9 September 2022

Mr Darryl Watkins
Chairperson
Community Consultative Committee
Bowdens Silver Project

Sent by email to:
darrylnwatkins@gmail.com

Greetings Darryl

Re: Bowdens Silver Project: Community Consultative Committee 4 May 2022, Response to Questions on Notice

Following the Community Consultative Committee (CCC) meeting held 4 May 2022, Bowdens Silver was provided with two questions on notice from CCC members Mr Bradley Bliss and Mr Michael Boller. There were also four action items that were tasked to RWC to follow up on in the meeting. This letter provides a response to each of these matters for the purpose of addressing the questions from the CCC. We would be pleased to discuss these matters at the next CCC meeting.

Information Request

In the absence of publicly available and validated, long-term daily rainfall and evaporation records, the Surface Water Assessment (and subsequent updates) prepared by WRM Water and Environment Pty Ltd (WRM) obtained data for the 130-year period between January 1889 to December 2018 from the Scientific Information for Landowners (SILO) data service to assess the Project (refer Section 3.2 of WRM [2022]). SILO is commonly used by hydrological consultants, research agencies such as CSIRO and the Murray-Darling Basin Authority and State agencies. At the most recent CCC meeting Mr Tom Combes noted that he held long-term historical rainfall data collected at Lue Station.

Following discussion with Bowdens Silver, we request that provided Mr Combes is comfortable, he shares that data with us. It would be useful to us to compare this data to that used in the assessment of the Bowdens Silver Project. We have completed a review of the data supplied by Mr Boller but agree that longer-term data would provide a greater point of comparison. We also note that the Lue Action Group submitted to DPE an independent review of the Updated Surface Water Assessment in response to the public exhibition of the Amendment Report: Water Supply. This document, prepared by S. Baguley (Baguley, 2022), provides a graphical presentation of composited recorded rainfall for the Lue area during the period 1887 to 2021 (refer Figure 9 of Baguley [2022]). The long-term data at Lue Station would also enable the preparation of a more meaningful response to the matters raised in Baguley (2022).

Action Items

Action: *N. Warren (RWC) to review possible influence of exclusion of 2019 rainfall data on outcomes*.

Response: Given the SILO dataset used for the assessment spanned 130 years, the inclusion or exclusion of one year does not significantly change assessment outcomes. Long-term data is used so the full range of historical rainfall highs and lows are considered. Review of the SILO data used for the assessment indicates that while 2019 was a low year for rainfall, years of lower rainfall were recorded in the assessment data.

However, to consider this more thoroughly, a comparative analysis of annual rainfall frequencies for both datasets (1889-2018 and 1889-2019) was undertaken using the Log Pearson Type III Distribution method to determine Annual Exceedance Probability (AEP). The results of this analysis on high (99%) and median (50%) AEP annual rainfall is provided in **Table 1** below. Based on this analysis, 99% of annual rainfall in the 1889-2018 dataset would exceed 330mm/year, with a slightly lower 319mm/year for the 1889-2019 dataset. For 50% AEP, this difference is almost completely removed. As the 11mm (4%) difference for 99% AEP is

minor, it would not substantially change any assessment outcomes for low rainfall periods. This demonstrates that, by capturing a representative range of rainfall distribution, the data utilised by WRM for assessing potential Project-related impacts on surface water resources was entirely suitable.

Table 1

AEP (%)	Rainfall (mm/year)		Difference	
	1889-2018	1889-2019	mm/year	%
99	330	319	11	4%
50	687	686	1	0%

Action: *N. Warren (RWC) to provide justification for rainfall level used in low rainfall scenario assessment in the Surface Water Assessment*.

Response: Complete assessment of the Project's water supply reliability and impacts requires consideration of the full range of climatic conditions possible over the entire Project-life. This is to properly account for preceding conditions, such as catchment disturbance, rainfall conditions and volumes held in water storages (i.e. carry-over) that could be drawn upon to meet shortfalls. As not all rainfall becomes runoff (generally), WRM tested the site water balance model's sensitivity to **low runoff** rather than a **low rainfall** period. This analysis was undertaken by altering the Mine Site catchment's runoff response parameters (refer Table 5.8 of WRM [2022]).

For the modelling assessment, daily rainfall varies throughout the model period and within the ranges of the long-term SILO data. As such, the low runoff scenario applies historical rainfall patterns obtained from the SILO database but assumes that less water is collected in storages (dams) for Project-related use. This is why the low runoff scenario results in a 14% reduction in water availability.

As the full SILO dataset was used to assess Project-related impacts, water supply security and water management system performance, an annual **low rainfall** volume cannot be supplied. However, as identified in the table above, the data used for the assessment had a 99% AEP annual rainfall volume of 330mm/year. That is, as in the table above, on most occasions, rainfall exceeded 330mm.

Action: *N. Warren (RWC) to review impacts to water users under low rainfall scenario assessment.*

Response: As noted above, the low rainfall scenario referred to in the question is actually low runoff. The change in runoff does not change the worst case assessment of impact. The principal means by which the Project would impact upon Lawsons Creek water users is by increasing the frequency and duration of periods when "cease to take" water access license conditions occur. That is, the conditions of such licences specify when water taken under the licence must cease due to streamflow conditions. During extended periods of low rainfall, all water users would be impacted by these conditions that will occur irrespective of Project approval.

In order to assess impacts of water users under a worst case, WRM assessed the greatest predicted change to "cease to flow" periods. WRM considered the "cease to flow" condition as being Lawsons Creek flows of less than 0.1ML/day at its confluence with Walkers Creek (refer Location C, Table 8.1 and Figure 8.2 of WRM [2022]). The flow frequency curves for Location C, as derived from the model are presented as Figure 8.3 of WRM (2022). This figure identifies that the Project would add approximately 2 cease to flow days in a given year. This is irrespective of catchment wide rainfall conditions and is in addition to the cease to flow days that would already occur as a result of these conditions.

Action: *N. Warren (RWC) to review extreme high rainfall scenario and what level of rainfall would be needed to cause overflow*.

Response: The Mine Site's water management system would be integrated with all dams equipped with pumps and associated infrastructure to transfer water around the Mine Site. This system would be used to meet processing demand and prevent overflow/discharge to the downstream environment. Using the full SILO dataset, WRM assessed the integrated water management system's performance to identify that **no discharge** would occur. The exception to this was runoff within the clean (undisturbed) water management system (i.e. harvestable rights dams).

The preliminary design of the various water storages within the water management system was based on the following minimum design rainfall events:

- **Tailings storage facility:** 1% AEP 72-hour design rainfall (211mm) event plus 0.5 metre freeboard in accordance with ANCOLD (2012)[1]. However, this minimum capacity would only be required immediately prior to an embankment raise or toward the end of the facility's operational life. At all other times, capacity would be greater.
- **Leachate management dam:** 1% AEP 72-hour design rainfall event (217mm)[2] plus 1 metre freeboard.
- **Processing plant dams:** <0.1% AEP 72-hour design rainfall event (345mm)[3].
- **Sediment dams:** 5% AEP design rainfall event (157mm) with an additional 50% storage capacity for captured sediment. This design rainfall event significantly exceeds the regulatory design requirements for NSW.
- **Clean water (harvestable) rights dams:** Varies, water within these dams would be of similar quality to other farm dams in the area and allowed to freely discharge.

Discussion

The design rainfall events identified above were used to inform preliminary design of the respective minimum storage requirements. All structures have been designed in accordance with, or exceeding, best practice guidelines and standards and have been subject to detailed review by the EPA and DPE Water. Neither agency has raised any concerns with the preliminary design or modelled system performance. As demonstrated by WRM, these structures and their respective storage capacity, coupled with system integration would prevent discharge from the Mine Site under the historical range of rainfall conditions assessed.

In conclusion, the following is also noted.

- The integrated water management system would actively transfer water to maintain design capacities.
- The Project would have the benefit of weather forecasting services for operational water balance modelling that would be used to predict management actions.
- For key containment structures (i.e. the tailings storage facility, leachate management dam and processing plant dams), the preliminary design rainfall event identified above is not recorded in the SILO dataset.
- When considering the preliminary design rainfall levels provided above, with no allowance for management actions, a review of Bureau of Meteorology (BoM) rainfall records identifies:
  - No exceedance of the minimum 211mm 72-hour design rainfall event at Mudgee (BoM Station ID 062021, 152-years of record) or Lue (BoM Station ID 062071, 49-years of record);
  - One exceedance (229.4mm) of the minimum 211mm 72-hour design rainfall event recorded at Rylstone (BoM Station ID 062026, 141-years of record) between 23 and 25 June 1926; and
  - Past exceedances of the 157mm 72-hour design rainfall event for sediment dams in all records. However, given their intended use, these structures have a lower risk level.

[1] Australia National Council on Large Dams (ANCOLD) 2012 – Guidelines on Tailings Dams

[2] It is noted that the Bureau of Meteorology's Intensity Frequency Duration website nominates different rainfall depths for the same event at the tailings storage facility and leachate management dam as each has a different geographic grid reference point.

[3] Based on combined 100ML capacity.

Finally, it must be noted that, should the Project be approved, all elements of the Mine Site water management system would be the subject of detailed design that would further assess design rainfall and the risk of discharge to establish final design criteria. Water management is critical to achieving successful operational and environmental outcomes for mining operations and it would be a key focus throughout the life of the Project-life. As these matters are also closely regulated and scrutinised, it is in the best interest of Bowdens Silver to ensure the water management system operates effectively.

Questions on Notice

Question from Mr Bradley Bliss - *When is the Water Pipeline Amendment Response to Submissions date expected?*

Response: It is anticipated that the Submissions Report relating to the Water Supply Amendment will be submitted to DPE in September 2022.

Question from Mr Mick Boller - *What is the modelled average summer rainfall? Is it 450mm for 6 summer months?*

Response: No. The average summer monthly rainfall for the six-month period from October through March, as derived from the SILO dataset used for modelling was **392.4mm**.

Question from Mr Mick Boller - *Was the modelled monthly average 75mm per month in summer?*

Response: No. The average summer monthly rainfall from the SILO dataset used for modelling was **65.3mm/month**. This average, shown on **Figure A** was derived from the monthly averages that are also shown. **Figure A** also presents the averages recorded by Mr Boller over the period 1987 to 2018.

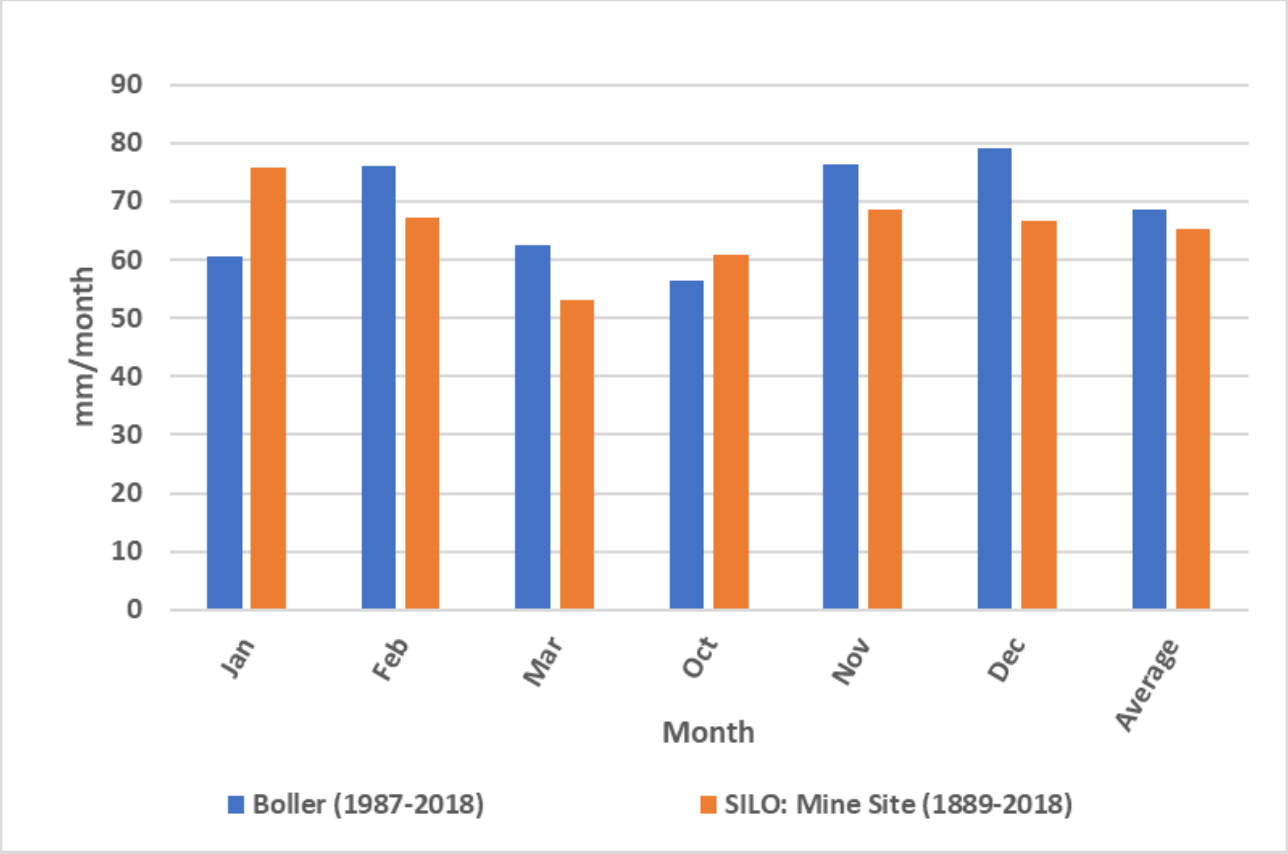

Figure A: Monthly Average Summer Rainfall: Mine Site SILO (1889 – 2018) and Boller (1987 – 2018)

Question from Mr Mick Boller - *What were the modelled rainfall totals for the 1978/79, 1988/89,1990/91, 2006/07 and 2014/15?*

Response: Figure B presents the SILO dataset rainfall totals for the requested periods that are assumed to relate to seasonal summer rainfall. This figure also presents the rainfall recorded by Mr Boller over the same period (except for 1978/79). Average summer rainfall totals for the full SILO dataset and that of Mr Boller are also provided on **Figure B**.

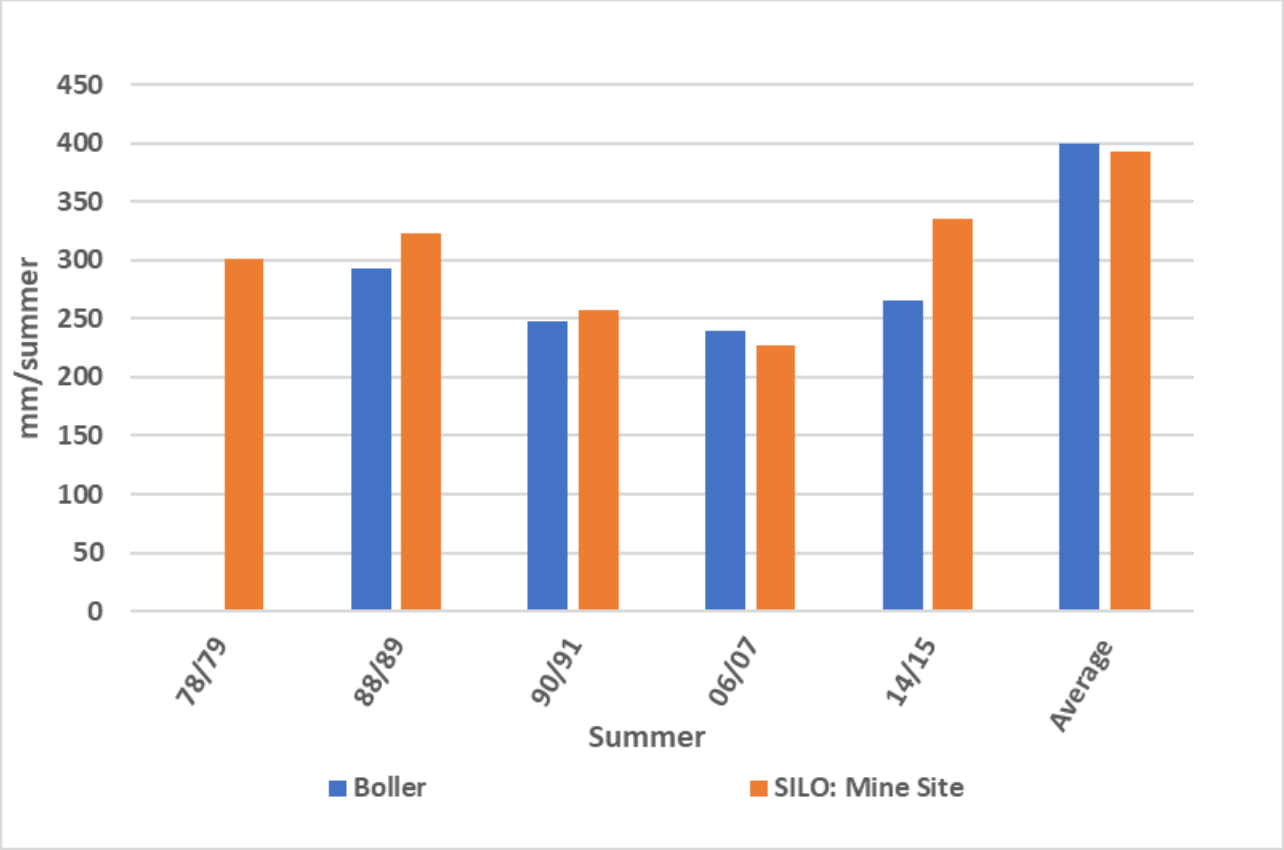

Figure B: Selected and Average Summer Rainfall Totals

Discussion

WRM's long term daily rainfall data obtained from SILO was used for the response to Mr Boller's questions on notice. Rainfall data provided by Mr Boller in his submission to the Department of Planning and Environment (SE-40510577) is also shown in the response for comparative purposes. It is noted that Mr Boller's yearly data was not presented in a consistent monthly format and all effort has been made to ensure it is adequately reproduced. We would be pleased to discuss this further with Mr Boller. For completeness and clarity, Mr Boller's rainfall data in the form it was supplied, and the reproduced dataset drawn from it is also provided.

The information presented on **Figure A** identifies that, whilst there is some variation in the average rainfall for respective months, when compared with the data provided by Mr Boller, the differences are not significant. In fact, due to the longer period of record, the averages derived from the SILO data ensure a conservative (worst case) approach is taken for the assessment of Project-related impacts to surface water resources. This is demonstrated by the generally higher monthly average rainfall derived from Mr Boller's data that was collected over a (relatively) shorter period. Furthermore, notwithstanding the minor differences in the actual seasonal rainfall totals shown on **Figure B** (except for 2014/2015), the average rainfalls over summer for both datasets generally align and identify the SILO rainfall data as representative of local conditions and thus suitable for assessing the Project.

Closure

This response has been prepared and provided to the Community Consultative Committee in good faith and we trust that it is sufficient to address all questions. Bowdens Silver's objective from the outset has been to ensure all matters, including those of significant community interest, such as water resources, are addressed in a comprehensive fashion. Bowdens Silver maintains that the Surface Water Assessment for the Project and subsequent amendments is scientifically robust and has been prepared to the highest level of technical rigour.

We would be happy to discuss any questions regarding this response at the next CCC meeting.

Regards

Paul Ryall
Senior Environmental Consultant

Attached: **Table A**, rainfall data tabulated from Mr Boller's submission SE-40510577
Rainfall data as originally provided in Mr Boller's submission SE-40510577

Table A: M. Boller: Monthly Rainfall Records 1987 – 2018

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Summer totals	
Year	Rainfall (mm/month)												Period (YY/YY)	Rainfall (mm/period)
1987	ND[1]	ND[1]	ND[1]	0	ND[1]	ND[1]	38	ND[1]	24	91	73	83	Not applicable	
1988	129	72	21	ND[1]	40	16	ND[1]	ND[1]	ND[1]	5	60	59	87/88	469
1989	43	35[2]	91	ND[1]	ND[1]	ND[1]	ND[1]	18	3	48	100	49	88/89	293
1990	77	97	29	ND[1]	38	34	ND[1]	ND[1]	45	67	6	39	89/90	400
1991	84	30	22	2	ND[1]	ND[1]	ND[1]	48	31	30	21	107	90/91	248
1992	47	227	72	14	15	21	20	64	43	73	79	103	91/92	504
1993	41	50	84	2	28	42	ND[1]	ND[1]	ND[1]	108	102	29	92/93	430
1994	22	68	43	15	13	10	46	20	2	19	87	58	93/94	372
1995	118	82	4	3	ND[1]	ND[1]	38	1	ND[1]	25	72	131	94/95	368
1996	198	28	17	ND[1]	ND[1]	ND[1]	ND[1]	ND[1]	ND[1]	60	92	123	95/96	471
1997	58	83	37	5	47	25	32	19	ND[1]	52	23	42	96/97	453
1998	55	54	33	ND[1]	ND[1]	ND[1]	ND[1]	ND[1]	ND[1]	62	95	38	97/98	259
1999	57	14	81	ND[1]	ND[1]	ND[1]	ND[1]	ND[1]	ND[1]	154	51	71	98/99	347
2000	128	3	218	ND[1]	ND[1]	ND[1]	ND[1]	ND[1]	20	123	140	147	99/00	625
2001	29	65	76	ND[1]	ND[1]	ND[1]	ND[1]	ND[1]	ND[1]	93	51	37	00/01	580
2002	43	113	28	5	34	31	11	16	31	8	32	62	01/02	365
2003	10	162	52	ND[1]	18	ND[1]	40	ND[1]	11	82	74	55	02/03	326
2004	22	92	27	35	30	26	60	36	ND[1]	83	67	121	03/04	352
2005	20	134	69	0	3	ND[1]	ND[1]	ND[1]	ND[1]	72	175	34	04/05	494
2006[3]	48	69	11	69	2	30	65	18	22	5	32	20	05/06	409
2007[3]	5	115	62	23	60	160	21	0	0	18	125	111	06/07	239
2008	125	133	23	12	7	50	39	ND[1]	ND[1]	88	153	76	07/08	535
2009	6	90	25	24	6	41	40	16	ND[1]	42	28	129	08/09	438
2010	78	98	62	ND[1]	ND[1]	ND[1]	ND[1]	ND[1]	ND[1]	67	170	188	09/10	437
2011	30	32	47	25	38	15	2	57	ND[1]	38	136	75	10/11	534
2012	88	142	197	ND[1]	ND[1]	ND[1]	ND[1]	7	43	15	40	86	11/12	676
2013	ND[1]	ND[1]	ND[1]	ND[1]	ND[1]	ND[1]	ND[1]	ND[1]	ND[1]	ND[1]	ND[1]	ND[1]	12/13	141
2014	14	86	125	ND[1]	23	42	38	24	24	26	32	98	13/14	225
2015	60	23	27	ND[1]	52	43	47	27	9	33	80	105	14/15	266
2016	113	46	30	2	ND[1]	ND[1]	ND[1]	ND[1]	ND[1]	76	58	33	15/16	407
2017	43	30	204	31	0	13	2	26	3	28	72	86	16/17	444
2018	27	11	60	19	9	32	13	39	35	56	39	55	17/18	284

Note: 1 - ND (no data). 2 - inconsistency between stated annual and summer monthly totals. 3 – recorded at/by “Mills”

Year	Month	Rainfall		Summer		Summer	
1987	Jan			Oct	91	Jan	129
	Feb			Nov	73	Feb	72
	Mar			Dec	83	Mar	21
	Apr	0					
	May					Summer	
	Jun					Total	**474**
	Jul	38					
	Aug						
	Sep	24					
	Oct						
	Nov					Annual	
	Dec					Total	774

Year	Month	Rainfall		Summer		Summer	
1988	Jan			Oct	5	Jan	43
	Feb			Nov	60	Feb	35
	Mar	21		Dec	59	Mar	91
	Apr						
	May	40				Summer	
	Jun	16				Total	**290**
	Jul						
	Aug						
	Sep						
	Oct	5					
	Nov						
	Dec					Annual	
						Total	705

Year	Month	Rainfall		Summer		Summer	
1989	Jan	43		Oct	48	Jan	77
	Feb	45		Nov	100	Feb	97
	Mar			Dec	49	Mar	29
	Apr						
	May					Summer	
	Jun					Total	**400**
	Jul						
	Aug	18					
	Sep	3					
	Oct						
	Nov						
	Dec					Annual	
						Total	822

Year	Month	Rainfall		Summer		Summer	
1990	Jan			Oct	67	Jan	84
	Feb			Nov	6	Feb	30
	Mar	29		Dec	39	Mar	22
	Apr						
	May	38				Summer	
	Jun	34				Total	**248**
	Jul						
	Aug						
	Sep	45					
	Oct						
	Nov	6					
	Dec	39				Annual	
						Total	848

Comment: two period totalling 230 days in 1990/1991 recorded 185mms. 23/10/1990-31/121990 = 45 mms over 70 days. 11/1/1991-10/5/1991= 140mms over 160 days

Year	Month	Rainfall		Summer		Summer	
1991	Jan			Oct	30	Jan	47
	Feb	30		Nov	21	Feb	227***
	Mar	22		Dec	107	Mar	72
	Apr	2					
	May					Summer	
	Jun					Total	**504**
	Jul						
	Aug	48					
	Sep	31					
	Oct	30					
	Nov	21					
	Dec					Annual	
						Total	574

Comment: Severe Winter deficit. 8/3/1991-30/8/1991=134mms over 180 days

Year	Month	Rainfall		Summer		Summer	
1992	Jan			Oct	73	Jan	41
	Feb			Nov	79	Feb	50
	Mar			Dec	103	Mar	84
	Apr	14					
	May	15				Summer	
	Jun	21				Total	**450**
	Jul	20					
	Aug	64					
	Sep	43					
	Oct						
	Nov					Annual	
	Dec					Total	774

Comment: Severe winter deficit. 177mms recorded in 6 months

Year	Month	Rainfall		Summer		Summer	
1993	Jan	41		Oct	108	Jan	22
	Feb	50		Nov	102	Feb	68
	Mar			Dec	29	Mar	43
	Apr	2					
	May	28				Summer	
	Jun	42				Total	**372**
	Jul						
	Aug						
	Sep						
	Oct						
	Nov					Annual	
	Dec					Total	778

Comment: Severe deficit. 163mms recorded in 6 months. 30/3/93-4/7/93=72mms

Year	Month	Rainfall		Summer		Summer	
1994	Jan			Oct	19	Jan	118
	Feb			Nov	87	Feb	82
	Mar	43		Dec	58	Mar	4
	Apr	15					
	May	13				Summer	
	Jun	10				Total	**368**
	Jul	46					
	Aug	20					
	Sep	2					
	Oct	19					
	Nov					Annual	
	Dec					Total	401

Comment: Severe Winter deficit. 168mms in 8 months

Year	Month	Rainfall		Summer		Summer	
1995	Jan			Oct	25	Jan	198
	Feb	82		Nov	72	Feb	28
	Mar	4		Dec	131	Mar	17
	Apr	3					
	May					Summer	
	Jun					Total	**511**
	Jul	38					
	Aug	1					
	Sep						
	Oct						
	Nov					Annual	
	Dec					Total	704

Comment: Dry spells Feb/Mar/Apr and again in Jul/Aug/Sep

Year	Month	Rainfall		Summer		Summer	
1996	Jan			Oct	60	Jan	58
	Feb			Nov	92	Feb	83
	Mar			Dec	123	Mar	37
	Apr						
	May					Summer	
	Jun					Total	**453**
	Jul						
	Aug						
	Sep						
	Oct						
	Nov					Annual	
	Dec					Total	963

Year	Month	Rainfall		Summer		Summer	
1997	Jan			Oct	52	Jan	55
	Feb			Nov	23	Feb	54
	Mar	37		Dec	42	Mar	33
	Apr	5					
	May	47				Summer	
	Jun	25				Total	**259**
	Jul	32					
	Aug	19					
	Sep						
	Oct						
	Nov					Annual	
	Dec					Total	503

Winter deficit. 165mms over 6 months

Year	Month	Rainfall		Summer		Summer	
1998	Jan			Oct	62	Jan	57
	Feb			Nov	95	Feb	14
	Mar			Dec	38	Mar	81
	Apr						
	May					Summer	
	Jun					Total	**347**
	Jul						
	Aug						
	Sep						
	Oct						
	Nov					Annual	
	Dec					Total	876

Year	Month	Rainfall		Summer		Summer	
1999	Jan			Oct	154	Jan	128
	Feb			Nov	51	Feb	3
	Mar			Dec	71	Mar	218
	Apr						
	May					Summer	
	Jun					Total	**635**
	Jul						
	Aug						
	Sep						
	Oct						
	Nov					Annual	
	Dec					Total	690

Year	Month	Rainfall		Summer		Summer	
2000	Jan			Oct	123	Jan	29
	Feb	3		Nov	140	Feb	65
	Mar			Dec	147	Mar	76
	Apr						
	May					Summer	
	Jun					Total	**580**
	Jul						
	Aug						
	Sep	20					
	Oct						
	Nov					Annual	
	Dec					Total	1147

Year	Month	Rainfall		Summer		Summer	
2001	Jan			Oct	93	Jan	43
	Feb			Nov	51	Feb	113
	Mar			Dec	37	Mar	28
	Apr						
	May					Summer	
	Jun					Total	**365**
	Jul						
	Aug						
	Sep						
	Oct						
	Nov					Annual	
	Dec					Total	628

Year	Month	Rainfall		Summer		Summer	
2002	Jan			Oct	8	Jan	10
	Feb			Nov	32	Feb	162
	Mar	28		Dec	62	Mar	52
	Apr	5					
	May	34				Summer	
	Jun	31				Total	**408**
	Jul	11					
	Aug	16					
	Sep	31					
	Oct	8					
	Nov	32				Annual	
	Dec	62				Total	410
2003	Jan	10					

Severe winter and spring deficit. 268mms in 11 months

Year	Month	Rainfall		Summer		Summer	
2003	Jan	10		Oct	82	Jan	22
	Feb			Nov	74	Feb	92
	Mar			Dec	55	Mar	27
	Apr						
	May	18				Summer	
	Jun					Total	**352**
	Jul	40					
	Aug						
	Sep	11					
	Oct						
	Nov					Annual	
	Dec					Total	710

Year	Month	Rainfall		Summer		Summer	
2004	Jan			Oct	83	Jan	20
	Feb			Nov	67	Feb	134
	Mar	27		Dec	121	Mar	69
	Apr	35					
	May	30				Summer	
	Jun	26				Total	**504**
	Jul	60					
	Aug	36					
	Sep						
	Oct						
	Nov					Annual	
	Dec					Total	616

Year	Month	Rainfall		Summer		Summer	
2005	Jan			Oct	72	Jan	48
	Feb			Nov	175	Feb	69
	Mar			Dec	34	Mar	11
	Apr	0					
	May	3				Summer	
	Jun					Total	**409**
	Jul						
	Aug						
	Sep						
	Oct						
	Nov					Annual	
	Dec					Total	796

Year	Month	Rainfall		Summer		Summer	Mills
2006	Jan			Oct	5	Jan	5
	Feb			Nov	32	Feb	115
	Mar	11		Dec	20	Mar	62
	Apr	69					
	May	2				Summer	
	Jun	30				Total	**239**
	Jul	65					
	Aug	18					
	Sep	22					
	Oct	5					
	Nov	32				Annual	
	Dec	20				Total	383

Comment: Dry Autumn. Winter drought. 274mms in 10 months**. 7th driest year on record** (Mudgee Rainfall statistics)

Year	Month	**Rainfall Mud Air**	**Rainfall Mills**	Summer		Summer	
2007	Jan	16	5	Oct	5	Jan	125
	Feb	81	115	Nov	115	Feb	133
	Mar	77	62	Dec	62	Mar	23
	Apr	36	23				
	May	58	60			Summer	
	Jun	127	160			Total	**463**
	Jul	14	21				
	Aug	35	0				
	Sep	1	0				
	Oct	26	18				
	Nov	100	125		Annual	**Mud Air**	**Mills**
	Dec	151	111		Total	**702**	**700**

Year	Month	Rainfall		Summer		Summer	
2008	Jan			Oct	88	Jan	6
	Feb			Nov	153	Feb	90
	Mar	23		Dec	76	Mar	25
	Apr	12					
	May	7				Summer	
	Jun	50				Total	**438**
	Jul	39					
	Aug						
	Sep						
	Oct						
	Nov					Annual	
	Dec					Total	840

Dry winter. 131mms in 5 months.

Year	Month	Rainfall		Summer		Summer	
2009	Jan			Oct	42	Jan	78
	Feb			Nov	28	Feb	98
	Mar	25		Dec	129	Mar	62
	Apr	24					
	May	6				Summer	
	Jun	41				Total	**437**
	Jul	40					
	Aug	16					
	Sep						
	Oct						
	Nov					Annual	

	Dec					Total	518

Dry Autumn and Winter. 152mms in 6 months.

Year	Month	Rainfall		Summer		Summer	
2010	Jan			Oct	67	Jan	30
	Feb			Nov	170	Feb	32
	Mar			Dec	188	Mar	47
	Apr						
	May					Summer	
	Jun					Total	**534**
	Jul						
	Aug						
	Sep						
	Oct						
	Nov					Annual	
	Dec					Total	1067

Year	Month	Rainfall		Summer		Summer	
2011	Jan			Oct	38	Jan	88
	Feb			Nov	136	Feb	142
	Mar	47		Dec	75	Mar	197
	Apr	25					
	May	38				Summer	
	Jun	15				Total	**676**
	Jul	2					
	Aug	57					
	Sep						
	Oct						
	Nov					Annual	
	Dec					Total	598

Dry Winter. 194mm in 6 months

Year	Month	Rainfall		Summer		Summer	
2012	Jan			Oct	15	Jan	NA
	Feb			Nov	40	Feb	NA
	Mar			Dec	86	Mar	NA
	Apr						
	May					Summer	
	Jun					Total	**NA**
	Jul						
	Aug	7					
	Sep	43					
	Oct	15					
	Nov	40				Annual	
	Dec					Total	793

Dry Spring. 105mms in 4 months

Year	Month	Rainfall		Summer		Summer	
2013	Jan			Oct	NA	Jan	14
	Feb			Nov	NA	Feb	86
	Mar			Dec	NA	Mar	125
	Apr						
	May					Summer	
	Jun					Total	**NA**
	Jul						
	Aug						
	Sep						
	Oct						
	Nov					Annual	
	Dec					Total	NA

Year	Month	Rainfall		Summer		Summer	
2014	Jan			Oct	26	Jan	60
	Feb			Nov	32	Feb	23
	Mar			Dec	98	Mar	27
	Apr						
	May	23				Summer	
	Jun	42				Total	**266**
	Jul	38					
	Aug	24					
	Sep	24					
	Oct	26					
	Nov	32				Annual	
	Dec					Total	612

Dry winter. 209 mms in 7 months.

Year	Month	Rainfall		Summer		Summer	
2015	Jan			Oct	33	Jan	113
	Feb			Nov	80	Feb	46
	Mar			Dec	105	Mar	30
	Apr						
	May	52				Summer	
	Jun	43				Total	**407**
	Jul	47					
	Aug	27					
	Sep	9					
	Oct	33					
	Nov					Annual	
	Dec					Total	604

Dry winter. 211mms in 6 months.

Year	Month	Rainfall		Summer		Summer	
2016	Jan			Oct	76	Jan	43
	Feb	46		Nov	58	Feb	30
	Mar	30		Dec	33	Mar	204
	Apr	2					
	May					Summer	
	Jun					Total	**444**
	Jul						
	Aug						
	Sep						
	Oct						
	Nov					Annual	
	Dec					Total	886

Dry Autumn. 78mms in 3 months.

Year	Month	Rainfall		Summer		Summer	
2017	Jan			Oct	28	Jan	27
	Feb			Nov	72	Feb	111
	Mar			Dec	86	Mar	60
	Apr	31					
	May	0				Summer	
	Jun	13				Total	**384**
	Jul	2					
	Aug	26					
	Sep	3					
	Oct	28					
	Nov					Annual	
	Dec					Total	535

Severe winter deficit. 102mms in 7 months.

Year	Month	Rainfall		Summer		Summer	
2018	Jan			Oct	56	Jan	122
	Feb			Nov	39	Feb	9
	Mar			Dec	55	Mar	100
	Apr	19					
	May	9				Summer	
	Jun	32				Total	**381**
	Jul	13					
	Aug	39					
	Sep	35					
	Oct						
	Nov					Annual	
	Dec					Total	503

Severe winter deficit. 147mms in 6 months.

Year	Month	Rainfall		Summer		Summer	
2019	Jan			Oct	16	Jan	62
	Feb	9		Nov	34	Feb	78
	Mar	100		Dec	3	Mar	108
	Apr	0					
	May	15				Summer	
	Jun	7				Total	**391**
	Jul	1					
	Aug	9					
	Sep	37					
	Oct	16					
	Nov	34				Annual	
	Dec	3				Total	350

Severe Drought through entire year. 231mms in 11 months.

Year	Month	Rainfall		Summer		Summer	
2020	Jan			Oct	103	Jan	50
	Feb			Nov	43	Feb	78
	Mar			Dec	137	Mar	195
	Apr						
	May					Summer	
	Jun					Total	**606**
	Jul						
	Aug						
	Sep						
	Oct						
	Nov					Annual	
	Dec					Total	874

Year	Month	Rainfall		Summer		Summer	
2021	Jan			Oct	73	Jan	114
	Feb			Nov	163	Feb	39
	Mar			Dec	67	Mar	181
	Apr						
	May					Summer	
	Jun					Total	**637**
	Jul						
	Aug						
	Sep						
	Oct						
	Nov					Annual	
	Dec					Total	798