APPENDIX D: MODELLING QUALITY REPORT

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TECHNICAL NOTE

DATE	10 July 2010
TO	Moreton Bay Regional Council
FROM	Leonard Cheung
COPY	
PROJECT	301001-01156
SUBJECT	Stanley River Modelling Quality Report
DOC NO	
FILE LOC	

INTRODUCTION

A detailed TUFLOW model of the Stanley River (STA) minor basin has been developed as part of Moreton Bay Regional Council's (MBRC) Regional Floodplain Database (RFD) Stage 2 project.

This technical note is prepared to demonstrate that the performance of the STA model is suitable for the intended use and the associated model outputs can be adopted by MBRC for the RFD to deliver reliable flood information across the Stanley River minor basin.

MODEL PERFORMANCE

Model stability, warning messages and mass errors were monitored throughout model simulation periods to ensure that the model performance was acceptable. Careful attention has been paid to ensure that flood water flowing through the 1D structure elements in the model as well as flowing across the floodplain in the 2D domain were stable during model simulation period.

Overland flow hydrographs were checked at key locations in the floodplain (PO lines) to ensure the simulation extended well beyond the peak throughout the STA study area, especially around the downstream boundary.

To demonstrate there are no significant loss or gain of flood volumes during model runs, a check of the mass balance of the flood volumes for the three selected critical durations of the 10Yr, 100Yr ARI and PMF flood events has been undertaken and presented in the following Table 1.

Table 1: Mass Balance Check

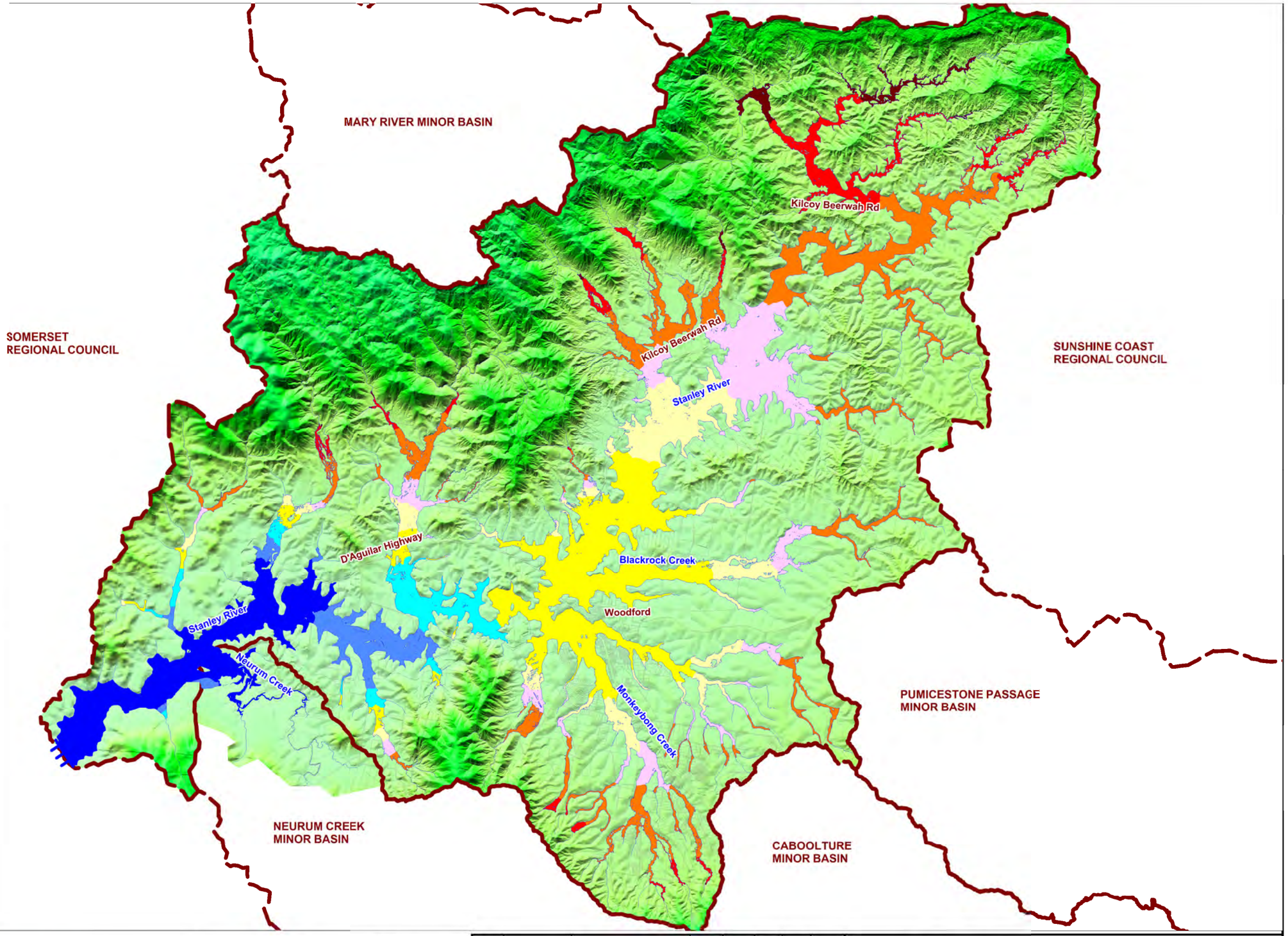
Event	10Yr ARI			100Yr ARI			PMF		
Critical Duration	**120M**	**720M**	**1440M**	**120M**	**720M**	**1440M**	**120M**	**360M**	**720M**
Volume at Start (m3)	30835642	30835642	30835642	41039327	41039327	41039327	173122879	173122879	173122879
Volume at End (m3)	44286143	64861081	65197048	66316378	111718655	103610471	289682264	347759616	397735319
Total Volume In (m3)	49607805	94081952	116520167	78552237	160378434	209437282	390109448	623430087	694581802
Total Volume Out (m3)	35771033	59946928	81245568	52805260	89051077	145418870	273416440	448613502	469694679
Volume Error (m3)	-386270	-109585	-913193	-469926	-648029	-1447269.00	-133624	-179848	-274684
Final Cummulative ME (%)	-0.45%	-0.07%	-0.46%	-0.36%	-0.26%	-0.41%	-0.02%	-0.02%	-0.02%

The above table shows that there are no significant loss and gain of flood volume during the modelling and the mass balance errors are within the range of -0.46% to -0.02% for the critical duration runs of the three design events.

CONCLUSIONS

The quality of the STA model run has been reviewed. It is considered that the overall model performance is suitable for the intended use and the associated model outputs can be adopted for the MBRC RFD to deliver reliable flood information across the Stanley River minor basin.

APPENDIX E: FLOOD MAPS – 100 YEAR ARI



LEGEND

- Catchment Boundary
- Downstream Boundary
- Stream Reaches
- Cadastral Boundaries

Flood Level (mAHD)

- <105
- 105 to 110
- 110 to 115
- 115 to 200
- 120 to 125
- 125 to 130
- 130 to 150
- 150 to 170
- >170

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REGIONAL FLOODPLAIN DATABASE PROJECT (STAGE 2)
STANLEY RIVER
FIGURE E1 PEAK FLOOD LEVEL MAP - 100 YEAR ARI

Project No: 301001-01156 | Figure:301001-01156-EN-DAL-0090 | Rev: 0

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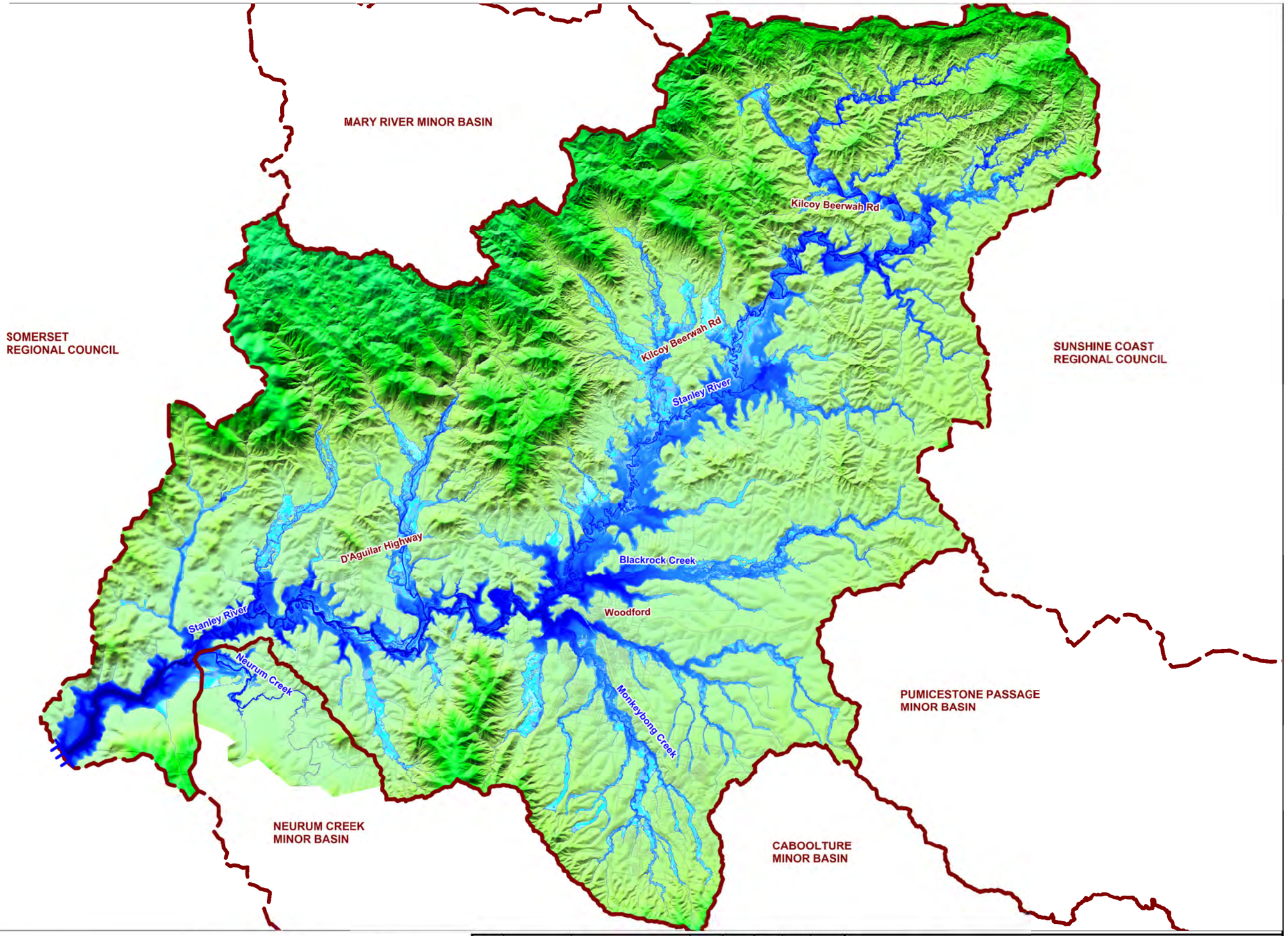

LEGEND

- Catchment Boundary
- Downstream Boundary
- Stream Reaches
- Cadastral Boundaries

Flood Depth (m)

>6.0
5.0
4.0
3.0
2.0
1.0
0.0

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STANLEY RIVER
FIGURE E2 PEAK FLOOD DEPTH MAP - 100 YEAR ARI

Project No: 301001-01156 | Figure:301001-01156-EN-DAL-0091 | Rev: 0

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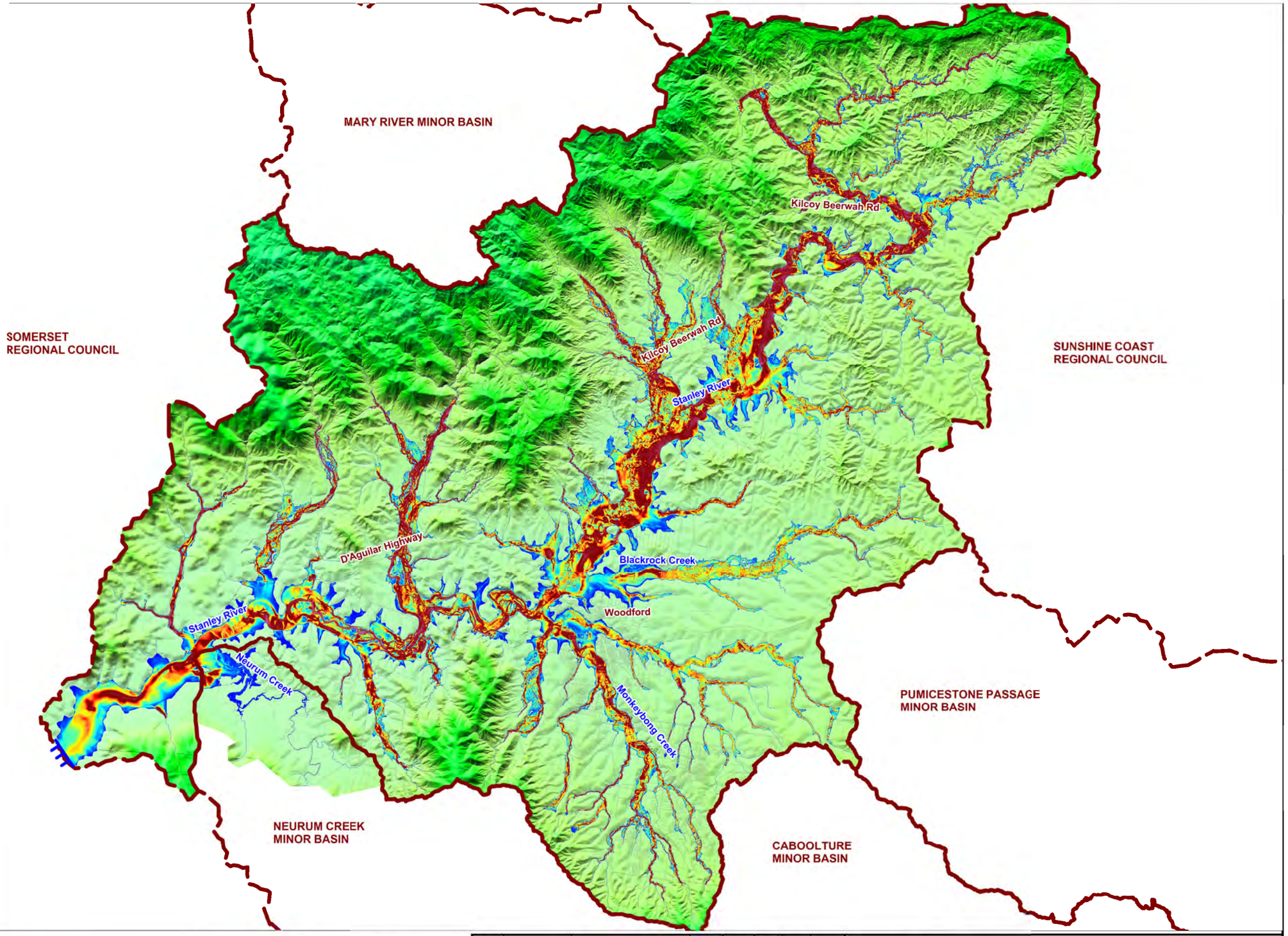

LEGEND

- Catchment Boundary
- Downstream Boundary
- Stream Reaches
- Cadastral Boundaries

Flood Velocity (m/s)

8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0

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STANLEY RIVER
FIGURE E3 PEAK FLOOD VELOCITY MAP - 100 YEAR ARI

Project No: 301001-01156	Figure:301001-01156-EN-DAL-0092	Rev: 0

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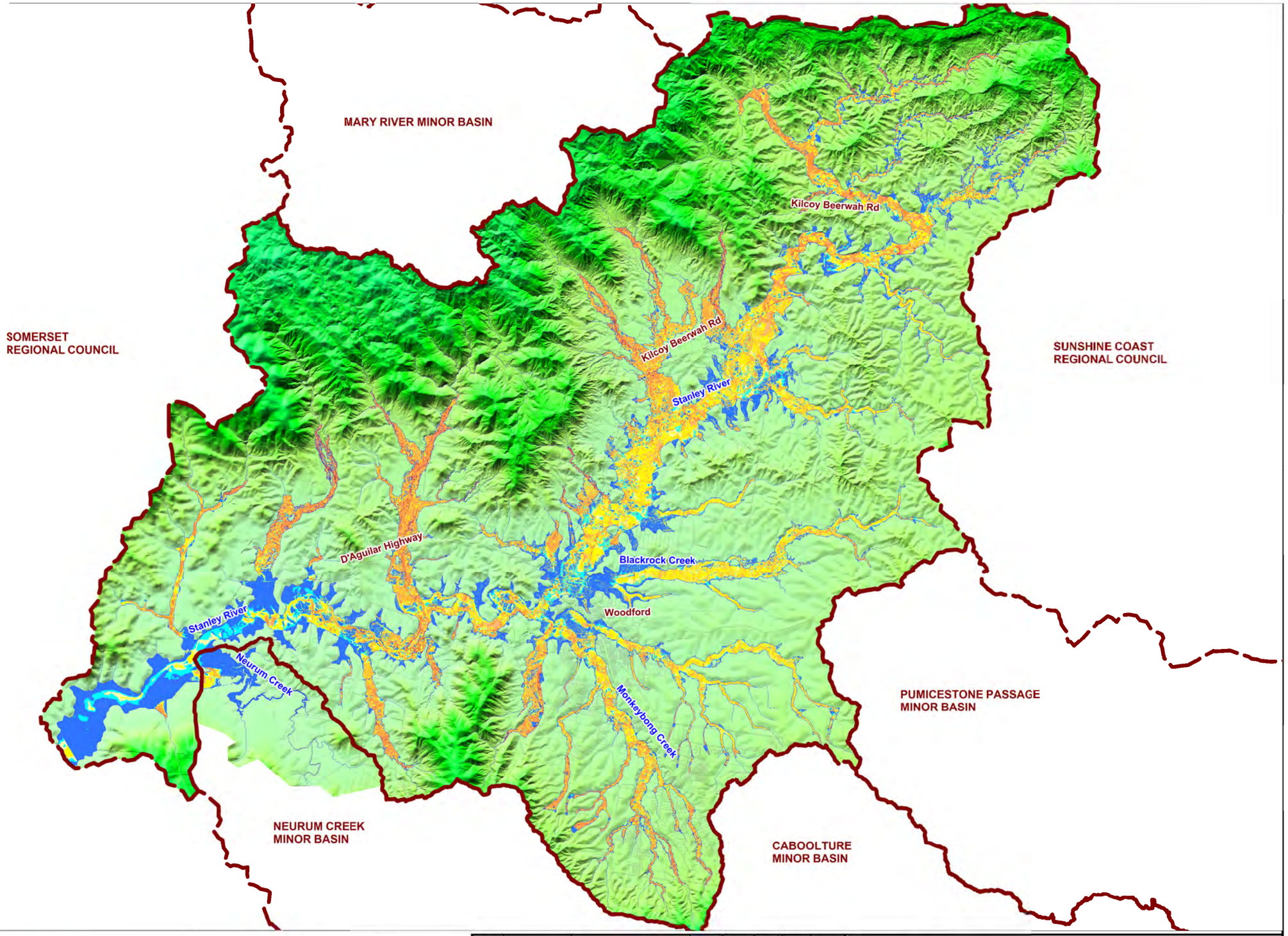

LEGEND

- Catchment Boundary
- Stream Reaches
- Cadastral Boundaries

Stream Power (Watt/m^2)

- 0 to 1
- 1 to 3
- 3 to 5
- 5 to 10
- 10 to 50
- 50 to 100
- 100 to 500
- 500 to 1000
- 1000 to 2000
- 2000 to 5000
- > 5000

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REGIONAL FLOODPLAIN DATABASE PROJECT (STAGE 2)
STANLEY RIVER
FIGURE E4 PEAK STREAM POWER MAP - 100 YEAR ARI

Project No: 301001-01156	Figure:301001-01156-EN-DAL-0093	Rev: 0

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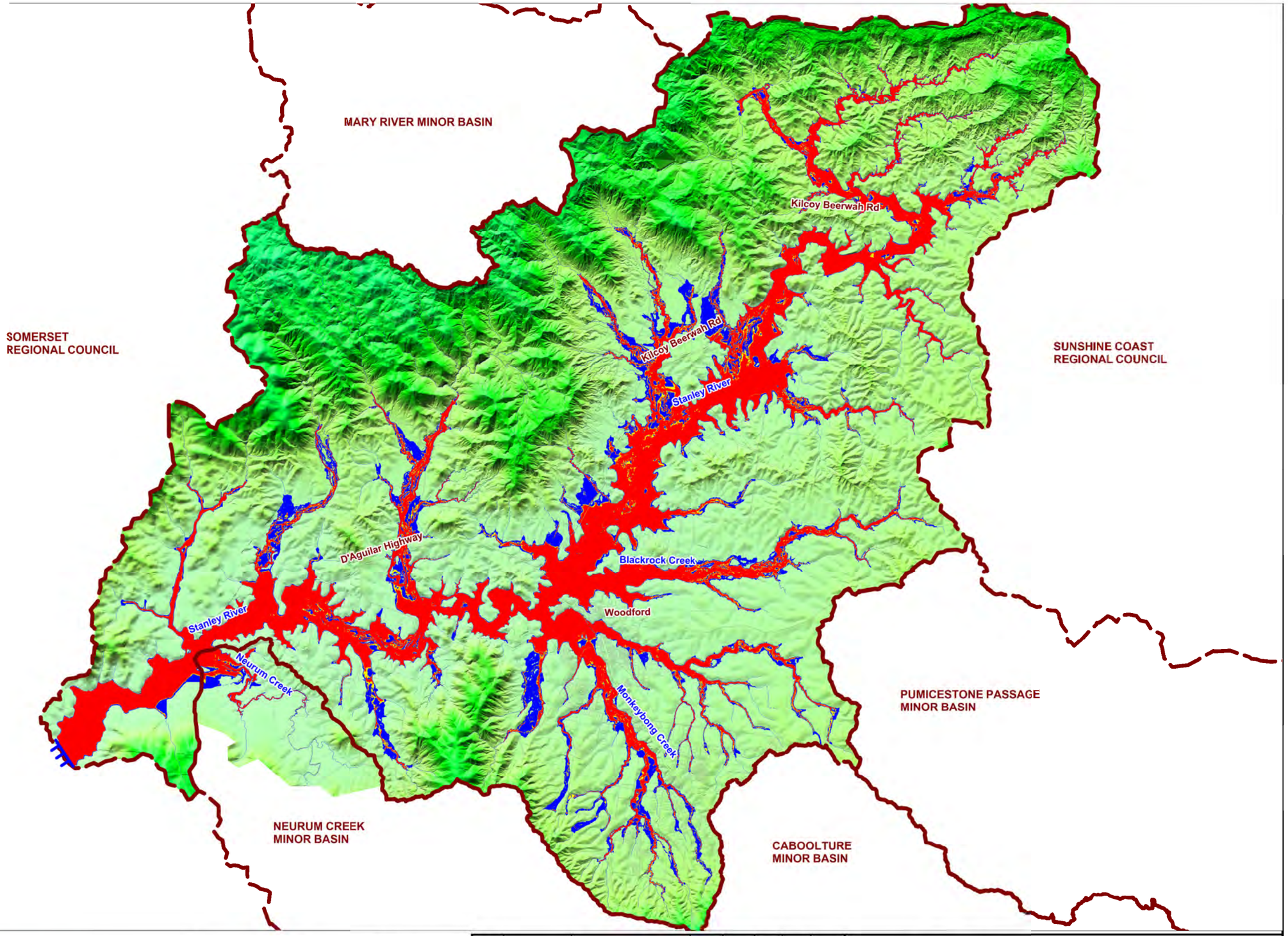

LEGEND

- Catchment Boundary
- Downstream Boundary
- Stream Reaches
- Cadastral Boundaries

New South Wales Floodplain Development Manual Flood Hazard Category

- Low Hazard
- Intermediate
- High Hazard

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STANLEY RIVER
FIGURE E5 PEAK FLOOD HAZARD MAP - 100 YEAR ARI

Project No: 301001-01156 | Figure:301001-01156-EN-DAL-0094 | Rev: 0

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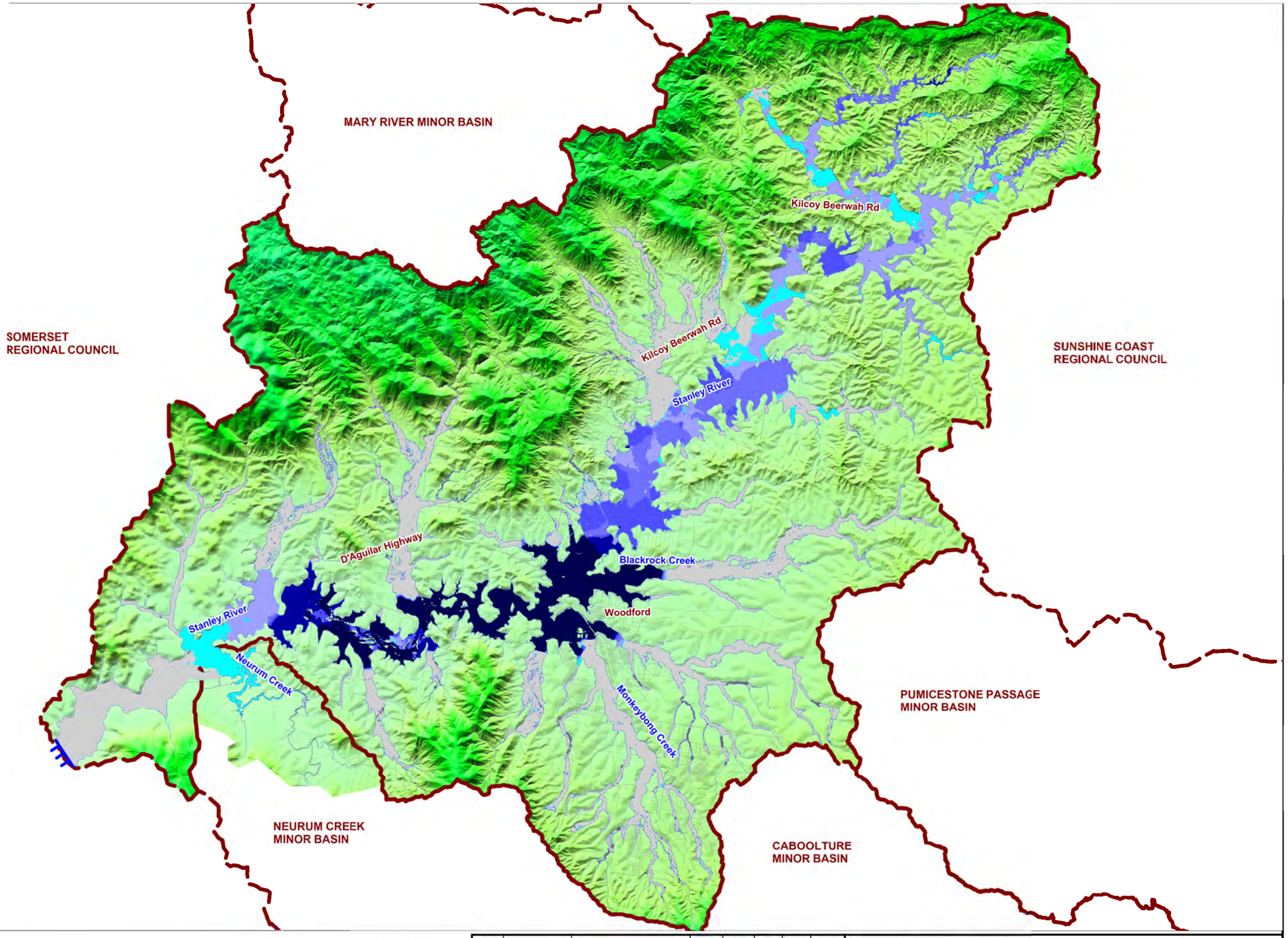
APPENDIX F: MODEL SENSITIVITY ANALYSIS MAPS



LEGEND

- Catchment Boundary
- Downstream Boundary
- Stream Reaches
- Cadastral Boundaries

Peak Flood Level Difference* (m)

- < -0.50
- -0.50 to -0.40
- -0.40 to -0.30
- -0.30 to -0.20
- -0.20 to -0.10
- -0.10 to -0.05
- -0.05 to 0.05
- > 0.05

*Peak flood levels from 100 Yr EDS (S1) minus peak levels from selected 100 Yr ARI critical durations

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0 3000 6000m

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REGIONAL FLOODPLAIN DATABASE PROJECT (STAGE 2)
STANLEY RIVER
FIGURE F1 FLOOD LEVEL DIFFERENCE BETWEEN EDS AND SELECTED CRITICAL STORM DURATIONS - 100 YR ARI (S1)

Project No: 301001-01156 | Figure:301001-01156-EN-DAL-0095 | Rev: 0

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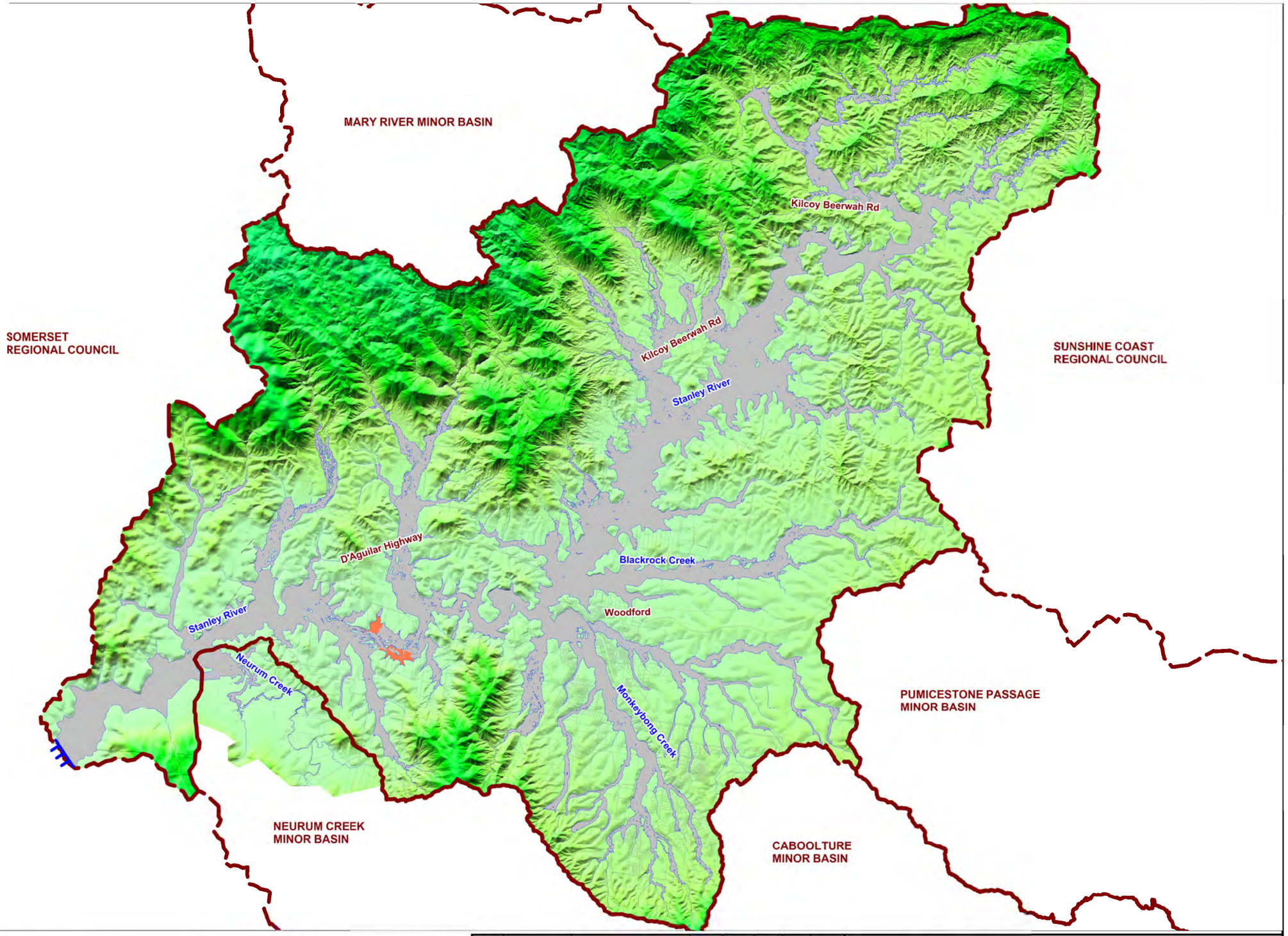

LEGEND

- Catchment Boundary
- Downstream Boundary
- Stream Reaches
- Cadastral Boundaries

Peak Flood Level Difference* (m)

- < -0.50
- -0.50 to -0.10
- -0.10 to 0.10
- 0.10 to 0.50
- > 0.50
- Was dry now wet
- Was wet now dry

*Peak flood levels from increase in roughness (S2) minus peak flood levels from 100 Yr EDS (S1)

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SCALE - 1:120,000 (at A3)

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REGIONAL FLOODPLAIN DATABASE PROJECT (STAGE 2)
STANLEY RIVER
FIGURE F2 INCREASE IN ROUGHNESS FLOOD LEVEL IMPACT - 100 YEAR EDS (S2)

Project No: 301001-01156	Figure:301001-01156-EN-DAL-0096	Rev: 0

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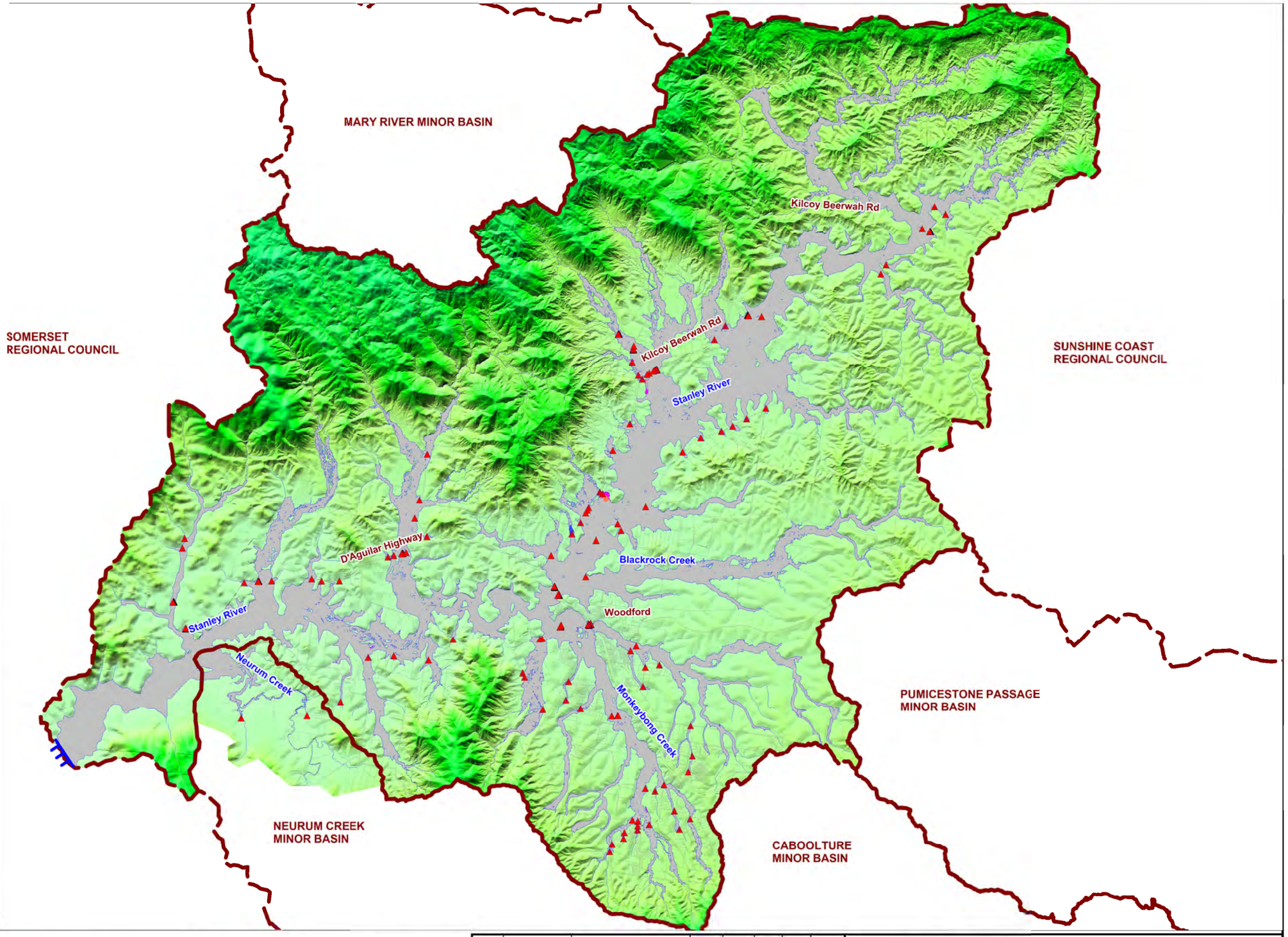

LEGEND

- Catchment Boundary
- Downstream Boundary
- Stream Reaches
- Cadastral Boundaries
- Key Hydraulic Structures

Peak Flood Level Difference* (m)

- < -0.50
- -0.50 to -0.10
- -0.10 to 0.10
- 0.10 to 0.50
- > 0.50
- Was dry now wet
- Was wet now dry

*Peak flood levels from structure blockage (S3) minus peak flood levels from 100 Yr EDS (S1)

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0 3000 6000m

SCALE - 1:120,000 (at A3)

Latitude / Longitude
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REGIONAL FLOODPLAIN DATABASE PROJECT (STAGE 2)
STANLEY RIVER
FIGURE F3 STRUCTURE BLOCKAGE FLOOD LEVEL IMPACT - 100 YEAR EDS (S3)

Project No: 301001-01156 | Figure:301001-01156-EN-DAL-0097 | Rev: 0

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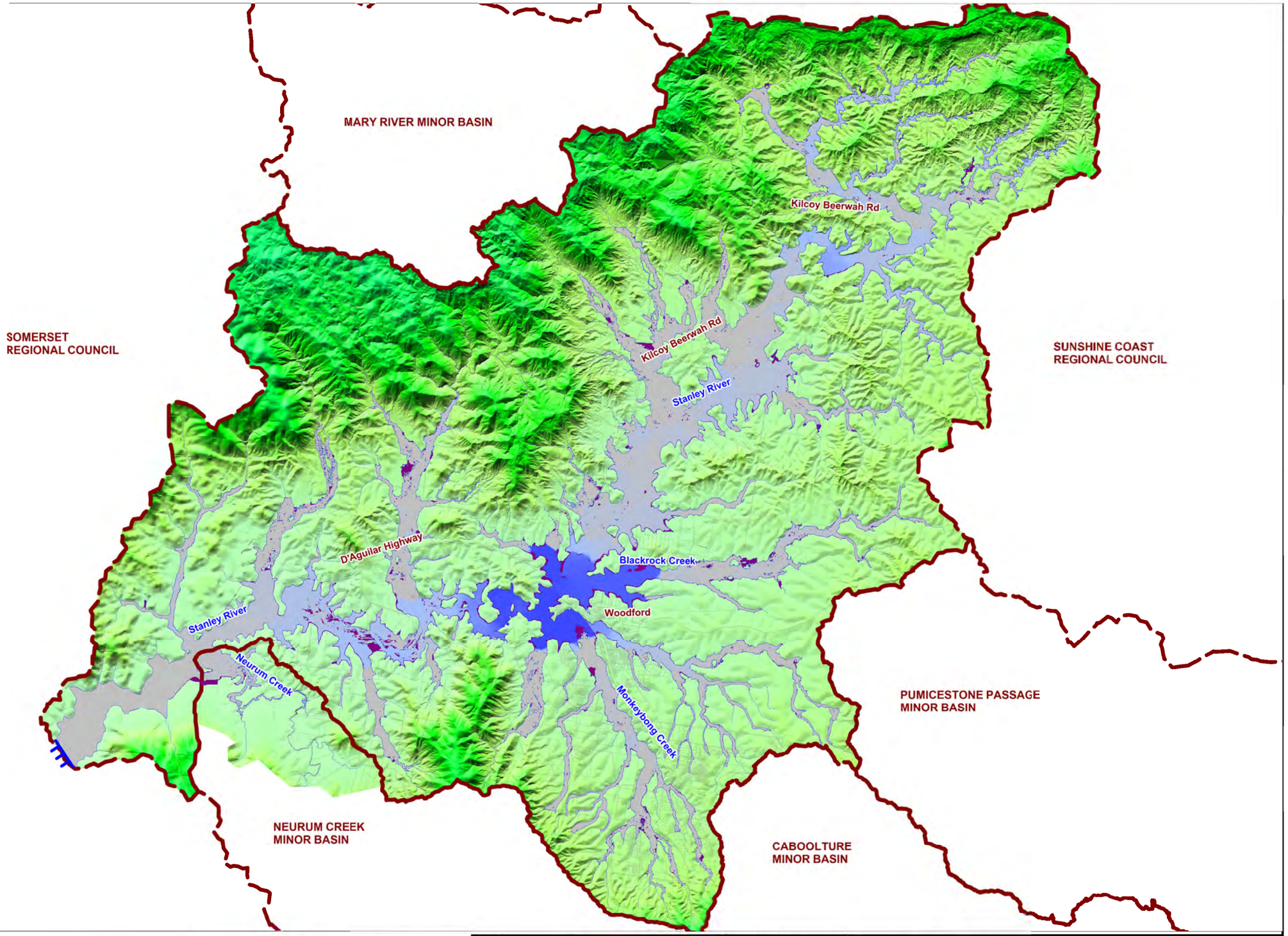

LEGEND

- Catchment Boundary
- Downstream Boundary
- Stream Reaches
- Cadastral Boundaries

Peak Flood Level Difference* (m)

- < -0.50
- -0.50 to -0.10
- -0.10 to 0.10
- 0.10 to 0.50
- 0.50 to 1.00
- > 1.00
- Was dry now wet
- Was wet now dry

*Peak flood levels from increase in rainfall (S4) minus peak flood levels from 100 Yr EDS (S1)

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0 3000 6000m

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REGIONAL FLOODPLAIN DATABASE PROJECT (STAGE 2)
STANLEY RIVER
FIGURE F4 INCREASE IN RAINFALL FLOOD LEVEL IMPACT - 100 EDS (S4)

Project No: 301001-01156 | Figure:301001-01156-EN-DAL-0098 | Rev: 0

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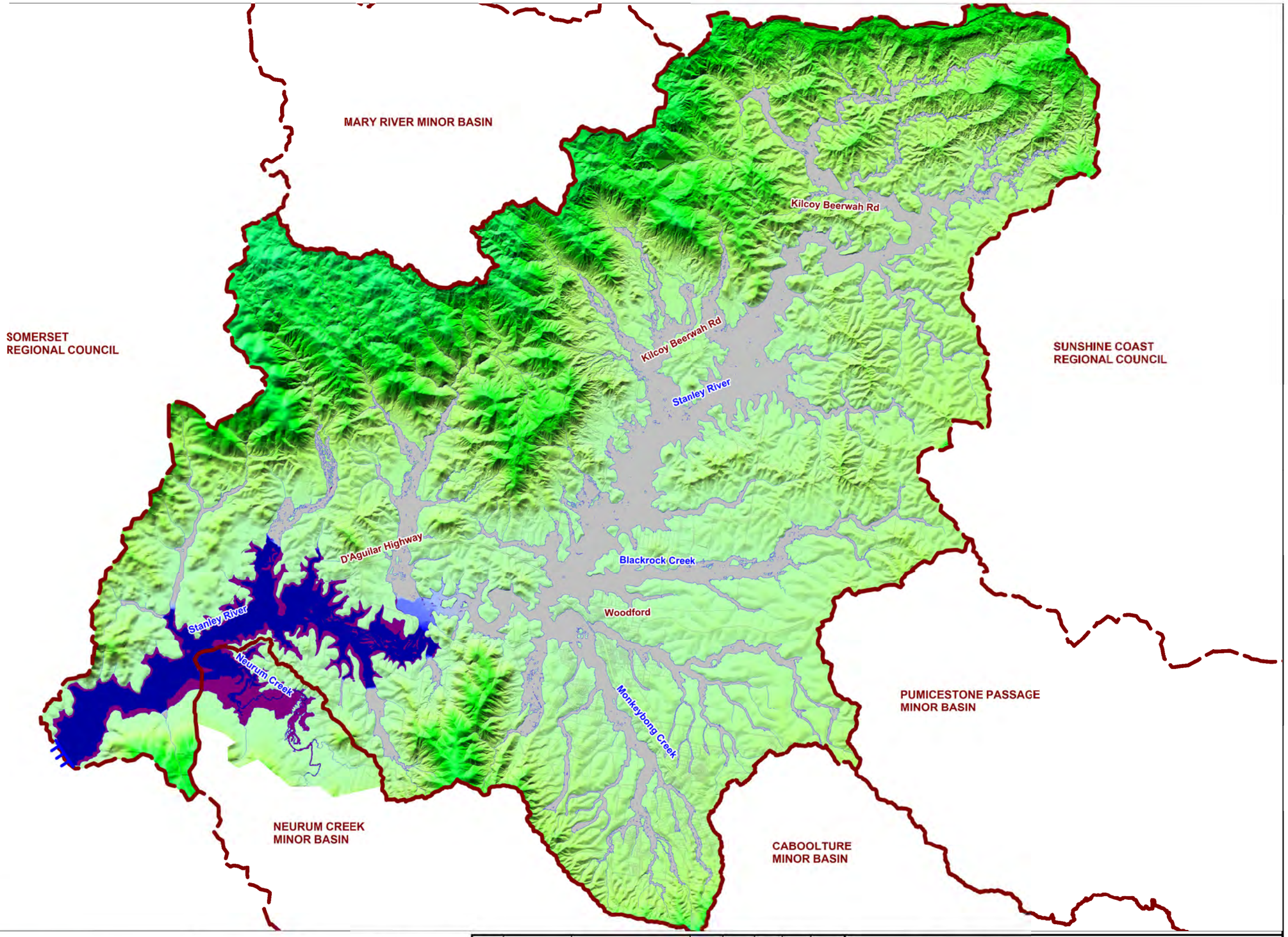

LEGEND

- Catchment Boundary
- Downstream Boundary
- Stream Reaches
- Cadastral Boundaries

Peak Flood Level Difference* (m)

- < -0.50
- -0.50 to -0.10
- -0.10 to 0.10
- 0.10 to 0.50
- 0.50 to 1.00
- > 1.00
- Was dry now wet
- Was wet now dry

*Peak flood levels from increase in tailwater level (S5) minus peak flood levels from 100 Yr EDS (S1)

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0 3000 6000m

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REGIONAL FLOODPLAIN DATABASE PROJECT (STAGE 2)
STANLEY RIVER
FIGURE F5 INCREASE IN TAILWATER LEVEL
FLOOD LEVEL IMPACT - 100 EDS (S5)

Project No: 301001-01156 | Figure:301001-01156-EN-DAL-0099 | Rev: 0

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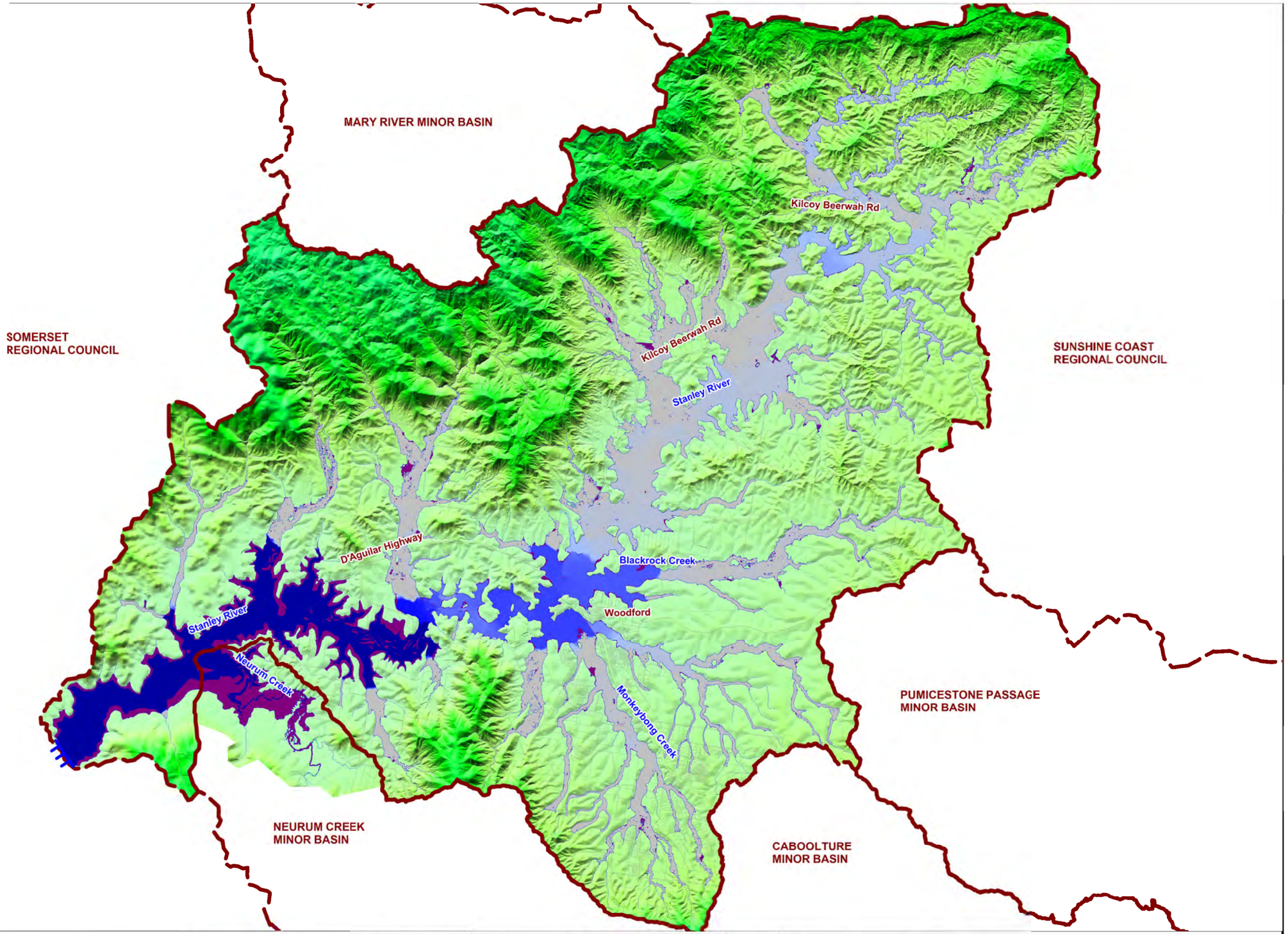

LEGEND

- Catchment Boundary
- Downstream Boundary
- Stream Reaches
- Cadastral Boundaries

Peak Flood Level Difference* (m)

- < -0.50
- -0.50 to -0.10
- -0.10 to 0.10
- 0.10 to 0.50
- 0.50 to 1.00
- > 1.00
- Was dry now wet
- Was wet now dry

*Peak flood levels from increase in rainfall & tailwater level (S6) minus peak flood levels from 100 Yr EDS (S1)

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0 3000 6000m

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REGIONAL FLOODPLAIN DATABASE PROJECT (STAGE 2)
STANLEY RIVER
FIGURE F6 INCREASE IN RAINFALL & TAILWATER LEVEL FLOOD LEVEL IMPACT - 100 EDS (S6)

Project No: 301001-01156 | Figure:301001-01156-EN-DAL-0100 | Rev: 0

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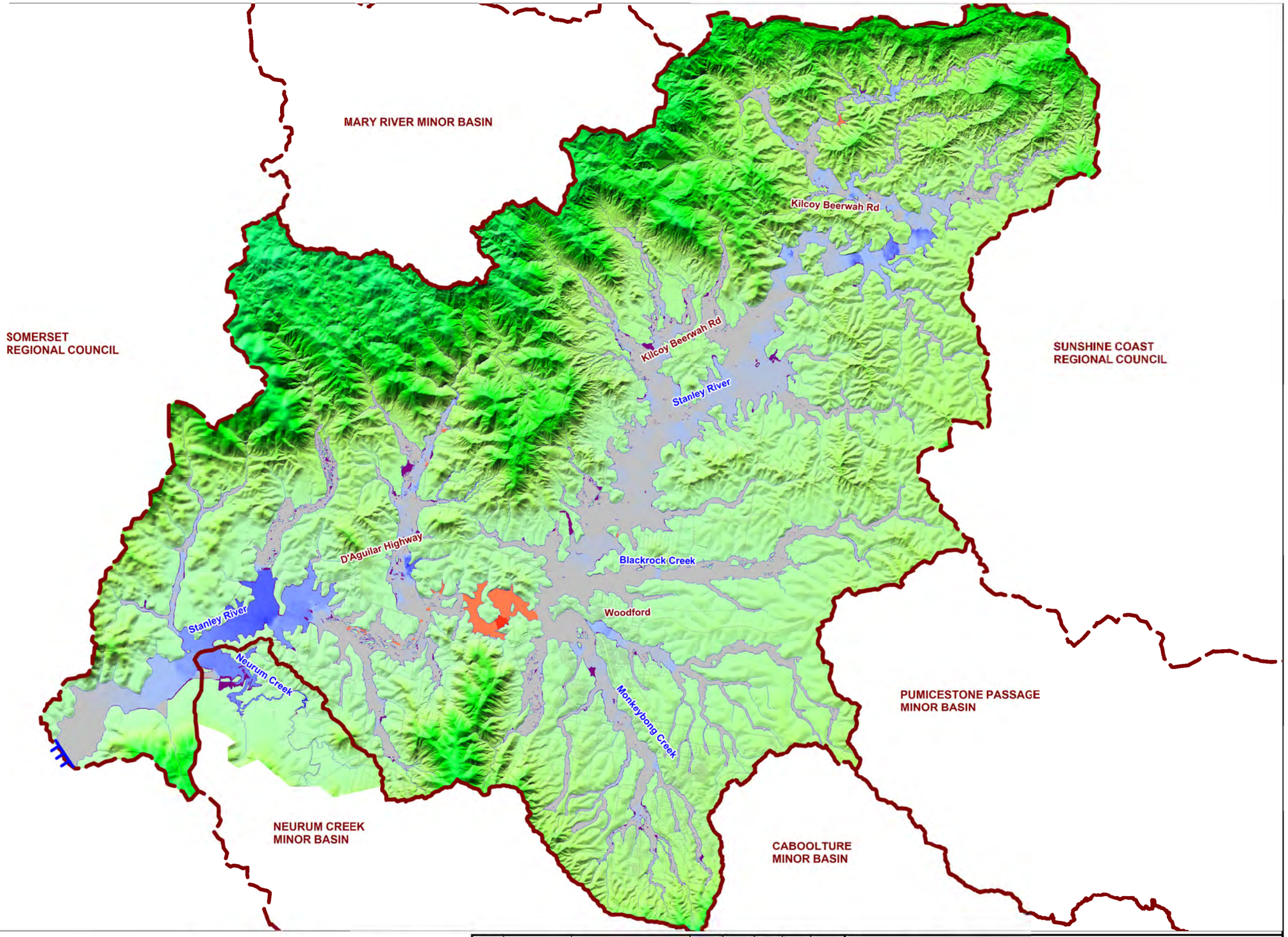

LEGEND

- Catchment Boundary
- Downstream Boundary
- Stream Reaches
- Cadastral Boundaries

Peak Flood Level Difference* (m)

- < -0.50
- -0.50 to -0.10
- -0.10 to 0.10
- 0.10 to 0.50
- > 0.50
- Was dry now wet
- Was wet now dry

*Peak flood levels from increase in vegetation (S10) minus peak flood levels from 100 Yr EDS (S1)

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0 3000 6000m

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REGIONAL FLOODPLAIN DATABASE PROJECT (STAGE 2)
STANLEY RIVER
FIGURE F10 INCREASE IN VEGETATION FLOOD LEVEL IMPACT - 100 EDS (S10)

Project No: 301001-01156 | Figure:301001-01156-EN-DAL-0101 | Rev: 0

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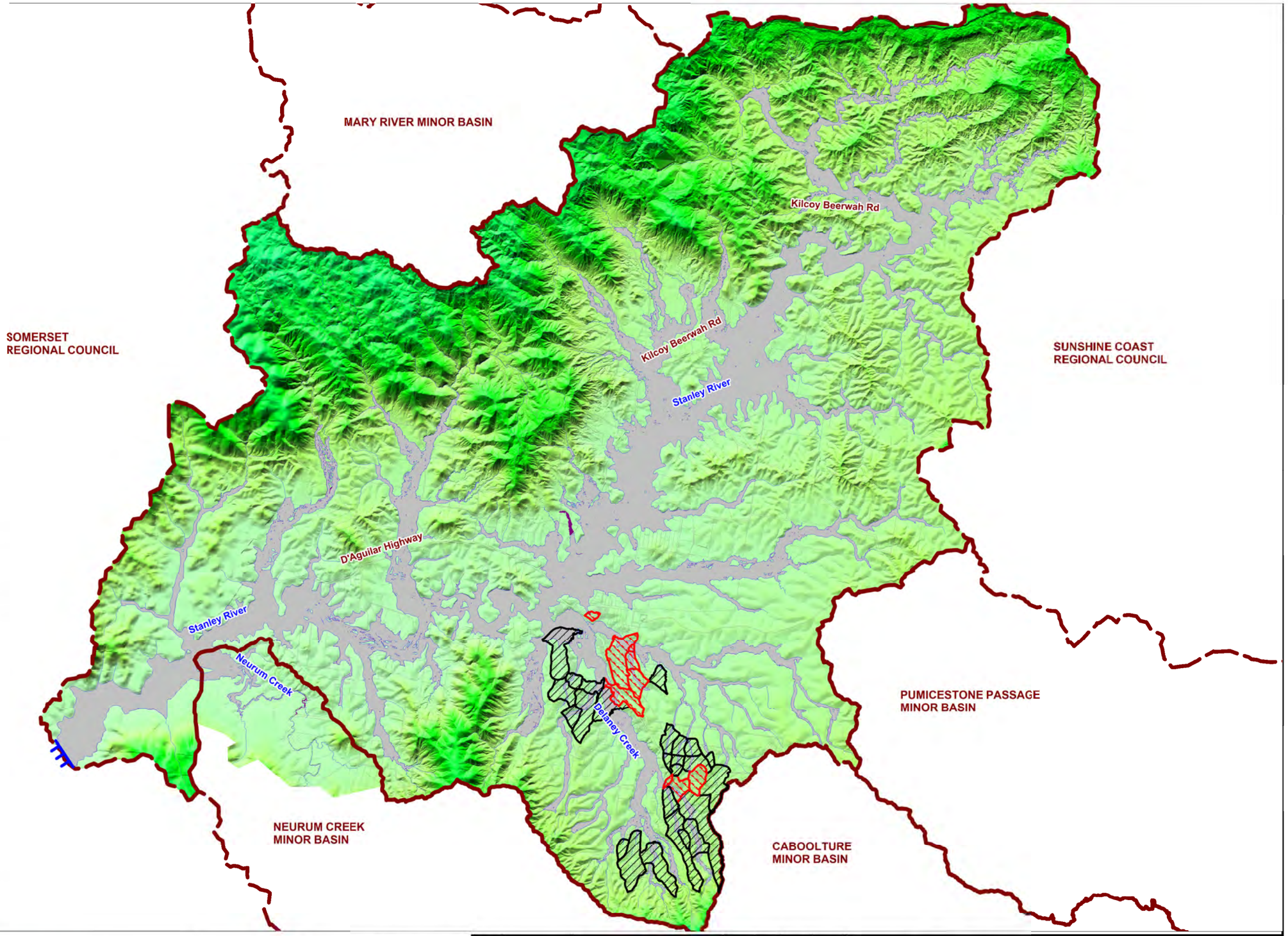

LEGEND

- Catchment Boundary
- Downstream Boundary
- Stream Reaches
- Cadastral Boundaries
- 10% Impervious Area
- 40% Impervious Area

Peak Flood Level Difference* (m)

- < -0.50
- -0.50 to -0.10
- -0.10 to 0.10
- 0.10 to 0.50
- > 0.50
- Was dry now wet
- Was wet now dry

*Peak flood levels from increase in residential development (S11) minus peak flood levels from 100 Yr EDS (S1)

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0 3000 6000m

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REGIONAL FLOODPLAIN DATABASE PROJECT (STAGE 2)
STANLEY RIVER
FIGURE F11 INCREASE IN RESIDENTIAL DEVELOPMENT FLOOD LEVEL IMPACT - 100 EDS (S11)

Project No: 301001-01156	Figure:301001-01156-EN-DAL-0102	Rev: 0

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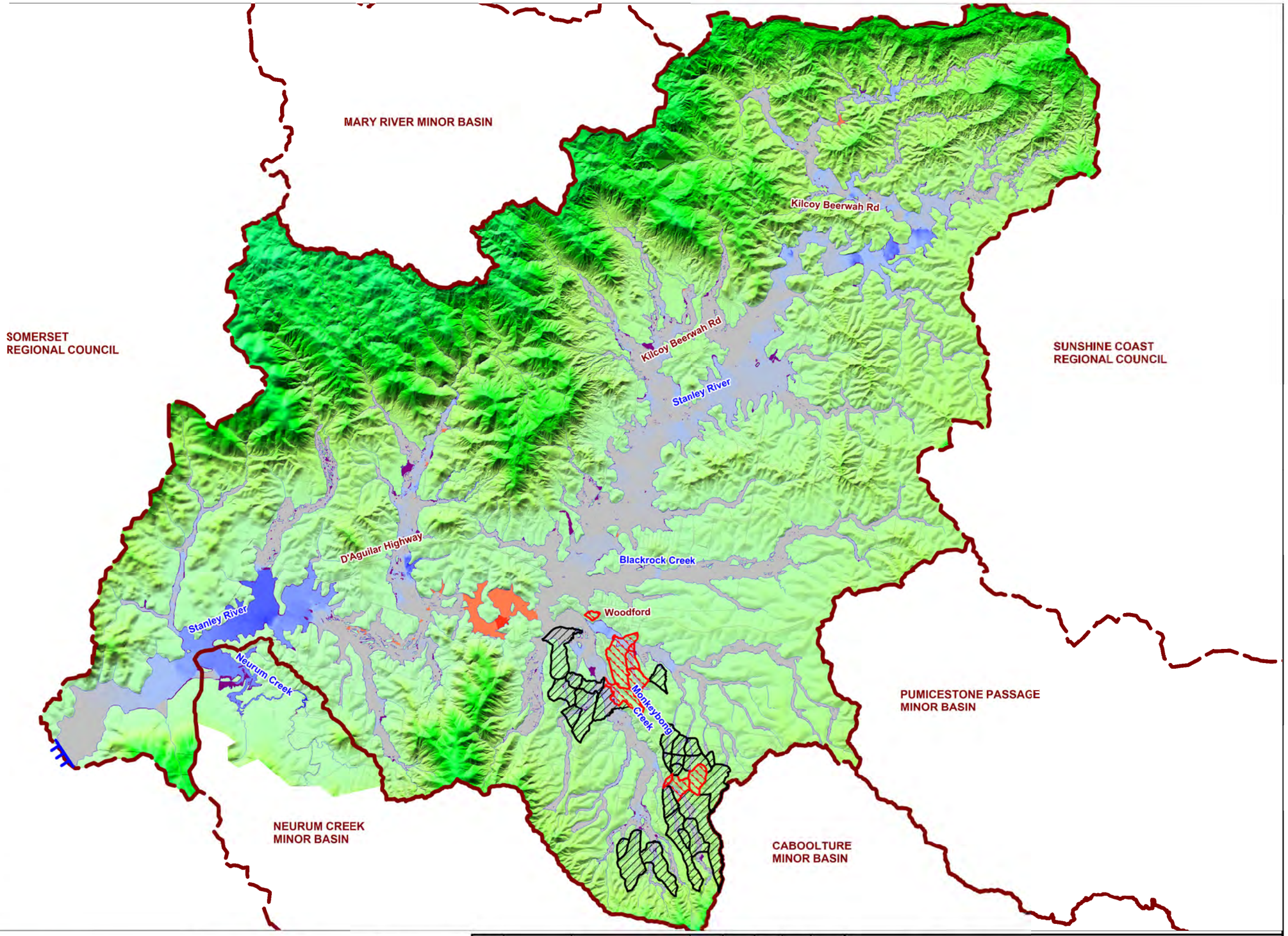

LEGEND

- Catchment Boundary
- Downstream Boundary
- Stream Reaches
- Cadastral Boundaries
- 10% Impervious Area
- 40% Impervious Area

Peak Flood Level Difference* (m)

- < -0.50
- -0.50 to -0.10
- -0.10 to 0.10
- 0.10 to 0.50
- > 0.50
- Was dry now wet
- Was wet now dry

*Peak flood levels from increase in vegetation & residential development (S12) minus peak flood levels from 100 Yr EDS (S1)

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0 3000 6000m

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REGIONAL FLOODPLAIN DATABASE PROJECT (STAGE 2)
STANLEY RIVER
FIGURE F12 INCREASE IN VEGETATION & RESIDENTIAL DEVELOPMENT FLOOD LEVEL IMPACT - 100 EDS (S12)

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