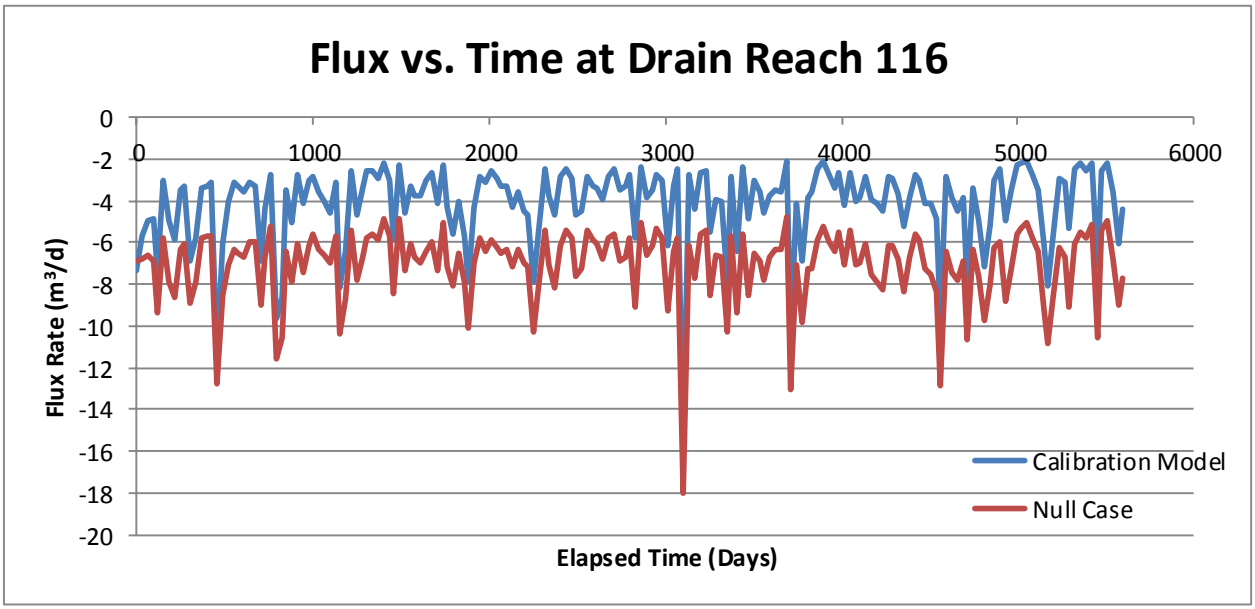
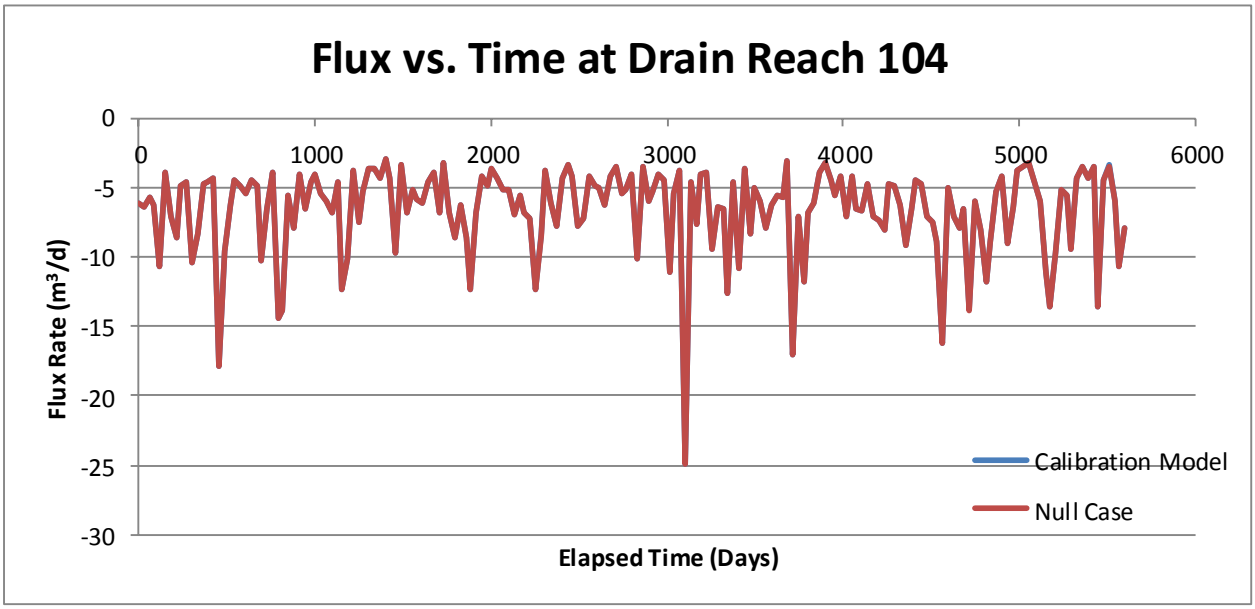
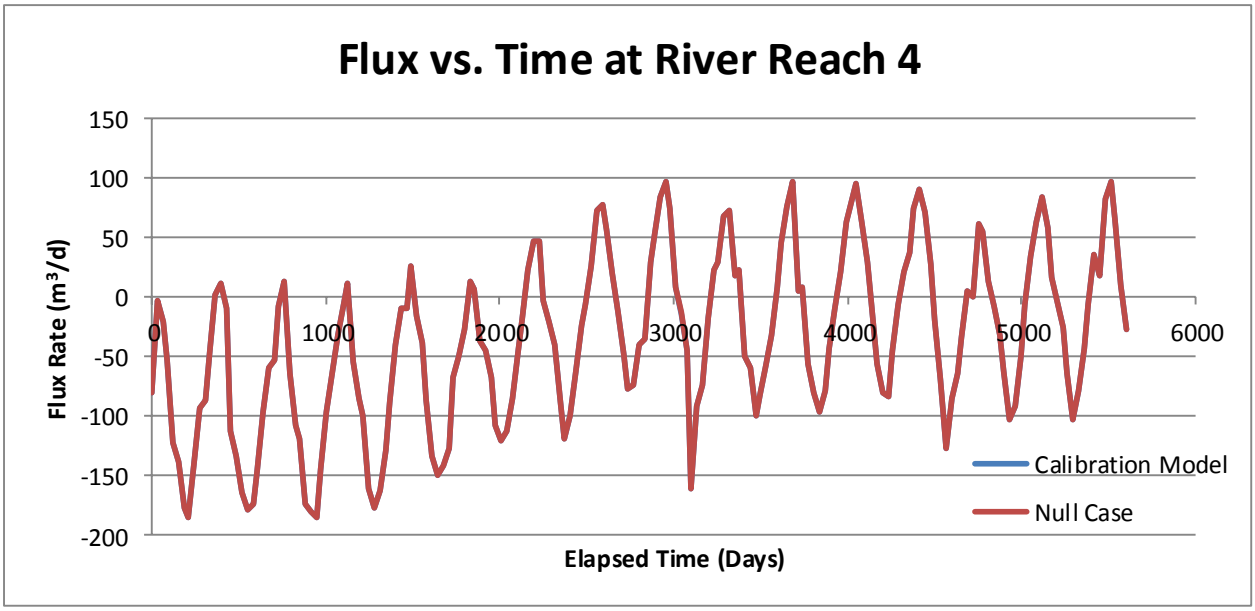
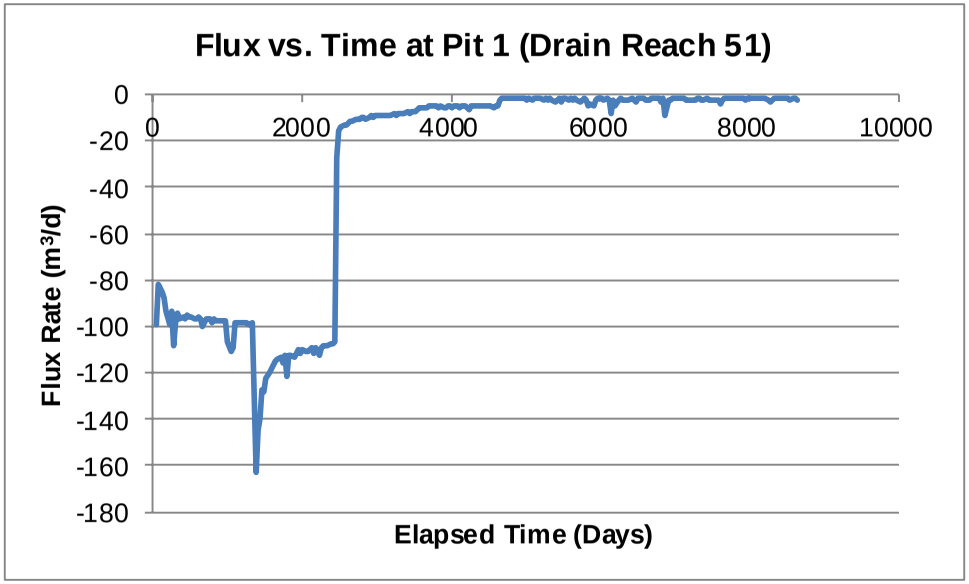
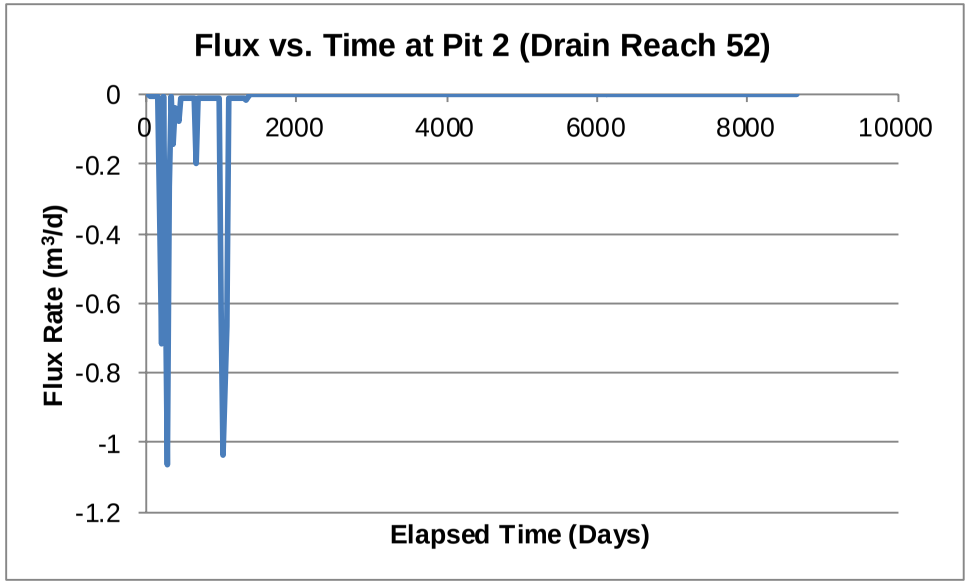
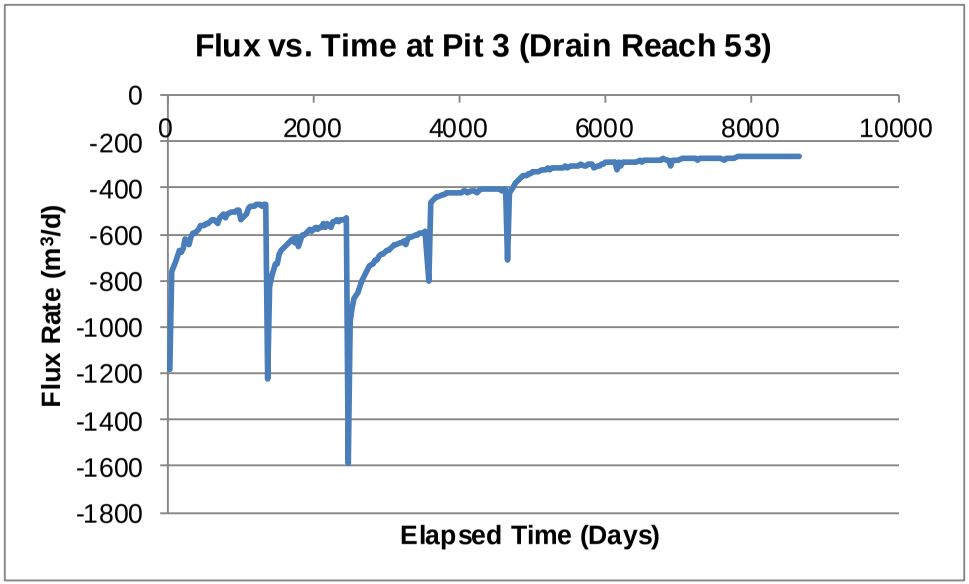

Flux vs. Time at Drain Reach 116
Flux Rate (m³/d)
0
-2
-4
-6
-8
-10
-12
-14
-16
-18
-20
0
1000
2000
3000
4000
5000
6000
Elapsed Time (Days)
Calibration Model
Null Case

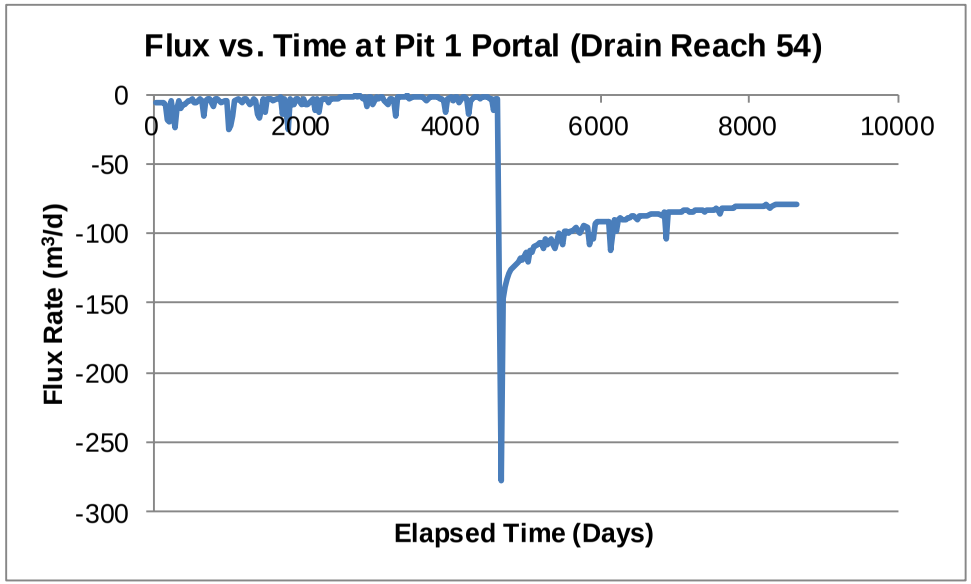

Flux vs. Time at Drain Reach 104
Flux Rate (m³/d)
0
-5
-10
-15
-20
-25
-30
0
1000
2000
3000
4000
5000
6000
Elapsed Time (Days)
Calibration Model
Null Case

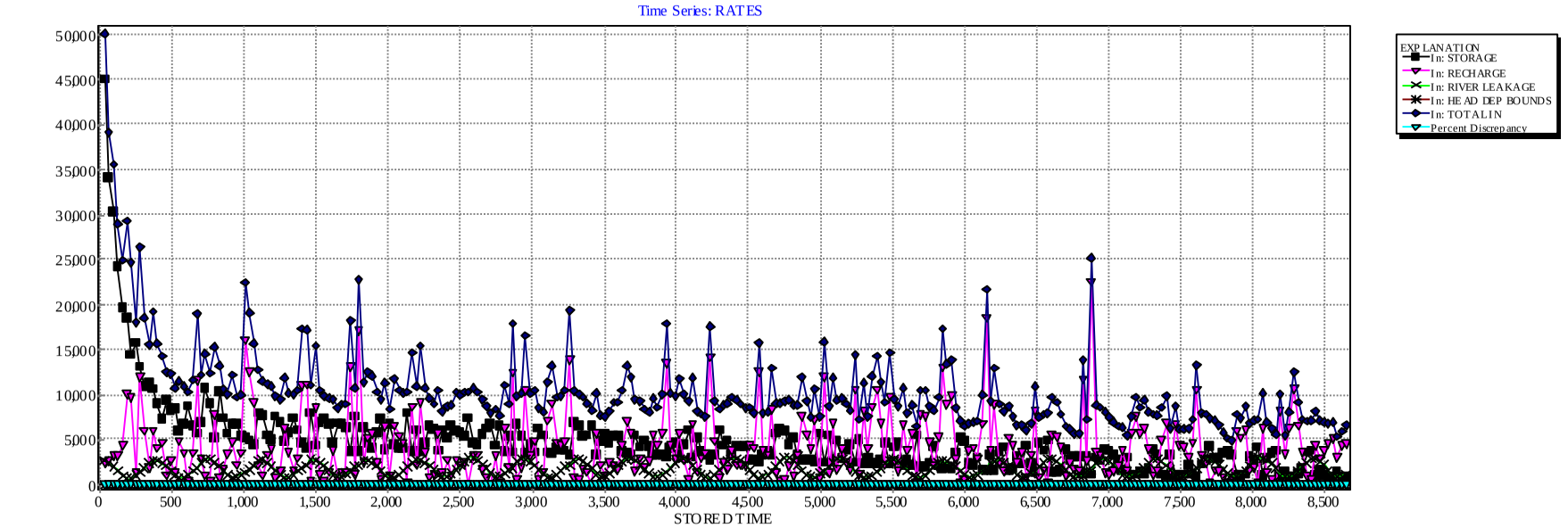

Flux vs. Time at River Reach 4
Flux Rate (m³/d)
150
100
50
0
-50
-100
-150
-200
0
1000
2000
3000
4000
5000
6000
Elapsed Time (Days)
Calibration Model
Null Case

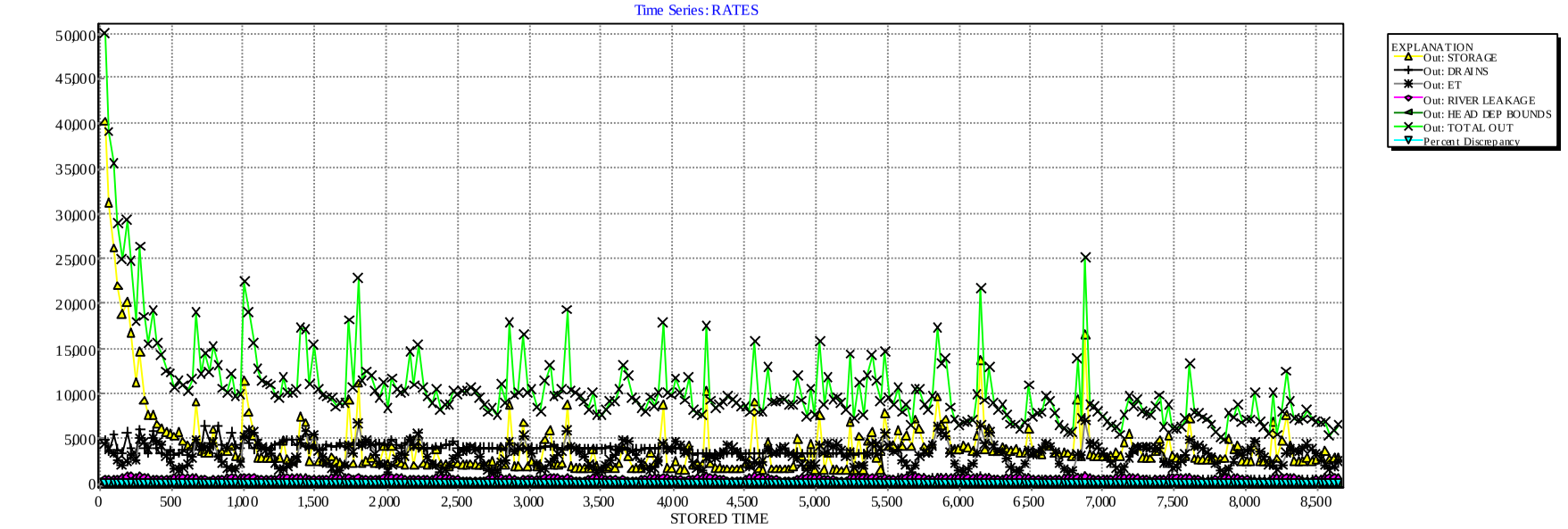

Flux vs. Time at Pit 1 (Drain Reach 51)
Flux Rate (m³/d)
0
-20
-40
-60
-80
-100
-120
-140
-160
-180
0
2000
4000
6000
8000
10000
Elapsed Time (Days)


Flux vs. Time at Pit 2 (Drain Reach 52)
Flux Rate (m³/d)
0
-0.2
-0.4
-0.6
-0.8
-1
-1.2
0
2000
4000
6000
8000
10000
Elapsed Time (Days)


Flux vs. Time at Pit 3 (Drain Reach 53)
Flux Rate (m³/d)
0
-200
-400
-600
-800
-1000
-1200
-1400
-1600
-1800
0
2000
4000
6000
8000
10000
Elapsed Time (Days)

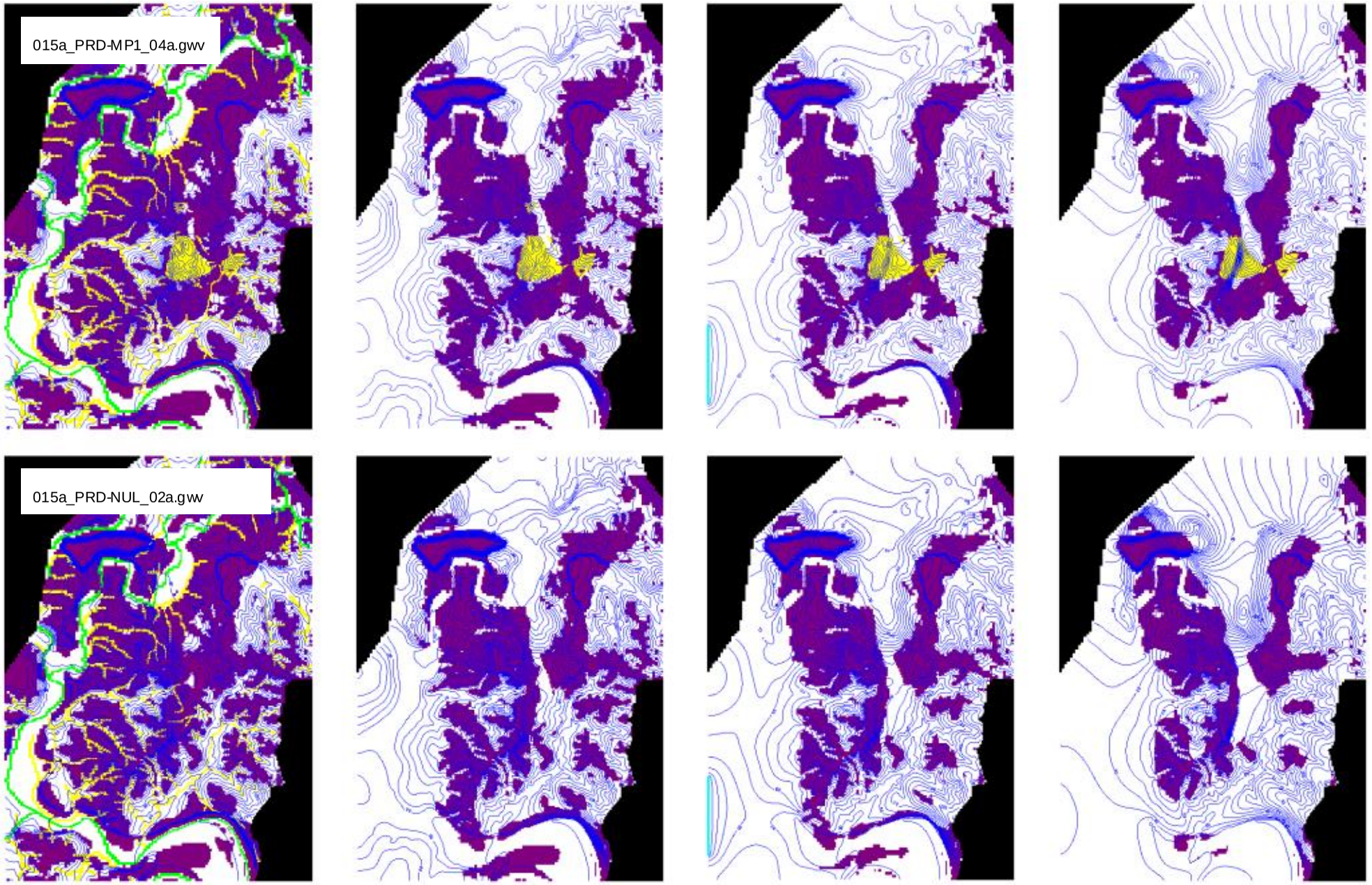

Flux vs. Time at Pit 1 Portal (Drain Reach 54)
Flux Rate (m³/d)
0
-50
-100
-150
-200
-250
-300
0
2000
4000
6000
8000
10000
Elapsed Time (Days)



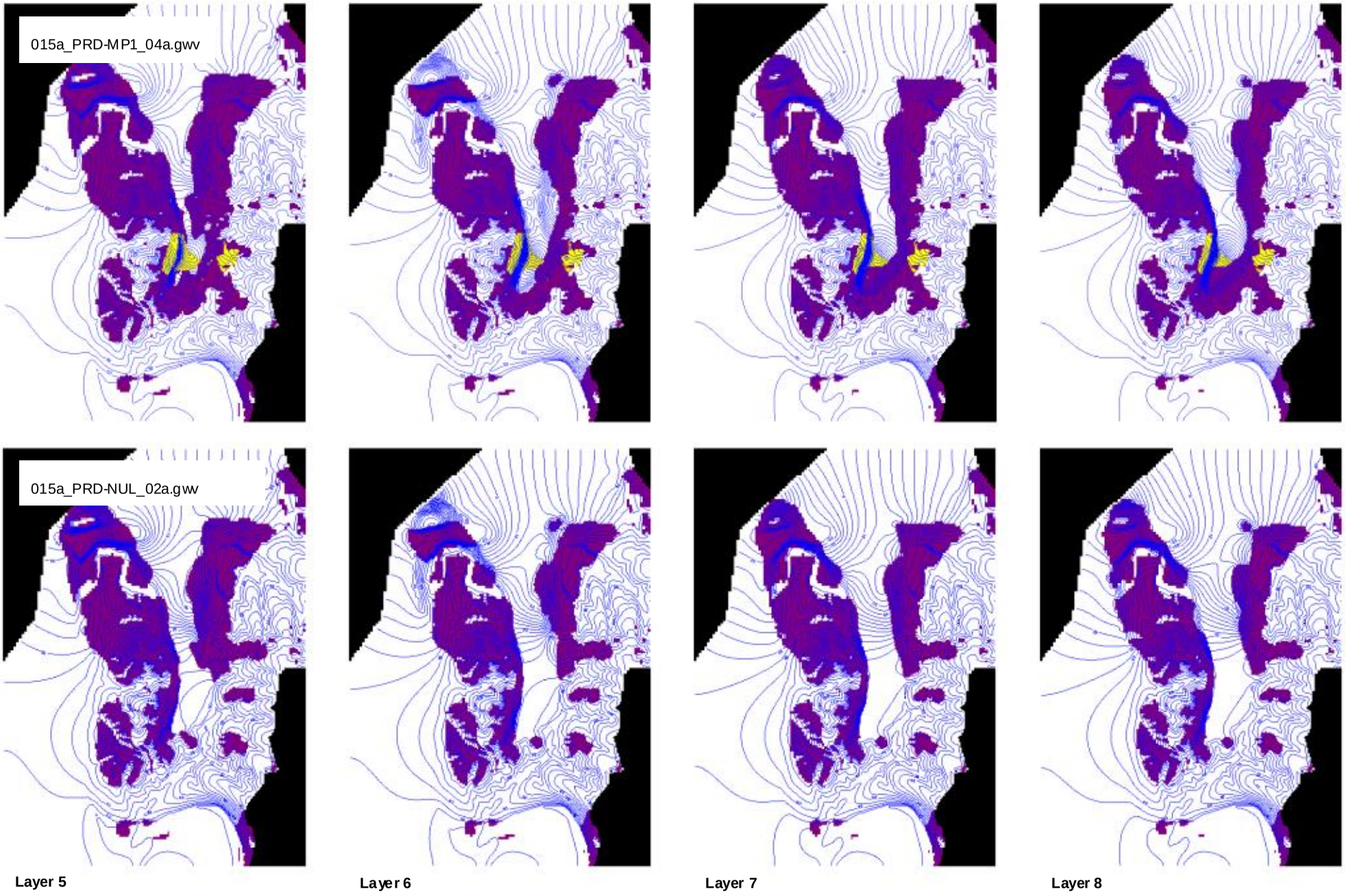


PREDICTION MODEL – MODEL MASS BALANCE FIGURE 8.17

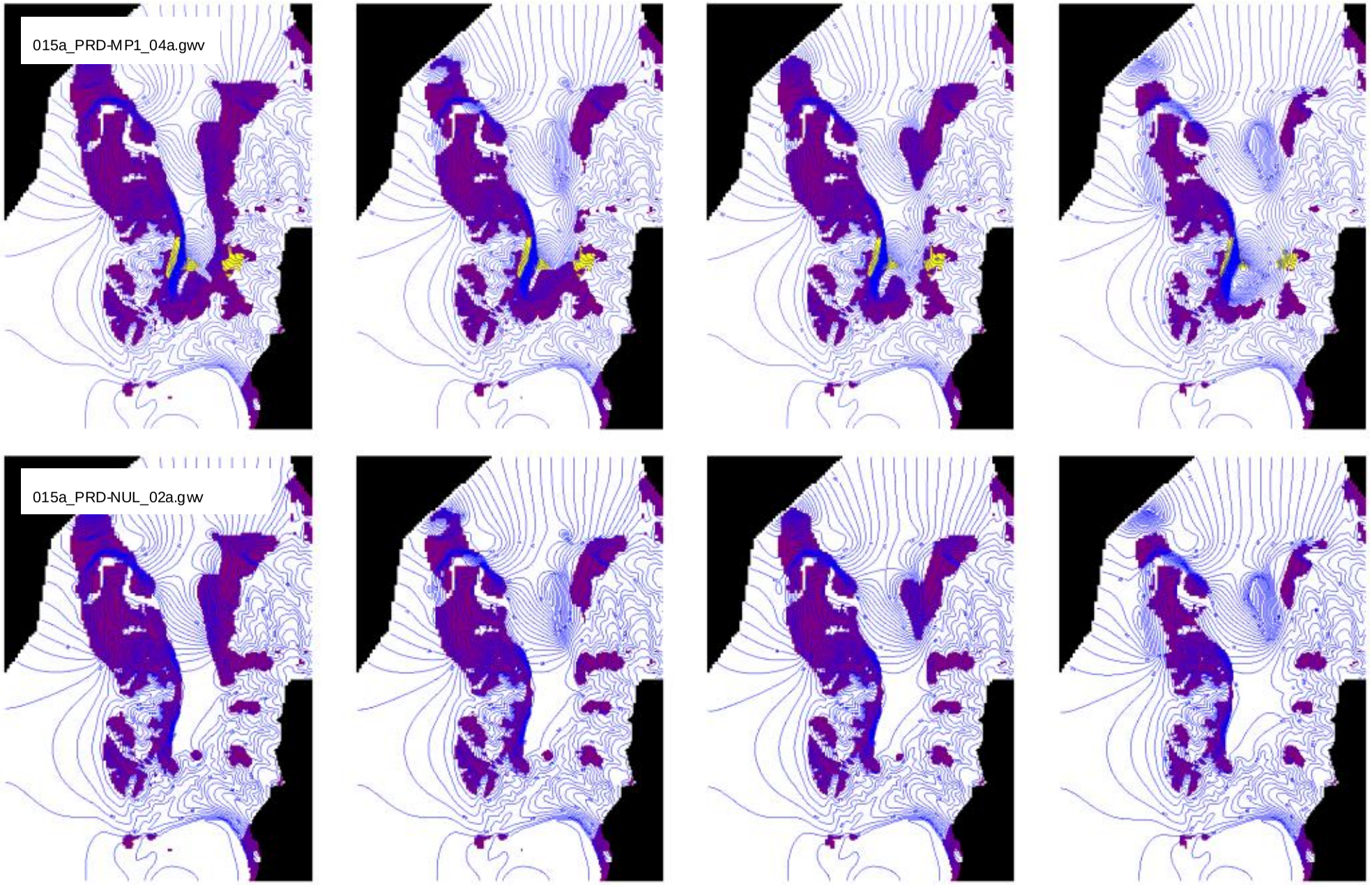
c:\jobs\s66d\300\figures\word\projects\015a_d064_figure8-17_predictionmodelmassbalance.docx



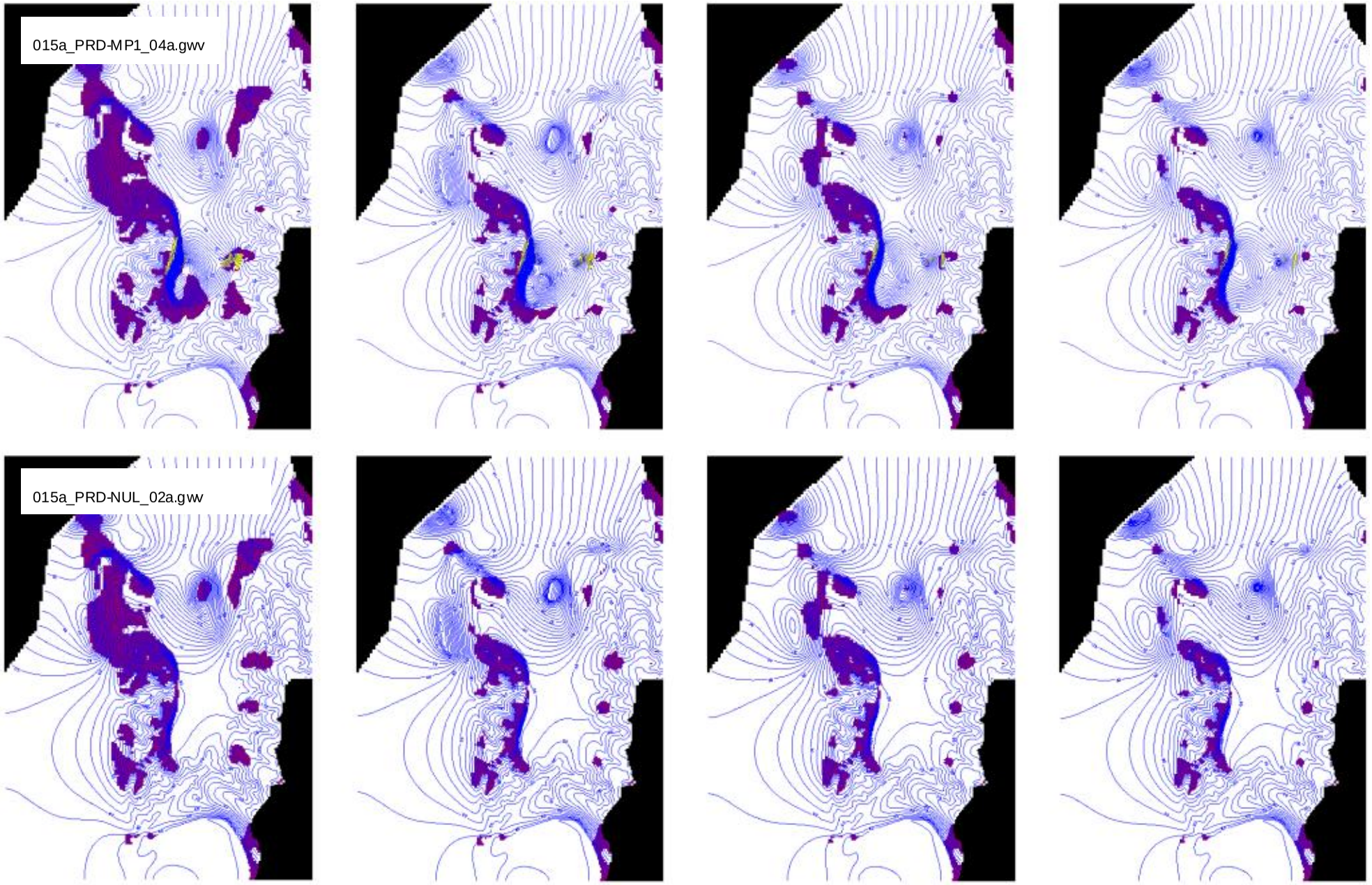
PREDICTION MODEL – MODELLED GROUNDWATER CONTOURS – DEC 2037 FIGURE 8.18.1



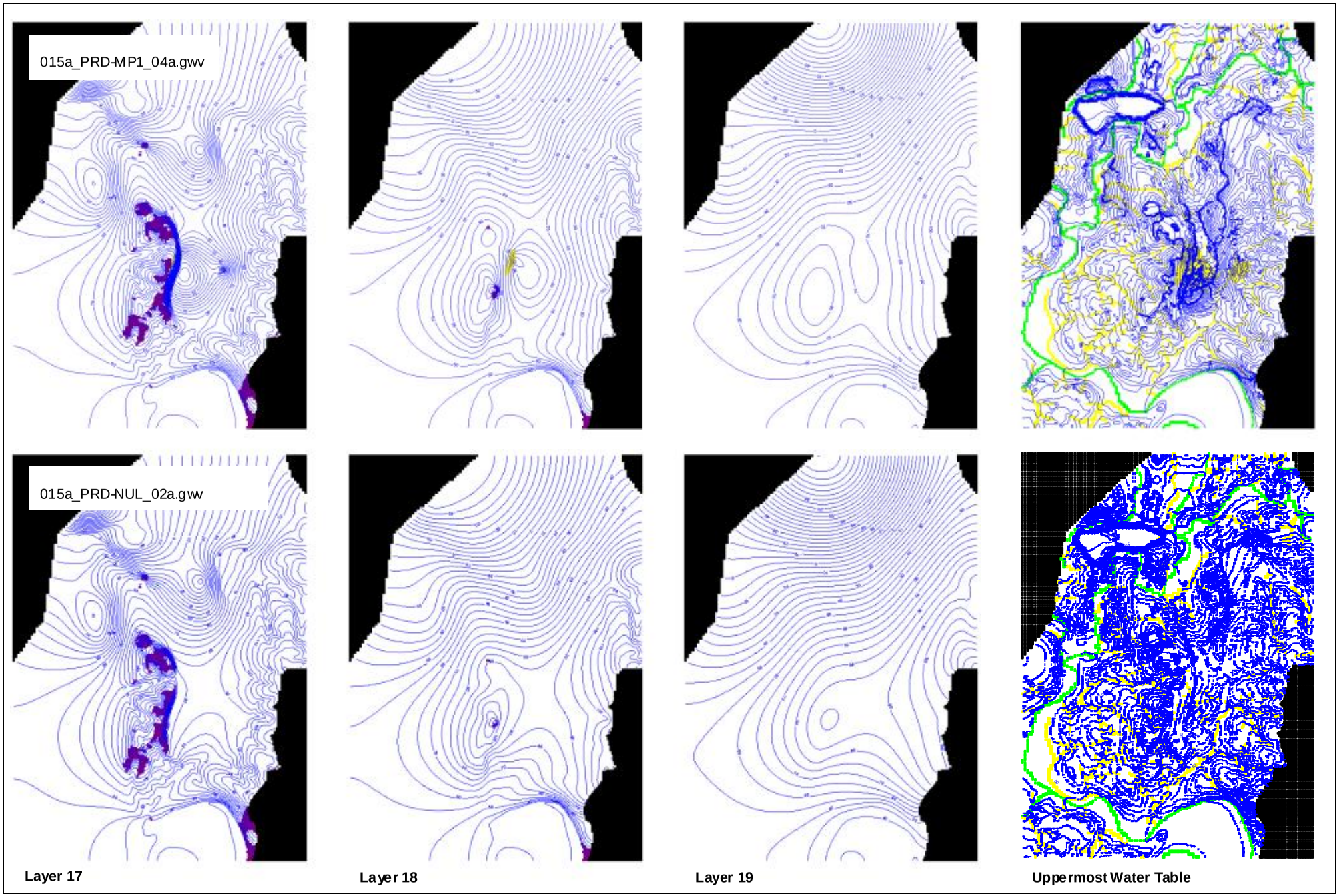
PREDICTION MODEL – MODELLED GROUNDWATER CONTOURS – DEC 2037 FIGURE 8.18.2



PREDICTION MODEL – MODELLED GROUNDWATER CONTOURS – DEC 2037 FIGURE 8.18.3



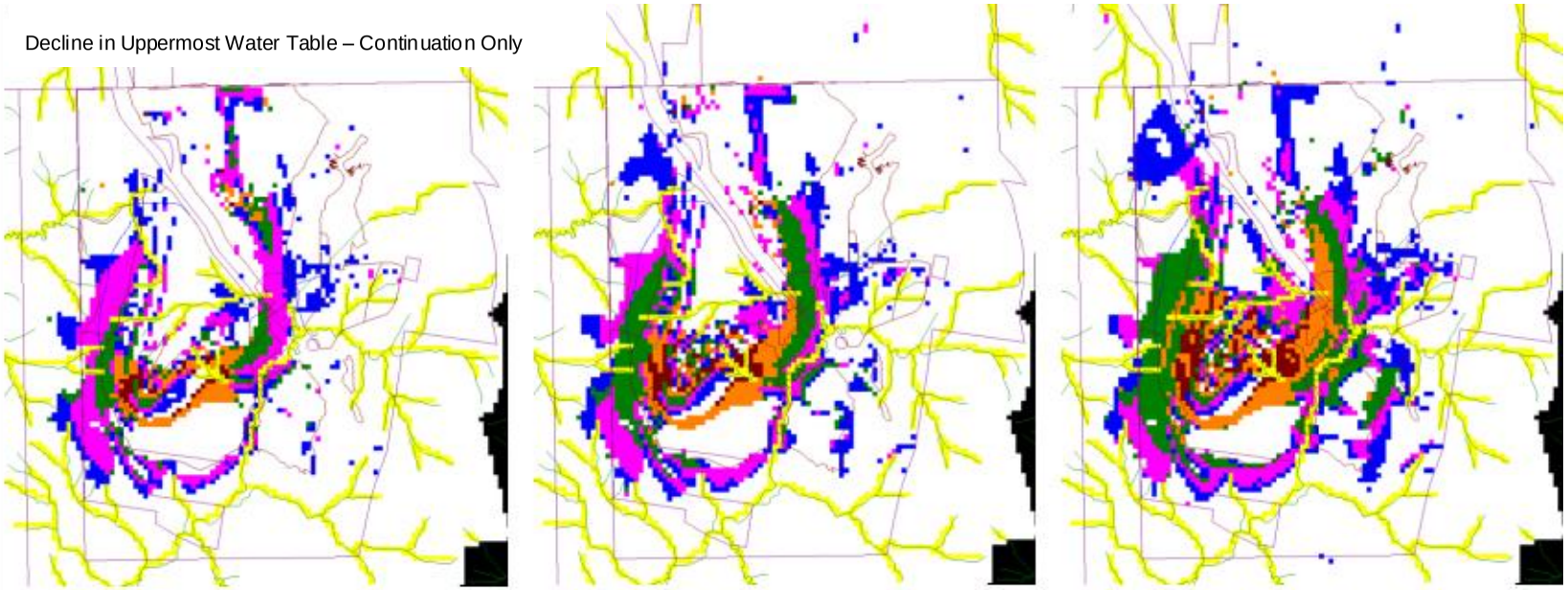
PREDICTION MODEL – MODELLED GROUNDWATER CONTOURS – DEC 2037 FIGURE 8.18.4



PREDICTION MODEL – MODELLED GROUNDWATER CONTOURS – DEC 2037 FIGURE 8.18.5

c:\jobs\s66d\300\figures\word\projects\015a_d034_figure8-18-5_predictionmodelgroundwaterlevels.docx

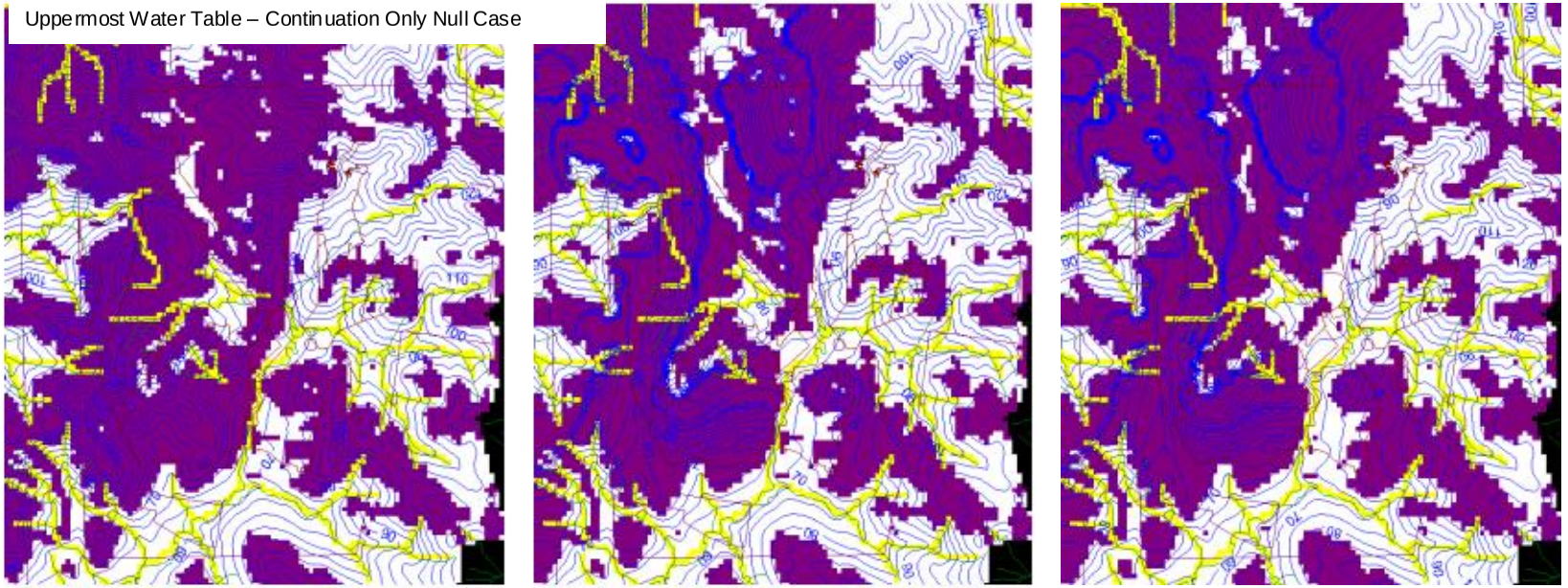
Decline in Uppermost Water Table – Continuation Only



Decline (m):

- >50m
- 20 to 50m
- 10 to 20m
- 5 to 10m
- 2 to 5m
- <2m

Uppermost Water Table – Continuation Only Null Case



Notes. 1) Dry cells in the lower images, displayed in purple, are with respect to heads from Layer 1; 2) Contours are highest water table, however, not necessarily residing in Layer 1.

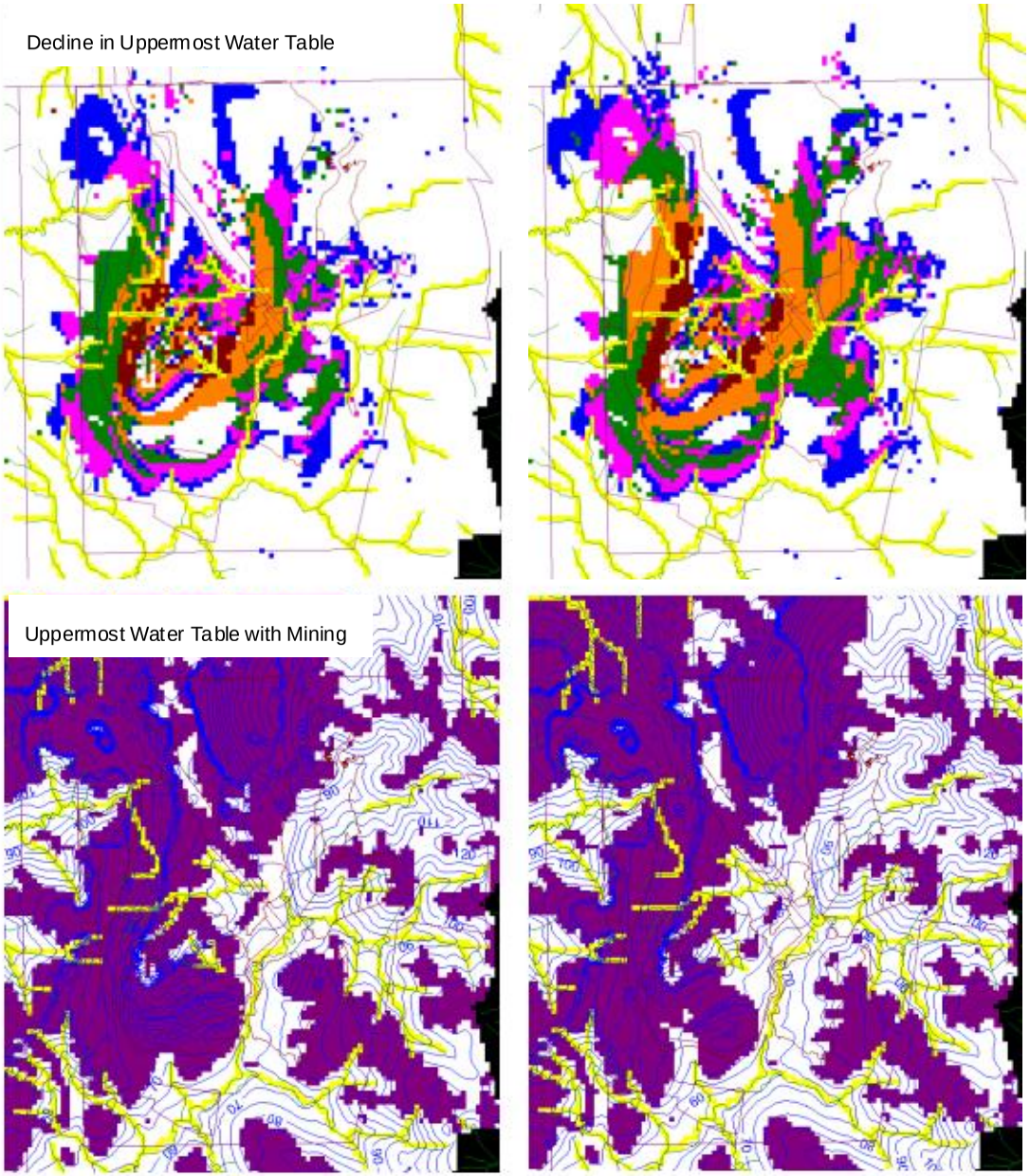
Dec 2017 (SP44) **Dec 2020 (SP80)** **Dec 2023 (SP116)**

015a_PRD-MP1_04a_NUL.gw

RPS

PREDICTION MODEL – MODELLED DECLINE IN UPPERMOST WATER TABLE – CONTINUATION ONLY FIGURE 8.19.1

c:\jobs\s66d\300\figures\word\projects\015a_d035_figure8_19_1_prediction\modelmodelleddeclineinwt_continuationonly.docx



Notes. 1) Dry cells in the lower images, displayed in purple, are with respect to heads from Layer 1; 2) Contours are highest water table, however, not necessarily residing in Layer 1.

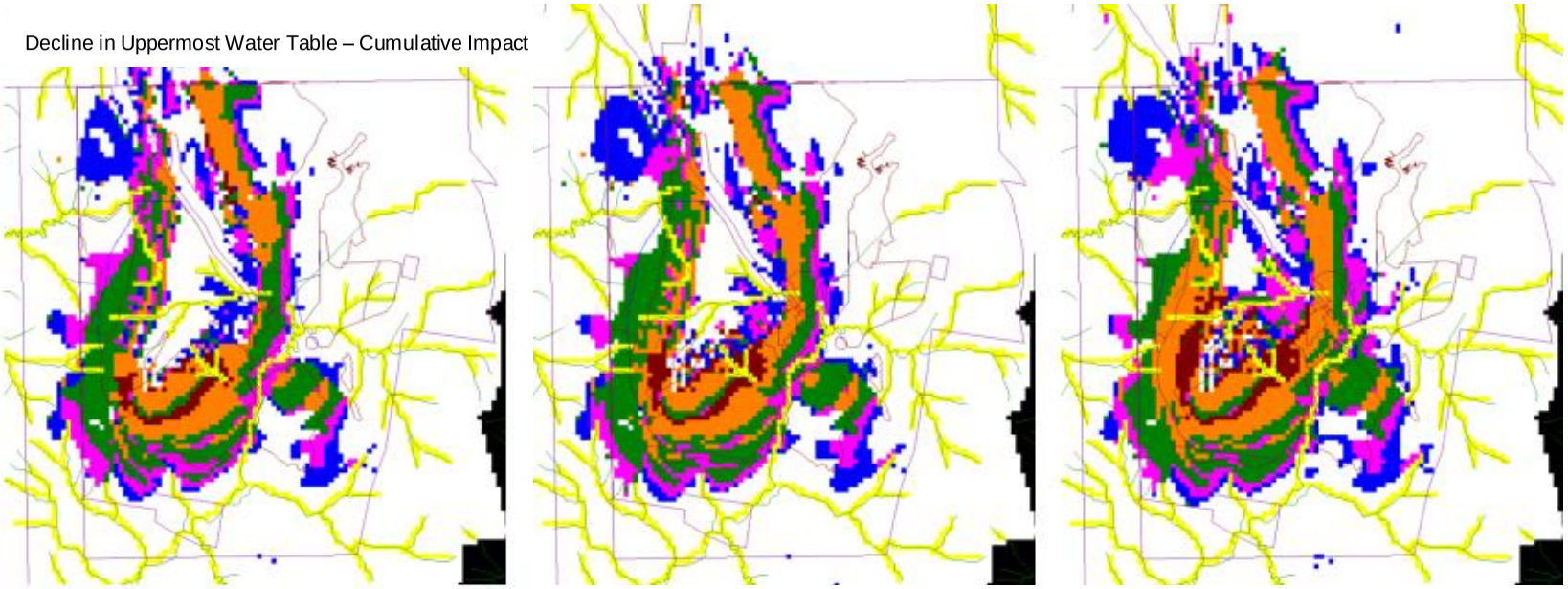
015a_PRD-MP1_04a_NUL.gw

RPS

PREDICTION MODEL – MODELLED DECLINE IN UPPERMOST WATER TABLE – EXTENSION ONLY FIGURE 8.19.2

c:\jobs\s66d\300\figures\word\projects\015a_d036_figure8-19-2_predictionmodelmodelleddeclineinwt_extensiononly.docx

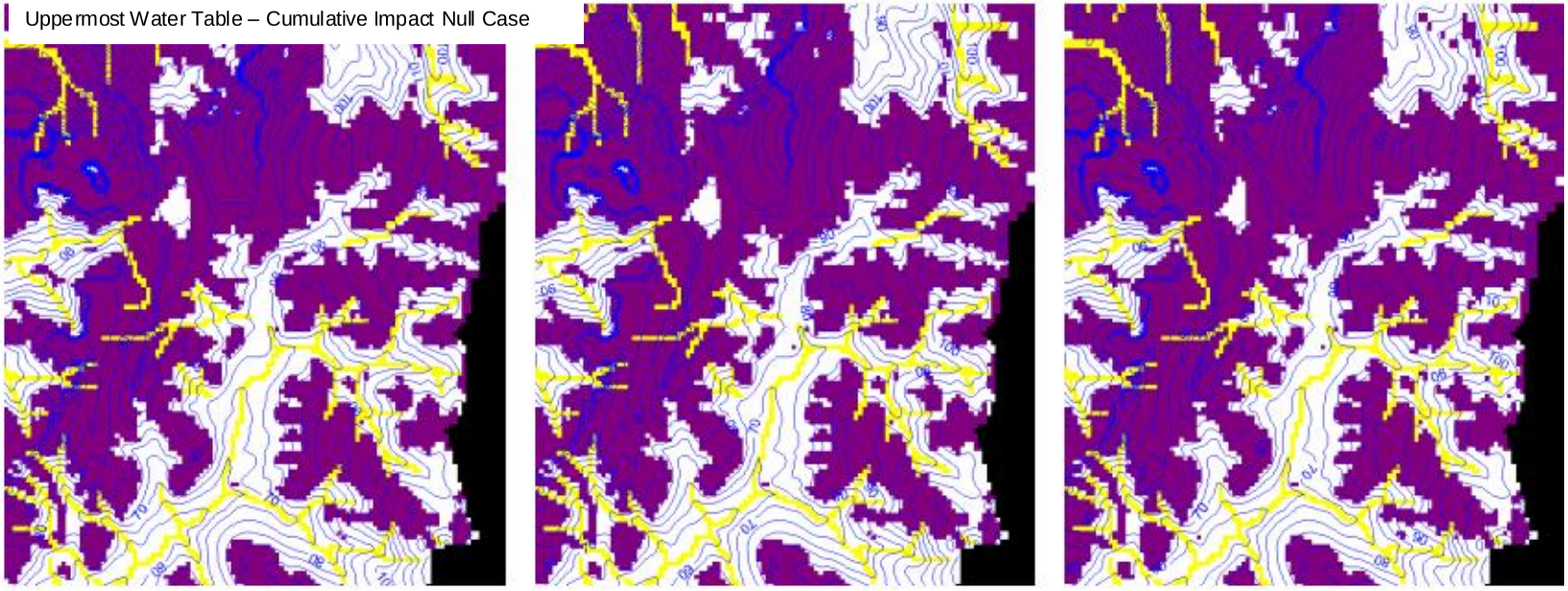
Decline in Uppermost Water Table – Cumulative Impact



Decline (m):

- >50m
- 20 to 50m
- 10 to 20m
- 5 to 10m
- 2 to 5m
- <2m

Uppermost Water Table – Cumulative Impact Null Case



Notes. 1) Dry cells in the lower images, displayed in purple, are with respect to heads from Layer 1; 2) Contours are highest water table, however, not necessarily residing in Layer 1.

Dec 2017 (SP44) **Dec 2020 (SP80)** **Dec 2023 (SP116)**

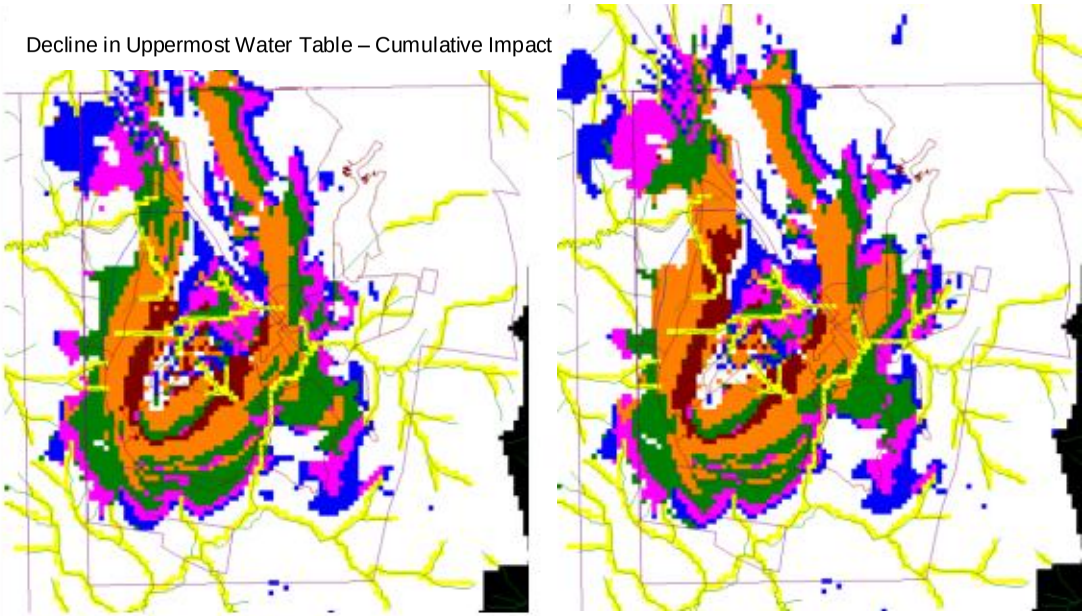
015a_PRD-NUL_02a.gwv

RPS

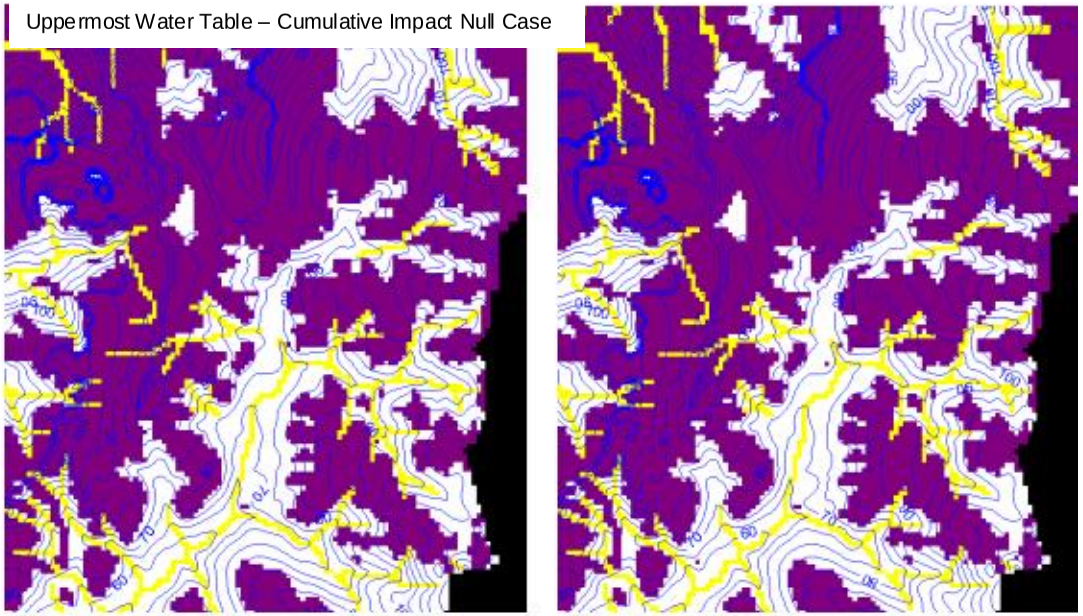
PREDICTION MODEL – MODELLED DECLINE IN UPPERMOST WATER TABLE – CUMULATIVE IMPACT FIGURE 8.19.3

c:\jobs\s66d\300\figures\word\projects\015a_d037_figure8 19 3_predictionmodelmodelleddeclineinwt_cumulativeimpact.docx

Decline in Uppermost Water Table – Cumulative Impact



Uppermost Water Table – Cumulative Impact Null Case



Dec 2026 (SP152) **Dec 2037 (SP284)**

Decline (m):

- >50m
- 20 to 50m
- 10 to 20m
- 5 to 10m
- 2 to 5m
- <2m

Notes. 1) Dry cells in the lower images, displayed in purple, are with respect to heads from Layer 1; 2) Contours are highest water table, however, not necessarily residing in Layer 1.

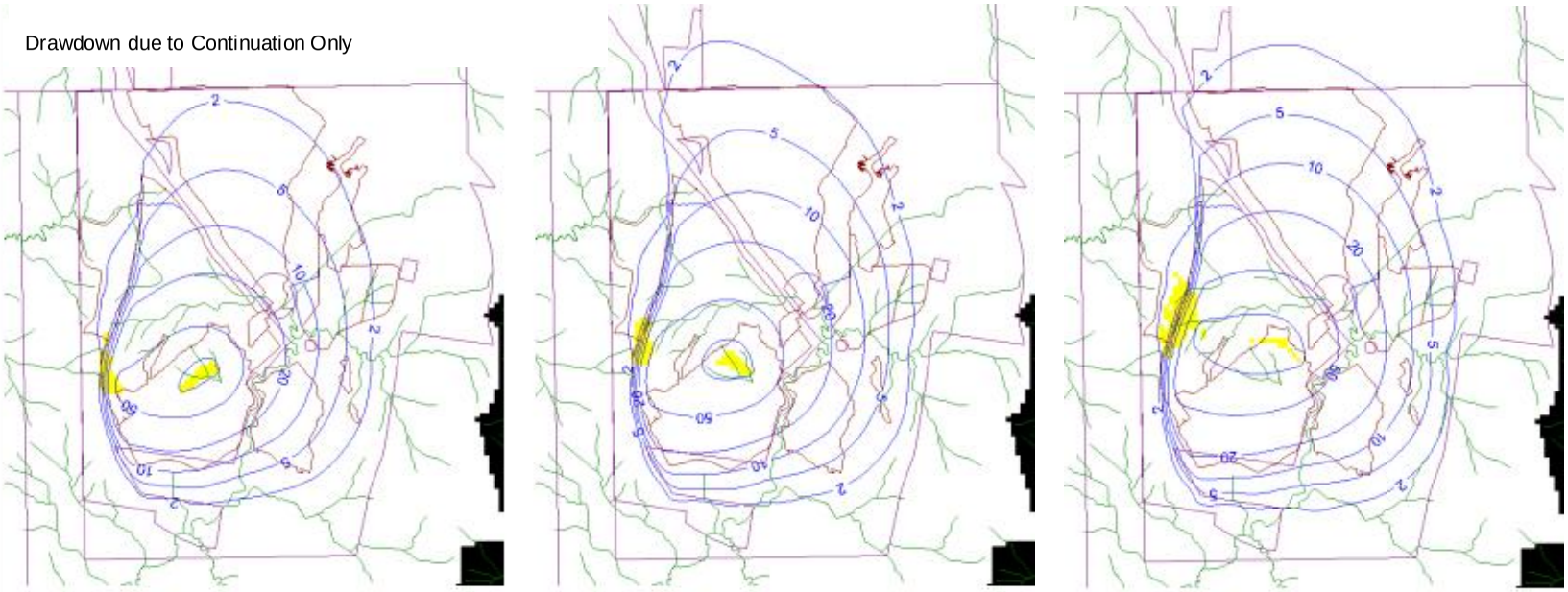
015a_PRD-NUL_02a.gwv

RPS

PREDICTION MODEL – MODELLED DECLINE IN UPPERMOST WATER TABLE – CUMULATIVE IMPACT FIGURE 8.19.4

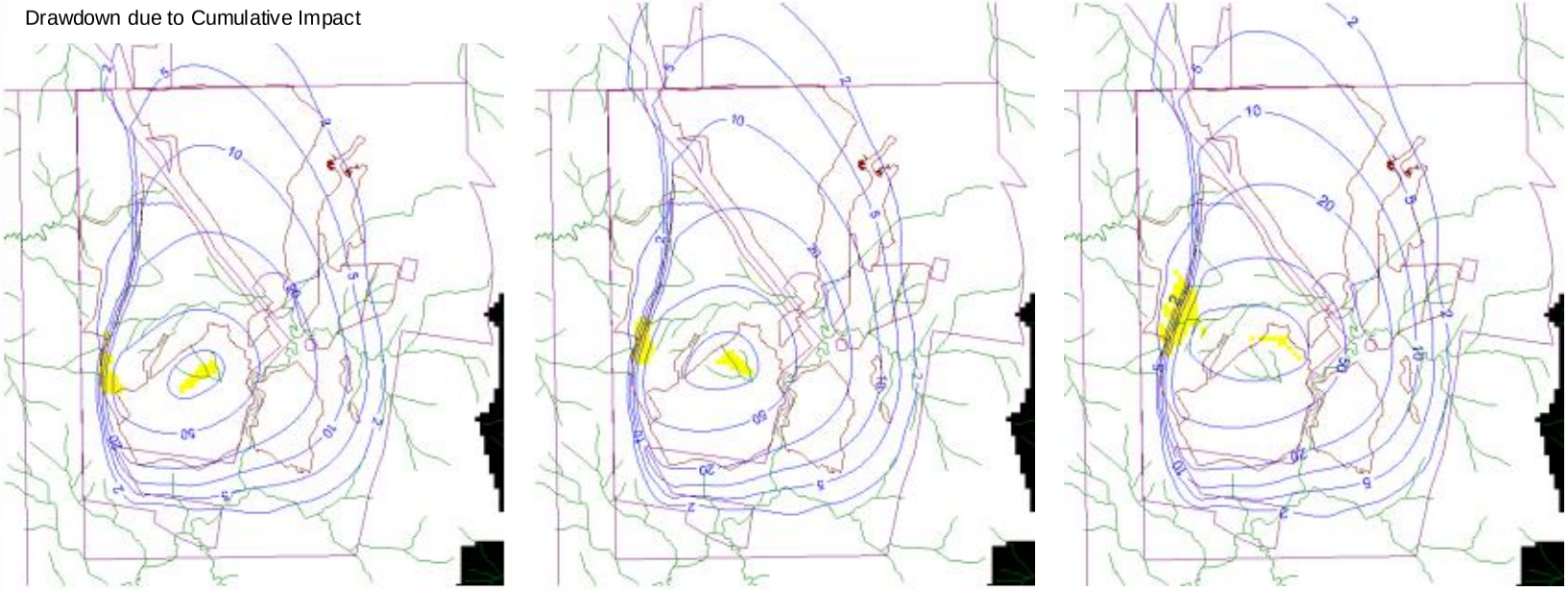
c:\jobs\s66d\300\figures\word\projects\015a_d038_figure8-19-4_predictionmodelmodelleddeclineinwt_cumulativeimpact.docx

Drawdown due to Continuation Only



015a_PRD-MP1_04a_NUL.gwv

Drawdown due to Cumulative Impact



Dec 2017 (SP44) **Dec 2020 (SP80)** **Dec 2023 (SP116)**

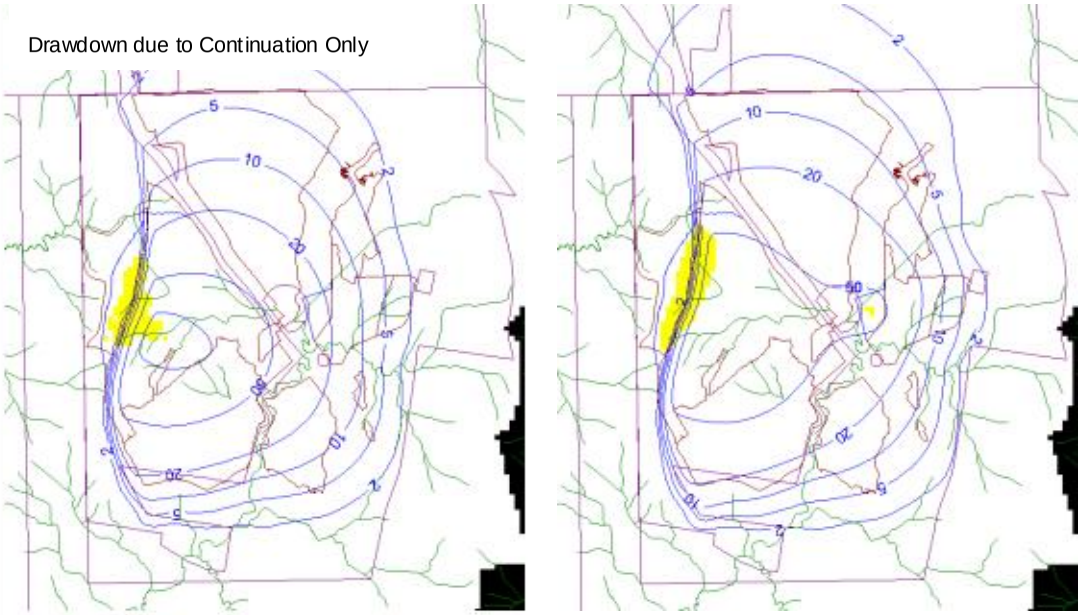
015a_PRD-NUL_02a.gw

RPS

PREDICTION MODEL – MODELLED DRAWDOWN IN HEBDEN SEAM FIGURE 8.19.5

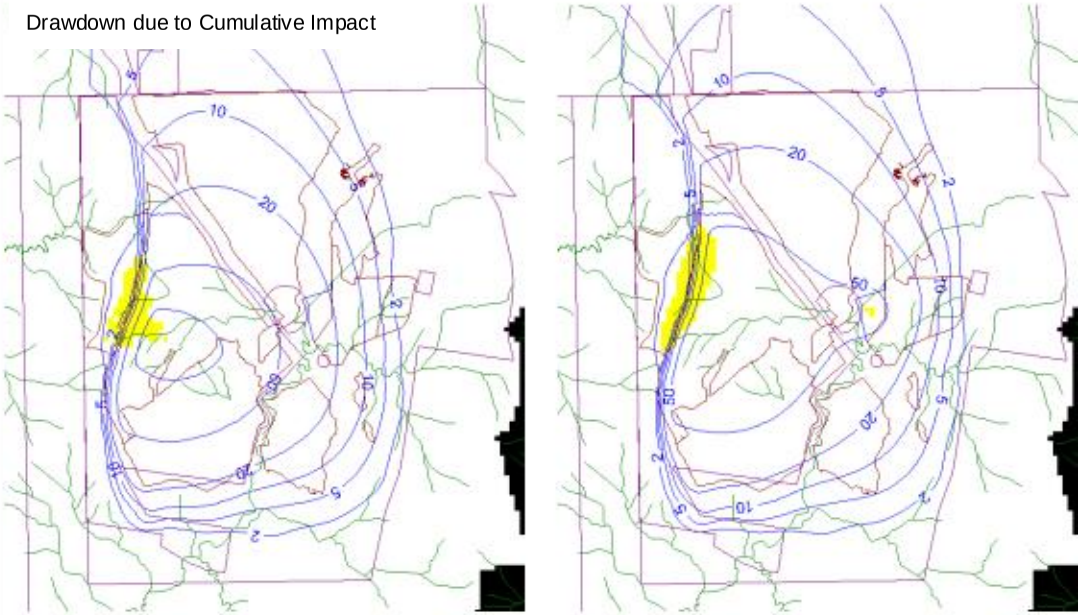
c:\jobs\s66d\300\figures\word\projects\015a_d049_figure8-19-5_predictionmodelmodelleddrawdownhebden.docx

Drawdown due to Continuation Only



015a_PRD-MP1_04a_NUL.gwv

Drawdown due to Cumulative Impact



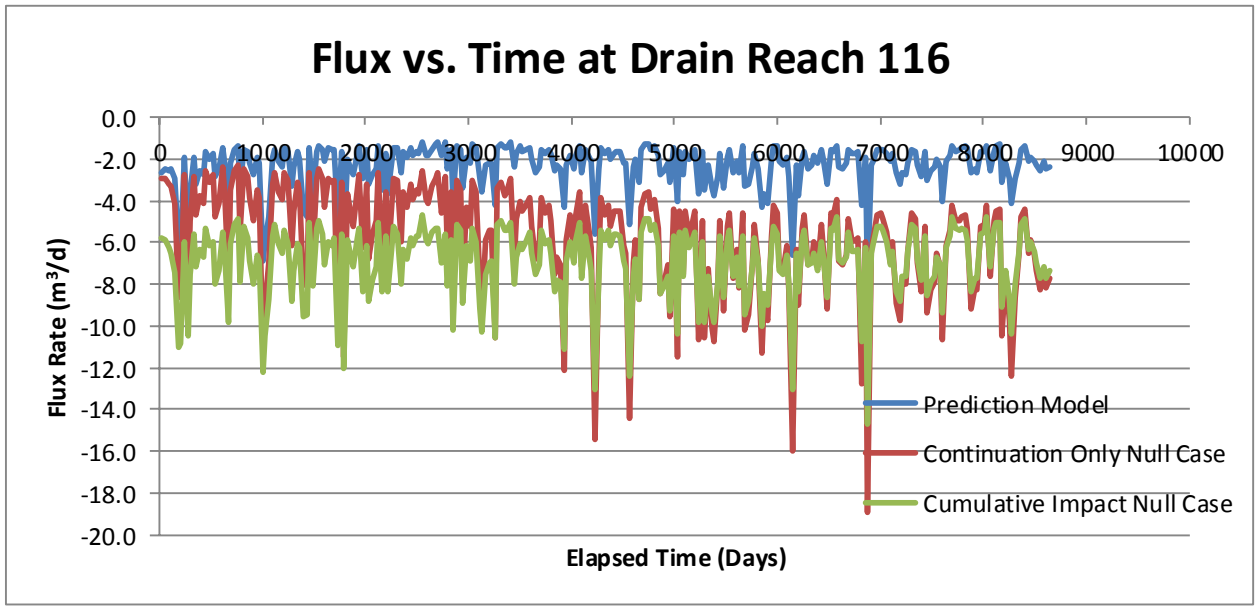
Dec 2026 (SP152) **Dec 2037 (SP284)**

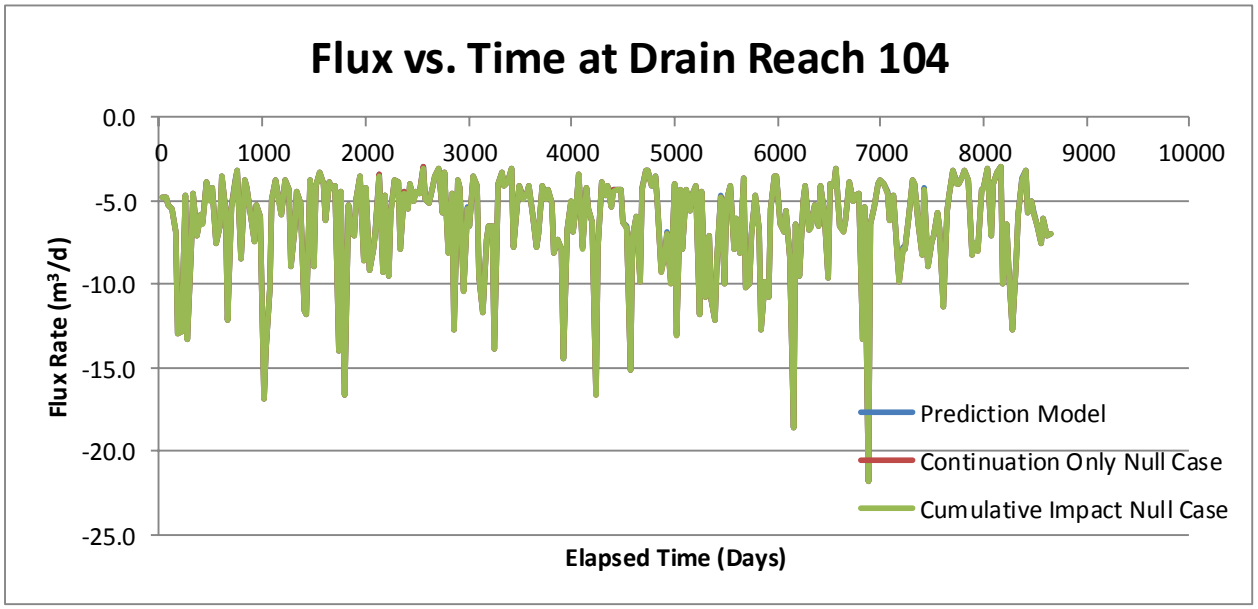
015a_PRD-NUL_02a.gwv

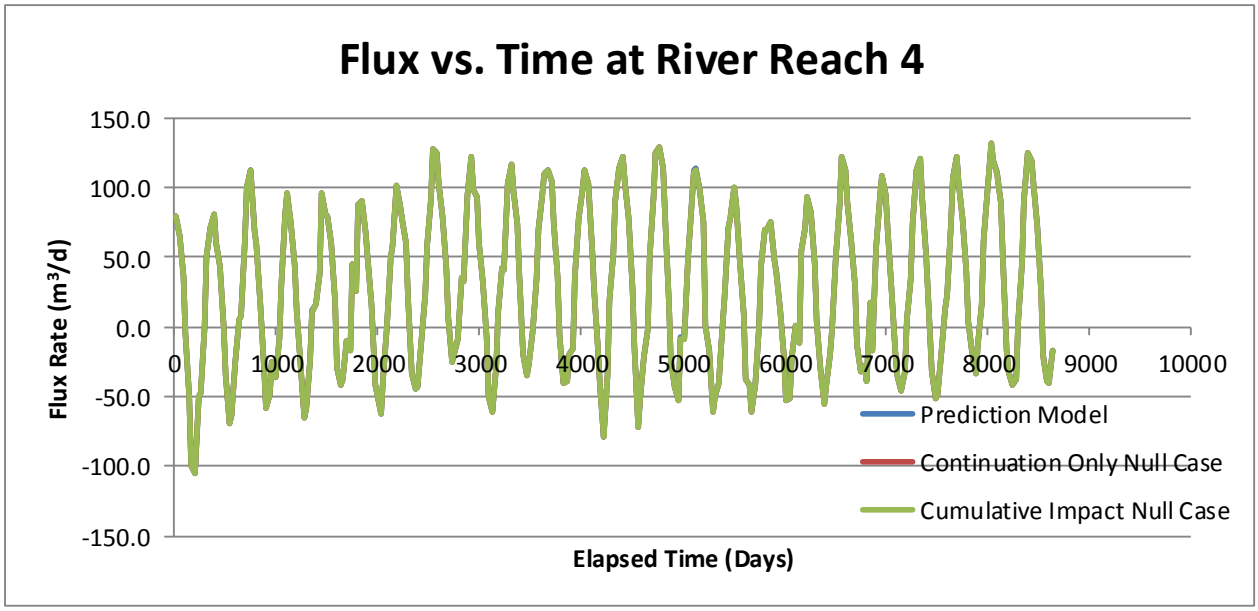
RPS

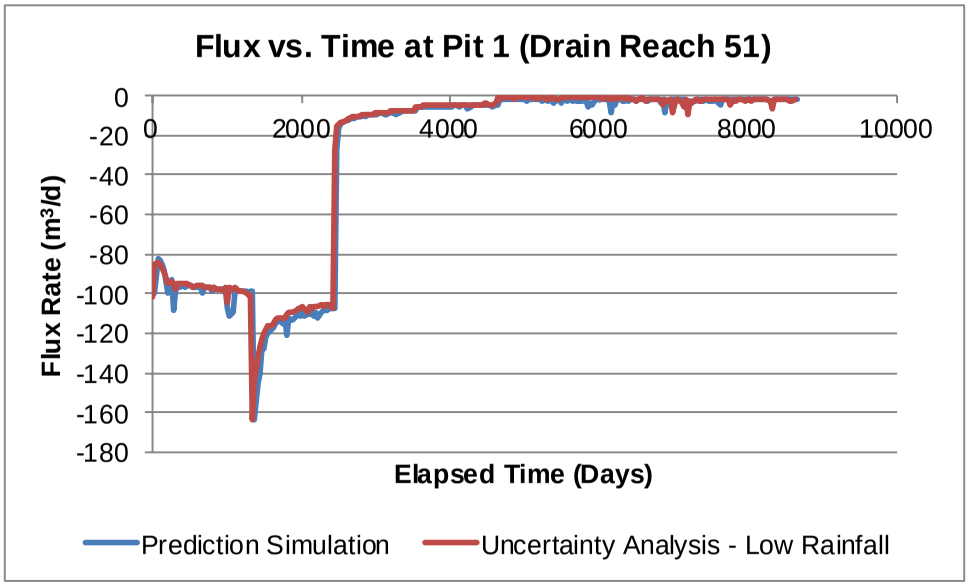
PREDICTION MODEL – MODELLED DRAWDOWN IN HEBDEN SEAM FIGURE 8.19.6

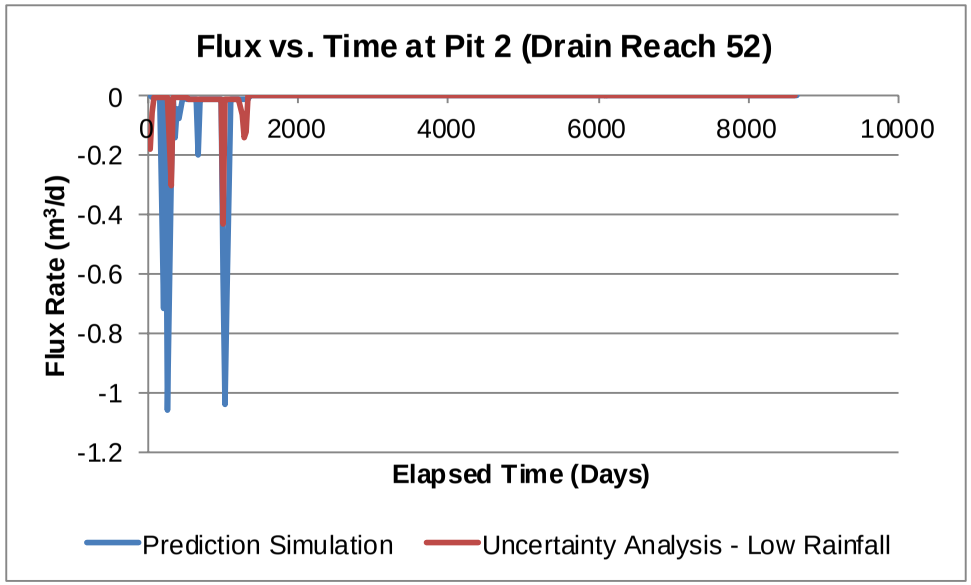
c:\jobs\s66d\300\figures\word\projects\015a_d050_figure8-19-6_predictionmodelmodelleddrawdownhebden.docx

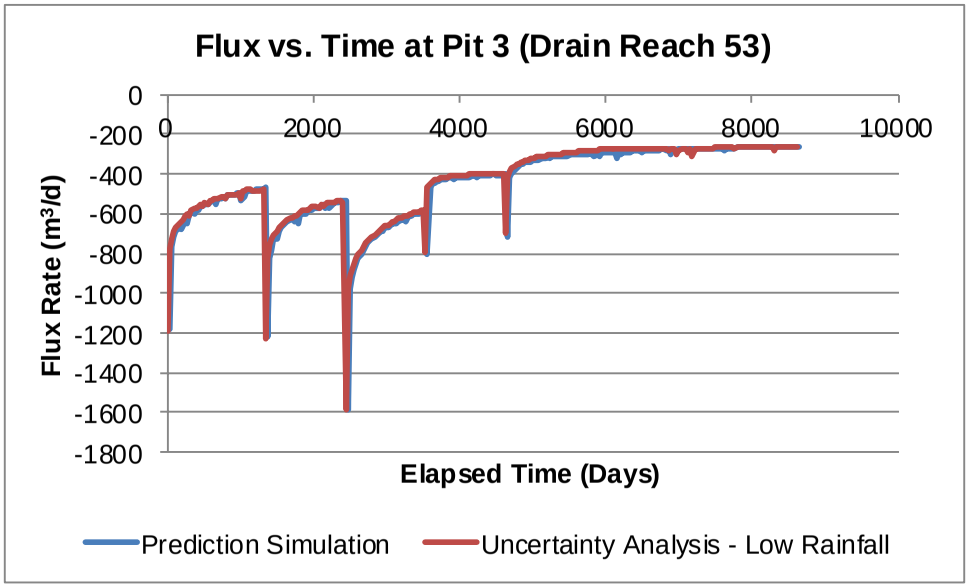

Flux vs. Time at Drain Reach 116
Flux Rate (m³/d)
0.0
-2.0
-4.0
-6.0
-8.0
-10.0
-12.0
-14.0
-16.0
-18.0
-20.0
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000
Elapsed Time (Days)
Prediction Model
Continuation Only Null Case
Cumulative Impact Null Case

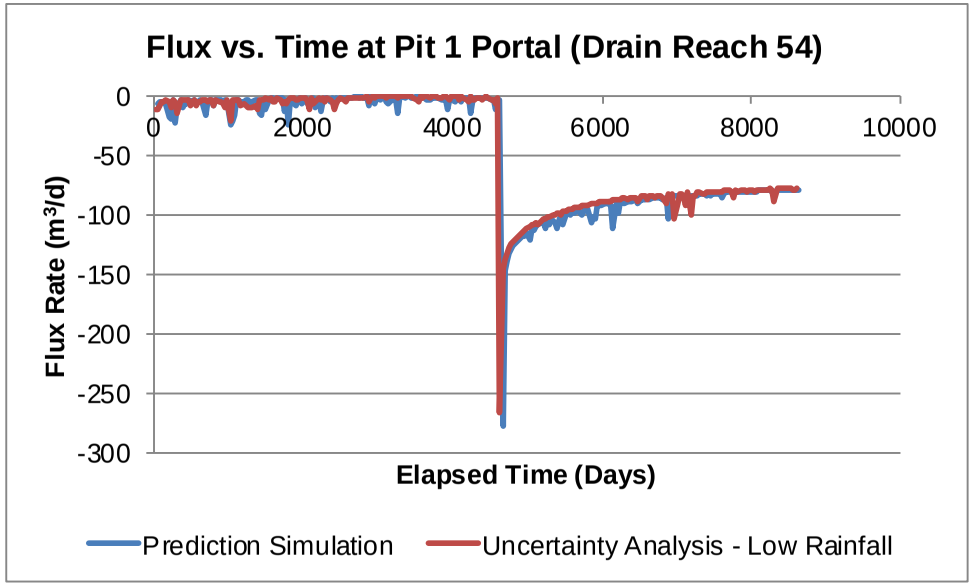

Flux vs. Time at Drain Reach 104
Flux Rate (m³/d)
0.0
-5.0
-10.0
-15.0
-20.0
-25.0
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000
Elapsed Time (Days)
Prediction Model
Continuation Only Null Case
Cumulative Impact Null Case


Flux vs. Time at River Reach 4
Flux Rate (m³/d)
150.0
100.0
50.0
0.0
-50.0
-100.0
-150.0
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000
Elapsed Time (Days)
Prediction Model
Continuation Only Null Case
Cumulative Impact Null Case









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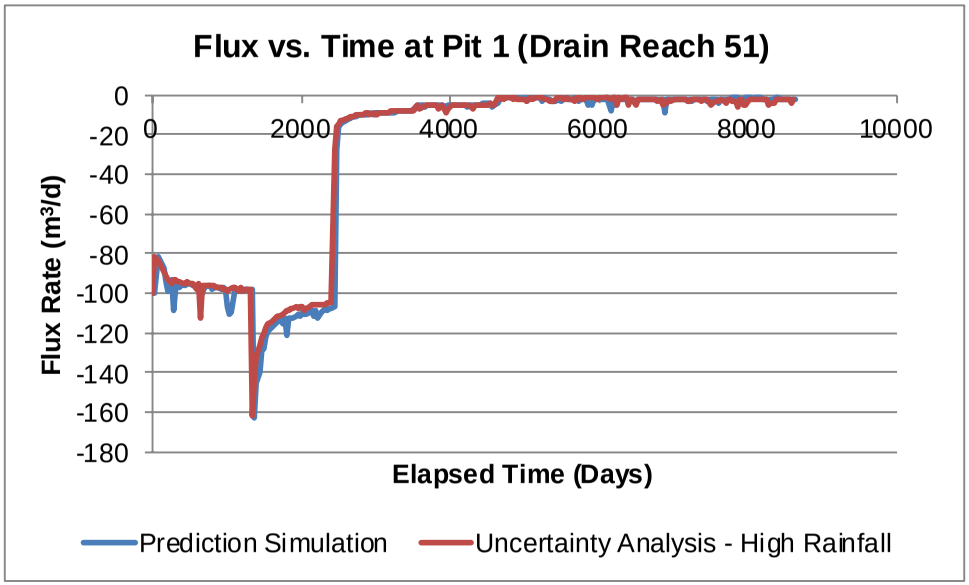
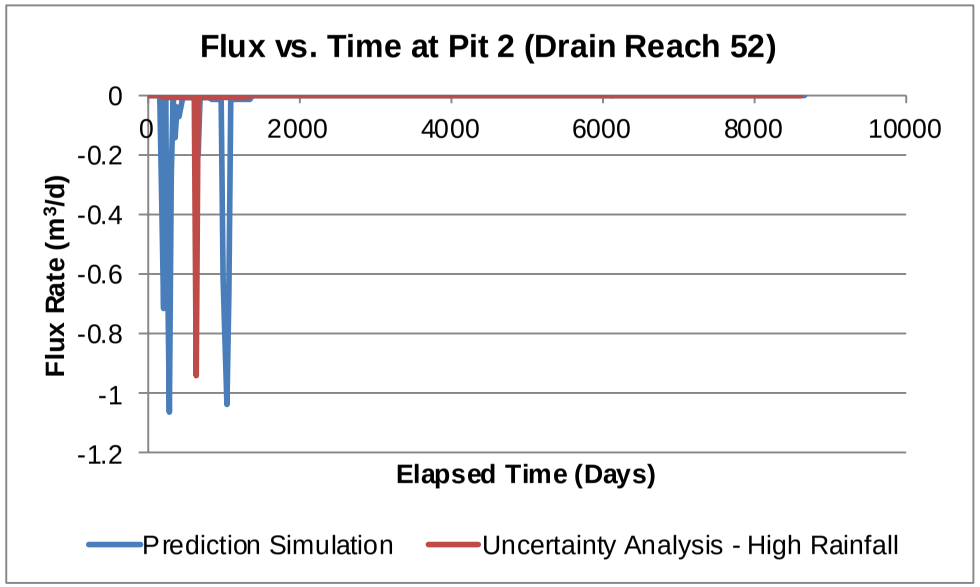
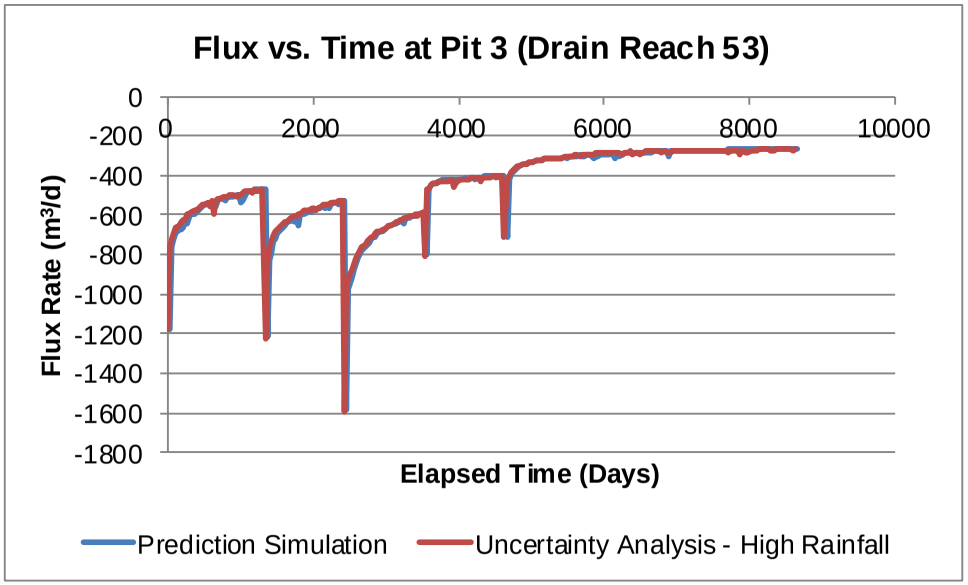
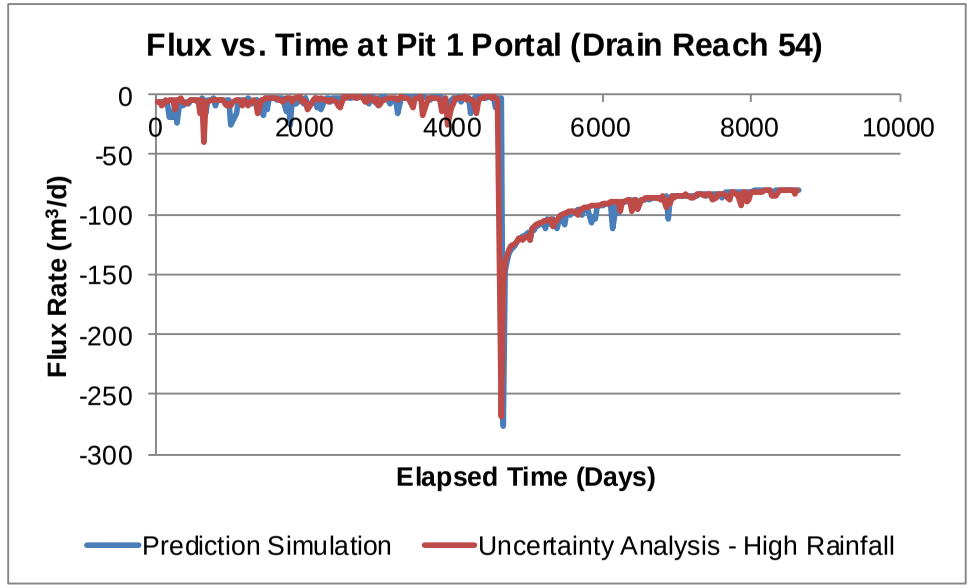
UNCERTAINTY ANALYSIS (LOW RAINFALL) – MINE INFLOWS FIGURE 8-21A

c:\jobs\s66d\300\figures\word\projects\015c_d001_figure8-16_uncertaintymodelmineinflows.docx





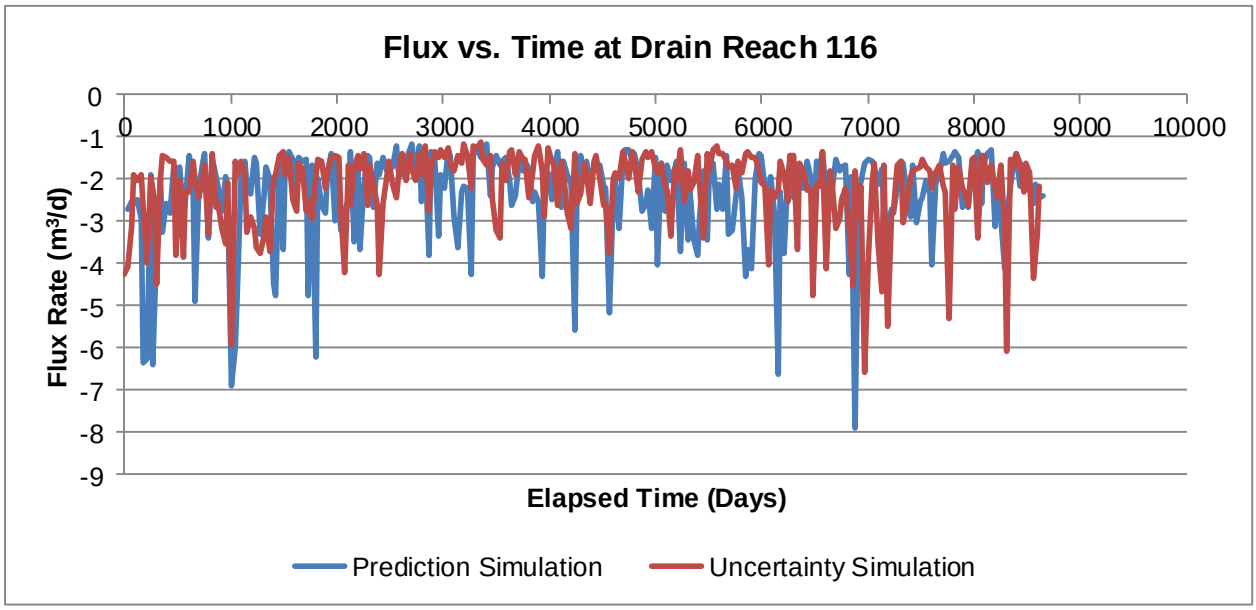


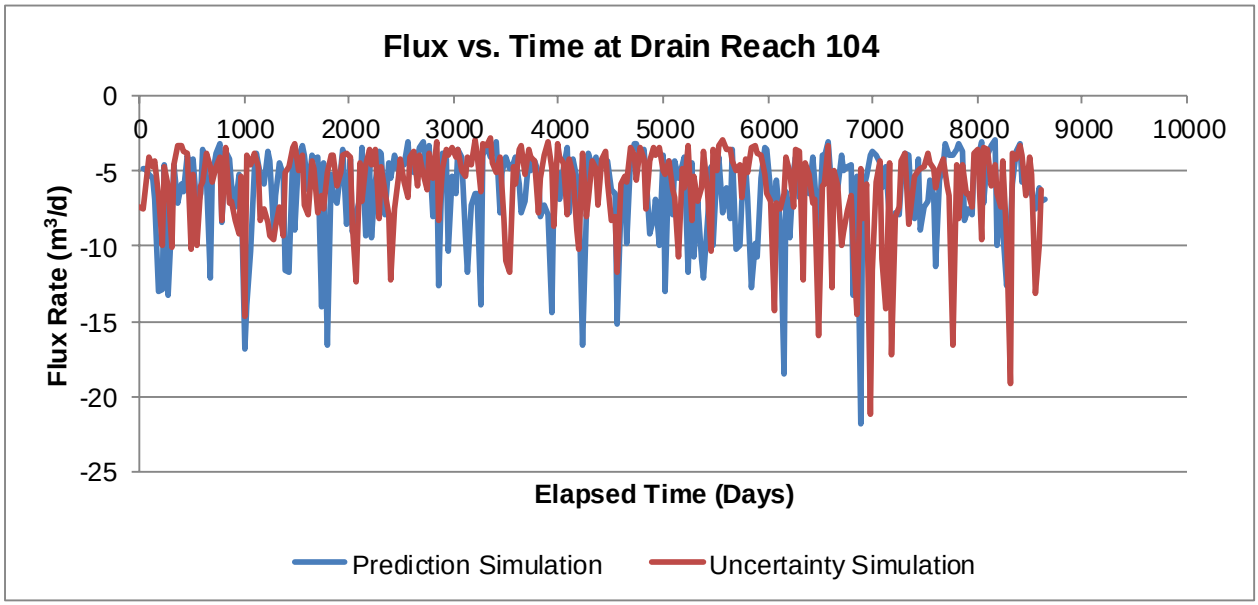


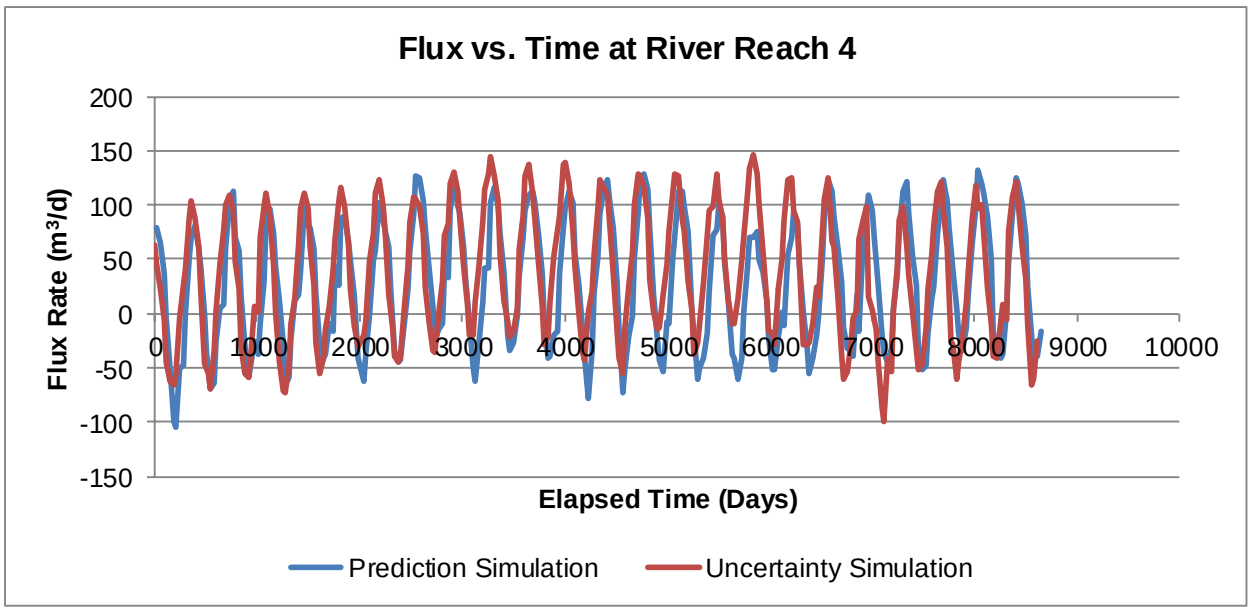
RPS

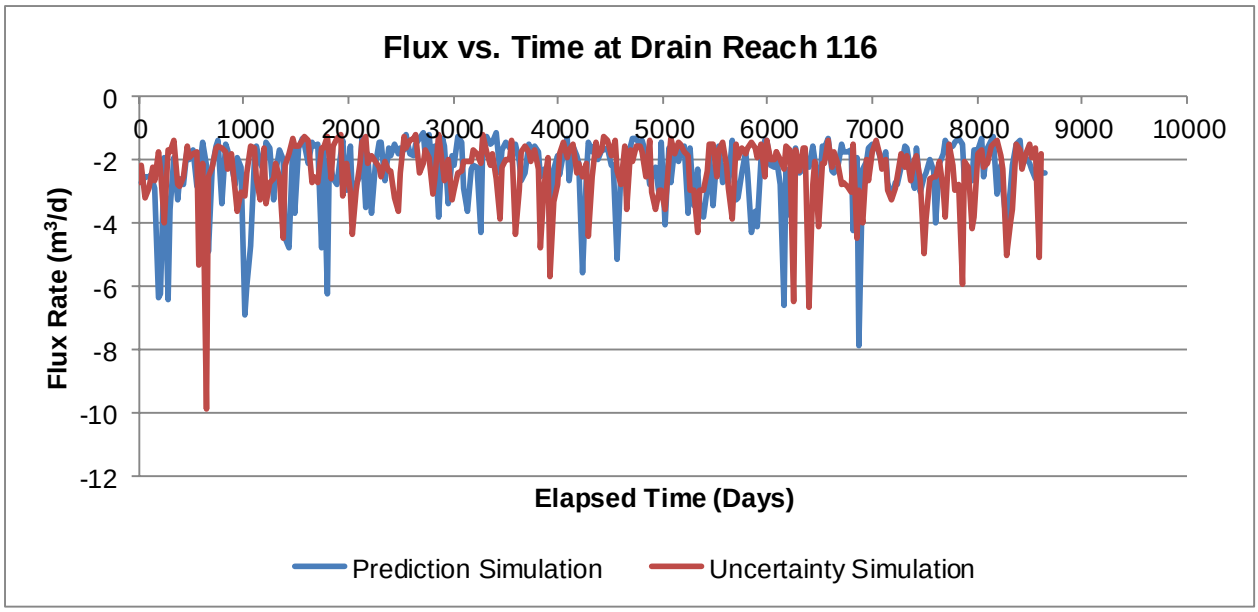
UNCERTAINTY ANALYSIS (HIGH RAINFALL) – MINE INFLOWS FIGURE 8-21B

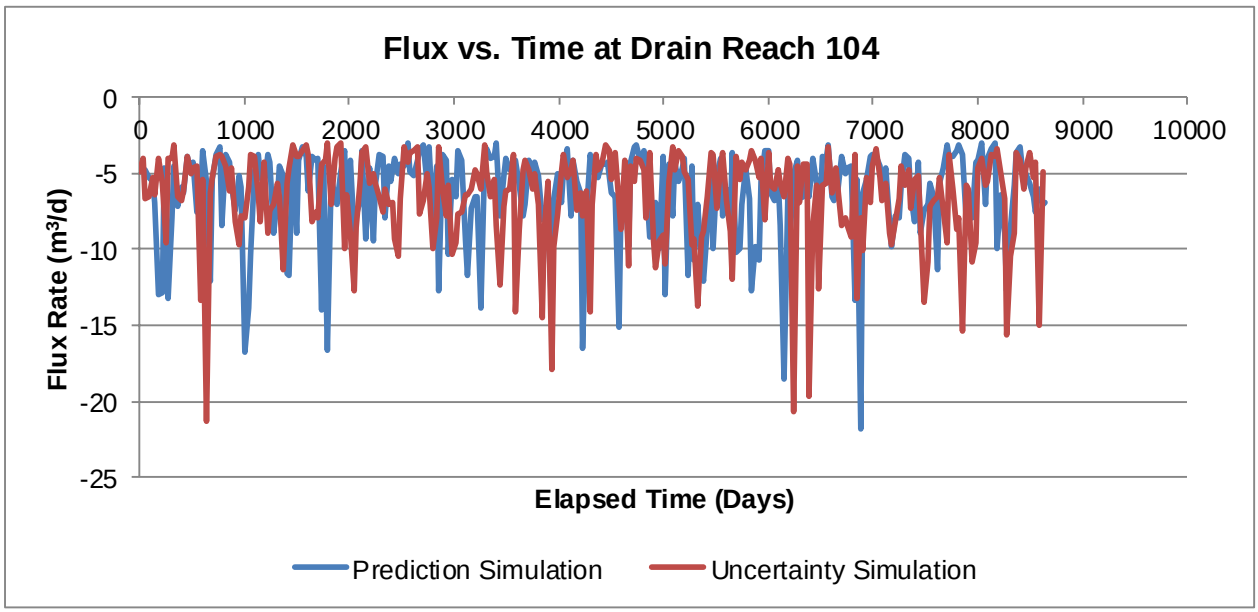
c:\jobs\s66d\300\figures\word\projects\015c_d002_figure8-21_uncertaintymodelmineinflows.docx

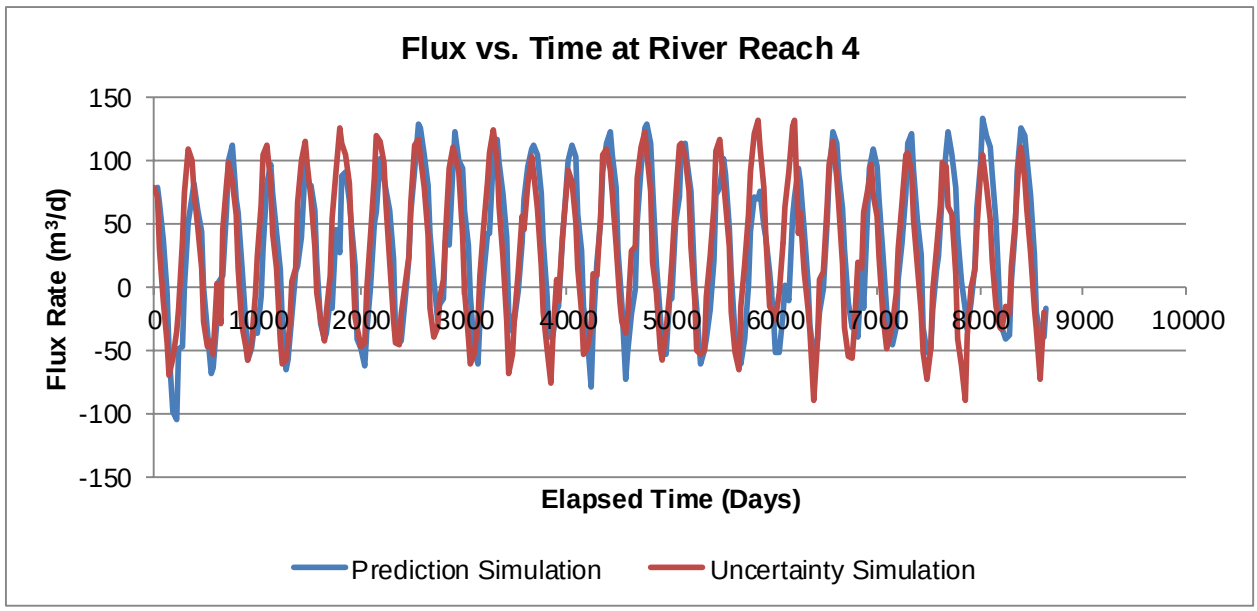

Flux vs. Time at Drain Reach 116
Flux Rate (m³/d)
0
-1
-2
-3
-4
-5
-6
-7
-8
-9
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000
Elapsed Time (Days)
Prediction Simulation
Uncertainty Simulation

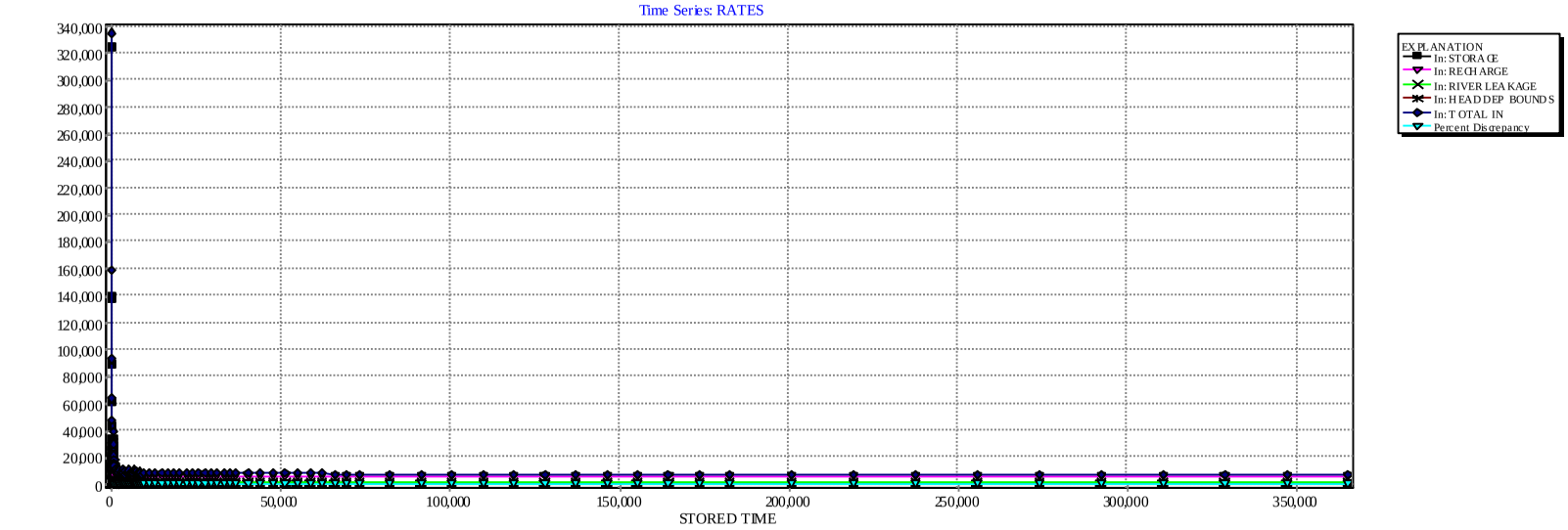

Flux vs. Time at Drain Reach 104
Flux Rate (m³/d)
0
-5
-10
-15
-20
-25
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000
Elapsed Time (Days)
Prediction Simulation
Uncertainty Simulation

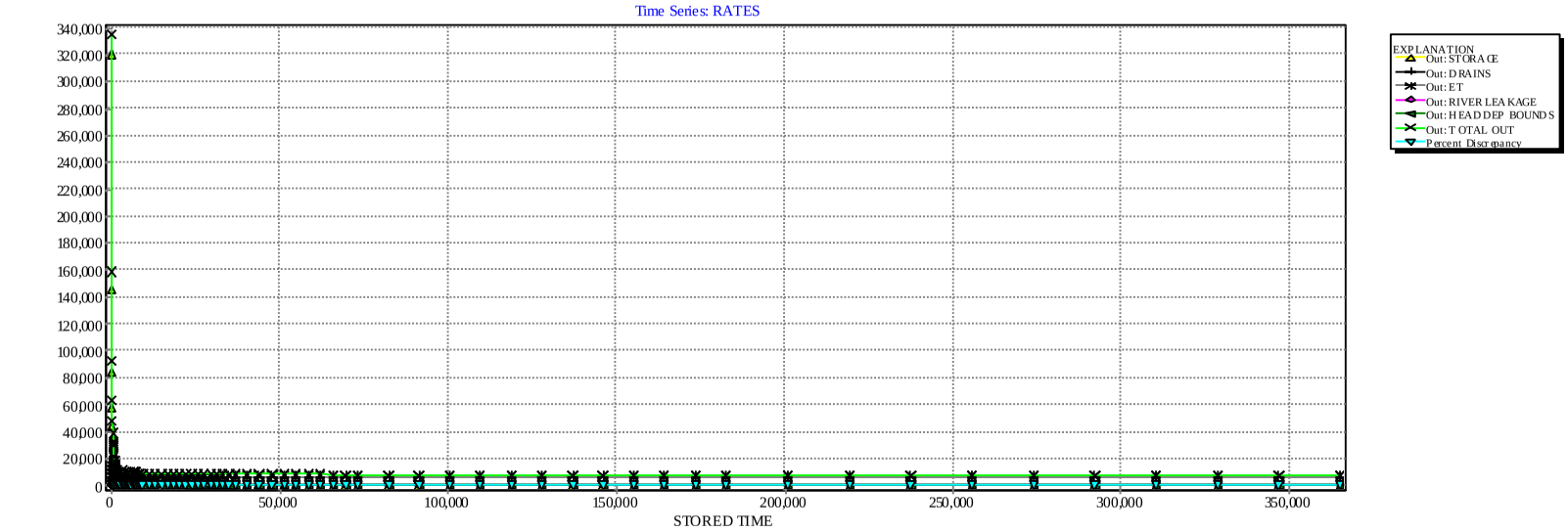

Flux vs. Time at River Reach 4
Flux Rate (m³/d)
200
150
100
50
0
-50
-100
-150
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000
Elapsed Time (Days)
Prediction Simulation
Uncertainty Simulation


Flux vs. Time at Drain Reach 116
Flux Rate (m³/d)
0
-2
-4
-6
-8
-10
-12
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000
Elapsed Time (Days)
Prediction Simulation
Uncertainty Simulation


Flux vs. Time at Drain Reach 104
Flux Rate (m³/d)
0
-5
-10
-15
-20
-25
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000
Elapsed Time (Days)
Prediction Simulation
Uncertainty Simulation


Flux vs. Time at River Reach 4
Flux Rate (m³/d)
150
100
50
0
-50
-100
-150
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000
Elapsed Time (Days)
Prediction Simulation
Uncertainty Simulation



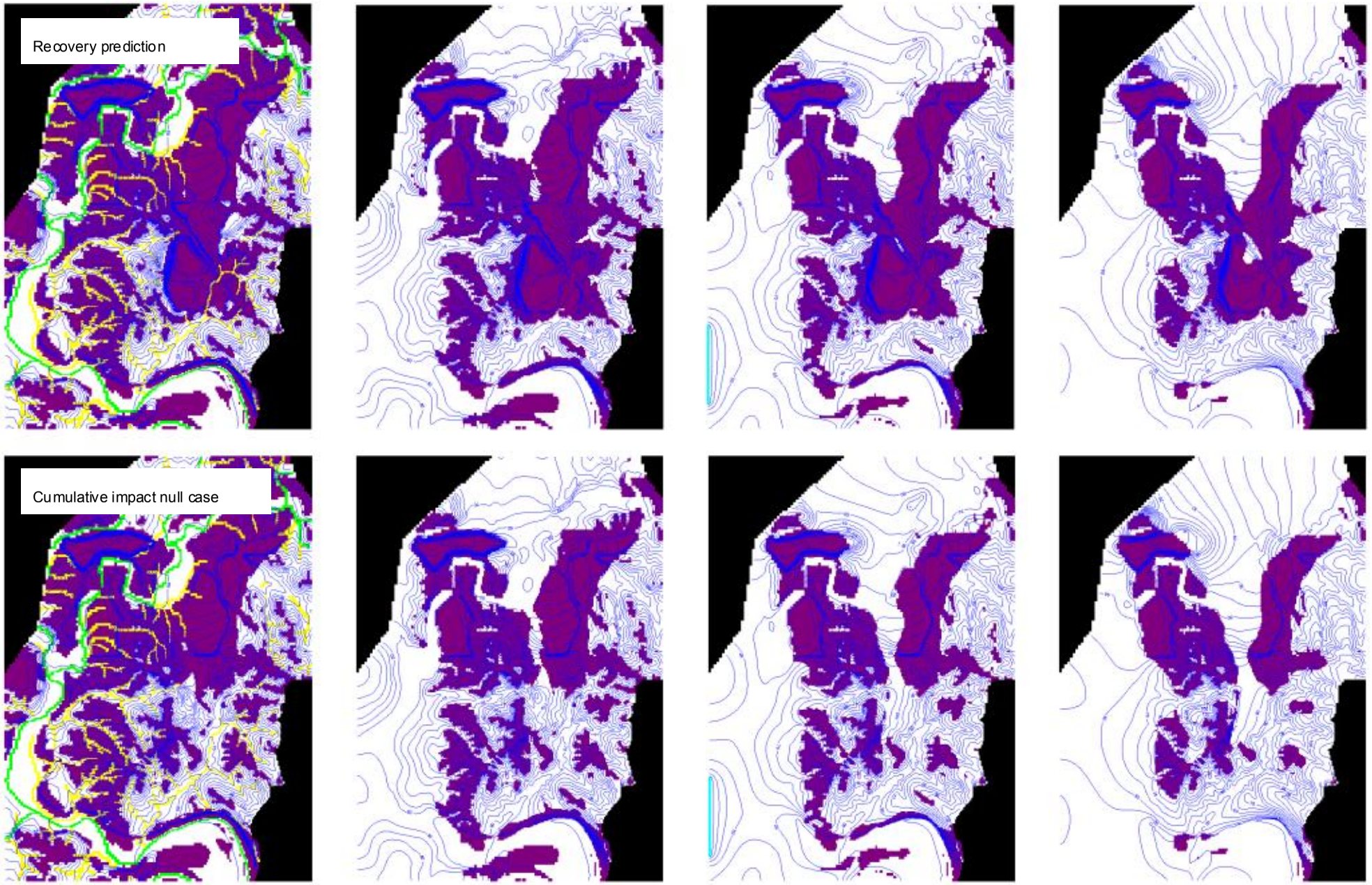


015a_RCV-MP1_05a.gwv

RPS

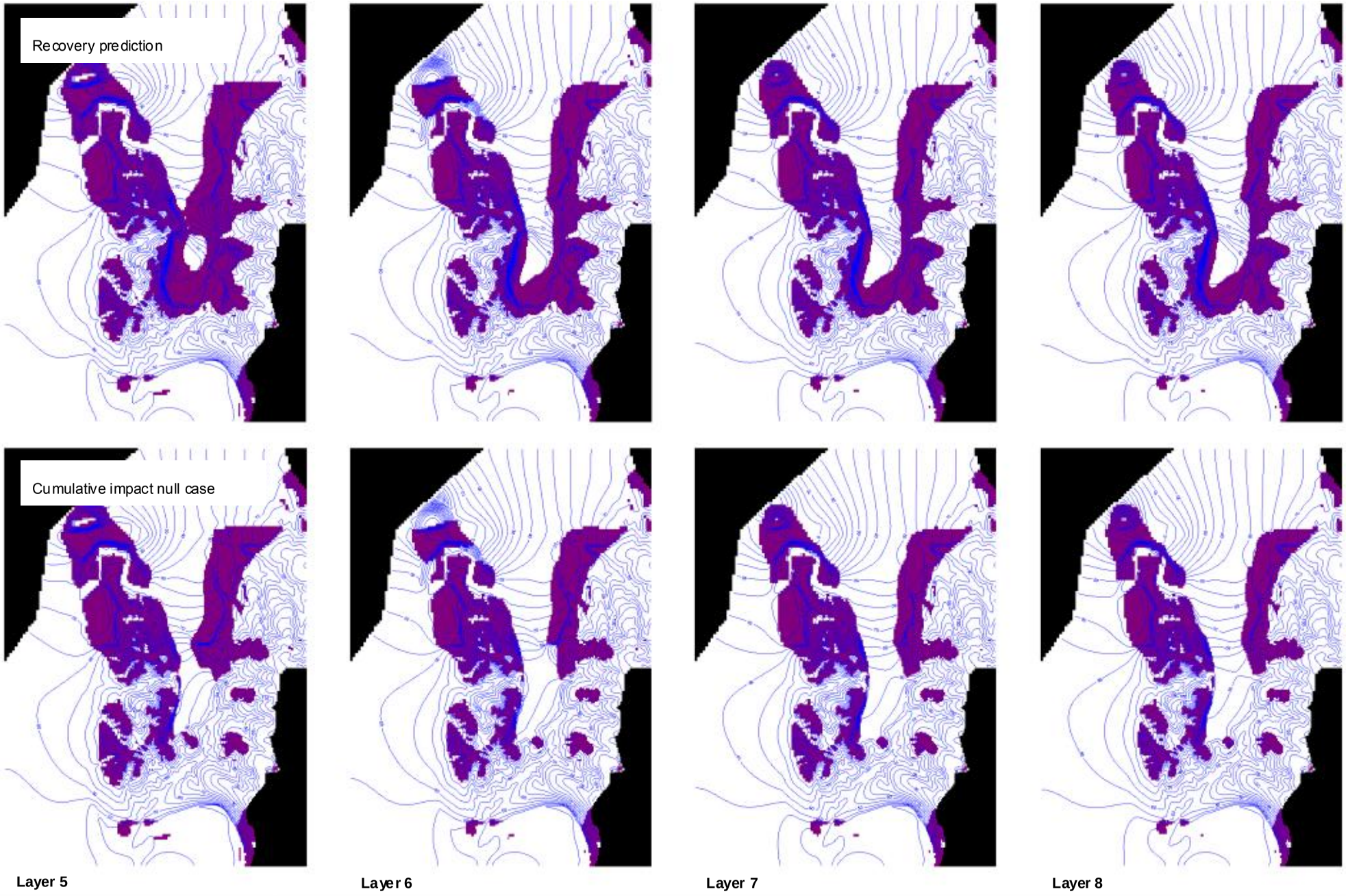
RECOVERY MODEL – MODEL MASS BALANCE FIGURE 8.23

c:\jobs\s66d\300\figures\word\projects\015a_d062_figure8-23_recoverymodelmassbalance.docx



RPS

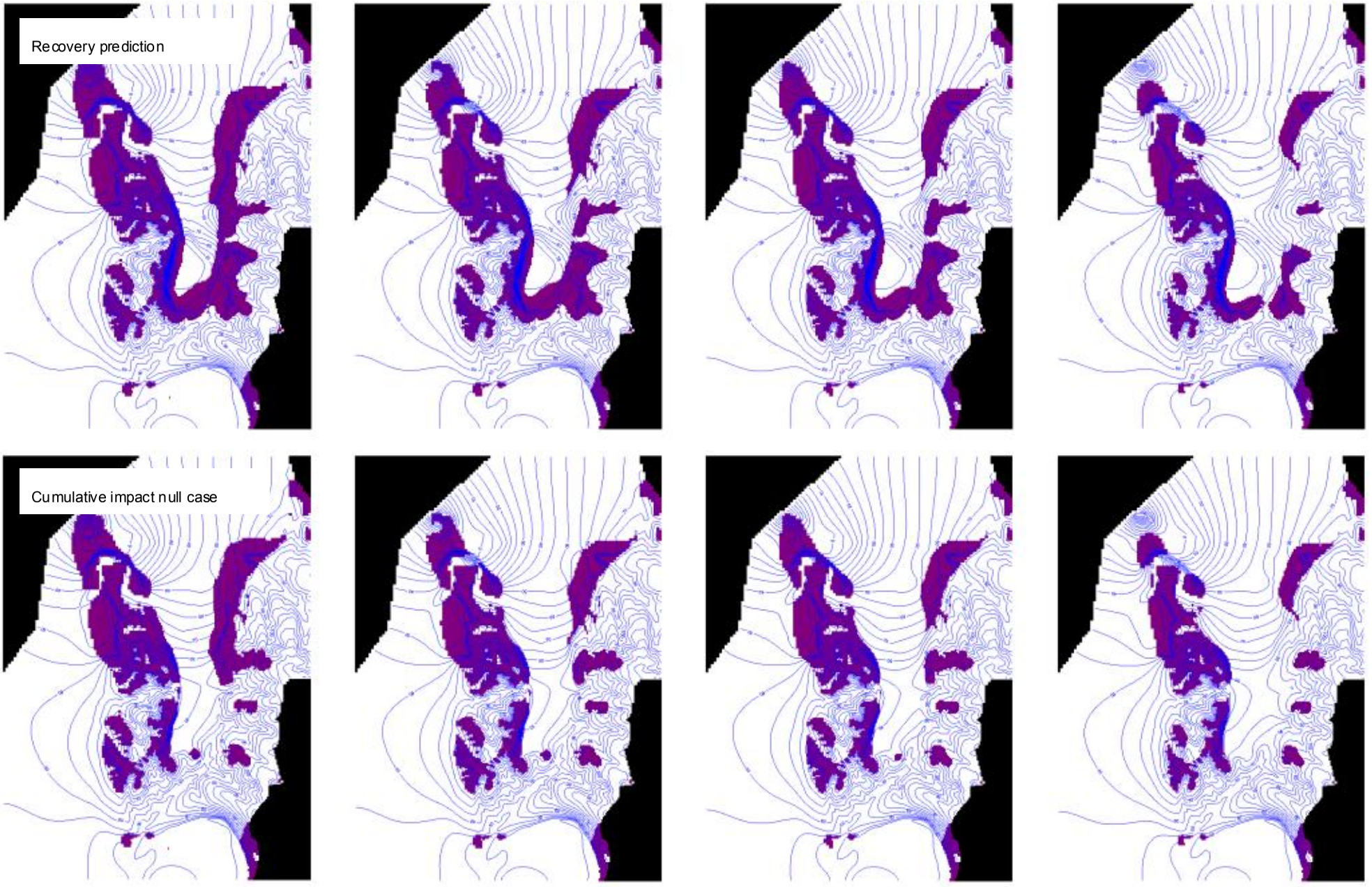
RECOVERY MODEL – MODELLED GROUNDWATER CONTOURS – 2057 FIGURE 8.24.1



RPS

RECOVERY MODEL – MODELLED GROUNDWATER CONTOURS – 2057 FIGURE 8.24.2

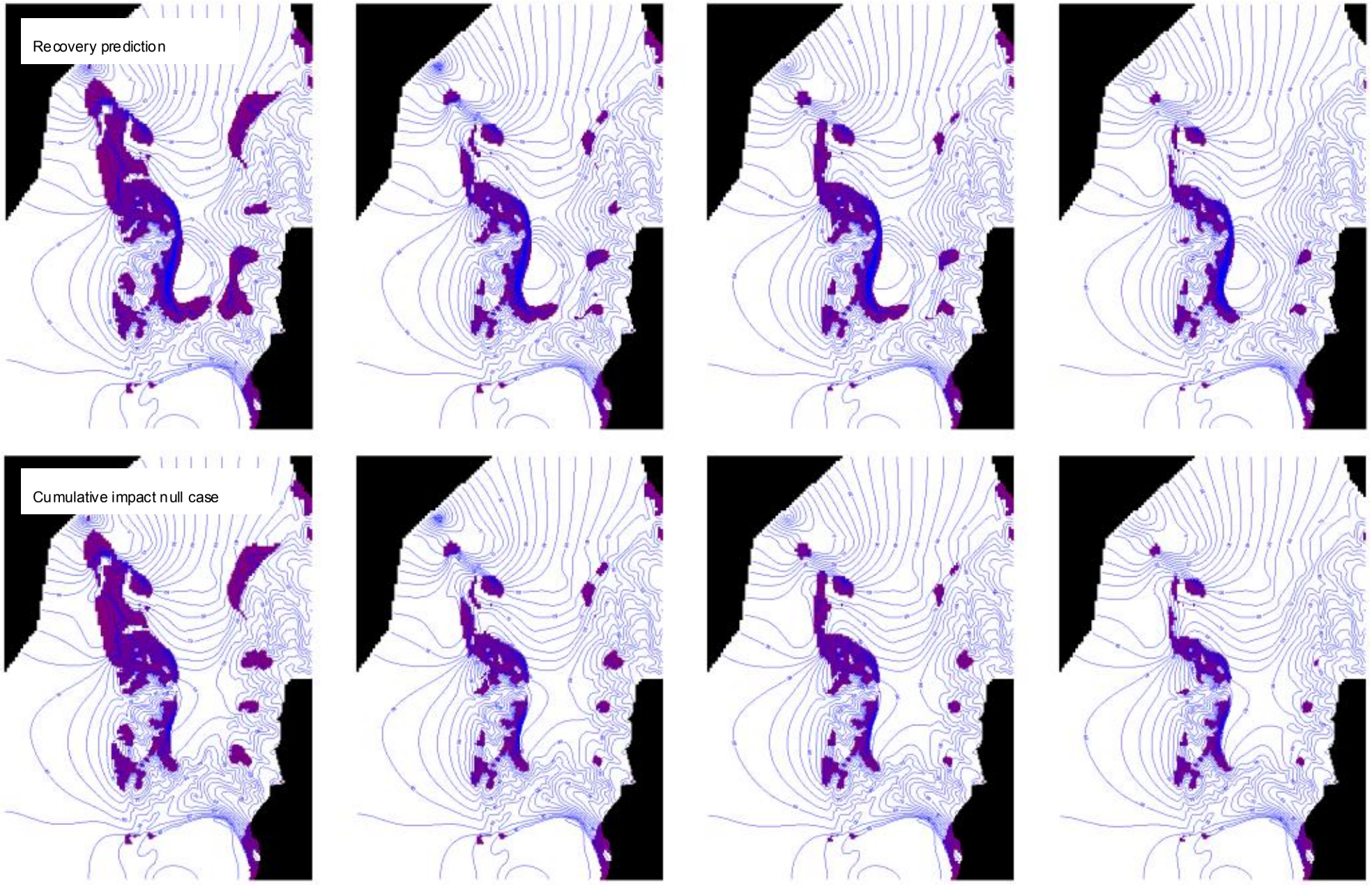
c:\jobs\s66d\300\figures\word\projects\015a_d040_figure8 24 2_recoverymodelgroundwaterlevels.docx



RPS

RECOVERY MODEL – MODELLED GROUNDWATER CONTOURS – 2057 FIGURE 8.24.3

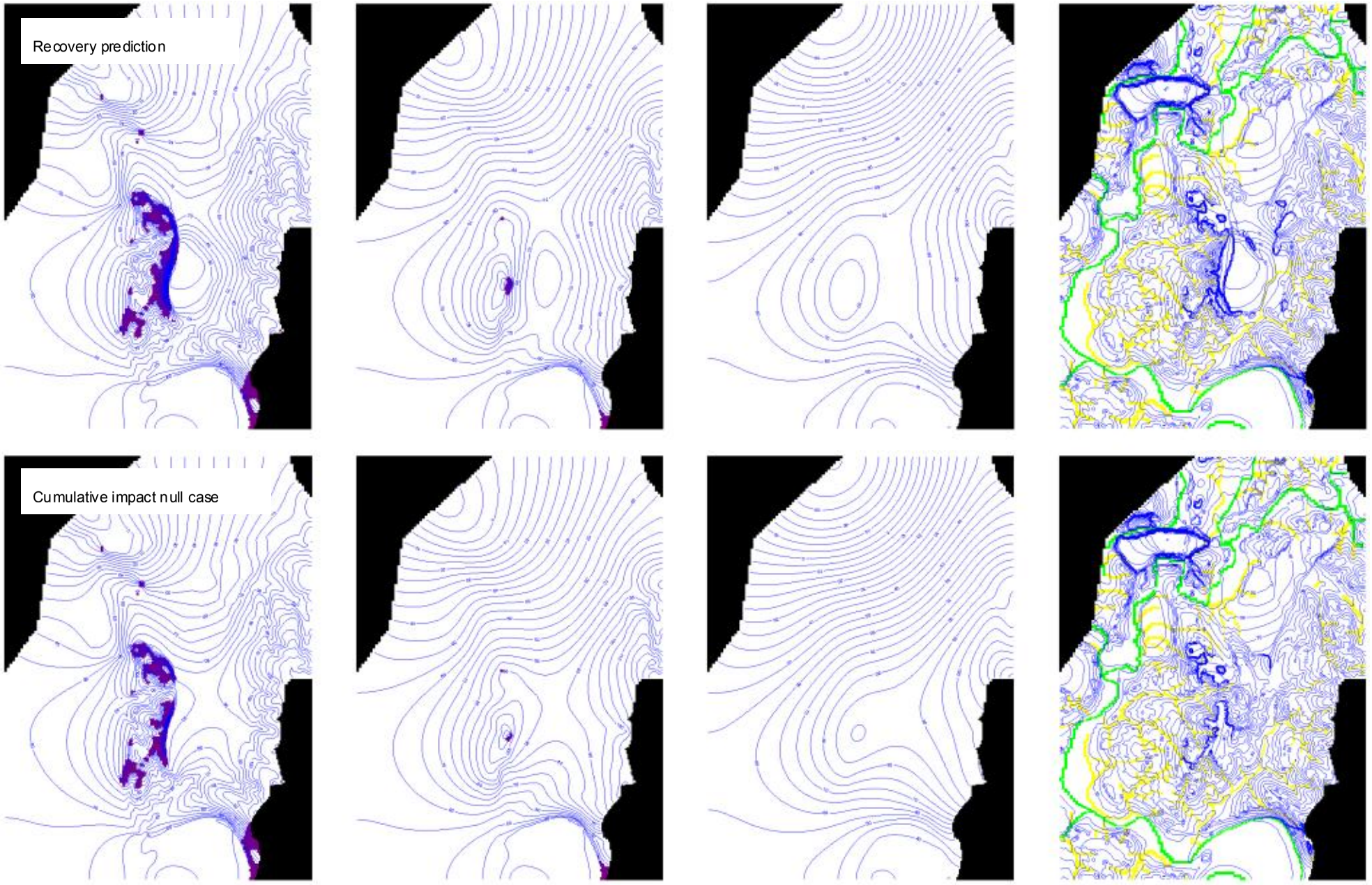
c:\jobs\s66d\300\figures\word\projects\015a_d041_figure8 24 3_recoverymodelgroundwaterlevels.docx



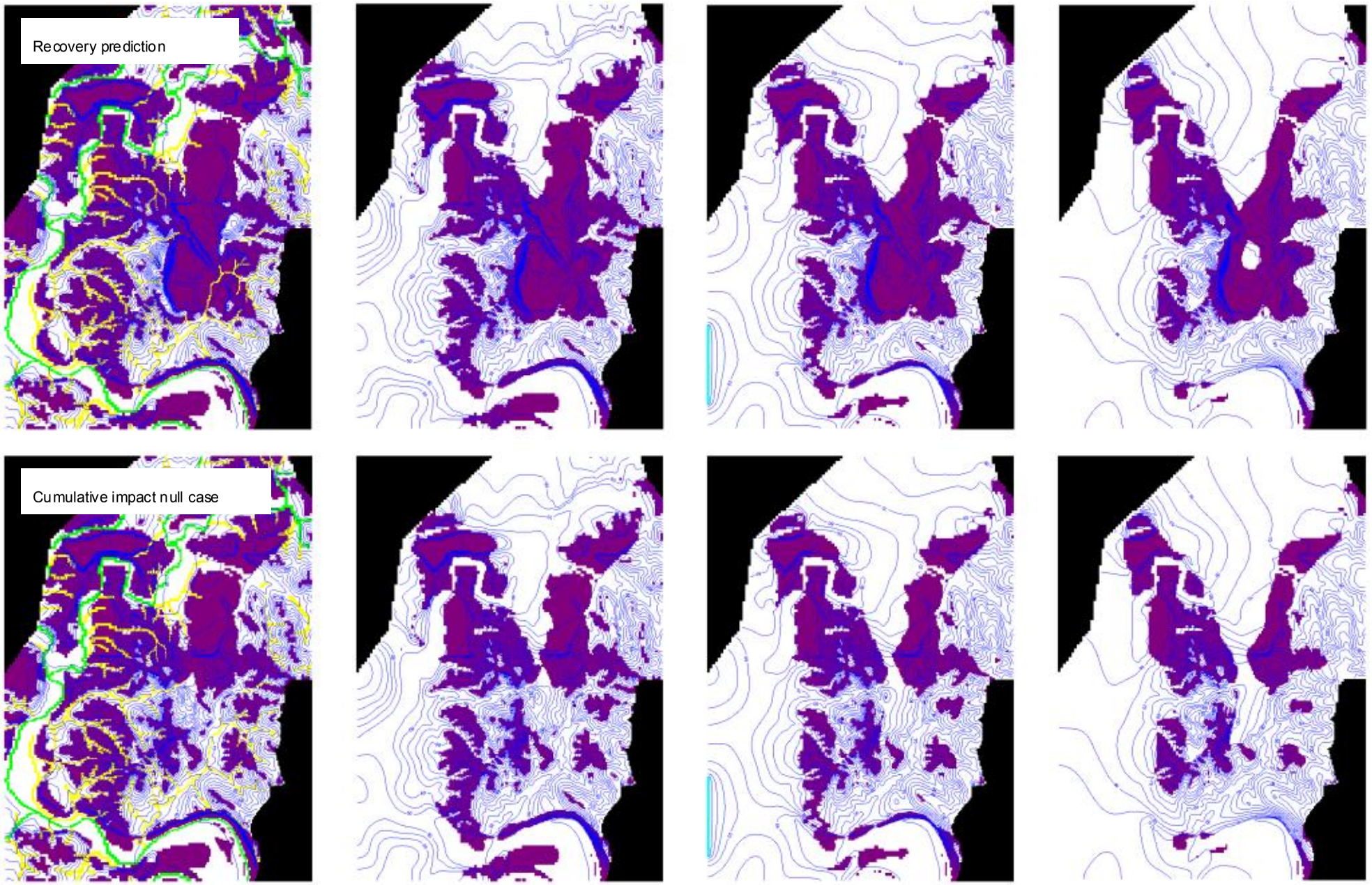
RPS

RECOVERY MODEL – MODELLED GROUNDWATER CONTOURS – 2057 FIGURE 8.24.4

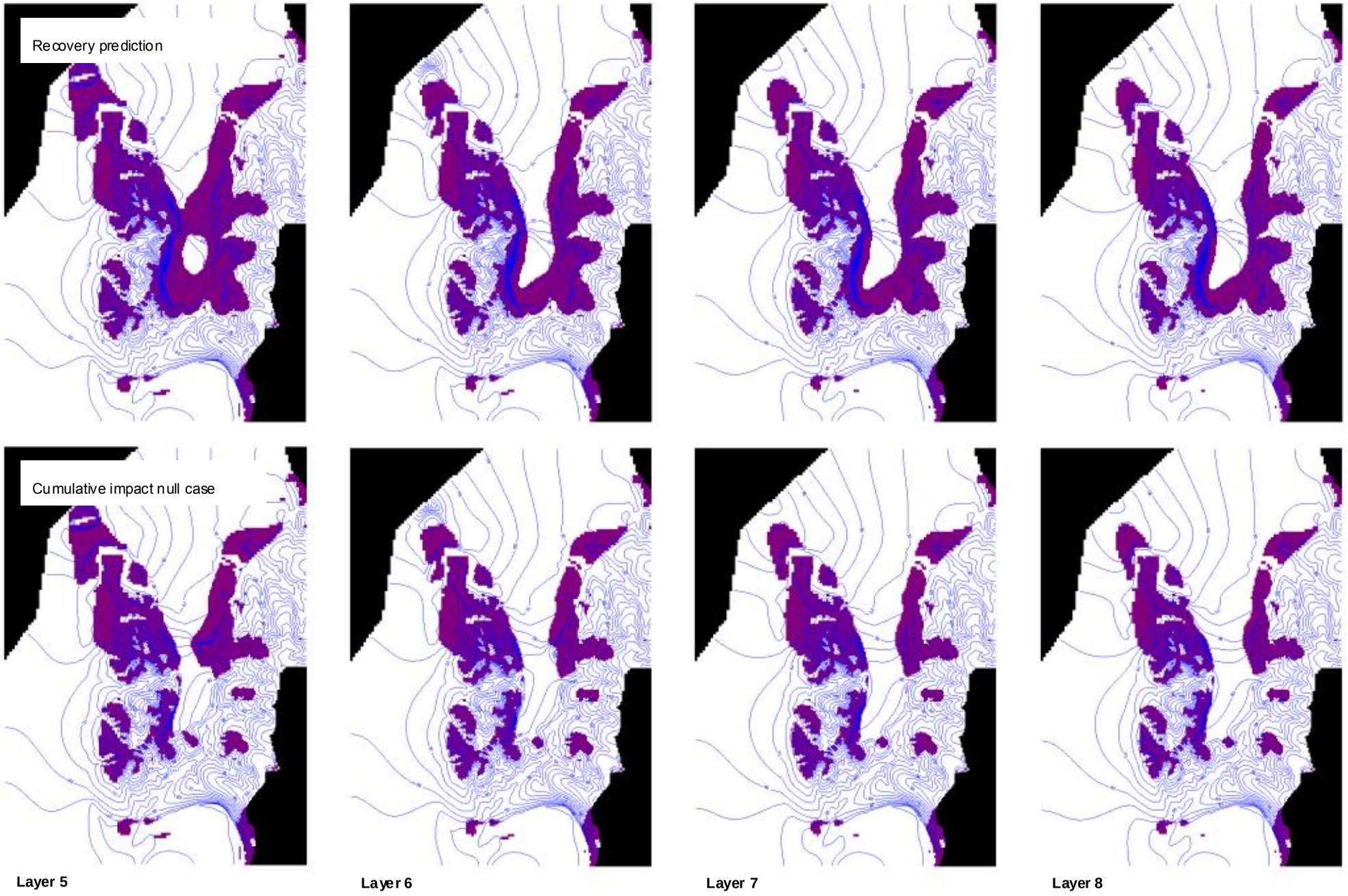
c:\jobs\s66d\300\figures\word\projects\015a_d042_figure8 24 4_recoverymodelgroundwaterlevels.docx



RECOVERY MODEL – MODELLED GROUNDWATER CONTOURS – 2057 FIGURE 8.24.5



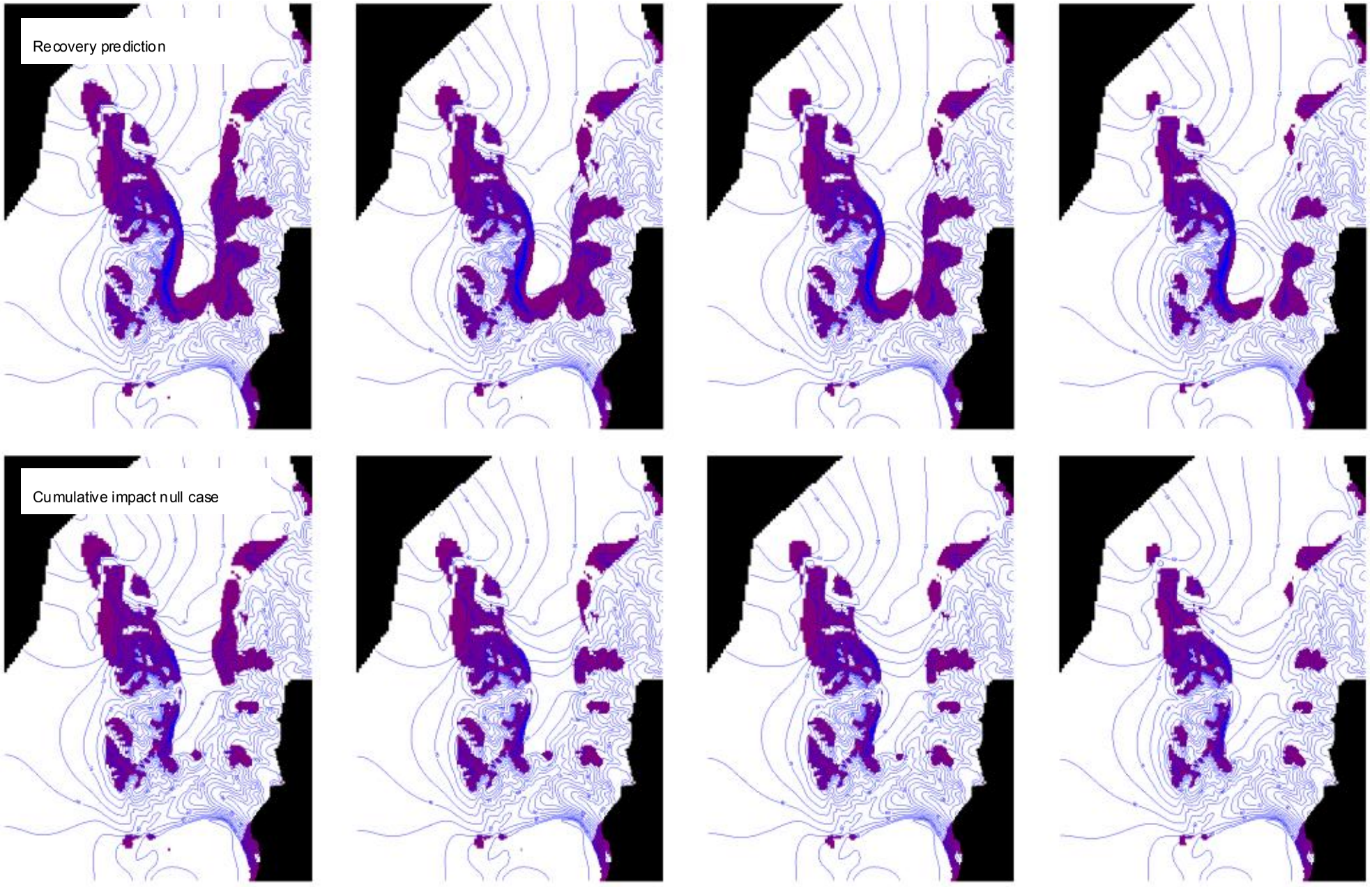
RECOVERY MODEL – MODELLED GROUNDWATER CONTOURS – 2137 FIGURE 8.25.1



RPS

RECOVERY MODEL – MODELLED GROUNDWATER CONTOURS – 2137 FIGURE 8.25.2

c:\jobs\s66d\300\figures\word\projects\015a_d045_figure8 25 2_recoverymodelgroundwaterlevels.docx



RPS

RECOVERY MODEL – MODELLED GROUNDWATER CONTOURS – 2137 FIGURE 8.25.3

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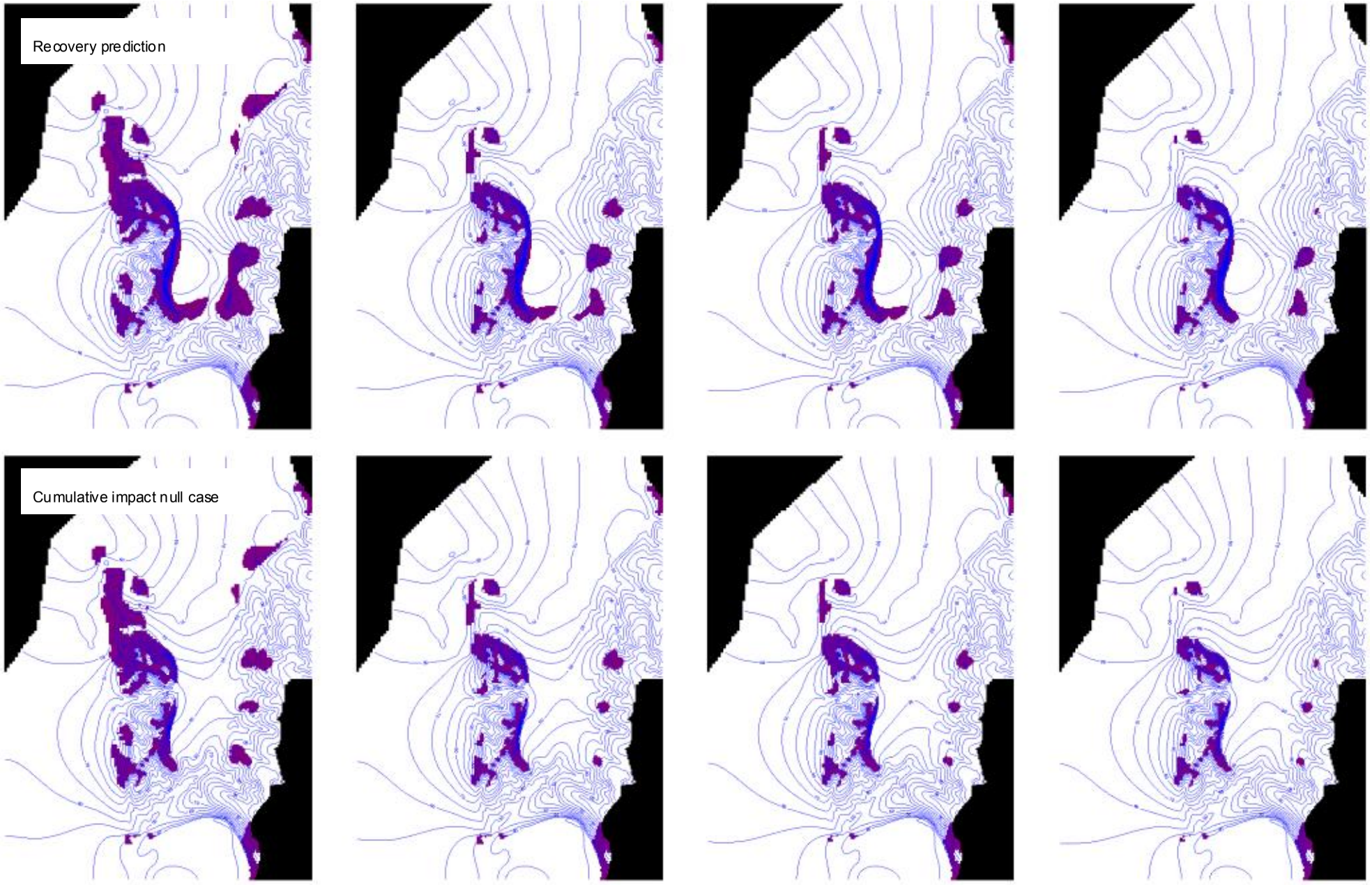
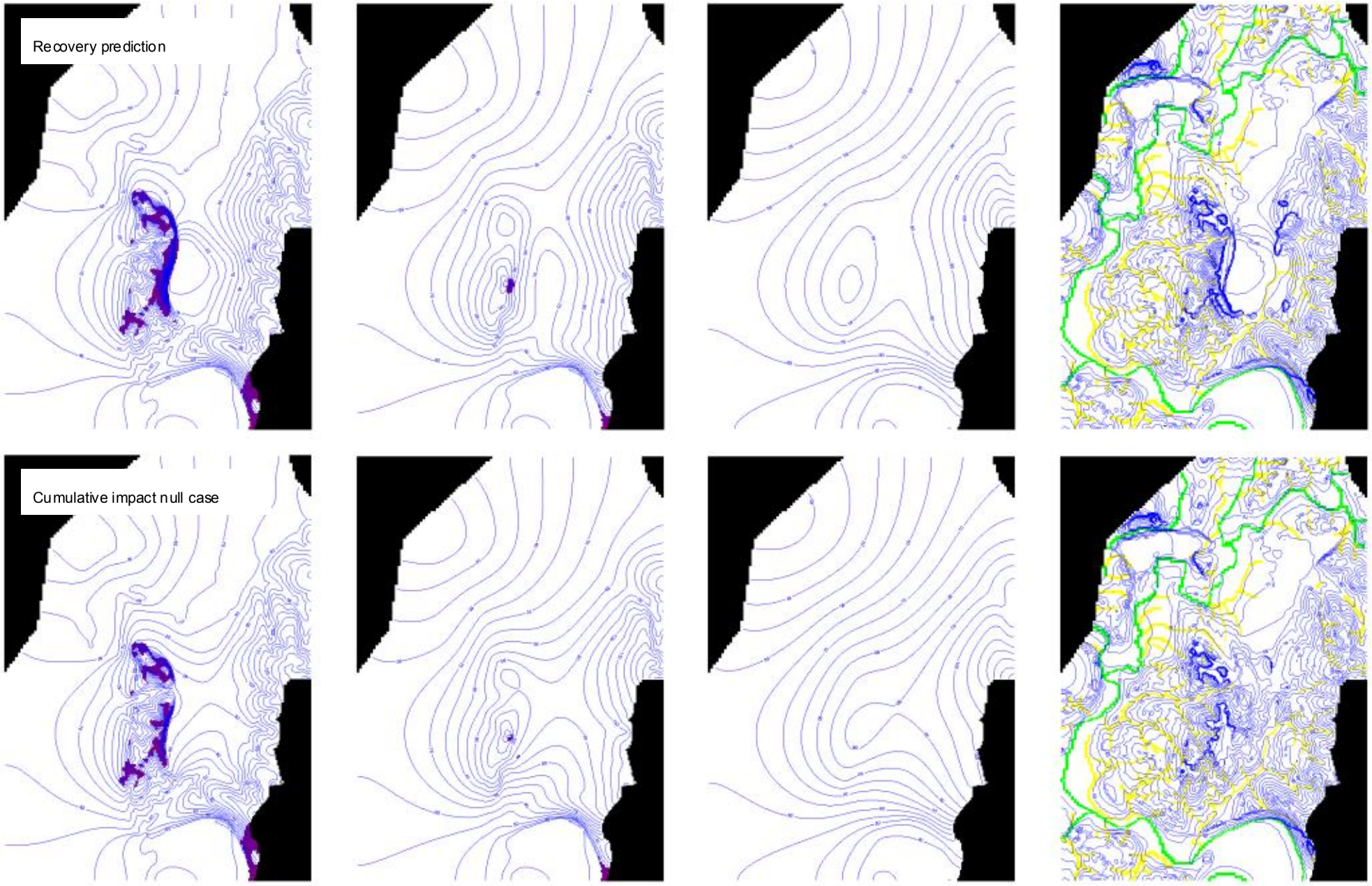


RPS

RECOVERY MODEL – MODELLED GROUNDWATER CONTOURS – 2137 FIGURE 8.25.4

c:\jobs\s66d\300\figures\word\projects\015a_d047_figure8 25 4_recoverymodelgroundwaterlevels.docx

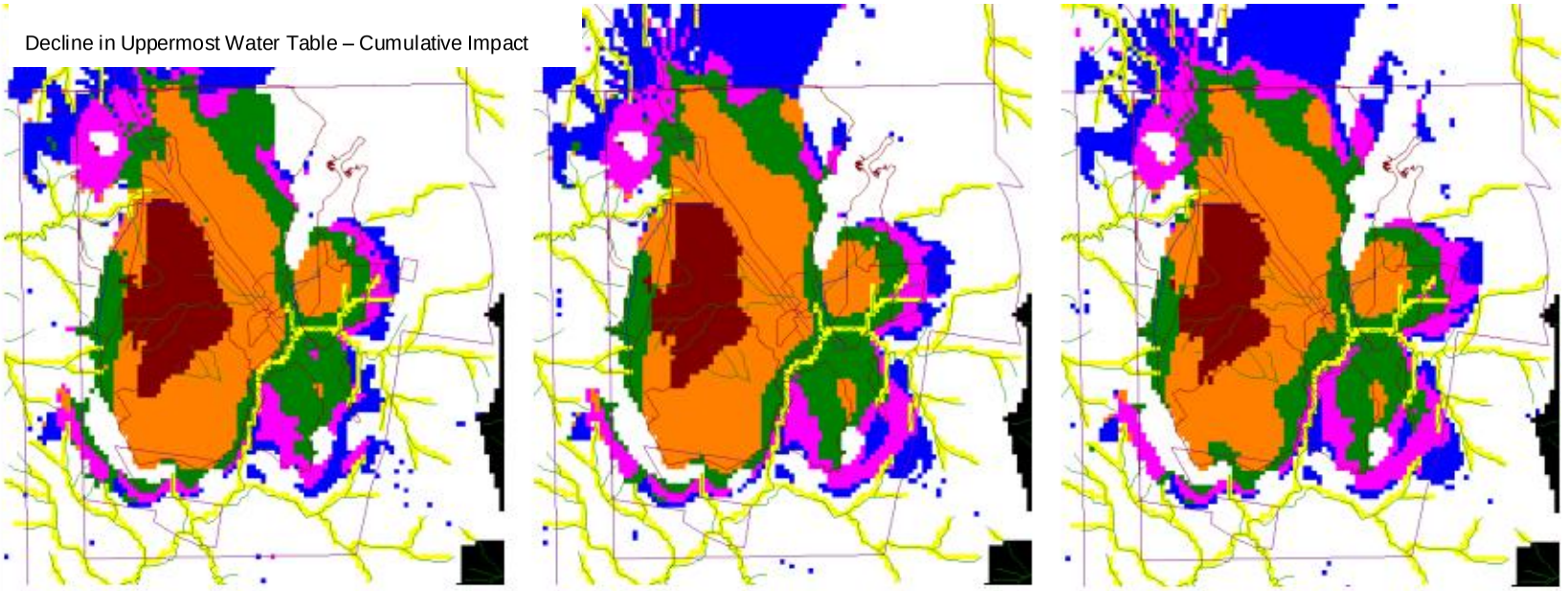


RPS

RECOVERY MODEL – MODELLED GROUNDWATER CONTOURS – 2137 FIGURE 8.25.5

c:\jobs\s66d\300\figures\word\projects\015a_d045_figure8 25 5_recoverymodelgroundwaterlevels.docx

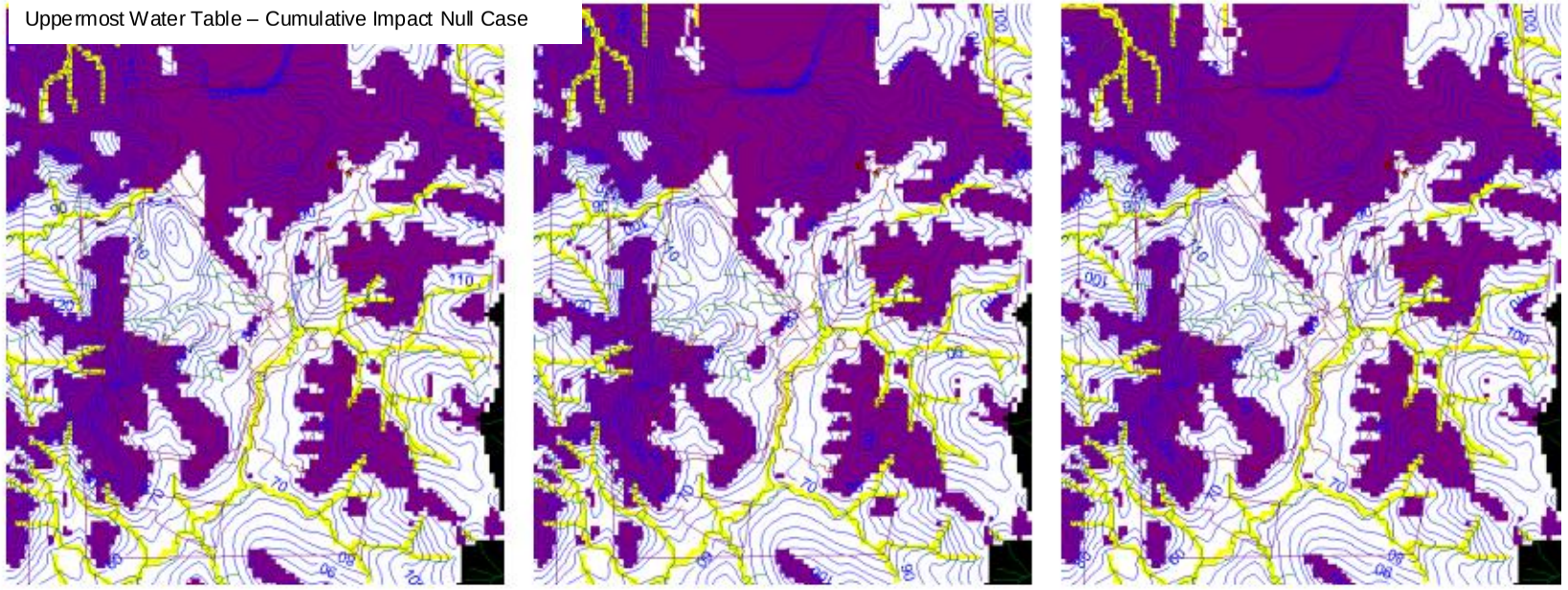
Decline in Uppermost Water Table – Cumulative Impact



Decline (m):

- >50m
- 20 to 50m
- 10 to 20m
- 5 to 10m
- 2 to 5m
- <2m

Uppermost Water Table – Cumulative Impact Null Case



Notes. 1) Dry cells in the lower images, displayed in purple, are with respect to heads from Layer 1; 2) Contours are highest water table, however, not necessarily residing in Layer 1.

2057 (SP42TS6) **2087 (SP52TS8)** **2137 (SP62TS8)**

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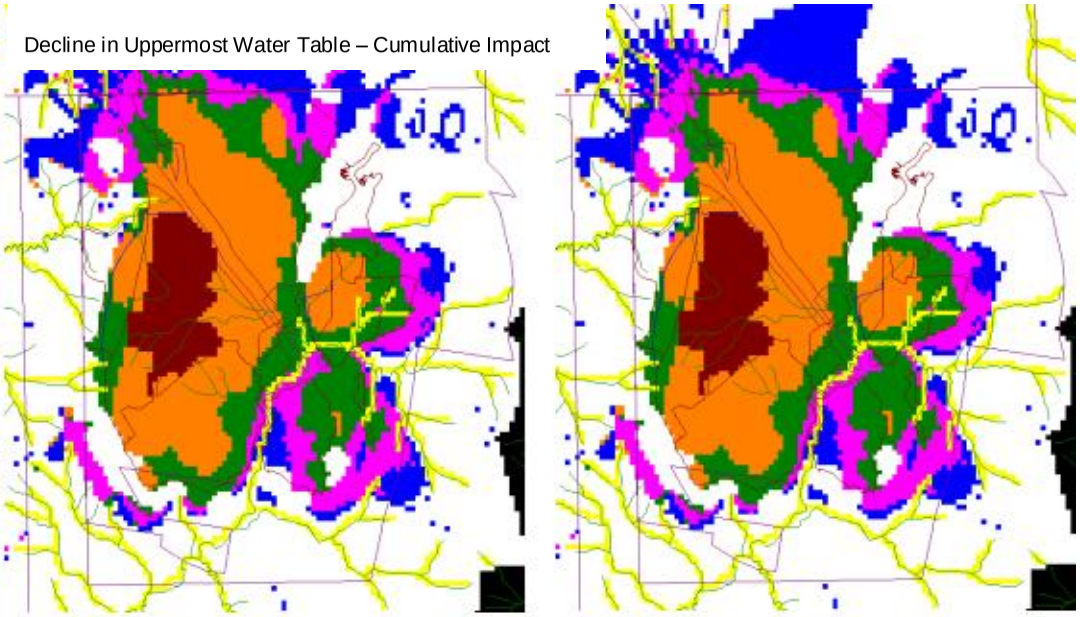
RPS

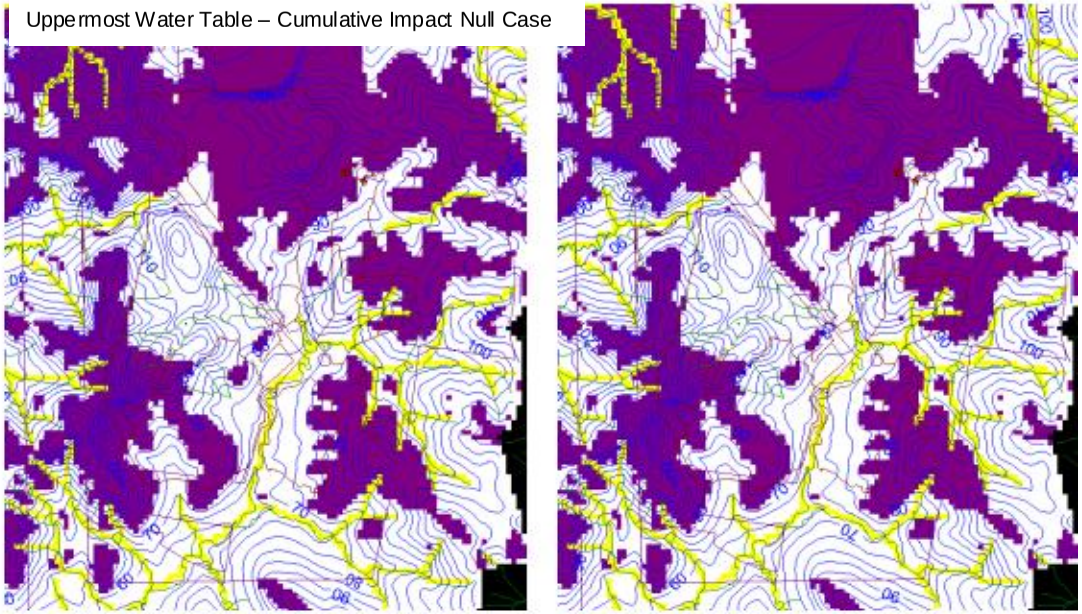
RECOVERY MODEL – MODELLED DECLINE IN UPPERMOST WATER TABLE – CUMULATIVE IMPACT FIGURE 8.26.1

c:\jobs\s66d\300\figures\word\projects\015a_d051_figure8 26 1_recovery-modelmodelleddeclineinwt_cumulativeimpact.docx

Decline in Uppermost Water Table – Cumulative Impact



Uppermost Water Table – Cumulative Impact Null Case



2237 (SP72TS8) **3037 (SP94TS11)**

Decline (m):

- >50m
- 20 to 50m
- 10 to 20m
- 5 to 10m
- 2 to 5m
- <2m

Notes. 1) Dry cells in the lower images, displayed in purple, are with respect to heads from Layer 1; 2) Contours are highest water table, however, not necessarily residing in Layer 1.

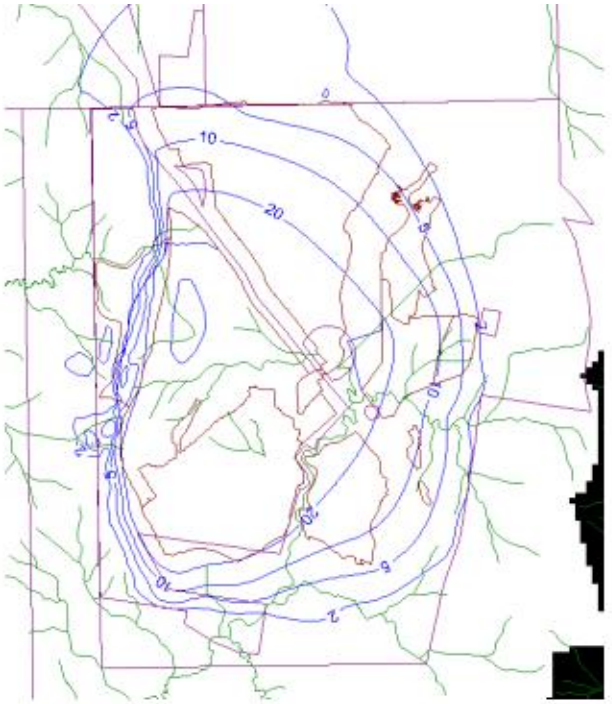
015a_RCV-NUL_01a.gwv

RPS

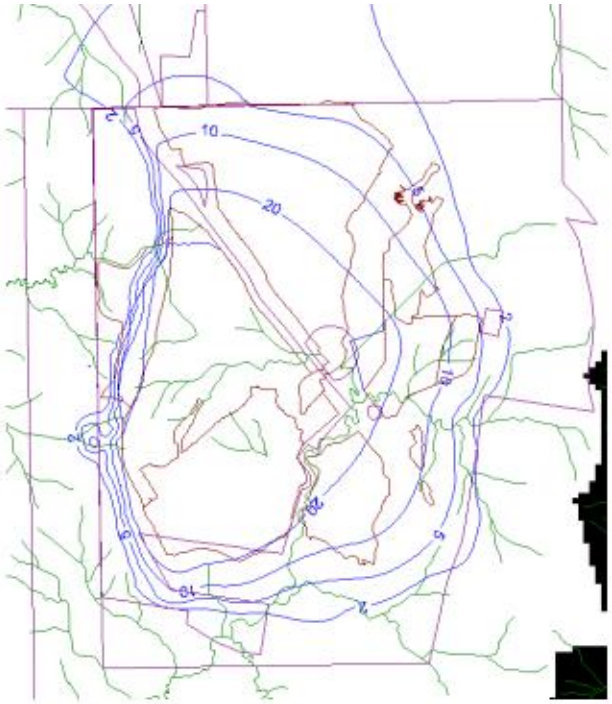
RECOVERY MODEL – MODELLED DECLINE IN UPPERMOST WATER TABLE – CUMULATIVE IMPACT FIGURE 8.26.2

c:\jobs\s66d\300\figures\word\projects\015a_d052_figure8-26-2_recoverymodelmodelleddeclineinwt_cumulativeimpact.docx

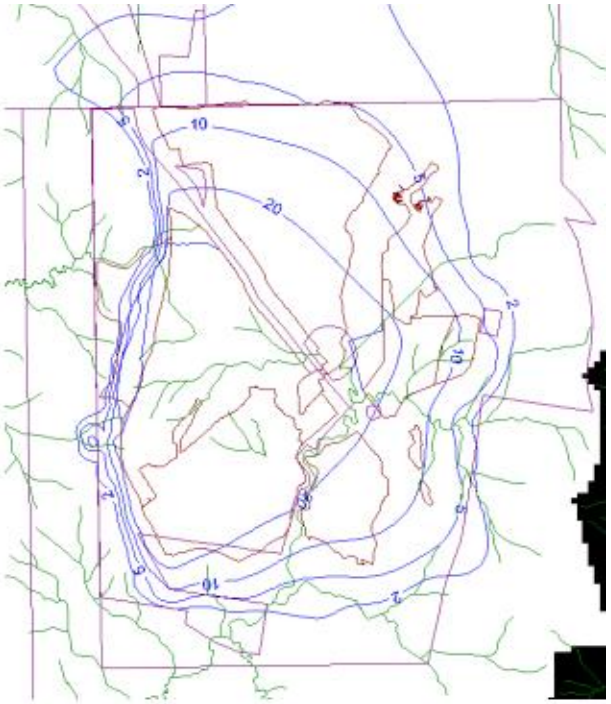
Drawdown due to Cumulative Impact



2057 (SP42TS6)



2087 (SP52TS8)



2137 (SP62TS8)

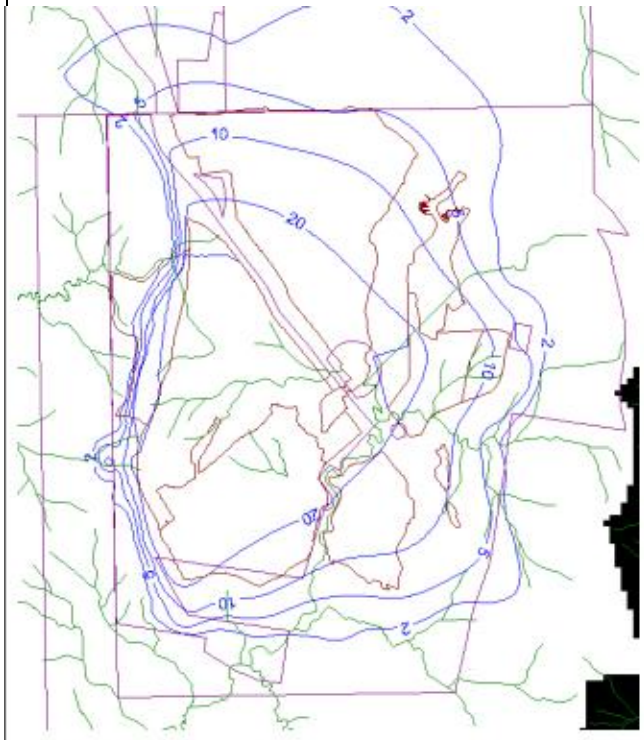
015a_RCV-NUL_01a.gwv

RPS

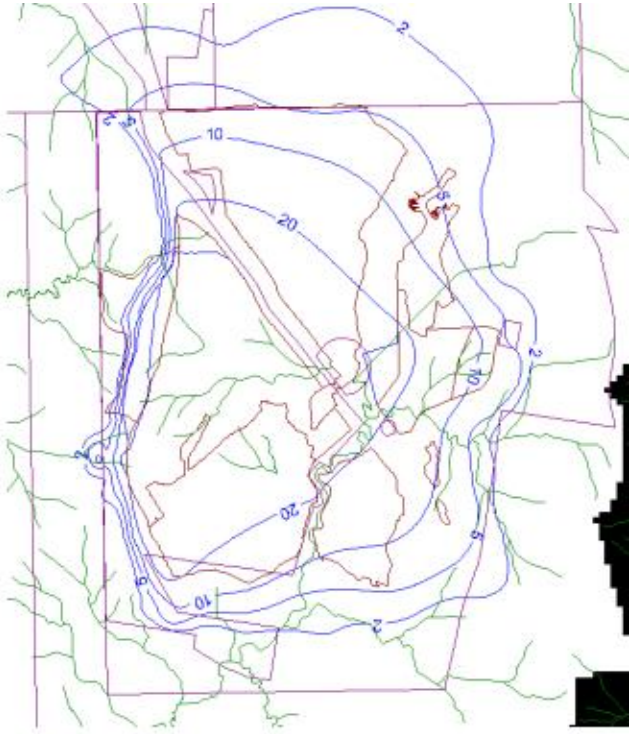
RECOVERY MODEL – MODELLED DRAWDOWN IN HEBDEN SEAM FIGURE 8.26.3

c:\jobs\s66d.300\figures\word\projects\015a_d053_figure8 26 3_recoverymodelmodelleddrawdownhebden.docx

Drawdown due to Cumulative Impact



2237 (SP72TS8)



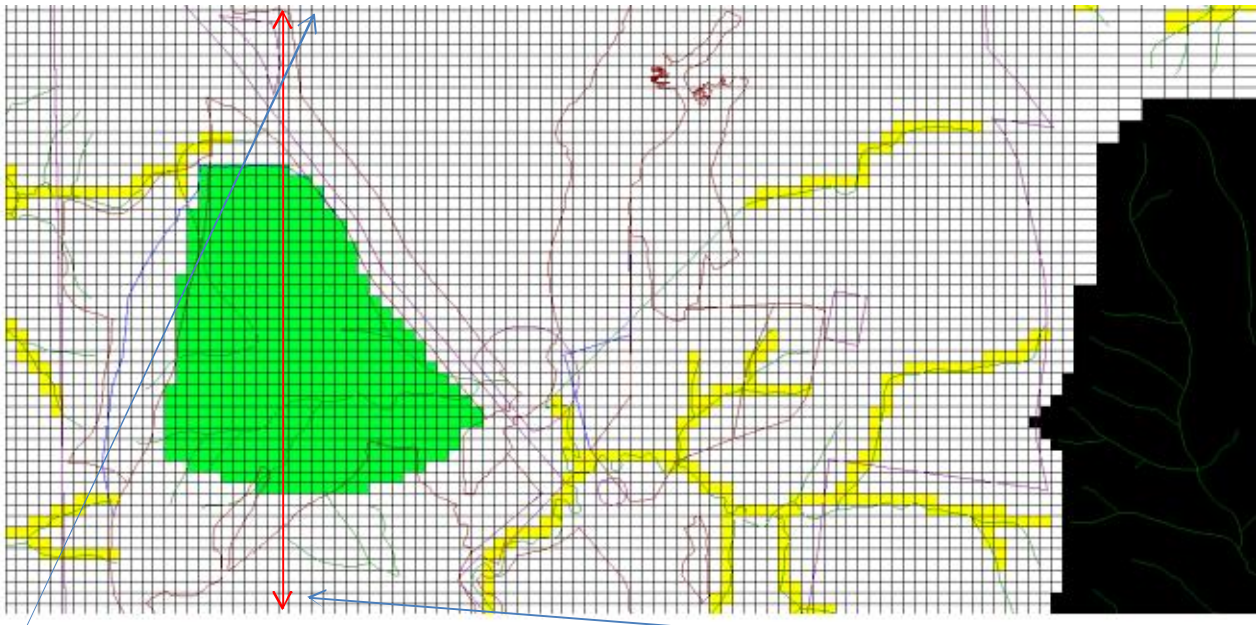
3037 (SP94TS11)

015a_RCV-NUL_01a.gw

RPS

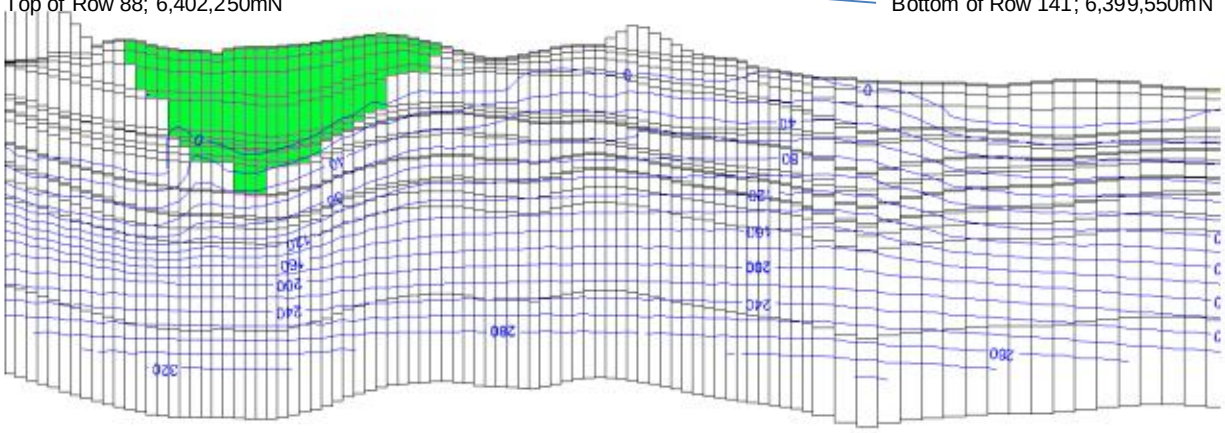
RECOVERY MODEL – MODELLED DRAWDOWN IN HEBDEN SEAM FIGURE 8.26.4

c:\jobs\s66d.300\figures\word\projects\015a_d054_figure8-26-4_recoverymodelmodelleddrawdownhebden.docx

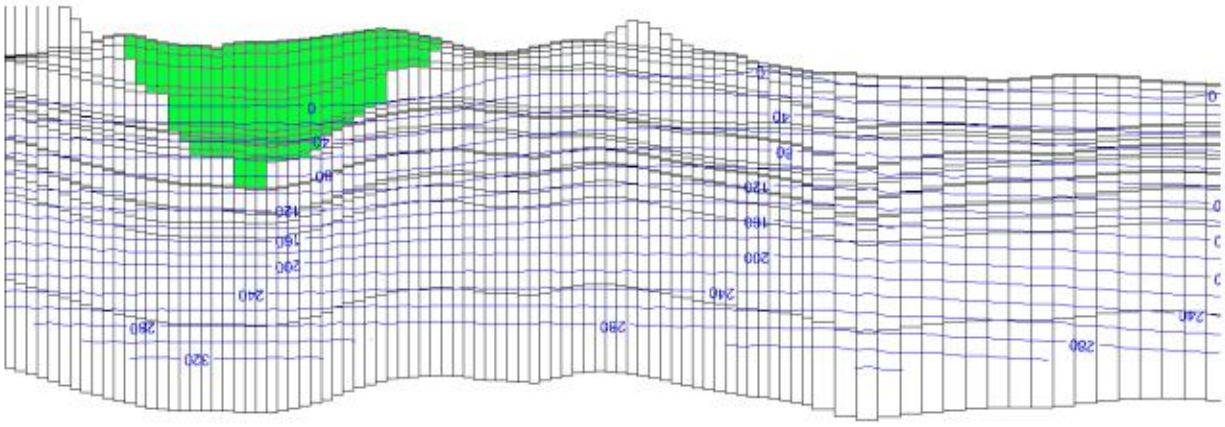


Top of Row 88; 6,402,250mN

Bottom of Row 141; 6,399,550mN



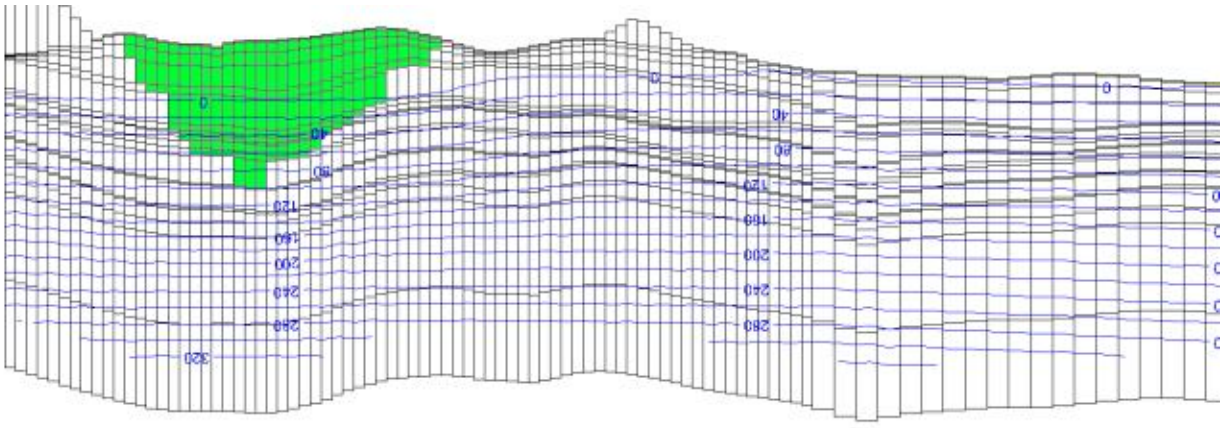
2037 (SP1TS17)



2057 (SP42TS6)

VERTICAL EXAGGERATION 1:4

015a_RCV-MP1_05a.gwv



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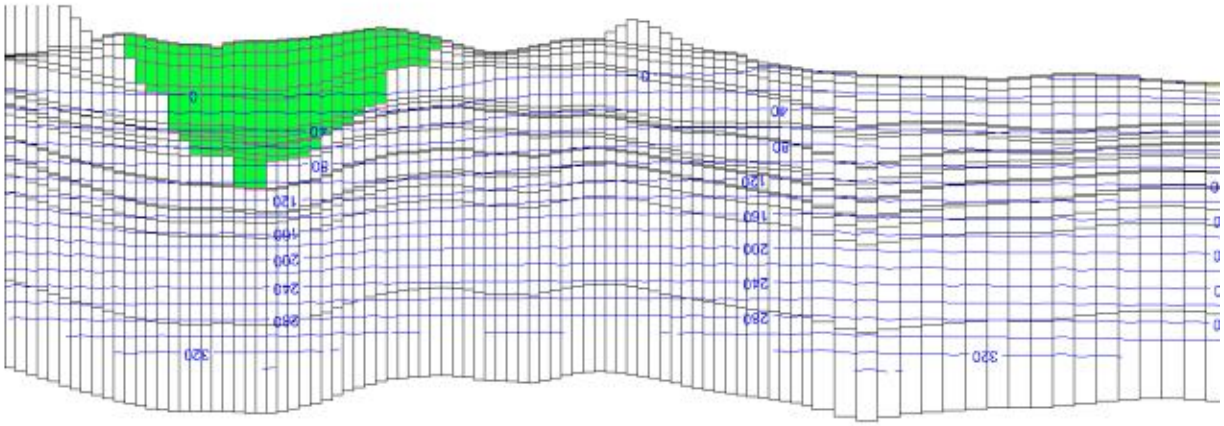

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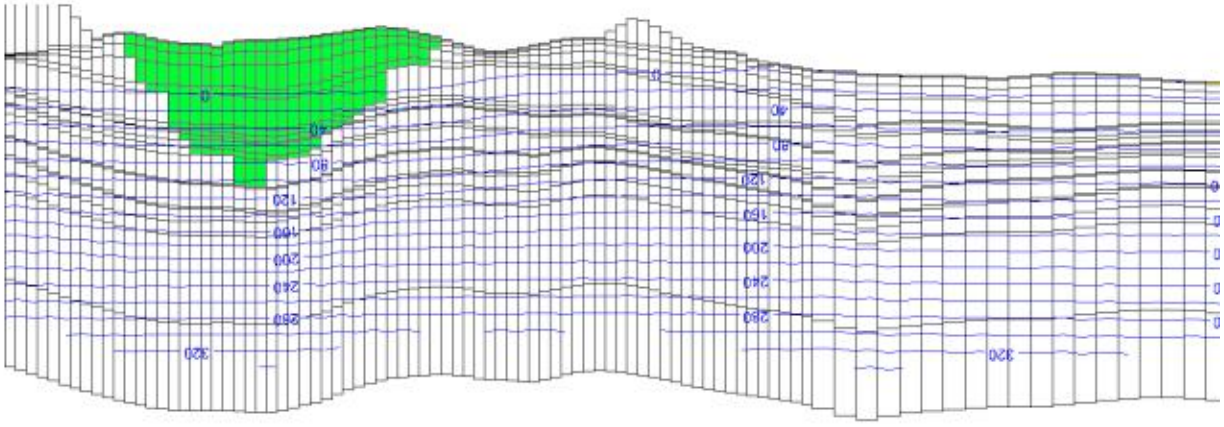

3037 (SP94TS11)

VERTICAL EXAGGERATION 1:4

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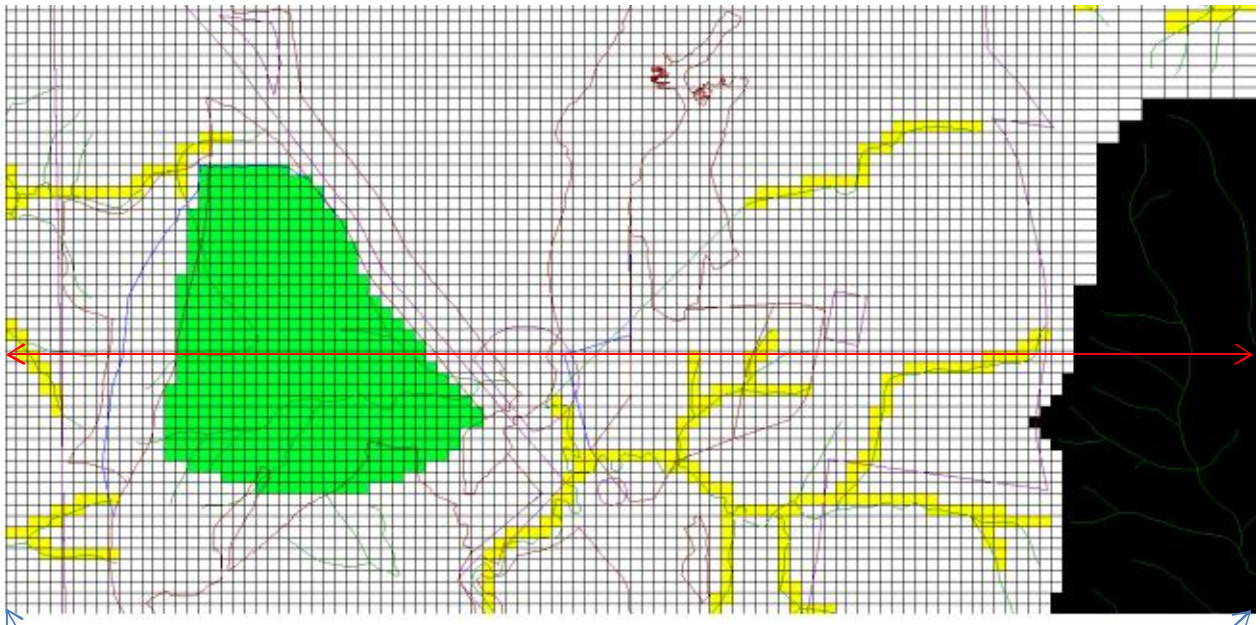
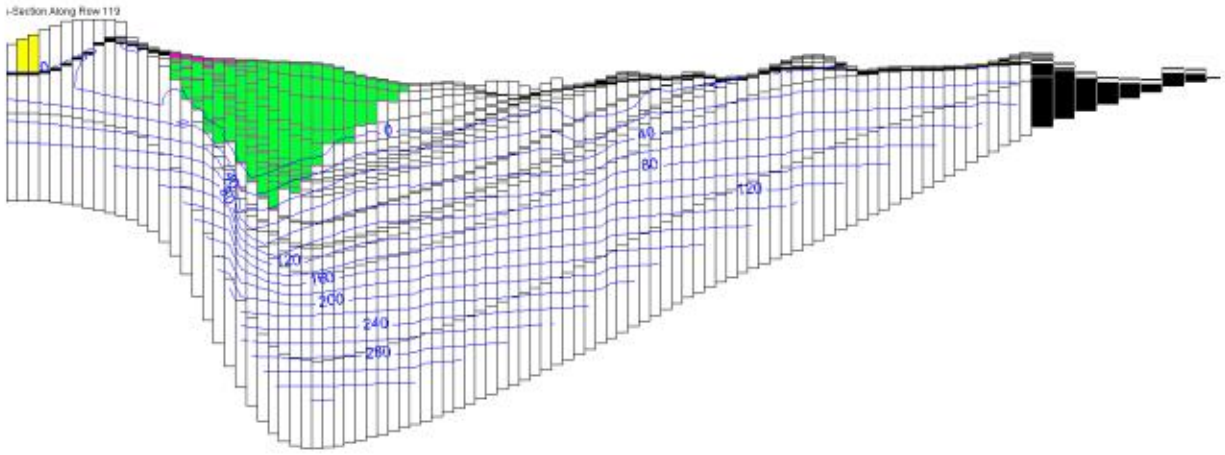
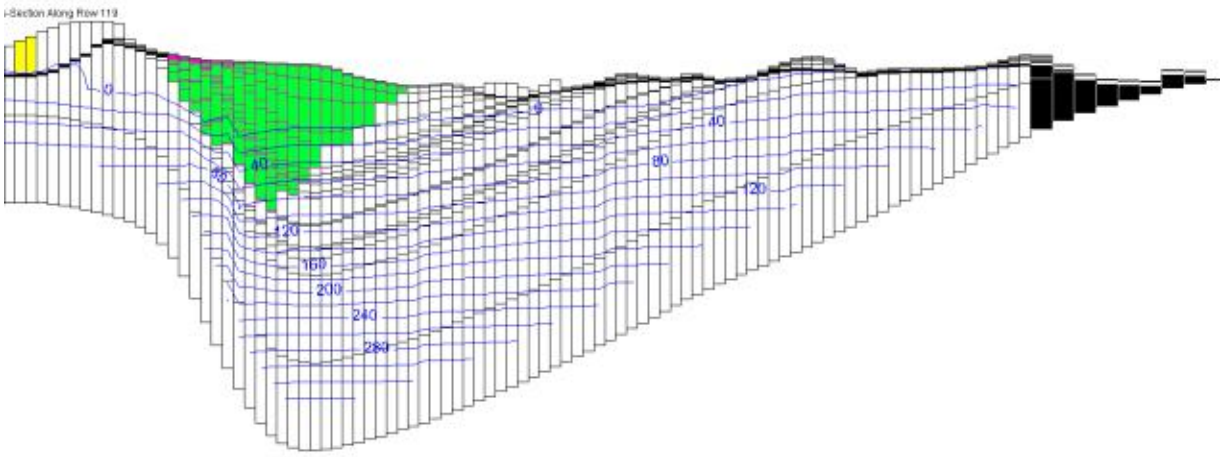


Left of Col 64; 322,000mE

Right of Col 165; 328,000mE



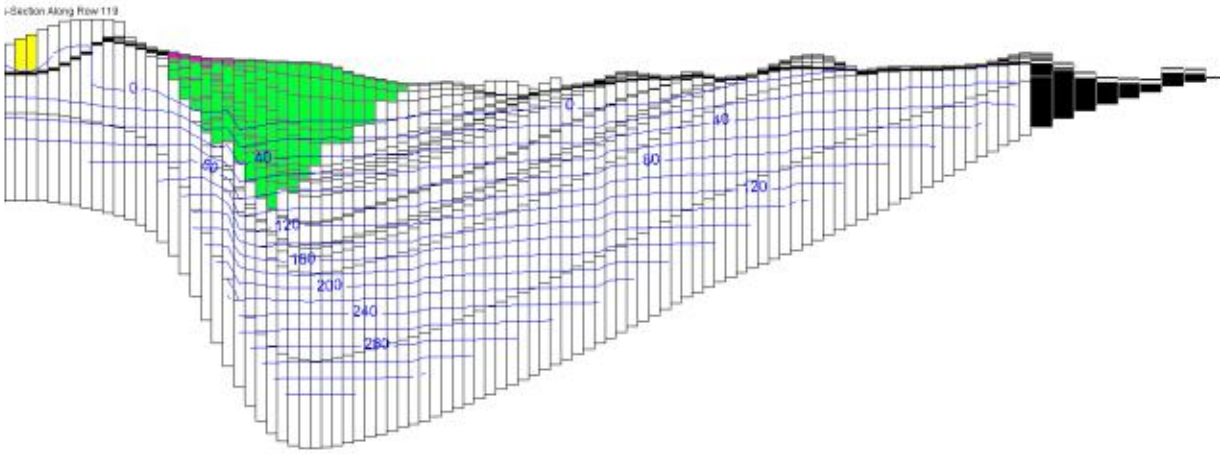
2037 (SP1TS17)



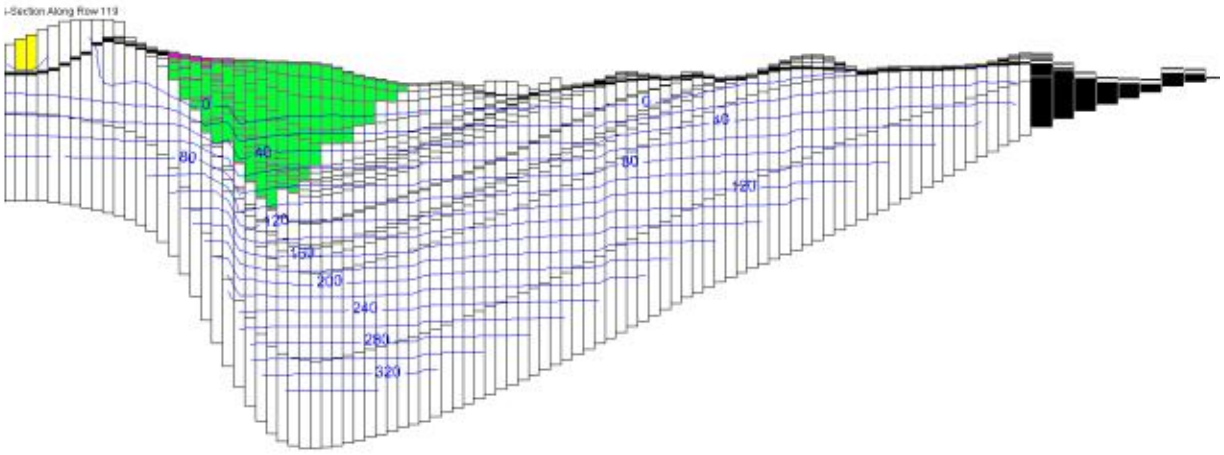
2057 (SP42TS6)

VERTICAL EXAGGERATION 1:4

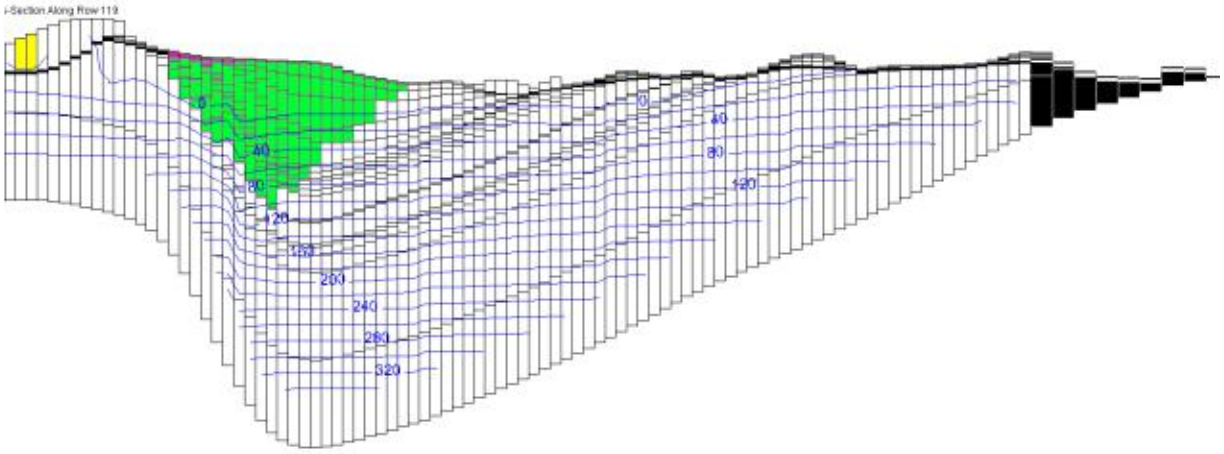
015a_RCV-MP1_05a.gwv



2087 (SP52TS8)



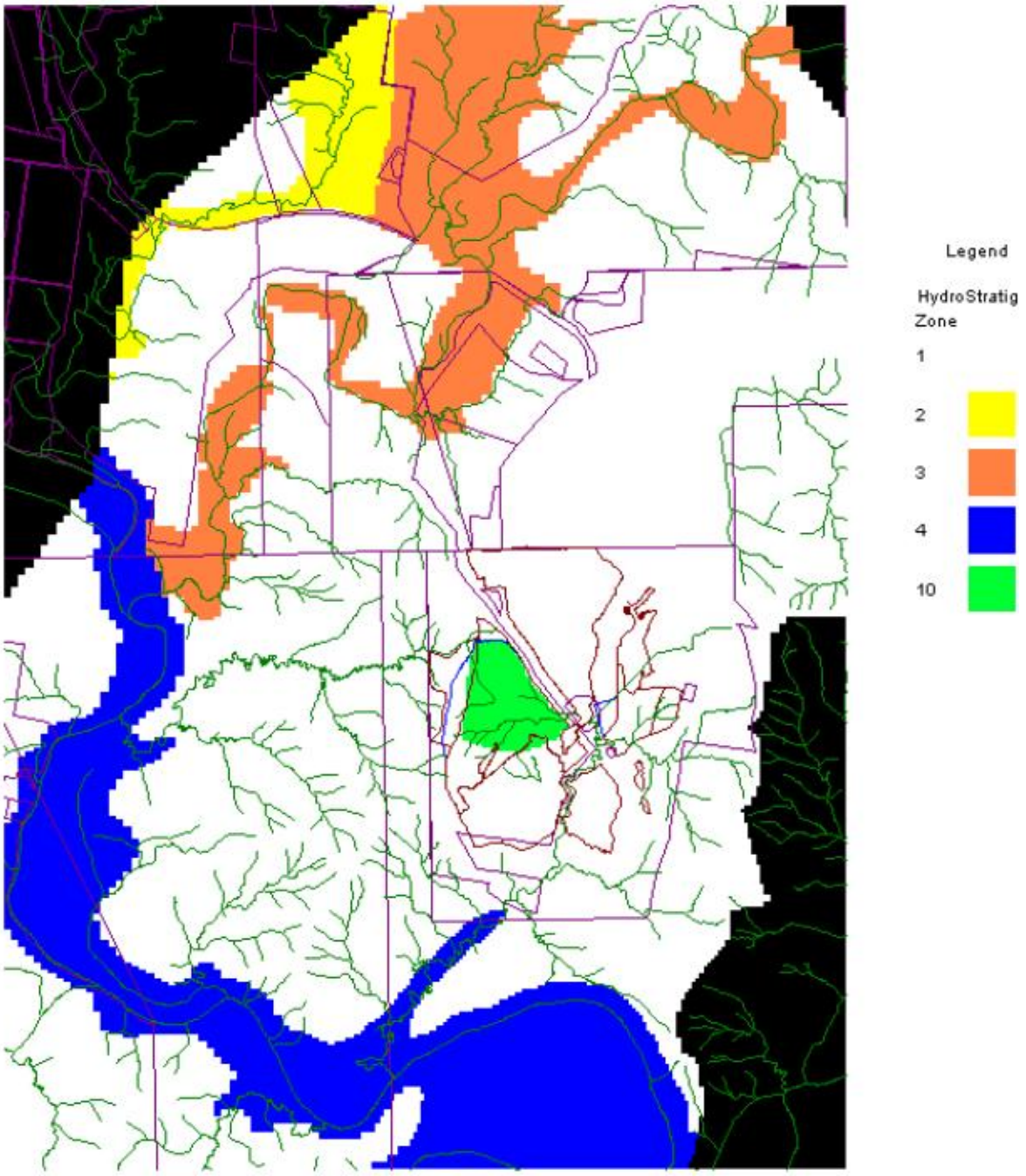
2237 (SP72TS8)



3037 (SP94TS11)

VERTICAL EXAGGERATION 1:4

015a_RCV-MP1_05a.gwv



RPS

RECOVERY MODEL – HYDROSTRATIGRAPHIC ZONES FIGURE 8.29

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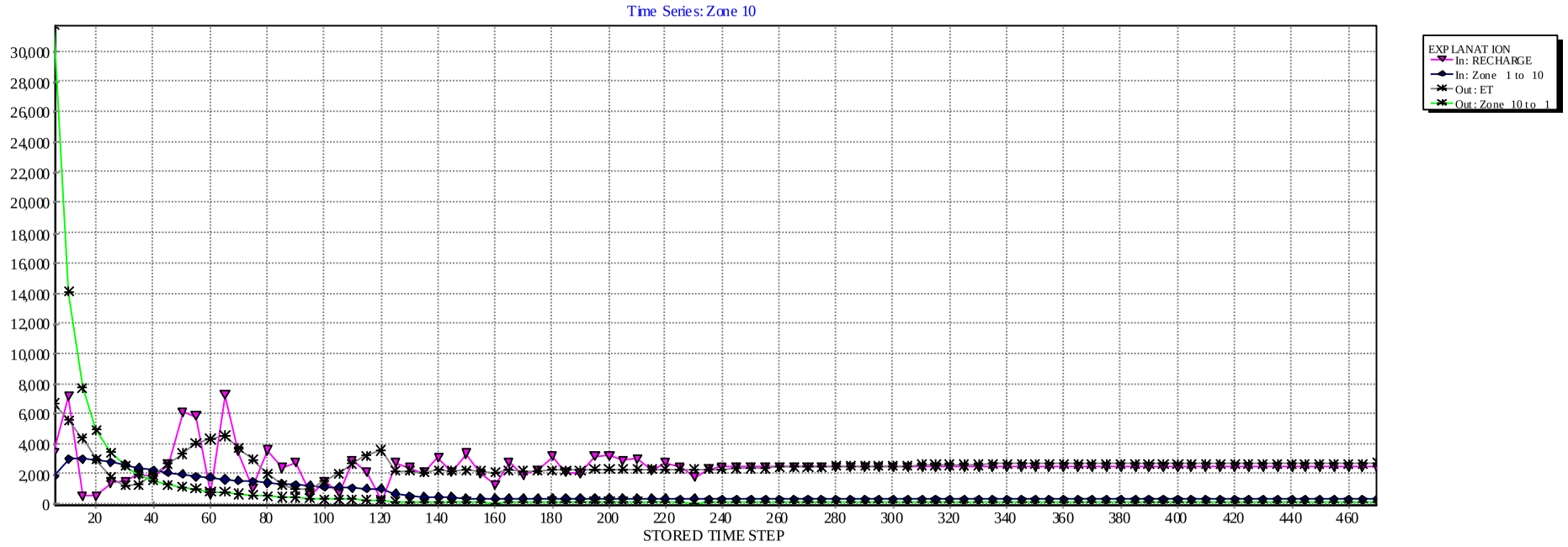

Notes. Zone 10 = Final Void; Zone 1 = Hard-Rock, Backfill

015a_RCV-MP1_05a.gwv

RPS

WATER BALANCE OF THE FINAL VOID FIGURE 8.30

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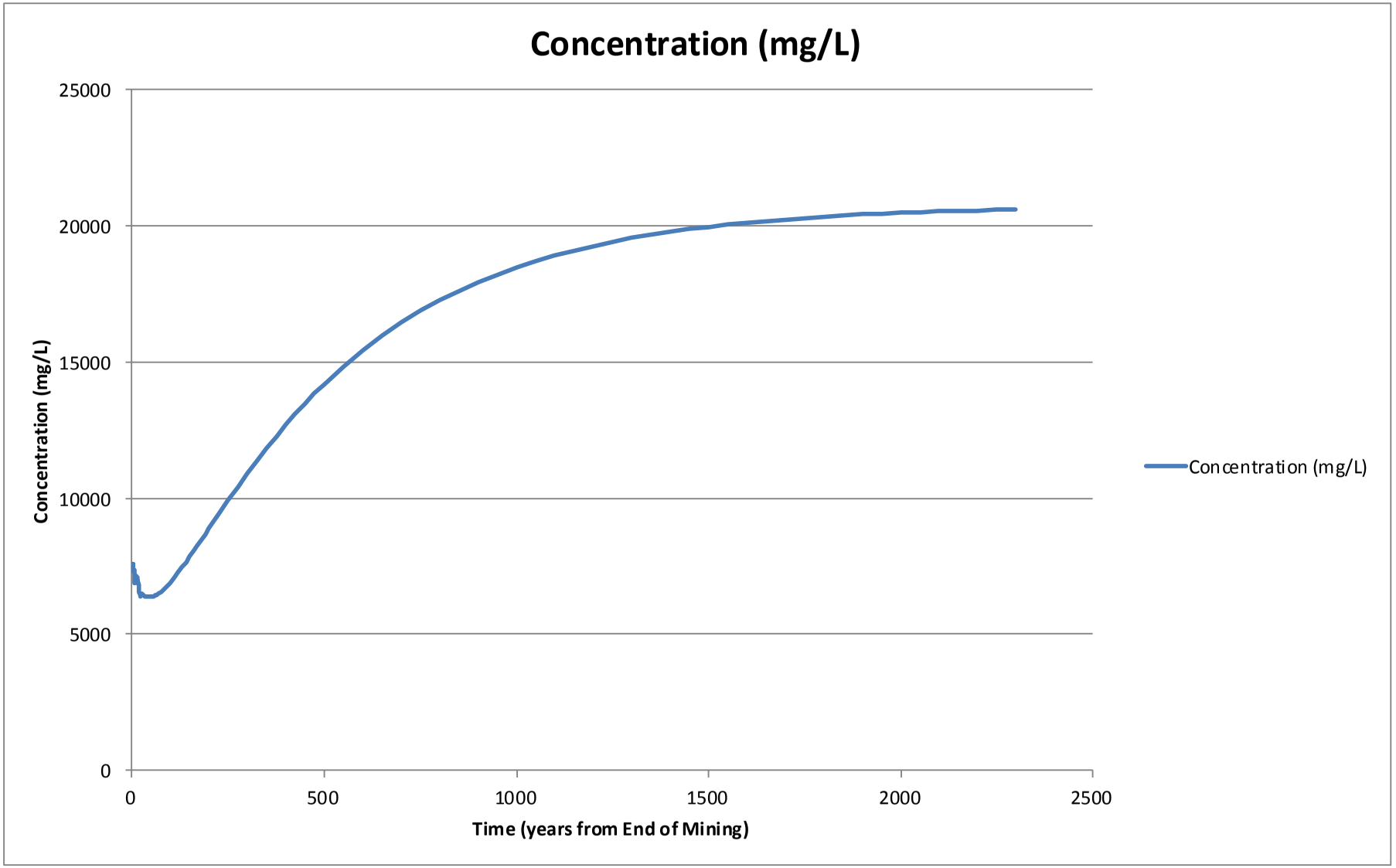

Notes. Assumed Pit Inflow Concentration is 7,370mg/L (11,000µS/cm)

015a_RCV-MP1_05a.gwv

RPS

SALT BALANCE OF THE FINAL VOID FIGURE 8.31

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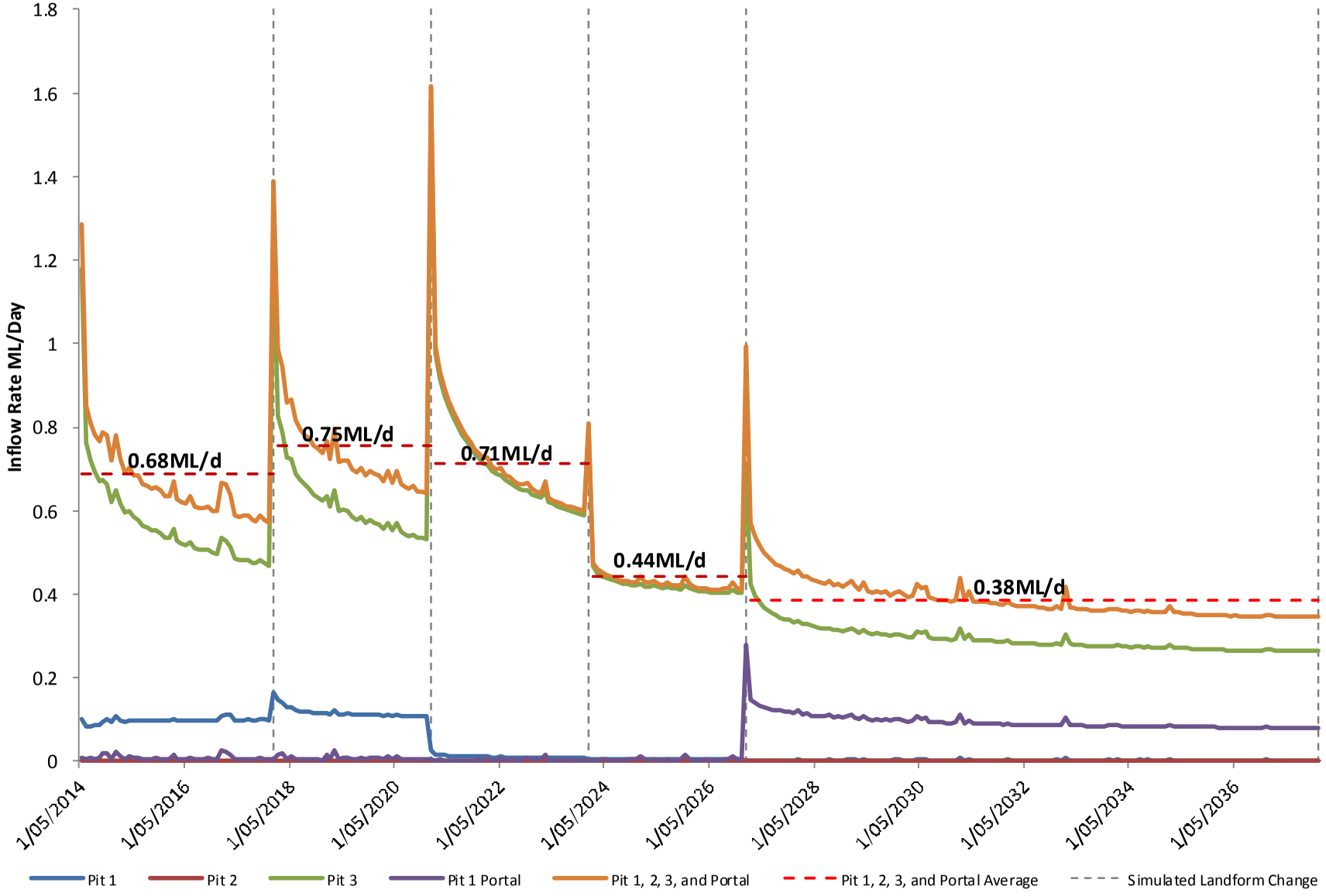
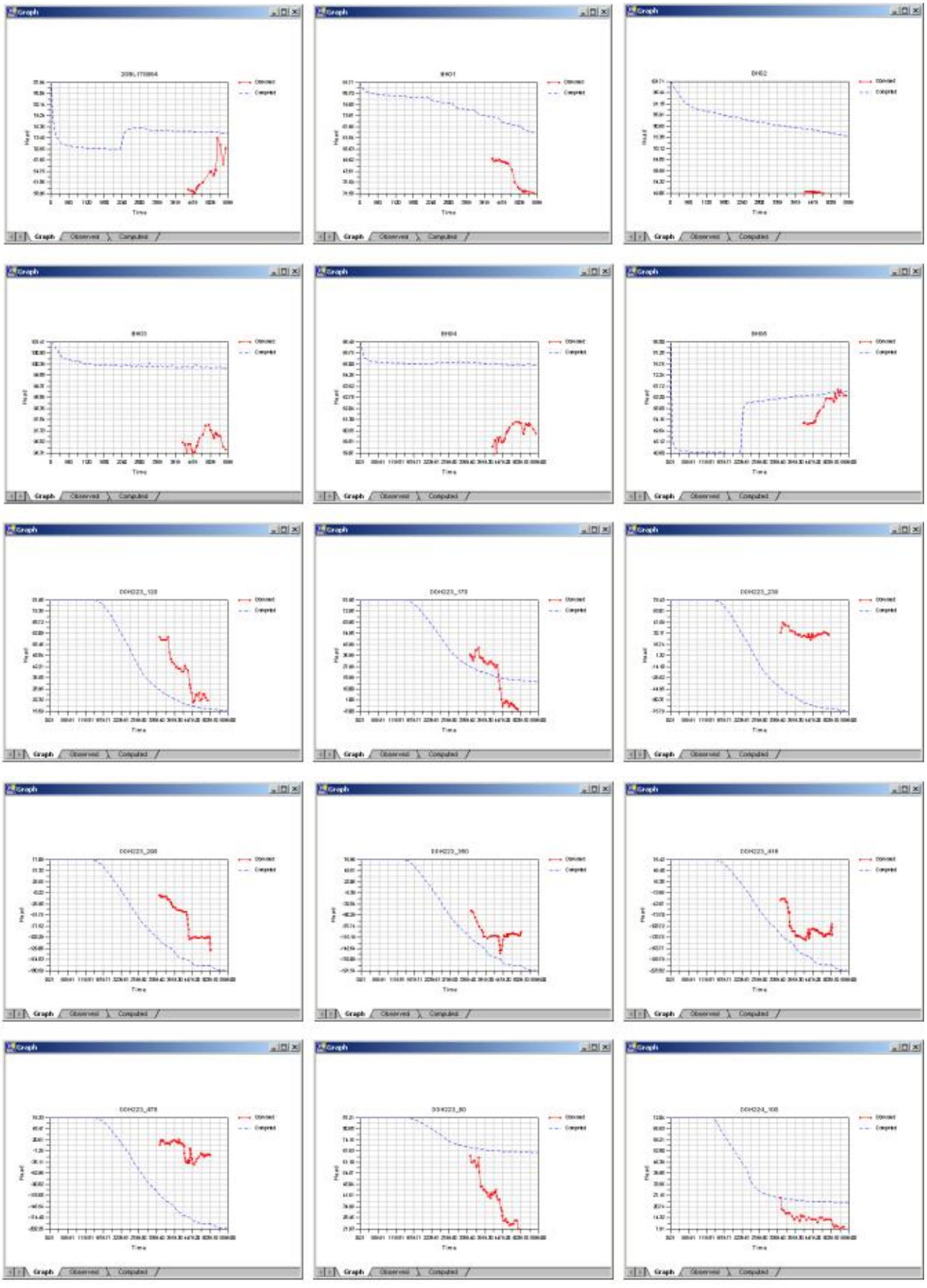


RPS

Predicted Mine Inflows - Figure 9.1

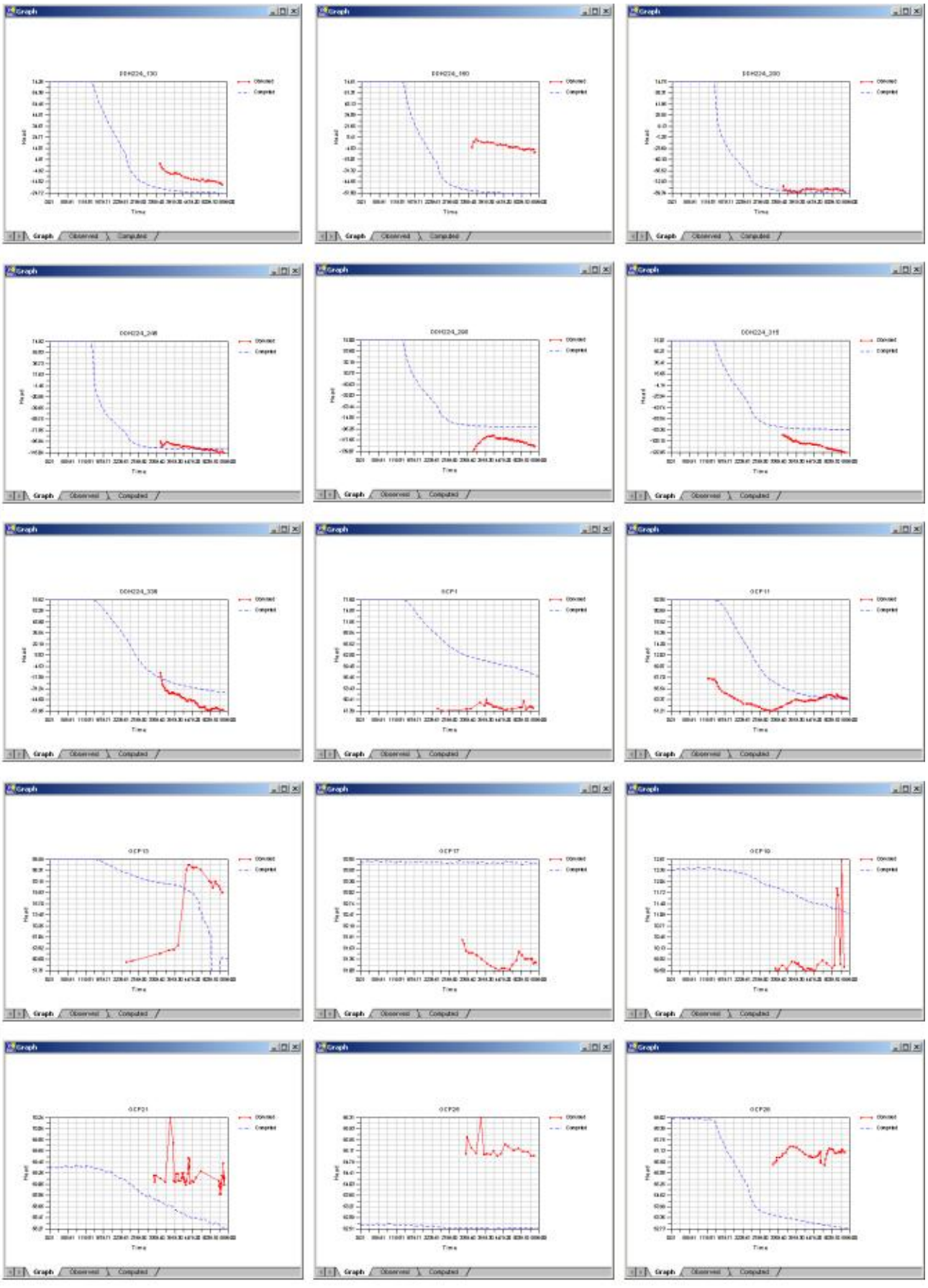
F:\Jobs\S66D\300\Analysis\Hydrogeology\GWV\Results\[015a_Licensing Requirements.xlsx]Rate

APPENDIX A:
CALIBRATION MODEL HYDROGRAPHS

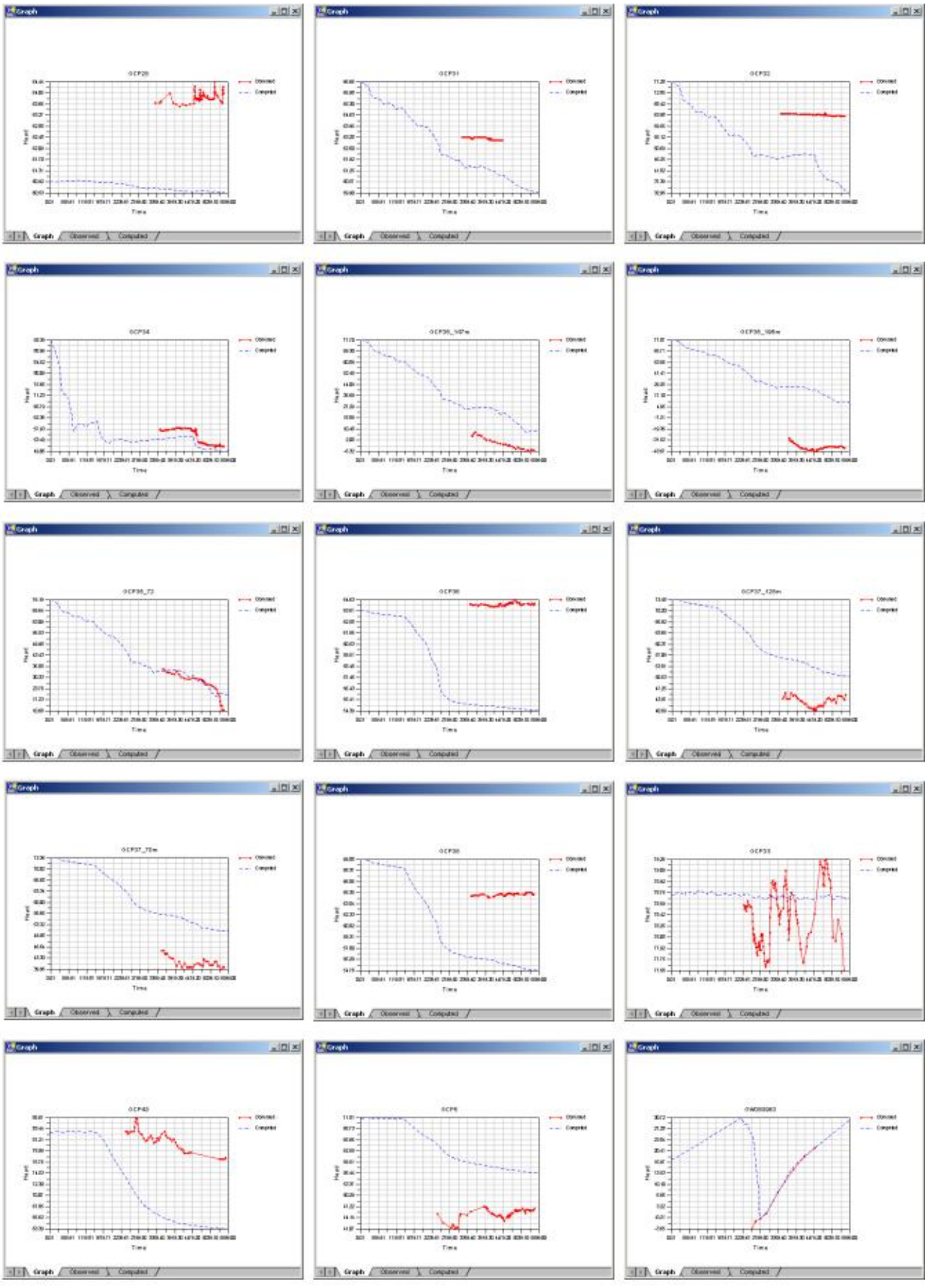


CALIBRATION MODEL – GROUNDWATER LEVEL HYDROGRAPHS FIGURE A-1

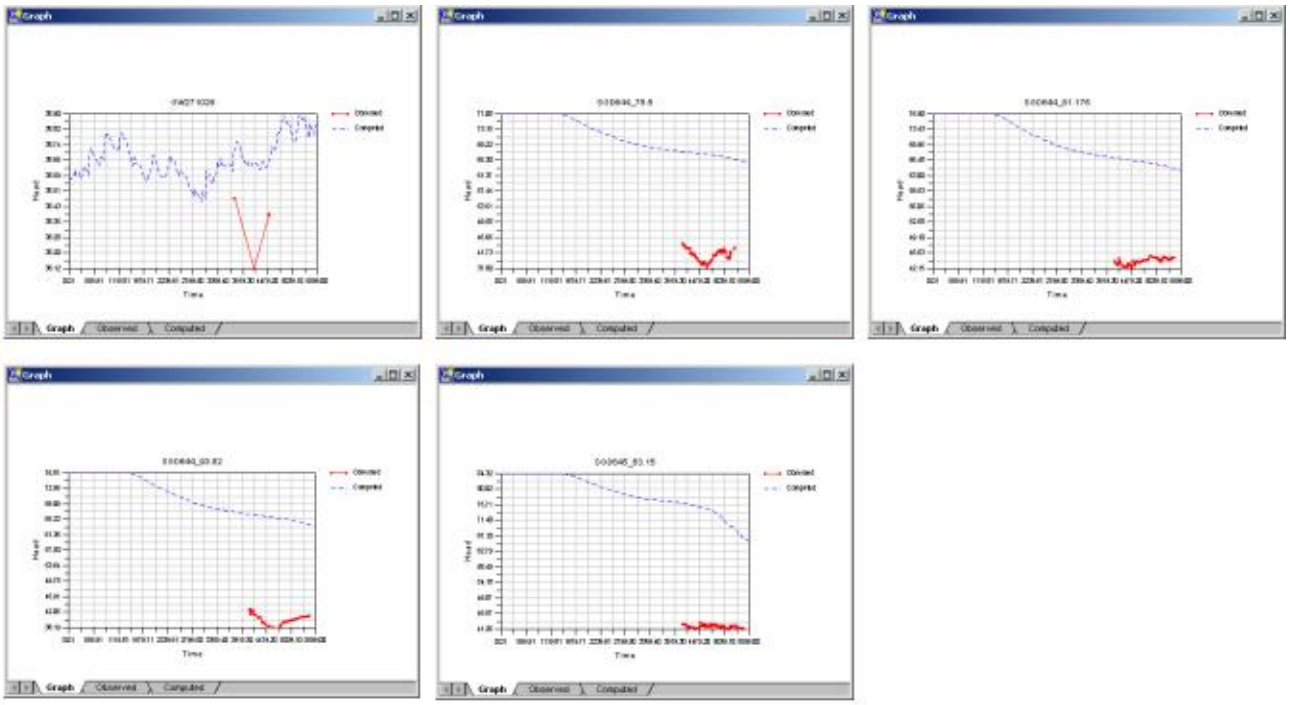
c:\jobs\s66u\300\figures\word\projects\015a_u066_figurea-1_calibrationmodelgroundwaterlevelhydrographs.docx



CALIBRATION MODEL – GROUNDWATER LEVEL HYDROGRAPHS FIGURE A-2



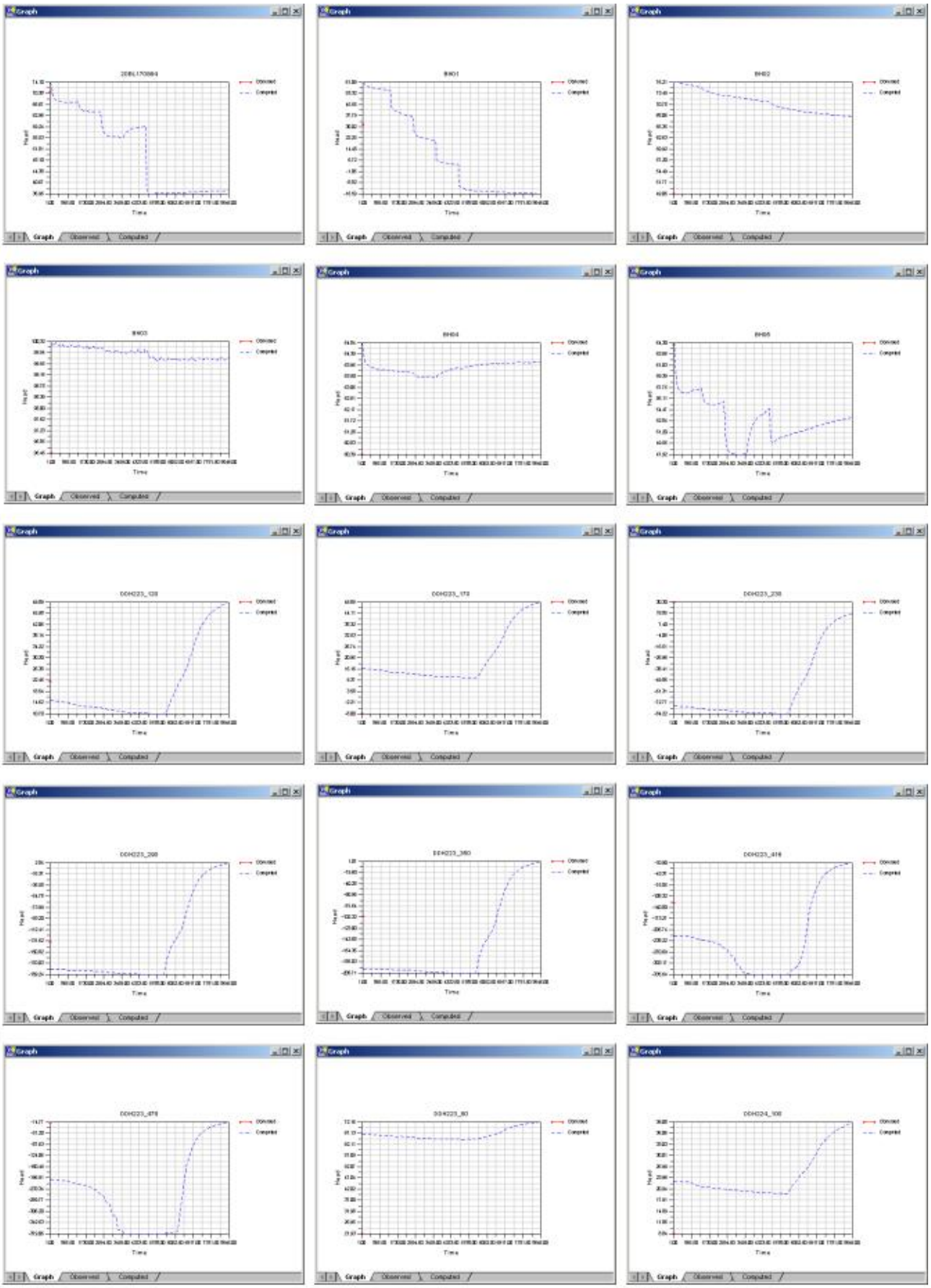
CALIBRATION MODEL – GROUNDWATER LEVEL HYDROGRAPHS FIGURE A-3



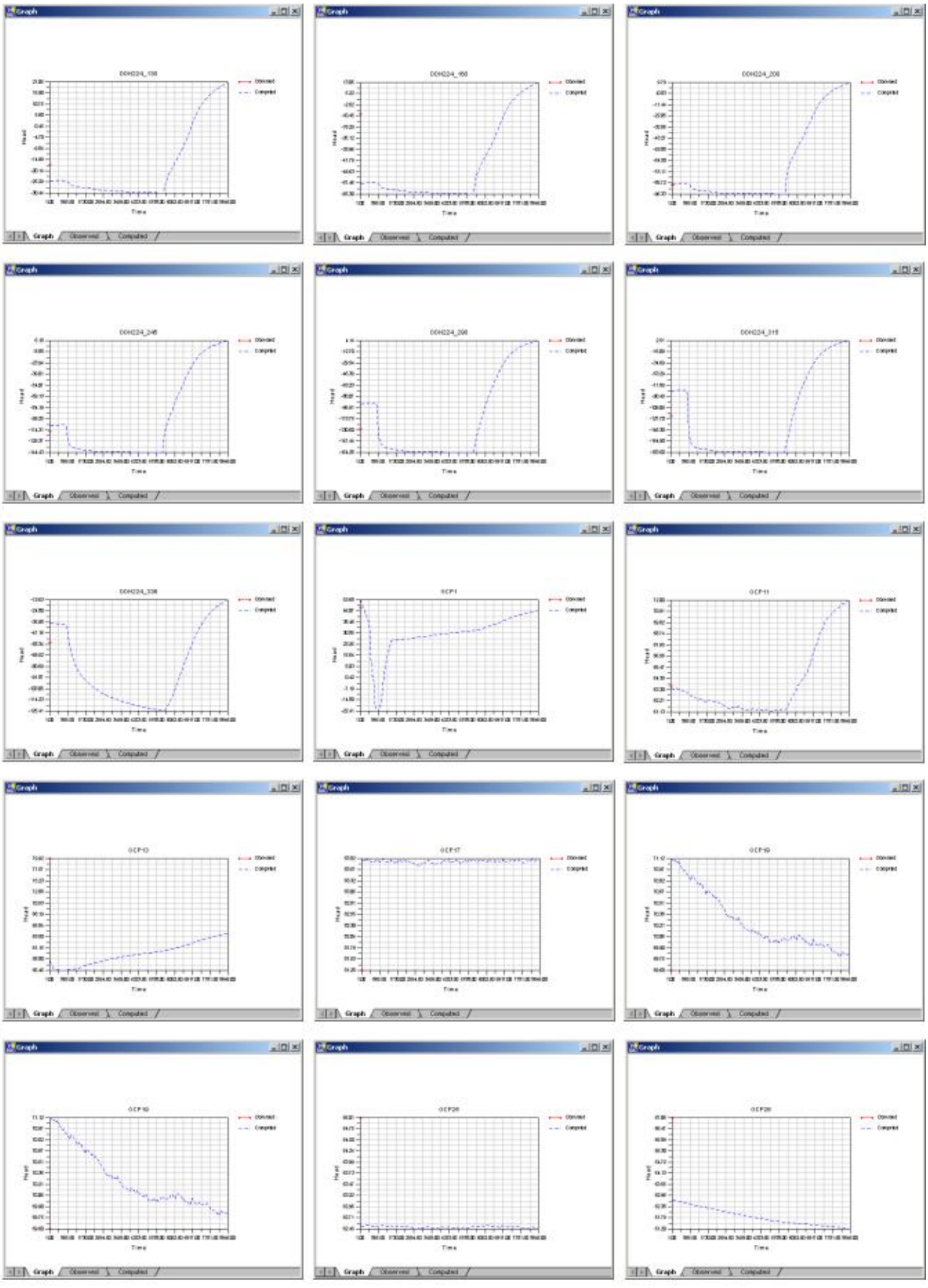
CALIBRATION MODEL – GROUNDWATER LEVEL HYDROGRAPHS FIGURE A-4

c:\jobs\s66d\300\figures\word\projects\015a_d069_figurea-4_calibrationmodelgroundwaterlevelhydrographs.docx

APPENDIX B:
PREDICTION MODEL HYDROGRAPHS



PREDICTION MODEL – GROUNDWATER LEVEL HYDROGRAPHS FIGURE B-1



PREDICTION MODEL – GROUNDWATER LEVEL HYDROGRAPHS FIGURE B-2

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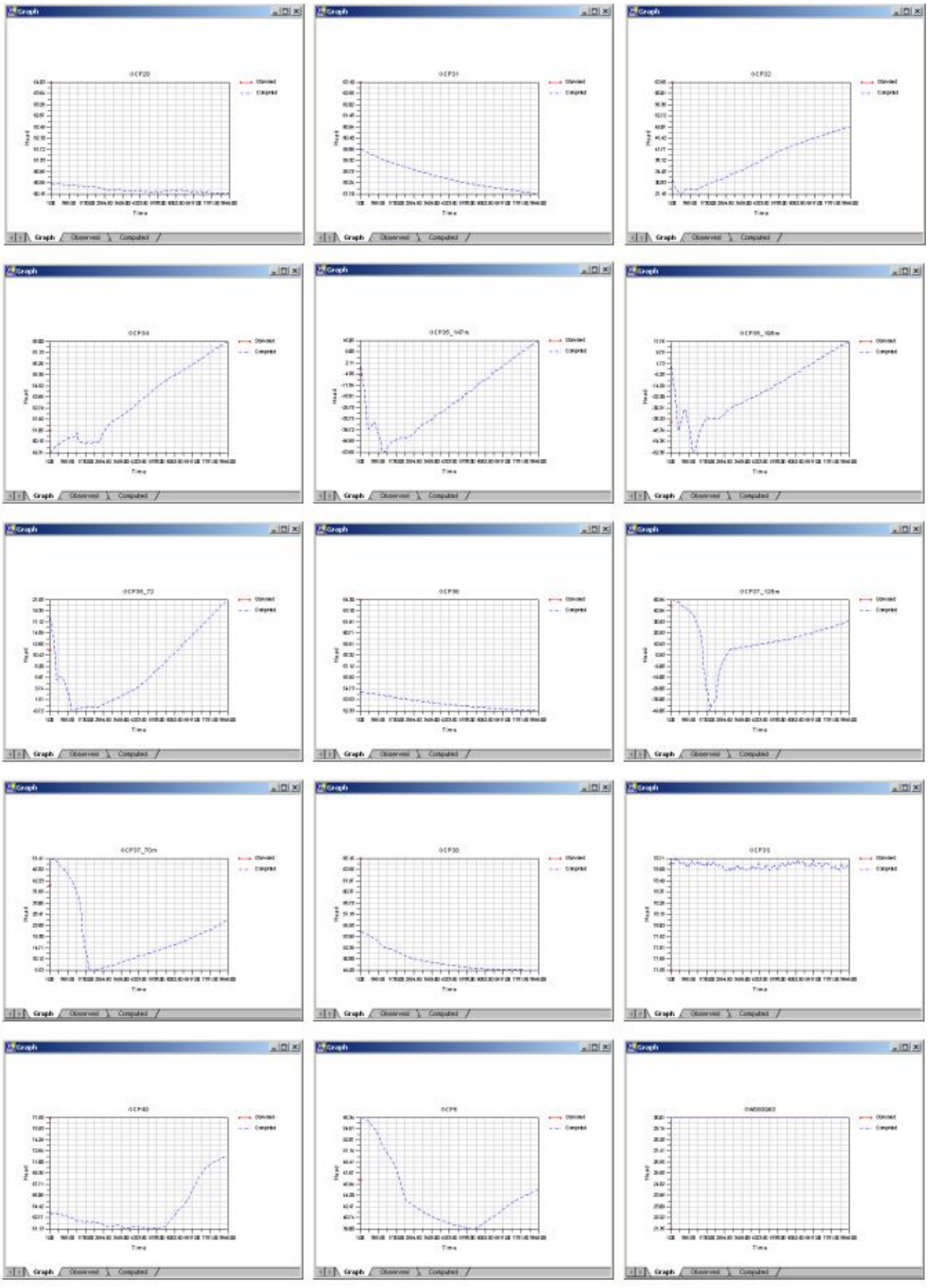
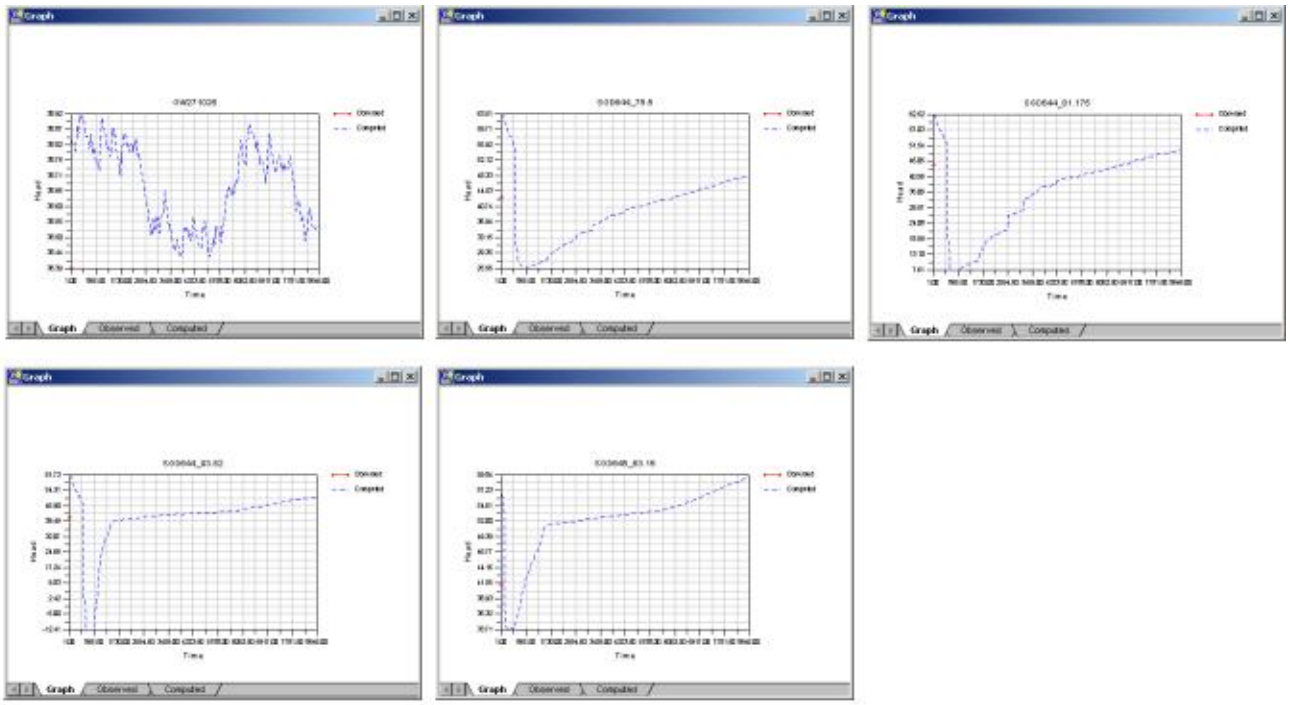
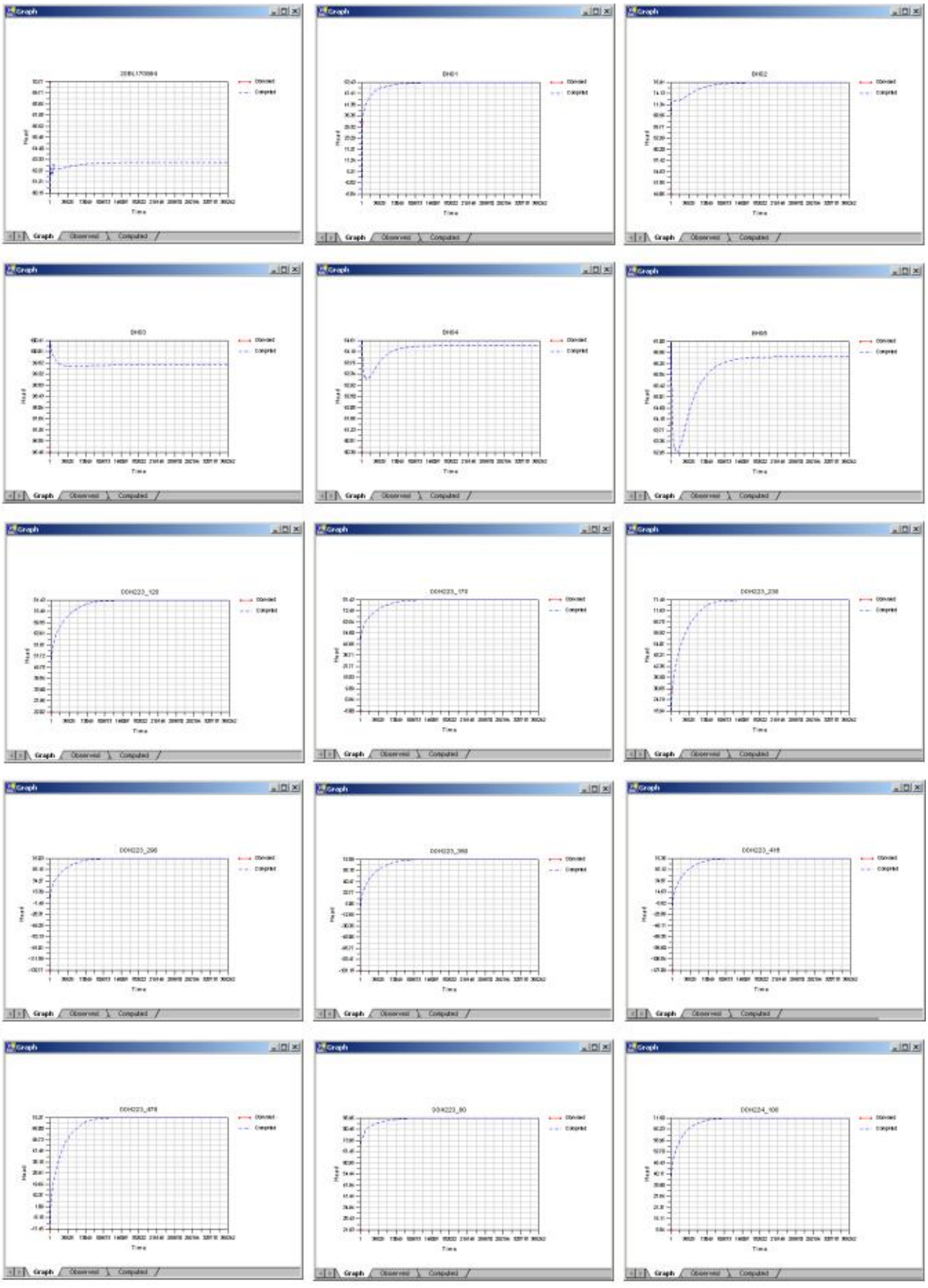


PREDICTION MODEL – GROUNDWATER LEVEL HYDROGRAPHS FIGURE B-3



PREDICTION MODEL – GROUNDWATER LEVEL HYDROGRAPHS FIGURE B-4

APPENDIX C:
RECOVERY MODEL HYDROGRAPHS



RPS

RECOVERY MODEL – GROUNDWATER LEVEL HYDROGRAPHS FIGURE C-1

c:\jobs\s66d\300\figures\word\projects\015a_d074_figurec-1_recoverymodelgroundwaterlevelhydrographs.docx

RPS

RECOVERY MODEL – GROUNDWATER LEVEL HYDROGRAPHS FIGURE C-2

c:\jobs\s66d\300\figures\word\projects\015a_d075_figurec-2_recoverymodelgroundwaterlevelhydrographs.docx

RPS

RECOVERY MODEL – GROUNDWATER LEVEL HYDROGRAPHS FIGURE C-3

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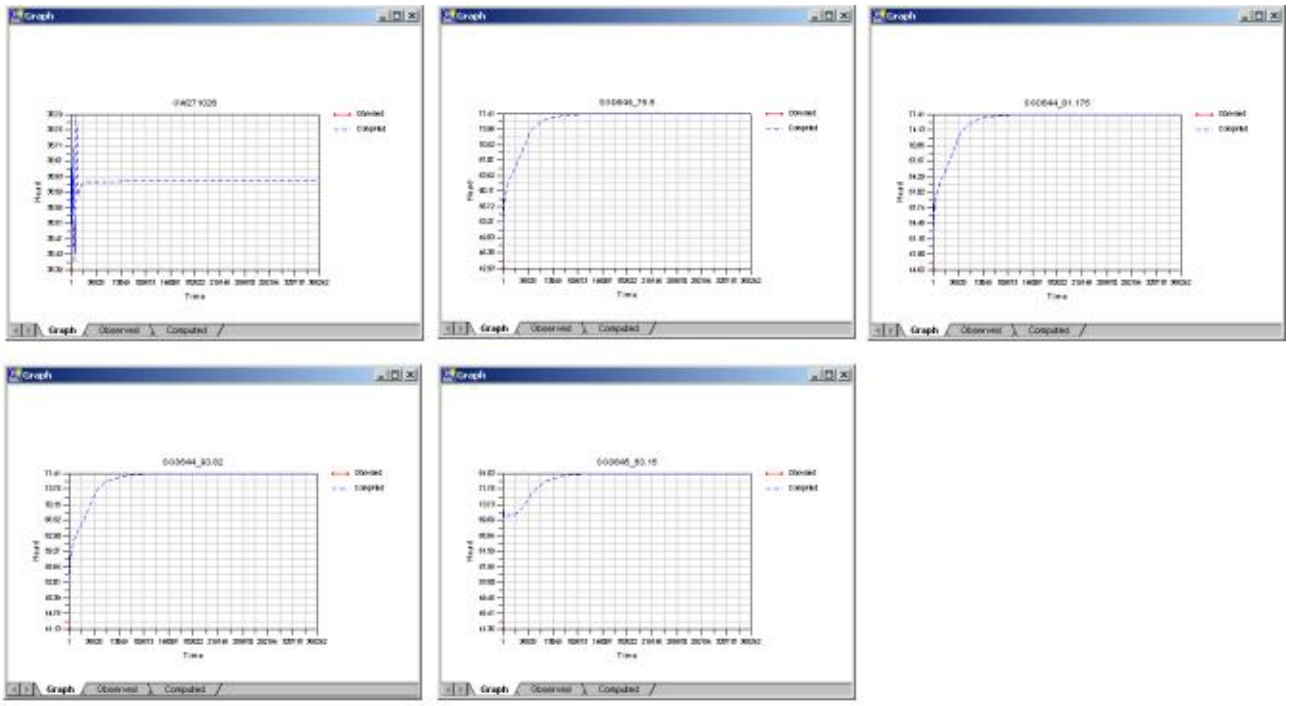

RECOVERY MODEL – GROUNDWATER LEVEL HYDROGRAPHS FIGURE C-4

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APPENDIX D:
COMPOSITE BORE LOGS

aquaterra
Level 9, North Tower
1-5 Railway St, Chatswood
NSW 2067, Australia
Tel: +61 02 9412 4630
Fax: +61 02 9412 4805
www.aquaterra.com.au

COMPOSITE WELL LOG

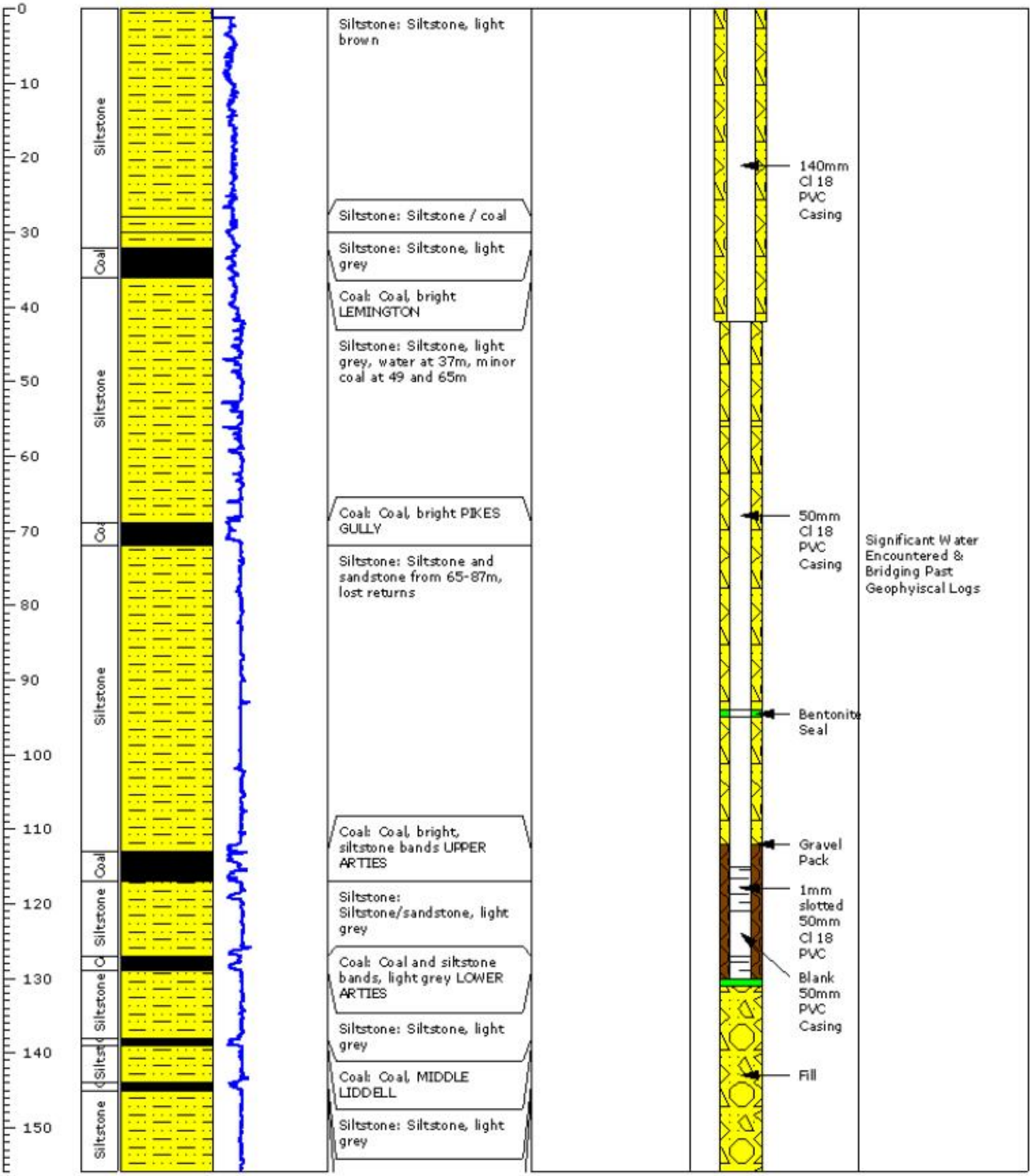
Well No: Bore Hole 1

Client: Bloomfield Collieries Pty Ltd **Project:** S66 Rix's Creek

Commenced:	11/5/2010	**Method:**	Rotary Air	**Area:**	Rix's Creek
Completed:	25/05/2010	**Fluid:**		**East:**	323190
Drilled:	Hunter Drilling	**Bit Record:**	170mm	**North:**	6400562
Logged By:	Scott Dundon		20 BL172457	**Projection:**	

Static Water Level: 64 mbgl **Date:** 13/08/2010

Depth (mbgl)	Geology	Graphic Log	Density Log	Lithological Description	Field Notes	Well Completion: Diagram	Well Completion: Notes
			0 10				



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Level 9, North Tower
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NSW 2067, Australia
Tel: +61 02 9412 4630
Fax: +61 02 9412 4805
www.aquaterra.com.au

COMPOSITE WELL LOG

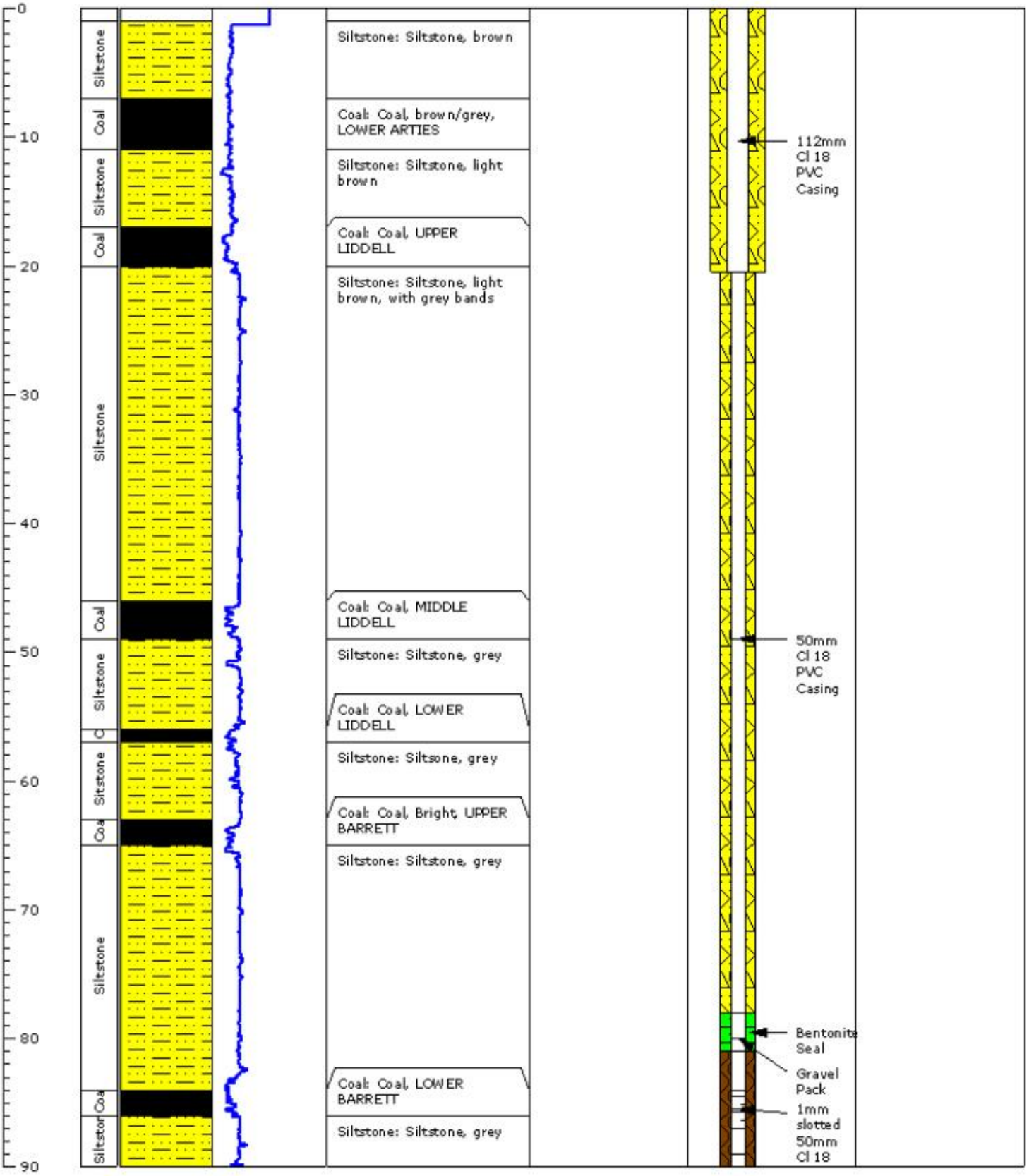
Well No: Bore Hole 2

Client: Bloomfield Collieries Pty Ltd **Project:** S66 Rix's Creek

Commenced:	11/5/2010	**Method:**	Rotary Air	**Area:**	Rix's Creek
Completed:	21/05/2010	**Fluid:**		**East:**	322936
Drilled:	Hunter Drilling	**Bit Record:**	125mm	**North:**	6402272
Logged By:	Scott Dundon		BL172458	**Projection:**	

Static Water Level: 86.155 mbgl **Date:** 12/08/2010

Depth (mbgl)	Geology	Graphic Log	Density Log	Lithological Description	Field Notes	Well Completion Diagram	Well Completion Notes
			0 10				



aquaterra
Level 9, North Tower
1-5 Railway Street Chatswood
NSW 2067 Australia
Tel: (+61) 02 9412 4630
Fax: (+61) (02) 9412 4805

COMPOSITE WELL LOG

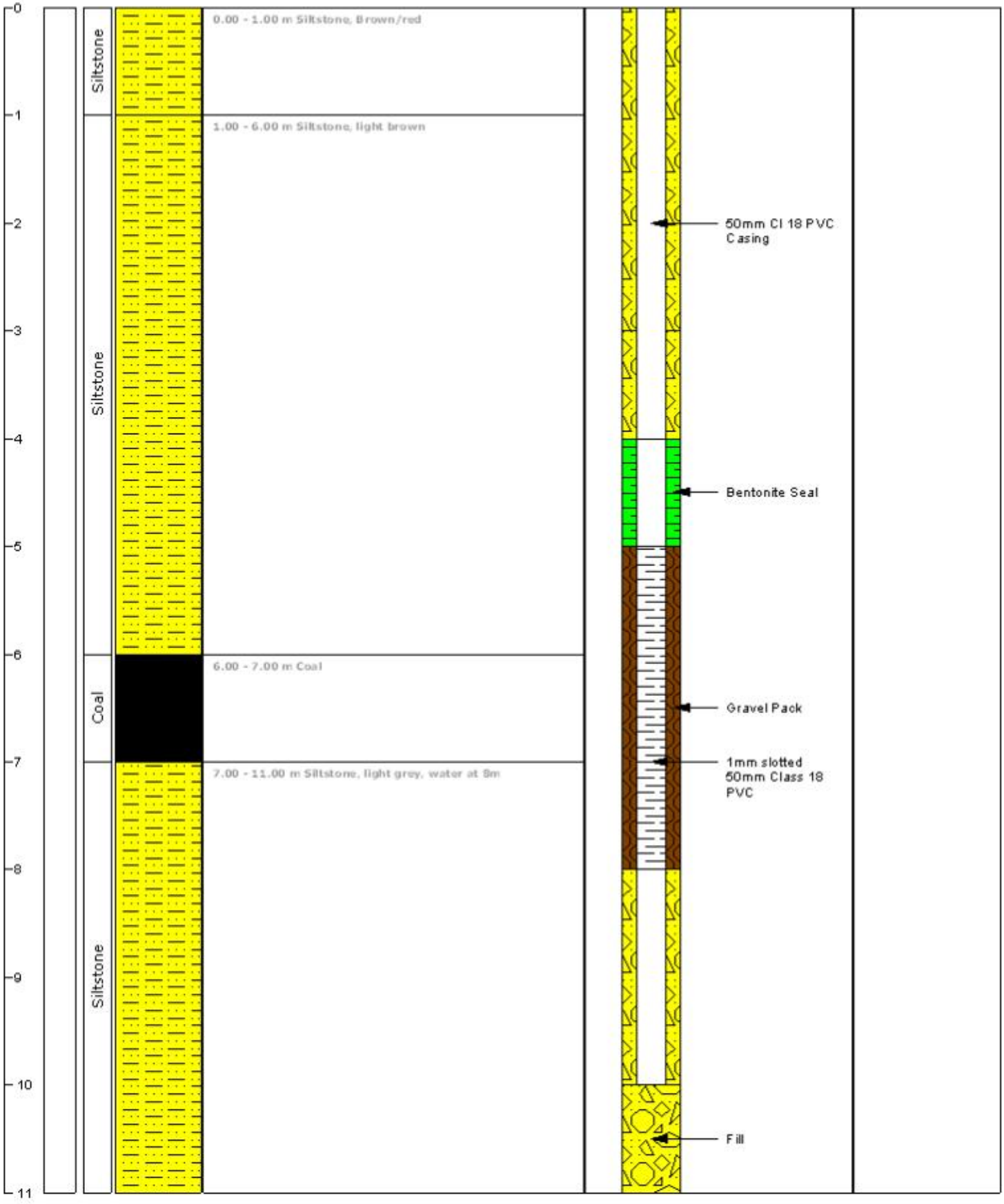
Well No: Bore Hole 3

Client: Bloomfield Collieries Pty Ltd **Project:** S66 Rix's Creek

Commenced:	11/5/2010	**Method:**	Rotary Air	**Area:**	Rix's Creek
Completed:	20/05/2010	**Fluid:**		**East:**	325457 (GDA94 Zone 54)
Drilled:	Hunter Drilling	**Bit record:**	100mm	**North:**	6401923 (GDA94 Zone 54)
Logged By:	Scott Dundon	20 BL172459		**Ref. Pt. Elevation:**	

Static Water Level: 3.295 mbgl **Date:** 3/08/2010

Depth (mbgl)	Method	Geology	Graphic Log	Lithological Description	Well Completion: Diagram	Well Completion: Notes
0–11		Siltstone		0.00 - 1.00 m Siltstone, Brown/red		
		Siltstone		1.00 - 6.00 m Siltstone, light brown		
		Coal		6.00 - 7.00 m Coal		
		Siltstone		7.00 - 11.00 m Siltstone, light grey, water at 9m		



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1-5 Railway Street Chatswood
NSW 2067 Australia
Tel: (+61) 02 9412 4630
Fax: (+61) (02) 9412 4805

COMPOSITE WELL LOG

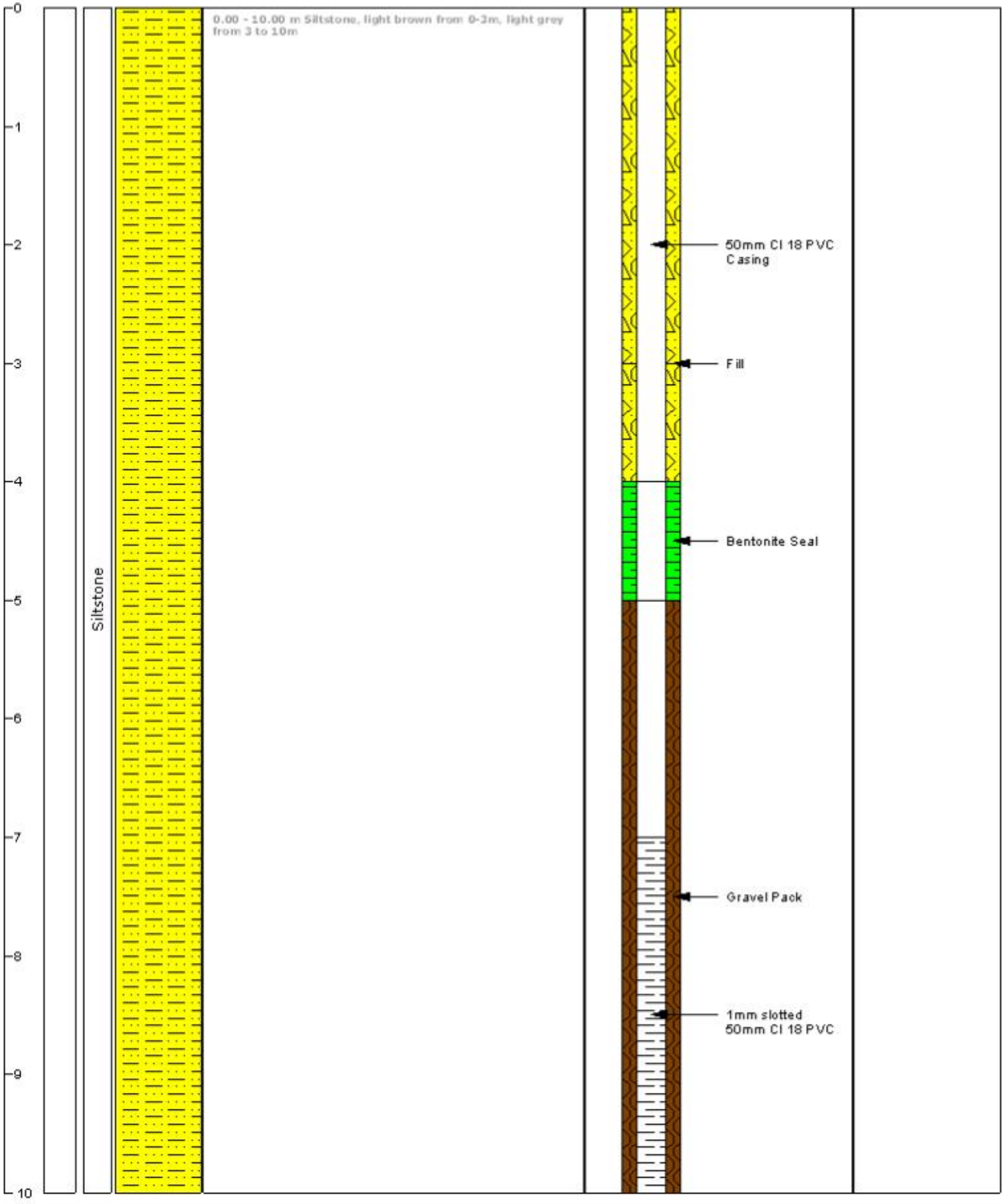
Well No: Bore Hole 4

Client: Bloomfield Collieries Pty Ltd **Project:** S66 Rix's Creek

Commenced:	11/5/2010	**Method:**	Rotary Air	**Area:**	Rix's Creek
Completed:	20/05/2010	**Fluid:**		**East:**	323982 (GDA94 Zone 54)
Drilled:	Hunter Drilling	**Bit record:**	100mm	**North:**	6398666 (GDA94 Zone 54)
Logged By:	Scott Dundon	20 BL172460		**Ref. Pt. Elevation:**	

Static Water Level: 3.08 mbgl **Date:** 13/08/2010

Depth (mbgl)	Method	Geology	Graphic Log	Lithological Description	Well Completion: Diagram	Well Completion: Notes
0 - 10		Siltstone		0.00 - 10.00 m Siltstone, light brown from 0-3m, light grey from 3 to 10m		



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1-5 Railway St, Chatswood
NSW 2067, Australia
Tel: +61 02 9412 4630
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www.aquaterra.com.au

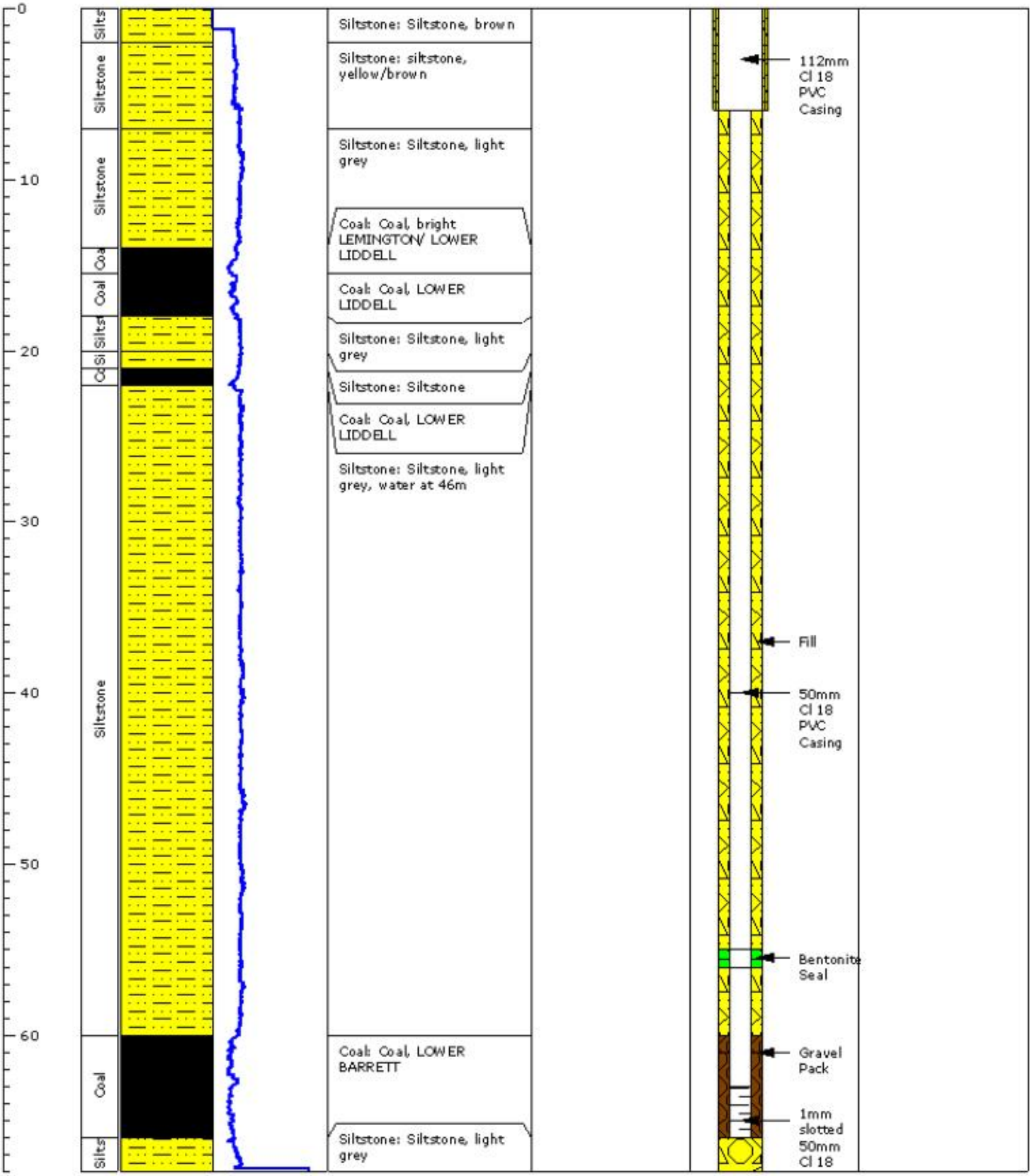
COMPOSITE WELL LOG

Well No: Bore Hole 5

Client: Bloomfield Collieries Pty Ltd **Project:** S66 Rix's Creek

Commenced:	12/5/2010	**Method:**	Rotary Air	**Area:**	Rix's Creek
Completed:	21/05/2010	**Fluid:**		**East:**	
Drilled:	Hunter Drilling	**Bit Record:**	125mm	**North:**	
Logged By:	Scott Dundon		20 BL172461	**Projection:**	

Static Water Level: 22.98 mbgl **Date:** 15/07/2010



APPENDIX E:
WATER QUALITY ANALYTICAL RESULTS – AUGUST 2013

Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: **ES1319071**	Page	: 1 of 4
Client	: **AECOM Austral a Pty Ltd**	Laboratory	: Environ ental Division Sydney
Contact	: ALL SINGLETON RESULTS	Contact	: Client Services
Address	: PO BOX 3148 SINGLETON NSW, AUSTRALIA 2330	Address	: 277-289 Woodpark Road S ithfield NSW Australia 2164
E- ail	: sin.als@ensr.aeco .co	E- ail	: sydney@alsglobal.co
Telephone	: +61 02 6575 9000	Telephone	: +61-2-8784 8555
Facsi ile	: +61 02 6575 9099	Facsi ile	: +61-2-8784 8500
Project	: 60239918	QC Level	: NEPM 2013 Schedule B(3) and ALS QCS3 require ent
Order nu ber	: A3424		
C-O-C nu ber	: ---	Date Sa ples Received	: 28-AUG-2013
Sa pler	: S	Issue Date	: 02-SEP-2013
Site	: ---		
		No. of sa ples received	: 4
Quote nu ber	: SY/287/13	No. of sa ples analysed	: 4

This report supersedes any previous report(s) with this reference. Results apply to the sa ple(s) as sub itted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following infor ation:

- General Co ents
- Analytical Results

NATA Accredited Laboratory 825

Accredited for co pliance with ISO/IEC 17025.

Signatories

This docu ent has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in co pliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Inorganic Che ist	Sydney Inorganics
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics
Hoa Nguyen	Senior Inorganic Che ist	Sydney Inorganics

General Comments

The analytical procedures used by the Environ ental Division have been developed fro established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are e ployed in the absence of docu ented standards or by client request.

Where oisture deter ination has been perfor ed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this ay be due to pri ary sa ple extract/digestate dilution and/or insufficient sa ple for analysis.

Where the LOR of a reported result differs fro standard LOR, this ay be due to high oisture content, insufficient sa ple (reduced weight e ployed) or atrix interference.

When sa pling ti e infor ation is not provided by the client, sa pling dates are shown without a ti e co ponent. In these instances, the ti e co ponent has been assu ed by the laboratory for processing purposes.

Key : CAS Nu ber = CAS registry nu ber fro database aintained by Che ical Abstracts Services. The Che ical Abstracts Service is a division of the A erican Che ical Society.
LOR = Li it of reporting
^ = This result is co puted fro individual analyte detections at or above the level of reporting

- **EK059G: LOR ra sed for NOx on sample ID (BH3) due to sample matr x.**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BH3	20 BL 170864	BH5	BH4	----
				Client sampling date / time	[28-AUG-2013]	[28-AUG-2013]	[28-AUG-2013]	[28-AUG-2013]	----
Compound	CAS Number	LOR	Unit		ES1319071-001	ES1319071-002	ES1319071-003	ES1319071-004	----
EA005P: pH by PC T trator									
pH Value	----	0.01	pH Unit		5.32	7.52	7.10	7.59	----
EA010P: Conduct v ty by PC T trator									
Electr cal Conduct v ty @ 25°C	----	1	µS/c		5810	7300	4750	18700	----
EA015: Total D ssolved Sol ds									
Total D ssolved Sol ds @180°C	----	10	g/L		3370	4600	2510	12200	----
ED037P: Alkal n ty by PC T trator									
Hydrox de Alkal n ty as CaCO3	DMO-210-001	1	g/L		<1	<1	<1	<1	----
Carbonate Alkal n ty as CaCO3	3812-32-6	1	g/L		<1	<1	<1	<1	----
B carbonate Alkal n ty as CaCO3	71-52-3	1	g/L		64	825	510	990	----
Total Alkal n ty as CaCO3	----	1	g/L		64	825	510	990	----
ED041G: Sulfate (Turb d metr c) as SO4 2- by DA									
Sulfate as SO4 - Turb d metr c	14808-79-8	1	g/L		460	873	762	1410	----
ED045G: Chlor de D screte analyser									
Chlor de	16887-00-6	1	g/L		1410	1370	742	5400	----
ED093F: D ssolved Major Cat ons									
Calc um	7440-70-2	1	g/L		26	117	66	181	----
Magnes um	7439-95-4	1	g/L		102	238	116	507	----
Sod um	7440-23-5	1	g/L		1010	1240	876	3940	----
Potass um	7440-09-7	1	g/L		22	15	9	16	----
EG020F: D ssolved Metals by ICP-MS									
Arsen c	7440-38-2	0.001	g/L		0.009	0.001	<0.001	0.003	----
Boron	7440-42-8	0.05	g/L		<0.05	0.06	0.09	0.15	----
Bar um	7440-39-3	0.001	g/L		0.017	0.042	0.015	0.013	----
Beryll um	7440-41-7	0.001	g/L		<0.001	<0.001	<0.001	<0.001	----
Cadm um	7440-43-9	0.0001	g/L		0.0001	0.0001	<0.0001	<0.0001	----
Cobalt	7440-48-4	0.001	g/L		0.010	0.016	<0.001	<0.001	----
Chrom um	7440-47-3	0.001	g/L		<0.001	<0.001	<0.001	<0.001	----
Copper	7440-50-8	0.001	g/L		0.005	0.004	<0.001	<0.001	----
Manganese	7439-96-5	0.001	g/L		0.400	0.309	0.138	0.051	----
N ckel	7440-02-0	0.001	g/L		0.010	0.007	<0.001	<0.001	----
Lead	7439-92-1	0.001	g/L		<0.001	<0.001	<0.001	<0.001	----
Selen um	7782-49-2	0.01	g/L		<0.01	<0.01	<0.01	0.02	----
Vanad um	7440-62-2	0.01	g/L		<0.01	<0.01	<0.01	<0.01	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BH3	20 BL 170864	BH5	BH4	----
				Client sampling date / time	[28-AUG-2013]	[28-AUG-2013]	[28-AUG-2013]	[28-AUG-2013]	----
Compound	CAS Number	LOR	Unit		ES1319071-001	ES1319071-002	ES1319071-003	ES1319071-004	----
EG020F: Dissolved Metals by ICP-MS - Continued									
Zinc	7440-66-6	0.005	g/L		**0.037**	**0.052**	<0.005	<0.005	----
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	g/L		<0.0001	<0.0001	<0.0001	<0.0001	----
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	g/L		**0.77**	**0.06**	**0.68**	**0.30**	----
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	----	0.01	g/L		<0.01	<0.01	<0.01	<0.01	----
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	g/L		<0.10	**1.24**	**0.04**	**0.02**	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	g/L		<0.10	**1.24**	**0.04**	**0.02**	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	g/L		**2.3**	**0.3**	**0.7**	**0.4**	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
Total Nitrogen as N	----	0.1	g/L		**2.3**	**1.5**	**0.7**	**0.4**	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	g/L		**0.13**	**0.01**	**0.15**	**0.02**	----
EN055: Ionic Balance									
Total Anions	----	0.01	eq/L		**50.6**	**73.3**	**47.0**	**201**	----
Total Cations	----	0.01	eq/L		**54.2**	**79.8**	**51.2**	**222**	----
Ionic Balance	----	0.01	%		**3.37**	**4.18**	**4.24**	**4.95**	----