IN THE MATTER OF THE INQUIRIES ACT 2014

AND IN THE MATTER OF A BOARD OF INQUIRY INTO THE MCCRAE LANDSLIDE

ENTITY: SOUTH EAST WATER CORPORATION

WITNESS STATEMENT OF JONATHAN CROOK

I, **JONATHAN CROOK**, Group Manager for Analytics and Performance, South East Water Corporation, of 101 Wells Street, Frankston in the State of Victoria say:

1. I am the Group Manager for Analytics and Performance at South East Water Corporation (**SEW**).

2. I hold a Bachelor in Physics, a Bachelor (Hons) in Mathematics, and a Doctorate in Applied Mathematics from Victoria University of Wellington.

3. I have been an employee of SEW for almost 10 years and have worked in a number of data-related roles.

4. I was appointed to the role of Group Manager for Analytics and Performance on 6 March 2023. My day-to-day responsibilities in that role are focused on achieving and monitoring the benefits of SEW's customer digital metering program, and monitoring the performance of SEW's customer digital meters.

5. On 23 May 2025 the Board of Inquiry into the McCrae Landslide served upon SEW's lawyers a Request to Produce Witness Statement, which required me to provide a Statement in response to the questions set out in that document.

6. The information in this Statement is based upon my personal knowledge, or information I have obtained from the business records SEWhas provided to me or other employees / contractors where necessary. I believe the information to be true.

7. This Statement is structured in the order of questions set out in the List of Questions for Mr Jonathan Crook, South East Water Corporation (SEW).

Question 1 – Describe Mr Jonathan Crook's work to date with respect to calculating the volume of water lost due to the burst water main located near the corner of

Bayview Road and Outlook Road, McCrae. As part of your answer, exhibit key documents informing or demonstrating that work.

8. On 13 February 2025 my colleague, Julian Tully, Technical Director Civil and Environmental Engineering, asked me to attempt to calculate the volume of water lost due to the burst water main located near the corner of Bayview Road and Outlook Road, McCrae (**Burst**).

Method of Calculation

9. In simple terms, I began by obtaining data from SEW's main flow meters into McCrae over the past 5 years. This information told me the volume of mains water that entered the McCrae area and how much mains water left the McCrae area in that period (**Calculation Method**).

10. There is a meter which measures the water supplied into the McCrae region in question. There are a number of sub-meters which record the flow to customers beyond those meters. The Burst occurred between that initial meter and those other meters. The balance between those meters provides a reasonable estimate of water lost through the Burst, and water to private properties and any other water use within that area (**Balance**).

11. In order to apportion the Balance resulting from the calculation set out in the preceding paragraph between the Burst, and the water used by McCrae residents and any other water use within the area, I then needed to estimate (and deduct from that balance) the amount of water used by McCrae residents and any other water use in that period.

12. It was not possible to approximate the amount of water used by McCrae residents by simply obtaining the readings of the private water meters of those residents. This is because private water meters are only read quarterly, so some of the water used and read on customer properties included usage from the periods both before the Burst commenced and after the Burst was rectified. Additionally, some private water meters were not read at all, and some properties are not metered. As such, using private meters would involve too many assumptions (and guesswork) about private usage during the relevant period.

13. The Burst occurred around the beginning of summer. In my experience, water usage across Melbourne increases in summer/warm periods because of, amongst other things, increased irrigation and watering of gardens, increased filling and use of swimming pools and car washing. Additionally, it is quite typical to see an increase in water usage in holiday destinations like the Mornington Peninsula, which includes McCrae, over summer due to increased occupancy rates.

14. As such, I obtained a baseline figure for water usage in the relevant area from mid-July to mid-August in each of the four years preceding 2024 and established the day-by-day

change on that figure for each of those years. I then averaged the changes across the four years to arrive at a typical change profile that took into account seasonal changes.

15. I decided to use four years of historical data in order to provide a balance between utilising too little data and potentially being overly influenced by differences of a single year, while also not using older data which may create a bias. It is assumed post-Covid that more people had moved to outer suburbs and, if this was the case, data from this time period may have led to a greater seasonal increase and an under-estimation of the Burst. While Covid-period data may have a smaller seasonal increase (which would lead to a larger estimation of the Burst size) due to less people travelling in and out of the area, including this data is considered to be a conservative option.

16. After estimating how much water use would have been expected to seasonally increase irrespective of the Burst (i.e., 'normal' seasonal usage increase), I estimated the usage for 2025 and subtracted that estimated usage over the time of the Burst from the Balance to estimate the size of the Burst.

17. Once having the seasonally adjusted daily usage above into that region above and beyond what would be typically expected, we can observe where there is a distinct increase (i.e. beyond zero). This is most pronounced from November 1 2024. There is also, however, a potential increase above zero which starts 25 days prior to this date. This is based on my interpretation of the graphs set out in Figure 7 of my Final Report referred to below. There may be other explanations for this earlier increase, but in the interests of transparency both of these dates were used to give two calculations for the Burst duration and size. The additional volume in the earlier 25 days is relatively small compared to the estimated volume of the Burst after this date.

18. I also performed additional checks that aren't directly related to the estimation of the leak size in order to test the methodology and data received. These included a check of the water in and out of the tanks around the Parkes St Pump Station as well as a comparison of the Balance with the number of residences in the Burst area to determine if the Balance was reasonable. Both of these were in an order expected.

19. I believe my calculation is as accurate as possible given the data that underpins it and the assumptions that needed to be made. My calculation performs an estimate of the size of the Burst event using known water usage and network data available for the area around the Burst. It attempts to make the least number of assumptions in coming to that conclusion. That said, there are still uncertainties in this method. I have made an assessment of these uncertainties using 2 methods. The first method considers how much water usage varies day-to-day. This variation may be due to meter or other error. However, I know the variation is also due to how McCrae residents use water in the area, so the uncertainty is overestimated. The second method was to only estimate the

uncertainty of the meters using the accepted standard for meters of that type referred to in my Final Report referred to below.

20. The work in the report was done independently of estimates from any other parties, and it is appropriate to try and reconcile the differences between the data analysis set out in my Final Report referred to below and those other estimates. The earlier estimate given by Gary Loudon of South East Water provided a reasonable starting point, but it was based on a series of assumptions that, with the benefit of time, I have been able to refine as part of my calculation. The earlier estimate used a triangular area calculation, and assumed the leak grew in a linear fashion to 2ML/day at its largest point. While reasonable for approximating an order of magnitude sizing, both of these assumptions (i.e. 2 ML/day, and linear growth) likely lead to an over-estimation of the Burst size. Those two assumptions, together with the inclusion of a seasonal adjustment, would likely explain the discrepancy between the earlier estimate and the estimate set out in my Final Report referred to below.

21. I am also aware of a calculation performed by Mr Bolsch on the size of the leak. From my understanding, Mr Bolsch's calculation appears to assume a flow rate which does not change over time. This is not observed in the data given in my Final Report referred to below. I also note the work by Mr Christofi on behalf of Mr Bolsch. Mr Christofi's methodology appears to assume a growing leak which increases every 15 days for 60 days. At the largest size (150mm) the estimated leak volume in this report is equivalent to a 4ML/day leak, which is larger than the volume we observe entering the region.

My report

22. I understand the Board of Inquiry has been provided two versions of the report I produced to estimate the volume of water lost due to the Burst:

    a. "*Burst Volume 8 May2025*" (**May Report**); and

    b. "*McCrae Burst Volume - V4 250513*" (**Final Report**).

    Copies of the May Report and Final Report are **Exhibit 1: "Burst Volume 8May2025"** and **Exhibit 2: "McCrae Burst Volume - V4 250513"** to this Statement.

23. Although the May Report is dated 8 May 2025, this report was actually written in or around the middle of April 2025. The date discrepancy is due to initially drafting the report without a date, and when I intended to formally share the report in May of 2025, I realised the report should have a date on it – hence the May report being dated 8 May 2025.

24. The Final Report was finalised on 13 May 2025, and I confirm this document to be the most up-to-date version of the report.

25. The main difference between the May Report and the Final Report is an adjustment in my calculations in light of being provided an amended network map (a copy of which is

included in my Final Report). I recalculated my estimates as I established a meter measuring water out (WB130) was previously excluded as it was downstream from another meter, but it needed to be included. Although I was not able to anticipate the effect of making this amendment at the time, the result was to reduce the Burst size. The old map depicting the incorrect location of WB130 is **Exhibit 3: "Network Sketch_PP_v1"** to this Statement.

Key Documents Informing / Demonstrating the Calculations

26. The following documents contain information and / or data that I took into account in the preparation of my May Report and Final Report:

    a. Databricks, which allows me to use multiple programming languages to access and work with data. I have included this in both the native Databricks format, and as a '.html' to allow for easier access. Copies of the Databricks and '.html' are **Exhibit 4: "Work_For_JT_5_Year.dbc"** and **Exhibit 5: "Work_For_JT_5_Year.html"** to this Statement.

    b. Data of flow meters and reservoirs / tanks over the past 5 years I requested from my colleague Vui Shin Liew, Operations Data Analyst and obtained on 21 February 2025. A copy of this email chain is **Exhibit 6: "FW_ Privileged and Confidential_ Flows"** to this Statement.

    c. Data of flowmeter thresholds I obtained from my colleague Greg Bardwell, SCADA Engineer on 4 April 2025. A copy of this email chain is **Exhibit 7: "Privileged & Confidential"** to this Statement.

Dated: 4 June 2025

Signature: Personal Information ___ Witness: _____

Signature: _____ Witness: _____