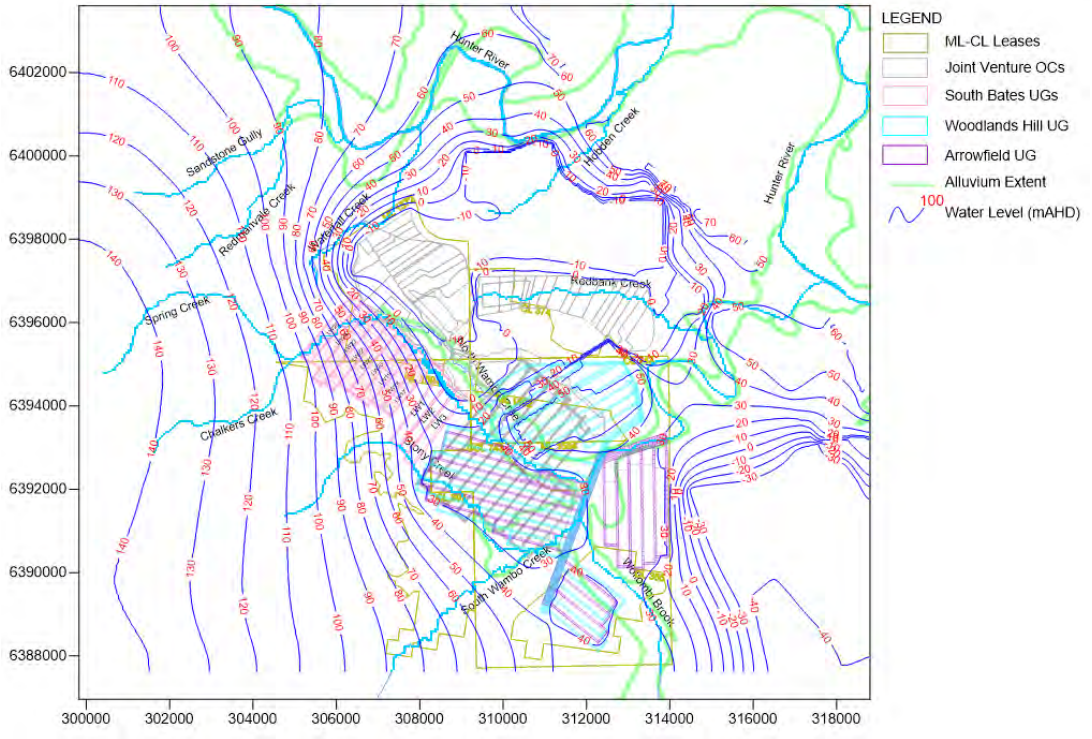


Figure 71 Recovered Groundwater Levels (mAHD) in the Arrowfield Seam (Model Layer 11) after 200 Years

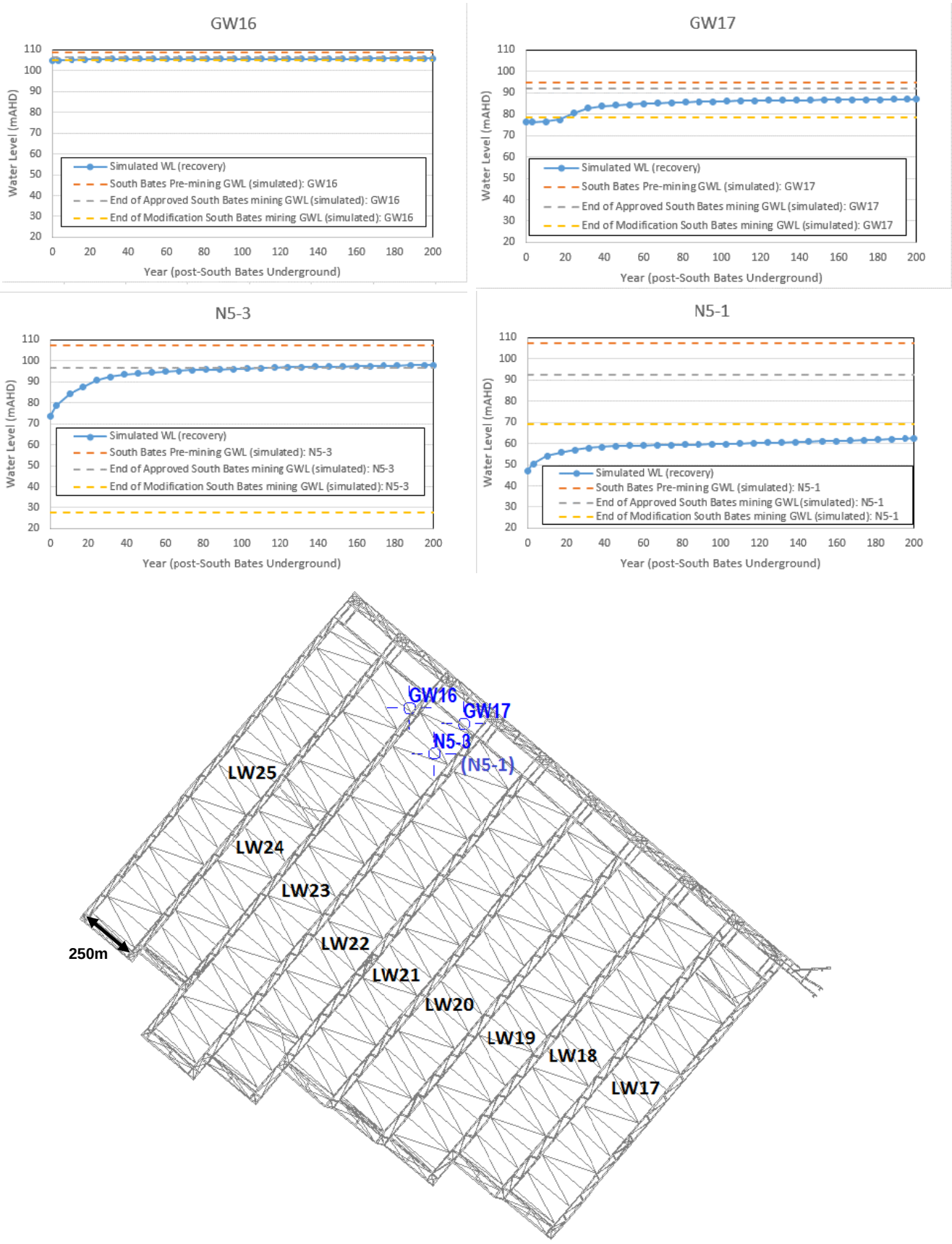


Figure 72 Representative Recovery Hydrographs at Bores Over Longwall Panels: GW16 in Layer 1 (alluvium), GW17 in Layer 2 (Whybrow Seam Overburden), N5-3 in Layer 3 (Whybrow Seam), N5-1 in Layer 5 (Wambo Seam)

Note: Pre-mining GWL (simulated) is the 2014 pre-South Bates and Joint Venture United/Wambo Open Cut mining water levels, which includes the influence of some historical mining.

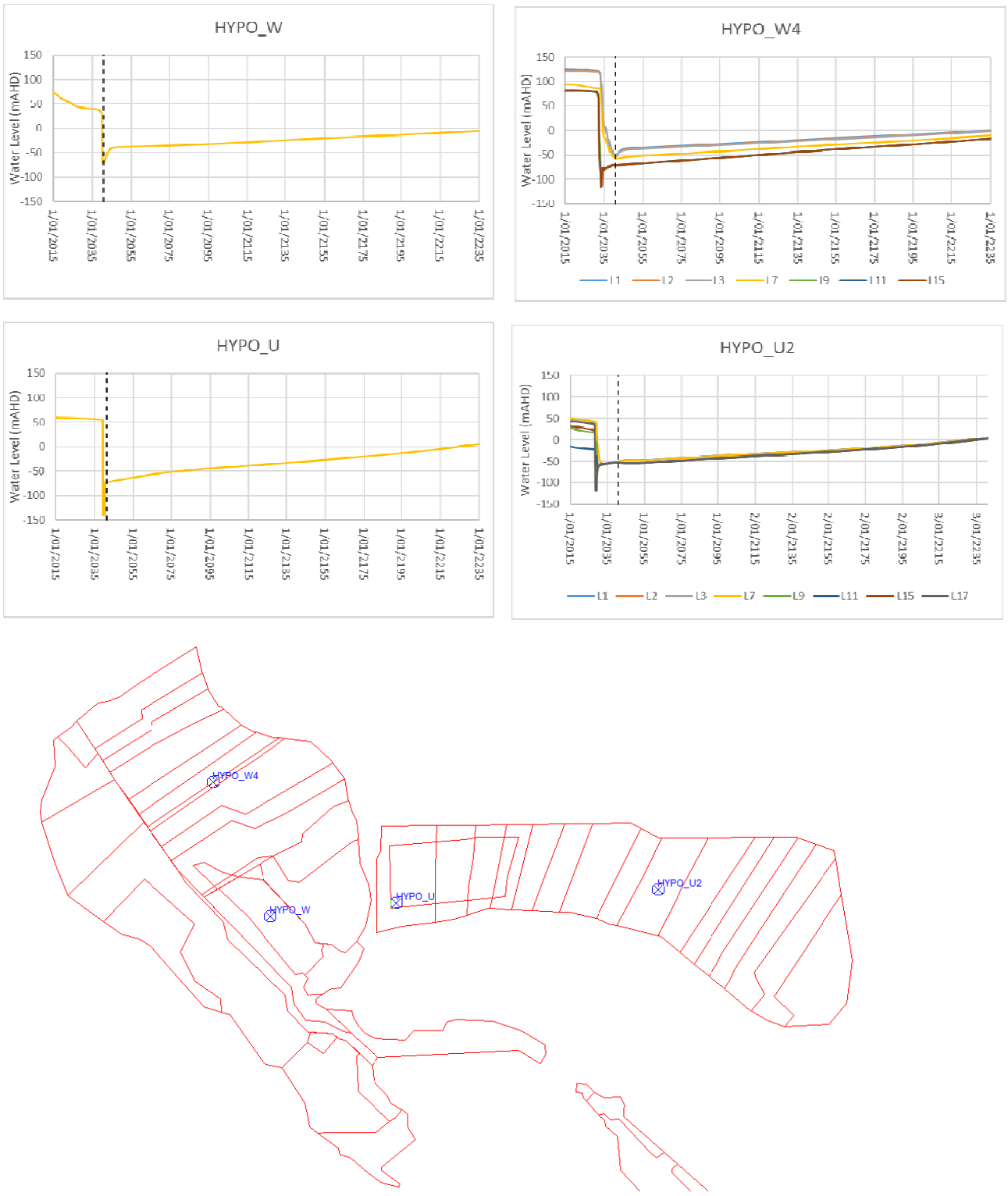


Figure 73 Representative Recovery Hydrographs at Hypothetical Bores at Open Cuts: HYPO_W within Joint Venture_Wambo Open Cut final void in layer 7(Whynot Seam), HYPO_W4 within Joint Venture_Wambo Open Cut spoil area, HYPO_U within Joint Venture_United Open Cut final void in layer 17 (Vaux Seam), HYPO_U2 within Joint Venture_United Open Cut spoil area

Note: Pre-mining GWL (simulated) is the 2014 pre-South Bates and Joint Venture United/Wambo Open Cut mining water levels, which includes the influence of some historical mining.

ATTACHMENT A

Alluvial Groundwater Hydrographs

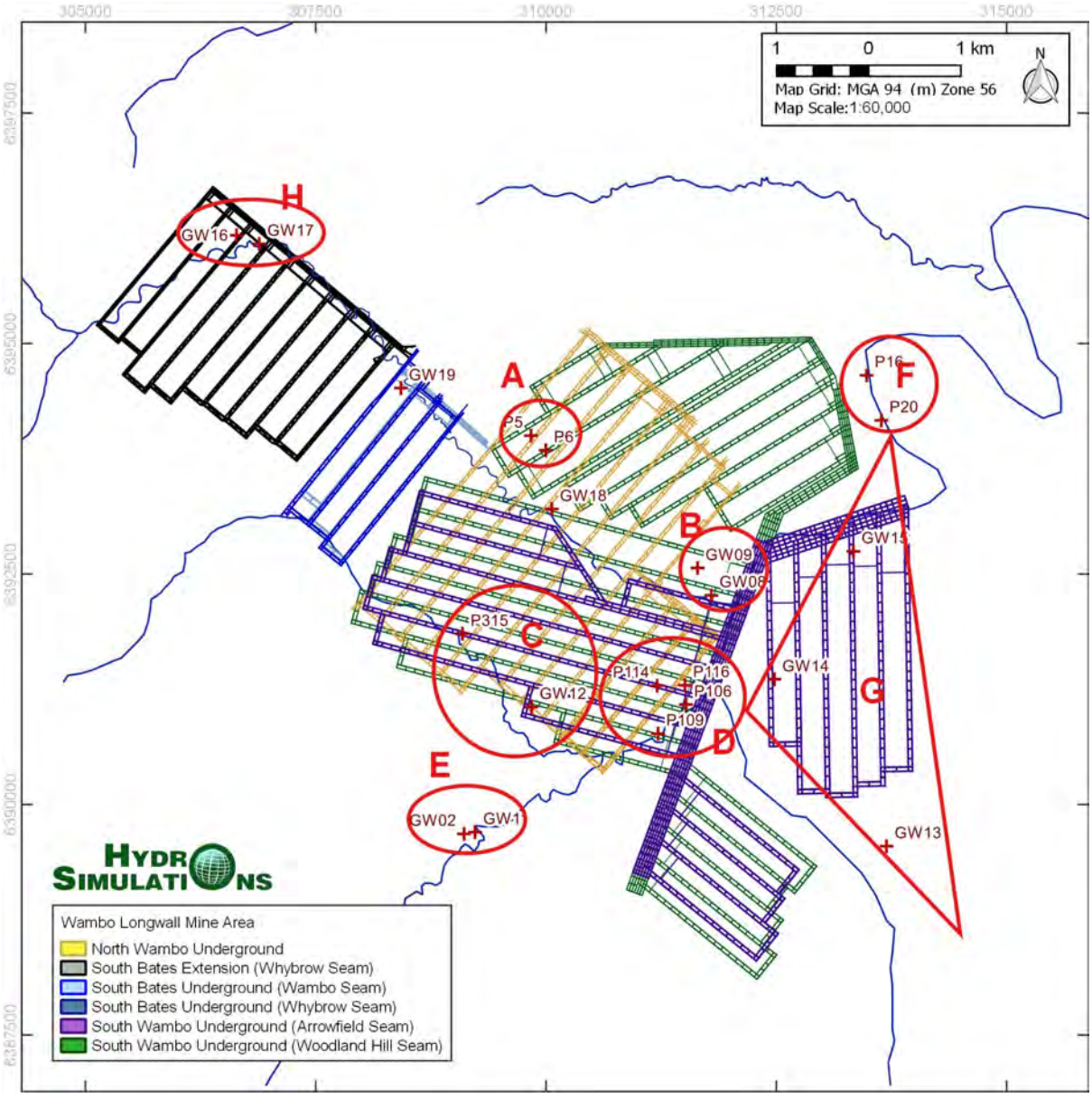


Figure A 1 - Alluvial Groundwater Monitoring Network and Hydrograph Groups

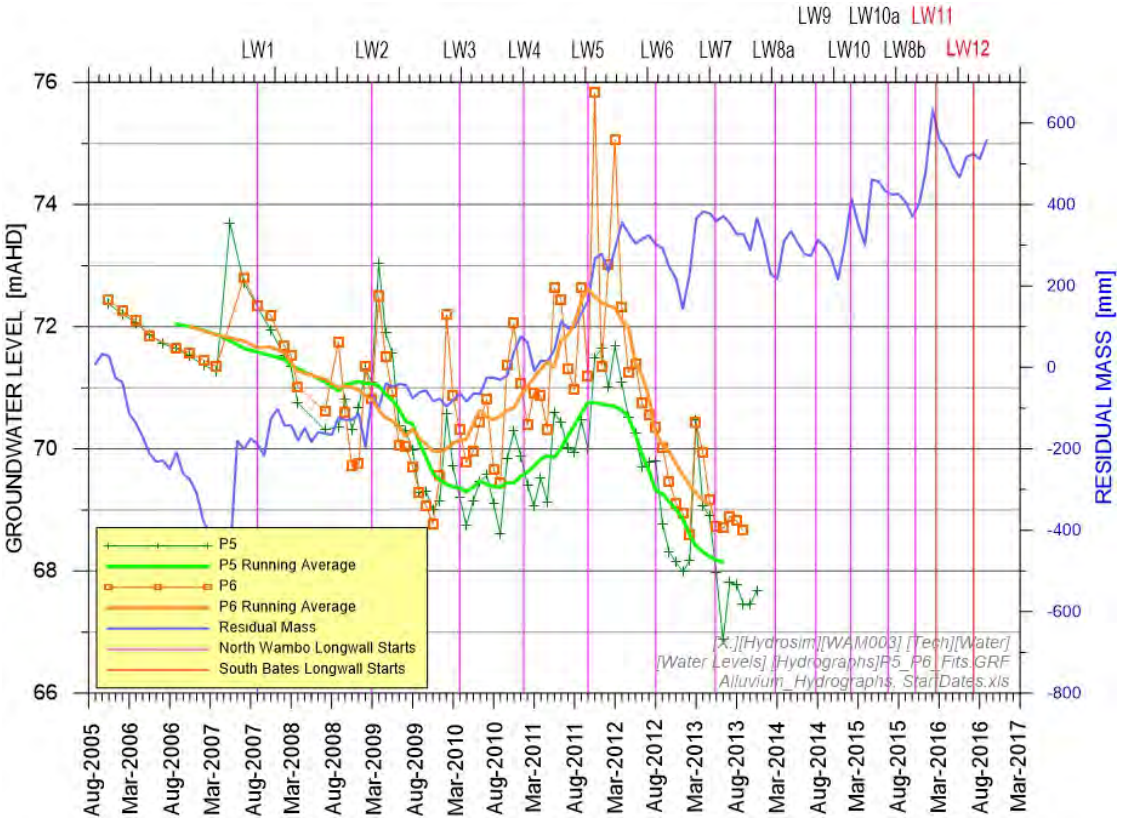


Figure A 2 - Group A Alluvial Hydrographs

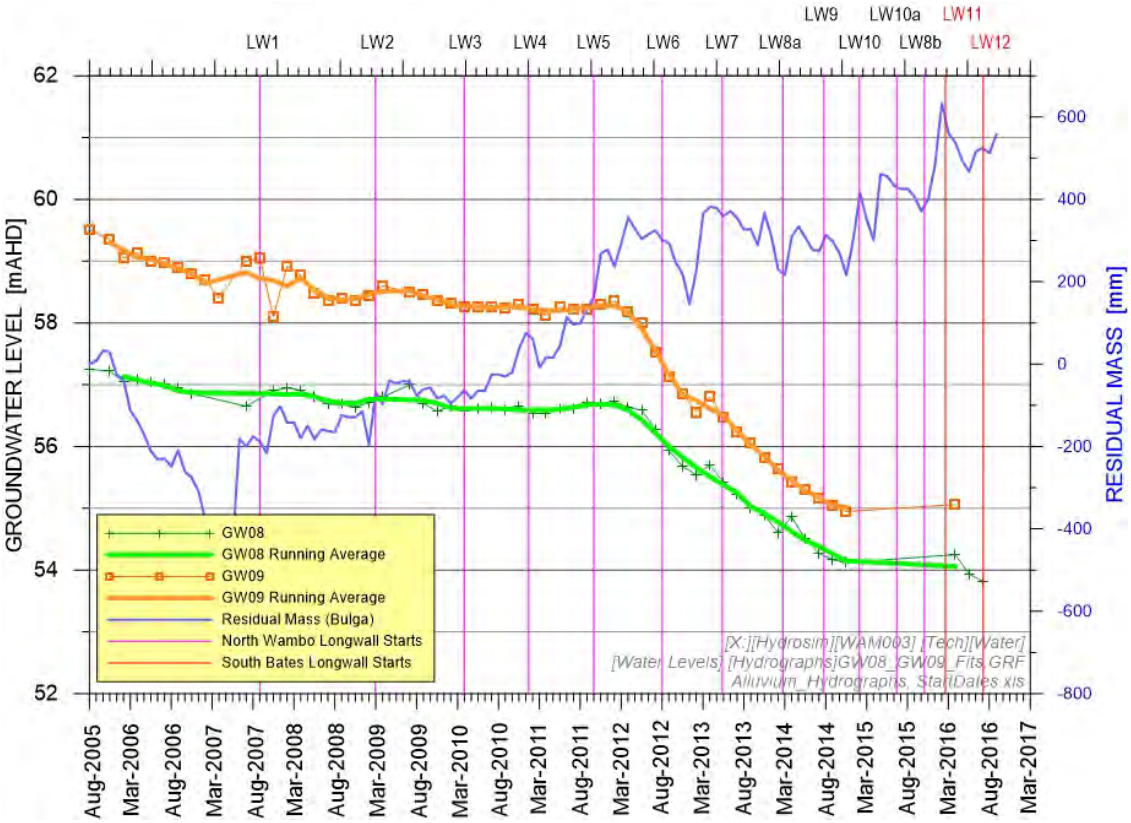


Figure A 3 - Group B Alluvial Hydrographs

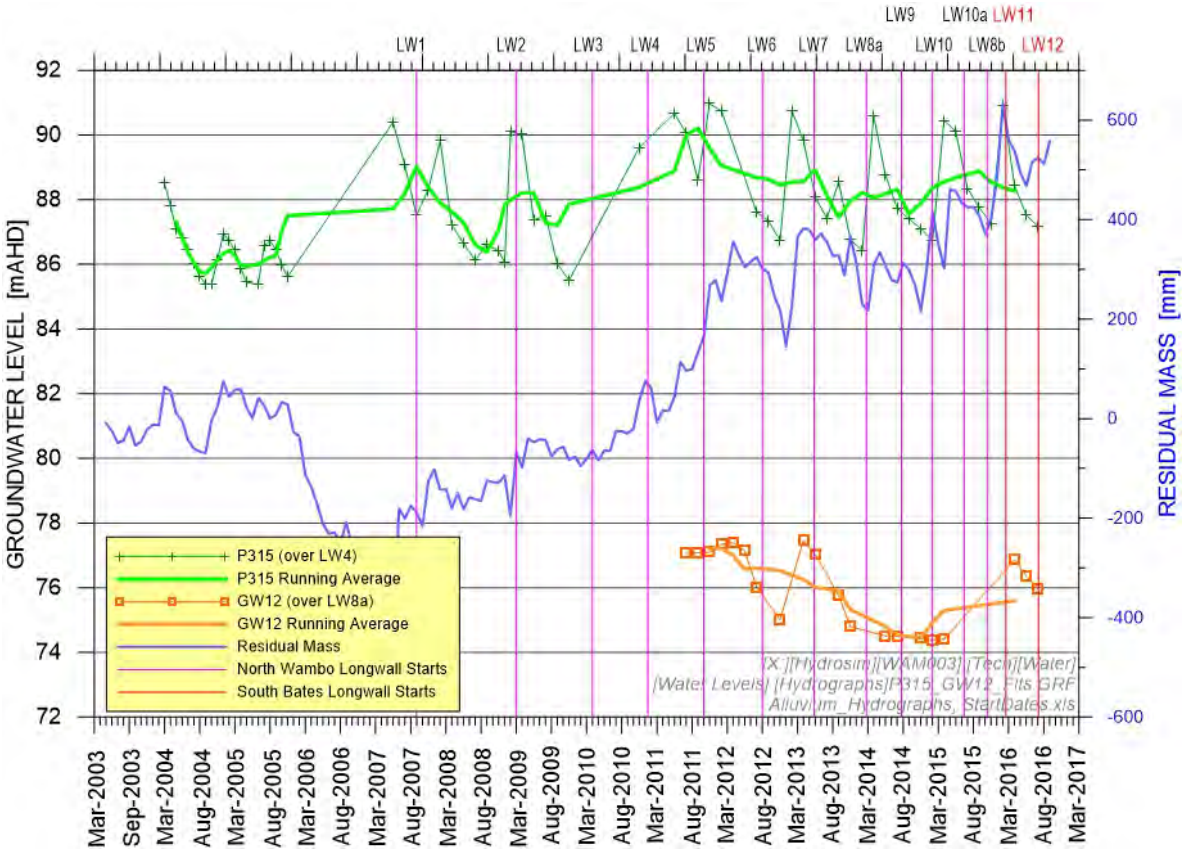


Figure A 4 - Group C Alluvial Hydrographs

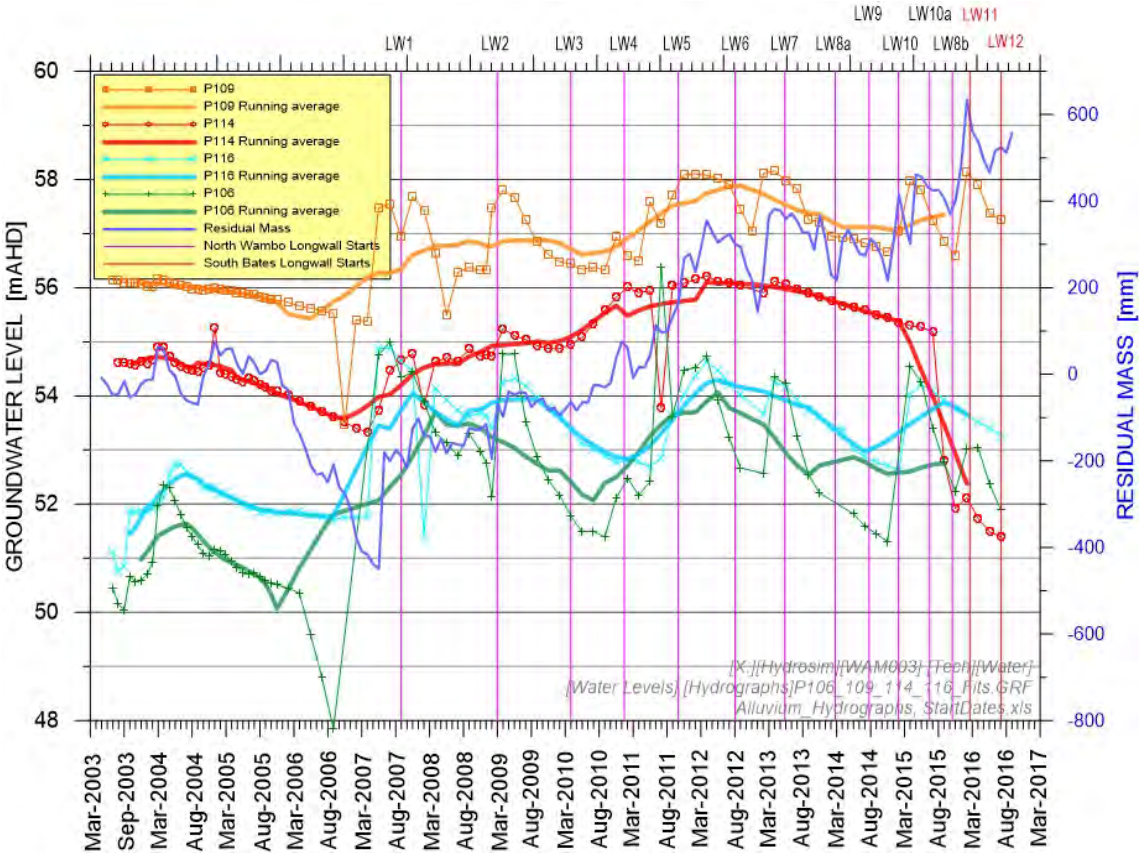


Figure A 5 - Group D Alluvial Hydrographs

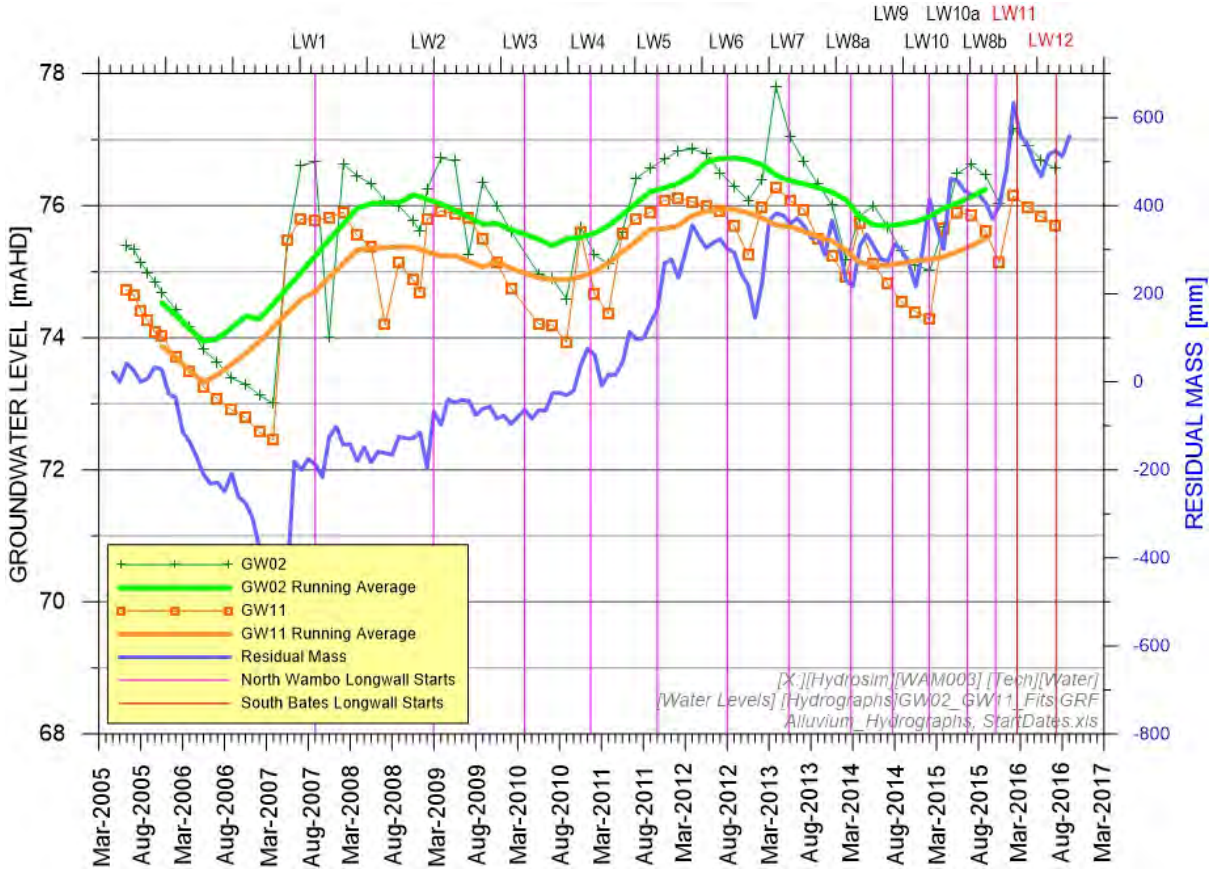


Figure A 6 - Group E Alluvial Hydrographs

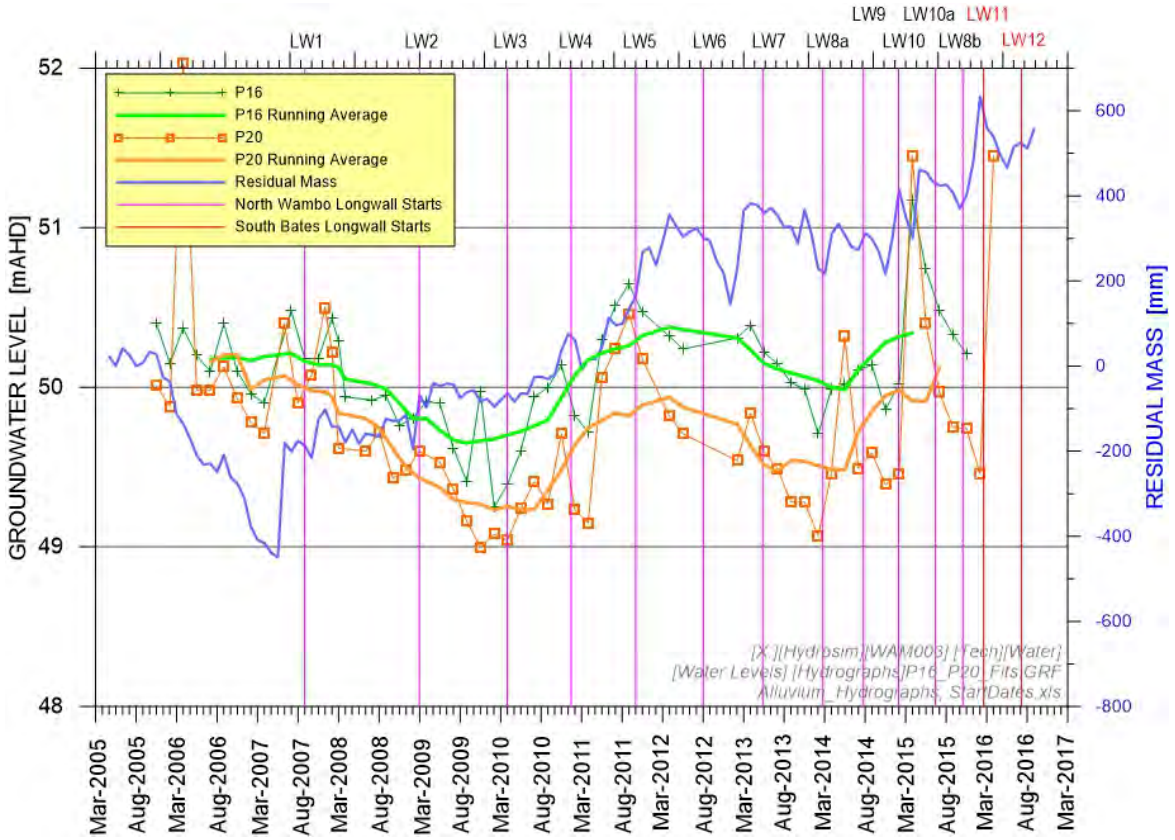


Figure A 7 - Group F Alluvial Hydrographs

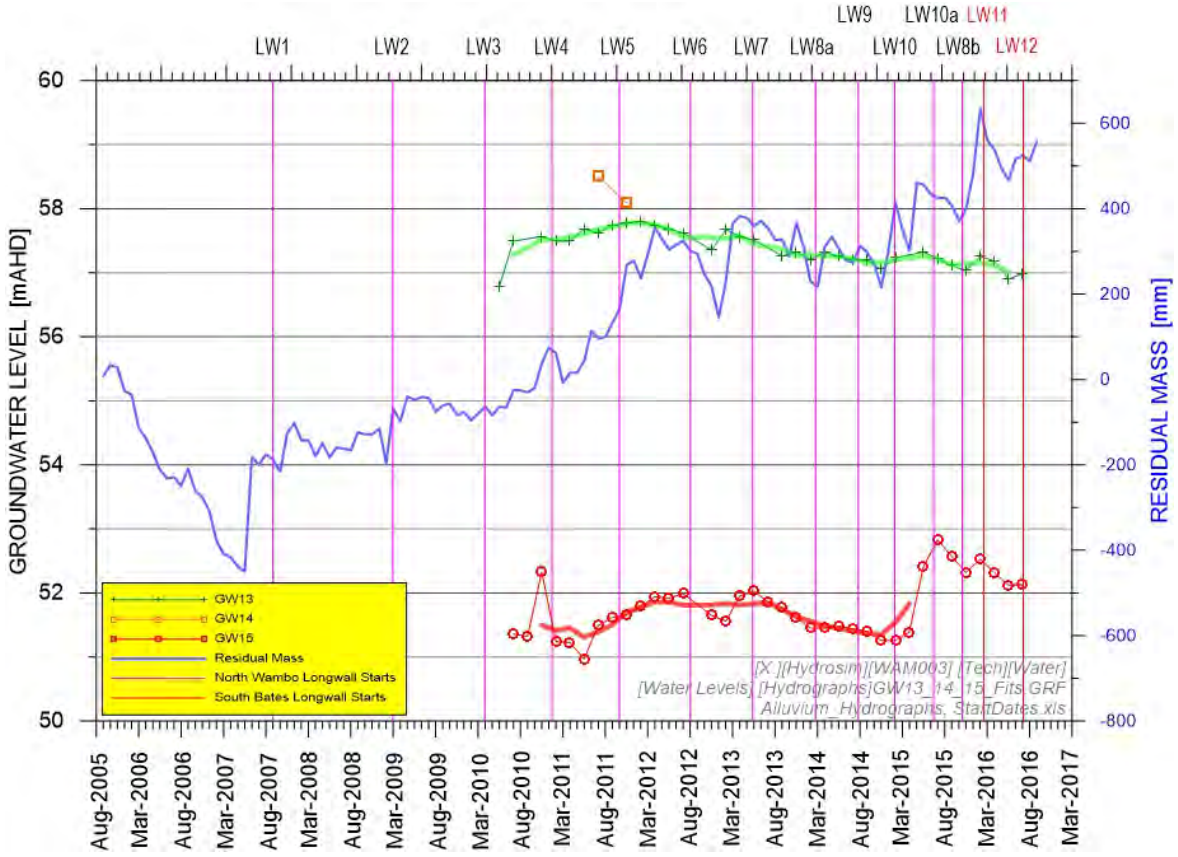


Figure A 8 - Group G Alluvial Hydrographs

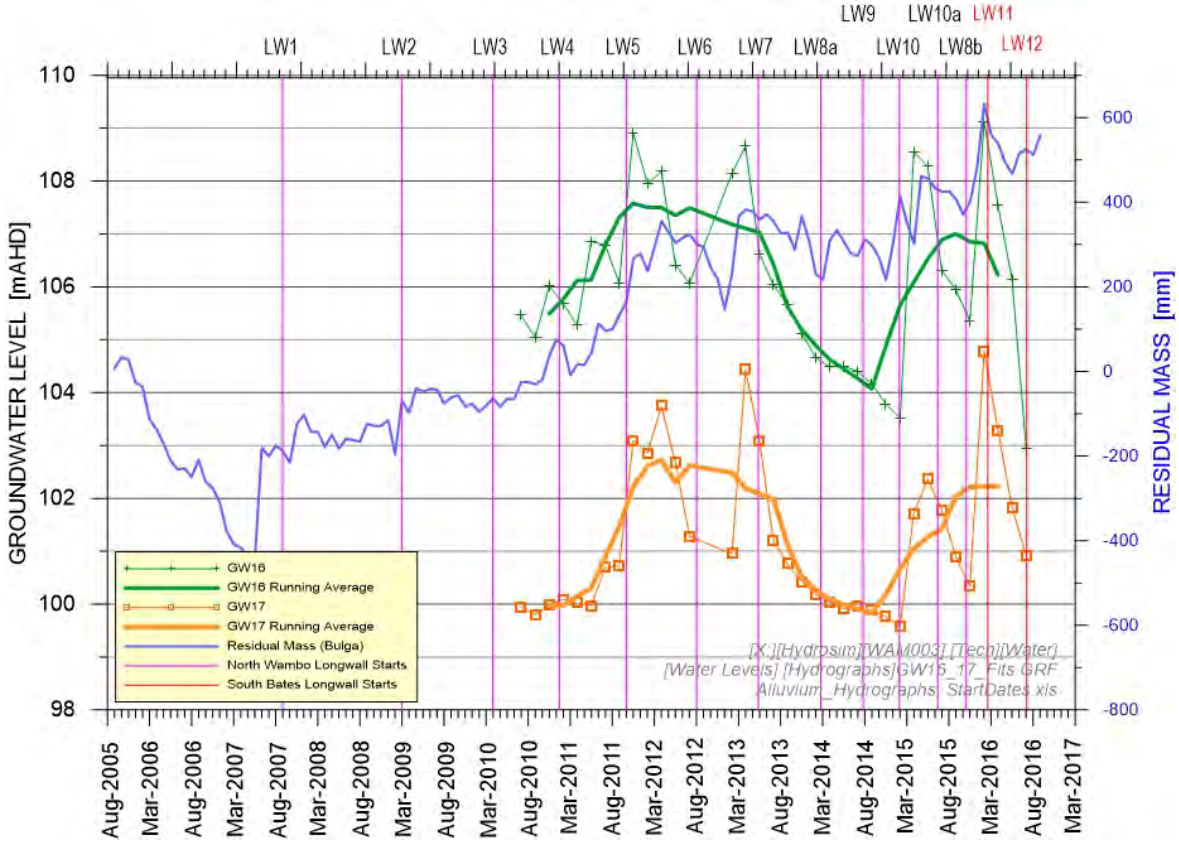


Figure A 9 - Group H Alluvial Hydrographs

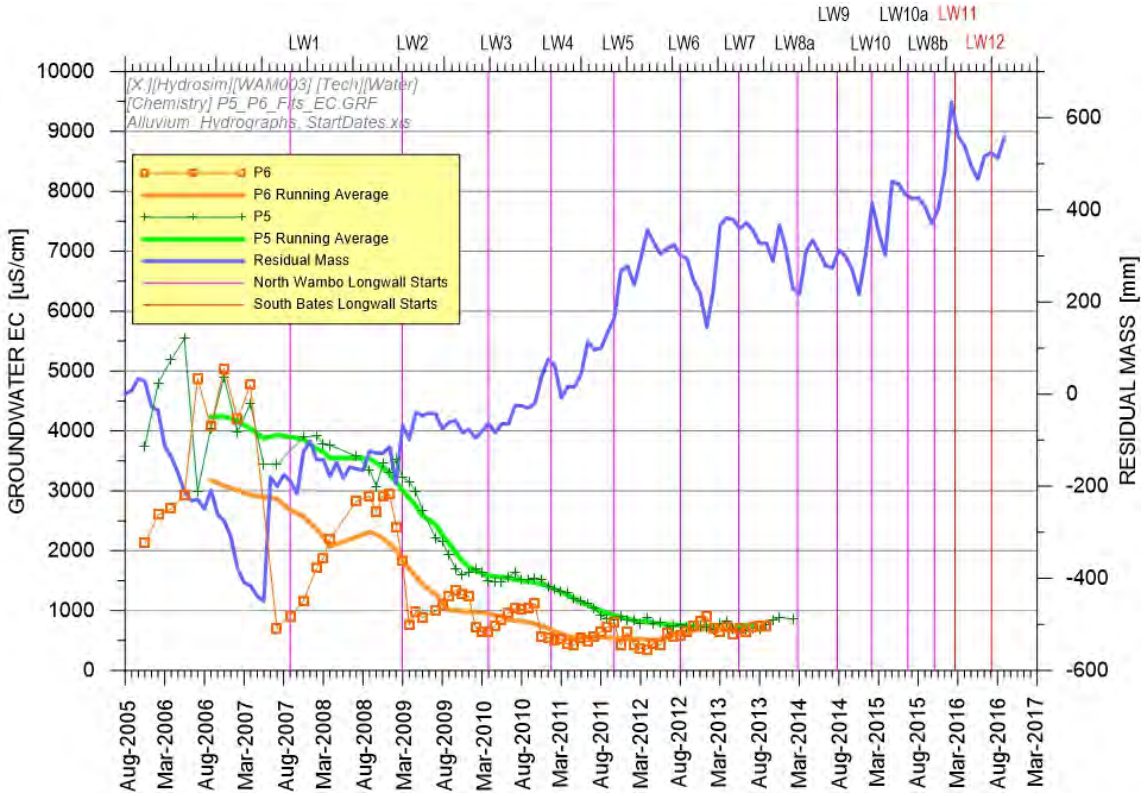


Figure A 10 - Group A Alluvial EC Time-Series

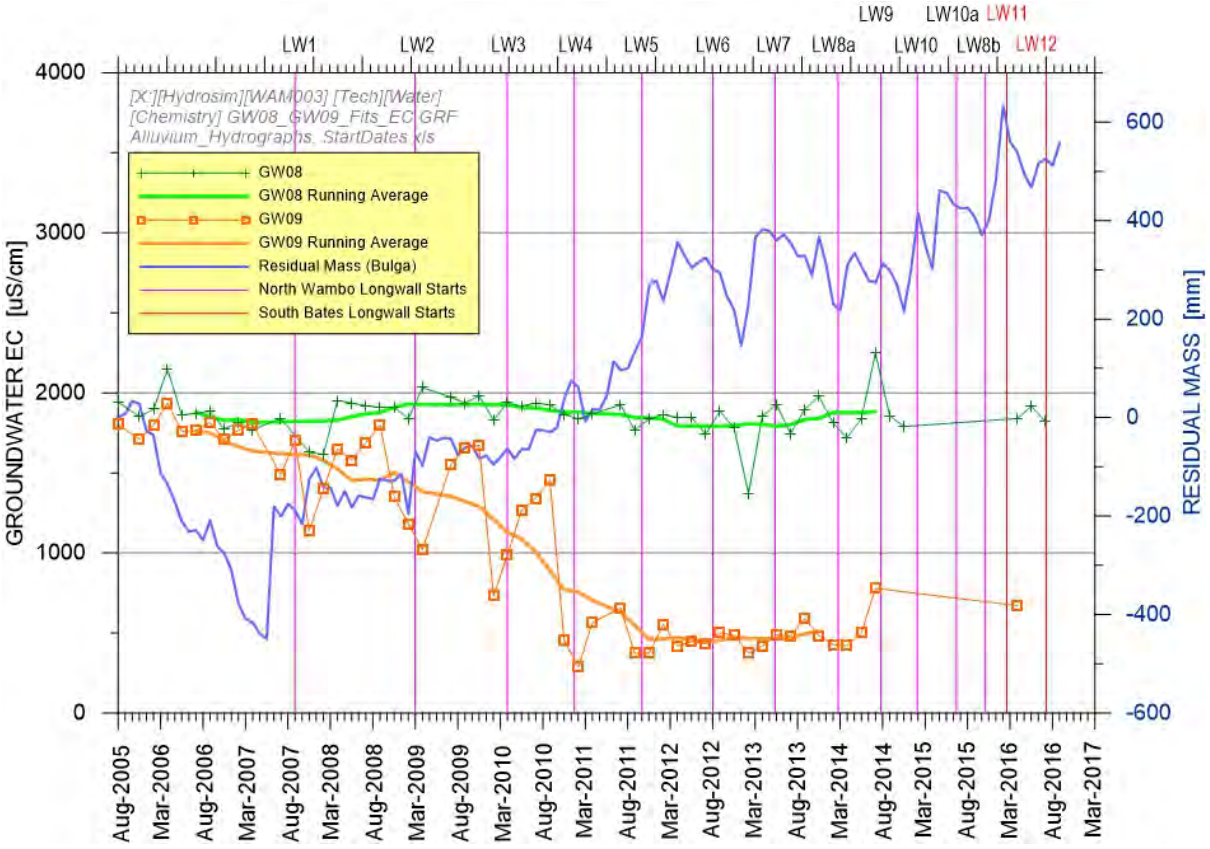


Figure A 11 - Group B Alluvial EC Time-Series

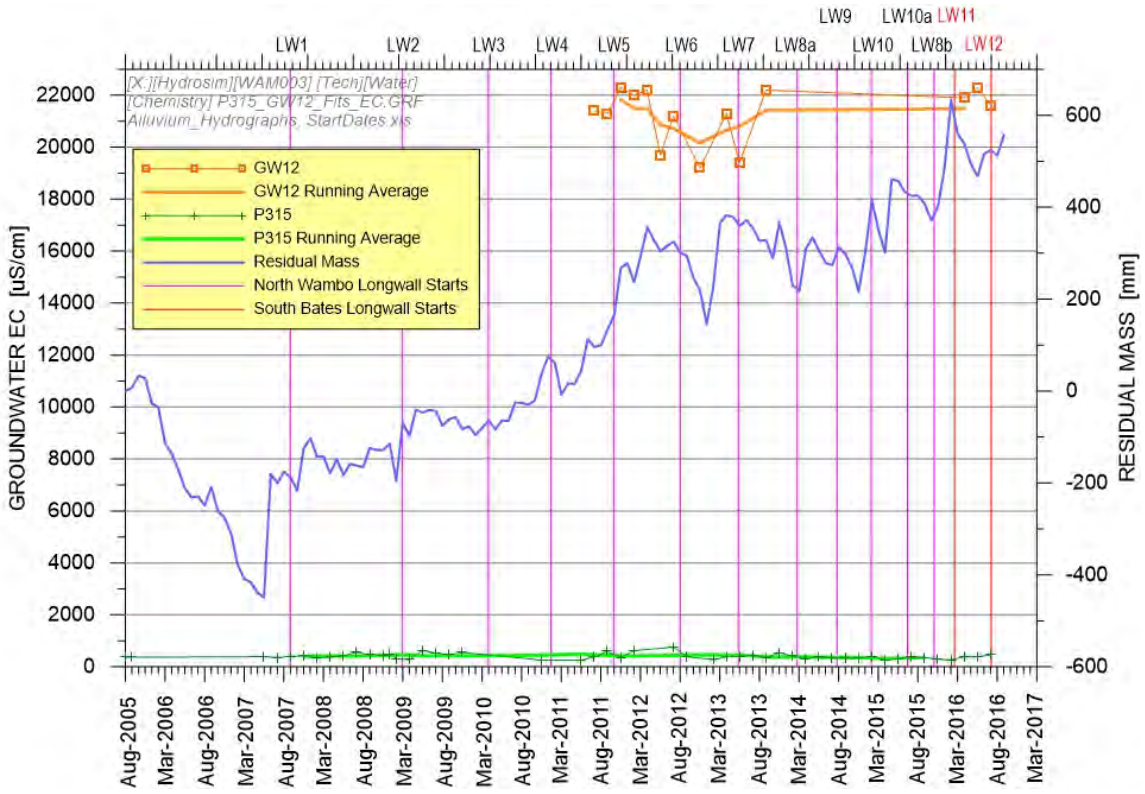


Figure A 12 - Group C Alluvial EC Time-Series

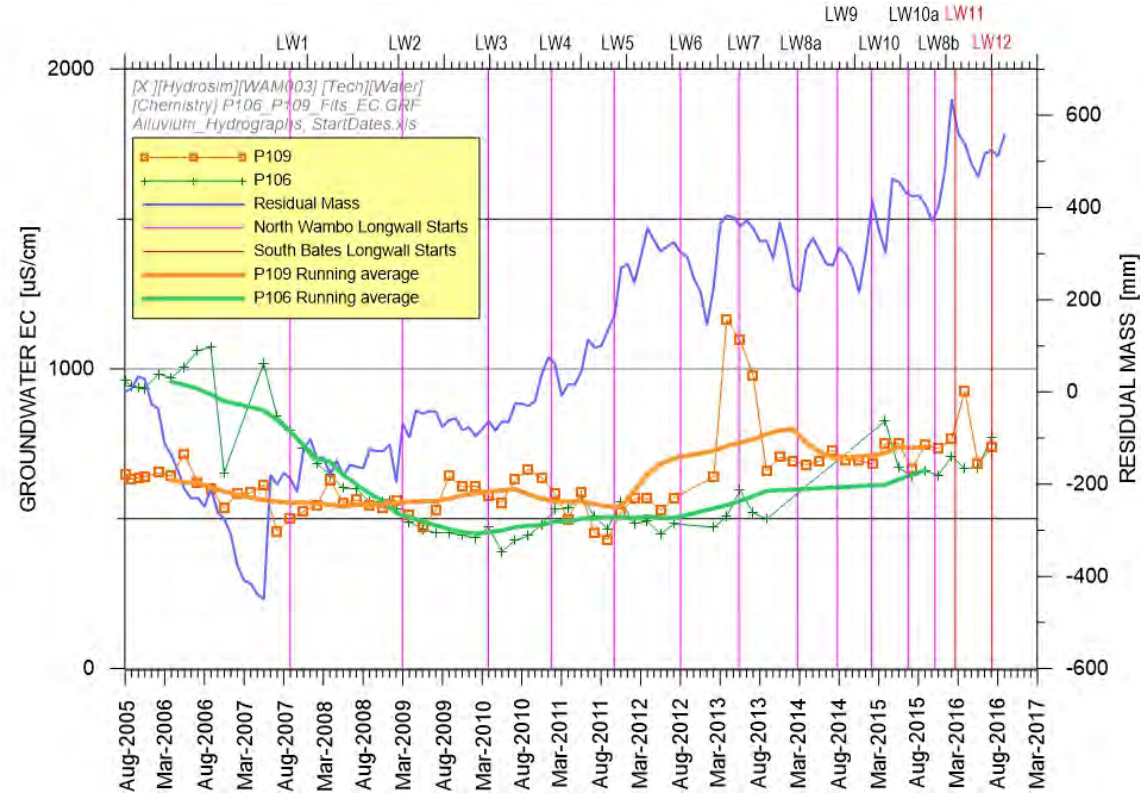


Figure A 13a - Group D Alluvial EC Time-Series

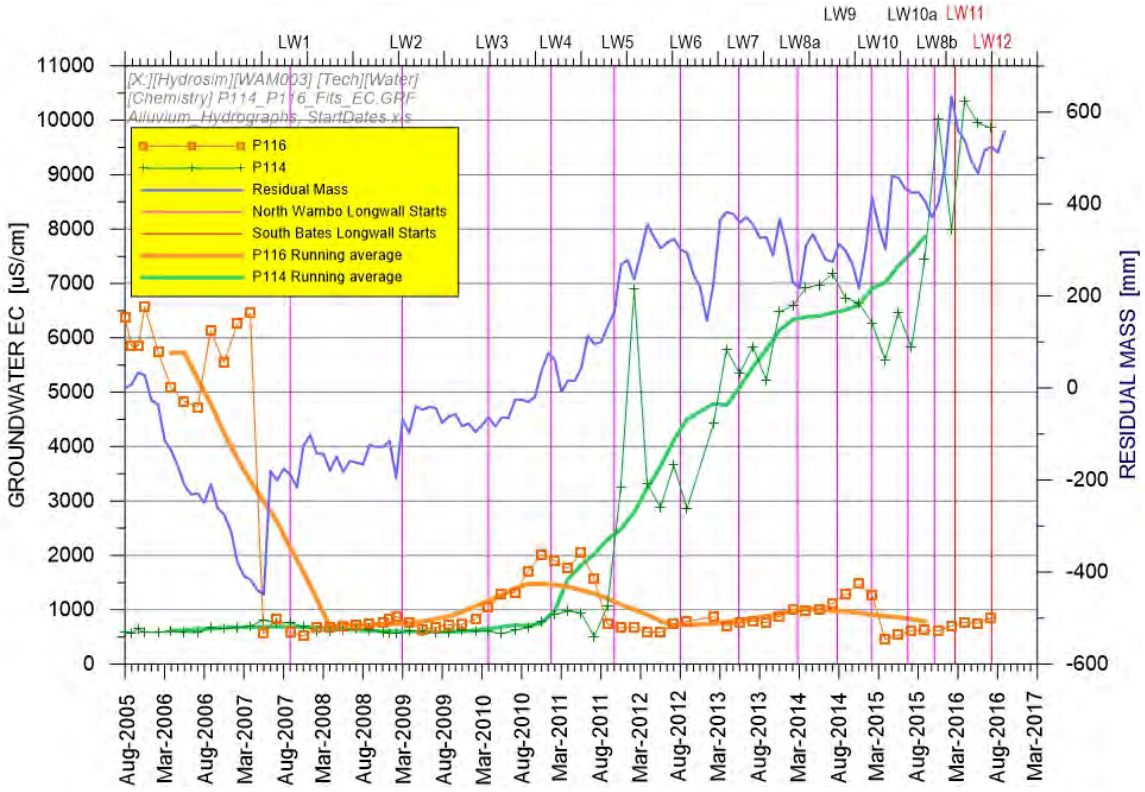


Figure A 13b - Group D Alluvial EC Time-Series

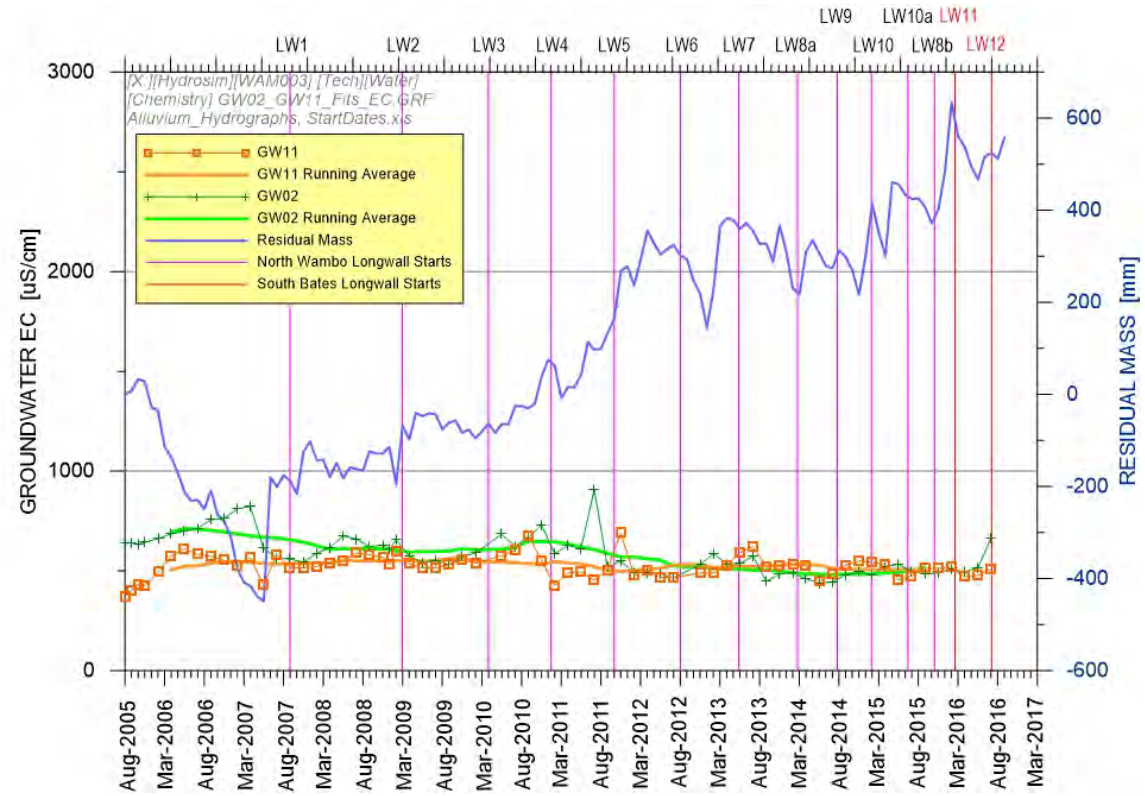


Figure A 14 - Group E Alluvial EC Time-Series

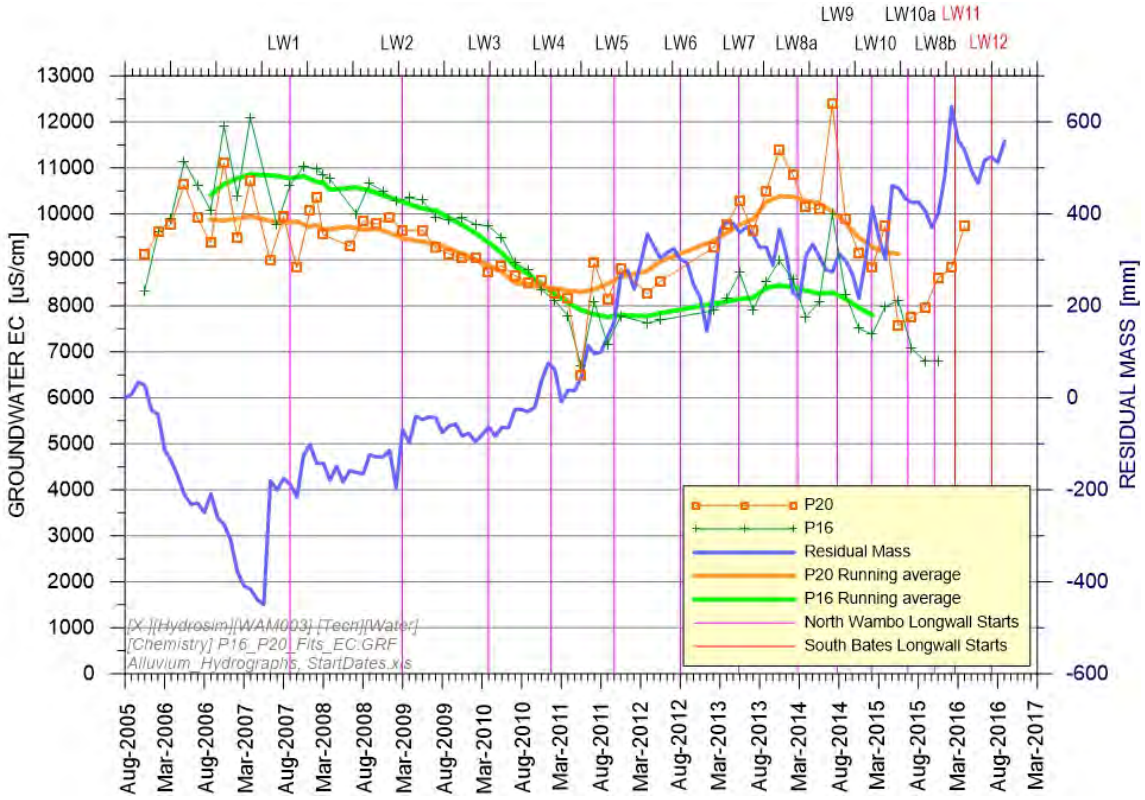


Figure A 15 - Group F Alluvial EC Time-Series

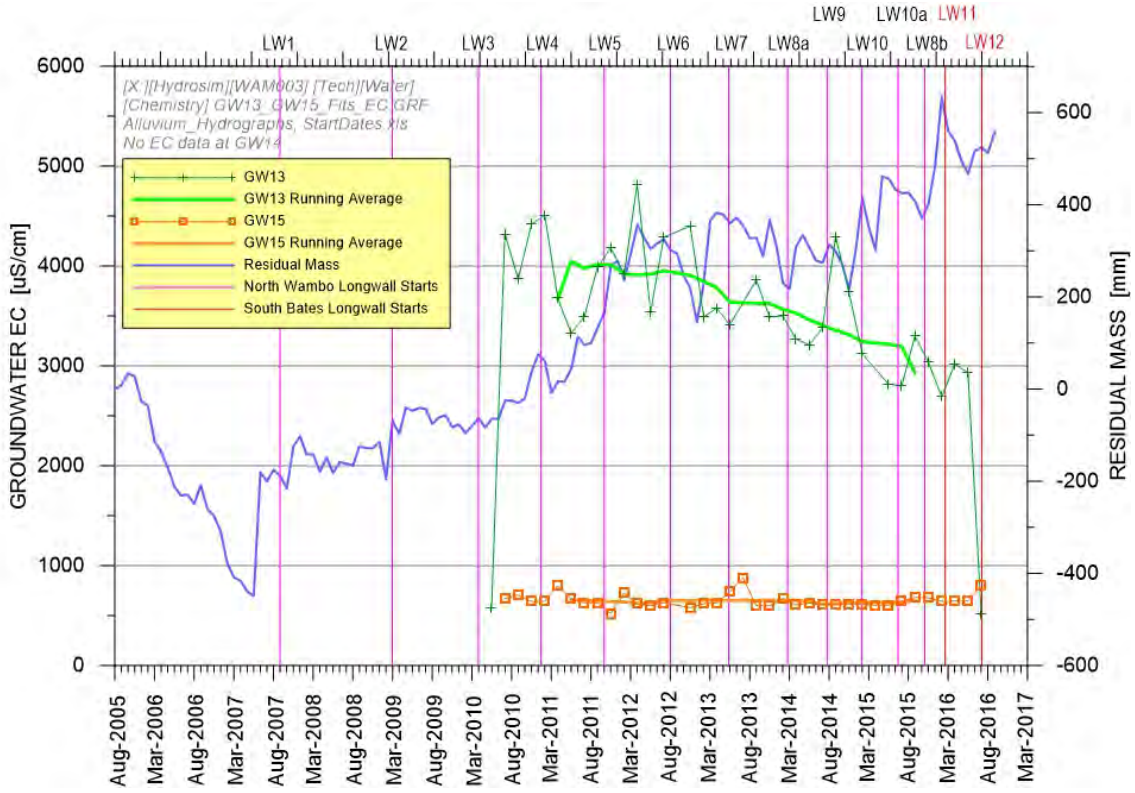


Figure A 16 - Group G Alluvial EC Time-Series

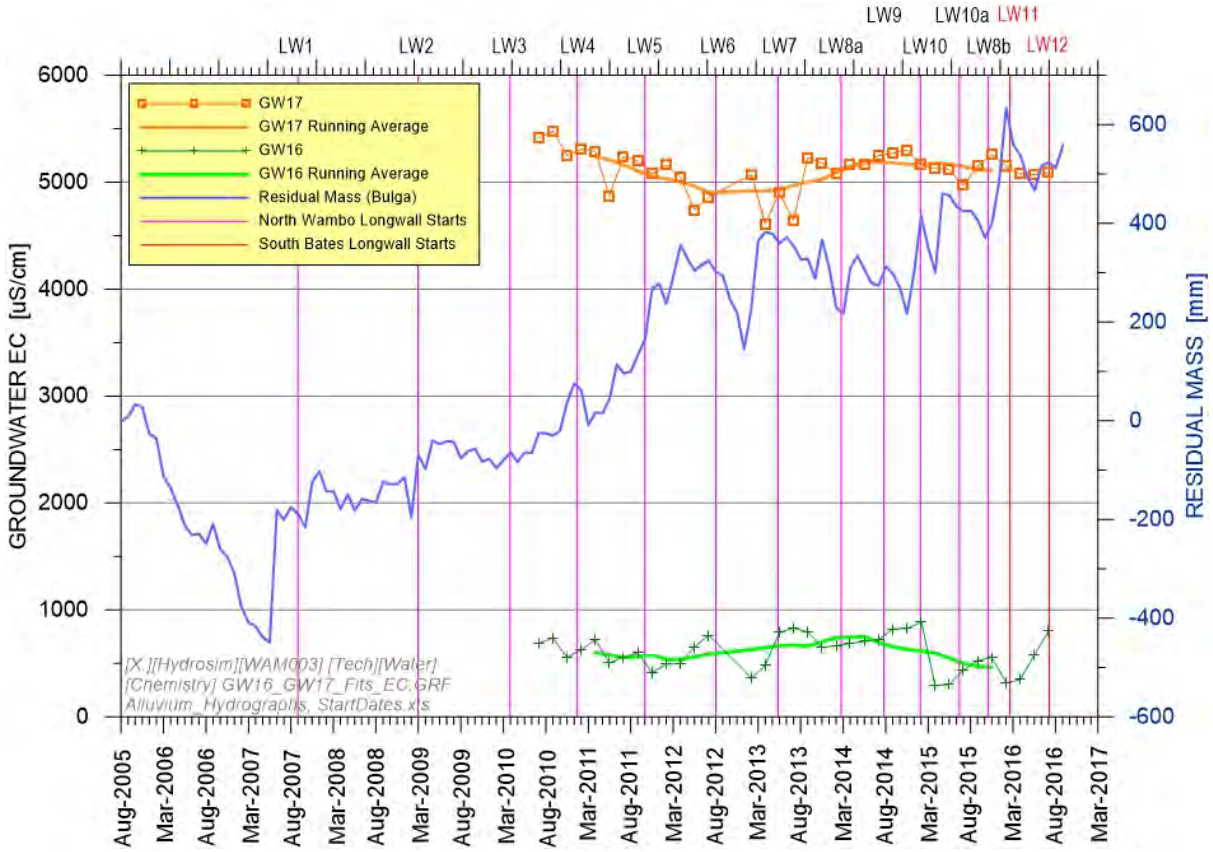


Figure A 17 - Group H Alluvial EC Time-Series

ATTACHMENT B

Interburden Groundwater Hydrographs

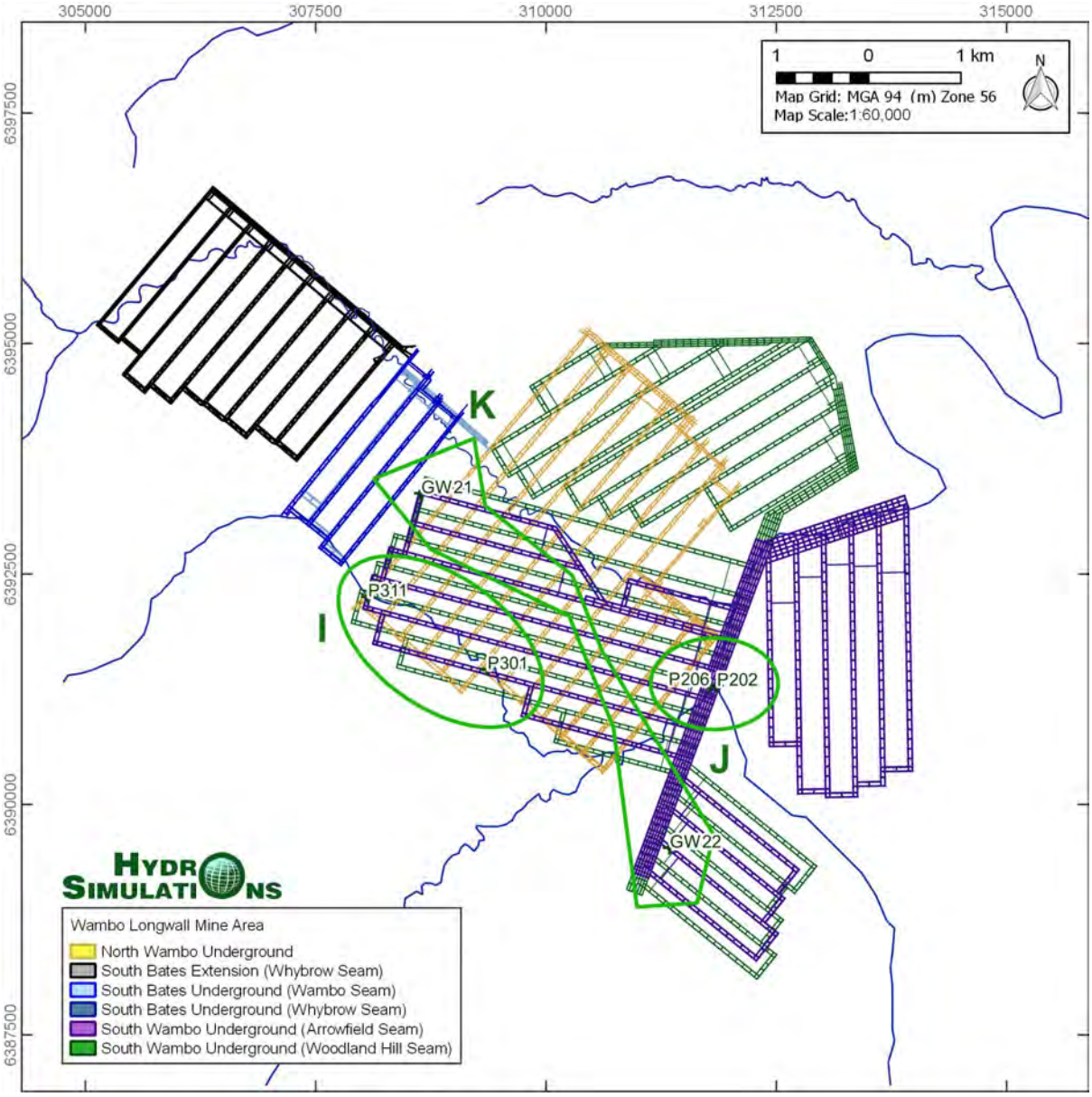


Figure B 1 - Interburden Groundwater Monitoring Network and Hydrograph Groups

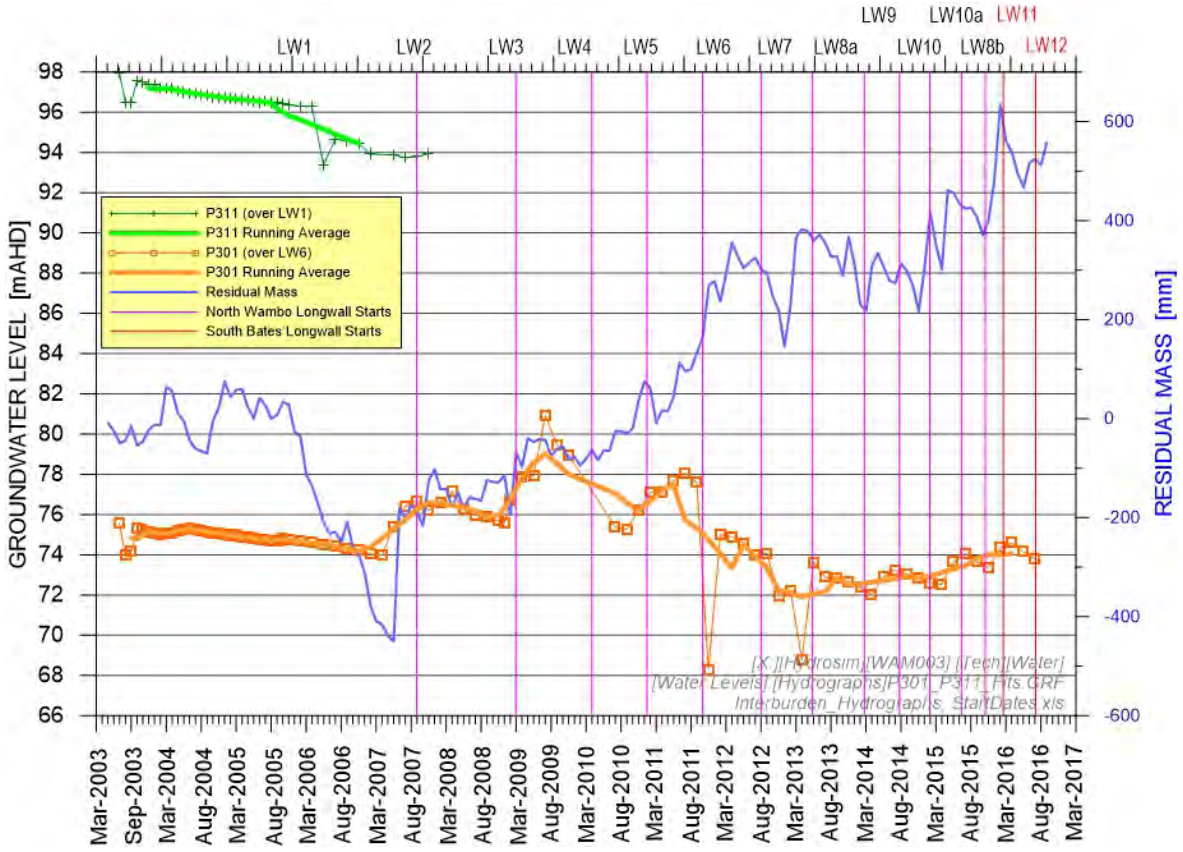


Figure B 2 - Group I Interburden Hydrographs

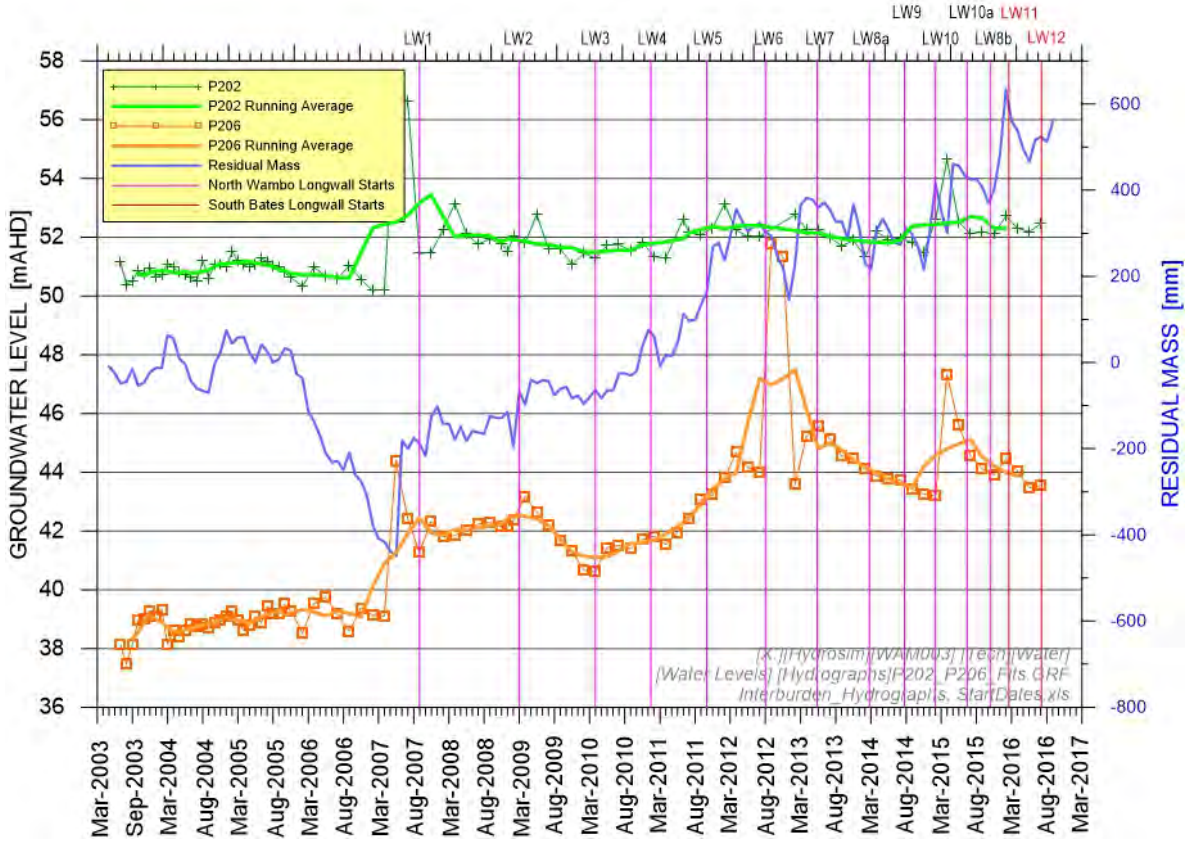


Figure B 3 - Group J Interburden Hydrographs

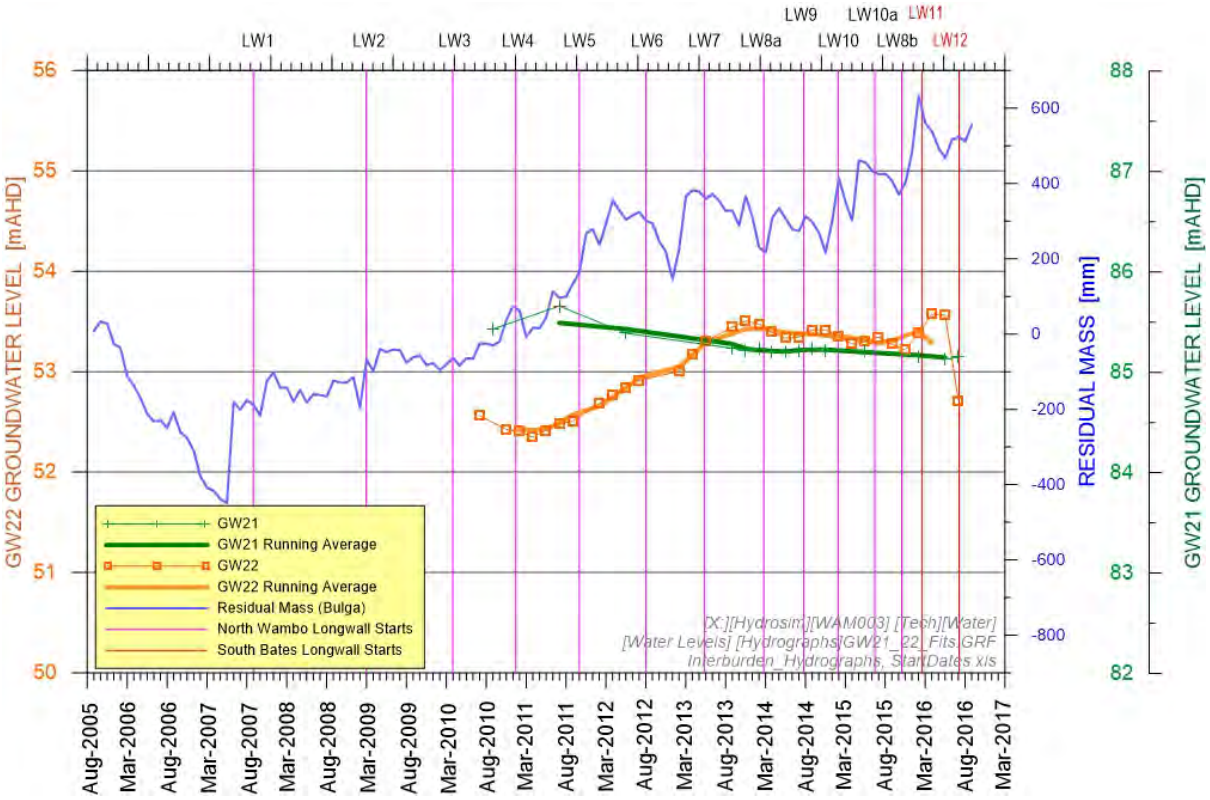


Figure B 4 - Group K Interburden Hydrographs

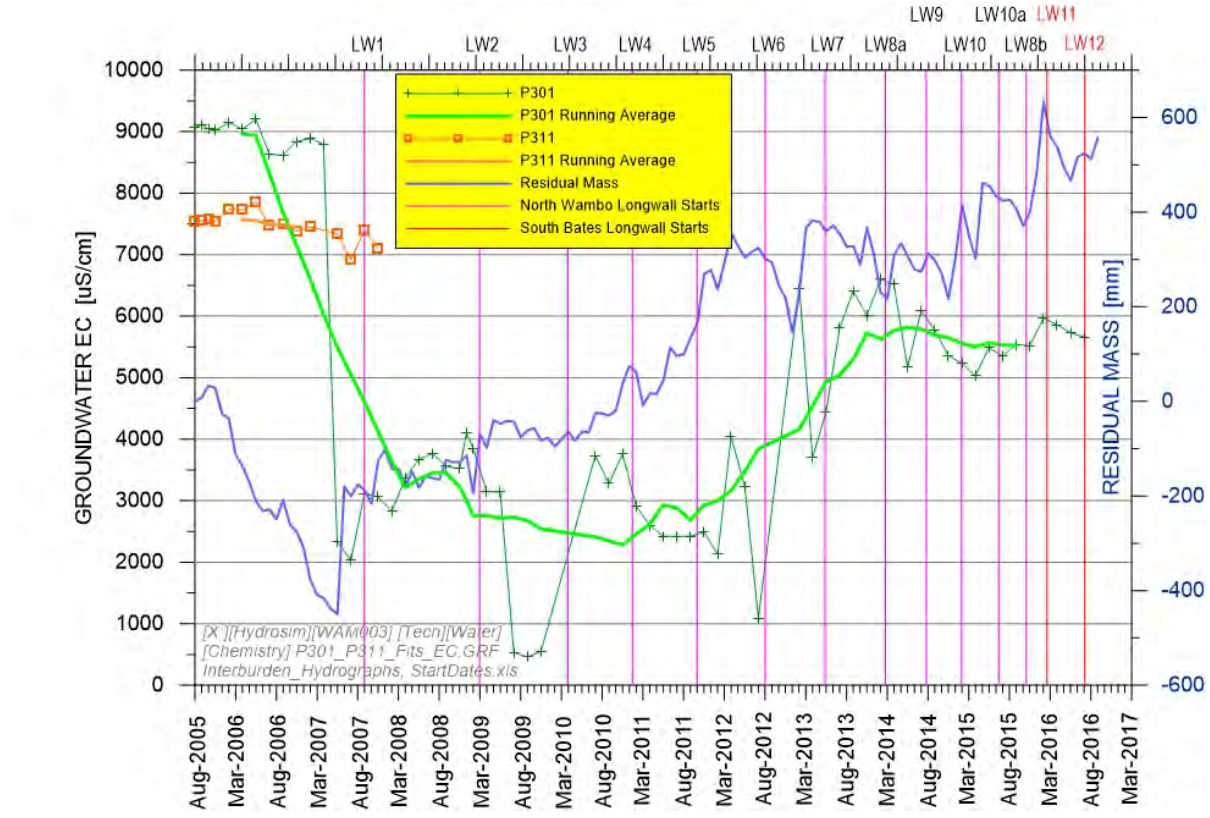


Figure B 5 - Group I Interburden EC Time-Series

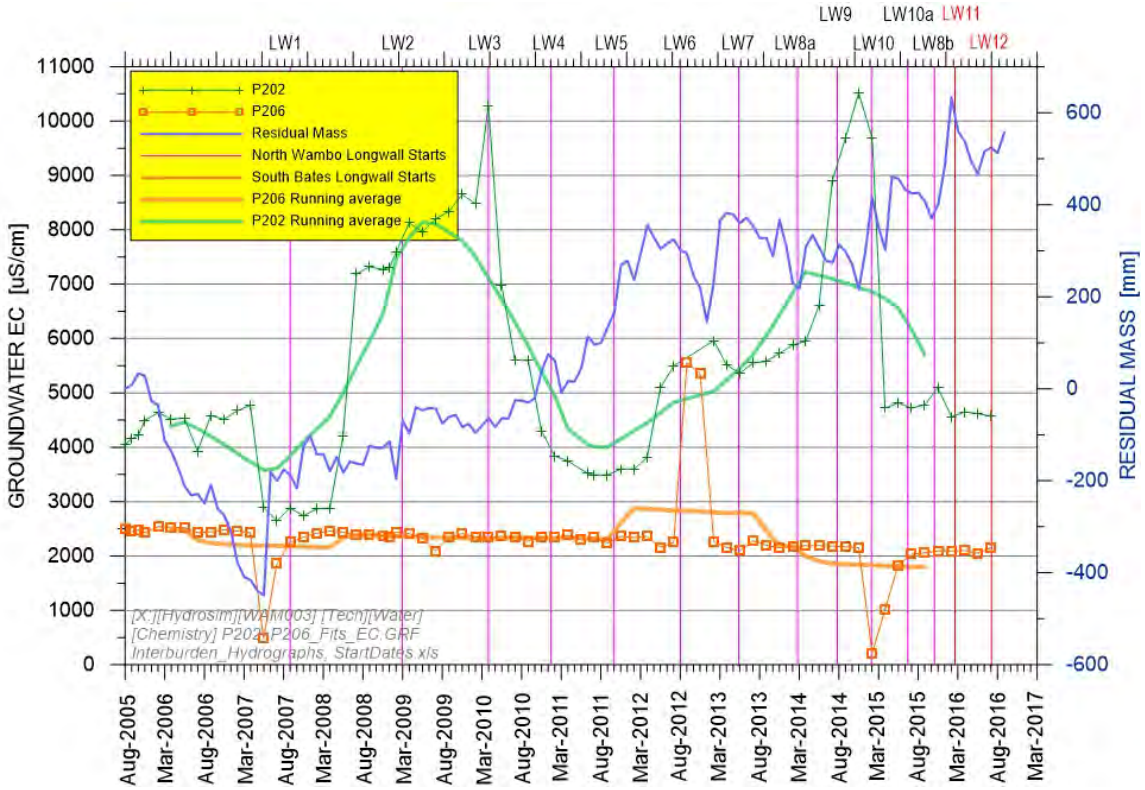


Figure B 6 - Group J Interburden EC Time-Series

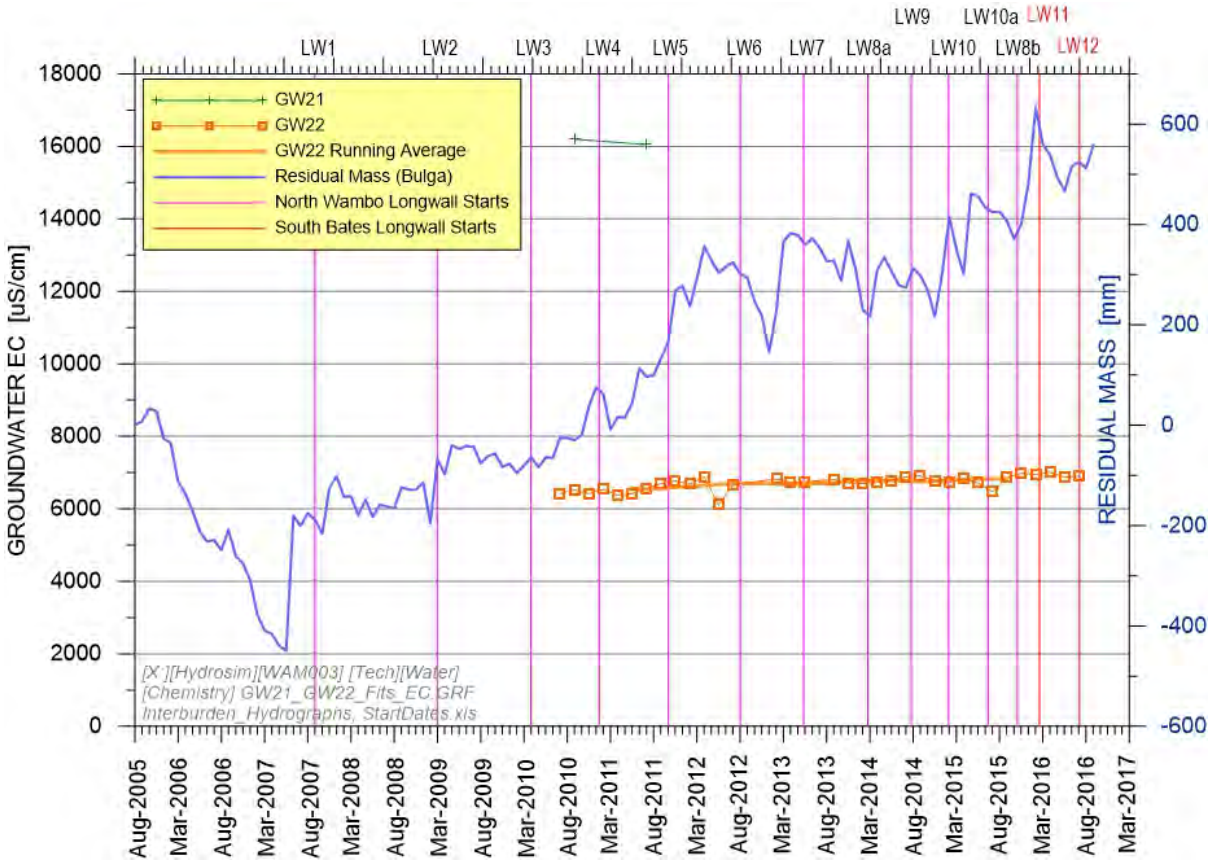


Figure B 7 - Group K Interburden EC Time-Series

ATTACHMENT C

Vibrating Wire Piezometer Hydrographs

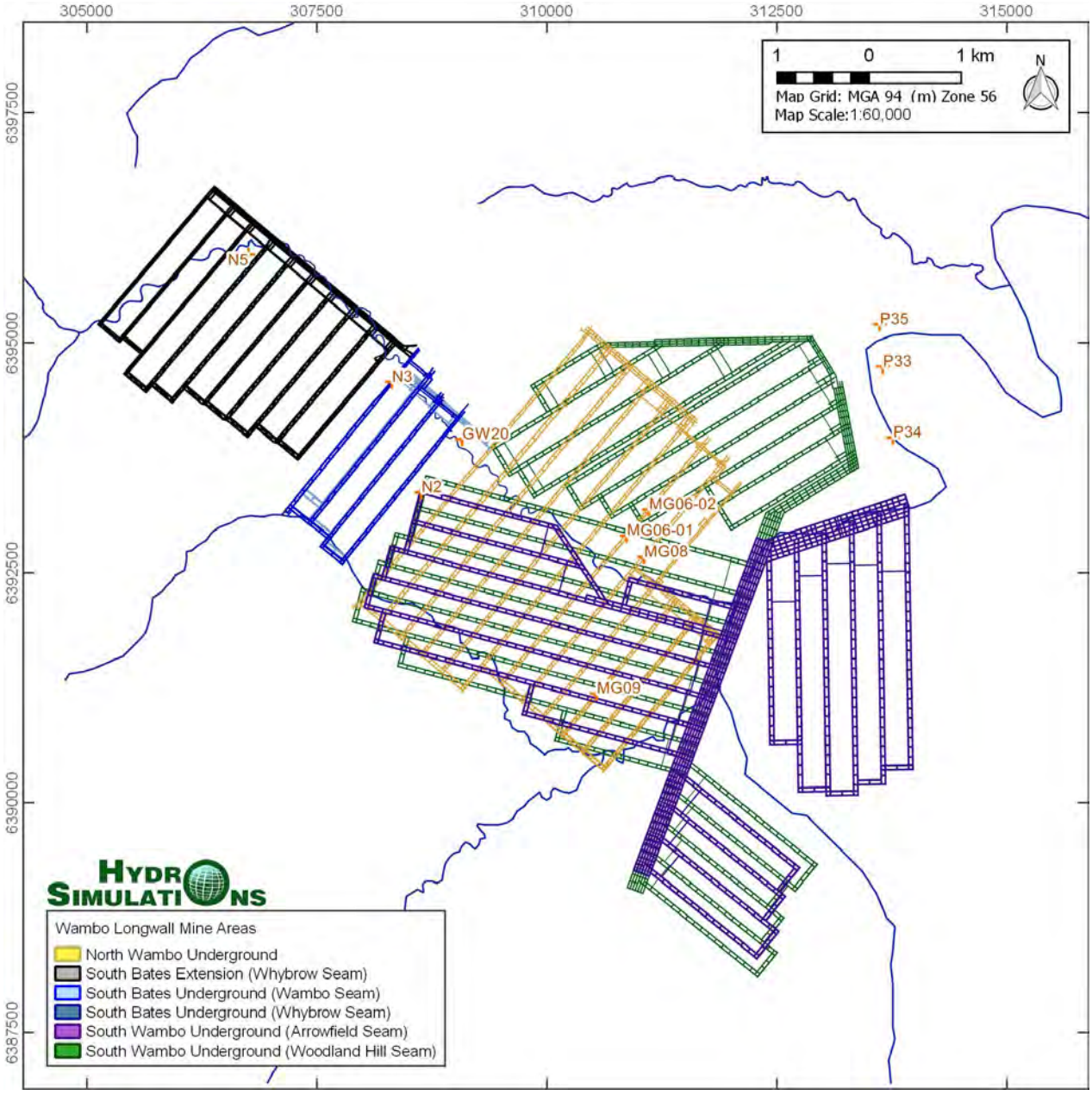


Figure C 1 - Vibrating Wire Piezometer Monitoring Network

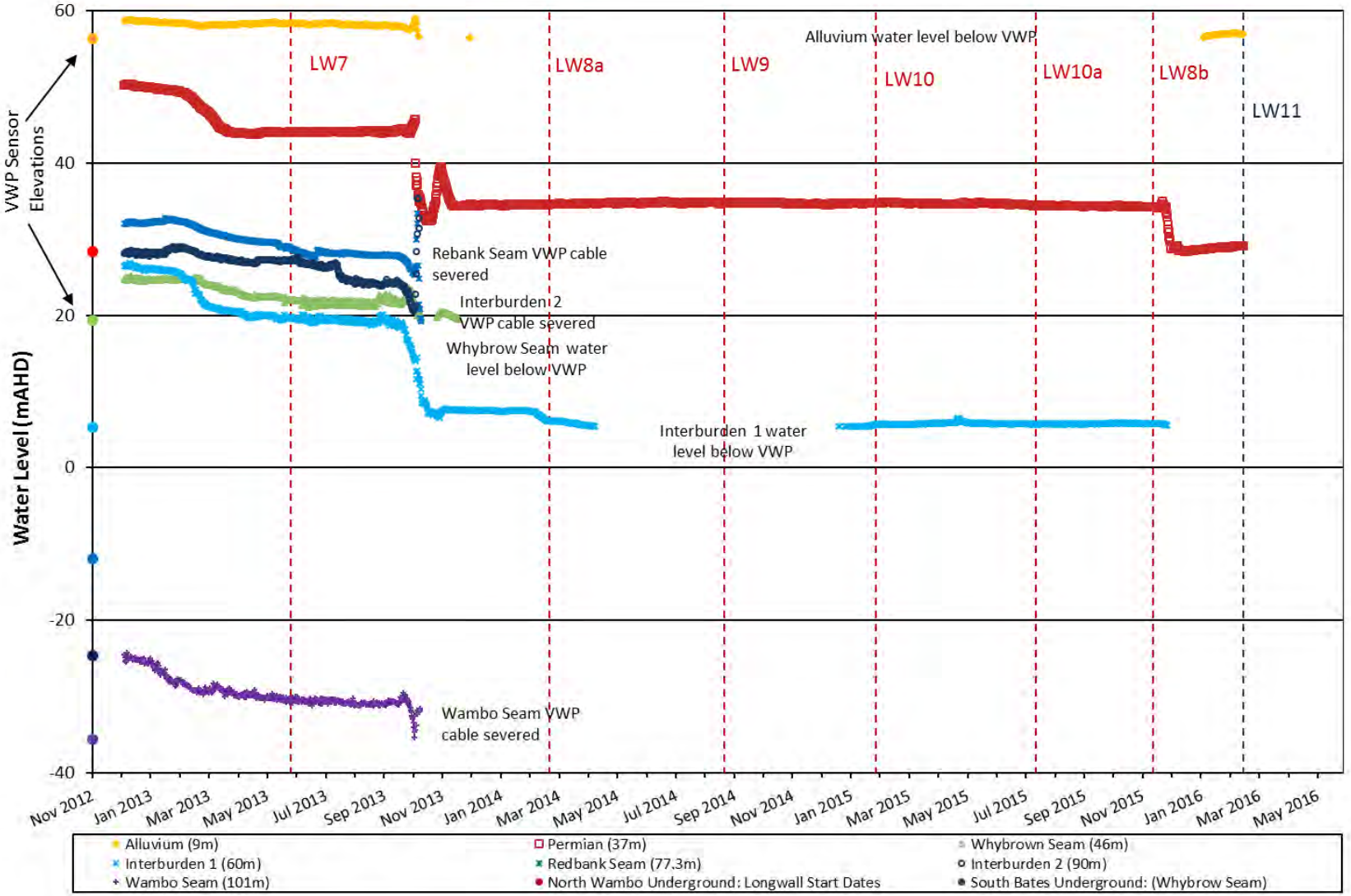


Figure C 2 - MG08 VWP Hydrographs

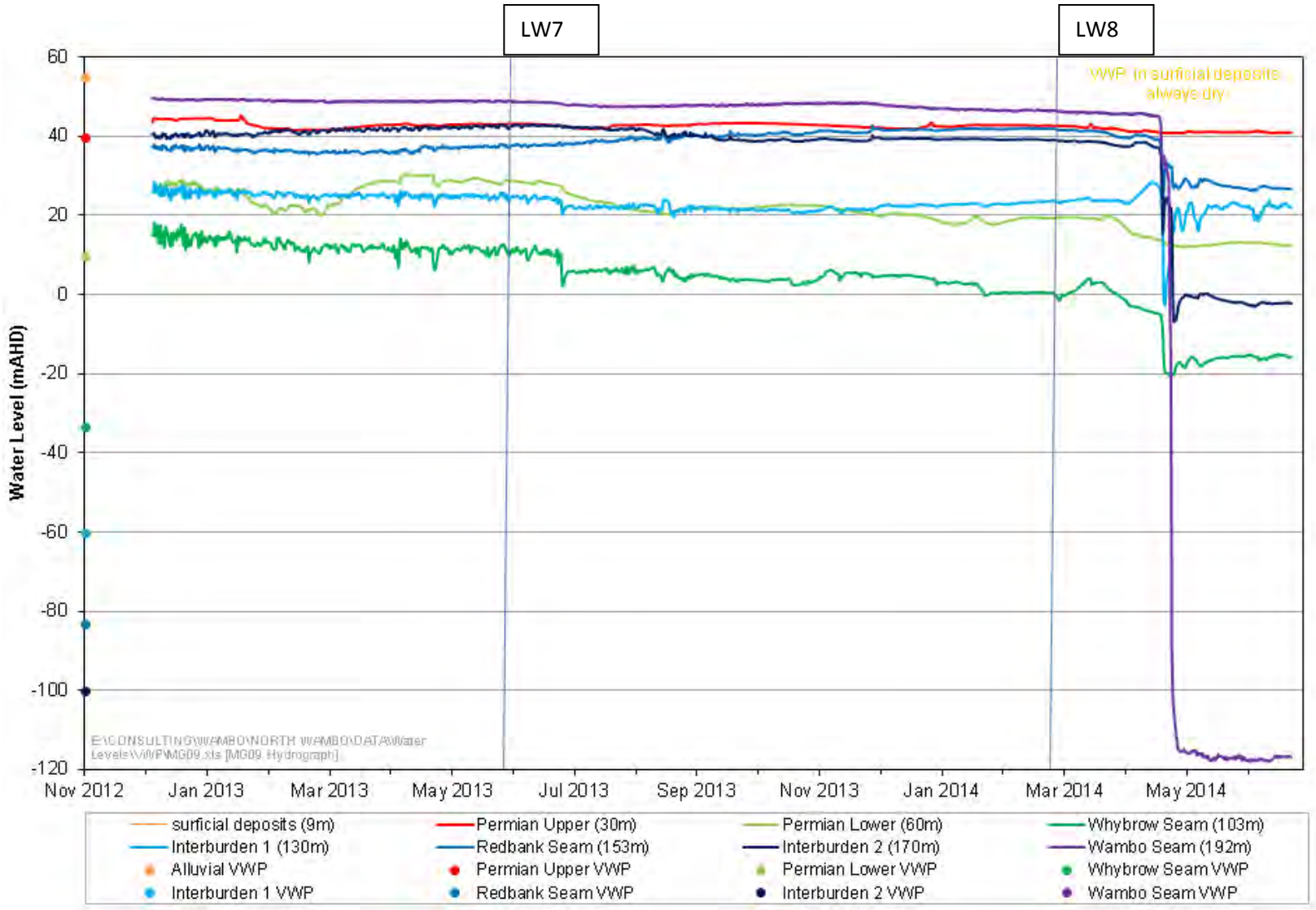


Figure C 3 - MG09 VWP Hydrographs

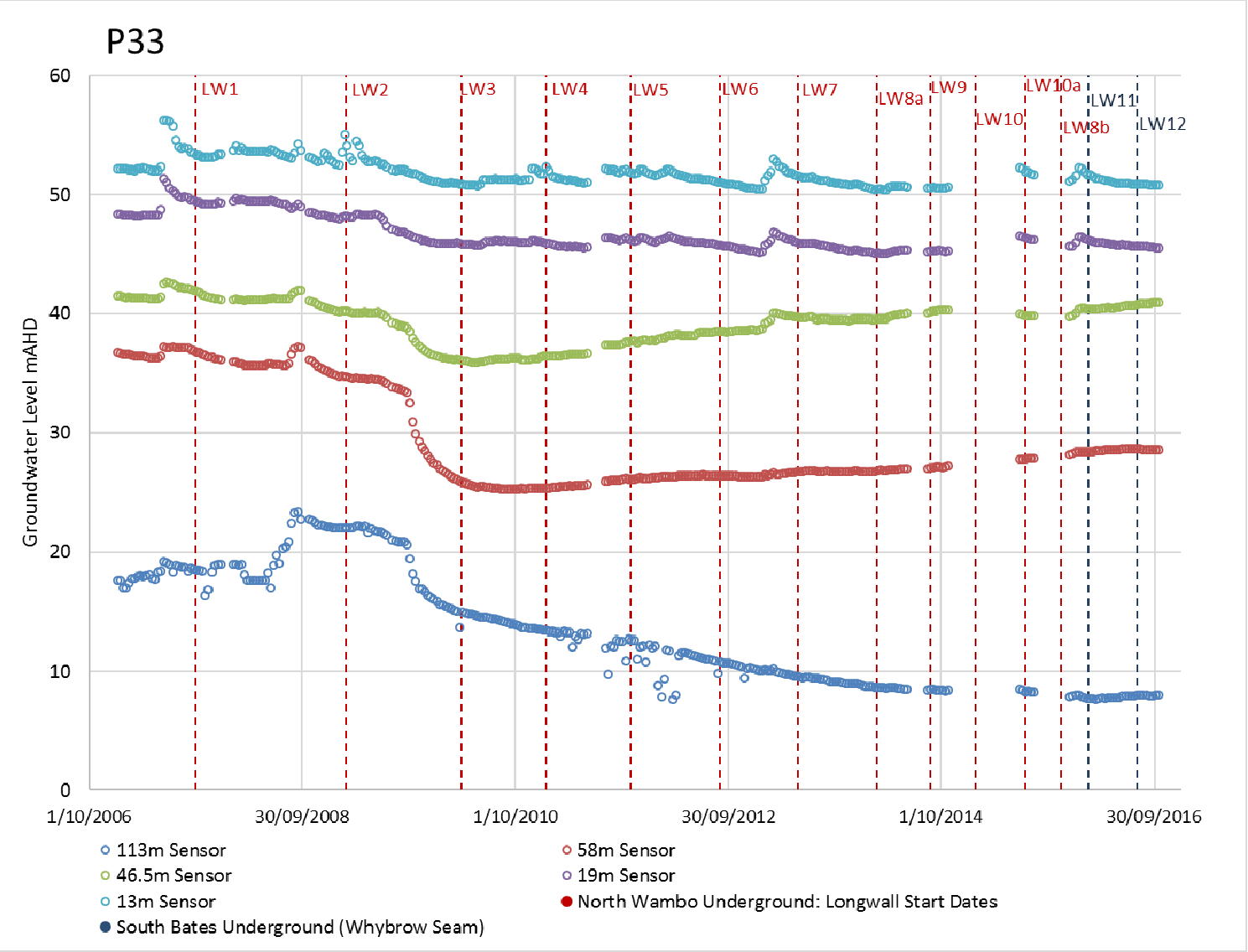


Figure C 4 – P33 VWP Hydrographs

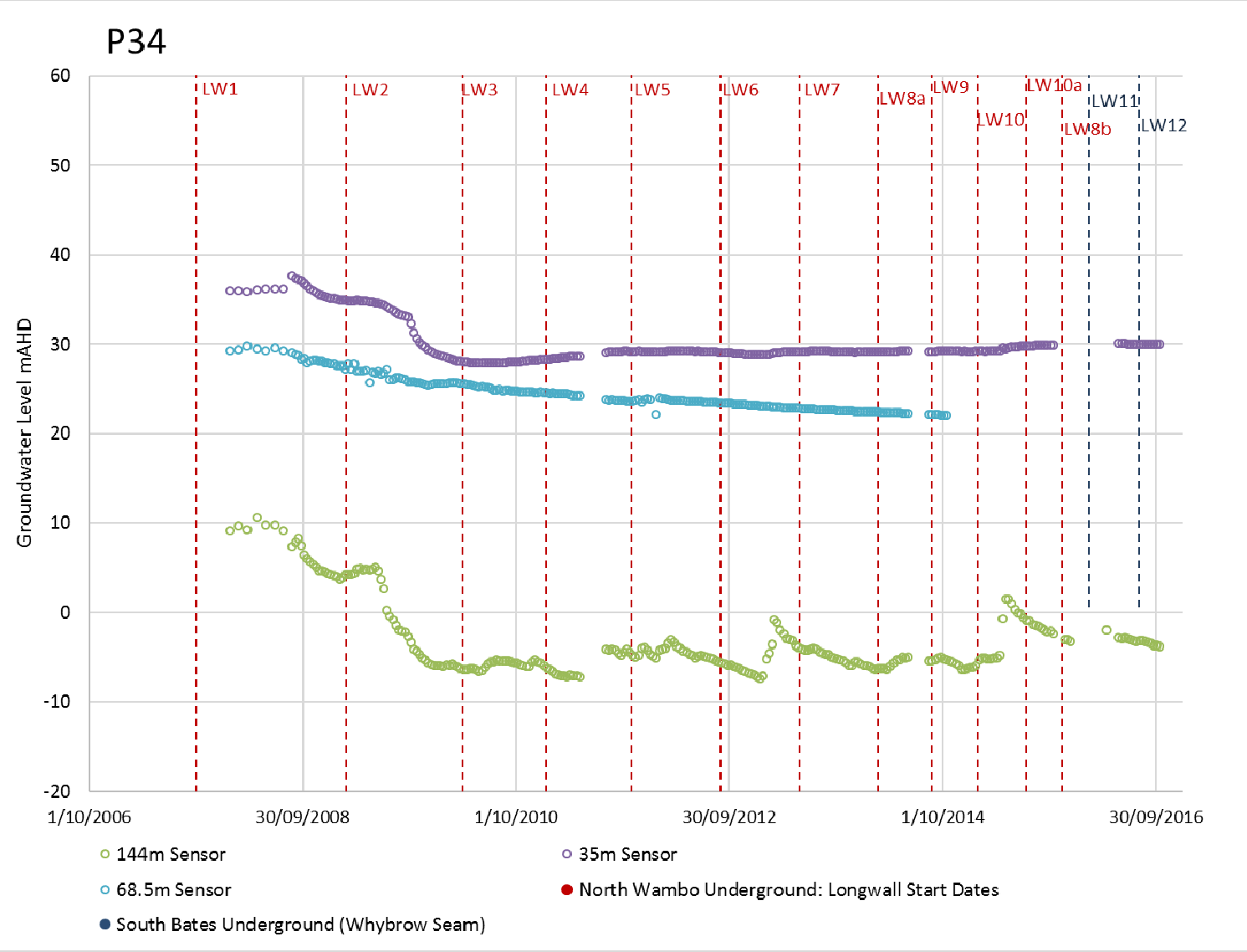


Figure C 5 – P4 VWP Hydrographs

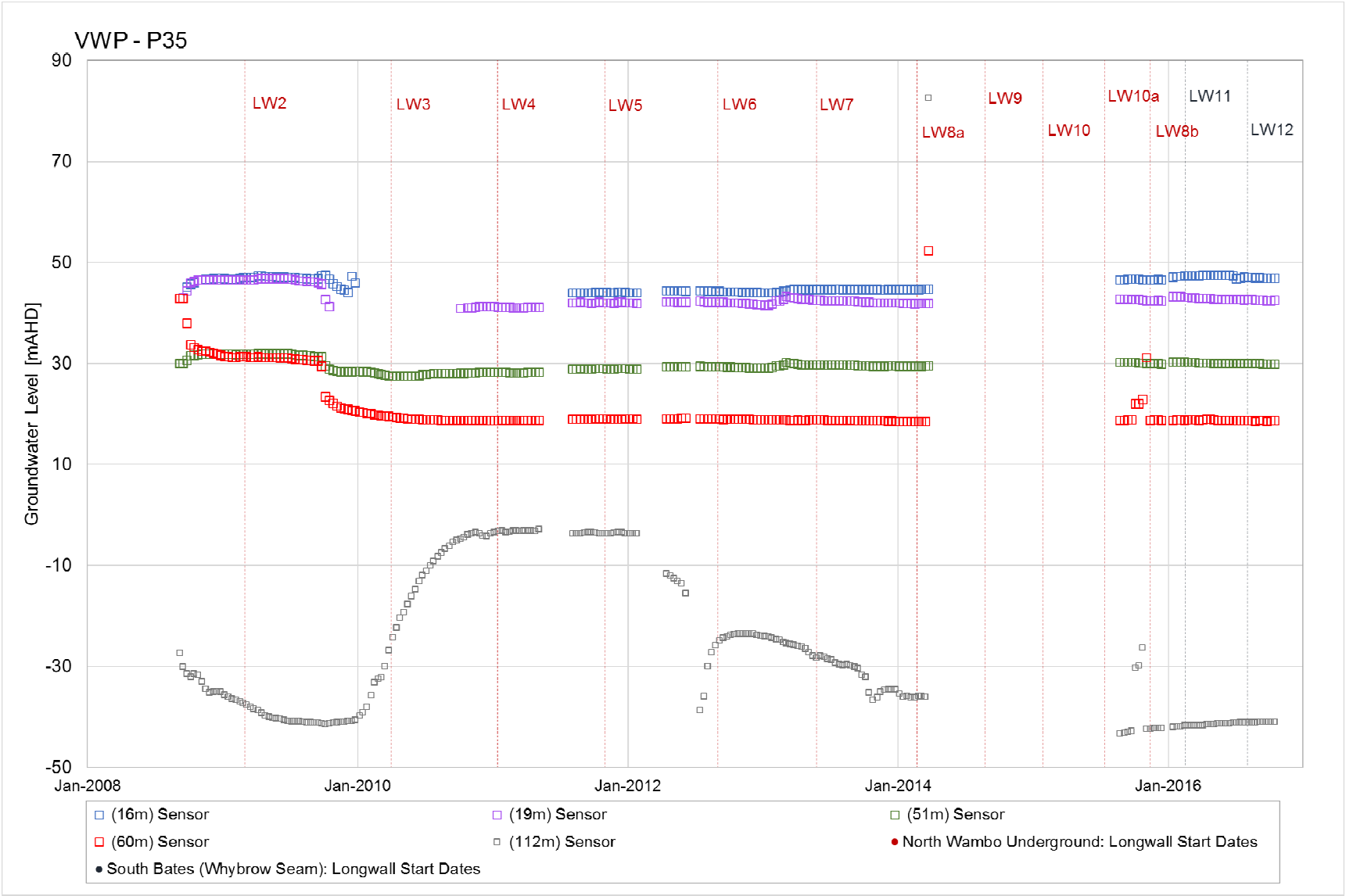


Figure C 6 – P35 VWP Hydrographs

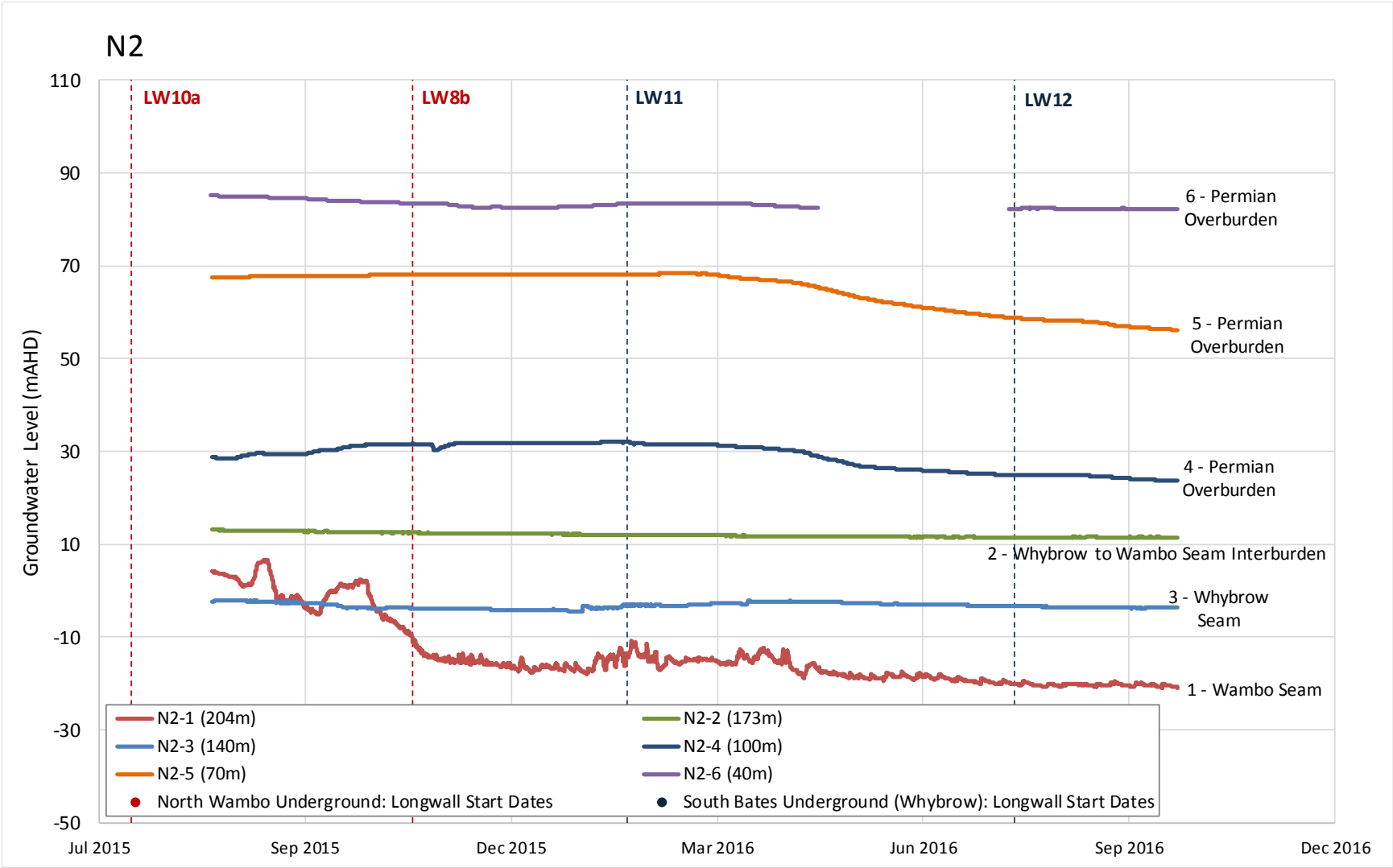


Figure C 7 – N2 VWP Hydrographs

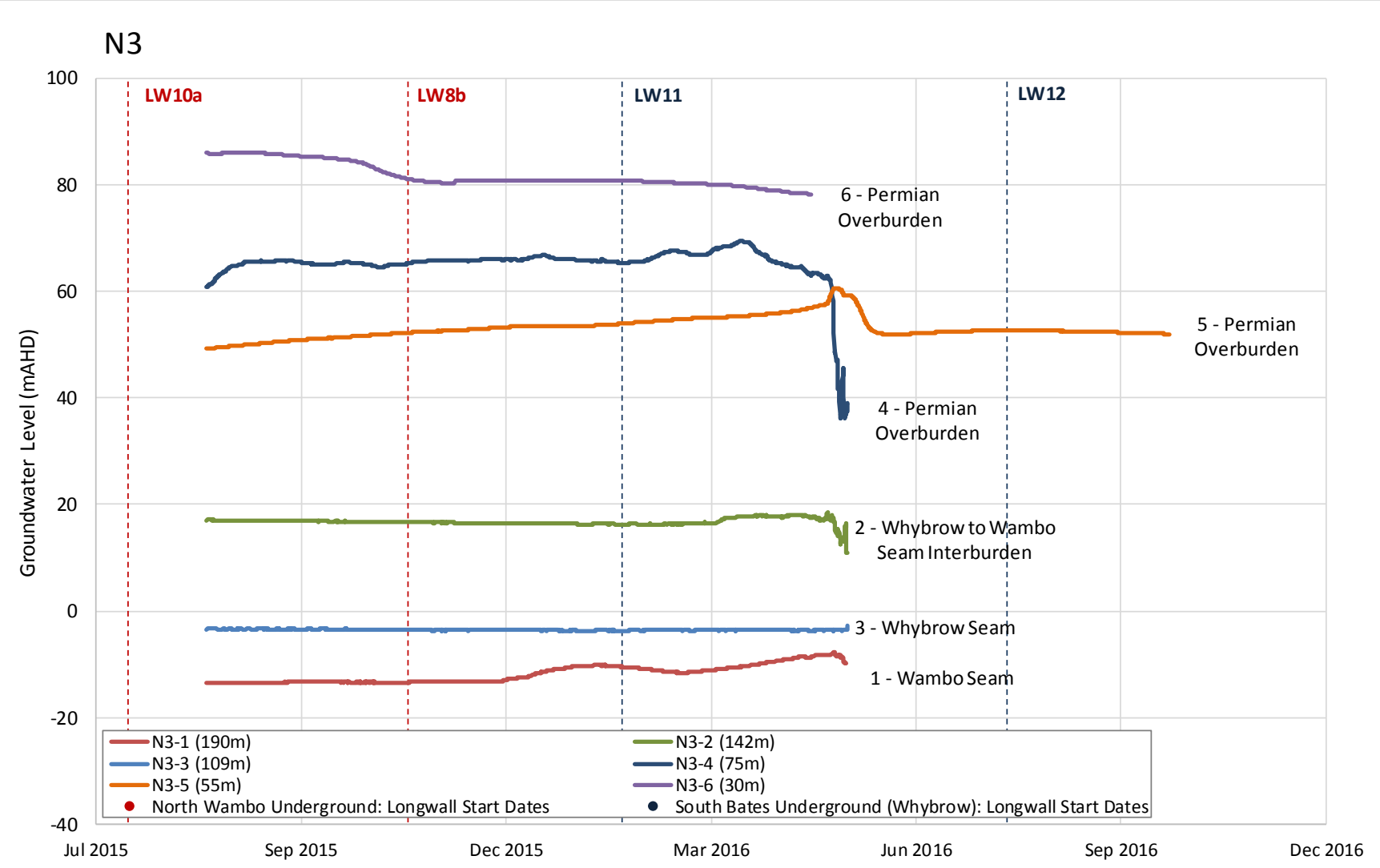


Figure C 8 – N3 VWP Hydrographs

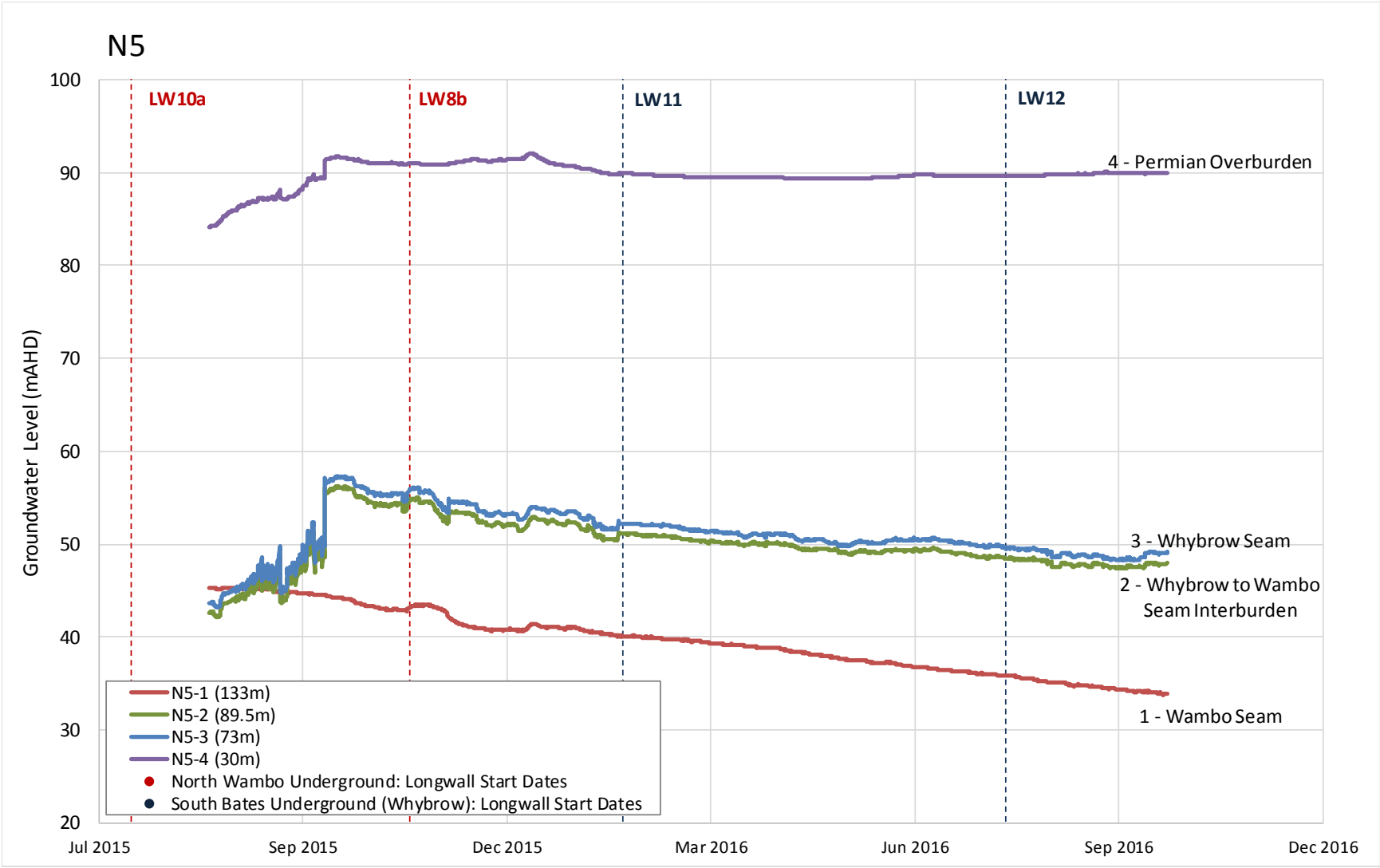


Figure C 9 – N5 VWP Hydrographs

ATTACHMENT D

Simulated

Fracture Zones

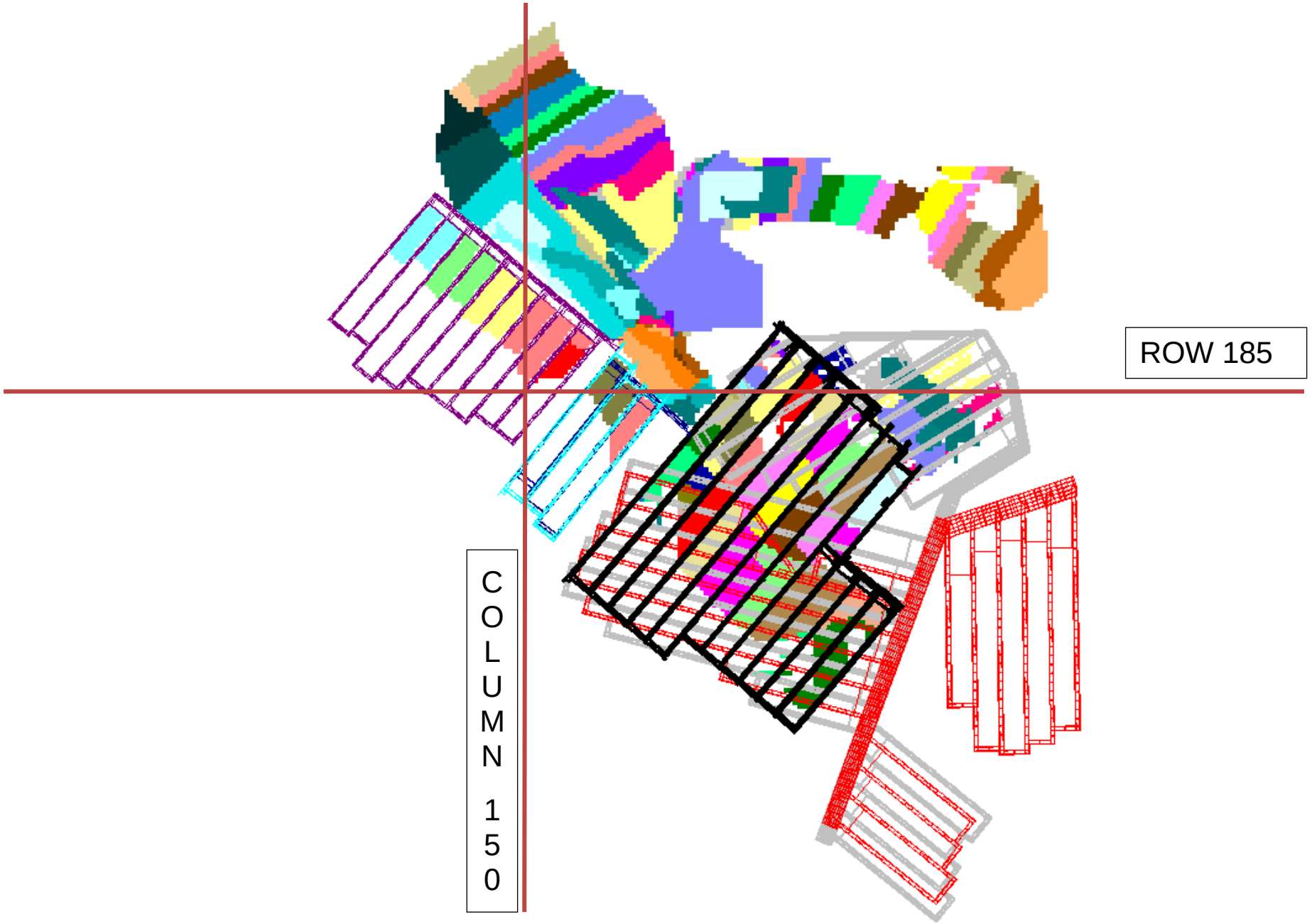


Figure D 1. Locations of Cross Section Lines (coloured zones above longwall panels indicate simulated fracturing to land surface)

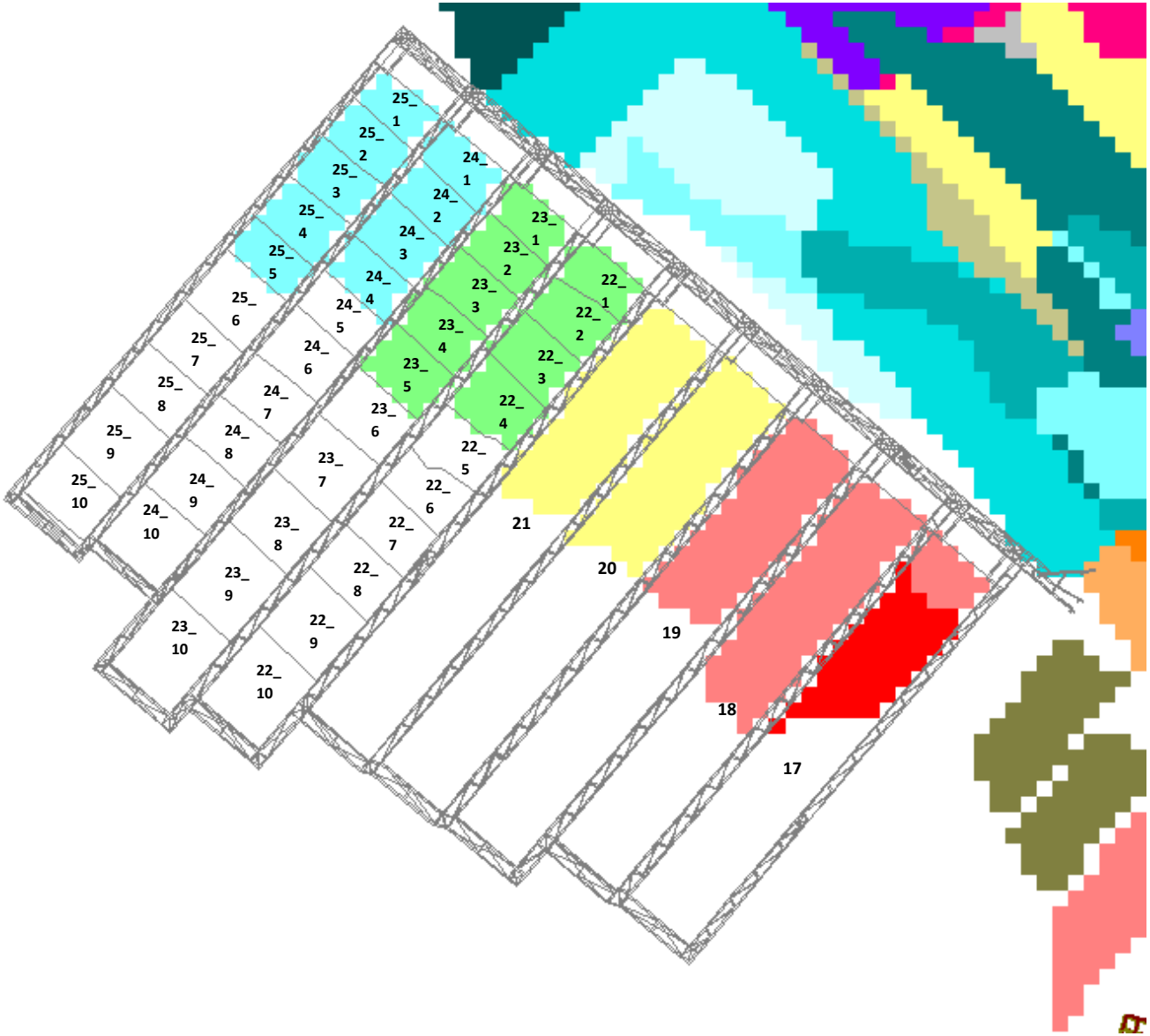
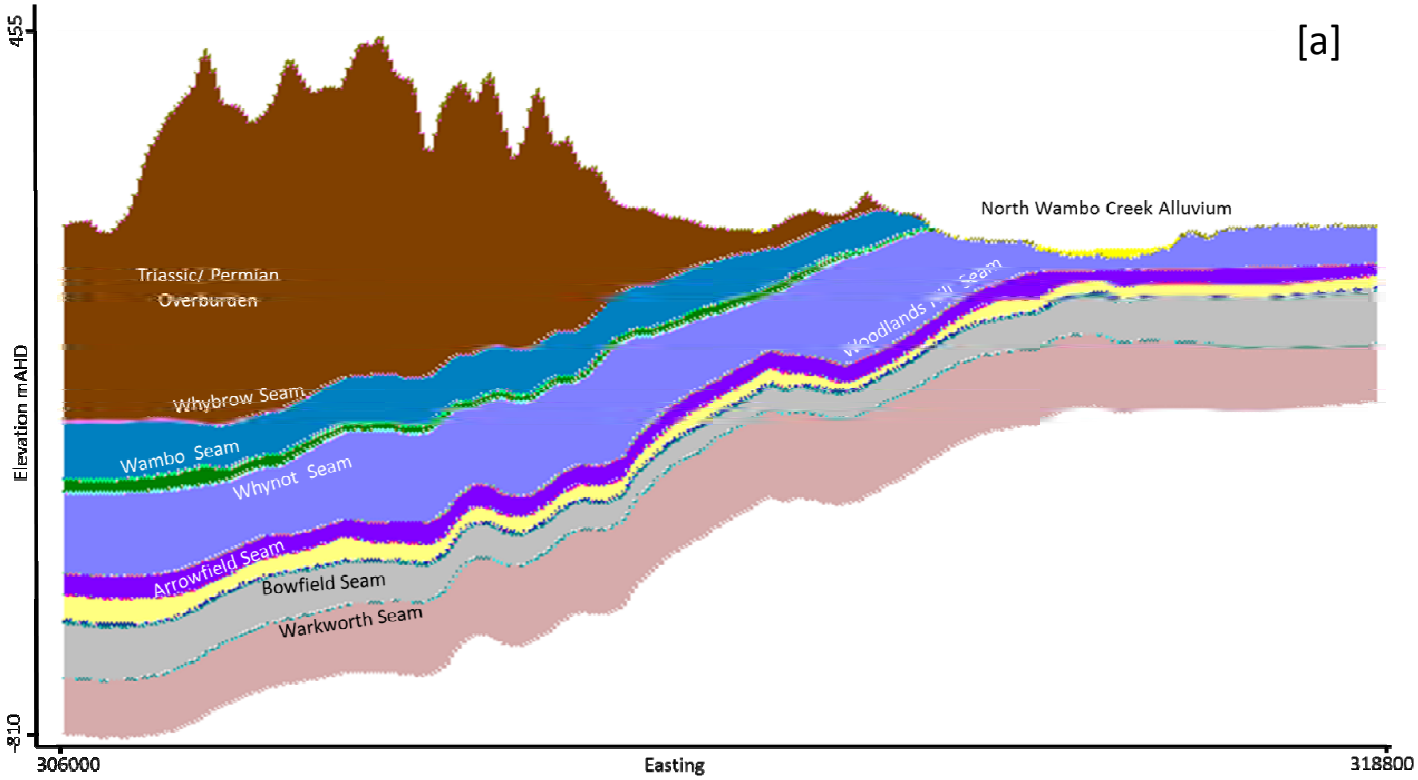


Figure D 2. Longwall Segments for Height of Fracturing Calculations (coloured zones above longwall panels indicate simulated fracturing to land surface)



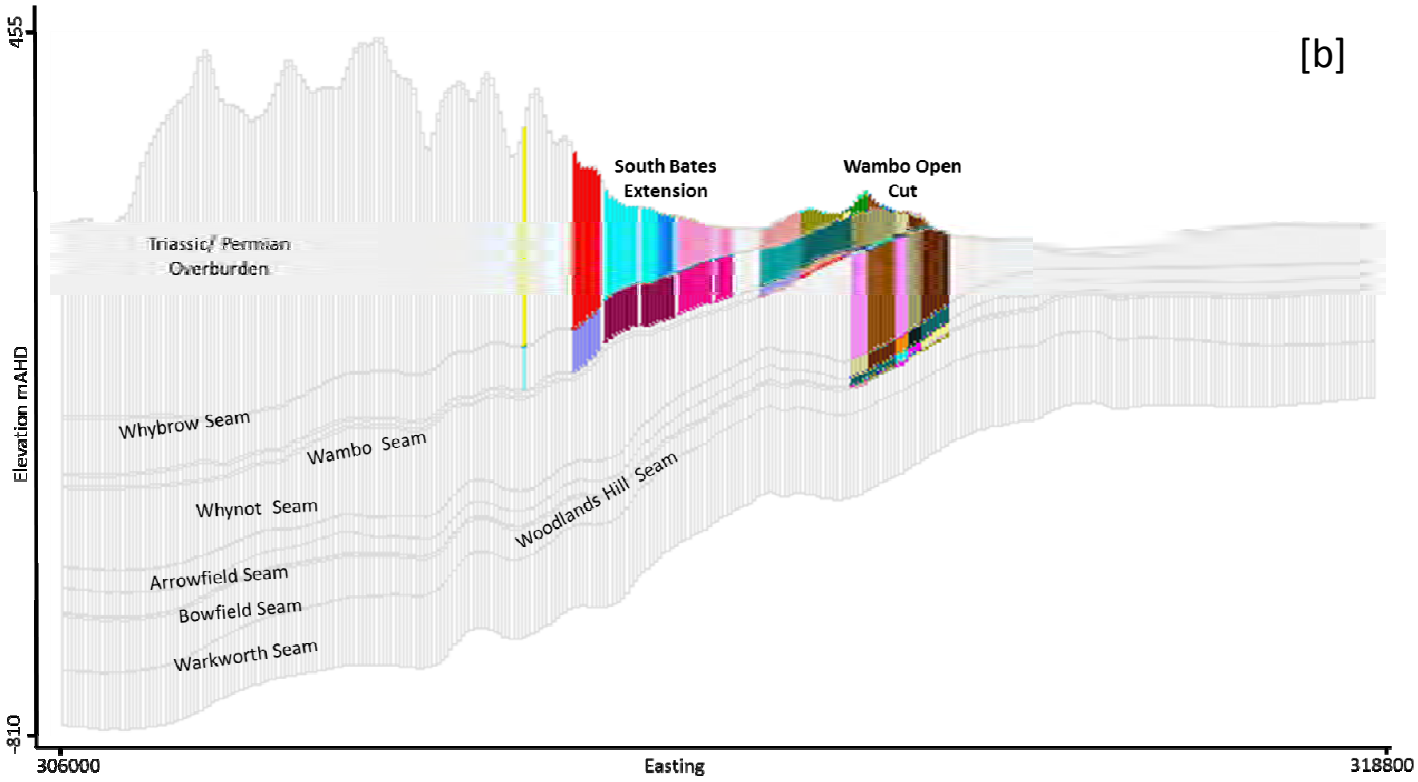


Figure D 3. Modified Scenario Model Column 150: (a) Hydraulic Conductivity Host Zones and Permanent Fracture Zones; (b) Dynamic Fractured Zones

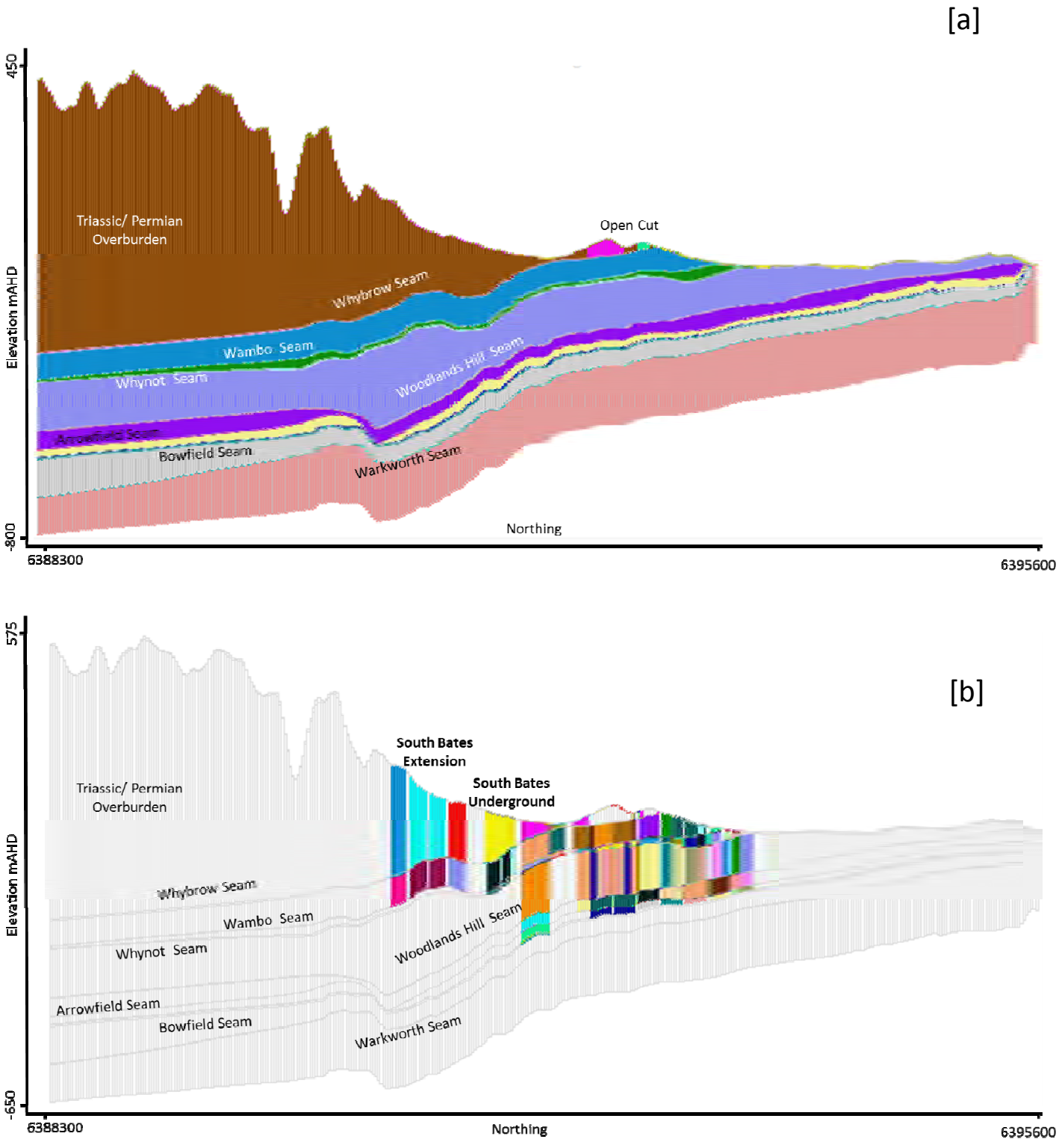


Figure D 4. Modified Scenario Model Row 185: (a) Hydraulic Conductivity Host Zones and Permanent Fracture Zones; (b) Dynamic Fractured Zones

ATTACHMENT E

Predictive Alluvial Groundwater Hydrographs

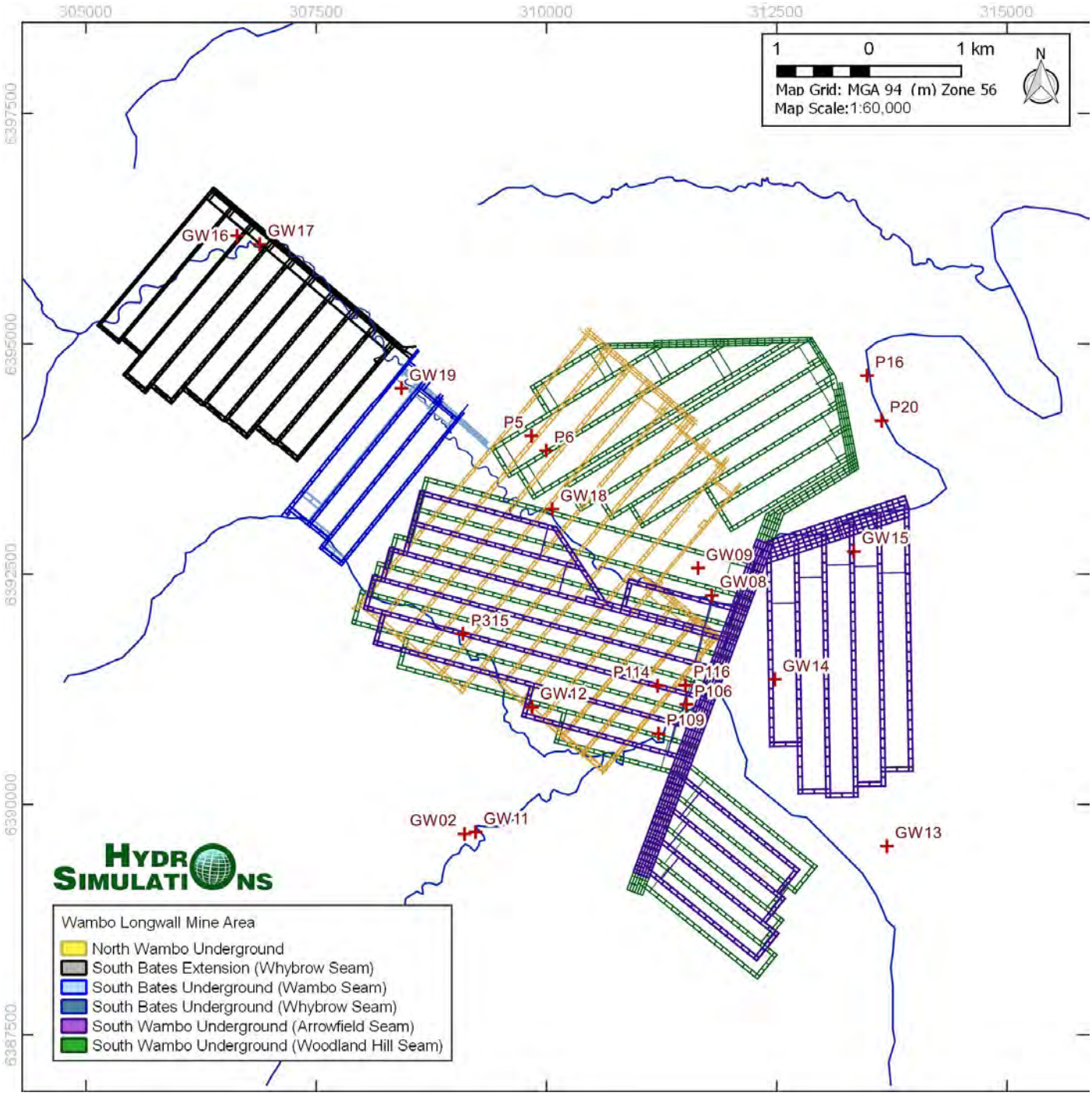


Figure E - 1 Alluvial Groundwater Monitoring Network.

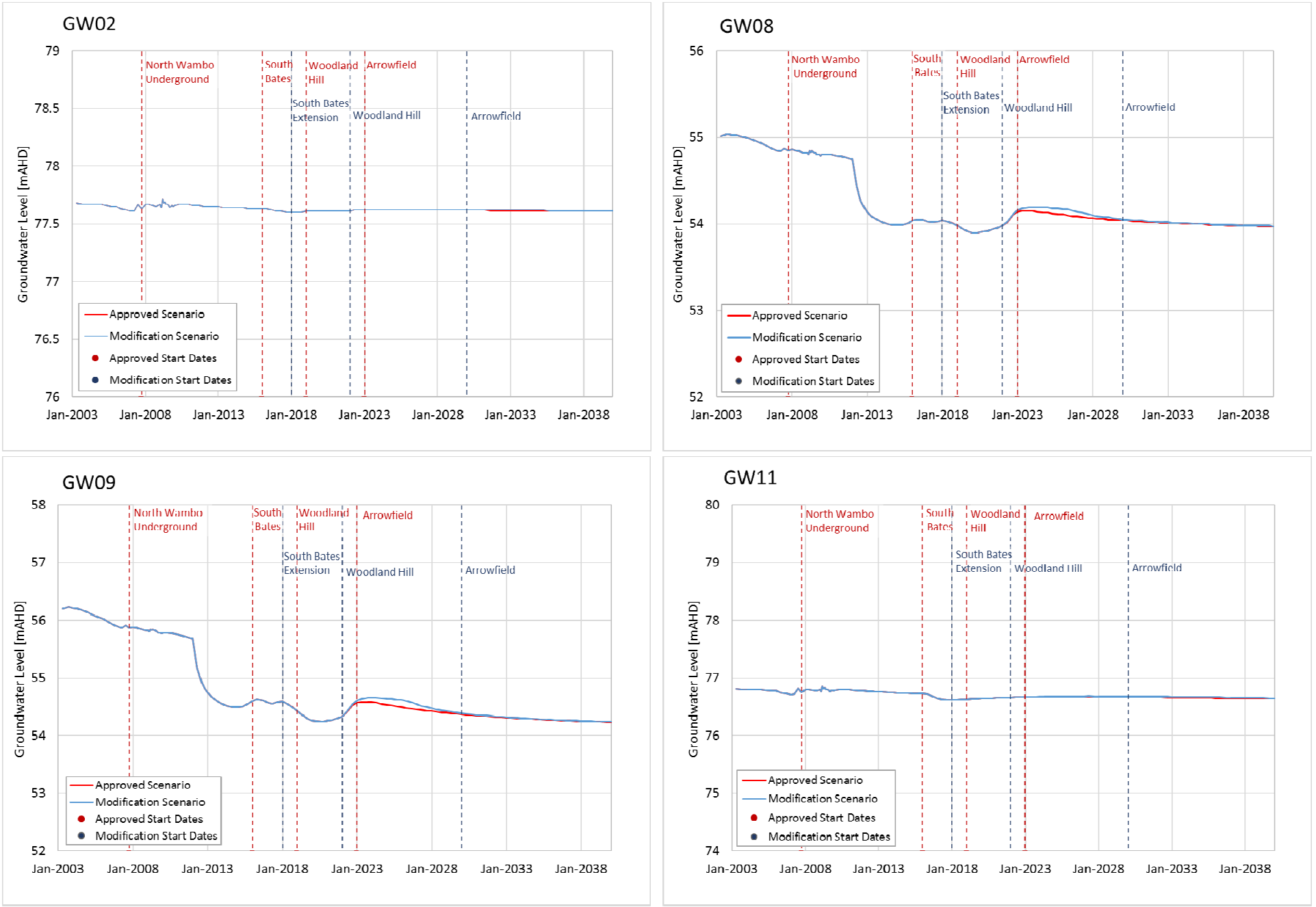
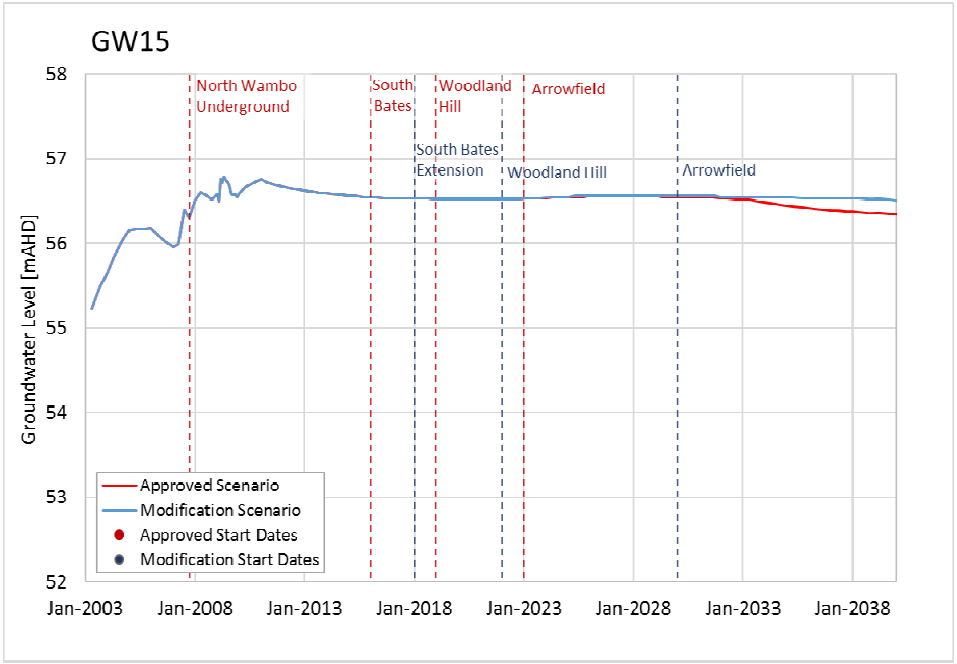
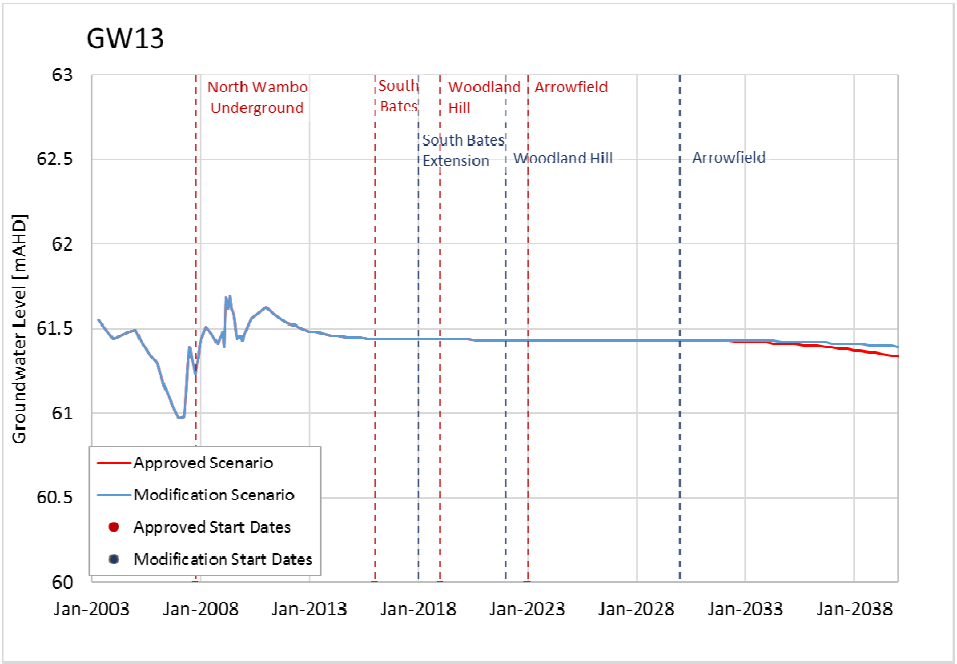


Figure E - 2 GW02, GW08, GW09, GW11 Predictive Hydrographs





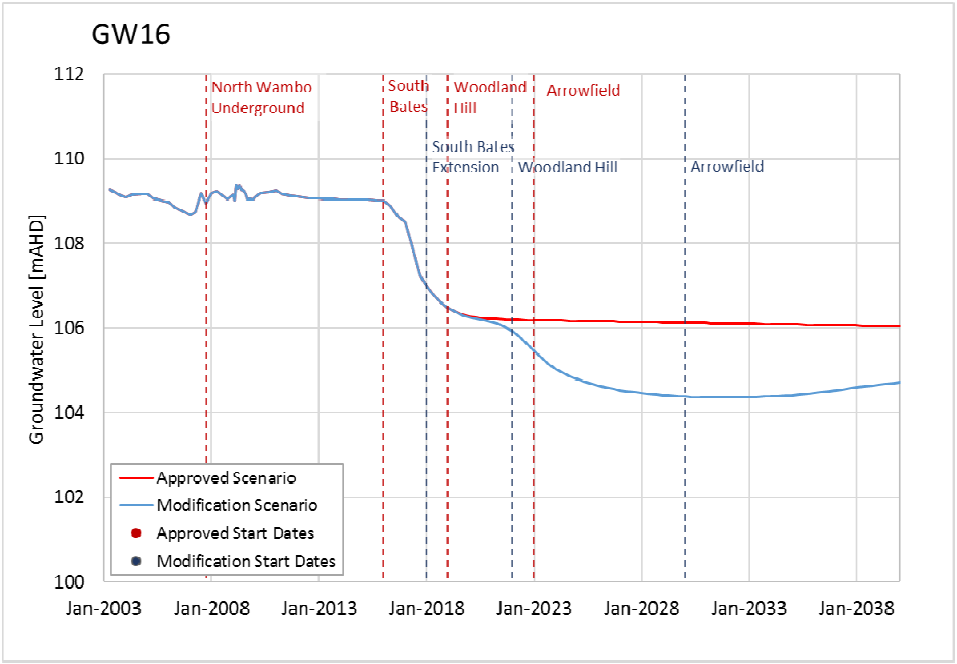


Figure E - 3 GW13, GW15, GW16 Predictive Hydrographs

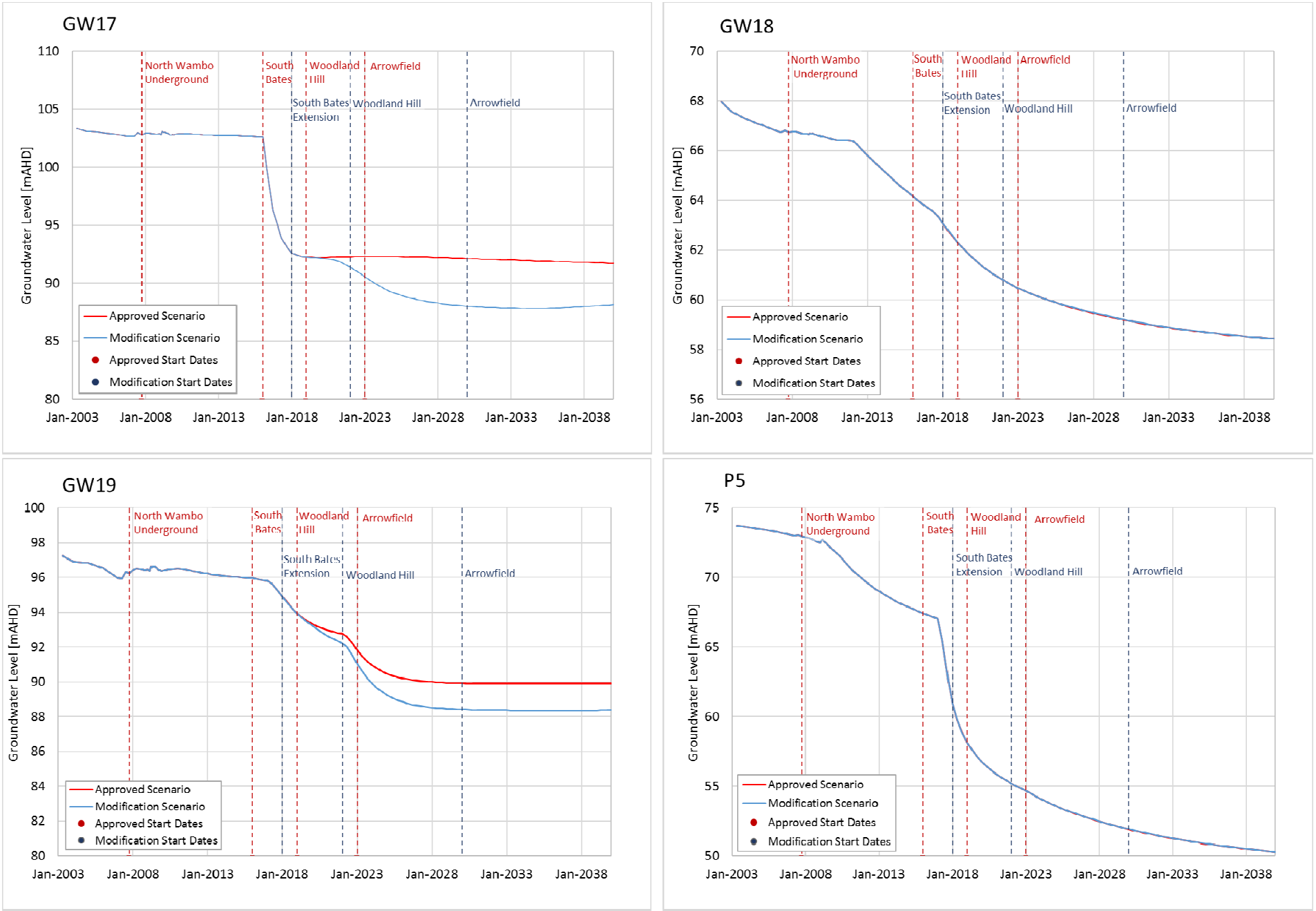


Figure E - 4 GW17, GW18, GW19, P5 Predictive Hydrographs

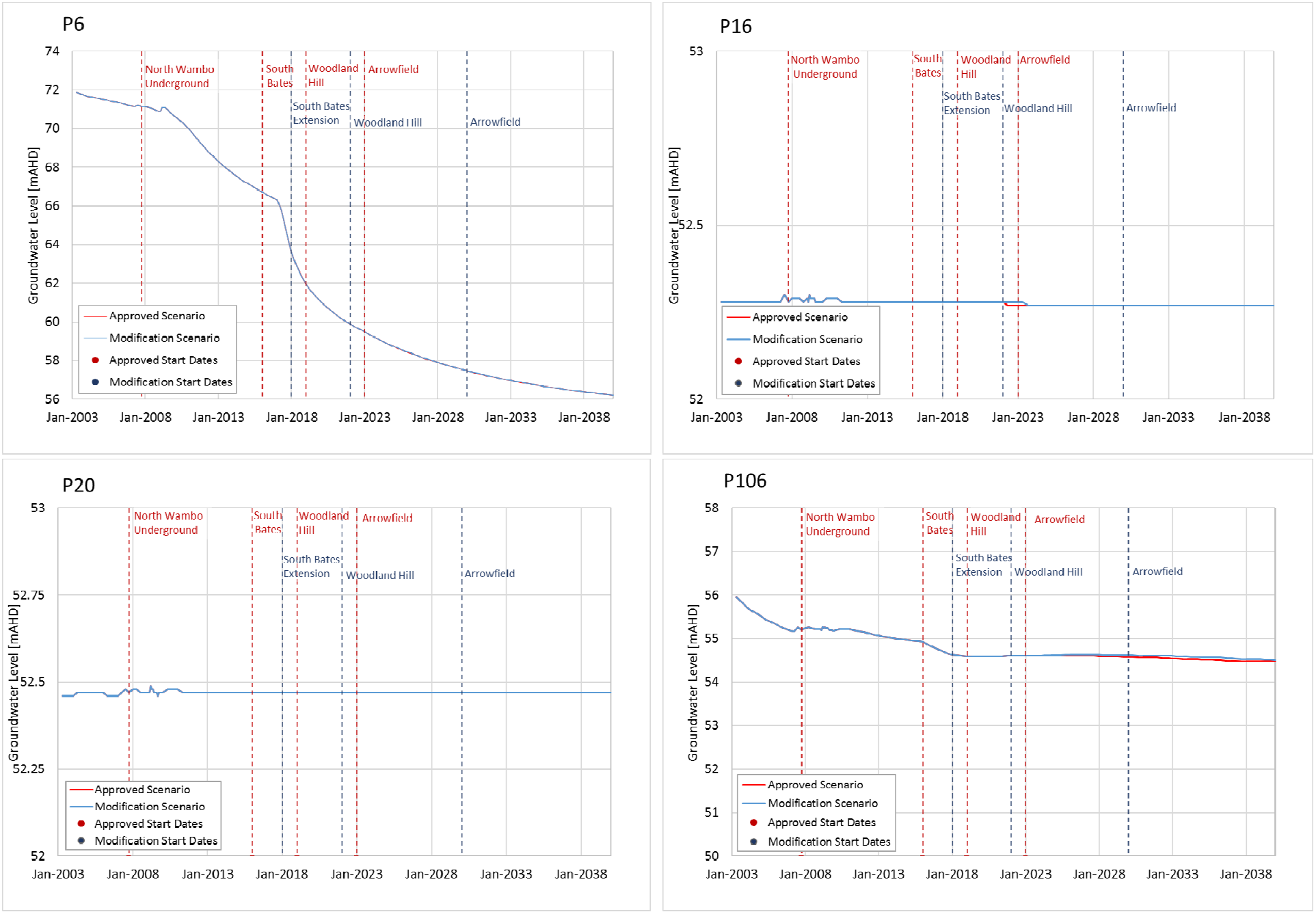


Figure E - 5 P6, P16, P20, P106 Predictive Hydrographs

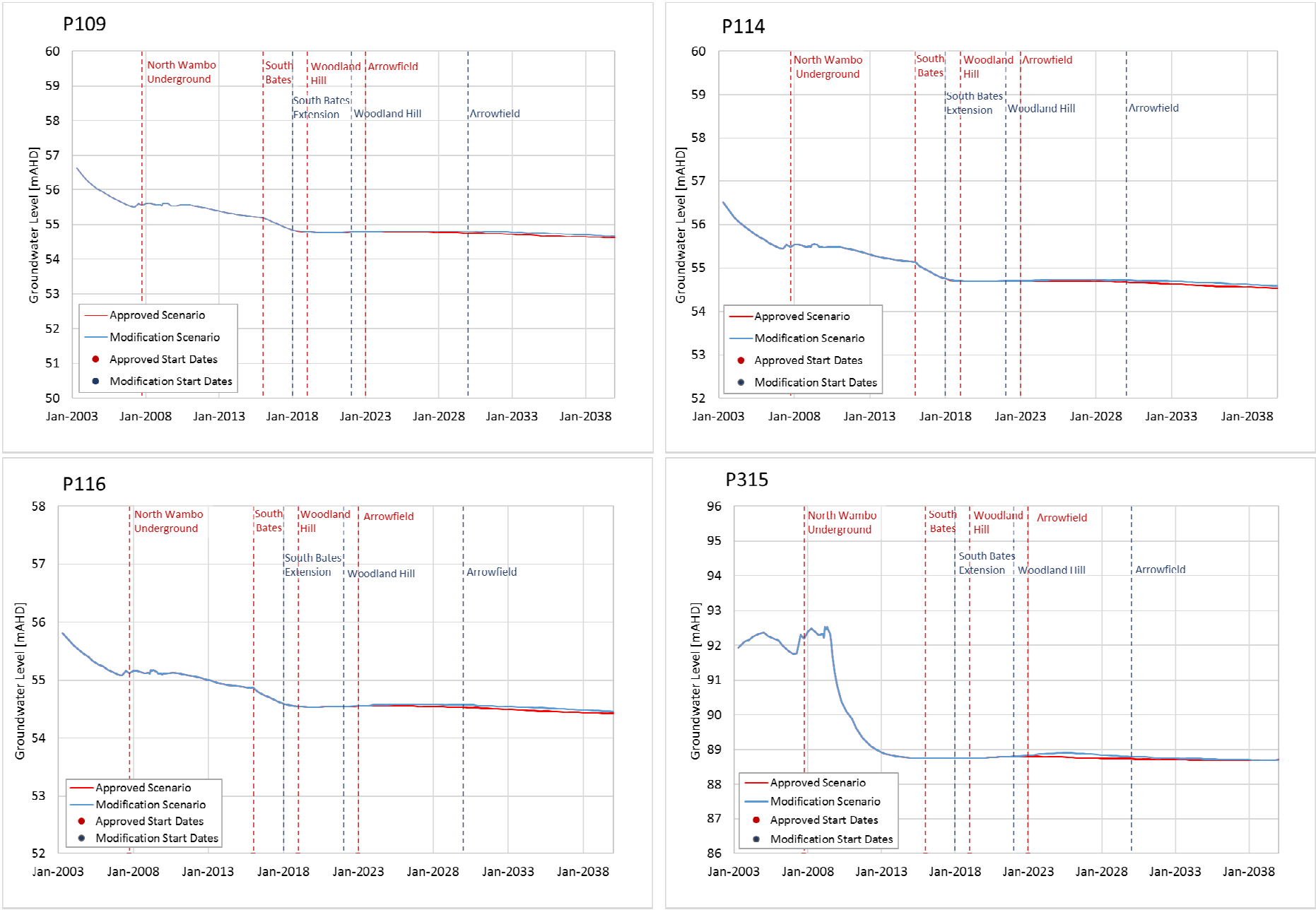


Figure E - 6 P109, P114, P116, P315 Predictive Hydrographs

NB. Groundwater levels at P114 are calculated from L1 in the model (not averaged over L1 and L2 as shown in Section 3.8).