

**Board of Inquiry into the McCrae landslide**

**Before: The Chairperson,  
Ms Renée Enbom KC**

**Federal Court of Australia,  
305 William Street, Melbourne, Victoria**

**Tuesday, 24 June 2025 at 10.00am**

**(Day 10)**

**Mr M. Costello KC and Ms A. Kittikhoun appeared as Counsel  
Assisting.**

**Ms K. Evans KC with Ms E. Pepler and Mr C. McDermott  
appeared on behalf of the State of Victoria.**

**Ms Ms E. Bateman and Dr W. Phillips appeared on behalf of  
the Mornington Peninsula Shire Council.**

**Mr C. Roberts appeared on behalf of South East Water  
Corporation.**

1 CHAIRPERSON: Good morning, Mr Costello.  
2  
3 MR COSTELLO: Good morning, Madam Chair. I was going to  
4 announce the appearance of Mr Roberts on behalf of South  
5 East Water.  
6  
7 CHAIRPERSON: Thank you.  
8  
9 MR ROBERTS: I seek leave to appear on behalf of South  
10 East Water.  
11  
12 CHAIRPERSON: You have that leave.  
13  
14 You are appearing for the shire?  
15  
16 MS BATEMAN: Ms Bateman, appearing for the shire.  
17  
18 CHAIRPERSON: Now, Mr Costello --  
19  
20 MR COSTELLO: I'm still here.  
21  
22 CHAIRPERSON: -- we have three witnesses today?  
23  
24 MR COSTELLO: Yes, that's right. The first is Dr Crook.  
25 Then Mr Tully and then Ms Kittikhoun will take the last  
26 witness, Mr Forster-Knight.  
27  
28 CHAIRPERSON: Do we need to cut or reduce the length some  
29 of the breaks to get through the witnesses?  
30  
31 MR COSTELLO: No. We'll be done well and truly in time.  
32 More likely than not, early.  
33  
34 CHAIRPERSON: Is Mr Crook --  
35  
36 MR COSTELLO: Yes.  
37  
38 CHAIRPERSON: Mr Crook, if you can just make your way to  
39 the witness box.  
40  
41 <JONATHAN CROOK, affirmed:  
42  
43 <EXAMINATION BY MR COSTELLO:  
44  
45 MR COSTELLO: Q. Dr Crook, feel free to pour yourself  
46 a glass of water, if you like.  
47 A. I will, thank you very much.

1  
2 Q. Could you state your full name for the record, please?  
3 A. Sure. Jonathan Crook.  
4  
5 Q. And your business address?  
6 A. 101 Wells Street in Frankston.  
7  
8 Q. Current occupation?  
9 A. I am the group manager for analytics and performance  
10 within the digital and transformation group.  
11  
12 Q. Dr Crook, you have made a witness statement for the  
13 purpose of this board of inquiry?  
14 A. I have.  
15  
16 Q. I will have a copy handed to you.  
17 A. Thank you.  
18  
19 Q. Is that your witness statement?  
20 A. It is.  
21  
22 Q. Are the contents of that statement true and correct?  
23 A. Yes, they are.  
24  
25 Q. Can I ask you to sign the final page, please.  
26 A. The final page. Yep.  
27  
28 MR COSTELLO: Thank you. Madam Chair, I tender that  
29 witness statement and the exhibits thereto.  
30  
31 CHAIRPERSON: Statement of Jonathan Crook and the  
32 documents referred to in the statement are exhibit CA40.  
33  
34 **EXHIBIT #CA40 STATEMENT OF JONATHAN CROOK AND DOCUMENTS**  
35 **REFERRED TO IN THE STATEMENT**  
36  
37 MR COSTELLO: Q. Mr Crook, you said you are the group  
38 manager for analytics and performance and South East Water?  
39 A. Yes.  
40  
41 Q. You've got undergraduate degrees in mathematics and  
42 physics and a PhD in mathematics?  
43 A. I do.  
44  
45 Q. You have applied your expertise here to analyse water  
46 flow data in the McCrae network. Is that an ordinary  
47 aspect of your job?

1 A. Not for calculating size of leaks. It's more - my  
2 day-to-day job's more around the analytics around customer  
3 metering as opposed to the main meters that we're talking  
4 about here, but in terms of the analysis of time series  
5 data, which effectively this is, that would be a standard  
6 aspect of my role, yes.

7  
8 Q. So the analysis of time series data is an ordinary  
9 aspect of your job but you don't ordinarily do that work in  
10 circumstances of identifying volume of leaks?

11 A. Correct.

12  
13 Q. Thank you. Just to set the scene, you have reached  
14 the conclusion that between 34 and 41 megalitres of water  
15 were lost during the 2024 burst event?

16 A. Yes.

17  
18 Q. And you know what I'm speaking about when I say "2024  
19 burst event"? All right.

20 A. (No audible response).

21  
22 Q. Could you briefly outline the method you used to reach  
23 that conclusion?

24 A. By all means. We have a number of meters in the  
25 McCrae area one that feeds water into the zone as a whole  
26 and a number of what I would call submeters which take  
27 water out and supply it to zones which have other  
28 customers. The balance of the water in and the water out  
29 of that area is, effectively, the sum total of any water  
30 that's used in that area. That includes both customer  
31 usage and any other sort of unmetered usage, which may  
32 include leaks or bursts.

33  
34 In this case, because the burst event happened over  
35 summer, it's tricky to know exactly how much of that water  
36 may have flown through to the customer properties. So to  
37 do that, I looked at previous years' history of customer  
38 usage or, sorry, previous years' usage into that area and  
39 tried to estimate how much would have been used by  
40 customers in that same time period, leaving the remainder  
41 to be what was unascrbed usage and in this case we've  
42 applied that to the burst event.

43  
44 Q. At paragraphs 10 and 11 of your statement - you have  
45 a copy of that there?

46 A. I do.

1 Q. At 10 and 11 of your statement, you have made some  
2 reference to meters, and private residential usage.  
3 A. Yes.

4  
5 Q. Why is working out private residential usage necessary  
6 if you have the difference between the meter and the  
7 submeters that you have referred to?

8 A. So within the area that the burst occurred, there are  
9 also a number of customer properties which are fed by that  
10 same balance. So effectively, when we do that balance, we  
11 end up with all of the usage that our customers in that  
12 same area are using as well as the water that's going to  
13 the burst, and so we need to understand how much of that is  
14 going to our customers so that we can subtract that from  
15 that water balance to be left with the amount of water that  
16 is going out of that burst event.

17  
18 Q. You then refer in paragraph 18 of your witness  
19 statement to some additional checks that aren't directly  
20 related to the estimation of the leak size. What were  
21 those additional checks?

22 A. There were two primary ones. One is we have a series  
23 of tanks in that zone which take water, supply it both back  
24 into that area but also into a further part of our network.  
25 And so to - as a general sense check when you are doing  
26 sort of any mathematical analysis, you want to know that  
27 the data that you are getting is reasonably accurate or as  
28 accurate as it can be. So the check on those tanks was to  
29 make sure that the water flowing in and out of those tanks  
30 was of the right order given the size of the tanks, as well  
31 as that there wasn't, on any one day, more water that could  
32 have gone in or out of those tanks than the size of the  
33 tanks themselves, for example.

34  
35 Q. I see.

36 A. The second check was around once we did that water  
37 balance between the water in and out of the zone, was to  
38 check to see if that total volume was of the right order  
39 you would expect for the number of customers that we have  
40 in there and potentially the occupancy rates that we may  
41 expect to have in that sort of an area.

42  
43 Q. Thank you. You have prepared two reports dealing with  
44 the question, and you refer to them both at paragraph 22 of  
45 your witness statement. The first is dated 8 May, although  
46 you explain in paragraph 23 that, in fact, it was written  
47 in or around the middle of April.

1 A. Yes.  
2  
3 Q. And then the second is your final report.  
4 A. Yes.  
5  
6 Q. And that was finalised on 13 May?  
7 A. (Witness nods).  
8  
9 Q. And we'll come to the content of the final report  
10 soon, but before that, why two reports?  
11 A. So the first report and the first calculation was done  
12 off a network diagram that I was supplied. It was  
13 identified during further investigation that one of the  
14 meters in that network diagram was incorrectly placed off  
15 one of our - one of our mains pipes. So when I was  
16 notified of that change, I made the modification to the  
17 calculations that were required to properly assign the flow  
18 coming off that meter.  
19  
20 Q. Right.  
21 A. It is probably also worth sort of clarifying the  
22 timing of those reports. That work, as I say, was done  
23 in April. The reason that those two came very soon after  
24 each other was simply due to the fact that I sent out the  
25 wrong report first and then obviously needed to follow that  
26 up with the amended report.  
27  
28 Q. I see. Could we have on screen, please,  
29 SEW.0001.0001.4914, and if we could go to the second page,  
30 please. Thank you. That diagram there --  
31 A. Yes.  
32  
33 Q. -- is that the infrastructure map that you were  
34 talking about? So the actuating difference between the  
35 initial report and the final report was that in the final  
36 report, you rely upon this diagram?  
37 A. Yes.  
38  
39 Q. Whereas in the initial report, you relied upon  
40 a different infrastructure map; is that right?  
41 A. Yes, and in particular, off the red hash that you see  
42 in the top right-hand corner.  
43  
44 Q. Yes. The meter, WB130, I believe it was, which is the  
45 second purple line, the underneath of those two in the  
46 Cinerama Crescent/Flinders Street PR zone, that one fed  
47 from the red hash down into that same area as opposed to

1 coming from the Parkes Street zone, which is identified  
2 here.

3

4 Q. Why did the initial map indicate that?

5 A. I'm not sure.

6

7 Q. But in any event, you were either told or determined  
8 that it was in error?

9 A. Told, yes.

10

11 Q. You were told it was in error and you were told that  
12 this was, in fact, this was the accurate map?

13 A. Correct.

14

15 Q. In general terms, what's the effect of that change in  
16 the network on your analysis?

17 A. Yes, so when it was in its original location it was -  
18 what I would say is behind another meter, so we had assumed  
19 that the flow going out of that meter was accounted for  
20 because it had already been registered by a previous meter.  
21 In this case, because it does, in fact, come off that main  
22 area that was in question, we have to take into account the  
23 flow that's going out of that meter to get a correct water  
24 balance. In terms of the effect on the calculation, it's a  
25 little bit trickier in that, when it was in its original  
26 zone, incorrectly, the water would, effectively, have ended  
27 up in the sum of the balance - it would have been an  
28 unknown usage into the area. So adding it in to that area  
29 simply means that it is a more correct and accurate  
30 estimate of the balance.

31

32 Q. I know the resolution is not great on this but perhaps  
33 you can just give some explanation of what it is we're, in  
34 fact, looking at here. You are pointing to the purple  
35 triangle?

36 A. Yes.

37

38 Q. Now, a purple - sorry, not a purple - a triangle like  
39 that is a water meter; is that right?

40 A. I believe the water meter is actually the F that sits  
41 beside that purple triangle. The F in a little --

42

43 Q. I see. Immediately before it?

44 A. Yes, before it, yes.

45

46 Q. Immediately before it. Then what's the purple  
47 triangle?

1 A. I would have to look at the diagram but --  
2  
3 Q. That's all right. These are not diagrams that you  
4 commonly have regard to?  
5 A. No.  
6  
7 Q. You had to seek to understand this diagram for the  
8 purpose of doing this particular work?  
9 A. Yes.  
10  
11 Q. All right. And did anybody assist you with that or  
12 were you --  
13 A. Yes, so discussions with Julian Tully.  
14  
15 Q. Thank you, all right. There is another infrastructure  
16 map that appears to be different. Let me bring it up and  
17 you can tell me whether or not this was the map that you  
18 initially had regard to or if it's something else. It's  
19 SEW.0001.0001.4918.  
20 A. If not identical, very similar.  
21  
22 Q. I see.  
23 A. But with the same idea that that meter is now coming  
24 from the Cook Street tank zone, red hash, into that  
25 Cinerama Cres and Flinders Street PR zone.  
26  
27 Q. So this map is a diagrammatic explanation of the  
28 infrastructure in the area, but it appears to be done in a  
29 slightly different way. For example, here there is no  
30 sideways triangles that I was pointing out to you before.  
31 A. Correct.  
32  
33 Q. But this is presenting the same data in a different  
34 visual format as the one we were looking at earlier?  
35 A. Yes.  
36  
37 Q. Is this the one that you relied on or do you rely on  
38 the earlier one?  
39 A. In terms of the final report?  
40  
41 Q. Yes.  
42 A. The earlier one.  
43  
44 Q. The earlier one. Thank you. Now, is it right that in  
45 performing your calculations, you chose two specific  
46 periods - 60 days and 85 days for your analysis?  
47 A. I wouldn't say I chose them; it's what I assessed from



1 the graph that came out of it.

2

3 Q. Your analysis of the graph suggested that those were  
4 the relevant periods that needed to be analysed?

5 A. Yes.

6

7 Q. And why 60 days and why 85 days? What was the - why  
8 not just one as opposed to both?

9 A. So to my eye, there was a fairly distinct in the -  
10 effectively, the difference of the balance being above zero  
11 from the 60-day mark, and, you know, a pronounced slope  
12 increase in that graph, which suggested there was something  
13 other than standard usage going on. When I'm doing any of  
14 this work, however, I always like to be trying to be very  
15 clear about what I've seen and what I've found and what  
16 I believe may be apparent, and to my assessment, there was  
17 a period of about 25 days prior to that which did have  
18 a smaller but potentially noticeable increase above  
19 a balance of zero, and I thought it would be remiss not to  
20 call that out and make that clear in the work I was  
21 presenting.

22

23 Q. I see. So you decided to use four years of historical  
24 data for the baseline; is that correct?

25 A. Yes.

26

27 Q. Why did you choose that period?

28 A. Yes, so obviously we have a fair history in there and  
29 finding a balance between how long, longer or shorter, is  
30 tricky. If we use too little data, we end up with being  
31 heavily influenced by a very small amount of changes, the  
32 things that have happened recently, which may overweight  
33 one-off events that happened in that time period. The  
34 further we go back, the more we're influenced by changes to  
35 customer behaviour or changes to the population, changes to  
36 the percentage of people that are actually occupying their  
37 properties.

38

39 With four years, it was an attempt to try a reasonable  
40 balance. Obviously COVID has complicated a lot of  
41 historical data that we've worked with, but by including  
42 those COVID years, I felt we were taking a conservative  
43 approach to the work we were doing - I was doing.

44

45 Q. You relied on a number of flowmeters for your volume  
46 calculations; is that correct?

47 A. Yes.

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Q. Were there any particular flowmeters that were critical to the water balance?

A. The - probably the two that would be most critical would be the flow at - the main flowmeter entering the area, so WP208FT1, and then one them entering the tanks at the end, which would be one of the two in particular around WP222.

Q. I see. Are all of those meters calibrated regularly?

A. I'm not sure.

Q. Do you know if there is any standard that relates to calibration of flowmeters?

A. Not to calibration. I obviously know there is regulations which I think I have included in that, in my report.

Q. Yes. You make a reference in your report to NMIR49-1. Do you know whether or not that standard is complied with?

A. No, I'm not sure.

Q. All right. You just know that the standard exists?

A. Yes.

Q. It appears from your final report that one meter, which was WP222FT3, had an outage in early 2021. Do you recall that?

A. Not off the top of my head but it's quite possible.

Q. I will draw your attention to it in a moment.

A. Thank you.

Q. If you proceed on the assumption that that's contained in your final report, how was it that you would have come to be aware of the fact of that outage?

A. Can you call up which meter it was and I'm sure I can have look at my work so I can --

Q. Yes, it is WP222FT3.

A. Yes. So in terms of if there was an outage, typically, we would just see that as either periods of blank or null data available to me in the data I've provided.

Q. So because an outage is identifiable by null or blank data, you can be confident that there were no similar

1 outages that occurred during the burst period?

2 A. Yes.

3

4 Q. Are you aware of whether any additional work was done  
5 by South East Water to validate the accuracy of the meters  
6 during the late 2024 period?

7 A. I'm not aware of any, except for I believe there was  
8 one email that I received, which referred to one of the  
9 meters and a check that was done on that.

10

11 Q. You mention at paragraph 25 of your witness statement  
12 that one meter, WB130 --

13 A. Yes.

14

15 Q. -- was originally excluded and then included. Is that  
16 because of the difference in the diagram that we've talked  
17 about, or is that for a different reason?

18 A. It's for that reason.

19

20 Q. I see. So the original diagram that you relied upon  
21 for your earlier report didn't include WB130 and this  
22 diagram did?

23 A. Yes. So the diagram that we have up on the screen at  
24 the moment shows it coming off a zone for which the water  
25 is already accounted for by another meter.

26

27 Q. I see. And so that's - the square box in the  
28 purple --

29 A. Yes.

30

31 Q. -- the second square box in the purple area, and  
32 accepting as you said before that you are not entirely  
33 familiar with these types of diagrams, do you understand at  
34 least what the different colours indicate?

35 A. I believe they're just for distinct zones.

36

37 Q. For distinct zones?

38 A. Yes, in terms of what they call - the names on them,  
39 the Cook Street tank zone, Cinerama Crescent, Flinders  
40 Street PR zone.

41

42 Q. So all of the water that's being fed into the relevant  
43 zone comes from the Dromana reservoir?

44 A. Yes, I believe so.

45

46 Q. Then it passes through into each of the zones, and the  
47 large hashes, are they in every case a tank?

1 A. No. I believe the large hashes simply refer to groups  
2 of customer properties that are in the area.

3

4 Q. I see. And does each zone have a flowmeter?

5 A. Not necessarily. The ones that we have in these areas  
6 I believe do. But not - if you're looking, for example,  
7 for the - was that the question - yes, the four lines that  
8 go out to different hashes in blue, for example, there  
9 wouldn't necessarily - there wouldn't typically be meters  
10 on each of those.

11

12 Q. You adjusted for seasonal variation by averaging data  
13 from prior years; is that correct?

14 A. (No audible response).

15

16 Q. And when you averaged the data from the prior years,  
17 did you make any investigation into whether or not there  
18 was unseasonal weather in those prior years - that is,  
19 whether one year was particularly hot or a year was  
20 particularly cold?

21 A. Not in particular. I have more recently had a look at  
22 weather patterns for the Moorabbin area, and there didn't  
23 seem to be anything too anomalous there. I think the final  
24 year was the warmest. 2024, that is.

25

26 Q. 2024 was the warmest?

27 A. Yes.

28

29 Q. Thank you. Was it necessary to account for any COVID  
30 era behavioural shifts?

31 A. So it was considered, in that what typically happened  
32 during COVID is we had a lot less pronounced seasonal  
33 impacts. People tended to stay at home, they didn't move  
34 as much, there wasn't as much travel around. So what that  
35 tended to mean is we saw less seasonal impact. So  
36 considering what effect that's going to have on the  
37 calculation means that you end up with - I'll use a term -  
38 less what I would call a peaking factor, so less of  
39 a summer increase, and applying that would mean that we  
40 would end up to be fairly conservative about the leak size,  
41 so we would probably estimate that it would be larger  
42 potentially than it was, and so it was decided that it was  
43 better to leave that in as opposed to try and make any  
44 changes that may make us - make it look like the leak was  
45 smaller than we expected it to be, or not expected it to  
46 be, but calculated, I calculated to be.

47

1 Q. You have attributed the entire excess volume to  
2 a single burst event; is that correct?

3 A. Yes.

4

5 Q. Could it have been caused by a number of smaller  
6 issues or unmetered uses?

7 A. It could have been impacted by other uses, but what we  
8 see is that we know the day that the leak finishes,  
9 obviously we've got the Montage records that refer to that,  
10 and we see that that peak drops to - back to a normal level  
11 at that stage, coinciding with the leak being repaired. So  
12 it seems fairly unlikely that there would have been  
13 a number of other repairs or other, say, unmetered customer  
14 usage that would have also been repaired at exactly the  
15 same day and therefore it looks likely that all of that  
16 usage would be due to the burst event. There may have been  
17 short periods in that time where there are other events  
18 that could have contributed and added to it, but we  
19 wouldn't be able to know.

20

21 Q. Would you describe the change here as a sudden spike  
22 in flow or a gradual increase?

23 A. I would say a steady increase.

24

25 Q. So it being a steady increase, how is it that you  
26 distinguish it from just increased use?

27 A. That's - in terms of in the area?

28

29 Q. Yes.

30 A. That's to do that seasonal calibration so we look at  
31 what happened in previous years, tri4d to work out what the  
32 typical increase over a summer would be and then removed  
33 that from that year's usage to end up with the remainder  
34 being - well, you know, the excess above what we would  
35 expect to be typical, to be the burst event.

36

37 Q. Are you aware of other estimates of the burst volume  
38 being prepared?

39 A. I know of three, yes.

40

41 Q. What are the three that you are aware of?

42 A. So there is one done previously by South East Water;  
43 one done, I believe, by Mr Bolch, I believe it is; and  
44 another by Mr Christofi.

45

46 Q. The one that was previously done by South East Water,  
47 is that the estimate prepared by Mr Loudon?

1 A. Yes.  
2  
3 Q. And you had regard to that?  
4 A. I'm aware of it, yeah.  
5  
6 Q. Did you consider it in the course of doing your  
7 report?  
8 A. I didn't look into it until after I'd finished my  
9 calculation.  
10  
11 Q. I see. And after you had finished your calculation,  
12 you had regard to it to ascertain - as a sort of  
13 a cross-check?  
14 A. Yes.  
15  
16 Q. Is that the idea? All right. Could I have on the  
17 screen, please, SEW.0001.0001.0036. This is a document you  
18 have seen before. I might just ask the operator to scroll  
19 through it just so you can see the graph at the end, which  
20 is the graph of the water going into the area, I believe?  
21 A. Yep. Yes, I have.  
22  
23 Q. Is this the format that you saw Mr Loudon's --  
24 A. I think originally I was just given it verbally but  
25 eventually I saw this, yes.  
26  
27 Q. I see, thank you. Now, did you interrogate the source  
28 of data used by Mr Loudon?  
29 A. I believe it would have been a very similar source of  
30 data that I used. I'm not aware exactly of where his came  
31 from.  
32  
33 Q. Are you aware of whether he adopted a similar approach  
34 to you in performing his calculations?  
35 A. No. I believe it would have been different to mine.  
36  
37 Q. What would be the central differences between your  
38 method and his method?  
39 A. If he would have looked at - from - if we can actually  
40 just go back to that final graph, if that would be  
41 possible.  
42  
43 Q. The green one?  
44 A. Yes, yes.  
45  
46 Q. If you could just scroll forward until we get to  
47 a green bar graph, not that one. Keep going. After the

1 photos. That one. Thank you. It is a bit grainy.  
2 A. Yes. So my understanding is that's done off a minimum  
3 nightly flow calculation, so the smallest --  
4  
5 Q. Did you say done via an overnight flow calculation?  
6 A. Over what they call minimum nightly flow.  
7  
8 Q. Minimum nightly flow, thank you.  
9 A. Yes, which is to look at how - the smallest volume of  
10 water going through a meter at night. What they've done,  
11 effectively, is looked at what the baseline was prior to  
12 the leak, when they believe the leak was started, what they  
13 looked at when it was at its peak, and then simply done an  
14 area under the curve of a triangle over that time period.  
15 So that's to say, calculate how long it went for, the  
16 increase that came, and that gives you a volume.  
17  
18 Q. And you would accept, wouldn't you, that minimum  
19 nightly flow is an important indicator for this type of  
20 analysis?  
21 A. In terms of finding a leak?  
22  
23 Q. Yes.  
24 A. Yes.  
25  
26 Q. And did you take that into account in your work?  
27 A. The minimum nightly flow?  
28  
29 Q. Yes.  
30 A. I looked at it briefly. There are a couple of issues  
31 with it in terms of the context of what we're working here  
32 with. In particular, we're trying to do seven - I believe  
33 seven different meters, so minimum nightly flows happen at  
34 different times on different meters so it can be harder to  
35 give an accurate estimate.  
36  
37 Q. Just before you go on, could you just explain that?  
38 Why is it that the minimum nightly flows happen at  
39 different times on different meters?  
40 A. So as an example, we have the volume of water that  
41 comes into the area, some of that feeds into a tank. The  
42 water coming into the area may stop flowing and therefore  
43 you would see its minimum nightly flow or - may stop  
44 flowing but be significantly reduced and you would see its  
45 minimum nightly flow at one time. At that same time, the  
46 tank may start feeding water back into the area, and so it  
47 might have a significant volume of water happening at the

1 same time as the other one has its minimum. There's also  
2 other aspects that make it a little bit more complicated.  
3 We have pressures that change at different times of the  
4 day. So even if you have a minimum nightly flow at one  
5 time, that same flow rate may not be appropriate at other  
6 times of the day. So you might get more or less water  
7 coming out from a burst depending on the pressure in the  
8 area.

9  
10 Q. Are there any other reasons that you would discount  
11 it?

12 A. Off the top of my head, no, I suspect there may have  
13 been, but --

14  
15 Q. I'll take you to paragraph 20 of your witness  
16 statement which might assist you in a moment, but before  
17 I do, is the utility and accuracy of minimum nightly flow  
18 more likely to be higher where you're looking at it in  
19 respect of a smaller area, a smaller number of zones?

20 A. It depends a lot on the volume of water going through  
21 the meter overnight in comparison to the size of that zone  
22 itself. So, for example, to try and sort of elaborate on  
23 that, if - meters tend to run better, from my  
24 understanding, when there is a reasonable amount of flow  
25 going through them. As you start dropping into the very  
26 low ones, potentially, the accuracy isn't as great, and  
27 therefore, if you have a very large zone for - and a very  
28 large meter that's sized for it and a small amount of water  
29 going through it, there are levels of accuracy that may not  
30 be as good.

31  
32 Q. I see. Just to make sure that you have been given the  
33 opportunity to make the points that you want to make,  
34 I will just show you paragraph 20 of your witness  
35 statement, which is SEW.0001.0001.4919. Go to page 4,  
36 paragraph 20. I think this is the paragraph where you deal  
37 directly with Mr Loudon.

38 A. Yes.

39  
40 Q. Could you just read that paragraph to yourself, and  
41 see if there's any further evidence that you wish to give,  
42 in light of the matters there --

43 A. Sorry. I know we were talking about minimum nightly  
44 flow and we were focusing on that. If we're talking about  
45 the calculation in particular and the reasons for the  
46 differences --



1 Q. Yes.  
2 A. -- there are probably two or three that are worth  
3 calling out. It may be worth showing the graph again, but  
4 the three of them that I suppose I would call out:  
5 firstly, that calculation didn't have any seasonal  
6 adjustment so it assumes that all of the water going into  
7 that area above and beyond the baseline is all attributable  
8 to the leak event as opposed to an increase that we would  
9 see in summer. The second is - and again, I've had a look  
10 at that graph, had a conversation with people in question,  
11 and it looks like the bottom level they've chosen to start  
12 their calculation from is probably lower than is accurate.  
13 And then the third point is they assume a perfectly linear  
14 growth, in that it grows the same amount each day, and we  
15 could probably see in that previous graph that it doesn't  
16 grow like that, it tends to grow smaller at the start and  
17 then increase more rapidly at the end. So all of those  
18 three things will tend to overestimate the size of the  
19 leak.  
20  
21 Q. I see. And as it happened, on your analysis - if your  
22 analysis is correct, then those three factors caused it to  
23 be overestimated by 40 per cent or so?  
24 A. I believe so, yes.  
25  
26 Q. So when did you first receive Mr Loudon's full  
27 workings?  
28 A. I don't know the date off the top of my head.  
29  
30 Q. Was it after you had finished your first report?  
31 A. No, I'm not certain. I can come back with the  
32 information if I can, but --  
33  
34 Q. Do you recall if you had regard to Mr Loudon's  
35 workings before you finalised your second report?  
36 A. I suspect I would have had the volume. I'm not sure  
37 if I would have had the email.  
38  
39 Q. And you had the volume because somebody had told you  
40 the headline number. And who was that?  
41 A. Most likely it would have been Julian but I'm not a  
42 hundred per cent certain.  
43  
44 Q. Julian is Mr Tully?  
45 A. Yes.  
46  
47 Q. And do you recall the context in which he told you the

1 number?

2 A. No.

3

4 Q. Who was it that asked you to prepare your reports?

5 A. Julian Tully. Mr Tully.

6

7 Q. What was the explanation given to you by Mr Tully?

8 A. There was an explanation that we had identified  
9 a burst event in the area and that we were interested in  
10 trying to find the most accurate calculation we could have  
11 for the size of that leak.

12

13 Q. When Mr Tully told you the headline number that  
14 Mr Loudon had arrived at, do you recall if that caused you  
15 to go back and reconsider your own number or did you have  
16 an immediate reaction to Mr Loudon's number?

17 A. To be honest, I would suspect that given I have some  
18 idea how they typically do these calculations that I would  
19 have expected that his number - to have been larger. It  
20 was not a surprise.

21

22 Q. So Mr Loudon's estimate was the first of the three you  
23 mentioned.

24 A. Yes.

25

26 Q. The second was Mr Bolch's?

27 A. Yes.

28

29 Q. When did you become aware of Mr Bolch's estimate?

30 A. Only quite recently, sort of while - probably while  
31 preparing the witness statement. Again, I knew he had made  
32 an estimate but in terms of the volume, it was only very  
33 recently.

34

35 Q. What have you been shown about Mr Bolch's estimate?

36 A. So I read through the comments from the court.

37

38 Q. I see. You read through his evidence, do you mean?

39 A. Yes, in the transcript of --

40

41 Q. Him in the witness box?

42 A. Yes.

43

44 Q. I see. And Mr Bolch, I think I'm right to recall,  
45 accepted in the witness box that he wasn't an expert on  
46 this but he had made a good faith calculation?

47 A. Yes.

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Q. Of what it might be. What are your reflections on Mr Bolch's estimate?

A. Look, I can't speak to the engineering, it's not something that I can comment on. Probably the mathematical side of things, what I was aware of with his calculation is he's assumed a leak which is the same size for the entire length of the 60 days that he calculated it over and that was obviously something that we didn't see in the data that we had available to us, which understandably, he would not have had available.

Q. Did you reconsider your work in the light of Mr Bolch's or were you able to discount Mr Bolch's estimate?

A. I was fairly comfortable with the differences.

Q. Part of Mr Bolch's estimate was based on an assessment of the pressure in the pipe. Do you recall that?

A. I believe I saw that written, yes.

Q. Is that something that you had regard to in coming to your estimate?

A. No. We're dealing with the water that actually comes through the pipe and so we sort of have an understanding of the actual water itself as opposed to the pressure that's forcing it through.

Q. So you're not seeking to ascertain whether or not the pressure has an effect in that it causes - higher pressure causes more water to leak, you're trying to ascertain the actual gap in water as identified by flowmeters and domestic meters?

A. Yes. Well, we didn't use the domestic meters but the domestic usage.

Q. Yes, thank you, you are quite right. On the question of domestic meters, did you consider having regard to domestic meters in the area?

A. We looked into them and really at a very high level of how much water had gone through them. But in terms of this calculation, because it's only a 60-day time period and we're only reading the analogue meters in the area over a 90-day time period, it means that we would have to make, say, guesswork or assumptions into how much of each of those customers' water usage was during the time of the burst event, and they were assumptions or guesses which

1 I felt were too approximate to be included.

2

3 Q. I see. You mentioned Mr Loudon's report, Mr Bolch's  
4 report - sorry, Mr Bolch's estimate, and Mr Christofi's.  
5 Do you consider Mr Christofi's and Mr Bolch's to be the  
6 same or do you consider them to be different?

7 A. Different from what I have read.

8

9 Q. And you had regard to Mr Christofi?

10 A. Yeah. So, sorry, I read through his - I think it was  
11 his evidence that was presented, and the main reason I try  
12 and consider them as distinct is because from what I could  
13 read into that work, Mr Christofi assumed the leak did grow  
14 over a period of time, so unlike the consistent number that  
15 Mr Bolch provided, he assumed it grew every 15 days.  
16 Probably again, if I look at the mathematical side of what  
17 he did, he assumed, I think, a 150mm leak by the last 15  
18 days - sorry, 150mm hole in the last 15 days. And the  
19 volume of water that was going through that per day was in  
20 the order of about 4 megalitres per day. And obviously  
21 from the data that we have, I think the entire amount of  
22 water that we supply into the area in that time was about  
23 2.5 megalitres per day.

24

25 Q. Yes. It seemed to me that Mr Christofi's analysis had  
26 a final flow rate of 4 megalitres a day and that was higher  
27 than the highest peaks in the graph?

28 A. Yes.

29

30 Q. And that's because that's more than the total volume  
31 of water passing through?

32 A. Yes.

33

34 Q. Thank you. So that's the range of estimates. Has  
35 your work been peer reviewed?

36 A. No, it's currently undergoing a review from the  
37 University of Technology in Sydney.

38

39 Q. And who is it that is peer reviewing it?

40 A. Their Institute for Sustainable Futures, so I believe  
41 that the lead of that is Professor Pierre "Mukheibi" -  
42 Mukheibir, sorry

43

44 Q. When was that peer review sought?

45 A. I think we kicked off about three to four weeks ago.

46

47 Q. I see. And when is the peer review expected to be

1 finalised?

2 A. We've had a preliminary report and I'd say we would  
3 have a final report in the next week or so.

4  
5 Q. You have received a preliminary report?

6 A. Yes.

7  
8 Q. And what is the headline of the preliminary report?

9 A. Effectively, the methodology - because we've asked  
10 them to review the methodology and not the data itself -  
11 the methodology is sound. They've given a couple of  
12 suggestions for other methodologies that could be used.  
13 They did not believe that would make a significant  
14 difference to the size of the calculation.

15  
16 Q. All right. Were you involved in selecting the peer  
17 reviewer?

18 A. (No audible response).

19  
20 Q. And on what basis did you make that selection?

21 A. So we've had a history of working with UTS. They have  
22 a very long history of working with water, both, you know,  
23 leak calculations, not necessarily as I have said, like  
24 this one, but in terms of volumetric flow calculations and  
25 other time series to do with water usage.

26  
27 Q. I see. Can we talk a bit about uncertainty.

28 A. (Witness nods).

29  
30 Q. I think I'm right to say that you offer two ranges of  
31 uncertainty?

32 A. For each of the two lengths of time, yes.

33  
34 Q. One based on observed variation and one based on meter  
35 specification?

36 A. Yes.

37  
38 Q. Before we get to an analysis of the two, perhaps it  
39 might be useful if you just explain the two of them. So  
40 commencing with the uncertainty based on observed  
41 variation?

42 A. Yeah. So that was simply to try and calculation the  
43 typical - what I call standard deviation variation in the  
44 volume of water that goes through it. So on any days, how  
45 much does that water usage vary. And it's probably worth  
46 noting that that includes difference in behaviour, how  
47 customers use water, as well as any other uncertainties

1 that are involved there. So it's always going to be -  
2 should always be the largest uncertainty you could see in  
3 it, because it includes uncertainty that's real not just  
4 uncertainty that's created by the calculation.  
5

6 Q. And the uncertainty based on meter specification?

7 A. Yeah, so that's to run with the fact that we used  
8 a 1 per cent uncertainty in the meters to assume that or  
9 apply that to the volume of water that flowed through each  
10 of those meters, and also to assume worst case scenario,  
11 effectively.  
12

13 Q. The larger uncertainty is in the range of 9 to  
14 13 megalitres. Do you recall that?

15 A. Correct, yes.  
16

17 Q. And that incorporates human and environmental factors?

18 A. Yes.  
19

20 Q. The smaller range is between 2 and 3 megalitres?

21 A. Yes.  
22

23 Q. That's the one that relates only to meter accuracy?

24 A. Yes.  
25

26 Q. You didn't attempt to quantify the probability of your  
27 estimate being outside the 34 to 41 megalitre range?

28 A. No.  
29

30 Q. Why was that?

31 A. I suppose within the larger range, again, the larger  
32 calculation, that was to give sort of a full end spectrum  
33 of how large we thought the uncertainty could be. In terms  
34 of trying to find a methodology for the probability it was  
35 outside that range, I'm not sure where I'd begin.  
36

37 Q. You are not sure what?

38 A. Where I'd begin to look to work out what the  
39 probability of it being outside that range was.  
40

41 Q. If you had to describe your estimate as  
42 "conservative", "moderate" or "generous", how would you  
43 describe it?

44 A. The assumptions that I have tried to make - I've  
45 always tried to be conservative, and when I say  
46 "conservative", I mean to not make any assumptions that  
47 would force the leak to be smaller than its actual result.

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Q. That was your intention?

A. Was to try and make sure that, yes, wherever I could, to not discount things that would - to - yes. I'm trying not to get myself into double negatives here, but, effectively, I didn't want to try to make it look like the leak was any smaller than it could have been.

Q. I just want to ask you some questions about mathematical reliability and statistical rigour. And if any of the questions don't have a relationship to the work you've done you need only say so. You constructed a typical year using an average of prior years; is that correct?

A. (No audible response).

Q. Did you consider whether a median or a trimmed median might offer a more robust alternative?

A. I don't really think that applies in this situation, in that we're talking four data points.

Q. What about - you don't think that because of the limited data points, there's a sufficient prospect of outliers?

A. The effect it's going to have on that calculation is going to be minimal.

Q. Too small to bother. I understand, thank you. Did you check for variants or standard deviation across the years that you looked to?

A. So we looked at the yearly variation in terms of visual representation. But again, to do a standard deviation on, if you're looking for each day on four data points is - we can't even be sure it is a normal distribution, which we require to do a standard deviation. We'd looked at the standard deviation across the entire dataset, which is what you see in that uncertainty calculation.

Q. I think I'm right to say that you refer to a 95 per cent confidence interval?

A. Yes. Sorry. Yeah.

Q. And just so I understand it, did you assume a specific distribution?

A. A normal distribution --

1 Q. Normal distribution?  
2 A. -- over the entire length of the dataset.  
3  
4 Q. The specific distribution was normal, a normal  
5 distribution?  
6 A. Yes.  
7  
8 Q. Thank you. Sometimes in the context of uncertainty  
9 scales there's consideration as to whether or not error  
10 bounds are additive or multiplicative?  
11 A. Yes.  
12  
13 Q. Is that something that's relevant to your analysis  
14 here?  
15 A. No, there's only one type of error that we're  
16 including in these, so there's not --  
17  
18 Q. Which error is that?  
19 A. So either - either the - we're doing basically  
20 a calculation of a daily error. So in either case we've  
21 either had a single --  
22  
23 Q. I see.  
24 A. -- size of the uncertainty due to the meters or  
25 a single total uncertainty due to the standard deviation  
26 across the entire dataset.  
27  
28 Q. Thank you. And once you had come to your conclusion,  
29 did you then conduct any further analysis to test the  
30 robustness of your conclusions?  
31 A. I'm just trying to think if there would be anything  
32 that would be relevant. As part of it - as part of the  
33 analysis we did, obviously, we did the checks at the time,  
34 so the ones that we've already spoken about. But once they  
35 were done, there probably wasn't anything that would be  
36 appropriate to follow afterwards.  
37  
38 Q. And nothing's been identified by the peer review in  
39 that regard?  
40 A. No. Probably the only - the work was then shared  
41 amongst South East Water and at least reviewed as SME  
42 expertise, but that's, you know - they're unlikely to pull  
43 anything out mathematically from it but they are likely to  
44 find anything that would seem at cross-purposes with what  
45 you'd expect.  
46  
47 Q. When was it shared?



1 A. In the interim between the - the final report being  
2 finalised and my witness statement being written.  
3  
4 Q. I see. And have you received any feedback from those  
5 with whom it was shared?  
6 A. So, yes, I mean, we sat together and went through it.  
7  
8 Q. I see.  
9 A. Yes.  
10  
11 Q. And you sat together and talked - they talked through  
12 the report and gave you their comments. And do you recall  
13 if you made any changes as a result of that feedback?  
14 A. No.  
15  
16 Q. No changes were made?  
17 A. Sorry, probably the only - no, no changes to the  
18 calculation, no.  
19  
20 Q. I'm not sure that I entirely understand the extent to  
21 which there were multiple meter readings done in the course  
22 of your work. Do you recall how many meters there were  
23 that you had to have regard to?  
24 A. What meters are we talking about?  
25  
26 Q. Well, I think start with flowmeters.  
27 A. Again, do you mean customer flowmeters or the  
28 flowmeters of the area?  
29  
30 Q. Well, did you have regard to both?  
31 A. So in terms of their applicability, yes.  
32  
33 Q. So you obtained the meter readings from both of those  
34 types of flowmeters?  
35 A. So we did from the main meters - the main and the  
36 submeters, which are the meters that take water in and out  
37 of the area. We looked at the number of readings we had  
38 and when the readings were made of customer meters, without  
39 using the actual volumes that went through them in the  
40 calculation.  
41  
42 Q. Yes. I think the mistake in my question is that I was  
43 substituting - I was saying "flowmeter" when I meant "main  
44 meter"?  
45 A. Okay.  
46  
47 Q. So you had regard to the main meters and the

1 submeters?

2 A. (No audible response).

3

4 Q. All right. And we had better make sure that it is  
5 clear what the role of each of these meters are. Could you  
6 describe the main meter and the submeter?

7 A. I'm not a network expert in regard to use. The use of  
8 the word "main" and "submeters" may be something that I use  
9 but, effectively, they are measuring the same way. They're  
10 both measuring water that goes through a pipe in South East  
11 Water's network.

12

13 Q. Would all the water that passes through a submeter  
14 necessarily have already passed through a main meter?

15 A. In the context that I'm using the terminology, yes.

16

17 Q. Yes. I understand. And that means there is  
18 necessarily then some relationship between the meter  
19 readings of the submeters and the meter reading of the main  
20 meters?

21 A. They're made independently of each other. You would  
22 expect, obviously, that you would have no more water going  
23 through a submeter than has gone through the main meter to  
24 go into it, with a little bit of variation there because  
25 there are tanks which do store water which can impact it,  
26 but, you know, you should have a net balance of water that  
27 goes through the area.

28

29 Q. So then when you were seeking meter readings relevant  
30 to your work, how do you ascertain - before we come to the  
31 actual data and whether or not there is any propagation of  
32 uncertainty, how did you actually get that data?

33 A. I was provided it by a colleague.

34

35 Q. You would have asked a colleague for it, and do you  
36 recall who you asked?

37 A. Yes, I think it's in as the one of the documents that  
38 I provide. I think the person is Vui Shin Liew.

39

40 Q. That's not someone you deal with on a regular basis?

41 A. In terms that we both work with data, but yes, we  
42 speak to them, but in relation to something like this, no.

43

44 Q. When you were asked to do this task, was it  
45 immediately - was it sufficiently apparent to you what data  
46 you needed or did you have a conversation with your  
47 colleagues in data analytics to ascertain what it was that

1 they could provide you with?

2 A. I would have - yeah, I would have needed to have  
3 a conversation. I wouldn't have known what meters were in  
4 the area to request the data from.

5

6 Q. I see. In any event, were you provided with the data  
7 and you understood the data to relate to what you have  
8 described as "main meters" and "submeters"?

9 A. (No audible response).

10

11 Q. You didn't seek data in respect of the domestic meters  
12 at individual properties?

13 A. No. I mean, I can get that data for myself.

14

15 Q. I see.

16 A. Yes.

17

18 Q. Did you have regard to that data or you --

19 A. So in particular, in terms of how many meters we had  
20 in there, about when they were read, yes, that was  
21 considered. Yes.

22

23 Q. Volume of usage?

24 A. I had a look at it at one point, yes.

25

26 Q. But am I correct to understand that you didn't think  
27 volume of usage at domestic meters, even if summed, was  
28 a data point of particular utility to your work?

29 A. No, so the reason for that is, a lot of the meters  
30 were read - again, they're not all measured, read at the  
31 same time, because we have people that go out and they read  
32 them over time. A lot of them were read on and around the  
33 end of November. And so it means that while they're 90  
34 days of usage, only 30 days of that usage from the first  
35 period, and 30 days of usage from the second read, would  
36 actually have been applied to the same time period that the  
37 burst was occurring. And so we would have had to make some  
38 guess or assumption on how much of each of those customer  
39 meter reads and the volume of water they used was actually  
40 attributable to that time period. And so I felt there were  
41 too many assumptions I'd have to make to include that and  
42 it was more appropriate to do the calculation the way  
43 I did.

44

45 Q. I see. And your analysis didn't include, for example,  
46 any cross-checking of operational logs or material of that  
47 type; you were just concerned with the raw data in terms of

1 flow rates, is that fair?  
2 A. Yes, except for obviously knowing the day that the  
3 leak finished.  
4  
5 Q. You knew the date the - well, when you say "the leak  
6 finished", you knew the date the repair was made?  
7 A. Yes.  
8  
9 Q. And that date was 31 December 2024?  
10 A. (Witness nods).  
11  
12 Q. And the data that you saw correlated with the fact  
13 that a repair had been made on that day?  
14 A. Yes.  
15  
16 Q. You saw a change in the --  
17 A. Yes, so I didn't actually know the date when I did the  
18 calculation.  
19  
20 Q. I see.  
21 A. I correlated it afterwards, and it was obviously very  
22 obvious from the data that that was the day it should have  
23 happened on and that was confirmed by the logs.  
24  
25 Q. All right. So then just to understand the final  
26 conclusions that you've come to and the degree of certainty  
27 that you consider they offer, you have given a range-based  
28 estimate?  
29 A. Yes.  
30  
31 Q. And you accept that that estimate - that range is  
32 subject to several uncertainties, and which are the most  
33 prominent or significant uncertainties that you would point  
34 to?  
35 A. Probably the biggest uncertainty would be the - you  
36 know, understanding the data itself, so any calculation  
37 relies on the data that comes into it. So there is that  
38 one. The second would be we have assumed that the usage  
39 from the previous four years can be assumed to be  
40 representative of what happened in the year in question.  
41 And I'd say that would probably be the biggest assumption  
42 we've needed to make.  
43  
44 Q. The first you pointed to was understanding the data.  
45 Is there also an uncertainty in your mind as to the  
46 accuracy of the data or are you content that the data in  
47 respect of flowmeters is likely to be highly accurate?

1 A. I think there's always a risk that there is going to  
2 be uncertainty in that data. I think what gave me - gives  
3 me comfort is that there's very likely that that's going to  
4 be both a positive and a negative difference, and so  
5 there's not a bias to it, which is one of the things that  
6 we're most concerned about when doing calculations of this  
7 sort of length of time and this type. So it's unlikely to  
8 have biased the result one way or the other.

9

10 Q. One way or the other?

11 A. Yes.

12

13 Q. Based on the data that you've seen and analysed,  
14 you're confident that it is probable that all - well, that  
15 the overwhelming amount of excess water loss can be  
16 attributed to a single burst event?

17 A. (No audible response).

18

19 Q. And based on the feedback that you have received from  
20 the peer reviewer, do you anticipate making changes, even  
21 if minor changes, to the report that you and I have been  
22 describing as your final report?

23 A. So they've had one suggestion that I will take on  
24 board, and we will look at. I'm not sure if it's going to  
25 be possible to do, and that is around looking to see if we  
26 have other representative areas that could be used to  
27 indicate, as we've been talking about, whether or not that  
28 seasonal adjustment is appropriate for that year. The  
29 possibility of finding similar type catchments, I'm not  
30 sure about.

31

32 Q. That leads me to something that I was going to ask you  
33 about, which is: this is a fairly small area that you have  
34 looked at within the broader South East Water network --

35 A. Yes.

36

37 Q. -- and have you - you haven't yet given consideration  
38 to whether there are any analogues with - throughout the  
39 network?

40 A. No.

41

42 Q. For example, whether there might be some distribution  
43 zones in Flinders that are sufficiently similar to those in  
44 McCrae?

45 A. Yes, no, I haven't done that.

46

47 Q. And that's one of the suggestions that the peer review

1 has made in their draft to you?

2 A. Yes.

3

4 Q. How will you go about ascertaining whether or not  
5 there are other - is it distribution zone you'd look to?

6 A. That's the terminology I'm using, whether or not it's  
7 the correct one, but yes --

8

9 Q. You are not the first witness --

10 A. -- similar zones. --

11

12 Q. You're not the first person sitting there to use that,  
13 so you can be comforted by that.

14 A. Yes.

15

16 Q. How will you go about the task of seeing if there are  
17 relevantly analogous distribution zones somewhere else in  
18 your network?

19 A. A number of conversations with people in the business.

20

21 Q. I see. And is there an obvious person or group that  
22 you would go to to explore that?

23 A. Across a fair few different areas, I suspect.

24

25 MR COSTELLO: I see. Dr Crook, I don't have any further  
26 questions for you, others may.

27

28 CHAIRPERSON: Q. Mr Crook, you explain that you used four  
29 years of usage data to try to estimate customer usage  
30 during the burst period, and that four years used included  
31 the COVID years, when people obviously spent a significant  
32 amount of time at home. Did you perform the calculation  
33 using or excluding the COVID years?

34 A. I didn't. My worry with something like this is if  
35 I do it using multiple different methods, it then comes  
36 down to a choice of which one I select as being correct,  
37 and that can lead to comments on preferential selection of  
38 what we did. So my feeling was that this was  
39 a conservative approach to doing so and I decided to go  
40 with that.

41

42 Q. Can you explain why it's a conservative approach,  
43 given that, during the COVID years, people spent  
44 a significant amount of time at home, compared to the time  
45 that people would likely have spent at home during the  
46 period of the burst?

47 A. Yeah. So the key factor is less the volume of water

1 they're using but more for how much it increases over  
2 summer, and so if there are people who are more  
3 consistently at home, as tended to happen during COVID -  
4 people would go out to their properties and just stay there  
5 the entire time during the year - it meant that you didn't  
6 get a lot of seasonal change. So that big increase towards  
7 summer that people do when they're going on holiday and  
8 taking breaks, and so it was a lot more flat-lined, and  
9 that means that that's what we then assumed also happened  
10 in this year in question, that that peaking factor is  
11 smaller, there wasn't as big an increase in summer, people  
12 weren't going on holiday in 2024, because that's what sort  
13 of the COVID years told us, which meant we subtracted less  
14 of a volume from that increase in volume that we saw at the  
15 time.

16  
17 Q. Did you perform a calculation - you didn't perform  
18 a calculation using a number of years excluding COVID. Did  
19 you perform a calculation using a greater number of years?

20 A. No. I guess for a similar reason. I'm always worried  
21 that whether or not what happened prior to COVID is still  
22 relevant just because of the change in people's behaviour.  
23

24 Q. If you were to perform the calculation using  
25 a different number of years --

26 A. Yes.  
27

28 Q. -- would that take you very long to do?

29 A. It would take a little while but nothing exorbitant.  
30

31 Q. How long is a little while?

32 A. A few weeks, potentially.  
33

34 Q. A few weeks?

35 A. Yes. I mean, I think.  
36

37 Q. How many hours of work would it take to --

38 A. No, that's true. It should probably take 20, 30 hours  
39 of work, depending on getting access to the data, which  
40 would be the biggest thing for the previous one, assuming  
41 that we have it and it's accessible. The actual process is  
42 set up as a document that I think has come into the court  
43 and, hopefully, that should be able to run through  
44 reasonably quickly. It would just be whether or not there  
45 needs to be any checks to make sure there's accurate data  
46 in there. I think three data points need to be removed  
47 from the first set, and just those checks to be done.

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Q. Were you only given data for the four years?  
A. I was originally given data for the first two years and I went back and collected data for the extra three years beyond that.

Q. You were given the data for the first two years and you didn't perform the calculation on that - on those two years?  
A. Not to the full extent, no. I did an initial investigation and decided I wanted more data than that to continue.

CHAIRPERSON: Are there any other questions?

MR ROBERTS: Madam Chair, I have two issues that I'd like to take Dr Crook to if I could, it is essentially to clarify some issues with Mr Lloyd's evidence yesterday.

**<EXAMINATION BY MR ROBERTS:**

MR ROBERTS: Q. Dr Crook, I'm not sure whether you had a chance to see Mr Lloyd give evidence yesterday?  
A. No.

Q. Mr Lloyd was taken at one point to the various zones, and I think they've ben the "distribution zones" and "zones". And there was a bit of confusion about whether the burst had occurred in the same zone as the Waller Place distribution zone. Can you explain those two zones and how they are separated?  
A. Yes. So the Waller Place zone is one of the subzones that we talked about as having a meter that feeds water into it out of that main zone. So we have the main meter coming into it, a number of submeters which take water out to other customer properties. The Waller Place zone is one of those submeter zones. The leak occurred in the main area.

Q. So for the clarity of the board, the burst did not occur in the Waller Place distribution zone?  
A. No.

Q. The second issue I wanted to take you to, Mr Lloyd yesterday was taken to an email from Greta Pullen. I'm not sure if we can bring that up. It's SEW.0001.0001.4857 - sorry, SEW.0001.0001.0032. Are you familiar with that



1 email, Dr Crook?  
2 A. I am.  
3  
4 Q. In that email, Ms Pullen attempts to calculate water  
5 loss as a percentage of total system output?  
6 A. M'hmm.  
7  
8 Q. Is that correct?  
9 A. Yes. Sorry - in this case, out of - a combination of  
10 minimum nightly flow and total system output, yes.  
11  
12 Q. At around about the same time as that email was sent,  
13 you had sent another email yourself, in which you'd  
14 commented on the applicability of percentages or the  
15 appropriateness to use percentages?  
16 A. Yes.  
17  
18 Q. Can I ask you to bring up the first one,  
19 SEW.0001.0001.4857. Dr Crook, this is not an exhibit to  
20 your statement, but are you familiar with that email?  
21 A. I am, yes.  
22  
23 Q. And in that email, would you like to just explain it  
24 to the board --  
25 A. Yes.  
26  
27 Q. -- the comments you have made about the use of  
28 percentages?  
29 A. Yes, so this was information in relation to the  
30 calculation I'd made at the time. It was trying to verify  
31 the numbers around minimum nightly flow to try and indicate  
32 whether or not there had been a potential leak event in  
33 that Waller Place zone. The comments I made was that while  
34 we couldn't find anything which disagreed with those  
35 minimum nightly flow volumes - people were interested in  
36 percentages - the comments I made were simply that for such  
37 a small zone, percentages tend to be very prone to minor  
38 changes, therefore, they don't always lead to accurate  
39 conclusions to, you know, non-revenue water percentages,  
40 they were talking at the time.  
41  
42 Q. And you're not sure whether Ms Pullen took that into  
43 account in relation to her email given they were sent in  
44 such close proximity to each other?  
45 A. No.  
46  
47 MR ROBERTS: I would seek to tender that email, Madam

1 Chair, which is SEW.0001.0001.4857.

2

3 CHAIRPERSON: I take it there is no objection? The email  
4 from Jonathan Crook to Helen Morris and others, document ID  
5 SEW.0001.0001.4857, will be exhibit.

6

7 **EXHIBIT #SEW3 EMAIL FROM JONATHAN CROOK TO HELEN MORRIS AND**  
8 **OTHERS**

9

10 MR ROBERTS: Thank you, Madam Chair. No further  
11 questions.

12

13 MS BATEMAN: I seek leave to ask a few questions.

14

15 **<EXAMINATION BY MS BATEMAN:**

16

17 MS BATEMAN: Q. Mr Crook, I'm counsel for the shire,  
18 I just have a short number of questions for you. You gave  
19 evidence that you didn't have regard to the operational  
20 logs when doing your analysis and your analysis relies  
21 purely on the data?

22 A. Yes.

23

24 Q. If there was evidence that the leak may have commenced  
25 some time before the dates or the ranges of time that  
26 you've assessed, would that indicate to you that your  
27 seasonal adjustment may need revisiting?

28 A. If there was such evidence. The tricky question is  
29 the seasonal adjustment is based on the previous years'  
30 data, so to find out - to find another one would be to,  
31 effectively, try and pick it, to choose - sorry, select it  
32 to feed in to the results that are given, as in the logs  
33 that are there. So it's not something that I would  
34 consider appropriate to do. If there were evidence that  
35 the leak had been going on for longer, there would - yes,  
36 it would lead to a revisit of the calculations that were  
37 made.

38

39 Q. Are you aware that South East Water produced a report  
40 from SMEC?

41 A. I'm aware of a report. I don't know any of the  
42 content.

43

44 MS BATEMAN: I have no further questions.

45

46 MR COSTELLO: No re-examination, thank you.

47

1 CHAIRPERSON: Mr Crook, your evidence is now complete.  
2 Thank you for coming along, and you are excused.

3

4 <THE WITNESS WITHDREW

5

6 MR COSTELLO: Madam Chair, the next witness is Mr Tully,  
7 who I now call.

8

9 CHAIRPERSON: Mr Tully, if you could just make your way to  
10 the witness box.

11

12 <JULIAN TULLY, affirmed:

13

14 <EXAMINATION BY MR COSTELLO:

15

16 MR COSTELLO: Q. Pour yourself a glass of water if you  
17 would like to.

18 A. Thank you.

19

20 Q. Mr Tully, could you state your full name and address,  
21 please?

22 A. Julian Tully, and my workplace is 101 Wells Street,  
23 Frankston.

24

25 Q. Current occupation?

26 A. My title is technical director of civil and  
27 environmental engineering.

28

29 Q. You have made a witness statement for the purpose of  
30 this board of inquiry?

31 A. Yes.

32

33 Q. I'll have a copy handed to you. The version that's  
34 been handed to you, Mr Tully, does that have some words  
35 lined through in paragraph 37 and some words added?

36 A. Yes. I was just checking that. That's the correct  
37 version.

38

39 Q. And the same at paragraph 42?

40 A. Yes. It does.

41

42 Q. All right. Those changes are also reflected in the  
43 version that we have in the system. With those changes, is  
44 your witness statement true and correct?

45 A. Yes, it is.

46

47 Q. Could I ask you to sign the final page, please.

1  
2 MR COSTELLO: Madam Chair, I tender that witness statement  
3 and its exhibits.  
4

5 CHAIRPERSON: The statement of Julian Tully is  
6 exhibit CA41 (inaudible).  
7

8 **EXHIBIT #CA41 STATEMENT OF JULIAN TULLY**  
9

10 MR COSTELLO: Q. Mr Tully, you are the director of civil  
11 and environmental and engineering?  
12

13 A. That's correct.  
14

15 Q. What does that role entail?  
16

17 A. It's quite a diverse role and it continues to evolve.  
18 It's relatively new to the organisation. But it's a wide  
19 range of things from supporting the recruitment of  
20 graduates, through to writing or reviewing technical  
21 standards, occasionally some troubleshooting on projects,  
22 a wide variety activities.  
23

24 Q. You've been in that role since November 2022?  
25

26 A. Yes.  
27

28 Q. When did you first commence with South East Water?  
29

30 A. May 2021.  
31

32 Q. And that was when you were the design manager?  
33

34 A. That's correct.  
35

36 Q. Aside from your time at South East Water, you have  
37 other experience in the water industry?  
38

39 A. Yes. Yes. I've worked in the Victorian industry my  
40 whole career.  
41

42 Q. Could you just outline in general terms your  
43 experience over those 30 years?  
44

45 A. Yes. I've worked - initially I was employed by  
46 a small construction contractor, after completing  
47 university, then I've worked in consulting for the majority  
of my time, and I've had a previous stint at another  
Victorian water authority.

Q. You've got an undergraduate degree in civil  
engineering?

A. That's correct.

1 Q. And a graduate diploma in environmental engineering?  
2 A. That's correct.  
3  
4 Q. Does your day-to-day work include, on occasion,  
5 dealing with burst water mains?  
6 A. Not usually, no.  
7  
8 Q. How was it that you came to be involved in this  
9 matter, and to be answering the questions that the board of  
10 inquiry put to South East Water?  
11 A. Yes, so I returned from leave in mid-January. I think  
12 probably on my first day back a colleague rang me and said  
13 had I heard of the incident that was going on, and then my  
14 involvement gradually increased and then I was asked to  
15 take on a role to lead the technical aspects of South East  
16 Water's response to the events that have occurred.  
17  
18 Q. Just to be clear, was that role that you were asked to  
19 take on to lead South East Water's response to the  
20 landslides that occurred in January 2025 or to lead the  
21 response in respect of this board of inquiry?  
22 A. To the events of the landslide, 2025.  
23  
24 Q. So concentrating, then, on those events, what work  
25 have you done in connection with the 2025 landslides?  
26 A. It might be difficult to put into a few short words,  
27 but I've instigated a range of assessments and activities -  
28 so, for example, the previous witness, Jonathan Crook,  
29 I asked him to investigate and whether he would be able to  
30 produce our best estimate of the burst volume. I've been  
31 active in communicating with our consultant, SMEC. They're  
32 some of the activities. I've been involved in meetings  
33 with the shire, so a fairly wide range of activities.  
34  
35 Q. I see. Do you have experience yourself in estimating  
36 flow rates?  
37 A. I'm not quite sure how to answer the question. In  
38 terms of burst volumes, I'm familiar with looking at data,  
39 of flowmeter data. It's not a day-to-day activity. But  
40 yes, I've done that from time to time.  
41  
42 Q. You have estimated flow rates or calculated likely  
43 flow rates from time to time in the course of your work?  
44 A. Yes.  
45  
46 Q. I see. And is that your work at South East Water or  
47 is that work before South East Water or both?

1 A. Oh, I'd have to think through past experiences, but  
2 mostly at South East Water. I'm not saying I've done a lot  
3 of burst volume analysis. I'm just saying I'm used to  
4 looking at data, flow data.

5  
6 Q. I see. And as a trained engineer, you would have  
7 a good understanding of the concepts, including the  
8 mathematical concepts that go into estimating flow; is that  
9 right?

10 A. Generally speaking, yes.

11  
12 Q. But you don't claim the same degree of mathematical  
13 expertise, for example, as Dr Crook?

14 A. No, which is why - it was complicated, and so it was  
15 important to me that we look at that carefully and  
16 properly, and so that's why I thought that would be beyond  
17 my expertise and sought the assistance of Mr Crook.

18  
19 Q. Would it be fair to say that you have a high degree of  
20 familiarity with South East Water's infrastructure in the  
21 McCrae area?

22 A. Oh, there's people who know it a lot better than I do,  
23 and prior to being involved in the work I've been doing  
24 this year, I would have had a very rudimentary  
25 understanding. But to be involved in the investigation  
26 is - means understanding the network better. So yes, I've  
27 had to become familiar with the network.

28  
29 Q. And were you sitting in the hearing room when Dr Crook  
30 just gave his evidence?

31 A. Yes.

32  
33 Q. Do you recall seeing the two diagrams of the McCrae  
34 network zone that I called up on to the screen?

35 A. Yes.

36  
37 Q. Are they diagrams you're familiar with?

38 A. Yes. So I instigated their creation. And that was  
39 part of the process for me to become familiar with the  
40 South East Water assets in the McCrae area. It started off  
41 as a bit of a hand sketch to try and put it all together,  
42 and then in conversations with other people, it seemed like  
43 it might be of value to others, so I got that drawn up for  
44 me a little bit neatly than what I'd done in my own little  
45 sketch, and then that was used. Unfortunately, as Jonathan  
46 referred to, there was a time period between when I -  
47 creating the first sketch and getting it checked, and in

1 that time period, someone alerted me to the fact that I'd  
2 drawn it incorrectly.

3

4 Q. Thank you for that. Well, it sounds like you are just  
5 the man to explain it to us. So I will put it on the  
6 screen. SEW.0001.0001.4918. So as I understand it, not  
7 only do you have familiarity with this diagram, you drew at  
8 least its predecessor by hand to begin with, or  
9 a predecessor?

10 A. Yes. So this is the incorrect version on the screen.

11

12 Q. Yes.

13 A. Yep.

14

15 Q. And then the correct version is the one that I first  
16 called up, which is slightly more grainy. And who actually  
17 prepares these diagrams?

18 A. So we have - I used two sources of data to produce  
19 this. So we have our GIS system that includes all our  
20 pipes for our entire service area. That was one source of  
21 information. And the other source of information was we  
22 have a similar, but not to this same level of degree,  
23 diagram that covers our whole service area, so those two  
24 pieces of information I used to combine to produce this  
25 one.

26

27 Q. I would put the two of them up side by side, but the  
28 correct one is so grainy, if I make it smaller, it will be  
29 very hard to see. So let me just see if I can ask you  
30 a couple of questions about this one, and then we'll go to  
31 the correct one, but just so we can understand the  
32 differences.

33 A. Okay.

34

35 Q. The central difference that Dr Crook pointed out is in  
36 the purple section there, and rather than there being one  
37 line in the purple section on the corrected map, there  
38 are - sorry, diagram - there are two lines. There are two  
39 purple lines?

40 A. Yes.

41

42 Q. And that's for the reasons that Dr Crook pointed out  
43 before, as to the particular WB130, I think it is, being  
44 mislocated?

45 A. Yes. So I - when I was looking at this, I think it  
46 was late one evening and I didn't look carefully enough,  
47 I thought that the purple area, which is marked as Cinerama

1 Crescent and Flinders Street zone, had - I was - I knew  
2 that it had two sources of supply. I thought one was from  
3 the Parkes Street zone and one was from the Cook Street  
4 zone. But on subsequent examination, or actually it was  
5 somebody else pointed out to me when they were reviewing  
6 it, they said, "No, that's incorrect. Both feeds are from  
7 the Parkes Street zone." So then I went back and looked at  
8 our GIS and confirmed that, yes, I'd made the mistake.  
9

10 Q. I see. And so you're comfortable, then, that the  
11 revised version that I took Dr Crook to is accurate?

12 A. Yes. Yeah, I've confirmed it myself and I've had an  
13 experienced water operations engineer confirm that that is  
14 also the case.  
15

16 Q. Thank you. The other sort of most obvious difference  
17 between this diagram and the one that I'll take you to in a  
18 moment is that the other accurate diagram uses some  
19 different indicators including triangles. Do you recall  
20 that?

21 A. Oh, generally. I think --  
22

23 Q. I will bring it up now.

24 A. Yes, okay.  
25

26 Q. It is SEW.0001.0001.4915, and if we could go over the  
27 page, please, yes. And perhaps we could just blow up the  
28 diagram. Thank you. Now, I said it's grainy.

29 A. You weren't lying.  
30

31 Q. I can't read the legend. But I'm hoping that you've  
32 got sufficient recollection of the document to be able to  
33 explain what the different parts of the schematic indicate.  
34 Can you see there, in the purple section, there's two  
35 triangles?

36 A. Yes.  
37

38 Q. And there's also triangles in the green and the  
39 aqua --

40 A. Yes.  
41

42 Q. -- below. So they're not present on the version that  
43 I just took you to.

44 A. Yes.  
45

46 Q. So whoever's created this has used some different  
47 schematic, but it's right to say, is it, that it's still



1 representing the same infrastructure?  
2 A. Yes. So it was an iterative process. So I had done  
3 an initial sketch. Someone had beautified that, I guess  
4 you could say, into the first diagram. And then that  
5 continued to be updated and improved. We added the legend.  
6 We improved some of the symbols that we used.  
7  
8 Q. And so as you sit there now, do you know what the  
9 triangles are?  
10 A. Yes. So they're to represent a pressure reducing  
11 valve.  
12  
13 Q. And in each case, I think - no, all but one case -  
14 before the triangles, there's an ice cream cone?  
15 A. Yes. With an F in it, F for flowmeter.  
16  
17 Q. So there's a flowmeter before each pressure reducing  
18 valve?  
19 A. M'hmm, yes.  
20  
21 Q. There doesn't seem to be one in the green section.  
22 There seems to be a flowmeter that's after the pressure  
23 reducing valve?  
24 A. Yes.  
25  
26 Q. So the flowmeter can be either side of the valve?  
27 A. Yes.  
28  
29 Q. I see. The hash, as I think Dr Crook said, were  
30 clusters of customers?  
31 A. Yes, that's their intention, to - and it represents  
32 potentially a collection of pipework that distributes the  
33 water to the customers.  
34  
35 Q. I see. They're triangles, but to avoid confusion,  
36 they're sort of upside-down pyramids up the top, which look  
37 the same as or close to the same as the pyramid for the  
38 Dromana reserve. What are the smaller pyramids?  
39 A. So Dromana reservoir, yes, so --  
40  
41 Q. Sorry, reservoir, yes.  
42 A. Yes, they are all water storages or also called water  
43 tanks.  
44  
45 Q. I see. So they are the tanks?  
46 A. M'hmm.  
47

1 Q. And then if you are looking at the blue upside-down  
2 pyramids, immediately above them, there's a red circle. Is  
3 that a pump station?  
4 A. Yeah. So there's two pump stations in this diagram.  
5 So one down --  
6  
7 Q. There might be three. There's a red, a blue and  
8 a black?  
9 A. Oh, yes, correct. Sorry, I was not counting the black  
10 one. That black one is - there's a complicated story  
11 around how that operates. Sometimes it operates - it  
12 only - sorry, I'll express that a bit better. The pump  
13 station, my understanding is, it only operates when there's  
14 high water flows, so the water can flow under gravity, or  
15 it can also flow under pump, which is why I didn't consider  
16 it a primary. But the two ones in --  
17  
18 Q. I see.  
19 A. -- our area of interest are the blue at the bottom and  
20 the red at the top.  
21  
22 Q. The last feature I wanted to ask you about is can you  
23 see "Cook Street tank zone" at the top?  
24 A. Yes.  
25  
26 Q. Beneath it, there is a Z. Immediately beneath it?  
27 A. "Cook Street tank" - oh, sorry, yes, I was looking -  
28 there are two references to "Cook Street tank zone".  
29  
30 Q. Oh, sorry, yes, you are right. The one on the left in  
31 the middle?  
32 A. Yes, the one in the middle.  
33  
34 Q. Yes.  
35 A. Yes, so --  
36  
37 Q. There's a Z with an arrow?  
38 A. Yes. So that represents a non-return valve which  
39 serves the purpose of only allowing water in one direction,  
40 and the direction of flow is indicated by the arrow.  
41  
42 Q. I see. And what's the circled X beneath it?  
43 A. So the Xs represent valves, and the ones with a circle  
44 around them represent valves that are normally closed.  
45  
46 Q. That's very helpful. Thank you, Mr Tully.  
47

1 MR COSTELLO: Madam Chair, we're bang on time and we'll be  
2 finished early today. We may even be finished by lunch but  
3 I suspect we will go just over lunch. Is that a convenient  
4 time to break?

5

6 CHAIRPERSON: Yes. Mr Tully, we'll have a 15-minute break  
7 and return at 11.45.

8

9

#### SHORT ADJOURNMENT

10

11 MR COSTELLO: Thank you, Madam Chair.

12

13 Q. Mr Tully, thank you for your explanation of that  
14 diagram. I now just want to understand some of the  
15 features of the network that are set out on the diagram.  
16 One of the features are tanks. How do tanks work  
17 operationally within a distribution zone?

18 A. Yes, so we have different tanks operate in different  
19 ways, and the purpose of the tanks are different. So the  
20 Waller Place tank, for example, receives water from the  
21 reservoir and then - from the Dromana reservoir, as in the  
22 diagram, and then that tank doesn't supply any customers  
23 directly. Its purpose is to store water so that it can be  
24 pumped to the Parkes Street tank. So that's one style of  
25 tank operation in the McCrae network. Then at Parkes  
26 Street, that's a little bit more complicated because we  
27 have two tanks, but if I talk about the main tank at Parkes  
28 Street, that tank serves a different purpose, which is to  
29 supply customers under gravity.

30

31 Q. And these tanks, they're all above ground, are they?

32 A. Yes.

33

34 Q. And then there are flowmeters, and in general terms,  
35 a flowmeter is a device that just measures the amount of  
36 water that passes through a pipe; is that right?

37 A. Yes.

38

39 Q. Now, you say in your witness statement that not every  
40 pipe has a flowmeter attached to it.

41 A. Correct.

42

43 Q. So far as you understand it, is there a particular  
44 rationale that determines where a flowmeter is placed?

45 A. Yes. They're normally installed at major asset sites.  
46 So we have them commonly at tanks, we have them at pump  
47 stations and, generally speaking, we have them at our

1 pressure reducing valve stations, we call them, or sites.

2

3 Q. The Waller Place zone is described as the "Waller  
4 Place pressure reducing zone". That's because there's  
5 a pressure reducing valve?

6 A. Yes.

7

8 Q. And what's the role of a pressure reducing valve?

9 A. So its purpose is to reduce the pressure in a section  
10 of the network or a subzone, I guess. So there's multiple  
11 benefits to controlling the pressure in a zone, but  
12 probably the simplest to understand is we don't want the  
13 pressure, the water pressure that our customers receive, to  
14 be too high. It can damage equipment - you know, washing  
15 machines, dishwashers, that kind of thing - if the pressure  
16 is too high. But that's one of several benefits.

17

18 Q. All right. But not all zones are pressure reduced?

19 A. No, so it depends. Maybe if I explain zones in  
20 general, it might be helpful?

21

22 Q. Yes, please.

23 A. So the McCrae area's got multiple zones because it's  
24 on the side of a hill. And so we've got - this is not  
25 exactly right but in simple terms, we've got the properties  
26 at the top of the hill, or higher up the hill, are in the  
27 Cook Street zone. Then the properties that are a little  
28 bit lower down the hill are in our Parkes Street zone.  
29 Then there's sort of a ring of pressure reduced zones that  
30 are in the diagram, of which Waller Place is one of those.  
31 They're a little bit further down the hill again. And  
32 then, down at the bay level, Point Nepean Road, there's  
33 also another zone which is fed directly from Dromana, the  
34 Dromana reservoir zone. So it's - those zones are  
35 staggered down the hill to prevent high pressures to any of  
36 the customers.

37

38 Q. And pressures generated by some combination of  
39 pumping, size of pipe and gravity, is it?

40 A. Yes. So there's - in simple terms, it's the pressure  
41 in the network is governed by the tank that supplies it.  
42 So the top water level at the Parkes Street tank is about  
43 140 metres. So then - but the pressure that we set as  
44 a maximum in the Waller Place zone is about 90 metres. So  
45 we've reduced the pressure by about 50 metres in the zone,  
46 in the Waller Place zone.

47

1 Q. You're familiar with the pipe where there was the  
2 burst that we're interested in?  
3 A. Yes, very familiar.  
4  
5 Q. All right. Now, that type of water main there, is  
6 that under pressure?  
7 A. Yes, it is. All the water mains are under pressure.  
8 Yes.  
9  
10 Q. Does it operate within a fixed pressure or a fixed  
11 range of pressure?  
12 A. The pressure can vary, but in general terms or the  
13 simplest way - no, I'll say the best way is it's around  
14 70 metres, because that is the difference in elevation from  
15 the top water level of the Parkes Street tank to the ground  
16 level at the burst site.  
17  
18 Q. It's South East Water's internal practice to refer to  
19 pressure by way of metres, is it?  
20 A. Yeah, we - because we're looking at ground, because  
21 the pressure that - if you take a pressure gauge and you  
22 connect it to a pipe, what that's measuring is the relative  
23 pressure between the ground level and the pressure set by  
24 the water level in the tank. So it's easier to work in  
25 terms of metres of water.  
26  
27 Q. I see. So a more orthodox measure of pressure might  
28 be PSI or pascals or something like that?  
29 A. Yes.  
30  
31 Q. But for this particular purpose, it is more convenient  
32 or perhaps makes more sense to do it in the way you have  
33 just described?  
34 A. Yes. So there's 10 metres of water is equivalent to  
35 1 bar, is another unit of measurement, which is equal to  
36 about 100,000 kPa or kilopascals. So they're all measuring  
37 the same thing, it's just different units of measurement  
38 and we use the one that's most convenient for us.  
39  
40 Q. So within South East Water's own records, would you  
41 expect pressure at a main to ordinarily be ascribed  
42 a metreage; is that how it would work?  
43 A. We sometimes use different units. We try and make  
44 things as confusing as possible --  
45  
46 Q. Yes.  
47 A. -- so sometimes we are --

1  
2 Q. I'm glad it's not just me.  
3 A. We'll use different units for different purposes. But  
4 the dominant units that we use is metres of water.  
5  
6 Q. All right. Thank you. Now, for the purpose of  
7 preparing your witness statement, you've included some data  
8 taken from a flowmeter?  
9 A. Yes.  
10  
11 Q. To be clear, there's no flowmeter on the pipe that  
12 burst?  
13 A. Correct.  
14  
15 Q. There is a flowmeter into the Waller Place zone; is  
16 that the relevant flowmeter?  
17 A. Yes. So we're talking about the 2022 burst?  
18  
19 Q. Yes.  
20 A. Yes.  
21  
22 Q. Correct. Thank you. There wasn't a burst on the  
23 relevant pipe, but the nearest flowmeter that was of  
24 relevance is the flowmeter that measures water into the  
25 Waller Place zone; is that right?  
26 A. Yes, that's right.  
27  
28 Q. Okay. And dealing, as you correctly say, with the  
29 2022 burst, you've included a graph - I'll bring it up on  
30 the screen - it's SEW.0001.0001.4942. Can we go to page 3,  
31 please. This is the graph that I'm referring to. So this  
32 is a graph of data taken from the Waller Place - sorry,  
33 from the flowmeter into the Waller Place PR zone; is that  
34 right?  
35 A. Correct, yes.  
36  
37 Q. All right. And there's the very clear spike in the  
38 middle of the graph, and what's being measured here is flow  
39 rate in five-minute intervals; is that correct?  
40 A. Yes. So we - the way our data collection system works  
41 is the amount of flow that's gone through the flowmeter in  
42 a five-minute window is sent to our central data system.  
43 You could think of it as the data is sent to head office.  
44 And then that five-minute interval data is stored.  
45  
46 Q. And just to be clear, what's being shown here isn't  
47 total water loss; it's just the flow rate?

1 A. Yes. So that's another confusing thing that we like  
2 to do, is we change our units around a bit in different  
3 circumstances. So the units are megalitres per day, but  
4 that is an instantaneous flow. It's not saying how much  
5 water flowed over - a volume of water over a period of  
6 a day.  
7  
8 Q. Yes. So this tells you no more and no less than what  
9 the spike was in the flow rate but doesn't tell you as -  
10 doesn't tell you anything definitive as to the volume of  
11 water that leaked?  
12 A. Yes.  
13  
14 Q. And the flow rate here peaks at about, what is it,  
15 2.25 megalitres a day?  
16 A. Yes, something of that order, yes. I think I've  
17 written in the witness statement 2.3, but yes, similar.  
18  
19 Q. And otherwise, the flow rate was always well below 0.5  
20 megalitres a day?  
21 A. Yes.  
22  
23 Q. If we could move to the next page of the witness  
24 statement, please, it's another graph here that's been  
25 annotated. Did you make these annotations?  
26 A. Yes.  
27  
28 Q. Okay. I might just ask you, perhaps, to talk through  
29 this graph. First, what's this graph measuring?  
30 A. This is basically just a zoomed-in version of the  
31 previous one. So it's the same data, the same X and Y axes  
32 as the previous graph.  
33  
34 Q. It was a little hard for me to tell. Is this  
35 measuring it over the same period or is this a shorter  
36 period in respect of the same flowmeter?  
37 A. It's exactly the same as the previous one, it's just  
38 zoomed in.  
39  
40 Q. Just snipped --  
41 A. Yeah.  
42  
43 Q. -- for the actual moment?  
44 A. Yes.  
45  
46 Q. Yes, that's what I thought it was. Thank you. So  
47 you've annotated there that the burst starts at 5.40am?

1 A. Yes.

2

3 Q. And just explain the way the data on the flowmeters  
4 work - is it it's constantly recording the flow rate, time  
5 stamping it, is it?

6 A. Yes, so there's - if you can make out, along the line  
7 there's individual dots. So those dots are the actual data  
8 itself, and the line is simply playing dot to dot, joining  
9 up those dots. So each of those dots are a five-minute  
10 time period, and then what the graph is showing is that the  
11 amount of flow recorded by the flowmeter is going up quite  
12 substantially in each of those five-minute intervals.

13

14 Q. Yes. The next annotation you have got there is the  
15 burst stopped, "Valve turned off"?

16 A. Yes. So you can see that, going from the left, the  
17 flow has increased significantly. It's then levelled off  
18 and then it's just fairly abruptly stopped. That's because  
19 that's when our maintenance contractor has arrived on site  
20 to repair the burst and has turned the valve off.

21

22 Q. See. And you've said that's at 6.50am. Ought that be  
23 PM?

24 A. Yes, that looks like it's wrong, doesn't it? Yes.

25

26 Q. Yes, it does. All right. Thank you. So I will take  
27 that to be PM. So 5.40 it starts; 6.50 - 5.40am it starts;  
28 6.50pm it's turned off. Then there's this water supply  
29 interruption period. That's because it's turned off at  
30 that point in time?

31 A. Yes, so that's when we've physically, on site, closed  
32 the valve, and then we've started cutting out the damaged  
33 section of pipe and putting a new section of pipe in,  
34 joining that up and getting the pipe network ready to  
35 operate or to run.

36

37 Q. I see. So that work happens, the valve's turned back  
38 on, there's then a period of mains flushing?

39 A. Yes. So we've done the work between 6.50pm and 8pm,  
40 or thereabouts, and then we've turned the valve back on,  
41 and then there's a series of activities that happen after  
42 that - the valve's turned on; we tend to flush the mains;  
43 and there's - also tends to be that the pipe has to be  
44 refilled, because it would have been emptied, and so  
45 there's numerous things that go on in that immediate period  
46 of time when the water's restored.

47



1 Q. Thank you. You've then set out in the  
2 paragraph immediately below that, based on your  
3 calculation, you think that - you've assessed 0.9  
4 megalitres as being the likely loss of water?

5 A. Yes.

6  
7 Q. And so when you've come to that conclusion, you've had  
8 regard to data other than the data in this graph?

9 A. No - well, it's data from the graph but it's also -  
10 I've also used our maintenance records to check that the  
11 events match.

12  
13 Q. So the maintenance records are where the information  
14 comes from that's in the red on the graph; is that right?

15 A. It's a mixture of conclusions that can be drawn from  
16 the flowmeter data and cross-verified, I guess, with the  
17 maintenance records.

18  
19 Q. All right. This flow rate graph, as we discussed  
20 before, tells you the change in flow rate but doesn't tell  
21 you the volume of water loss. So what have you done to  
22 that data to then come to the conclusion of 0.9 megalitres?

23 A. So this graph is produced or - so the process was that  
24 I downloaded about 10 days of data from our data system and  
25 then put that into a spreadsheet and then, from that  
26 spreadsheet, was able to produce the graph and then, within  
27 that spreadsheet, I then calculated or summed up the flow  
28 during the period between when the burst starts, which was  
29 roughly 5.40am, and when the burst stops, which is roughly  
30 6.50pm, and then the water that was - that went through the  
31 flowmeter over those two periods - in that period, totals  
32 up to 0.9 megalitres.

33  
34 Q. So this is a relatively simpler calculation than the  
35 calculation in respect of the 2024 burst?

36 A. Very much so. So because of - the first graph shows  
37 quite clearly how, you know, we went from a normal  
38 situation to an abnormal situation. The burst was quick.  
39 It was readily identified. Probably could be described as  
40 obvious, what was going on. There wasn't a lot of need to  
41 manipulate or to adjust the data or to manage the data or  
42 to cross-compare to the same extent that was needed for the  
43 2024 burst.

44  
45 Q. Thank you. You've pointed out in paragraph 20 of your  
46 statement that there's substantial differences between the  
47 actual physical burst at Bayview Road and this burst. One

1 of them is that the pipes were made of different material?  
2 A. (Witness nods).

3

4 Q. The pipe in the 2024 burst was a PVC pipe, but the  
5 pipe here was an asbestos cement pipe; is that right?

6 A. That's correct.

7

8 Q. And what's the relevance of the difference between the  
9 two materials?

10 A. So the PVC pipe is - or PVC is plastic, and it's  
11 generally a ductile material, which means that it stretches  
12 before it breaks, whereas the asbestos cement pipe is -  
13 that material is more of a brittle material, so it snaps;  
14 it doesn't bend and stretch. So where you - you know, in a  
15 PV - so the asbestos cement pipe, it had a circumferential  
16 fracture or break, so that's commonly when - I suppose, if  
17 you think of it as just it's bent and it snaps. So that's  
18 commonly caused by a slight ground movement or that kind of  
19 thing. Yeah, with the PVC pipe, it - if that kind of thing  
20 happens, it bends and it doesn't snap; it just deforms a  
21 little bit. It can deform. If it deforms a lot, it'll  
22 fail, but it takes a lot for it to fail because it can -  
23 it's a ductile material.

24

25 Q. You describe the burst of the PVC pipe in 2024 as  
26 a longitudinal burst?

27 A. Yes. A longitudinal split. So a longitudinal split  
28 is, in general terms, related to two things. One is  
29 there's usually a defect of some kind that causes a weak  
30 point, and then there is a pressure - the pressure of the  
31 pipe, either pushing - whether it's soil pressure pushing  
32 in or water pressure pushing out, puts more pressure on the  
33 defect and that causes a very small hole to form. And then  
34 that's why - the behaviour we've seen in the work that  
35 Jonathan was talking about earlier, about how the burst  
36 grew over time, that's quite consistent with the nature of  
37 a longitudinal split where it can just grow a little bit  
38 over time.

39

40 Q. You ascertained that the split in 2024 was  
41 longitudinal based on Montage data, did you?

42 A. Yes, and I've also had a personal conversation with  
43 one of the maintenance crew that repaired the pipe, so  
44 I asked them. The Montage data probably didn't quite have  
45 as much information in it as I would have liked, so I've  
46 managed to speak to one of the - or to the lead that was on  
47 site during the repair work and asked them to repeat their

1 recollections of what they saw, and they repeated that it  
2 was a longitudinal split and they estimated the length as  
3 about 100mm long. But it wasn't a measured length, so it's  
4 an approximate indication of the length.

5

6 Q. All right. Thank you. Finally, it was somebody from  
7 the shire council that reported the fact of this break, was  
8 it?

9 A. Yes. That's what the - our Montage, or works  
10 management system information, shows, that it - I believe  
11 it was an email from the shire that alerted South East  
12 Water to the burst. This is the 2022 burst.

13

14 Q. That's right. Thank you.

15 A. Yes.

16

17 Q. I might just take that document down and instead put  
18 up the amended version of it, which is the version that's  
19 been tendered. It's SEW.0001.0001.5173. If we could move  
20 to page 5, please. At page 5, you start giving some  
21 evidence in answer to question 12 in the notice that was  
22 sent to SEW that concerns the amount of water that  
23 travelled down a stormwater pit?

24 A. Yes.

25

26 Q. Was this an issue that you were aware of before you  
27 were asked to answer this question?

28 A. Yes.

29

30 Q. All right, then. Had you sought to ascertain the  
31 volume of water that had travelled down the grate before  
32 you were asked to answer this question?

33 A. Yes, most certainly. I think I probably started  
34 thinking about this in February.

35

36 Q. All right. And you started thinking about it  
37 in February, why?

38 A. Well, I guess - and I've alluded to that in the  
39 witness statement - Gary had talked about hearing the noise  
40 in the stormwater system. Fortunately, we'd actually taken  
41 a photo, or Jason Marsh, I believe, took a photo of some  
42 water flowing in the drain, and straightaway, my mind went  
43 to, well, we might be able to use that to estimate how much  
44 water went down the drain.

45

46 Q. All right. And are you the person that has done the  
47 calculations to try and estimate the amount?

1 A. Yes.

2

3 Q. Have you had the assistance of anybody else within  
4 South East Water in coming to those views?

5 A. I've had a colleague check the calculations.

6

7 Q. All right. In paragraph 28, which is at the bottom of  
8 the screen there, you refer to the fact that South East  
9 Water's in the process of engaging an international expert  
10 to advise how much of the water made its way to the  
11 surface.

12 A. Yes.

13

14 Q. Is the international expert that you refer to there,  
15 is that SMEC --

16 A. No.

17

18 Q. -- the company?

19 A. No. It's separate.

20

21 Q. All right. And who is that person?

22 A. He is a professor who currently works in - at  
23 a New Zealand university.

24

25 Q. Do you recall the Professor's name?

26 A. I think it is Dr Kobus van Zyl.

27

28 Q. Do you know how it came to be Dr van Zyl that was  
29 engaged?

30 A. Yes. I was interested in the topic. I was doing some  
31 reading of papers, academic papers, because it's somewhat  
32 complicated, the way the water flowing out of the pipe  
33 interacts with the soil, and so in my background reading, I  
34 noticed that he was a - he'd authored many papers and his  
35 work was of interest and relevance to the questions I was  
36 interested in, so I contacted him to see whether he would  
37 be interested in helping us.

38

39 Q. What type of papers were you reading when you noticed  
40 that he'd authored a number of them?

41 A. So academic technical --

42

43 Q. Presumably they're not about flow of water down grates  
44 but something --

45 A. No, they were looking at the behaviour of how water -  
46 the behaviour of water leaving a split. It's a bit more  
47 complicated than might first meet the eye. And then also

1 how that water then interacts with the soil before making  
2 its way to the surface. There's a critical flow rate at  
3 which, if the flow rate out of the burst is very, very  
4 small, then the water might not make it to the surface, but  
5 if it's a reasonable sized flow rate, then it makes it to  
6 the surface and there's - it's a whole field of academic  
7 investigation to develop or extend our understanding of all  
8 of that, and apply some calculations to enable that to be  
9 done.

10  
11 Q. Right. And Professor van Zyl, he's at the University  
12 of Auckland, is he?

13 A. I believe so, yes.

14  
15 Q. And when was it that Professor van Zyl - I should just  
16 say to assist the transcript, it's van, V-A-N, new word  
17 Zyl, Z-Y-L. When was Professor van Zyl engaged?

18 A. I'm not sure of the exact timing but it's recently.

19  
20 Q. How recently, do you think?

21 A. Oh, a handful of weeks.

22  
23 Q. Do you sit on the committee that South East Water's  
24 established to deal with the McCrae issue, if I can call it  
25 that?

26 A. Yes, I think you're referring to what we know as the  
27 McCrae strategy group. So yes, I've been a part of that.

28  
29 Q. And was the decision to engage Professor van Zyl  
30 a decision taken by that group?

31 A. Oh, there was a lot of discussion about - I'm not  
32 entirely sure who - how - there were several discussions  
33 about it. I'm not sure exactly which (inaudible) that was  
34 all discussed in.

35  
36 Q. Do you recall if you raised the idea at a meeting of  
37 that group?

38 A. I think I would have certainly mentioned this activity  
39 in that group.

40  
41 Q. Would you have needed somebody else's authority to  
42 engage Professor van Zyl or did you have sufficient  
43 authority to take that step of your own volition?

44 A. I would have consulted with other people, as to  
45 whether we - whether it was worth doing and whether there  
46 was support for it. But I think broadly, the approach has  
47 been where we think that there's value in undertaking extra

1 investigations that will help with us understanding it,  
2 that we should do those works. So there's also that broad  
3 high-level understanding.  
4

5 Q. Who - before I ask you that, let me ask a preliminary  
6 question. Was Professor van Zyl given specific questions  
7 to answer?

8 A. Yes, I was asked to - well, I have given them a scope.  
9 I've had some correspondence backwards and forwards with  
10 him about finetuning that scope, and I think I'm going to  
11 be meeting with him this week to progress that.  
12

13 Q. So as things currently stand, Professor van Zyl has  
14 been engaged, he doesn't yet have finalised questions to  
15 answer?

16 A. I would say the questions have been finalised, but  
17 sometimes, when you start these things, you don't  
18 necessarily know exactly where you'll end, so there's key  
19 things we want to know, but there might be some things that  
20 he says, "Well, yes, we can investigate this further or it  
21 would be useful to investigate that further", so it's not  
22 something I have an enormous amount of knowledge on so I'll  
23 be relying on him to guide and inform where he can make  
24 a good contribution to the topic.  
25

26 Q. Does Professor van Zyl need to travel to Australia to  
27 perform his work?

28 A. That's not the intention.  
29

30 Q. Have you identified the extent of the information or  
31 data that you intend to provide to him so that he can  
32 undertake his work?

33 A. It would be on a - I've provided him with some very -  
34 the key pieces of information to date, and he has replied  
35 back with a list of maybe 20-odd questions for extra data.  
36 So we'll exchange the information and data as he requests  
37 and as we discuss the topics that - there might be  
38 questions he raises that I can say "Yes, well, I've got  
39 some more information about that." I'll provide it.  
40

41 Q. Have you discussed the engagement of Professor van Zyl  
42 with anyone from SMEC?

43 A. Yes. We've - they're aware of that work. We had  
44 initial discussion around the different parts of the puzzle  
45 that we're trying to work on, and whether they had specific  
46 expertise. My recollection of that conversation was that  
47 SMEC didn't feel they had the level of expertise in this

1 quite a niche topic.

2

3 Q. Are the questions that have been put to  
4 Professor van Zyl solely concerned with ascertaining the  
5 amount of water that likely travelled to the stormwater  
6 grate?

7 A. No. So I think it might be on the screen there - in  
8 the paragraph 25, the key question that I'm asking the  
9 professor to look at is how much water from the pipe made  
10 its way to the surface.

11

12 Q. Yes. But that's what I want to understand. Water  
13 that made its way to the surface and then ultimately to the  
14 grate, that's within scope, if you like, is it?

15 A. No. So I've - there are two parts to that, or I see  
16 it as two parts. So the first part is how much water from  
17 the pipe made it to the surface; and then from that water  
18 that made its way to the surface, how much of that water  
19 made its way to the grate? So two parts to that question.

20

21 Q. Professor van Zyl is not investigating the likely flow  
22 of water that made its way to the surface more generally?

23 A. Not sure what you mean when you say "more generally."

24

25 Q. Well, some of the water made its way to the surface  
26 and then travelled to the grate?

27 A. Yes, so that kind of - the flow of water from the  
28 surface to the grate is within SMEC's skills and  
29 experience. So they're undertaking that work.

30

31 Q. So he's looking at water that found its way to the  
32 surface and then did not find its way to the grate?

33 A. I suppose you could express it that way. But it's -  
34 the question that we're trying to - the high-level question  
35 that we're trying to answer is how much water made its way  
36 to the grate. To answer that question, there are two  
37 subquestions. So he's - the professor is answering one of  
38 those subquestions, and SMEC is answering the other  
39 subquestion.

40

41 Q. What are the two subquestions?

42 A. So the professor is answering the subquestion of how  
43 much water from the pipe made it to the surface adjacent to  
44 the pipe. And then the second subquestion, which SMEC are  
45 answering, is of the water that made its way to the  
46 surface, how much of that made its way to the grate.

47

1 Q. And then is anybody considering what I would consider  
2 the third part or the third obvious question, which is, of  
3 the water that made its way to the surface, but not to the  
4 grate, where did it go?  
5 A. Well, that would be inferred from the other two  
6 questions; if we know the answer to both the subquestions,  
7 then that will tell us the answer that you've asked.  
8  
9 Q. Won't that just tell you that it went somewhere, not  
10 where it went?  
11 A. Well, it'll tell us that it went - yes, you're right.  
12 It'll tell us that it went somewhere else, but we're trying  
13 to - the primary purpose of these questions and  
14 subquestions is to work out how much water made its way to  
15 the grate.  
16  
17 Q. And so, so far as you understand, it's no part of the  
18 work of Professor van Zyl to ascertain the likely path of  
19 water, for example, that made its way to the surface but  
20 not to the grate?  
21 A. Correct.  
22  
23 Q. He's not a hydrogeologist, is he?  
24 A. No, I don't believe so.  
25  
26 Q. And do you understand that to be part of the brief to  
27 SMEC?  
28 A. In broad terms, yes.  
29  
30 Q. Has a date been fixed for receipt of  
31 Professor van Zyl's report?  
32 A. I believe he's given an indication of when that would  
33 be ready, but I don't recall the date.  
34  
35 Q. Do you have an indication in general terms?  
36 A. I think it was just a handful of weeks.  
37  
38 Q. From when?  
39 A. From - well, I would expect - I would expect it in the  
40 month of July. Maybe that's more helpful to say that.  
41  
42 Q. You expect you'll receive his report at some point in  
43 the month of July?  
44 A. Yes, possibly a draft report in the month of July.  
45  
46 Q. Thank you for that. To return to your preliminary  
47 calculations, if you will, you can see there at the bottom



1 of the page, it says "topic b":

2

3 *[South East Water] has engaged SMEC to*  
4 *undertake work to calculate the proportion*  
5 *of water that did not travel to [the*  
6 *stormwater pit] from the Bayview Road*  
7 *burst.*

8

9 A. Yes.

10

11 Q. So that question there that SMEC's undertaking, the  
12 proportion of water that did not travel to the stormwater  
13 pit, whatever answer they come up with, one would hope will  
14 correlate with the answer that Professor van Zyl comes up  
15 with as to the amount of water that did travel to the pit;  
16 is that right?

17 A. Yes, I think - I find it easier to refer back to the  
18 paragraph 25, about what they're doing. So SMEC - maybe  
19 the wording in paragraph 29 could be clearer, but SMEC are  
20 answering the question that's referred to in 25(b), as how  
21 much water from the surface made its way to the stormwater  
22 pit.

23

24 Q. Okay. In any event, you've done some calculations  
25 while all of this work from the experts is going on?

26 A. Yes, I was curious myself, but I'm not expert in that  
27 work, so was curious to see what the common use standards  
28 and approaches might tell us.

29

30 Q. And you've undertaken those calculations on two bases,  
31 that is, using two different methods that are in the - it's  
32 the "Australian Rainfall and Runoff"?

33 A. Correct.

34

35 Q. That's a guide about flood estimation?

36 A. Yes.

37

38 Q. And was that a guide that you were familiar with  
39 before you did this work?

40 A. I haven't used it for many years, but I was aware of  
41 its existence. I think, if my memory is correct, it was  
42 part of my degree studies.

43

44 Q. I see. So you had a general awareness of it, but it's  
45 not part of your ordinary day-to-day work?

46 A. Correct.

47

1 Q. One of the methods you selected is the Horton method?

2 A. Correct.

3

4 Q. And in general terms, do you want to describe the  
5 Horton method?

6 A. Yes. So they're both - or both methods are broadly  
7 the same, they just approach it from slightly different  
8 angles. The behaviour of runoff from a rainfall event is  
9 quite complicated, but there's a few different equations  
10 that simplify what's happening in that physical behaviour,  
11 and the Horton is one of those formulas. It's very popular  
12 in the United States, it's less commonly used in Australia,  
13 but it is mentioned in the Australian Rainfall and Runoff  
14 guidelines, and what it does is it talks about the amount  
15 of rain that falls and then it also includes how dry the  
16 soil is. If the soil is dry, then it can absorb more of  
17 that rainfall. By the soil absorbing the rainfall, then  
18 that means less water runs off the surface and into the  
19 drains or the waterways. So there's three or four  
20 different parameters in that equation, and then you select  
21 those parameters and then it provides an answer.

22

23 Q. So integral to the Horton method are the prevailing  
24 soil types in the area?

25 A. Yes. So there's - one of the factors that needs to be  
26 considered is the soil type, and then we have a sample of  
27 soil and we've had that lab-tested from near the burst  
28 site, so we've got a general understanding of the soil  
29 particle size, distribution, and then that is one of the  
30 components that goes into selecting which category of soil  
31 we should use in the calculation.

32

33 Q. I see. And then your conclusions, in respect of the  
34 Horton method, are set out at 33 of your witness statement,  
35 which is just over the page.

36 A. Yes.

37

38 Q. It says there in the second-last sentence that your  
39 calculation suggests, regardless of the volume of the  
40 burst, approximately 7 megalitres of the water from the  
41 burst entered the soil?

42 A. Yes, that's correct.

43

44 Q. So there, you're talking about water that entered the  
45 soil and did not enter the stormwater drain; is that right?

46 A. Yes.

47

1 Q. And do you expect that Professor van Zyl will be  
2 having regard to the Horton method in the course of his  
3 work?  
4 A. No, so he won't be replicating this, but SMEC will be.  
5  
6 Q. I see?  
7 A. And SMEC's work, they - I believe they won't be using  
8 the simple methods that I've used, they'll be using more  
9 advanced methods to try and replicate in a computer model  
10 the complicated behaviours that are occurring.  
11  
12 Q. I see. The second method you used is the initial  
13 loss/continuing loss method?  
14 A. Yes.  
15  
16 Q. And is that a method that is more commonly used in  
17 Australia?  
18 A. Yes, it appears to be. Again, I'm not an expert in  
19 this, so I'm not well placed to answer the question, but my  
20 understanding is that it is more commonly used.  
21  
22 Q. What is the central difference between the two  
23 methods?  
24 A. There's - the Horton method uses a standard - a set of  
25 tables to provide the parameters to use, whereas because  
26 the initial loss/continuing loss method is more common in  
27 Australia, there's a website that provides different values  
28 that should be used based on geographic location. So  
29 there's a different - it's more site-specific, I guess.  
30 However, the numbers in that - it's a little bit deceptive,  
31 just because you can type into the website and say, "I want  
32 the parameters for McCrae", it doesn't mean that - and it  
33 spits you back the numbers and you might go, "Oh, yeah,  
34 well, that's fantastic, I've now got very specific  
35 locations to my precise location", those numbers are very,  
36 very broad. So it can be misleading in its accuracy.  
37  
38 Q. The conclusion that you reached applying the initial  
39 loss/continuing loss method was, I think, 3 megalitres; is  
40 that your recollection?  
41 A. Yes, it's written in the witness statement, probably  
42 I should be check to be certain.  
43  
44 Q. Over the page at paragraph 35.  
45 A. Yes, that's right. It says 3 megalitres.  
46  
47 Q. On the application of the Horton method, 7 megalitres,

1 on the application of initial loss/continuing loss,  
2 3 megalitres.  
3 A. Yes.  
4  
5 Q. Am I right? I can't now see it. Oh, yes, there it  
6 is. When you applied the Horton method, you chose group B  
7 soil; do you recall that?  
8 A. Yes, I do.  
9  
10 Q. And that is sandy soil?  
11 A. Yes. There's - I found a reference, a United States  
12 publication that references sand percentages for different  
13 categories of soil, and then from the soil sample we've got  
14 from the burst location, I used that percentage of sand  
15 in that soil sample to then pick the category which was  
16 group B of the soils.  
17  
18 Q. And when you say the "soil sample", you mean a soil  
19 sample that somebody else had taken?  
20 A. Well, no, I - so in the - we've got the December 2024  
21 burst.  
22  
23 Q. Yes.  
24 A. But roughly 5 or 10 metres away from that, we had  
25 a minor leak in March 2025 --  
26  
27 Q. Yes.  
28 A. -- on that pipe. So while we were excavating to  
29 repair that leak, I took a soil sample and have had that  
30 sample laboratory tested.  
31  
32 Q. I see. So you, in fact, took that soil sample  
33 yourself, did you?  
34 A. Yes.  
35  
36 Q. How far away did you say that was?  
37 A. Oh, it's of the order of 5 to 10 metres from the  
38 December 2024 burst.  
39  
40 Q. You also had regard to rainfall data, did you?  
41 A. No. I took a conservative approach that there had  
42 been no rain in the calculations, so particularly the  
43 Horton method, one of the parameters is how much rainfall  
44 had been in the preceding five days.  
45  
46 Q. Yes.  
47 A. So the conservative approach was to assume it was dry.

1  
2 Q. I see. And do you know, in fact, whether it was dry?  
3 A. I know it was generally dry, but there's been some  
4 comments in Montage records and the like of some patches of  
5 rain.  
6  
7 Q. It is fair to say that you are not experienced in this  
8 kind of hydrological modelling?  
9 A. No, no, it's not - the intention of doing it was just  
10 for my own personal understanding and appreciation of what  
11 might be going on, but because I've been asked as to, you  
12 know, what work I've done, I've provided that.  
13  
14 Q. But this work will ultimately be either confirmed or  
15 corrected by SMEC?  
16 A. Yes.  
17  
18 Q. And it will be supplemented by or informed by, to some  
19 extent, the work of Professor van Zyl?  
20 A. Yes, correct.  
21  
22 Q. You also did some calculations regarding flow rate to  
23 the downstream pit?  
24 A. Yes.  
25  
26 Q. And you applied Colebrook-White assumptions?  
27 A. Correct.  
28  
29 Q. Is that a common part of your work or was this again  
30 you doing something that's outside your ordinary work for  
31 the purpose of trying to have a better understanding of the  
32 circumstances?  
33 A. Calculating flow rates in pipes is a common part of my  
34 work.  
35  
36 Q. Colebrook-White assumptions are assumptions that are  
37 commonly applied?  
38 A. Yes.  
39  
40 Q. Thank you. Is one of the assumptions that - no,  
41 sorry, is 10 litres a second roughly two-thirds of peak  
42 flow, here?  
43 A. Yes, that would - on the basis of Jonathan's  
44 calculations, he's estimated that the peak flow was  
45 around - out of the burst, was around 15 litres a second.  
46  
47 Q. Yes. And so you've taken that from Dr Crook's work?

1 A. Yes.

2

3 Q. That's an estimate that must depend, mustn't it, on  
4 the slope and the diameter of the pipe; is that fair?

5 A. Well, the flow rate does, but Jonathan's calculations  
6 are not looking at it from a hydraulic calculation point of  
7 view, they're looking at it - he's looking at it from the  
8 data that's been collected from our flowmeter. So there's  
9 two different ways of looking at the - or more than two,  
10 but those two ways are different ways of looking at it, at  
11 the same problem.

12

13 Q. I see. So this way of looking at it is different from  
14 seeking to examine it by reference to other hydrological  
15 methods that you could use to come to this. Are you  
16 familiar with the concept of Monte Carlo simulation?

17 A. Yes, yes. I've been - someone has suggested to me  
18 that I could use a Monte Carlo simulation to try and  
19 determine a percentage likelihood of the flow rate, because  
20 there are several variables that I have discussed in that,  
21 and yes, that might be worthwhile, although it can - Monte  
22 Carlo can be a bit of a rubbish in/rubbish out kind of  
23 situation.

24

25 Q. I see, Mr Tully, you're not the only one reading  
26 abstruse academic articles, late at night.

27 A. Monte Carlo is quite commonly used. We use it almost  
28 on a - well, maybe on a weekly basis in cost estimating.

29

30 Q. Is it different to range testing?

31 A. I'm not highly familiar with the term "range testing".  
32 I can infer what it means from the words, but it's probably  
33 not a phrase I would commonly use.

34

35 Q. Okay. Back to Monte Carlo, then, is that something  
36 that SMEC are likely to undertake, do you know?

37 A. I'm not sure exactly what they will use to establish  
38 the range. I don't think they will be able to - they will  
39 give a single answer and say, "That is categorically the  
40 number". I think they will also have the same general  
41 issues that I've talked about in that there's a plausible  
42 range of what the numbers will be, but no, we haven't got  
43 to that level of detail - they haven't got to that level of  
44 detail, is my understanding.

45

46 MR ROBERTS: Mr Tully, I have no further questions for you,  
47 but others may have some. Thank you, Madam Chair.

1  
2 CHAIRPERSON: Are there any further questions?

3  
4 MS BATEMAN: I do.

5  
6 <EXAMINATION BY MS BATEMAN:

7  
8 MS BATEMAN: Q. Mr Tully, I appear on behalf of the  
9 shire. Can we just go back to the 2022 burst. As  
10 I understand it, your evidence is that that broken pipe was  
11 fixed on 14 November? Is that right?

12 A. Yes, I think that's right.

13  
14 Q. Can we please bring up SEW.0001.0001.4933. While  
15 that's being brought up, your evidence was that your  
16 understanding of what occurred is based on the data that  
17 you've looked at as well as - and this is exhibited to your  
18 statement, this is the Montage report; do you recall that?

19 A. Yes, I do.

20  
21 Q. Can we please go to page 8 of this document, just to  
22 orientate for a moment. So this has a summary of the task  
23 events; is that correct?

24 A. Yes.

25  
26 Q. That's where you draw times from - for which you said  
27 that that the project, the job was allocated and in  
28 transit; is that right?

29 A. Yes.

30  
31 Q. And it records there that the people were on site at  
32 2.45pm?

33 A. Yes, that's - that's what it says, yes.

34  
35 Q. It also says "On site surface okay" 8.05?

36 A. Yes.

37  
38 Q. On 15 November; is that correct?

39 A. Yes. Yes, it - the terminology can be a little bit  
40 mis - well, not misleading, but a little bit confusing, in  
41 that basically, when the onsite service is okay, that's  
42 when the water's been restored, so that's what we've - you  
43 know, that's our primary purpose, and then there's a whole  
44 host of cleaning up and backfilling holes and those kind of  
45 activities after that.

46  
47 Q. Can we please go back to page 1 of that report. This

1 provides a bit more description here, doesn't it, of the  
2 events that occurred?  
3 A. Yes.  
4  
5 Q. You can see halfway down the page there, the date in  
6 the middle of the page, saying 15 November 2022?  
7 A. Yes, 15th? Yes, 15th, at 4.05.  
8  
9 Q. Have you had an opportunity to read this?  
10 A. Yes.  
11  
12 Q. So we see the description there is:  
13  
14 *Arrive/set up, drill holes to locate burst.*  
15 *Saw cut and remove concrete, shut main ...*  
16  
17 A. Yes.  
18  
19 Q.  
20 *... found broken back next to collar,*  
21 *closer inspection revealed second broken*  
22 *back, cut in replace section, slow back ...*  
23  
24 and it goes on. Do you accept that that indicates that the  
25 repair, in fact, occurred on 15 November?  
26 A. So the - there's - it's important to understand, the  
27 way the Montage system works is that the person will do  
28 some work and then they will - once they've completed that  
29 work, they will then type a summary of the work they have  
30 done and then the time stamp is the time when they have  
31 pressed "enter" into the computer. So it means that all  
32 those tasks have been completed by that date, by that time,  
33 not that they were undertaken at that time.  
34  
35 Q. So is it the case that the Montage report, in terms of  
36 its date stamps, is not a record of actually the time that  
37 events occurred?  
38 A. Well, there's different parts of it. And so we need  
39 to understand which component of it is - that we are  
40 talking about, because some components are precise and some  
41 components are after the fact. So the accuracy of the  
42 Montage record is depending on which component of the  
43 record you're looking at.  
44  
45 Q. And so looking at this section, being the task story,  
46 you'd say that the time/date stamps in this section are not  
47 accurate?



1 A. Well, I'd say they are accurate in that that is the  
2 time that the person pressed - entered in and had to  
3 represent when that series of activities have been  
4 completed. So it's accurate in that respect, but it's not  
5 telling at precisely at what time they arrived on site,  
6 what time they drilled the holes, what time they saw cut,  
7 what time they did all those individual activities they've  
8 talked about.

9  
10 Q. You say that the metadata for the photograph of the  
11 pipe has got a time stamp of 8.02pm.

12 A. Yes.

13  
14 Q. Has that metadata been produced to the board of  
15 inquiry?

16 A. My understanding is that the photos have been  
17 provided, and then the inquiry's able to see the metadata  
18 associated with the photos.

19  
20 Q. That metadata - I raise this because your witness  
21 statement doesn't provide a date for that photograph.  
22 Presumably the metadata will record the date as well as the  
23 time?

24 A. Yes. Not every - the vast majority of Montage photos  
25 I've seen have the metadata but I have seen one or two that  
26 don't have the metadata, but I think in relation to this,  
27 the photos did have the metadata.

28  
29 Q. In respect of the time it took to turn off the valve,  
30 your evidence based on the data - so not on the Montage  
31 report, on the data - was that it was turned off at 6.50pm,  
32 the valve?

33 A. Yes, I think so, yes.

34  
35 Q. Your evidence was also that - sorry. I took you to  
36 the time the crew came on site at the back of that  
37 document, which was 2.43pm. Is that section of the Montage  
38 report an accurate section?

39 A. Yeah, they normally record when they - that should be  
40 reasonably - that should be quite accurate, that arrival  
41 time.

42  
43 Q. So having regard to those two time frames, it seems  
44 that it took roughly four hours, from South East Water  
45 arriving on the site, to turn off the valve?

46 A. Yeah, well, they were trying to - I'm inferring,  
47 rather than knowing for sure, but I think when they arrived

1 on site, it would have been a confusing situation because  
2 the water was coming out of the road not directly above the  
3 water main. So there would have been some thinking about  
4 where's the water coming from, and what's our - the best  
5 course of action.  
6

7 Q. Do you know what type of valve it was that was  
8 ultimately turned off?

9 A. I don't know the specifics of the valve but our water  
10 main valves are fairly standard, so I assume it would be  
11 a standard knife gate valve.  
12

13 Q. And does South East Water map those valves for its  
14 field crews so that they can locate them?

15 A. Yes. So in our GIS system, we show the valve  
16 locations. Some of those will be - the position of those  
17 will be highly accurate and some of those might be a little  
18 bit more indicative.  
19

20 MS BATEMAN: No further questions, thank you.  
21

22 CHAIRPERSON: Any further questions?  
23

24 MR COSTELLO: No, thank you, Madam Chair.  
25

26 CHAIRPERSON: Mr Tully, that completes your evidence and  
27 you are excused. Thank you for coming along.  
28

29 THE WITNESS: Thank you.  
30

31 **<THE WITNESS WITHDREW**  
32

33 MR COSTELLO: Madam Chair, one further witness today.  
34 Would that be a convenient time to break?  
35

36 CHAIRPERSON: Let's return at 2 o'clock, unless that  
37 causes anyone difficulty. No? We will resume at 2.  
38

39 **LUNCHEON ADJOURNMENT**  
40

41 **UPON RESUMING AT 2.00 PM**  
42

43 MS KITTIKHOUN: Madam Chair, I now call the third and  
44 final witness for today, Mr Andrew Forster-Knight.  
45  
46  
47

1 <ANDREW FORSTER-KNIGHT, affirmed:

2

3 <EXAMINATION BY MS KITTIKHOUN:

4

5 MS KITTIKHOUN: Q. Good afternoon, Mr Forster-Knight.  
6 Could you please state your full name for the record?

7 A. Yeah, sure. Andrew Forster-Knight.

8

9 Q. And what is your business address?

10 A. 101 Wells Street, Frankston.

11

12 Q. And your current occupation?

13 A. General manager, digital and transformation at South  
14 East Water.

15

16 Q. Did you receive a notice from the inquiry to attend  
17 and give evidence today?

18 A. I did.

19

20 Q. And you have prepared a witness statement for the  
21 purpose of the inquiry?

22 A. I did.

23

24 Q. Can a copy of the witness statement and its exhibits  
25 please be provided to the witness? I see, the witness has  
26 that. I understand that you wish to make an amendment to  
27 your witness statement. Is that just in relation to  
28 exhibit 10?

29 A. No, there's also a - I think it's paragraph 36.

30

31 Q. Okay.

32 A. The number 30, we're changing to 29.

33

34 Q. So paragraph 36?

35 A. Paragraph 36.

36

37 Q. The "30" in the second line of that paragraph should  
38 be?

39 A. It says "However, the other", and put "29" instead of  
40 "30."

41

42 Q. 29?

43 A. Yep.

44

45 Q. Do you have any other amendments you wish to make?

46 A. No.

47

1 Q. Having made that amendment, are you happy that -  
2 sorry, are the contents of that statement true and correct?  
3 A. Yes.  
4  
5 Q. Please initial that amendment and then sign the last -  
6 sign and date the last page.  
7 A. Sorry, that was sign and date?  
8  
9 Q. And date the last page, thank you.  
10 A. 20.  
11  
12 Q. Today's the 24th, I believe.  
13 A. Thank you.  
14  
15 MS KITTIKHOUN: Madam Chair, I tender that statement and  
16 its exhibits.  
17  
18 CHAIRPERSON: The statement of Andrew Forster-Knight,  
19 together with its exhibits, will be CA42.  
20  
21 **EXHIBIT #CA42 STATEMENT OF ANDREW FORSTER-KNIGHT, TOGETHER**  
22 **WITH ITS EXHIBITS**  
23  
24 MS KITTIKHOUN: Q. Mr Forster-Knight, could you please  
25 describe your personal qualifications?  
26 A. Yes, I've got --  
27  
28 Q. Professional qualifications?  
29 A. Professional, yes, I've got a double degree from  
30 Monash University, majored in engineering, in chemical  
31 engineering; and in science, majored in mathematics.  
32  
33 Q. You have also completed a directors course; is that  
34 right?  
35 A. I have. I sit on the board of a South East Water  
36 subsidiary.  
37  
38 Q. What's the name of that subsidiary?  
39 A. Iota, I-O-T-A.  
40  
41 Q. You started working for South East Water shortly after  
42 you graduated; is that right?  
43 A. I did, yes.  
44  
45 Q. What year was that?  
46 A. 2003.  
47

1 Q. Have you worked with South East Water for the entire  
2 duration of your career?  
3 A. I have.  
4  
5 Q. And when you started at South East Water, what was the  
6 role that you held?  
7 A. It was a chemical or process engineer working in  
8 treatment plant, process engineering sort of world.  
9  
10 Q. Treatment plant in respect of the water network?  
11 A. No, no, more sewer, yes.  
12  
13 Q. And throughout your time at South East Water, you have  
14 held various roles and positions; is that right?  
15 A. Correct.  
16  
17 Q. Including operational technology manager?  
18 A. Correct.  
19  
20 Q. General manager, digital utility?  
21 A. Correct.  
22  
23 Q. General manager, service delivery?  
24 A. Correct.  
25  
26 Q. And so in general terms, would you say that your work  
27 at South East Water has centred around using operational  
28 technology and automation to improve and optimise business  
29 performance?  
30 A. Yes, I would.  
31  
32 Q. When did you start in your current role as executive -  
33 sorry, general manager, digital and transformation?  
34 A. It was November last year, so 2024, so pretty much the  
35 same time that Tim Lloyd started. We had swapped roles at  
36 that time, if that makes sense.  
37  
38 Q. Can I take you to the second paragraph of your witness  
39 statement just to confirm I understand. It's  
40 SEW.0001.0001.5014. The second paragraph there says that  
41 you have held the role since December 2024. Do you wish to  
42 amend that to November or --  
43 A. I'll go with December. It was roughly in that time.  
44 I had forgotten the specific date, but if that - that would  
45 be correct in my statement.  
46  
47 Q. I understand. And so broadly speaking, what does your

1 role as general manager, digital and transformation entail?  
2 A. Yes, so I oversee a couple of functions in there. The  
3 transformation side is we're trying to push out sort of  
4 leading-edge technology to the business to help the  
5 business, so that's one aspect of it. We also look after  
6 our existing metering fleet, which is the mechanical  
7 meters, and we've got an operational technology arm. So,  
8 yes, all in unison, we try and solve problems for the  
9 business.

10

11 Q. And do you report directly to Ms Lara Olsen?

12 A. I do.

13

14 Q. Are you part of the group that's been referred to as  
15 the McCrae strategy group?

16 A. I am.

17

18 Q. When did you become part of that group?

19 A. I would say it would be maybe around May.

20

21 Q. May of this year?

22 A. Yeah. I think that was it, about the time, yes.

23

24 Q. Mr Forster-Knight, I'm going to ask you some questions  
25 now about the roll-out of the digital meters.

26 A. Sure.

27

28 Q. In your statement, you describe South East Water's  
29 current program of rolling out digital meters across its  
30 network. But before I ask you about that program  
31 specifically, can I ask you some basal questions about the  
32 meters used in South East Water's network.

33 A. Yes.

34

35 Q. Am I right in understanding that, broadly speaking,  
36 there are two types of meters, so mechanical meters and  
37 digital meters?

38 A. Correct.

39

40 Q. Are the terms "analogue meter" and "mechanical meter"  
41 used interchangeably?

42 A. Yes.

43

44 Q. And so too "smart meter" and "digital meter"?

45 A. Correct. We call it "digital meter", but I know it's  
46 been referred to as "smart meter" in here, so either,  
47 either way.

1  
2 Q. So both mechanical and digital meters measure the  
3 amount of water that is used by customers on private  
4 property; is that right?  
5 A. Correct.  
6  
7 Q. And could you explain to Madam Chair the key  
8 differences between a mechanical meter and a digital meter?  
9 A. So the big difference is that the digital meter  
10 transmits its data over the air back to a central server.  
11 The mechanical meter has to be read manually by people  
12 walking the streets, looking at the number on it, recording  
13 it and manually submitting it, effectively. That's  
14 probably the big difference. There's probably a few  
15 others, but that's probably the main one.  
16  
17 Q. And mechanical meters are typically read every  
18 quarter?  
19 A. Correct.  
20  
21 Q. I now want to ask you some questions about the  
22 metering program, as I telegraphed. Mr Lloyd gave evidence  
23 yesterday that digital meters and the roll-out of those  
24 meters is squarely within your domain of responsibility; is  
25 that right?  
26 A. It is. It's a - yes, the accountability is with me,  
27 but the business has lots of input because everyone is  
28 excited to use digital meters for lots of different  
29 purposes, so we sort of harness that input, but we - I'm  
30 ultimately accountable.  
31  
32 Q. At the highest level, would you describe the program  
33 as involving the exchange of mechanical meters with digital  
34 meters?  
35 A. Yes.  
36  
37 Q. You say in your statement that South East Water is  
38 currently in the mass roll-out phase of the program; is  
39 that right?  
40 A. Correct.  
41  
42 Q. And that phase commenced in August of last year?  
43 A. Correct.  
44  
45 Q. Could you tell us about the mass roll-out phase?  
46 A. Yes. So we've been using and experimenting and  
47 trialling digital meters for quite a few years, and so

1 early trials were testing out different aspects of the  
2 technology. Once we had proven that out, we started to  
3 move towards a slightly larger phase. And then all being  
4 successful, ultimately we wanted to head to a mass roll-out  
5 phase, which is effectively putting, you know, thousands of  
6 meters a month - exchanging thousands of meters a month and  
7 really making inroads to changing all of our customers over  
8 to digital.

9  
10 Q. So all of the meters - is the objective of the program  
11 to convert all of the meters in the network over to digital  
12 meters?

13 A. Correct.

14  
15 Q. And that program is scheduled to conclude in 2029?

16 A. Correct.

17  
18 Q. And by the end of the program, you say that this will  
19 result in over 850,000 meters being exchanged?

20 A. Correct.

21  
22 Q. Mr Lloyd gave evidence yesterday that in respect of  
23 digital meters, there are some that have acoustic sensors  
24 and some that do not. Does that accord with your  
25 understanding?

26 A. It does, yes.

27  
28 Q. Could you tell us about those acoustic sensors?

29 A. Yes, so they are South East Water technology that  
30 we've licensed to some of the big vendors globally, but  
31 basically what it does, it's a cut-down version of a more  
32 sophisticated acoustic sensor that you would put out  
33 traditionally in the network. And with a low price point,  
34 it goes into - ultimately we want to put them in as many  
35 meters as we can, but it goes - once it's in there, it  
36 listens or - listens for vibration back on the South East  
37 Water side of the network, within close proximity to the  
38 house. So it's not trying to listen, you know, kilometres  
39 away or anything like that, but we do get lots of leaks in  
40 service pipes, which are the pipes that go into people's  
41 houses, and we get a couple of thousand of those a year,  
42 I think it is. So that's its target. So the difference  
43 literally between a standard digital meter and the  
44 vibration one - they look and feel exactly the same, but  
45 inside one has got a little device and one doesn't.

46  
47 Q. I see. Do you know the maximum range of effectiveness



1 of those sensors?

2 A. It depends on the pipe material and lots of other  
3 things, but to give you a broad ballpark I would say sort  
4 of 50 metres is probably a good number.

5

6 Q. Those digital meters that have acoustic sensors, are  
7 they monitored by a particular platform in South East  
8 Water's network - systems?

9 A. They are. So it's what they call an IoT, Internet of  
10 Things, platform, so it's separate to SCADA and everything  
11 else, but ultimately there is a tool that sort of triages  
12 all of the alarms from the vibration sensors, and that's an  
13 operational tool that either our operators or our NOCC team  
14 can use to investigate leaks coming from these sensors.

15

16 Q. So if the sensor has picked up a leak, it will trigger  
17 an alarm, and that will be brought to the attention of  
18 someone within the network operations control centre; is  
19 that right?

20 A. Yes, roughly speaking. So the sensor detects  
21 a vibration wave form. It doesn't necessarily say it's an  
22 alarm, but it does send that data back and the tool  
23 analyses it and also looks at the neighbouring sensors and  
24 nodes around and makes a determination to say, "I think  
25 there is something here", or, "There is not something  
26 here."

27

28 Q. Would it be then up to the operator to look at that  
29 data and then decide whether a response is required in  
30 relation to that vibration?

31 A. Exactly right, yep.

32

33 Q. And would that operator be given instructions or  
34 training as to how to respond?

35 A. Correct.

36

37 Q. And what would that entail?

38 A. So we've got a sort of a change management division in  
39 digital and transformation, so they will literally - once  
40 we've got the tool, they sit and train and get feedback  
41 from the operators. So it's reasonably extensive, and then  
42 at a certain point it's handed over to operations or to the  
43 NOCC team to run with from that point on.

44

45 Q. You said earlier that the SCADA system is separate  
46 from the IoT system. Do they speak to each other in any  
47 way?

1 A. Do they speak to each other? I would say yes, very -  
2 for very specific purposes. They are not sort of  
3 hand-in-glove systems, but they can talk to each other with  
4 the technology.

5  
6 Q. Can they speak to each other for the purpose of  
7 enhancing leak detection practices?

8 A. They don't at the moment, but in the future they  
9 probably will.

10  
11 Q. So am I right in understanding that about 60 per cent  
12 of digital meters that would be rolled out in South East  
13 Water's network will contain that acoustic sensor?

14 A. That's the aim, yeah.

15  
16 Q. Can I take you to the mass roll-out deployment  
17 strategy, which is exhibit 2 to your statement. It's  
18 SEW.0001.0001.5007. In general terms, can you describe the  
19 purpose of this document?

20 A. Yes. So the strategy and the plan were really just to  
21 give rigour to how we're going to exchange 850,000  
22 mechanical meters. So you would think in theory you could  
23 start at one part of the network and work your way through.  
24 We wanted to have - instead of that, we wanted to let the  
25 business have input to determine how we should do it and  
26 put a bit of nuance as to where the best - where to  
27 prioritise our earlier roll-out. So the purpose of this  
28 was to craft a strategy that was co-designed by the  
29 business and then implement that in the roll-out.

30  
31 Q. Which parts of the business have had input into this?

32 A. So what I would say, service delivery, which is the  
33 ops and maintenance; our customer experience team; our  
34 environmental team; and our planning team, called liveable  
35 water solutions, but the people that plan the  
36 infrastructure. Just off the top of the head, they're  
37 probably the main ones, yes.

38  
39 Q. Can we specifically, please, go to page 9 of the  
40 document. This is a table that sets out the six criteria  
41 for the mass roll-out; is that right?

42 A. Correct.

43

44 Q. And these principles of prioritisation, as you  
45 mentioned earlier, were co-created with many areas of the  
46 business?

47 A. Correct.

1  
2 Q. So by reference to these principles of prioritisation,  
3 South East Water then determined which geographic areas  
4 would have digital meters rolled out?  
5 A. Not so much - I wouldn't say geographic, but it was  
6 more - because we're replacing mechanical meter walking  
7 routes, where people walk around, we'll try and replace  
8 them in one hit. So this probably prioritised those, what  
9 we call the metering zones or districts. That's what it  
10 was prioritising more so than just a geographic area, if  
11 that makes sense.  
12  
13 Q. Are metering zones distinct from water distribution  
14 zones?  
15 A. They're completely different.  
16  
17 Q. Completely different?  
18 A. They're literally - the metering zones are literally  
19 where - and they're legacy sort of stuff, but it's where  
20 our meter readers will walk a particular route around  
21 particular streets. That's a - that's within a metered  
22 zone. Hydraulic zones on the water side - nothing to do  
23 with it.  
24  
25 Q. And would you say there are more metering zones than  
26 water distribution zones?  
27 A. Yeah - that's a good question. I don't know the  
28 answer to that.  
29  
30 Q. Do you know how many metering zones there are?  
31 A. Not exactly. No, not off the top of the head.  
32  
33 Q. No worries. I want to ask you about the first two  
34 criteria in this table in particular, the first being the  
35 number of customer-side leaks. That was given the highest  
36 priority weighting in the strategy?  
37 A. Correct.  
38  
39 Q. And so areas with high levels of historic customer  
40 leak reports, they were factored in to the deployment  
41 priorities?  
42 A. They were, yes.  
43  
44 Q. In that column there headed "Justification", there is  
45 a cascading list of data sources for determining the  
46 frequency of customer-side leaks; is that right?  
47 A. Correct, yep.

1  
2 Q. The first two sources are actual sources of data --  
3 A. Yes.  
4  
5 Q. -- or sources of actual data?  
6 A. Yes.  
7  
8 Q. So actual data about leak allowances?  
9 A. Correct, yes.  
10  
11 Q. And could you just describe to us what leak allowances  
12 are?  
13 A. So a leak allowance - so maybe it's probably important  
14 just to distinguish that, in the mechanical world, it's  
15 really hard to discern between usage and leakage, just  
16 because we only get quarterly reads. So just put that one  
17 out there.  
18  
19 So the only - there's a couple of ways, but they are  
20 pretty rudimentary as to how we would know about  
21 a customer-side leak. One of the most reliable, I guess,  
22 is when a customer calls us in and says, "I've just found  
23 this massive leak. I've got a massive bill. Can I have  
24 a rebate?", in rough terms, and if South East Water accepts  
25 that, accepts that they have got a plumber and there is  
26 proof of it, then we would rebate their bill, and that's  
27 called a leak allowance.  
28  
29 Q. So in order for a leak allowance to be granted, does  
30 there need to be evidence that there has been an actual  
31 leak?  
32 A. I don't know for certain, to answer that. My - having  
33 been around the business for a while, definitely at some  
34 point, that was asked; you needed to have proof. I don't  
35 know if that's the case today.  
36  
37 Q. Are there circumstances where a leak allowance might  
38 be afforded where there is potentially no leak at all?  
39 A. I would say no, because they usually are accompanied  
40 by a large bill. That's normally what can trigger it, as  
41 well. So there's - I would say there would need to be some  
42 sort of basis for it, yep.  
43  
44 Q. I see. The second source there, under the heading  
45 "Justification", is CF alerts. Are CF alerts continuous  
46 flow alerts?  
47 A. Correct.

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47

Q. And this data can only be obtained from zones that have digital meters installed?

A. Correct. And maybe just to clarify, we - before we did our mass roll-out, like I said, we were already putting meters out there for various other reasons, stress testing the technology, so we had probably close to 90,000 meters in various locations. So they weren't done in full metering zones; they were done for other specific purposes. So I think they used some of that data to say, you know, "Caulfield" or somewhere, "That looks like we're getting lots of leaks. Maybe they all used the same sort of piping on their houses. Do we factor that in to the next roll-out?", if that makes sense.

Q. I see. If there has been a continuous flow through a particular meter, is that a good indication that there is a leak, or could it be explicable by other reasons?

A. It could be explicable, but in my experience I would say over 99 per cent of continuous flow alerts are leaks. And so others may argue that, but really it's only if - like, so maybe it's worth me just mentioning what a continuous flow is, because - how it's done.

So in the meter, so they're electronic meters with a battery in it, and they're scanning the water every five seconds. Now, they're not recording that data for us, but that's how it works out its volume going through it. And a continuous flow is if that meter sees flow for every - I think it's five seconds, it's either five seconds or two seconds - for every five seconds of the day, it's seeing flow. So it never goes to zero. So something is always running.

And so you ask yourself what would be doing that, and it's usually either - in real-world applications that could do it, that's probably evaporative cooling if you're in a hot summer and someone's running it flat-out for the whole time, or it could be irrigation. But then again, irrigation - that's assuming irrigation would be running for, you know, days on end. So, anyway, long story short, I would say nearly every one I have seen has been a legitimate leak. But yeah.

Q. And is the alert only triggered if there is a 24-hour period where there has been continuous flow or do you need a bigger data step?

1 A. Twenty-four hours in the - it's all done in the meter,  
2 and then the meter flags and says, yep, I have got  
3 a continuous flow and when I'm going to report the next  
4 day, or whenever the next window is, which is typically  
5 once a day, in the morning, it will send that payload  
6 through. So it doesn't send it instantly. So that 24-hour  
7 period might elapse at, you know, 2 in the afternoon, but  
8 it might send that data at 6 o'clock the next morning, in  
9 the next payload.

10  
11 Q. So it will send that data to the IoT system; is that  
12 right?

13 A. Correct, yes.

14  
15 Q. Would that prompt, then, someone from maintenance to  
16 go out and attend that private property?

17 A. No, so - and maybe just to distinguish, and you might  
18 have heard it already in the witness statements - South  
19 East Water's accountability is up to the meter; behind the  
20 meter is the customer's responsibility. Obviously we want  
21 to help them and inform them, but it's not our  
22 responsibility. So we don't do anything, but I will just  
23 caveat that. So when the data comes in, there is a whole  
24 heap of systems and business rules, and ultimately that  
25 customer will get a text message, fully automated text  
26 message, email and potentially an outbound call, but text  
27 and email are the main channels for digital.

28  
29 Q. So this then really is an avenue to notify the  
30 customer, who is then responsible for attending to  
31 remediating the private leak?

32 A. Correct, yep.

33  
34 Q. I will come back to the table. As to the third source  
35 of data, it says:

36  
37 *Use proxy data for leaks next ...*

38  
39 So is that on the assumption that the first two sources of  
40 data are unavailable?

41 A. Whether they're unavailable or just in the sort of  
42 cascading of priorities of when they're sort of - when the  
43 weightings and things were done. And I wasn't privy to it,  
44 but I understand there's some weightings and things that  
45 went into this, remembering this isn't, like, super  
46 scientific to a degree. It's just how do we - all right,  
47 we've got to put them everywhere; where do we - best bang

1 for buck?

2

3 So I think what they are talking about here is, okay,  
4 what else would be useful for customer leaks? So areas of  
5 sandy soil makes sense, because if customers are getting  
6 a leak, it's not coming to surface, they probably don't  
7 know about it. With a digital meter, they will know about  
8 it, regardless if it's invisible. So that's the sort of  
9 thing behind that.

10

11 Q. So the reference to sandy soil there is not so much a  
12 reference to the consequences of having a customer-side  
13 leak but the detectability of a leak?

14

A. Yes.

15

16 Q. And so in sandy soils, it's harder to detect the  
17 leak --

18

A. Yes, it just goes to ground, goes --

19

20 Q. -- because of its porous nature?

21

A. Yes.

22

23 Q. Okay. Then the second priority is network leaks. So  
24 this is to draw the distinction between customer-side leaks  
25 behind the boundary or behind the meter and then network  
26 leaks?

27

A. Yes.

28

29 Q. Okay. I might move on. So I understand that McCrae  
30 was prioritised for roll-out in the first phase of the mass  
31 roll-out deployment; is that right?

32

A. Correct.

33

34 Q. And when did the roll-out in McCrae commence?

35

A. It commenced I believe in either late March or early  
36 April this year.

37

38 Q. And prior to the McCrae landslide occurring, was  
39 McCrae prioritised for roll-out in that first phase?

40

41 A. It was. When McCrae was installed was in line with  
42 the planning. It wasn't any earlier. There's some  
43 dependencies, so we can have all of these great ideas about  
44 where we want stuff, but there's also some other  
45 dependencies. And so one of the dependencies is it uses  
46 the telecommunications network to send the data, like  
47 mobile phone towers, and so there was a dependency on the  
mobile phone towers being ready beforehand, because they

1 were getting upgraded as well. So there was a couple of  
2 other factors.

3  
4 So to answer your question, it got deployed as per  
5 originally planned. It just happened to be right near the  
6 landslide or, you know, a month or two after the landslide,  
7 which was good to bring visibility to that area, so that we  
8 could help customers.

9  
10 Q. What's the current status of the roll-out?

11 A. So in McCrae or just generally?

12  
13 Q. In McCrae, sorry.

14 A. Yep. So my understanding, as per my witness  
15 statement, pretty much every house has got it bar the ones  
16 that either, yeah, have opted out, which means they choose  
17 not to have it, and I think there's a couple that might be  
18 in that basket; where we can't get access, so it's  
19 a holiday house. We can't just jump the fence and do it;  
20 we have to contact the customer, and if we hear nothing, we  
21 don't do those ones. And if - some customers have larger  
22 meters. Our larger digital meters are just being  
23 certified, so they're not quite ready. So we are doing all  
24 of the standard ones, which is the 20mm, which is the  
25 majority of our fleet.

26  
27 Q. In your witness statement, you say only 110 properties  
28 remain without a digital meter in McCrae. You say a couple  
29 of those, of that number, 110, are due to customers opting  
30 out. Do you know the proportion of properties that haven't  
31 had digital meters installed by reason of property access  
32 issues?

33 A. I don't, off the top of my head. I imagine - and this  
34 was at a point in time - it's probably, you know, we've  
35 probably got most of them done now, but it would be -  
36 probably - I can't answer. I don't know that one, sorry.

37  
38 Q. Earlier you said that digital meters with acoustic  
39 sensors can be effective over a distance of about  
40 50 metres.

41 A. Yep.

42  
43 Q. Do you have a view as to whether, had digital meters  
44 been installed throughout McCrae prior to November 2024,  
45 would those digital meters have picked up the burst water  
46 main in question in this inquiry?

47 A. I don't believe so. I think Tim Lloyd gave evidence



1 that that Bayview Road leak was not around properties, is  
2 my understanding; it was a trunk main. So these sensors  
3 probably weren't - that's not the intent of these sensors,  
4 to be sort of detecting leaks hundreds of metres away on  
5 large pipes that are not near houses. They've got  
6 a specific purpose, to find and fix and help us optimise  
7 the thousands of small leaks that we get in service pipes.  
8 That's their main intent.

9  
10 And I think as Tim talked to, for those larger trunk  
11 mains, we will be looking at other technologies hopefully  
12 very soon that will be permanent equivalents of what  
13 currently is on the market as temporary solutions. We will  
14 be looking for something that you can deploy and leave  
15 there effectively permanently.

16  
17 Q. And these instruments that South East Water intends to  
18 install on trunk mains, do they predominantly rely on  
19 acoustic technology?

20 A. They do, yep.

21  
22 Q. Is that different from vibrations, detecting  
23 vibrations?

24 A. I think they're interchangeable. My understanding is,  
25 like, if you're listening just for the water, it's usually  
26 classified as a sort of hydrophone or microphone. For  
27 vibration, it's the water's leaking but it's actually  
28 vibrating along the pipe and that's what it's detecting.  
29 So just - if that sort of makes sense.

30  
31 Q. And do you have a sense when the technology on the  
32 trunk mains will be rolled out?

33 A. As soon as possible, but - so there's some emerging on  
34 the market now that you can get that look reasonable. But  
35 South East Water's also - has sort of built their own  
36 technology and it's not far off. It's getting - it's in -  
37 literally in trial phase. So, as soon as that's ready, we  
38 plan to put that out there, but realistically it could be,  
39 you know, six months or more, by the time that we test it,  
40 trial it and make sure it's fit for purpose.

41  
42 Q. You mentioned a South East Water technology. Is that  
43 the Sotto sensor or something else?

44 A. It is. So, yeah, that's Sotto, we call it. That's  
45 what's in the digital meter, but it's also what is going to  
46 be these other permanent ones that you can put on trunk  
47 mains and hydrants and stuff. It will be the same sensing

1 technology, just a different brain behind it. It doesn't  
2 need a meter. It's basically a magnetised version. You  
3 chuck on something, and it tells you leak information.

4  
5 Q. Could you just give us a little bit more detail about  
6 how that works, the Sotto technology?

7 A. Yes, so the 60 per cent of meters that will have the  
8 vibration will have this Sotto. It's for all intents and  
9 purposes a black box that sits on the water pipe. It  
10 measures vibration, uses a piezo crystal, and as the  
11 crystal is stressed by hearing a vibration - you can put  
12 your finger on a pipe and not feel it, but this sensor  
13 would pick it up. That's how sensitive it is. It converts  
14 that sensing into a voltage, and then the electronics infer  
15 that voltage as a vibration.

16  
17 So that's exactly what it's doing in the water meter,  
18 it's sitting on the pipe. And then in this standalone  
19 version, it's that exact same sensor magnetised to, say,  
20 a fire hydrant sitting in a - could be sitting in a paddock  
21 somewhere or middle of nowhere with a data logger on it.  
22 So it is not a meter per se but a little black box, and it  
23 transmits the data. Probably I think the way the guys are  
24 setting it up is it's going to transfer more frequently  
25 than the digital meter, which is that once a day. These  
26 ones that we're deploying permanently in the distribution  
27 areas are probably going to talk maybe every couple of  
28 hours or something, so you can get that more real-time  
29 aspect to it.

30  
31 Q. Mr Forster-Knight, are you happy to continue or would  
32 you like to take a break?

33 A. Keep going if you are happy to, yep.

34  
35 Q. You say at paragraph 16 of your statement that:

36  
37 *As part of the McCrae prioritisation*  
38 *process, any customer-side leaks ... (i.e.*  
39 *over 1000 litres per day) were given the*  
40 *highest response time priority from ...*  
41 *(Service Stream).*

42  
43 What is that response time?

44 A. So this isn't a KPI or anything. So just to frame it,  
45 in this sort of hyper-care period where we've just put  
46 digital meters in, in a sensitive community area, they're  
47 all - they're lighting up with customer-side leaks, they're

1 also finding network leaks, because that's the intent of  
2 them, and so we wanted to put a bit of structure around  
3 that and - and, sorry, what was your question again?  
4

5 Q. What's the response time from Service Stream?

6 A. Oh, yes, sorry. So typically we wouldn't - in a  
7 normal world and situation, we would put the digital meters  
8 out there, and, like I said, that automated process would  
9 be messaging the customer saying, "You've got a leak" and  
10 we stay out of it; like, that's all, and that works quite  
11 well.  
12

13 For this one, we wanted to go above and beyond, given  
14 the sensitivity, so our contractor, Service Stream, which  
15 isn't - it's the same parent company as Service Stream that  
16 you would have heard about through Tim Lloyd, our industry  
17 partner, but it's the metering department of that, they've  
18 got some plumbing skills. We basically said, "Any large  
19 leaks that are detected, we want you guys out there  
20 straightaway to help the customer find them and either  
21 repair it for them or guide them to - if they want to get  
22 their own plumber or do it themselves."  
23

24 Q. Sorry, and what was the response time?

25 A. Just high priority. So it wasn't - there was no  
26 formal KPIs. It's like, "As soon as we tell you, Service  
27 Stream, that there's a high leak [sic], can you get out  
28 there as soon as you can." And remembering, they are in  
29 the vicinity installing digital meters, anyway, so we've  
30 got - we had people on the ground that could scramble  
31 pretty quickly.  
32

33 Q. And so this is a bespoke process that was introduced  
34 following the McCrae landslide?

35 A. Correct.  
36

37 Q. Is this special process in connection with the  
38 customer-side leaks in McCrae intended to be a temporary or  
39 permanent approach?

40 A. Still to be determined. It's still getting discussed.  
41 Yes.  
42

43 Q. Is it too resource intensive to continue on  
44 a permanent basis?

45 A. We'll have to think about that, but just if I frame  
46 it, it's - when we're paying for customer-side leaks, all  
47 of the customer base is paying for that, just in sort of

1 raw and rough terms, and there's also potentially sort of  
2 liabilities that we need to think through. So if we're -  
3 you know, you can have pipework in customers' houses doing  
4 who knows what, going into bungalows and doing whatever.  
5 If we get involved and start trying to change people's  
6 property too much, that's a consideration that we need to  
7 think through. So, yes, a few factors to think about  
8 there.

9  
10 Q. At present, does South East Water have a view as to  
11 the minimum amount of time that this non-standard process  
12 will be in place?

13 A. I don't think - look, it's been discussed to say,  
14 like, the staff are asking how long do we do this for? At  
15 the moment, it's sort of all hands on deck, because we just  
16 want to show that sort of sense of urgency and care for  
17 customer, but, yeah, to be determined.

18  
19 Q. Mr Forster-Knight, I'm now going to ask you some  
20 questions about customer-side leaks in McCrae in the period  
21 between 12 May 2022 and 12 May 2025. You refer to this  
22 three-year period in your statement as the "Relevant  
23 Period". You were asked to provide information - and by  
24 "you", I mean South East Water was requested to provide  
25 information - concerning private property leaks in McCrae  
26 for that relevant period, including dates on which the  
27 relevant leak was reported, the volume of water lost and  
28 the date on which the leak was repaired. You say that it  
29 is not practicable to provide that information; is that  
30 right?

31 A. Correct.

32  
33 Q. Is that because South East Water did not have  
34 a comprehensive way, prior to the installation of digital  
35 meters, to monitor private-side or customer-side leaks?

36 A. That's right. Not - nowhere near - yeah, that's  
37 a good way to frame it. It's not comprehensive and we  
38 can't be sure there's - and I talked to a couple of ways  
39 where we for certain know that a customer's got a leak, but  
40 generally we don't know what's going on out there in the  
41 mechanical world, is what I would say.

42  
43 So, yeah, easy to produce the table on the digital,  
44 which we have done. And then on the mechanical side, we've  
45 done it by the evidence that we do have, which is those  
46 sort of three areas, which are the leak allowance, so  
47 that's clearly a customer's got a leak, so that's one way;

1 the high read notification, so we manually read it, the  
2 system says, "They're going to have a big bill here. Let's  
3 tell them as well that they could have a leak and tell them  
4 how to check for it", and things like that; and there was  
5 one other one, which I've just --  
6

7 Q. Red notices?

8 A. Red notices, sorry, yeah. That's not in my remit  
9 per se, that's a maintenance activity, but it's obviously -  
10 in their investigation, if they find an internal leak, then  
11 obviously that's proof that there's a customer leak. But  
12 outside of that, it's really hard to discern usage and  
13 leakage.  
14

15 Q. Can I add to that, would you say a fourth source of  
16 information, which is the raw meter read - a raw read of  
17 the meter data?

18 A. Yes, so that fourth one - so that's not a process  
19 per se. I think it was - we did that because it might have  
20 been part of the question, just to show high-consumption  
21 users in that area. It doesn't necessarily indicate leak.  
22 It could be, you know, other purposes. But - yeah,  
23 that's - that's that document you are referring to,  
24 I think.  
25

26 Q. I might ask you about each of those sources of  
27 information in turn. So we will start with red notices.  
28 These are notices that are issued by South East Water's  
29 maintenance staff or contractors who identify a leak on  
30 a private property; is that right?

31 A. Correct.  
32

33 Q. Do you know what information is provided in a red  
34 notice?

35 A. To the customer or to South East Water?  
36

37 Q. To the customer.

38 A. The customer gets a little note, generally, put on  
39 their door or in their mailbox saying, "You've got a leak  
40 and you've got this many days to fix it."  
41

42 Q. And it's the occupier's responsibility to repair the  
43 leak; we've discussed that?

44 A. Correct.  
45

46 Q. And is the occupier or owner required to report to  
47 South East Water once they have repaired the leak?

1 A. I don't believe so. I'm not fully across that  
2 process, but I don't believe that's the case.

3

4 Q. So there is no mechanism to follow up whether the  
5 customer has addressed the issue?

6 A. I - what I will say in - just because I've been around  
7 long enough, at a point in time there used to be  
8 a follow-up, so we would put a red notice and then somebody  
9 would manually follow up. I'm not sure to this day if that  
10 still occurs, yes.

11

12 Q. You have identified that 17 properties in McCrae were  
13 issued with red notices during that three-year relevant  
14 period. When you say "McCrae", are you referring to the  
15 entire suburb of McCrae or the confined area in the  
16 vicinity of the landslide site?

17 A. I don't actually know what zone we used for that.  
18 Yeah, sorry, I don't know exactly which zone. I thought we  
19 documented each - which definition of zone for each part,  
20 but clearly not in that one.

21

22 Q. Setting aside not knowing precisely the area over  
23 which these red notices concerned, does that number of red  
24 notices over a three-year period strike you as surprising  
25 or abnormal?

26 A. No, not at all. There's leaks everywhere. And as the  
27 digital meters would attest to, there's lots of leaks, so  
28 that number is - doesn't surprise me. It's probably on the  
29 low side.

30

31 Q. The second source you have referred to in your  
32 statement is leak allowances. You raised this earlier. So  
33 this is a situation where a customer receives a high water  
34 bill, an unexpected high water bill, and then calls South  
35 East Water and requests a reduction in their bill. Earlier  
36 you said that a leak allowance may be granted only in  
37 circumstances where there has been a leak, or might there  
38 be situations where leak allowances are afforded for  
39 unexplained reasons, for the high water usage?

40 A. My - I don't know for certain, but my strong  
41 assumption would be that we only give it for proof of or  
42 some evidence of a leak, not just somebody saying,  
43 "I used - you know, I filled my pool five times. Can  
44 I have some money back?" That obviously wouldn't fly. So,  
45 yeah, I'd say that's the case.

46

47 Q. You identified that 60 leak allowances were issued to

1 55 properties in McCrae from the beginning of 2022 to May  
2 2025?

3 A. Yes.

4  
5 Q. Is that an unusual number of leak allowances for that  
6 period of time?

7 A. I don't actually have a good reference for that one.  
8 We probably - it's probably not something that we - or I've  
9 seen analysis of versus other suburbs, so this was  
10 specifically pulled for this - for my witness statement.

11  
12 Q. Where a customer requests a leak allowance, are there  
13 circumstances where South East Water would independently go  
14 to verify that there has been a leak?

15 A. I'm not aware of that being a process.

16  
17 Q. So it's incumbent on the customer to provide evidence  
18 of the leak?

19 A. That's right. Either - my assumption, strong  
20 assumption, would be that they would show either an invoice  
21 from their plumber or some sort of evidence from a plumber  
22 to do it, and clearly you would expect their bill to  
23 reduce, and so there is some sort of checks and balances on  
24 that one.

25  
26 Q. The third source that you refer to in your statement  
27 in connection with customer-side leaks are high usage  
28 notifications. You say that high usage notification is  
29 a manual process for mechanical meters?

30 A. Yes.

31  
32 Q. Would you just describe what you mean by the manual  
33 process?

34 A. Yes, so there's no - like, the mechanical meter  
35 reading system is pretty antiquated and a bit legacy, if  
36 you like. So the meter readings come in, and then  
37 there's some South East Water-built algorithms, if you  
38 like, to come up with some business rules to say, "Is this  
39 reading higher than normal?" And then there's a second  
40 manual step, where somebody has to collate all of that  
41 information and then push it through to another system,  
42 predominantly our billing system, to amend to a customer's  
43 bill, so they get the bill and they'd get a letter saying,  
44 "By the way, you've got higher usage."

45  
46 Now, that's not generally - you know, you're getting  
47 your bill and then that, so that's not ideal. So we

1 changed that channel to be an SMS that comes earlier than  
2 the mail, so it at least gives people a couple of weeks'  
3 earlier notice of it. But that's the manual process we've  
4 talked to. I think I mentioned in there that, you know, it  
5 could get missed, and that's basically because it is  
6 a manual process. Ideally we don't miss any, but if  
7 someone's away and someone doesn't back them up that day  
8 and it gets missed in the wash, that could happen, but it's  
9 not a predominant problem.

10  
11 Q. Is South East Water looking to automate that process?

12 A. Yes, when we go to digital meters, there's already  
13 fully automated processes for lots of these manual  
14 workarounds, yes.

15  
16 Q. Just returning to the manual process that's in place  
17 for mechanical meters, what are the two situations in which  
18 a customer would receive a high usage notification?

19 A. So it's their consumption, which is quarterly, looked  
20 back a year ago, and if it's three times that same amount  
21 in a quarter, they will get it; or if they have used,  
22 I think it's 1,000 kilolitres in a quarter, they will also  
23 get a notification.

24  
25 Q. Is 1,000 kilolitres 1 million litres of water in a  
26 quarter?

27 A. Yep, that's right, yep.

28  
29 Q. To provide some context, do you know what the South  
30 East Water network-wide average water consumption is in a  
31 quarter?

32 A. I do. It's - I think it's in one of my exhibits  
33 there, but I think it's about 44 kilolitres - it varies  
34 from season, but it's about 44 kilolitres a quarter, is the  
35 South East Water average.

36  
37 Q. So 44,000 litres of water a quarter?

38 A. Yes.

39  
40 Q. And how is that figure arrived at? Is it as simple as  
41 aggregating the total volume of water used across the  
42 network in a quarter and then dividing it by the number of  
43 properties in South East Water's network?

44 A. That's right. There will be a bit of segmentation in  
45 there, so that we're not including sort of  
46 commercial/industrial customers or anything like that, but  
47 just residential, but - yeah.



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Q. Just residential. You have identified that 220 high usage notifications were sent to McCrae properties during the relevant period?

A. Yep.

Q. And you have exhibited to your statement a spreadsheet that records the properties that received those high usage notifications. I don't propose to take you to the detail of the spreadsheet, but in your review of the data, did you consider the volume of high usage notifications to be unusual or striking in any way?

A. I would probably say no, and I'm probably a bit biased by what we're seeing in the digital meter world that is really exposing the amount of leakage. So, yeah, I wasn't surprised.

Q. So would it be fair to say that a high usage notification is triggered when either water usage is uncharacteristically high for that property or the water usage exceeds a set threshold of a million litres a quarter?

A. Correct.

Q. And a high usage notification wouldn't give us detail as to the proportion of water that has been used as opposed to lost through a leak, for example?

A. Correct. You can't discern it from mechanical, yes.

Q. So would you accept, then, that a high usage notification in and of itself is not evidence of a leak occurring at a particular property?

A. Correct, and we don't frame it that way. We say, "You've got a high read, and by the way", and I think we send them some collateral to say, "if you want to check your property, do the" - you know, follow some simple steps to try and do that, yep.

Q. The final source of information you refer to is a table that was created by South East Water that contains information about properties within the McCrae landslide area that used more than three times the South East Water-wide network average amount of water. Can I take you to that table, which is SEW.0001.0001.5175. While we wait for the file to come up, Mr Forster-Knight, did you say earlier that this spreadsheet was prepared specifically in the context of your witness statement? Is it something

1 that South East Water would prepare as part of business as  
2 usual?

3 A. No.

4  
5 Q. Thank you. So in the top row there, we've got  
6 13 quarters going across, starting from April to June 2022,  
7 through to April to June 2025?

8 A. Yes.

9  
10 Q. And below that, for each of the quarters, is the South  
11 East Water-wide network average amount in kilolitres for  
12 each quarter; right?

13 A. Yes, correct.

14  
15 Q. To take April to June 2022 as an example, that network  
16 average consumption was just over 44,000 litres of water  
17 for the quarter?

18 A. Yes, correct.

19  
20 Q. And listed below are all the properties in the McCrae  
21 landslide area that have used more than three times the  
22 South East Water-wide network average at least once during  
23 the 13 quarters examined?

24 A. Yep.

25  
26 Q. And the red shading, that indicates the quarters where  
27 the usage has exceeded three times the network average?

28 A. Correct.

29  
30 Q. And the properties are ordered by highest total water  
31 usage?

32 A. Yep.

33  
34 Q. So within this dataset, you have pointed out in your  
35 statement that 10-12 View Point Road had, on average, the  
36 highest water usage in the McCrae landslide area?

37 A. Yep.

38  
39 Q. You say that's six times the average water use  
40 compared with the South East Water network-wide average?

41 A. Yep, in some quarters, yep.

42  
43 Q. And do you accept that this data does not tell us how  
44 the water was used at that property or whether it was lost?

45 A. Just for that particular property or --

46  
47 Q. Yes.

1 A. Yes, I accept that. We don't yet have a digital meter  
2 on that property, so, yeah, we can't tell.

3

4 Q. So one wouldn't be able to look at this data and infer  
5 the extent to which this property has experienced  
6 customer-side leaks?

7 A. Not for that property. Other properties that have  
8 since had digital meters, yes. But not that one.

9

10 Q. Would you accept that high water usage alone is not  
11 conclusive evidence of the presence of a leak?

12 A. Yes, I would accept that.

13

14 Q. Stepping back and looking at the four sources of  
15 information you have referred to - red notices, leakage  
16 allowances, high usage notifications and this raw meter  
17 data - would you accept that the red notices are the only  
18 definitive source of information that can be directly tied  
19 to known leaks?

20 A. Yeah, I guess the - yeah, if you are taking it on the  
21 point that a leak allowance isn't proof of it, but  
22 generally it would be, but, yeah, a red notice is a South  
23 East Water contractor or staff member physically seeing  
24 a meter ticking over. So, yeah, if that's your contention,  
25 I agree with that.

26

27 Q. So you would accept that leak allowances, high usage  
28 notifications and raw meter data go no higher than  
29 identifying potential properties that have experienced  
30 leaks?

31 A. That's right, yep.

32

33 Q. At paragraph 19 of your statement, you refer to  
34 a spreadsheet that shows all instances of continuous flow  
35 detected on private properties in McCrae since the digital  
36 meters have been installed?

37 A. Correct.

38

39 Q. So that they were deployed, you say here, since  
40 16 April 2025. And you say:

41

42 *The data reveals that as at 6th June,*  
43 *a total of 57 leaks were identified on*  
44 *private property in the suburb of McCrae*  
45 *(representing a cumulative water loss of*  
46 *approximately 800,000 litres since digital*  
47 *meters began identifying leaks in the*

1 suburb). There have been 24 leaks over  
2 1000 litres per day.  
3

4 Do any of those findings strike you as atypical or unusual?

5 A. Probably - probably not the number of leaks, but the  
6 volume of the leaks we were finding, and there's reference  
7 into the tables there, but some - and I think I put just  
8 a couple of examples, but there's ones with - pretty much  
9 as fast as you could lose water out of a pipe is what was  
10 happening on some of the properties.  
11

12 Q. And is that the example you have given of 17 Cook  
13 Street, with a loss of 27,000 litres per day?

14 A. Yep.  
15

16 Q. That would be on the very high end of the spectrum of  
17 private properties?

18 A. That's super high, yeah. I don't think I've seen  
19 one - I've seen similar but none higher than that one.  
20

21 Q. Mr Forster-Knight, I'm now going to ask you some  
22 questions about changes that have been made to South East  
23 Water's systems and procedures for identifying leaks as  
24 a result of the McCrae landslide. I will start with  
25 alarms. Am I correct in understanding that alarms are  
26 installed on various pieces of equipment in South East  
27 Water's network?

28 A. So I'll try and put how this actually works. So if  
29 we've got an asset, it's got sensors and electromechanical  
30 things happening, whether it's a pump station, a flowmeter,  
31 et cetera. Then there is a device that transmits that data  
32 back to a central server, which is the SCADA server. So at  
33 that point in time, it is just data coming back and it can  
34 either be ones and zeros for on and off, or it could be an  
35 analogue value for level whatever. At that point, there is  
36 no alarming still.  
37

38 In the SCADA platform itself, in the configuration  
39 during commissioning time or when an asset is built or  
40 changed, somebody, generally the operations team, would  
41 say, "Okay, that value coming back there, I want to put an  
42 alarm on that of this value, and I want to make it this" -  
43 what they call severity, which is just a way of getting it  
44 to the top of a list of many thousands of alarms that come  
45 in each day. It's trying to get eyeballs on something as  
46 a higher priority. So does that make sense?  
47

1 Q. Yes. Can I just ask a few follow-up questions. These  
2 alarms, are they triggered - sorry, I withdraw that. Are  
3 these alarms, for example, designed to detect changes in  
4 water pressure?

5 A. They can be.

6

7 Q. Water flow?

8 A. Can be.

9

10 Q. What are they predominantly measuring?

11 A. Literally any instrument in our field, of which we've  
12 got thousands of them, can have an alarm on it. So if  
13 we've got - we're measuring chlorine, turbidity, reservoir  
14 level, all just data coming back, and then there is an  
15 application to say when that data reaches a certain  
16 threshold, I want an alarm, which means it pops up in a  
17 centralised screen. Did that answer the question?

18

19 Q. Yes. And can you identify which alarms would be  
20 particularly useful in the context of leak detection?

21 A. Yes. So in leak detection, flow can be useful. I'll  
22 say "can", because it depends on the configuration of the  
23 zone and how complex it is, and it's not a - none of it is  
24 a silver bullet. Unless you understand the complexity of  
25 that zone, other things could be happening, and because we  
26 don't have digital meters to balance against a network  
27 flowmeter, we can't absolutely say there's a leak. But,  
28 yes, they can be - it can be useful for inferring something  
29 is happening potentially abnormally, but sometimes those  
30 areas are massive and you might say, "Okay, I've got  
31 something happening here", but there's, you know, 50,000  
32 properties in that zone. It probably doesn't pinpoint  
33 anything, if that's the case. It's not like an acoustic  
34 sensor that will tell you exactly where it is. It's far  
35 from that.

36

37 Q. I see. So an alarm essentially would trigger a body  
38 of work to investigate whether there might be a leak or not  
39 in the system?

40 A. That's right, or something to follow up, yeah.

41

42 Q. And I understand that South East Water is currently  
43 reviewing the calibration of those alarms and the process  
44 for escalating issues related to the performance of its  
45 network. Could you describe that process of recalibration  
46 or --

47 A. Yes, I probably didn't word that well in that, but

1 basically what we're trying to do, if you've listened to  
2 Jonathan Crook's testimony today, the calculation he did,  
3 which is very sophisticated and, you know, zones and flow  
4 in, flow out, and all that sort of stuff, we want to build  
5 that in a real-time manner going forward so that we can  
6 apply alarms to it that have criticality built into them to  
7 say, okay, this hydraulic zone, if it gets an alarm, it's  
8 more urgent than another or it needs to be escalated. And  
9 by "escalation", I mean the alarm comes in, but it also may  
10 get an email to a general manager or a group manager of  
11 operations to say, "By the way, something important is  
12 happening here. You should be across it." So this is what  
13 we are attempting to build, and the software has sort of  
14 moved to a point where we think it's doable and that's what  
15 we're attempting to do.

16  
17 Q. Do you have a sense of how long it might take to move  
18 from proof of concept to implementation?

19 A. I think in the next sort of two to three months, we  
20 will have a prototype working. It will need refinement,  
21 and we don't - you know, there is a balance between  
22 something that alarms all the time to the point where  
23 people ignore it or it's nuisance and then trying to find  
24 that threshold, so there will be a bit of that, but, yeah,  
25 in the next two to three months I would be surprised if  
26 we're not well progressed with that.

27  
28 Q. In your statement you refer to, flow thresholds for  
29 each zone will be set to drive leak investigations. When  
30 you refer to "zones", do you mean water distribution zones  
31 or something else?

32 A. Yes, water distribution zones, yes.

33  
34 Q. And can you tell us a little bit more about what you  
35 mean by "flow thresholds"?

36 A. So once we do this dynamic balance, which is, you  
37 know, one zone could have five entrances, so it could have  
38 two flowmeters coming in and three going out from PRVs, so  
39 in a complicated zone. So once we balance that, we will  
40 get a net flow for that particular zone, and the alarm will  
41 apply to that net flow algorithm or data point that we  
42 create. And the very near-term state hopefully is that  
43 once we set that alarm, it will say, "Something is very  
44 abnormal in this zone", and we can be pretty confident with  
45 it. Once we've got digital meters deployed en masse, we  
46 will be super confident that we will get sort of  
47 90 per cent of the way there already.

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Q. I see. And these flow thresholds can be calibrated depending on the sensitivity of the area in which the assets are working?

A. That's right. And more so to the balance I talked about earlier, we probably might need to live with some more nuisance alarms - not nuisance alarms but alarms that go off more regularly and get checked, and err on the side of that rather than setting conservative levels that may not get met. So that's a balance for our operations engineers to sort of help refine that.

Q. Ms Olsen gave oral evidence to this board of inquiry that there was a flow alert on 11 December 2024 prior to the McCrae landslide. Are you aware of that flow alert?

A. I am.

Q. She said that that leak grew over time. So one of the issues, I suppose, about alarms is that you can sort of look at it, it might be at a particular point in time, but actually it changes over time. Is South East Water in the process of or considering ways to overcome that challenge that Ms Olsen identifies?

A. Yes, and so what I sort of just highlighted will do that. I think that particular alarm in context would have been - if you put yourself in the shoes of the operators, it literally came in for two minutes, I think it was, and cleared itself. So it hit a threshold and then went below that threshold and then it disappears from the alarm system. So they saw it there, but with the seasonality of the peninsula, you're talking about thousands of hydraulic fluctuations, I guess their mindset was, okay, that's gone - it's appeared, it's disappeared; it's not a problem.

So the way to overcome that is to build these more dynamic zones that don't just take one piece of information, it takes the entire picture and sets the alarm to that and will be - I think it will be a lot better for our operators.

Q. So the new process will be able to provide a holistic understanding of the data rather than a point in time?

A. That - yeah, I wouldn't say "point in time". It will be just - it doesn't have the context. You might have one flowmeter that looks really high, but that could be just from demand and customers moving in, but that same zone could have heaps of flow flowing out of it from another

1 interface. So until you balance it all, you don't really  
2 know the full picture.

3

4 Q. I see. Is it the case that assets located in areas of  
5 landslide risk will attract more sensitive alarm  
6 thresholds?

7 A. That's the intention, yes.

8

9 Q. And what information or data will South East Water be  
10 drawing upon to determine areas that are susceptible to  
11 landslides?

12 A. I guess it's these erosion overlays, which, you know,  
13 I'm certainly learning about. But, yes, once we've got  
14 that information and it's confirmed, that's the plan.

15

16 Q. Do you have a sense of when the alarms will be  
17 calibrated to be sensitive to landslide risk?

18 A. So, similar to my comment on building the zones, which  
19 I think we can do in the next two to three months, as soon  
20 as those zones are built, we will be putting alarms on them  
21 straightaway and then we'll be tweaking them to make sure  
22 that they detect the right things, probably starting less  
23 conservative and so we get lots of alarms potentially early  
24 and we refine it. So, yeah, in that - I think I have said  
25 in Q1 FY26, but, yeah, in the next - so teams have  
26 literally been working on all of this stuff in the last few  
27 weeks, so it's happening.

28

29 Q. Is that a team that's under your responsibility or  
30 supervision?

31 A. Yes, the team that will build the technology is, but  
32 a lot of the inputs are from the service delivery team, who  
33 really own the decision about alarming. My team just  
34 triages the alarms, if that makes sense.

35

36 Q. I see. You say in your statement that South East  
37 Water is also reviewing governance of alarm management, for  
38 example, who can make a decision on an alarm, who can sign  
39 off on changing the threshold. What prompted this review  
40 of alarm management at South East Water?

41 A. I think it was part of a broader program, it was  
42 actually already in train before McCrae, just to review  
43 this, because over time, if you've got access to our SCADA  
44 system, we've empowered people to be able to change  
45 thresholds. It is all audited, et cetera, but unless there  
46 is some stronger governance over it, somebody could make  
47 a decision to change something that's not well



1 communicated, and sort of, you know, we could miss  
2 something in the future. So the governance we're looking  
3 at is, if we've designated an alarm to be critical, if  
4 somebody wants to change it, there will be a workflow where  
5 it has to be signed off by somebody up the chain.

6

7 Q. And did the McCrae landslide reveal some opportunities  
8 for South East Water to improve its approach to alarm  
9 management?

10 A. I think it was just more in the general discussion  
11 when sort of everything was going down and people were  
12 investigating data and alarms and all the rest of it - it  
13 was, you know, "Who did this?", and what - you know, those  
14 sort of questions. It just sort of framed it that we  
15 needed a bit more structure to that.

16

17 Q. I will move to a different topic now. You are aware  
18 that in the months leading up to the McCrae landslide,  
19 South East Water received multiple customer complaints of  
20 water surfacing on Waller Place, Charlesworth Street and  
21 Coburn Avenue?

22 A. Yes.

23

24 Q. Yesterday Mr Lloyd gave evidence that South East  
25 Water's systems do not have the ability to recognise  
26 clusters of complaints or recognise correlations between  
27 multiple complaints. Does that accord with your  
28 understanding?

29 A. Yes, the systems themselves as they are built in  
30 isolation don't do that.

31

32 Q. So South East Water's employees and contractors do not  
33 have an easy means of determining potential  
34 interrelationships between multiple customer complaints?

35 A. Correct.

36

37 Q. And you say that South East Water has initiated  
38 a manual process to identify when multiple customer  
39 contacts may be interrelated. Could you describe that  
40 process that's being undertaken?

41 A. Yes, so it's a daily process at the moment as part of  
42 this sort of hyper care we're doing down there, but it's  
43 literally somebody going into two or three different  
44 systems and checking for - you know, doing their own ad hoc  
45 analysis at the moment - that's the manual process - to see  
46 if there's any clusters or correlations, something  
47 happening over a rolling period. We're still defining what

1 that is, but we want it long enough to capture, you know,  
2 disparate events. It might be over a month or a few weeks.  
3 So, yeah, that's the manual process.  
4

5 And then in the background - and, again, all of this  
6 stuff is happening as we speak - we're looking to automate  
7 that, and that's - I would say it's not - what would I say?  
8 It's definitely - it's doable, absolutely doable. You can  
9 get into all of these systems in the back end of all of the  
10 systems. So we've got someone writing some software that's  
11 going to pull the data out of all of them and build these  
12 clusters - cluster detection that will then present itself  
13 an alarm on the SCADA system or it might email general  
14 manager or group manager, operations.  
15

16 Q. And do you know when that software will be written or  
17 be --

18 A. It's getting - it's literally getting written right  
19 now. When it will go live I can't say, but I would hope it  
20 would be in the next, you know, three or four months.  
21

22 Q. And then once that software is available, would that  
23 be deployed across all of South East Water's network?

24 A. Yeah, that's the intention of it.  
25

26 Q. And so for now, there's an initial - so there is a  
27 manual process in place. Is that just in relation to  
28 McCrae?

29 A. Yes, only because it's really hard to do it manually.  
30 You would have someone spending their entire time trying to  
31 find clusters everywhere. It would be really - yeah,  
32 probably not really efficient. So we're focusing on McCrae  
33 just to make sure that's rock-solid, and, yeah, hopefully  
34 if we get these automated ones sooner rather than later,  
35 that will go to that process.  
36

37 Q. How long will this manual process remain in place in  
38 McCrae?

39 A. I guess it will remain - well, I haven't formally  
40 discussed that with anyone, but my view would be it will  
41 remain until the automated process, so for the next few  
42 months.  
43

44 Q. I will move to the final topic. In your statement you  
45 say that these multiple reviews that are occurring in  
46 relation to South East Water's systems form part of  
47 a broader plan. What were you referring to when you

1 referred to the broader plan?  
2 A. Yes, so another - a small function in my team is the  
3 non-revenue water, which I think - you might have heard  
4 about in the session so far, but basically the water lost  
5 in the network. So we created a function to focus on that,  
6 and that was last year, probably mid last year. And as  
7 part of that, we've got a three-year plan, non-revenue  
8 water plan, and part of that - that's got lots of facets to  
9 it, but one of them was - I've just forgotten your - can  
10 you say the initial question again, sorry?

11  
12 Q. So what's this broader plan?  
13 A. Oh, yeah, sorry, the plan. It's a three-year plan and  
14 it has permanent leak detection on it, you know, in  
15 different phases of the years. It tackles leaks detection,  
16 it tackles administrative errors in, if you like, meter  
17 reading, which also contribute to non-revenue water. So it  
18 is a really comprehensive plan. So, yeah, that's what  
19 I was probably getting to about being part of the broader  
20 plan.

21  
22 Q. So would it be fair to say, given what you have told  
23 us today, that the time frame or the time horizon for  
24 implementing the reviews to South East Water's process for  
25 monitoring its network should be done within the next four  
26 to six months?

27 A. Correct. So - and just to be clear - the overarching  
28 plan, if none of this - if McCrae didn't happen, our  
29 overarching plan was over three years, and each year had  
30 a phase of work. We've obviously pivoted a bit of that  
31 because of the - we've brought forward quite a few things  
32 of that plan. Yeah.

33  
34 MS KITTIKHOUN: Thank you, Mr Forster-Knight. I have no  
35 further questions, but others may.

36  
37 DR PHILLIPS: Madam Chair, I appear for the Mornington  
38 Peninsula Shire Council. I do seek leave to ask a handful  
39 of questions. I have run them past --

40  
41 CHAIRPERSON: You have leave.

42  
43 DR PHILLIPS: There are a handful, Madam Chair, and  
44 I wonder if this would be a convenient time for a break,  
45 but I'm happy to proceed.

46  
47 THE WITNESS: I'm happy to keep going.

1  
2 <EXAMINATION BY DR PHILLIPS:  
3

4 DR PHILLIPS: Q. Mr Forster-Knight, my name is William  
5 Phillips and I appear for the Mornington Peninsula Shire  
6 Council. I have a few questions for you, starting with the  
7 topic of the roll-out of digital water meters. Operator,  
8 if we could bring up Mr Forster-Knight's statement, which  
9 is SEW.0001.0001.5014, please, and can we go to page 4,  
10 please. At paragraph 18, you say that:

11  
12 *Digital meters have the advantage of being*  
13 *able to detect probable leaks on private*  
14 *property in near real time ...*  
15

16 And then if we can go - sorry, for the benefit of the  
17 transcript, we can't record gestures, if you could say  
18 "yes"?

19 A. Oh, yes.  
20

21 Q. Thank you. Then if we could go to page 2, please. At  
22 paragraph 10, you discuss the roll-out of digital meters  
23 across the network?

24 A. Yes.  
25

26 Q. And we're currently in the mass roll-out phase; is  
27 that correct?

28 A. Correct.  
29

30 Q. Or referred to as MRO?

31 A. Yes.  
32

33 Q. And once this phase is completed, this will give South  
34 East Water the capacity to identify leaks on infrastructure  
35 within private property more readily?

36 A. Correct.  
37

38 Q. And also some network leaks within close proximity to  
39 private properties?

40 A. Correct.  
41

42 Q. And that's a function of whether the digital meter has  
43 that acoustic add-on; is that correct?

44 A. Correct.  
45

46 Q. Thank you. Operator, if we can go to page 3, please.  
47 At paragraph 14, you state that the suburb of McCrae was

1 prioritised for the MRO?  
2 A. Yeah, within the first 12 months, yep.  
3  
4 Q. And then at paragraph 15, you say that the roll-out  
5 has involved the deployment of approximately 2,500 digital  
6 meters to customers in the whole suburb?  
7 A. Correct.  
8  
9 Q. And that about 110 properties remain without a digital  
10 meter in McCrae?  
11 A. Yes, that was at the point in time of the statement.  
12 Probably updated now, but yes.  
13  
14 Q. Operator, if we can bring up MSC.5073.0001.0001,  
15 please. Mr Forster-Knight, this is an email from South  
16 East Water to the Mornington Peninsula Shire Council. If  
17 we can blow up the paragraph starting with, "This roll-out  
18 of 2,260", please. Would you accept, Mr Forster-Knight,  
19 based on that paragraph, that the MRO in McCrae started on  
20 28 April 2025?  
21 A. Yes, that looks about right.  
22  
23 Q. Thank you. I'm finished with that, operator. If we  
24 could bring up the statement again, please. I'm sorry,  
25 I will give the page - oh, thank you. Mr Forster-Knight,  
26 was the reason for the prioritisation of McCrae partly the  
27 occurrence of the recent landslides?  
28 A. No, it wasn't.  
29  
30 Q. That being said, the ability to potentially more  
31 readily detect leaks in private property has benefits for  
32 averting landslides; would you agree?  
33 A. So you're saying customer-side leaks?  
34  
35 Q. Yes.  
36 A. Potentially. I'm not an expert in it, but assuming  
37 bodies of water are not good for the environment, then  
38 yeah, I would accept that.  
39  
40 Q. Thank you. Operator, if we can go to  
41 SEW.0001.0001.5005, please. Mr Forster-Knight, this is  
42 exhibit 1 to your statement?  
43 A. Yes.  
44  
45 Q. And that's the Mass Roll Out Deployment Plan?  
46 A. Okay, yes.  
47

1 Q. If we can go to page 11, please, that's a description  
2 of what is referred to as the "Foundation Phase"?  
3 A. Yes, that seems to be.  
4  
5 Q. And then over the page to page 12, please, under the  
6 heading "Quarter, 1 FY25" it states:  
7  
8 *This quarter will include only:*  
9 *. 20mm basic meters, and*  
10 *. Portable [sic] meter exchanges.*  
11  
12 A. Potable, as in drinking water.  
13  
14 Q. Oh, sorry, "potable meter exchanges", thank you.  
15 A. Yes, correct, yes.  
16  
17 Q. And by 20mm meters, is that referring to the diameter  
18 of the connections to the pipes into and out of the meter?  
19 A. Yes, it is.  
20  
21 Q. And then over the page to page 13, please, for  
22 quarter 2 it says something similar:  
23  
24 *. 20mm meters.*  
25 *. Basic meters, with limited vibration*  
26 *meters expected.*  
27 *. Potable meter exchanges, with limited*  
28 *recycled meters expected.*  
29  
30 A. Yes.  
31  
32 Q. And then if we go to page 16, please, there we have  
33 a description of the "Build Phase", and specifically it  
34 states:  
35  
36 *Starting in January 2025, this phase will*  
37 *target around 7,500 installs a month for*  
38 *6 months. During this phase all meter*  
39 *sizes ... and all meter types will be*  
40 *installed ...*  
41  
42 A. Correct, yep.  
43  
44 Q. Thank you. And then if we go to page 20, please,  
45 there we have a description of the "Volume Phase", and it  
46 says something similar to the "Build Phase":  
47

1           *Starting in July 2025, the volume phase*  
2           *will target around 15,000 installs a month*  
3           *for the 12-month period, with all meter*  
4           *sizes and types included.*

5  
6       A.   Correct, yep.

7  
8       Q.   Is it correct, then, that the roll-out of digital  
9       meters to properties with existing analogue meters that are  
10      20mm was planned to occur first?

11      A.   Yeah, that's right. The larger meters are a bit -  
12      proving a bit trickier, but we're not far off having those,  
13      so, yeah, the 20mm is the majority.

14  
15      Q.   So South East Water plan to roll out digital metres to  
16      replace the larger analogue meters after the 20mm standard  
17      meters?

18      A.   Yes. To be honest, and remembering this is a plan  
19      done, you know, a year or so ago probably in its sort of  
20      thinking, and lots changes from logistics, procurement, but  
21      it is our plan.

22  
23           What the future state is, if we had the meters readily  
24      available, we would do - if we did a metering district,  
25      which is, as I alluded to earlier, where someone used to go  
26      and read, regardless of the meter size we would exchange  
27      every single one of those. That's our - what we're aiming  
28      for. It's just some logistics of getting those larger  
29      meters means we can only do the 20mm and we will come and  
30      fill the gaps when we have the larger meters. But ideal  
31      state, do it in one go.

32  
33      Q.   Thank you. But based on the Mass Roll Out Deployment  
34      Plan, South East Water's position is that the larger meters  
35      will only be exchanged from January 2025?

36      A.   Where are you getting this bit from, sorry?

37  
38      Q.   If we can go back to page 16, please. It's the  
39      sentence beginning with "During this phase".

40      A.   Yes.

41  
42      Q.   Before that, the sentence "Starting in January 2025".

43      A.   Yes, so, sorry, just to make the point there, that's  
44      our intention. But the meters there, they're new  
45      technology, they're - our plan is to have them all, but  
46      just from logistics, testing, certification, sometimes they  
47      are not quite ready, so this was our best-laid plans, but

1 it - yes, like I said, we don't - we're only just getting  
2 the larger-size meters, like, now-ish.

3

4 Q. So that January 2025 date is a bit off at this point?

5 A. Yes, would I say so, if that's referring to - like,  
6 for DN20s, probably okay; but for the larger sizes, that  
7 plan didn't come to fruition.

8

9 Q. And larger sizes, including 25mm?

10 A. Yes, 25 and above, yep.

11

12 Q. And is that because the larger meters have not yet  
13 been certified - was that your evidence?

14 A. Yes, and by "certified", I mean by South East Water.  
15 So the vendors have to build them and then go through lots  
16 of certification, and then South East Water do our due  
17 diligence, and that's taken a bit longer than we would have  
18 liked, but, like I said, it's pretty much over the line in  
19 recent times.

20

21 Q. Thank you. And you are aware that this board of  
22 inquiry is looking at issues surrounding the landslides  
23 that occurred in McCrae in November 2022 and 5 January and  
24 14 January 2025?

25 A. I'm aware, yes.

26

27 Q. Are you aware that the landslides that occurred in  
28 November 2022 in McCrae began from the land at 10-12 View  
29 Point Road, McCrae?

30 A. Only during sort of hearing the witness statement.  
31 I wasn't privy to it beforehand, yep.

32

33 Q. Thank you. And are you also aware that the 5 January  
34 and 14 January landslides in McCrae also began from  
35 10-12 View Point Road, McCrae?

36 A. Only through these hearings, if that's come up, yep.

37

38 Q. Thank you. Are you also aware that the property at  
39 10-12 View Point Road, McCrae, has a 25mm water meter?

40 A. Yes, I've since discovered that.

41

42 Q. And are you aware as a result of that that it has been  
43 excluded from the digital metering program to date?

44 A. Yeah, I wouldn't say "excluded". It's just we don't  
45 have the meter for it. As soon as the meter is available  
46 and assuming it can be accessed, it will get one.

47



1 Q. Thank you. Operator, if we could bring up  
2 MSC.5031.0001.4385, please. Mr Forster-Knight, you are not  
3 copied in on that email, but have you seen it before?  
4 A. No, I don't think I have ever seen this email.  
5  
6 Q. Take a moment to read it, if you like.  
7 A. Yes, I've read that.  
8  
9 Q. Would you agree, then, that it states that:  
10  
11 *We are excluding 3 Penny Lane because of*  
12 *damage and 10 View Point Rd because it has*  
13 *a 25mm meter, and at this time we [are]*  
14 *only replacing 20mm meters.*  
15  
16 A. Yes, and Julian, who wrote this, he might not have  
17 been aware of the full details of the plan of - once we had  
18 them. It's not - like I tried to articulate, we weren't  
19 going to do one size and then the next and the next. It's  
20 once they are available and certified, we are bundling them  
21 all together. It's just that we physically didn't have  
22 them.  
23  
24 Q. Do you know if a digital meter has since been  
25 installed at 10-12 View Point Road?  
26 A. At this point in time, I don't know for certain if it  
27 has. It's waiting on that release of acceptance of the  
28 25mm, I would assume, and as soon as that's done, I'm sure  
29 it will get one. I haven't heard personally whether it has  
30 got one yet.  
31  
32 Q. But you would agree that given its connection to  
33 landslides in McCrae, it is important for a digital meter  
34 to be installed at that property?  
35 A. I agree, yep.  
36  
37 Q. And do you know if a digital meter will be installed  
38 in the next couple of months or do you have a timeline for  
39 that?  
40 A. I don't, but other than to say it is - as soon as the  
41 meters are available, I'm sure the team have got that  
42 property, amongst others, as a super-high priority.  
43  
44 DR PHILLIPS: Thank you. Madam Chair, I tender those two  
45 emails.  
46  
47 CHAIRPERSON: The email from Julian Tully to Derek Rotter

1 and others dated 20 March 2025, is exhibit MPSC3.

2

3 **EXHIBIT #MPSC3 EMAIL FROM JULIAN TULLY TO DEREK ROTTER AND**  
4 **OTHERS DATED 20 MARCH 2025**

5

6 CHAIRPERSON: Can you read out, Dr Phillips, the document  
7 ID for the other email that you want to tender?

8

9 DR PHILLIPS: MSC.5073.0001.0001.

10

11 CHAIRPERSON: That will be exhibit MPSC4.

12

13 **EXHIBIT #MPSC4 EMAIL WITH BARCODE MSC.5073.0001.0001**

14

15 DR PHILLIPS: Thank you, Madam Chair.

16

17 Q. Operator, if we could bring up the witness statement  
18 again, SEW.0001.0001.5014, please, and go to page 4.  
19 Mr Forster-Knight, at paragraph 19, you say that digital  
20 meters have only been installed with a continuous flow data  
21 capability from 16 April 2025 onwards?

22

23 A. The spreadsheet shows that data.

24

25 Q. Yes. I'm just asking for the - is that date correct?

26

27 A. I think the date is correct. I don't - I'm not sure  
28 if it's referring to when the meters went on for the first  
29 time, but that would make sense. I'm assuming the  
30 spreadsheet was cut from 16 April. The team that built  
31 that for me made the call for that. It would make sense  
32 that that was when the meters are, but I don't know for  
33 sure whether they were aligning it to or just picking an  
34 arbitrary date.

35

36 Q. Thank you. But at any rate, it's some time around  
37 that date that data starts to become available of  
38 continuous flow?

39

40 A. Yes, correct.

41

42 Q. Thank you. And if we can go to page 5, at  
43 paragraph 22 are the four sources of other information that  
44 Ms Kittikhoun took you to before?

45

46 A. M'hmm, yes.

47

48 Q. One of those is red notices?

49

50 A. Correct.

51

52 Q. And you have prepared a table of those?

1 A. Correct.  
2  
3 Q. Another one is leak allowances?  
4 A. Yes, correct.  
5  
6 Q. And you have prepared a spreadsheet of those?  
7 A. Yes, I have.  
8  
9 Q. The third one is the high usage notifications?  
10 A. Yes.  
11  
12 Q. And you have prepared a spreadsheet of those?  
13 A. Correct.  
14  
15 Q. And then finally, we have the raw meter read data  
16 indicating properties within the McCrae landslide area with  
17 an average water usage that is more than three times the  
18 South East Water network average in any quarter?  
19 A. Yes.  
20  
21 Q. The area there referred to as the "McCrae Landslide  
22 Area", is that defined by a diagram at exhibit 4 to your  
23 statement?  
24 A. Yes.  
25  
26 Q. Would you like me to bring that diagram up?  
27 A. If you like. I will just caveat I'm not super  
28 familiar with every nuance of every property, but --  
29  
30 Q. Without bringing it up, are you able to confirm that  
31 it includes View Point Road?  
32 A. I wouldn't - I couldn't say.  
33  
34 Q. Okay.  
35 A. Yep.  
36  
37 Q. Operator, if we can bring up SEW.0001.0001.5006,  
38 please. Is that the diagram that --  
39 A. Yeah, I think I've briefly seen that. I think it  
40 was - for all of this stuff, when I was putting my witness  
41 statement together, when we were talking about McCrae, the  
42 whole suburb, then we were talking about exclusion zones  
43 and then other things, I think we tried to define it. So,  
44 yeah, that rings a bell.  
45  
46 Q. So this spreadsheet that we're talking about now, the  
47 raw meter read data one, is linked to this area identified

1 on this?

2 A. I believe so. I - yes, I believe that's the case.

3

4 Q. And as I understand it, while this data is for high

5 usage, not all of the usage for all of the properties

6 triggered a high usage notification between 2022 and 2025;

7 is that correct?

8 A. That's correct.

9

10 Q. And is that because for many of these properties, they

11 just had a consistently high usage; it wasn't greater than

12 the previous year?

13 A. That's right.

14

15 Q. Thank you. Operator, you can take that down now,

16 thank you. Sticking with this last set of data, and if we

17 could bring up the statement again, please, and if we could

18 go to page 7, paragraph 40, you state that between April

19 2022 and December 2024, the property at 10-12 View Point

20 Road had, "on average the highest water usage in the McCrae

21 landslide area and had six times the average water use

22 compared with the South East Water service-wide average"?

23 A. Yes.

24

25 Q. And you also say that in eight quarters out of 11 in

26 this period, which is April 2022 to December 2024,

27 10-12 View Point Road had the highest water usage in the

28 McCrae landslide area?

29 A. Correct.

30

31 Q. Operator, if we can bring up the spreadsheet at

32 SEW.0001.0001.5013, please. So the data - we lost it.

33 Operator, if we could go to the spreadsheet ending in 5175,

34 instead, please. I understand that that's the updated

35 spreadsheet. Thank you. Mr Forster-Knight, the data you

36 are basing those statements on for 10-12 View Point Road is

37 at row 8 of that spreadsheet?

38 A. Correct.

39

40 Q. Thank you. And then at row 6 of that spreadsheet -

41 sorry, at row 9 of that spreadsheet, we see 4 View Point

42 Road?

43 A. Correct.

44

45 Q. And am I right in saying that that was second in terms

46 of highest average usage over this period?

47 A. Correct.

1  
2 Q. And then at about row 44, I think, is 2 View Point  
3 Road?  
4 A. 47.  
5  
6 Q. 47, thank you. I've been reading the old spreadsheet.  
7 A. Yep, that's 2 View Point.  
8  
9 Q. So that's ranked slightly lower than the other two but  
10 still on a high average usage?  
11 A. Yes, correct.  
12  
13 Q. And 10-12 View Point Road and 4 View Point Road don't  
14 appear to have received high usage notifications; is that  
15 correct?  
16 A. Can you repeat that question, sorry?  
17  
18 Q. I won't take you to it unless you would like to see  
19 it, but based on my reading of your high usage  
20 notifications spreadsheet --  
21 A. Yes.  
22  
23 Q. -- 10-12 View Point Road and 4 View Point Road don't  
24 appear in there?  
25 A. Okay. I will take your word for it, but I'm assuming  
26 that the 10 one was because the seasonality was  
27 consistently high, yes.  
28  
29 Q. And I think you said in your evidence earlier that you  
30 can't definitively say what the reason for the high water  
31 usage is, or was, for those properties?  
32 A. For - if you scroll up on that spreadsheet, up to the  
33 top, please - so for 4 View Point Road, that's since got  
34 a digital meter, and we've been in correspondence with the  
35 customer there and they've had an irrigation system running  
36 that they weren't aware of. So for some properties that  
37 have got digital meters, we can discern. But for the ones  
38 that don't, you're right, we can't tell.  
39  
40 Q. And one possible reason for high usage could be a leak  
41 within the private property network?  
42 A. Correct.  
43  
44 Q. Another possible reason could be that the occupants  
45 are simply using that much water?  
46 A. Yes, correct.  
47

1 Q. And the reason for - or one of the contributing  
2 reasons for using that much water could be irrigating  
3 garden on their land?

4 A. Yes, that's right.

5

6 Q. This information about high average water usage, both  
7 in general and specifically about the properties at  
8 10-12 View Point Road, 4 View Point Road and 2 View Point  
9 Road, outside of the proceedings that are part of this  
10 board of inquiry, is this information that is ordinarily  
11 provided by South East Water to the Mornington Peninsula  
12 Shire Council?

13 A. Not that I'm aware of.

14

15 Q. Outside of these proceedings, does South East Water  
16 ordinarily notify the Mornington Peninsula Shire Council of  
17 red notices issued to customers?

18 A. I'm not certain on that. That's not in my remit.  
19 I know in some of the red notices that, through the  
20 hearings, they've talked about conversing with council or,  
21 you know, "This is a council", and sort of referring, but  
22 I don't think there's - I'm not aware of a formal channel  
23 of exchanging.

24

25 Q. It's not an ordinary thing to do, for South East Water  
26 to send that to send that to --

27 A. I think if they felt it was a council issue or somehow  
28 related - remembering, red notices are the customer issue,  
29 so it's only if - yes, so actually, with the frame of that,  
30 it's probably unlikely that we're going to tell council,  
31 unless it's affecting a council asset as well or doing  
32 something.

33

34 Q. And outside of the proceedings that are part of this  
35 board of inquiry, does South East Water ordinarily notify  
36 the shire of leak allowances given to customers?

37 A. I'm not sure on that one.

38

39 Q. And would that be for the same reason as for red  
40 notices?

41 A. Yeah, again, not sure. It probably - it sounds  
42 unlikely that it would happen for the same reason, but  
43 I don't know for certain.

44

45 Q. And outside of these proceedings, does South East  
46 Water ordinarily notify the Mornington Peninsula Shire  
47 Council of high usage notifications issued to customers?

1 A. I would doubt that.  
2  
3 Q. A few last questions. We're almost there. So just to  
4 clarify my understanding in terminology, a leak within  
5 water infrastructure on private property is called  
6 a customer-side leak?  
7 A. Correct.  
8  
9 Q. And a leak - and that means a leak on pipe  
10 infrastructure from the mains water meter to the house?  
11 A. Correct.  
12  
13 Q. And that's distinguished from a network leak?  
14 A. That's right. Network leak is from the meter back  
15 into the South East Water infrastructure.  
16  
17 Q. Thank you. What is South East Water's position on who  
18 bears responsibility for repairing a network leak?  
19 A. My understanding is that's a South East Water issue,  
20 depending on how it was - no, regardless of how it is  
21 damaged, we would still repair it, yes.  
22  
23 Q. Thank you. And where a customer-side leak is  
24 identified, what is South East Water's position on who  
25 bears responsibility for a repair of that kind of leak?  
26 A. So outside of this sort of bespoke process we're  
27 doing, it's the customer's responsibility to rectify that  
28 leak.  
29  
30 Q. So that's the ordinary course of things - it's the  
31 customer's responsibility?  
32 A. Correct, yes.  
33  
34 DR PHILLIPS: Thank you. No further questions.  
35  
36 MR ROBERTS: Madam Chair, I have simply got one question,  
37 very quick.  
38  
39 **<EXAMINATION BY MR ROBERTS:**  
40  
41 MR ROBERTS: Q. You have been taken, Mr Forster-Knight,  
42 today, to the reasons why or why not a digital meter might  
43 have been installed at 10-12 View Point Road. Are you  
44 aware of whether, at the moment, the water is actually  
45 connected to 10-12 View Point Road?  
46 A. I'm not aware of that one.  
47

1 MR ROBERTS: Thank you.

2

3 MS KITTIKHOUN: Just one further question.

4

5 <EXAMINATION BY MS KITTIKHOUN:

6

7 MS KITTIKHOUN: Q. Mr Forster-Knight, are you aware  
8 whether South East Water has been able to install digital  
9 meters in properties that are still subject to the  
10 exclusion zone?

11 A. My understanding is that we hadn't yet, until they  
12 were - and this is just what I've heard - until they are  
13 safe to access, et cetera, we weren't installing them.  
14 That may have changed but that was my understanding.

15

16 Q. Is your understanding that 10-12 View Point Road is  
17 part of the exclusion zone?

18 A. I thought it was. I had a note written that it was,  
19 but I don't know for certain. Yes.

20

21 MS KITTIKHOUN: No further questions, Madam Chair.

22

23 CHAIRPERSON: Thank you for your evidence,  
24 Mr Forster-Knight, you are free to go.

25

26 <THE WITNESS WITHDREW

27

28 CHAIRPERSON: Mr Costello, that's it for this hearing  
29 block?

30

31 MR COSTELLO: Yes.

32

33 CHAIRPERSON: Yes. Thank you, all counsel, solicitors and  
34 others, for your work in preparation for this hearing block  
35 and during the hearing block. We will adjourn now until  
36 the next hearing block at the start of August.

37

38 AT 3.33PM THE HEARING WAS ADJOURNED UNTIL AUGUST 2025

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<b>#</b>	1001:45, 1003:38, 1004:6, 1004:25, 1041:4	1009:41, 1020:44, 1035:14, 1048:19, 1048:26	<b>37</b> [1] - 975:35	<b>8</b>
<b>#CA40</b> [1] - 943:34				<b>8</b> [3] - 945:45, 1003:21, 1048:37
<b>#CA41</b> [1] - 976:8	<b>15,000</b> [1] - 1043:2	<b>2025</b> [20] - 941:24, 977:20, 977:22, 977:25, 1000:25, 1024:21, 1027:2, 1030:7, 1031:40, 1041:20, 1042:36, 1043:1, 1043:35, 1044:4, 1044:24, 1046:1, 1046:4, 1046:21, 1048:6, 1052:38	<b>4</b>	<b>8.02pm</b> [1] - 1005:11
<b>#CA42</b> [1] - 1008:21	<b>15-minute</b> [1] - 983:6		<b>4</b> [11] - 956:35, 960:20, 960:26, 1040:9, 1046:18, 1047:22, 1048:41, 1049:13, 1049:23, 1049:33, 1050:8	<b>8.05</b> [1] - 1003:35
<b>0</b>	<b>150mm</b> [2] - 960:17, 960:18		1046:18, 1047:22, 1048:41, 1049:13, 1049:23, 1049:33, 1050:8	<b>800,000</b> [1] - 1031:46
<b>0.5</b> [1] - 987:19	<b>15th</b> [2] - 1004:7		<b>4.05</b> [1] - 1004:7	<b>85</b> [2] - 948:46, 949:7
<b>0.9</b> [3] - 989:3, 989:22, 989:32	<b>16</b> [6] - 1022:35, 1031:40, 1042:32, 1043:38, 1046:21, 1046:28		<b>40</b> [2] - 957:23, 1048:18	<b>850,000</b> [2] - 1012:19, 1014:21
<b>1</b>	<b>17</b> [2] - 1026:12, 1032:12		<b>41</b> [2] - 944:14, 962:27	<b>8pm</b> [1] - 988:39
<b>1</b> [6] - 962:8, 985:35, 1003:47, 1028:25, 1041:42, 1042:6	<b>18</b> [2] - 945:18, 1040:10	<b>2025"</b> [1] - 1043:42	<b>42</b> [1] - 975:39	<b>9</b>
<b>1,000</b> [2] - 1028:22, 1028:25	<b>19</b> [2] - 1031:33, 1046:19	<b>2029</b> [1] - 1012:15	<b>44</b> [3] - 1028:33, 1028:34, 1049:2	<b>9</b> [3] - 962:13, 1014:39, 1048:41
<b>10</b> [12] - 941:28, 944:44, 945:1, 985:34, 989:24, 1000:24, 1000:37, 1001:41, 1007:28, 1040:22, 1045:12, 1049:26	<b>2</b>	<b>20mm</b> [9] - 1020:24, 1042:9, 1042:17, 1042:24, 1043:10, 1043:13, 1043:16, 1043:29, 1045:14	<b>44,000</b> [2] - 1028:37, 1030:16	<b>90</b> [3] - 967:33, 984:44, 1034:47
<b>10-12</b> [14] - 1030:35, 1044:28, 1044:35, 1044:39, 1045:25, 1048:19, 1048:27, 1048:36, 1049:13, 1049:23, 1050:8, 1051:43, 1051:45, 1052:16	<b>2</b> [10] - 962:20, 1006:36, 1006:37, 1014:17, 1018:7, 1040:21, 1042:22, 1049:2, 1049:7, 1050:8	<b>22</b> [2] - 945:44, 1046:40	<b>47</b> [2] - 1049:4, 1049:6	<b>90,000</b> [1] - 1017:7
<b>10.00am</b> [1] - 941:24	<b>2,260</b> [1] - 1041:18	<b>220</b> [1] - 1029:2	<b>5</b>	<b>90-day</b> [1] - 959:44
<b>100,000</b> [1] - 985:36	<b>2,500</b> [1] - 1041:5	<b>23</b> [1] - 945:46	<b>5</b> [7] - 991:20, 1000:24, 1000:37, 1044:23, 1044:33, 1046:39	<b>95</b> [1] - 963:41
<b>1000</b> [2] - 1022:39, 1032:2	<b>2.00</b> [1] - 1006:41	<b>24</b> [2] - 941:24, 1032:1	<b>5.40</b> [1] - 988:27	<b>99</b> [1] - 1017:20
<b>100mm</b> [1] - 991:3	<b>2.25</b> [1] - 987:15	<b>24-hour</b> [2] - 1017:45, 1018:6	<b>5.40am</b> [3] - 987:47, 988:27, 989:29	<b>A</b>
<b>101</b> [3] - 943:6, 975:22, 1007:10	<b>2.3</b> [1] - 987:17	<b>25</b> [5] - 949:17, 951:11, 995:8, 997:18, 1044:10	<b>50</b> [3] - 984:45, 1013:4, 1020:40	<b>ability</b> [2] - 1037:25, 1041:30
<b>11</b> [5] - 944:44, 945:1, 1035:14, 1042:1, 1048:25	<b>2.43pm</b> [1] - 1005:37	<b>25(b</b> [1] - 997:20	<b>50,000</b> [1] - 1033:31	<b>able</b> [15] - 953:19, 959:14, 971:43, 977:29, 980:32, 989:26, 991:43, 1002:38, 1005:17, 1031:4, 1035:41, 1036:44, 1040:13, 1047:30, 1052:8
<b>11.45</b> [1] - 983:7	<b>2.45pm</b> [1] - 1003:32	<b>25mm</b> [4] - 1044:9, 1044:39, 1045:13, 1045:28	<b>5175</b> [1] - 1048:33	<b>abnormal</b> [3] - 989:38, 1026:25, 1034:44
<b>110</b> [3] - 1020:27, 1020:29, 1041:9	<b>2.5</b> [1] - 960:23	<b>27,000</b> [1] - 1032:13	<b>55</b> [1] - 1027:1	<b>abnormally</b> [1] - 1033:29
<b>12</b> [5] - 991:21, 1024:21, 1041:2, 1042:5	<b>20</b> [9] - 956:15, 956:34, 956:36, 971:38, 989:45, 1008:10, 1042:44, 1046:1, 1046:4	<b>28</b> [2] - 992:7, 1041:20	<b>57</b> [1] - 1031:43	<b>abruptly</b> [1] - 988:18
<b>12-month</b> [1] - 1043:3	<b>20-odd</b> [1] - 994:35	<b>29</b> [4] - 997:19, 1007:32, 1007:39, 1007:42	<b>6</b>	<b>absolutely</b> [2] - 1033:27, 1038:8
<b>13</b> [5] - 946:6, 962:14, 1030:6, 1030:23, 1042:21	<b>2003</b> [1] - 1008:46	<b>3</b>	<b>6</b> [3] - 1018:8, 1042:38, 1048:40	<b>absorb</b> [1] - 998:16
<b>14</b> [4] - 1003:11, 1040:47, 1044:24, 1044:34	<b>2021</b> [2] - 950:27, 976:26	<b>3</b> [7] - 962:20, 986:30, 999:39, 999:45, 1000:2, 1040:46, 1045:11	<b>6.50</b> [1] - 988:27	<b>absorbing</b> [1] - 998:17
<b>140</b> [1] - 984:43	<b>2022</b> [15] - 976:22, 986:17, 986:29, 991:12, 1003:9, 1004:6, 1024:21, 1027:1, 1030:6, 1030:15, 1044:23, 1044:28, 1048:6, 1048:19, 1048:26	<b>3.33PM</b> [1] - 1052:38	<b>6.50am</b> [1] - 988:22	<b>abstruse</b> [1] - 1002:26
<b>15</b> [8] - 960:15, 960:17, 960:18,	<b>2024</b> [20] - 944:15, 944:18, 951:6, 952:24, 952:26, 968:9, 971:12, 989:35, 989:43, 990:4, 990:25, 990:40, 1000:20, 1000:38, 1009:34,	<b>30</b> [7] - 967:34, 967:35, 971:38, 976:37, 1007:32, 1007:37, 1007:40	<b>6.50pm</b> [4] - 988:28, 988:39, 989:30, 1005:31	<b>academic</b> [4] - 992:31, 992:41, 993:6, 1002:26
		<b>305</b> [1] - 941:18	<b>60</b> [6] - 948:46, 949:7, 959:8, 1014:11, 1022:7, 1026:47	<b>accept</b> [12] - 955:18, 968:31, 1004:24, 1029:30, 1030:43, 1031:1, 1031:10, 1031:12, 1031:17, 1031:27, 1041:18, 1041:38
		<b>31</b> [1] - 968:9	<b>60-day</b> [2] - 949:11, 959:42	<b>acceptance</b> [1] - 1045:27
		<b>33</b> [1] - 998:34	<b>6th</b> [1] - 1031:42	<b>accepted</b> [1] - 958:45
		<b>34</b> [2] - 944:14, 962:27	<b>7</b>	<b>accepting</b> [1] - 951:32
		<b>35</b> [1] - 999:44	<b>7</b> [3] - 998:40, 999:47, 1048:18	<b>accepts</b> [2] - 1016:24,
		<b>36</b> [3] - 1007:29, 1007:34, 1007:35	<b>7,500</b> [1] - 1042:37	
			<b>70</b> [1] - 985:14	

1016:25  
**access** [5] - 971:39, 1020:18, 1020:31, 1036:43, 1052:13  
**accessed** [1] - 1044:46  
**accessible** [1] - 971:41  
**accompanied** [1] - 1016:39  
**accord** [2] - 1012:24, 1037:27  
**account** [4] - 947:22, 952:29, 955:26, 973:43  
**accountability** [2] - 1011:26, 1018:19  
**accountable** [1] - 1011:30  
**accounted** [2] - 947:19, 951:25  
**accuracy** [8] - 951:5, 956:17, 956:26, 956:29, 962:23, 968:46, 999:36, 1004:41  
**accurate** [18] - 945:27, 945:28, 947:12, 947:29, 955:35, 957:12, 958:10, 968:47, 971:45, 973:38, 980:11, 980:18, 1004:47, 1005:1, 1005:4, 1005:38, 1005:40, 1006:17  
**acoustic** [9] - 1012:23, 1012:28, 1012:32, 1013:6, 1014:13, 1020:38, 1021:19, 1033:33, 1040:43  
**action** [1] - 1006:5  
**active** [1] - 977:31  
**activities** [8] - 976:20, 977:27, 977:32, 977:33, 988:41, 1003:45, 1005:3, 1005:7  
**activity** [3] - 977:39, 993:38, 1025:9  
**actual** [13] - 959:26, 959:32, 962:47, 965:39, 966:31, 971:41, 987:43, 988:7, 989:47, 1016:2, 1016:5, 1016:8, 1016:30  
**actuating** [1] - 946:34  
**ad** [1] - 1037:44  
**add** [2] - 1025:15, 1040:43  
**add-on** [1] - 1040:43  
**added** [3] - 953:18, 975:35, 981:5  
**adding** [1] - 947:28  
**additional** [3] - 945:19, 945:21, 951:4  
**additive** [1] - 964:10  
**address** [3] - 943:5, 975:20, 1007:9  
**addressed** [1] - 1026:5  
**adjacent** [1] - 995:43  
**adjourn** [1] - 1052:35  
**adjust** [1] - 989:41  
**adjusted** [1] - 952:12  
**adjustment** [4] - 957:6, 969:28, 974:27, 974:29  
**administrative** [1] - 1039:16  
**adopted** [1] - 954:33  
**advanced** [1] - 999:9  
**advantage** [1] - 1040:12  
**advise** [1] - 992:10  
**affecting** [1] - 1050:31  
**affirmed** [3] - 942:41, 975:12, 1007:1  
**afforded** [2] - 1016:38, 1026:38  
**afternoon** [2] - 1007:5, 1018:7  
**afterwards** [2] - 964:36, 968:21  
**aggregating** [1] - 1028:41  
**ago** [3] - 960:45, 1028:20, 1043:19  
**agree** [5] - 1031:25, 1041:32, 1045:9, 1045:32, 1045:35  
**aim** [1] - 1014:14  
**aiming** [1] - 1043:27  
**air** [1] - 1011:10  
**alarm** [20] - 1013:17, 1013:22, 1032:42, 1033:12, 1033:16, 1033:37, 1034:7, 1034:9, 1034:40, 1034:43, 1035:25, 1035:29, 1035:37, 1036:5, 1036:37, 1036:38, 1036:40, 1037:3, 1037:8, 1038:13  
**alarming** [2] - 1032:36, 1036:33  
**alarms** [19] - 1013:12, 1032:25, 1032:44, 1033:2, 1033:3, 1033:19, 1033:43, 1034:6, 1034:22, 1035:7, 1035:19, 1036:16, 1036:20, 1036:23, 1036:34, 1037:12  
**alert** [3] - 1017:45, 1035:14, 1035:15  
**alerted** [2] - 979:1, 991:11  
**alerts** [4] - 1016:45, 1016:46, 1017:20  
**algorithm** [1] - 1034:41  
**algorithms** [1] - 1027:37  
**aligning** [1] - 1046:31  
**allocated** [1] - 1003:27  
**allowance** [8] - 1016:13, 1016:27, 1016:29, 1016:37, 1024:46, 1026:36, 1027:12, 1031:21  
**allowances** [10] - 1016:8, 1016:11, 1026:32, 1026:38, 1026:47, 1027:5, 1031:16, 1031:27, 1047:3, 1050:36  
**allowing** [1] - 982:39  
**alluded** [2] - 991:38, 1043:25  
**almost** [2] - 1002:27, 1051:3  
**alone** [1] - 1031:10  
**alternative** [1] - 963:18  
**amend** [2] - 1009:42, 1027:42  
**amended** [2] - 946:26, 991:18  
**amendment** [3] - 1007:26, 1008:1, 1008:5  
**amendments** [1] - 1007:45  
**amount** [24] - 945:15, 949:31, 956:24, 956:28, 957:14, 960:21, 969:15, 970:32, 970:44, 983:35, 986:41, 988:11, 991:22, 991:47, 994:22, 995:5, 997:15, 998:14, 1011:3, 1024:11, 1028:20, 1029:15, 1029:43, 1030:11  
**analogous** [1] - 970:17  
**analogue** [5] - 959:43, 1010:40, 1032:35, 1043:9, 1043:16  
**analogues** [1] - 969:38  
**analyse** [1] - 943:45  
**analysed** [2] - 949:4, 969:13  
**analyses** [1] - 1013:23  
**analysis** [20] - 944:4, 944:8, 945:26, 947:16, 948:46, 949:3, 955:20, 957:21, 957:22, 960:25, 961:38, 964:13, 964:29, 964:33, 967:45, 974:20, 978:3, 1027:9, 1037:45  
**analytics** [4] - 943:9, 943:38, 944:2, 966:47  
**AND** [3] - 943:34, 974:7, 1046:3  
**Andrew** [3] - 1006:44, 1007:7, 1008:18  
**ANDREW** [2] - 1007:1, 1008:21  
**angles** [1] - 998:8  
**annotated** [2] - 987:25, 987:47  
**annotation** [1] - 988:14  
**annotations** [1] - 987:25  
**announce** [1] - 942:4  
**anomalous** [1] - 952:23  
**answer** [20] - 977:37, 991:21, 991:27, 991:32, 994:7, 994:15, 995:35, 995:36, 996:6, 996:7, 997:13, 997:14, 998:21, 999:19, 1002:39, 1015:28, 1016:32, 1020:4, 1020:36, 1033:17  
**answering** [6] - 977:9, 995:37, 995:38, 995:42, 995:45, 997:20  
**anticipate** [1] - 969:20  
**antiquated** [1] - 1027:35  
**anyway** [2] - 1017:41, 1023:29  
**apparent** [2] - 949:16, 966:45  
**appear** [6] - 942:9, 1003:8, 1039:37, 1040:5, 1049:14, 1049:24  
**appearance** [1] - 942:4  
**appeared** [5] - 941:32, 941:36, 941:38, 941:41, 1035:33  
**appearing** [2] - 942:14, 942:16  
**applicability** [2] - 965:31, 973:14  
**application** [3] - 999:47, 1000:1, 1033:15  
**applications** [1] - 1017:36  
**applied** [6] - 943:45, 944:42, 967:36, 1000:6, 1001:26, 1001:37  
**applies** [1] - 963:19  
**apply** [4] - 962:9, 993:8, 1034:6, 1034:41  
**applying** [2] - 952:39, 999:38  
**appreciation** [1] - 1001:10  
**approach** [10] - 949:43, 954:33, 970:39, 970:42, 993:46, 998:7, 1000:41, 1000:47, 1023:39, 1037:8  
**approaches** [1] - 997:28  
**appropriate** [5] - 956:5, 964:36, 967:42, 969:28, 974:34  
**appropriateness** [1] - 973:15  
**approximate** [2] - 960:1, 991:4  
**April** [12] - 945:47, 946:23, 1019:36, 1030:6, 1030:7, 1030:15, 1031:40, 1041:20, 1046:21, 1046:28, 1048:18, 1048:26  
**aqua** [1] - 980:39  
**arbitrary** [1] - 1046:32

<b>area</b> <sup>[58]</sup> - 944:25, 944:29, 944:30, 944:38, 945:8, 945:12, 945:24, 945:41, 946:47, 947:22, 947:28, 948:28, 950:6, 951:31, 952:2, 952:22, 953:27, 954:20, 955:14, 955:41, 955:42, 955:46, 956:8, 956:19, 957:7, 958:9, 959:39, 959:43, 960:22, 965:28, 965:37, 966:27, 967:4, 969:33, 972:38, 978:21, 978:40, 979:20, 979:23, 979:47, 982:19, 998:24, 1015:10, 1020:7, 1022:46, 1025:21, 1026:15, 1026:22, 1029:42, 1030:21, 1030:36, 1035:3, 1047:16, 1047:21, 1047:47, 1048:21, 1048:28	<b>ascertaining</b> <sup>[2]</sup> - 970:4, 995:4 <b>ascribed</b> <sup>[1]</sup> - 985:41 <b>aside</b> <sup>[2]</sup> - 976:31, 1026:22 <b>aspect</b> <sup>[5]</sup> - 943:47, 944:6, 944:9, 1010:5, 1022:29 <b>aspects</b> <sup>[3]</sup> - 956:2, 977:15, 1012:1 <b>assessed</b> <sup>[3]</sup> - 948:47, 974:26, 989:3 <b>assessment</b> <sup>[2]</sup> - 949:16, 959:18 <b>assessments</b> <sup>[1]</sup> - 977:27 <b>asset</b> <sup>[4]</sup> - 983:45, 1032:29, 1032:39, 1050:31 <b>assets</b> <sup>[3]</sup> - 978:40, 1035:4, 1036:4 <b>assign</b> <sup>[1]</sup> - 946:17 <b>assist</b> <sup>[3]</sup> - 948:11, 956:16, 993:16 <b>assistance</b> <sup>[2]</sup> - 978:17, 992:3 <b>Assisting</b> <sup>[1]</sup> - 941:33 <b>associated</b> <sup>[1]</sup> - 1005:18 <b>assume</b> <sup>[7]</sup> - 957:13, 962:8, 962:10, 963:44, 1000:47, 1006:10, 1045:28 <b>assumed</b> <sup>[8]</sup> - 947:18, 959:7, 960:13, 960:15, 960:17, 968:38, 968:39, 971:9 <b>assumes</b> <sup>[1]</sup> - 957:6 <b>assuming</b> <sup>[6]</sup> - 971:40, 1017:40, 1041:36, 1044:46, 1046:27, 1049:25 <b>assumption</b> <sup>[7]</sup> - 950:34, 967:38, 968:41, 1018:39, 1026:41, 1027:19, 1027:20 <b>assumptions</b> <sup>[9]</sup> - 959:45, 959:47, 962:44, 962:46, 967:41, 1001:26, 1001:36, 1001:40 <b>AT</b> <sup>[2]</sup> - 1006:41, 1052:38 <b>attached</b> <sup>[1]</sup> - 983:40 <b>attempt</b> <sup>[2]</sup> - 949:39, 962:26 <b>attempting</b> <sup>[2]</sup> - 1034:13, 1034:15	<b>attempts</b> <sup>[1]</sup> - 973:4 <b>attend</b> <sup>[2]</sup> - 1007:16, 1018:16 <b>attending</b> <sup>[1]</sup> - 1018:30 <b>attention</b> <sup>[2]</sup> - 950:31, 1013:17 <b>attest</b> <sup>[1]</sup> - 1026:27 <b>attract</b> <sup>[1]</sup> - 1036:5 <b>attributable</b> <sup>[2]</sup> - 957:7, 967:40 <b>attributed</b> <sup>[2]</sup> - 953:1, 969:16 <b>atypical</b> <sup>[1]</sup> - 1032:4 <b>Auckland</b> <sup>[1]</sup> - 993:12 <b>audible</b> <sup>[7]</sup> - 944:20, 952:14, 961:18, 963:15, 966:2, 967:9, 969:17 <b>audited</b> <sup>[1]</sup> - 1036:45 <b>August</b> <sup>[2]</sup> - 1011:42, 1052:36 <b>AUGUST</b> <sup>[1]</sup> - 1052:38 <b>Australia</b> <sup>[5]</sup> - 941:17, 994:26, 998:12, 999:17, 999:27 <b>Australian</b> <sup>[2]</sup> - 997:32, 998:13 <b>authored</b> <sup>[2]</sup> - 992:34, 992:40 <b>authority</b> <sup>[3]</sup> - 976:42, 993:41, 993:43 <b>automate</b> <sup>[2]</sup> - 1028:11, 1038:6 <b>automated</b> <sup>[5]</sup> - 1018:25, 1023:8, 1028:13, 1038:34, 1038:41 <b>automation</b> <sup>[1]</sup> - 1009:28 <b>available</b> <sup>[9]</sup> - 950:43, 959:10, 959:11, 1038:22, 1043:24, 1044:45, 1045:20, 1045:41, 1046:35 <b>avenue</b> <sup>[1]</sup> - 1018:29 <b>Avenue</b> <sup>[1]</sup> - 1037:21 <b>average</b> <sup>[19]</sup> - 963:13, 1028:30, 1028:35, 1029:43, 1030:11, 1030:16, 1030:22, 1030:27, 1030:35, 1030:39, 1030:40, 1047:17, 1047:18, 1048:20, 1048:21, 1048:22, 1048:46, 1049:10, 1050:6 <b>averaged</b> <sup>[1]</sup> - 952:16 <b>averaging</b> <sup>[1]</sup> - 952:12 <b>averting</b> <sup>[1]</sup> - 1041:32	<b>avoid</b> <sup>[1]</sup> - 981:35 <b>aware</b> <sup>[31]</sup> - 950:36, 951:4, 951:7, 953:37, 953:41, 954:4, 954:30, 954:33, 958:29, 959:6, 974:39, 974:41, 991:26, 994:43, 997:40, 1027:15, 1035:15, 1037:17, 1044:21, 1044:25, 1044:27, 1044:33, 1044:38, 1044:42, 1045:17, 1049:36, 1050:13, 1050:22, 1051:44, 1051:46, 1052:7 <b>awareness</b> <sup>[1]</sup> - 997:44 <b>axes</b> <sup>[1]</sup> - 987:31	<b>bases</b> <sup>[1]</sup> - 997:30 <b>basic</b> <sup>[1]</sup> - 1042:9 <b>Basic</b> <sup>[1]</sup> - 1042:25 <b>basing</b> <sup>[1]</sup> - 1048:36 <b>basis</b> <sup>[6]</sup> - 961:20, 966:40, 1001:43, 1002:28, 1016:42, 1023:44 <b>basket</b> <sup>[1]</sup> - 1020:18 <b>Bateman</b> <sup>[2]</sup> - 941:38, 942:16 <b>BATEMAN</b> <sup>[9]</sup> - 942:16, 974:13, 974:15, 974:17, 974:44, 1003:4, 1003:6, 1003:8, 1006:20 <b>battery</b> <sup>[1]</sup> - 1017:26 <b>bay</b> <sup>[1]</sup> - 984:32 <b>Bayview</b> <sup>[3]</sup> - 989:47, 997:6, 1021:1 <b>bears</b> <sup>[2]</sup> - 1051:18, 1051:25 <b>beautified</b> <sup>[1]</sup> - 981:3 <b>become</b> <sup>[5]</sup> - 958:29, 978:27, 978:39, 1010:18, 1046:35 <b>beforehand</b> <sup>[2]</sup> - 1019:47, 1044:31 <b>began</b> <sup>[3]</sup> - 1031:47, 1044:28, 1044:34 <b>begin</b> <sup>[3]</sup> - 962:35, 962:38, 979:8 <b>beginning</b> <sup>[2]</sup> - 1027:1, 1043:39 <b>behalf</b> <sup>[6]</sup> - 941:36, 941:38, 941:41, 942:4, 942:9, 1003:8 <b>behaviour</b> <sup>[8]</sup> - 949:35, 961:46, 971:22, 990:34, 992:45, 992:46, 998:8, 998:10 <b>behavioural</b> <sup>[1]</sup> - 952:30 <b>behaviours</b> <sup>[1]</sup> - 999:10 <b>behind</b> <sup>[6]</sup> - 947:18, 1018:19, 1019:9, 1019:25, 1022:1 <b>bell</b> <sup>[1]</sup> - 1047:44 <b>below</b> <sup>[6]</sup> - 980:42, 987:19, 989:2, 1030:10, 1030:20, 1035:28 <b>ben</b> <sup>[1]</sup> - 972:27 <b>bend</b> <sup>[1]</sup> - 990:14 <b>bends</b> <sup>[1]</sup> - 990:20 <b>beneath</b> <sup>[3]</sup> - 982:26, 982:42
--	---	--	---	---

## B

<b>benefit</b> [1] - 1040:16	1006:18, 1014:26,	972:46, 973:18,	989:47, 990:4,	949:46, 954:34,
<b>benefits</b> [3] - 984:11,	1022:5, 1023:2,	980:23, 986:29,	990:25, 990:26,	958:18, 961:23,
984:16, 1041:31	1027:35, 1028:44,	1003:14, 1020:7,	990:35, 991:12,	961:24, 969:6,
<b>bent</b> [1] - 990:17	1029:13, 1034:24,	1040:8, 1041:14,	993:3, 997:7,	974:36, 991:47,
<b>beside</b> [1] - 947:41	1034:34, 1037:15,	1041:24, 1045:1,	998:27, 998:40,	992:5, 993:8,
<b>bespoke</b> [2] -	1039:30, 1043:11,	1046:17, 1047:26,	998:41, 1000:14,	996:47, 997:24,
1023:33, 1051:26	1043:12, 1043:36,	1047:37, 1048:17,	1000:21, 1000:38,	997:30, 1000:42,
<b>best</b> [6] - 977:30,	1044:4, 1044:17	1048:31	1001:45, 1003:9,	1001:22, 1001:44,
985:13, 1006:4,	<b>black</b> [5] - 982:8,	<b>bringing</b> [1] - 1047:30	1004:14, 1020:45	1002:5
1014:26, 1018:47,	982:9, 982:10,	<b>brittle</b> [1] - 990:13	<b>bursts</b> [1] - 944:32	<b>calibrated</b> [3] -
1043:47	1022:9, 1022:22	<b>broad</b> [4] - 994:2,	<b>business</b> [16] - 943:5,	950:10, 1035:2,
<b>best-laid</b> [1] - 1043:47	<b>blank</b> [2] - 950:43,	996:28, 999:36,	970:19, 1007:9,	1036:17
<b>better</b> [8] - 952:43,	950:46	1013:3	1009:28, 1010:4,	<b>calibration</b> [4] -
956:23, 966:4,	<b>block</b> [4] - 1052:29,	<b>broader</b> [6] - 969:34,	1010:5, 1010:9,	950:14, 950:15,
978:22, 978:26,	1052:34, 1052:35,	1036:41, 1038:47,	1011:27, 1014:25,	953:30, 1033:43
982:12, 1001:31,	1052:36	1039:1, 1039:12,	1014:29, 1014:31,	<b>capability</b> [1] -
1035:38	<b>blow</b> [2] - 980:27,	1039:19	1014:46, 1016:33,	1046:21
<b>between</b> [27] - 944:14,	1041:17	<b>broadly</b> [4] - 993:46,	1018:24, 1027:38,	<b>capacity</b> [1] - 1040:34
945:6, 945:37,	<b>blue</b> [4] - 952:8, 982:1,	998:6, 1009:47,	1030:1	<b>capture</b> [1] - 1038:1
946:34, 949:29,	982:7, 982:19	1010:35	<b>BY</b> [9] - 942:43,	<b>care</b> [3] - 1022:45,
954:37, 962:20,	<b>board</b> [13] - 943:13,	<b>broken</b> [3] - 1003:10,	972:20, 974:15,	1024:16, 1037:42
965:1, 966:18,	969:24, 972:40,	1004:20, 1004:21	975:14, 1003:6,	<b>career</b> [2] - 976:34,
978:46, 980:17,	973:24, 975:30,	<b>brought</b> [3] - 1003:15,	1007:3, 1040:2,	1009:2
985:23, 988:39,	977:9, 977:21,	1013:17, 1039:31	1051:39, 1052:5	<b>carefully</b> [2] - 978:15,
989:28, 989:46,	1005:14, 1008:35,	<b>buck</b> [1] - 1019:1		979:46
990:8, 999:22,	1035:13, 1044:21,	<b>Build</b> [2] - 1042:33,		<b>Carlo</b> [5] - 1002:16,
1011:8, 1012:43,	1050:10, 1050:35	1042:46		1002:18, 1002:22,
1016:15, 1019:24,	<b>Board</b> [1] - 941:4	<b>build</b> [6] - 1034:4,	<b>C</b>	1002:27, 1002:35
1024:21, 1034:21,	<b>bodies</b> [1] - 1041:37	1034:13, 1035:35,	<b>CA40</b> [1] - 943:32	<b>cascading</b> [2] -
1037:26, 1037:34,	<b>body</b> [1] - 1033:37	1036:31, 1038:11,	<b>CA41</b> [1] - 976:6	1015:45, 1018:42
1048:6, 1048:18	<b>Bolch</b> [3] - 953:43,	1044:15	<b>CA42</b> [1] - 1008:19	<b>case</b> [17] - 944:34,
<b>beyond</b> [4] - 957:7,	958:44, 960:15	<b>building</b> [1] - 1036:18	<b>calculate</b> [3] - 955:15,	944:41, 947:21,
972:5, 978:16,	<b>Bolch's</b> [10] - 958:26,	<b>built</b> [7] - 1021:35,	973:4, 997:4	951:47, 962:10,
1023:13	958:29, 958:35,	1027:37, 1032:39,	<b>calculated</b> [5] -	964:20, 973:9,
<b>bias</b> [1] - 969:5	959:3, 959:14,	1034:6, 1036:20,	952:46, 959:8,	980:14, 981:13,
<b>biased</b> [2] - 969:8,	959:18, 960:3,	1037:29, 1046:28	977:42, 989:27	1004:35, 1016:35,
1029:13	960:4, 960:5	<b>bullet</b> [1] - 1033:24	<b>calculating</b> [2] -	1026:2, 1026:45,
<b>big</b> [6] - 971:6, 971:11,	<b>bother</b> [1] - 963:28	<b>bundling</b> [1] - 1045:20	944:1, 1001:33	1033:33, 1036:4,
1011:9, 1011:14,	<b>bottom</b> [4] - 957:11,	<b>bungalows</b> [1] -	<b>calculation</b> [40] -	1048:2
1012:30, 1025:2	982:19, 992:7,	1024:4	946:11, 947:24,	<b>catchments</b> [1] -
<b>bigger</b> [1] - 1017:47	996:47	<b>burst</b> [59] - 944:15,	952:37, 954:9,	969:29
<b>biggest</b> [3] - 968:35,	<b>boundary</b> [1] -	944:19, 944:34,	954:11, 955:3,	<b>categorically</b> [1] -
968:41, 971:40	1019:25	944:42, 945:8,	955:5, 956:45,	1002:39
<b>bill</b> [11] - 1016:23,	<b>bounds</b> [1] - 964:10	945:13, 945:16,	957:5, 957:12,	<b>categories</b> [1] -
1016:26, 1016:40,	<b>box</b> [8] - 942:39,	951:1, 953:2,	958:10, 958:46,	1000:13
1025:2, 1026:34,	951:27, 951:31,	953:16, 953:35,	959:6, 959:42,	<b>category</b> [2] - 998:30,
1026:35, 1027:22,	958:41, 958:45,	953:37, 956:7,	961:14, 961:42,	1000:15
1027:43, 1027:47	975:10, 1022:9,	958:9, 959:47,	962:4, 962:32,	<b>Caulfield</b> [1] - 1017:11
<b>billing</b> [1] - 1027:42	1022:22	967:37, 969:16,	963:25, 963:38,	<b>caused</b> [4] - 953:5,
<b>bit</b> [37] - 947:25,	<b>brain</b> [1] - 1022:1	970:30, 970:46,	964:20, 965:18,	957:22, 958:14,
955:1, 956:2,	<b>break</b> [7] - 983:4,	972:29, 972:40,	965:40, 967:42,	990:18
961:27, 966:24,	983:6, 990:16,	977:5, 977:30,	968:18, 968:36,	<b>causes</b> [5] - 959:30,
972:28, 978:41,	991:7, 1006:34,	977:38, 978:3,	970:32, 971:17,	959:31, 990:29,
978:44, 982:12,	1022:32, 1039:44	985:2, 985:16,	971:18, 971:19,	990:33, 1006:37
983:26, 984:28,	<b>breaks</b> [3] - 942:29,	986:12, 986:17,	971:24, 972:8,	<b>caveat</b> [2] - 1018:23,
984:31, 987:2,	971:8, 990:12	986:22, 986:29,	973:30, 989:3,	1047:27
990:21, 990:37,	<b>brief</b> [1] - 996:26	987:47, 988:15,	989:34, 989:35,	<b>cement</b> [3] - 990:5,
992:46, 999:30,	<b>briefly</b> [3] - 944:22,	988:20, 989:28,	998:31, 998:39,	990:12, 990:15
1002:22, 1003:39,	955:30, 1047:39	989:29, 989:35,	1002:6, 1034:2	<b>cent</b> [8] - 957:23,
1003:40, 1004:1,	<b>bring</b> [16] - 948:16,	989:38, 989:43,	<b>calculations</b> [19] -	957:42, 962:8,

963:41, 1014:11,  
1017:20, 1022:7,  
1034:47  
**central** [6] - 954:37,  
979:35, 986:42,  
999:22, 1011:10,  
1032:32  
**centralised** [1] -  
1033:17  
**centre** [1] - 1013:18  
**centred** [1] - 1009:27  
**certain** [12] - 957:31,  
957:42, 999:42,  
1013:42, 1016:32,  
1024:39, 1026:40,  
1033:15, 1045:26,  
1050:18, 1050:43,  
1052:19  
**certainly** [3] - 991:33,  
993:38, 1036:13  
**certainty** [1] - 968:26  
**certification** [2] -  
1043:46, 1044:16  
**certified** [4] - 1020:23,  
1044:13, 1044:14,  
1045:20  
**cetera** [3] - 1032:31,  
1036:45, 1052:13  
**CF** [2] - 1016:45  
**chain** [1] - 1037:5  
**Chair** [21] - 942:3,  
943:28, 972:16,  
974:1, 974:10,  
975:6, 976:2, 983:1,  
983:11, 1002:47,  
1006:24, 1006:33,  
1006:43, 1008:15,  
1011:7, 1039:37,  
1039:43, 1045:44,  
1046:15, 1051:36,  
1052:21  
**Chairperson** [1] -  
941:10  
**CHAIRPERSON** [28] -  
942:1, 942:7,  
942:12, 942:18,  
942:22, 942:28,  
942:34, 942:38,  
943:31, 970:28,  
972:14, 974:3,  
975:1, 975:9, 976:5,  
983:6, 1003:2,  
1006:22, 1006:26,  
1006:36, 1008:18,  
1039:41, 1045:47,  
1046:6, 1046:11,  
1052:23, 1052:28,  
1052:33  
**challenge** [1] -  
1035:22

**chance** [1] - 972:23  
**change** [14] - 946:16,  
947:15, 953:21,  
956:3, 968:16,  
971:6, 971:22,  
987:2, 989:20,  
1013:38, 1024:5,  
1036:44, 1036:47,  
1037:4  
**changed** [3] - 1028:1,  
1032:40, 1052:14  
**changes** [17] - 949:31,  
949:34, 949:35,  
952:44, 965:13,  
965:16, 965:17,  
969:20, 969:21,  
973:38, 975:42,  
975:43, 1032:22,  
1033:3, 1035:21,  
1043:20  
**changing** [3] -  
1007:32, 1012:7,  
1036:39  
**channel** [2] - 1028:1,  
1050:22  
**channels** [1] -  
1018:27  
**Charlesworth** [1] -  
1037:20  
**check** [12] - 945:25,  
945:28, 945:36,  
945:38, 951:9,  
954:13, 963:29,  
989:10, 992:5,  
999:42, 1025:4,  
1029:35  
**checked** [2] - 978:47,  
1035:8  
**checking** [3] - 967:46,  
975:36, 1037:44  
**checks** [6] - 945:19,  
945:21, 964:33,  
971:45, 971:47,  
1027:23  
**chemical** [2] -  
1008:30, 1009:7  
**chlorine** [1] - 1033:13  
**choice** [1] - 970:36  
**choose** [3] - 949:27,  
974:31, 1020:16  
**chose** [3] - 948:45,  
948:47, 1000:6  
**chosen** [1] - 957:11  
**Christofi** [3] - 953:44,  
960:9, 960:13  
**Christofi's** [3] - 960:4,  
960:5, 960:25  
**chuck** [1] - 1022:3  
**Cinerama** [4] - 946:46,  
948:25, 951:39,  
979:47

**circle** [2] - 982:2,  
982:43  
**circled** [1] - 982:42  
**circumferential** [1] -  
990:15  
**circumstances** [6] -  
944:10, 987:3,  
1001:32, 1016:37,  
1026:37, 1027:13  
**civil** [3] - 975:26,  
976:10, 976:44  
**claim** [1] - 978:12  
**clarify** [3] - 972:18,  
1017:4, 1051:4  
**clarifying** [1] - 946:21  
**clarity** [1] - 972:40  
**classified** [1] -  
1021:26  
**cleaning** [1] - 1003:44  
**clear** [8] - 949:15,  
949:20, 966:5,  
977:18, 986:11,  
986:37, 986:46,  
1039:27  
**cleared** [1] - 1035:28  
**clearer** [1] - 997:19  
**clearly** [4] - 989:37,  
1024:47, 1026:20,  
1027:22  
**close** [5] - 973:44,  
981:37, 1012:37,  
1017:7, 1040:38  
**closed** [2] - 982:44,  
988:31  
**closer** [1] - 1004:21  
**cluster** [1] - 1038:12  
**clusters** [5] - 981:30,  
1037:26, 1037:46,  
1038:12, 1038:31  
**co** [2] - 1014:28,  
1014:45  
**co-created** [1] -  
1014:45  
**co-designed** [1] -  
1014:28  
**Coburn** [1] - 1037:21  
**coinciding** [1] -  
953:11  
**cold** [1] - 952:20  
**Colebrook** [2] -  
1001:26, 1001:36  
**Colebrook-White** [2] -  
1001:26, 1001:36  
**collar** [1] - 1004:20  
**collate** [1] - 1027:40  
**collateral** [1] -  
1029:35  
**colleague** [4] -  
966:33, 966:35,  
977:12, 992:5

**colleagues** [1] -  
966:47  
**collected** [2] - 972:4,  
1002:8  
**collection** [2] -  
981:32, 986:40  
**colours** [1] - 951:34  
**column** [1] - 1015:44  
**combination** [2] -  
973:9, 984:38  
**combine** [1] - 979:24  
**comfort** [1] - 969:3  
**comfortable** [2] -  
959:16, 980:10  
**comforted** [1] - 970:13  
**coming** [19] - 946:18,  
947:1, 948:23,  
951:24, 955:42,  
956:7, 959:22,  
972:35, 975:2,  
992:4, 1006:2,  
1006:4, 1006:27,  
1013:14, 1019:6,  
1032:33, 1032:41,  
1033:14, 1034:38  
**commence** [2] -  
976:25, 1019:34  
**commenced** [3] -  
974:24, 1011:42,  
1019:35  
**commencing** [1] -  
961:40  
**comment** [2] - 959:5,  
1036:18  
**commented** [1] -  
973:14  
**comments** [7] -  
958:36, 965:12,  
970:37, 973:27,  
973:33, 973:36,  
1001:4  
**commercial/**  
**industrial** [1] -  
1028:46  
**commissioning** [1] -  
1032:39  
**committee** [1] -  
993:23  
**common** [4] - 997:27,  
999:26, 1001:29,  
1001:33  
**commonly** [10] -  
948:4, 983:46,  
990:16, 990:18,  
998:12, 999:16,  
999:20, 1001:37,  
1002:27, 1002:33  
**communicated** [1] -  
1037:1

**communicating** [1] -  
977:31  
**community** [1] -  
1022:46  
**company** [2] - 992:18,  
1023:15  
**compare** [1] - 989:42  
**compared** [3] -  
970:44, 1030:40,  
1048:22  
**comparison** [1] -  
956:21  
**complaints** [4] -  
1037:19, 1037:26,  
1037:27, 1037:34  
**complete** [1] - 975:1  
**completed** [5] -  
1004:28, 1004:32,  
1005:4, 1008:33,  
1040:33  
**completely** [2] -  
1015:15, 1015:17  
**completes** [1] -  
1006:26  
**completing** [1] -  
976:39  
**complex** [1] - 1033:23  
**complexity** [1] -  
1033:24  
**complicated** [10] -  
949:40, 956:2,  
978:14, 982:10,  
983:26, 992:32,  
992:47, 998:9,  
999:10, 1034:39  
**complicated** [1] - 950:20  
**component** [2] -  
1004:39, 1004:42  
**components** [3] -  
998:30, 1004:40,  
1004:41  
**comprehensive** [3] -  
1024:34, 1024:37,  
1039:18  
**computer** [2] - 999:9,  
1004:31  
**concentrating** [1] -  
977:24  
**concept** [2] - 1002:16,  
1034:18  
**concepts** [2] - 978:7,  
978:8  
**concerned** [4] -  
967:47, 969:6,  
995:4, 1026:23  
**concerning** [1] -  
1024:25  
**concerns** [1] - 991:22  
**conclude** [1] -  
1012:15

**conclusion** [6] - 944:14, 944:23, 964:28, 989:7, 989:22, 999:38  
**conclusions** [5] - 964:30, 968:26, 973:39, 989:15, 998:33  
**conclusive** [1] - 1031:11  
**concrete** [1] - 1004:15  
**conduct** [1] - 964:29  
**cone** [1] - 981:14  
**confidence** [1] - 963:41  
**confident** [4] - 950:47, 969:14, 1034:44, 1034:46  
**configuration** [2] - 1032:38, 1033:22  
**confined** [1] - 1026:15  
**confirm** [3] - 980:13, 1009:39, 1047:30  
**confirmed** [5] - 968:23, 980:8, 980:12, 1001:14, 1036:14  
**confusing** [4] - 985:44, 987:1, 1003:40, 1006:1  
**confusion** [2] - 972:28, 981:35  
**connect** [1] - 985:22  
**connected** [1] - 1051:45  
**connection** [4] - 977:25, 1023:37, 1027:27, 1045:32  
**connections** [1] - 1042:18  
**consequences** [1] - 1019:12  
**conservative** [11] - 949:42, 952:40, 962:42, 962:45, 962:46, 970:39, 970:42, 1000:41, 1000:47, 1035:9, 1036:23  
**consider** [11] - 954:6, 959:38, 960:5, 960:6, 960:12, 963:17, 968:27, 974:34, 982:15, 996:1, 1029:11  
**consideration** [3] - 964:9, 969:37, 1024:6  
**considered** [3] - 952:31, 967:21, 998:26  
**considering** [3] - 952:36, 996:1, 1035:22  
**consistent** [2] - 960:14, 990:36  
**consistently** [3] - 971:3, 1048:11, 1049:27  
**constantly** [1] - 988:4  
**constructed** [1] - 963:12  
**construction** [1] - 976:39  
**consultant** [1] - 977:31  
**consulted** [1] - 993:44  
**consulting** [1] - 976:40  
**consumption** [4] - 1025:20, 1028:19, 1028:30, 1030:16  
**contact** [1] - 1020:20  
**contacted** [1] - 992:36  
**contacts** [1] - 1037:39  
**contain** [1] - 1014:13  
**contained** [1] - 950:34  
**contains** [1] - 1029:40  
**content** [3] - 946:9, 968:46, 974:42  
**contention** [1] - 1031:24  
**contents** [2] - 943:22, 1008:2  
**context** [9] - 955:31, 957:47, 964:8, 966:15, 1028:29, 1029:47, 1033:20, 1035:25, 1035:44  
**continue** [3] - 972:12, 1022:31, 1023:43  
**continued** [1] - 981:5  
**continues** [1] - 976:15  
**continuous** [10] - 1016:45, 1017:16, 1017:20, 1017:23, 1017:29, 1017:46, 1018:3, 1031:34, 1046:20, 1046:36  
**contractor** [4] - 976:39, 988:19, 1023:14, 1031:23  
**contractors** [2] - 1025:29, 1037:32  
**contribute** [1] - 1039:17  
**contributed** [1] - 953:18  
**contributing** [1] - 1050:1  
**contribution** [1] - 994:24  
**control** [1] - 1013:18  
**controlling** [1] - 984:11  
**convenient** [5] - 983:3, 985:31, 985:38, 1006:34, 1039:44  
**conversation** [5] - 957:10, 966:46, 967:3, 990:42, 994:46  
**conversations** [2] - 970:19, 978:42  
**conversing** [1] - 1050:20  
**convert** [1] - 1012:11  
**converts** [1] - 1022:13  
**Cook** [8] - 948:24, 951:39, 980:3, 982:23, 982:27, 982:28, 984:27, 1032:12  
**cooling** [1] - 1017:37  
**copied** [1] - 1045:3  
**copy** [4] - 943:16, 944:45, 975:33, 1007:24  
**corner** [1] - 946:42  
**Corporation** [1] - 941:42  
**correct** [114] - 943:22, 944:11, 947:13, 947:23, 947:29, 948:31, 949:24, 949:46, 952:13, 953:2, 957:22, 962:15, 963:14, 967:26, 970:7, 970:36, 973:8, 975:36, 975:44, 976:12, 976:29, 976:46, 977:2, 979:15, 979:28, 979:31, 982:9, 983:41, 986:13, 986:22, 986:35, 986:39, 990:6, 996:21, 997:33, 997:41, 997:46, 998:2, 998:42, 1001:20, 1001:27, 1003:23, 1003:38, 1008:2, 1009:15, 1009:18, 1009:21, 1009:24, 1009:45, 1010:38, 1010:45, 1011:5, 1011:19, 1011:40, 1011:43, 1012:13, 1012:16, 1012:20, 1013:35, 1014:42, 1014:47, 1015:37, 1015:47, 1016:9, 1016:47, 1017:4, 1018:13, 1018:32, 1019:32, 1023:35, 1024:31, 1025:31, 1025:44, 1029:23, 1029:28, 1029:33, 1030:13, 1030:18, 1030:28, 1031:37, 1032:25, 1037:35, 1039:27, 1040:27, 1040:28, 1040:36, 1040:40, 1040:43, 1040:44, 1041:7, 1042:15, 1042:42, 1043:6, 1043:8, 1046:24, 1046:25, 1046:37, 1046:45, 1047:1, 1047:4, 1047:13, 1048:7, 1048:8, 1048:29, 1048:38, 1048:43, 1048:47, 1049:11, 1049:15, 1049:42, 1049:46, 1051:7, 1051:11, 1051:32  
**corrected** [2] - 979:37, 1001:15  
**correctly** [1] - 986:28  
**correlate** [1] - 997:14  
**correlated** [2] - 968:12, 968:21  
**correlations** [2] - 1037:26, 1037:46  
**correspondence** [2] - 994:9, 1049:34  
**cost** [1] - 1002:28  
**Costello** [4] - 941:32, 942:1, 942:18, 1052:28  
**COSTELLO** [21] - 942:3, 942:20, 942:24, 942:31, 942:36, 942:43, 942:45, 943:28, 943:37, 970:25, 974:46, 975:6, 975:14, 975:16, 976:2, 976:10, 983:1, 983:11, 1006:24, 1006:33, 1052:31  
**council** [6] - 991:7, 1050:20, 1050:21, 1050:27, 1050:30, 1050:31  
**Council** [7] - 941:39, 1039:38, 1040:6, 1041:16, 1050:12, 1050:16, 1050:47  
**counsel** [2] - 974:17, 1052:33  
**Counsel** [1] - 941:32  
**counting** [1] - 982:9  
**couple** [14] - 955:30, 961:11, 979:30, 1010:2, 1012:41, 1016:19, 1020:1, 1020:17, 1020:28, 1022:27, 1024:38, 1028:2, 1032:8, 1045:38  
**course** [7] - 954:6, 965:21, 977:43, 999:2, 1006:5, 1008:33, 1051:30  
**Court** [1] - 941:17  
**court** [2] - 958:36, 971:42  
**covers** [1] - 979:23  
**COVID** [11] - 949:40, 949:42, 952:29, 952:32, 970:31, 970:33, 970:43, 971:3, 971:13, 971:18, 971:21  
**craft** [1] - 1014:28  
**cream** [1] - 981:14  
**create** [1] - 1034:42  
**created** [5] - 962:4, 980:46, 1014:45, 1029:40, 1039:5  
**creating** [1] - 978:47  
**creation** [1] - 978:38  
**Cres** [1] - 948:25  
**Crescent** [2] - 951:39, 980:1  
**Crescent/Flinders** [1] - 946:46  
**crew** [2] - 990:43, 1005:36  
**crews** [1] - 1006:14  
**criteria** [2] - 1014:40, 1015:34  
**critical** [4] - 950:3, 950:4, 993:2, 1037:3  
**criticality** [1] - 1034:6  
**CROOK** [3] - 942:41, 943:34, 974:7  
**Crook** [22] - 942:24, 942:34, 942:38, 943:3, 943:12, 943:31, 943:37, 970:25, 970:28, 972:17, 972:22, 973:1, 973:19,

974:4, 974:17,  
975:1, 977:28,  
978:17, 979:35,  
979:42, 980:11,  
981:29  
**crook** [3] - 942:45,  
978:13, 978:29  
**Crook's** [2] - 1001:47,  
1034:2  
**cross** [5] - 954:13,  
964:44, 967:46,  
989:16, 989:42  
**cross-check** [1] -  
954:13  
**cross-checking** [1] -  
967:46  
**cross-compare** [1] -  
989:42  
**cross-purposes** [1] -  
964:44  
**cross-verified** [1] -  
989:16  
**crystal** [2] - 1022:10,  
1022:11  
**cumulative** [1] -  
1031:45  
**curious** [2] - 997:26,  
997:27  
**current** [6] - 943:8,  
975:25, 1007:12,  
1009:32, 1010:29,  
1020:10  
**curve** [1] - 955:14  
**customer** [54] - 944:2,  
944:30, 944:36,  
944:37, 945:9,  
949:35, 952:2,  
953:13, 965:27,  
965:38, 967:38,  
970:29, 972:36,  
1014:33, 1015:35,  
1015:39, 1015:46,  
1016:21, 1016:22,  
1018:25, 1018:30,  
1019:4, 1019:12,  
1019:24, 1020:20,  
1022:38, 1022:47,  
1023:9, 1023:20,  
1023:38, 1023:46,  
1023:47, 1024:17,  
1024:20, 1024:35,  
1025:11, 1025:35,  
1025:37, 1025:38,  
1026:5, 1026:33,  
1027:12, 1027:17,  
1027:27, 1028:18,  
1031:6, 1037:19,  
1037:34, 1037:38,  
1041:33, 1049:35,  
1050:28, 1051:6,

1051:23  
**customer's** [6] -  
1018:20, 1024:39,  
1024:47, 1027:42,  
1051:27, 1051:31  
**customer-side** [16] -  
1015:35, 1015:46,  
1016:21, 1019:12,  
1019:24, 1022:38,  
1022:47, 1023:38,  
1023:46, 1024:20,  
1024:35, 1027:27,  
1031:6, 1041:33,  
1051:6, 1051:23  
**customers** [24] -  
944:28, 944:40,  
945:11, 945:14,  
945:39, 961:47,  
981:30, 981:33,  
983:22, 983:29,  
984:13, 984:36,  
1011:3, 1012:7,  
1019:5, 1020:8,  
1020:21, 1020:29,  
1028:46, 1035:46,  
1041:6, 1050:17,  
1050:36, 1050:47  
**customers'** [2] -  
959:46, 1024:3  
**cut** [6] - 942:28,  
1004:15, 1004:22,  
1005:6, 1012:31,  
1046:28  
**cut-down** [1] -  
1012:31  
**cutting** [1] - 988:32

---

## D

---

**daily** [2] - 964:20,  
1037:41  
**damage** [2] - 984:14,  
1045:12  
**damaged** [2] - 988:32,  
1051:21  
**data** [132] - 943:46,  
944:5, 944:8,  
945:27, 948:33,  
949:24, 949:30,  
949:41, 950:43,  
950:47, 952:12,  
952:16, 954:28,  
954:30, 959:9,  
960:21, 961:10,  
963:20, 963:23,  
963:33, 966:31,  
966:32, 966:41,  
966:45, 966:47,  
967:4, 967:6, 967:7,  
967:11, 967:13,

967:18, 967:28,  
967:47, 968:12,  
968:22, 968:36,  
968:37, 968:44,  
968:46, 969:2,  
969:13, 970:29,  
971:39, 971:45,  
971:46, 972:2,  
972:3, 972:4, 972:7,  
972:11, 974:21,  
974:30, 977:38,  
977:39, 978:4,  
979:18, 986:7,  
986:32, 986:40,  
986:42, 986:43,  
986:44, 987:31,  
988:3, 988:7, 989:8,  
989:9, 989:16,  
989:22, 989:24,  
989:41, 990:41,  
990:44, 994:31,  
994:35, 994:36,  
1000:40, 1002:8,  
1003:16, 1005:30,  
1005:31, 1011:10,  
1013:22, 1013:29,  
1015:45, 1016:2,  
1016:5, 1016:8,  
1017:2, 1017:10,  
1017:27, 1017:47,  
1018:8, 1018:11,  
1018:23, 1018:35,  
1018:37, 1018:40,  
1019:45, 1022:21,  
1022:23, 1025:17,  
1029:10, 1030:43,  
1031:4, 1031:17,  
1031:28, 1031:42,  
1032:31, 1032:33,  
1033:14, 1033:15,  
1034:41, 1035:42,  
1036:9, 1037:12,  
1038:11, 1046:20,  
1046:22, 1046:35,  
1047:15, 1047:47,  
1048:4, 1048:16,  
1048:32, 1048:35  
**dataset** [4] - 963:37,  
964:2, 964:26,  
1030:34  
**date** [24] - 957:28,  
968:5, 968:6, 968:9,  
968:17, 994:34,  
996:30, 996:33,  
1004:5, 1004:32,  
1004:36, 1005:21,  
1005:22, 1008:6,  
1008:7, 1008:9,  
1009:44, 1024:28,  
1044:4, 1044:43,  
1046:24, 1046:25,

1046:32, 1046:35  
**dated** [2] - 945:45,  
1046:1  
**DATED** [1] - 1046:4  
**dates** [2] - 974:25,  
1024:26  
**day-to-day** [4] - 944:2,  
977:4, 977:39,  
997:45  
**days** [17] - 948:46,  
949:7, 949:17,  
959:8, 960:15,  
960:18, 961:44,  
967:34, 967:35,  
989:24, 1000:44,  
1017:41, 1025:40  
**deal** [3] - 956:36,  
966:40, 993:24  
**dealing** [4] - 945:43,  
959:24, 977:5,  
986:28  
**December** [8] - 968:9,  
1000:20, 1000:38,  
1009:41, 1009:43,  
1035:14, 1048:19,  
1048:26  
**deceptive** [1] - 999:30  
**decide** [1] - 1013:29  
**decided** [4] - 949:23,  
952:42, 970:39,  
972:11  
**decision** [5] - 993:29,  
993:30, 1036:33,  
1036:38, 1036:47  
**deck** [1] - 1024:15  
**defect** [2] - 990:29,  
990:33  
**define** [1] - 1047:43  
**defined** [1] - 1047:22  
**defining** [1] - 1037:47  
**definitely** [2] -  
1016:33, 1038:8  
**definition** [1] -  
1026:19  
**definitive** [2] - 987:10,  
1031:18  
**definitively** [1] -  
1049:30  
**deform** [1] - 990:21  
**deforms** [2] - 990:20,  
990:21  
**degree** [8] - 968:26,  
976:44, 978:12,  
978:19, 979:22,  
997:42, 1008:29,  
1018:46  
**degrees** [1] - 943:41  
**delivery** [3] - 1009:23,  
1014:32, 1036:32  
**demand** [1] - 1035:46

**department** [1] -  
1023:17  
**dependencies** [3] -  
1019:42, 1019:44  
**dependency** [1] -  
1019:46  
**deploy** [1] - 1021:14  
**deployed** [4] - 1020:4,  
1031:39, 1034:45,  
1038:23  
**deploying** [1] -  
1022:26  
**Deployment** [2] -  
1041:45, 1043:33  
**deployment** [4] -  
1014:16, 1015:40,  
1019:31, 1041:5  
**Derek** [1] - 1045:47  
**DEREK** [1] - 1046:3  
**describe** [14] - 953:21,  
962:41, 962:43,  
966:6, 990:25,  
998:4, 1008:25,  
1010:28, 1011:32,  
1014:18, 1016:11,  
1027:32, 1033:45,  
1037:39  
**described** [4] - 967:8,  
984:3, 985:33,  
989:39  
**describing** [1] -  
969:22  
**description** [5] -  
1004:1, 1004:12,  
1042:1, 1042:33,  
1042:45  
**design** [1] - 976:28  
**designated** [1] -  
1037:3  
**designed** [2] -  
1014:28, 1033:3  
**detail** [5] - 1002:43,  
1002:44, 1022:5,  
1029:9, 1029:25  
**details** [1] - 1045:17  
**detect** [5] - 1019:16,  
1033:3, 1036:22,  
1040:13, 1041:31  
**detectability** [1] -  
1019:13  
**detected** [2] -  
1023:19, 1031:35  
**detecting** [3] - 1021:4,  
1021:22, 1021:28  
**detection** [6] - 1014:7,  
1033:20, 1033:21,  
1038:12, 1039:14,  
1039:15  
**detects** [1] - 1013:20  
**determination** [1] -

1013:24  
**determine** [3] -  
1002:19, 1014:25,  
1036:10  
**determined** [4] -  
947:7, 1015:3,  
1023:40, 1024:17  
**determines** [1] -  
983:44  
**determining** [2] -  
1015:45, 1037:33  
**develop** [1] - 993:7  
**deviation** [6] - 961:43,  
963:29, 963:33,  
963:35, 963:36,  
964:25  
**device** [3] - 983:35,  
1012:45, 1032:31  
**diagram** [25] - 946:12,  
946:14, 946:30,  
946:36, 948:1,  
948:7, 951:16,  
951:20, 951:22,  
951:23, 979:7,  
979:23, 979:38,  
980:17, 980:18,  
980:28, 981:4,  
982:4, 983:14,  
983:15, 983:22,  
984:30, 1047:22,  
1047:26, 1047:38  
**diagrammatic** [1] -  
948:27  
**diagrams** [5] - 948:3,  
951:33, 978:33,  
978:37, 979:17  
**diameter** [2] - 1002:4,  
1042:17  
**difference** [15] -  
945:6, 946:34,  
949:10, 951:16,  
961:14, 961:46,  
969:4, 979:35,  
980:16, 985:14,  
990:8, 999:22,  
1011:9, 1011:14,  
1012:42  
**differences** [6] -  
954:37, 956:46,  
959:16, 979:32,  
989:46, 1011:8  
**different** [54] - 946:40,  
948:16, 948:29,  
948:33, 951:17,  
951:34, 952:8,  
954:35, 955:33,  
955:34, 955:39,  
956:3, 960:6, 960:7,  
970:23, 970:35,  
971:25, 980:19,  
980:33, 980:46,  
983:18, 983:19,  
983:28, 985:37,  
985:43, 986:3,  
987:2, 990:1,  
994:44, 997:31,  
998:7, 998:9,  
998:20, 999:27,  
999:29, 1000:12,  
1002:9, 1002:10,  
1002:13, 1002:30,  
1004:38, 1011:28,  
1012:1, 1015:15,  
1015:17, 1021:22,  
1022:1, 1037:17,  
1037:43, 1039:15  
**difficult** [1] - 977:26  
**difficulty** [1] - 1006:37  
**digital** [67] - 943:10,  
1007:13, 1009:20,  
1009:33, 1010:1,  
1010:25, 1010:29,  
1010:37, 1010:44,  
1010:45, 1011:2,  
1011:8, 1011:9,  
1011:23, 1011:28,  
1011:33, 1011:47,  
1012:8, 1012:11,  
1012:23, 1012:43,  
1013:6, 1013:39,  
1014:12, 1015:4,  
1017:3, 1018:27,  
1019:7, 1020:22,  
1020:28, 1020:31,  
1020:38, 1020:43,  
1020:45, 1021:45,  
1022:25, 1022:46,  
1023:7, 1023:29,  
1024:34, 1024:43,  
1026:27, 1028:12,  
1029:14, 1031:1,  
1031:8, 1031:35,  
1031:46, 1033:26,  
1034:45, 1040:7,  
1040:12, 1040:22,  
1040:42, 1041:5,  
1041:9, 1043:8,  
1043:15, 1044:43,  
1045:24, 1045:33,  
1045:37, 1046:19,  
1049:34, 1049:37,  
1051:42, 1052:8  
**diligence** [1] -  
1044:17  
**diploma** [1] - 977:1  
**direction** [2] - 982:39,  
982:40  
**directly** [7] - 945:19,  
956:37, 983:23,  
984:33, 1006:2,  
1010:11, 1031:18  
**director** [2] - 975:26,  
976:10  
**directors** [1] - 1008:33  
**disagreed** [1] - 973:34  
**disappeared** [1] -  
1035:33  
**disappears** [1] -  
1035:29  
**discern** [4] - 1016:15,  
1025:12, 1029:28,  
1049:37  
**discount** [3] - 956:10,  
959:14, 963:4  
**discovered** [1] -  
1044:40  
**discuss** [2] - 994:37,  
1040:22  
**discussed** [8] -  
989:19, 993:34,  
994:41, 1002:20,  
1023:40, 1024:13,  
1025:43, 1038:40  
**discussion** [3] -  
993:31, 994:44,  
1037:10  
**discussions** [2] -  
948:13, 993:32  
**dishwashers** [1] -  
984:15  
**disparate** [1] - 1038:2  
**distance** [1] - 1020:39  
**distinct** [5] - 949:9,  
951:35, 951:37,  
960:12, 1015:13  
**distinction** [1] -  
1019:24  
**distinguish** [3] -  
953:26, 1016:14,  
1018:17  
**distinguished** [1] -  
1051:13  
**distributes** [1] -  
981:32  
**distribution** [19] -  
963:35, 963:45,  
963:46, 964:1,  
964:4, 964:5,  
969:42, 970:5,  
970:17, 972:27,  
972:30, 972:41,  
983:17, 998:29,  
1015:13, 1015:26,  
1022:26, 1034:30,  
1034:32  
**district** [1] - 1043:24  
**districts** [1] - 1015:9  
**diverse** [1] - 976:15  
**dividing** [1] - 1028:42  
**division** [1] - 1013:38  
**DN20s** [1] - 1044:6  
**doable** [3] - 1034:14,  
1038:8  
**document** [11] -  
954:17, 971:42,  
974:4, 980:32,  
991:17, 1003:21,  
1005:37, 1014:19,  
1014:40, 1025:23,  
1046:6  
**documented** [1] -  
1026:19  
**documents** [2] -  
943:32, 966:37  
**DOCUMENTS** [1] -  
943:34  
**domain** [1] - 1011:24  
**domestic** [7] - 959:33,  
959:34, 959:35,  
959:38, 959:39,  
967:11, 967:27  
**dominant** [1] - 986:4  
**done** [41] - 942:31,  
946:11, 946:22,  
948:28, 951:4,  
951:9, 953:42,  
953:43, 953:46,  
955:2, 955:5,  
955:10, 955:13,  
963:12, 964:35,  
965:21, 969:45,  
971:47, 977:25,  
977:40, 978:2,  
978:44, 981:2,  
988:39, 989:21,  
991:46, 993:9,  
997:24, 1001:12,  
1004:30, 1017:8,  
1017:9, 1017:23,  
1018:1, 1018:43,  
1020:35, 1024:44,  
1024:45, 1039:25,  
1043:19, 1045:28  
**door** [1] - 1025:39  
**dot** [2] - 988:8  
**dots** [4] - 988:7, 988:9  
**double** [2] - 963:5,  
1008:29  
**doubt** [1] - 1051:1  
**down** [19] - 946:47,  
970:36, 981:36,  
982:1, 982:5,  
984:28, 984:31,  
984:32, 984:35,  
991:17, 991:23,  
991:31, 991:44,  
992:43, 1004:5,  
1012:31, 1037:11,  
1037:42, 1048:15  
**downloaded** [1] -  
989:24  
**downstream** [1] -  
1001:23  
**DR** [8] - 1039:37,  
1039:43, 1040:2,  
1040:4, 1045:44,  
1046:9, 1046:15,  
1051:34  
**Dr** [19] - 941:38,  
942:24, 942:45,  
943:12, 970:25,  
972:17, 972:22,  
973:1, 973:19,  
978:13, 978:29,  
979:35, 979:42,  
980:11, 981:29,  
992:26, 992:28,  
1001:47, 1046:6  
**draft** [2] - 970:1,  
996:44  
**drain** [3] - 991:42,  
991:44, 998:45  
**drains** [1] - 998:19  
**draw** [3] - 950:31,  
1003:26, 1019:24  
**drawing** [1] - 1036:10  
**drawn** [3] - 978:43,  
979:2, 989:15  
**drew** [1] - 979:7  
**drill** [1] - 1004:14  
**drilled** [1] - 1005:6  
**drinking** [1] - 1042:12  
**drive** [1] - 1034:29  
**Dromana** [6] - 951:43,  
981:38, 981:39,  
983:21, 984:33,  
984:34  
**dropping** [1] - 956:25  
**drops** [1] - 953:10  
**dry** [5] - 998:15,  
998:16, 1000:47,  
1001:2, 1001:3  
**ductile** [2] - 990:11,  
990:23  
**due** [6] - 946:24,  
953:16, 964:24,  
964:25, 1020:29,  
1044:16  
**duration** [1] - 1009:2  
**during** [21] - 944:15,  
946:13, 951:1,  
951:6, 952:32,  
959:46, 970:30,  
970:43, 970:45,  
971:3, 971:5,  
989:28, 990:47,  
1026:13, 1029:3,  
1030:22, 1032:39,  
1042:38, 1043:39,  
1044:30, 1052:35



**dynamic** [2] - 1034:36,  
1035:36

## E

**early** [6] - 942:32,  
950:27, 983:2,  
1012:1, 1019:35,  
1036:23

**easier** [2] - 985:24,  
997:17

**East** [103] - 941:41,  
942:5, 942:10,  
943:38, 951:5,  
953:42, 953:46,  
964:41, 966:10,  
969:34, 974:39,  
976:25, 976:31,  
977:10, 977:15,  
977:19, 977:46,  
977:47, 978:2,  
978:20, 978:40,  
985:18, 985:40,  
991:11, 992:4,  
992:8, 993:23,  
997:3, 1005:44,  
1006:13, 1007:14,  
1008:35, 1008:41,  
1009:1, 1009:5,  
1009:13, 1009:27,  
1010:28, 1010:32,  
1011:37, 1012:29,  
1012:36, 1013:7,  
1014:12, 1015:3,  
1016:24, 1018:19,  
1021:17, 1021:35,  
1021:42, 1024:10,  
1024:24, 1024:33,  
1025:28, 1025:35,  
1025:47, 1026:35,  
1027:13, 1027:37,  
1028:11, 1028:30,  
1028:35, 1028:43,  
1029:40, 1029:42,  
1030:1, 1030:11,  
1030:22, 1030:40,  
1031:23, 1032:22,  
1032:26, 1033:42,  
1035:21, 1036:9,  
1036:36, 1036:40,  
1037:8, 1037:19,  
1037:24, 1037:32,  
1037:37, 1038:23,  
1038:46, 1039:24,  
1040:34, 1041:16,  
1043:15, 1043:34,  
1044:14, 1044:16,  
1047:18, 1048:22,  
1050:11, 1050:15,  
1050:25, 1050:35,  
1050:45, 1051:15,

1051:17, 1051:19,  
1051:24, 1052:8

**easy** [2] - 1024:43,  
1037:33

**edge** [1] - 1010:4

**effect** [5] - 947:15,  
947:24, 952:36,  
959:30, 963:25

**effective** [1] - 1020:39

**effectively** [14] -

944:5, 944:29,  
945:10, 947:26,  
949:10, 955:11,  
961:9, 962:11,  
963:6, 966:9,  
974:31, 1011:13,  
1012:5, 1021:15

**effectiveness** [1] -  
1012:47

**efficient** [1] - 1038:32

**eight** [1] - 1048:25

**either** [21] - 947:7,

950:42, 964:19,  
964:20, 964:21,  
981:26, 990:31,  
1001:14, 1010:46,  
1010:47, 1013:13,  
1017:30, 1017:36,  
1019:35, 1020:16,  
1023:20, 1027:19,  
1027:20, 1029:19,  
1032:34

**elaborate** [1] - 956:22

**elapse** [1] - 1018:7

**electromechanical** [1]  
- 1032:29

**electronic** [1] -  
1017:25

**electronics** [1] -  
1022:14

**elevation** [1] - 985:14

**EMAIL** [3] - 974:7,

1046:3, 1046:13

**email** [22] - 951:8,

957:37, 972:45,  
973:1, 973:4,  
973:12, 973:13,  
973:20, 973:23,  
973:43, 973:47,  
974:3, 991:11,  
1018:26, 1018:27,  
1034:10, 1038:13,  
1041:15, 1045:3,  
1045:4, 1045:47,  
1046:7

**emails** [1] - 1045:45

**emerging** [1] -

1021:33

**employed** [1] - 976:38

**employees** [1] -

1037:32

**empowered** [1] -  
1036:44

**emptied** [1] - 988:44

**en** [1] - 1034:45

**enable** [1] - 993:8

**Enbom** [1] - 941:11

**end** [15] - 945:11,  
949:30, 950:7,  
952:37, 952:40,  
953:33, 954:19,  
957:17, 962:32,  
967:33, 994:18,  
1012:18, 1017:41,  
1032:16, 1038:9

**ended** [1] - 947:26

**ending** [1] - 1048:33

**engage** [2] - 993:29,  
993:42

**engaged** [4] - 992:29,  
993:17, 994:14,  
997:3

**engagement** [1] -  
994:41

**engaging** [1] - 992:9

**engineer** [3] - 978:6,  
980:13, 1009:7

**engineering** [8] -  
959:4, 975:27,  
976:11, 976:45,  
977:1, 1008:30,  
1008:31, 1009:8

**engineers** [1] -  
1035:11

**enhancing** [1] -  
1014:7

**enormous** [1] - 994:22

**entail** [3] - 976:14,  
1010:1, 1013:37

**enter** [2] - 998:45,  
1004:31

**entered** [3] - 998:41,  
998:44, 1005:2

**entering** [2] - 950:5,  
950:6

**entire** [12] - 953:1,  
959:7, 960:21,  
963:36, 964:2,  
964:26, 971:5,  
979:20, 1009:1,  
1026:15, 1035:37,  
1038:30

**entirely** [3] - 951:32,  
965:20, 993:32

**entrances** [1] -  
1034:37

**environment** [1] -  
1041:37

**environmental** [5] -  
962:17, 975:27,

976:11, 977:1,  
1014:34

**equal** [1] - 985:35

**equation** [1] - 998:20

**equations** [1] - 998:9

**equipment** [2] -  
984:14, 1032:26

**equivalent** [1] -  
985:34

**equivalents** [1] -  
1021:12

**era** [1] - 952:30

**erosion** [1] - 1036:12

**err** [1] - 1035:8

**error** [6] - 947:8,

947:11, 964:9,  
964:15, 964:18,  
964:20

**errors** [1] - 1039:16

**escalated** [1] - 1034:8

**escalating** [1] -  
1033:44

**escalation** [1] -  
1034:9

**essentially** [2] -  
972:17, 1033:37

**establish** [1] -  
1002:37

**established** [1] -  
993:24

**estimate** [23] - 944:39,  
947:30, 952:41,  
953:47, 955:35,  
958:22, 958:29,  
958:32, 958:35,  
959:3, 959:15,  
959:18, 959:23,  
960:4, 962:27,  
962:41, 968:28,  
968:31, 970:29,  
977:30, 991:43,  
991:47, 1002:3

**estimated** [3] -  
977:42, 991:2,  
1001:44

**estimates** [2] - 953:37,  
960:34

**estimating** [3] -  
977:35, 978:8,  
1002:28

**estimation** [2] -  
945:20, 997:35

**et** [3] - 1032:31,  
1036:45, 1052:13

**Evans** [1] - 941:35

**evaporative** [1] -  
1017:37

**evening** [1] - 979:46

**event** [17] - 944:15,  
944:19, 944:34,

944:42, 945:16,  
947:7, 953:2,  
953:16, 953:35,  
957:8, 958:9,  
959:47, 967:6,  
969:16, 973:32,  
997:24, 998:8

**events** [10] - 949:33,  
953:17, 977:16,  
977:22, 977:24,  
989:11, 1003:23,  
1004:2, 1004:37,  
1038:2

**eventually** [1] - 954:25

**everywhere** [3] -  
1018:47, 1026:26,  
1038:31

**evidence** [33] -  
956:41, 958:38,  
960:11, 972:18,  
972:23, 974:19,  
974:24, 974:28,  
974:34, 975:1,  
978:30, 991:21,  
1003:10, 1003:15,  
1005:30, 1005:35,  
1006:26, 1007:17,  
1011:22, 1012:22,  
1016:30, 1020:47,  
1024:45, 1026:42,  
1027:17, 1027:21,  
1029:31, 1031:11,  
1035:13, 1037:24,  
1044:13, 1049:29,  
1052:23

**evolve** [1] - 976:15

**exact** [2] - 993:18,  
1022:19

**exactly** [14] - 944:35,  
953:14, 954:30,  
984:25, 987:37,  
993:33, 994:18,  
1002:37, 1012:44,  
1013:31, 1015:31,  
1022:17, 1026:18,  
1033:34

**examination** [2] -  
974:46, 980:4

**examine** [1] - 1002:14

**examined** [1] -  
1030:23

**example** [17] - 945:33,  
948:29, 952:6,  
952:8, 955:40,  
956:22, 967:45,  
969:42, 977:28,  
978:13, 983:20,  
996:19, 1029:27,  
1030:15, 1032:12,  
1033:3, 1036:38

<b>examples</b> [1] - 1032:8	964:45, 966:22,	946:24, 947:12,	<b>fence</b> [1] - 1020:19	<b>five</b> [12] - 986:39,
<b>excavating</b> [1] -	985:41, 996:39,	947:21, 947:34,	<b>few</b> [16] - 970:23,	986:42, 986:44,
1000:28	996:42, 999:1,	950:36, 962:7,	971:32, 971:34,	988:9, 988:12,
<b>exceeded</b> [1] -	1027:22	968:12, 979:1,	974:13, 977:26,	1000:44, 1017:26,
1030:27	<b>expected</b> [6] - 952:45,	991:7, 992:8,	998:9, 1011:14,	1017:30, 1017:31,
<b>exceeds</b> [1] - 1029:21	958:19, 960:47,	1000:32, 1001:2,	1011:47, 1024:7,	1026:43, 1034:37
<b>except</b> [2] - 951:7,	1042:26, 1042:28	1004:25, 1004:41	1033:1, 1036:26,	<b>five-minute</b> [5] -
968:2	<b>experience</b> [6] -	<b>factor</b> [4] - 952:38,	1038:2, 1038:41,	986:39, 986:42,
<b>excess</b> [3] - 953:1,	976:32, 976:37,	970:47, 971:10,	1039:31, 1040:6,	986:44, 988:9,
953:34, 969:15	977:35, 995:29,	1017:13	1051:3	988:12
<b>exchange</b> [4] -	1014:33, 1017:19	<b>factored</b> [1] - 1015:40	<b>field</b> [3] - 993:6,	<b>fix</b> [2] - 1021:6,
994:36, 1011:33,	<b>experienced</b> [4] -	<b>factors</b> [5] - 957:22,	1006:14, 1033:11	1025:40
1014:21, 1043:26	980:13, 1001:7,	962:17, 998:25,	<b>figure</b> [1] - 1028:40	<b>fixed</b> [4] - 985:10,
<b>exchanged</b> [2] -	1031:5, 1031:29	1020:2, 1024:7	<b>file</b> [1] - 1029:45	996:30, 1003:11
1012:19, 1043:35	<b>experiences</b> [1] -	<b>fail</b> [2] - 990:22	<b>fill</b> [1] - 1043:30	<b>flags</b> [1] - 1018:2
<b>exchanges</b> [3] -	978:1	<b>fair</b> [8] - 949:28,	<b>filled</b> [1] - 1026:43	<b>flat</b> [2] - 971:8,
1042:10, 1042:14,	<b>experimenting</b> [1] -	968:1, 970:23,	<b>final</b> [20] - 943:25,	1017:38
1042:27	1011:46	978:19, 1001:7,	943:26, 946:3,	<b>flat-lined</b> [1] - 971:8
<b>exchanging</b> [2] -	<b>expert</b> [7] - 958:45,	1002:4, 1029:18,	946:9, 946:35,	<b>flat-out</b> [1] - 1017:38
1012:6, 1050:23	992:14, 997:26,	1039:22	948:39, 950:26,	<b>fleet</b> [2] - 1010:6,
<b>excited</b> [1] - 1011:28	999:18, 1041:36	<b>fairly</b> [8] - 949:9,	950:35, 952:23,	1020:25
<b>excluded</b> [2] - 951:15,	<b>expertise</b> [6] - 943:45,	952:40, 953:12,	954:40, 960:26,	<b>Flinders</b> [4] - 948:25,
1044:43	964:42, 978:13,	959:16, 969:33,	961:3, 965:1,	951:39, 969:43,
<b>excluded"</b> [1] -	978:17, 994:46,	977:33, 988:18,	968:25, 969:22,	980:1
1044:44	994:47	1006:10	975:47, 1006:44,	<b>flood</b> [1] - 997:35
<b>excluding</b> [3] -	<b>experts</b> [1] - 997:25	<b>faith</b> [1] - 958:46	1029:39, 1038:44	<b>flow</b> [82] - 943:46,
970:33, 971:18,	<b>explain</b> [12] - 945:46,	<b>falls</b> [1] - 998:15	<b>finalised</b> [6] - 946:6,	946:17, 947:19,
1045:11	955:37, 961:39,	<b>familiar</b> [13] - 951:33,	957:35, 961:1,	947:23, 950:5,
<b>exclusion</b> [3] -	970:28, 970:42,	972:47, 973:20,	965:2, 994:14,	953:22, 955:3,
1047:42, 1052:10,	972:30, 973:23,	977:38, 978:27,	994:16	955:5, 955:6, 955:8,
1052:17	979:5, 980:33,	978:37, 978:39,	<b>finally</b> [2] - 991:6,	955:19, 955:27,
<b>excused</b> [2] - 975:2,	984:19, 988:3,	985:1, 985:3,	1047:15	955:43, 955:45,
1006:27	1011:7	997:38, 1002:16,	<b>findings</b> [1] - 1032:4	956:4, 956:5,
<b>executive</b> [1] -	<b>explanation</b> [5] -	1002:31, 1047:28	<b>finetuning</b> [1] - 994:10	956:17, 956:24,
1009:32	947:33, 948:27,	<b>familiarity</b> [2] -	<b>finger</b> [1] - 1022:12	956:44, 960:26,
<b>exhibit</b> [10] - 943:32,	958:7, 958:8, 983:13	978:20, 979:7	<b>finished</b> [8] - 954:8,	961:24, 968:1,
973:19, 974:5,	<b>explicable</b> [2] -	<b>fantastic</b> [1] - 999:34	954:11, 957:30,	973:10, 973:31,
976:6, 1007:28,	1017:18, 1017:19	<b>far</b> [7] - 983:43,	968:3, 968:6, 983:2,	973:35, 977:36,
1014:17, 1041:42,	<b>explore</b> [1] - 970:22	996:17, 1000:36,	1041:23	977:42, 977:43,
1046:1, 1046:11,	<b>exposing</b> [1] -	1021:36, 1033:34,	<b>finishes</b> [1] - 953:8	978:4, 978:8,
1047:22	1029:15	1039:4, 1043:12	<b>fire</b> [1] - 1022:20	982:14, 982:15,
<b>EXHIBIT</b> [6] - 943:34,	<b>express</b> [2] - 982:12,	<b>fast</b> [1] - 1032:9	<b>first</b> [34] - 942:24,	982:40, 986:38,
974:7, 976:8,	995:33	<b>feature</b> [1] - 982:22	945:45, 946:11,	986:41, 986:47,
1008:21, 1046:3,	<b>extend</b> [1] - 993:7	<b>features</b> [2] - 983:15,	946:25, 957:26,	987:4, 987:9,
1046:13	<b>extensive</b> [1] -	983:16	957:30, 958:22,	987:14, 987:19,
<b>exhibited</b> [2] -	1013:41	<b>February</b> [2] - 991:34,	967:34, 968:44,	988:4, 988:11,
1003:17, 1029:7	<b>extent</b> [6] - 965:20,	991:37	970:9, 970:12,	988:17, 989:19,
<b>EXHIBITS</b> [1] -	972:10, 989:42,	<b>fed</b> [4] - 945:9, 946:46,	971:47, 972:3,	989:20, 989:27,
1008:22	994:30, 1001:19,	951:42, 984:33	972:7, 973:18,	992:43, 993:2,
<b>exhibits</b> [6] - 943:29,	1031:5	<b>Federal</b> [1] - 941:17	976:25, 977:12,	993:3, 993:5,
976:3, 1007:24,	<b>extra</b> [3] - 972:4,	<b>feed</b> [1] - 974:32	978:47, 979:15,	995:21, 995:27,
1008:16, 1008:19,	993:47, 994:35	<b>feedback</b> [4] - 965:4,	981:4, 987:29,	1001:22, 1001:33,
1028:32	<b>eye</b> [2] - 949:9, 992:47	965:13, 969:19,	989:36, 992:47,	1001:42, 1001:44,
<b>existence</b> [1] - 997:41	<b>eyeballs</b> [1] - 1032:45	1013:40	995:16, 1015:33,	1002:5, 1002:19,
<b>existing</b> [2] - 1010:6,		<b>feeding</b> [1] - 955:46	1015:34, 1016:2,	1016:46, 1017:16,
1043:9		<b>feeds</b> [4] - 944:25,	1018:39, 1019:30,	1017:20, 1017:23,
<b>exists</b> [1] - 950:23		955:41, 972:33,	1019:39, 1041:2,	1017:29, 1017:32,
<b>exorbitant</b> [1] - 971:29		980:6	1043:10, 1046:26	1017:46, 1018:3,
<b>expect</b> [11] - 945:39,		<b>felt</b> [4] - 949:42, 960:1,	<b>firstly</b> [1] - 957:5	1031:34, 1033:7,
945:41, 953:35,		967:40, 1050:27	<b>fit</b> [1] - 1021:40	1033:21, 1034:3,

## F

1034:4, 1034:28, 1034:35, 1034:40, 1034:41, 1035:2, 1035:14, 1035:15, 1035:47, 1046:20, 1046:36	1050:22 <b>formally</b> [1] - 1038:39 <b>format</b> [2] - 948:34, 954:23 <b>formulas</b> [1] - 998:11 <b>Forster</b> [24] - 942:26, 1006:44, 1007:5, 1007:7, 1008:18, 1008:24, 1010:24, 1022:31, 1024:19, 1029:45, 1032:21, 1039:34, 1040:4, 1040:8, 1041:15, 1041:18, 1041:25, 1041:41, 1045:2, 1046:19, 1048:35, 1051:41, 1052:7, 1052:24 <b>FORSTER</b> [2] - 1007:1, 1008:21 <b>Forster-Knight</b> [23] - 942:26, 1006:44, 1007:5, 1007:7, 1008:18, 1008:24, 1010:24, 1022:31, 1024:19, 1029:45, 1032:21, 1039:34, 1040:4, 1041:15, 1041:18, 1041:25, 1041:41, 1045:2, 1046:19, 1048:35, 1051:41, 1052:7, 1052:24 <b>FORSTER-KNIGHT</b> [2] - 1007:1, 1008:21 <b>Forster-Knight's</b> [1] - 1040:8 <b>fortunately</b> [1] - 991:40 <b>forward</b> [3] - 954:46, 1034:5, 1039:31 <b>forwards</b> [1] - 994:9 <b>Foundation</b> [1] - 1042:2 <b>four</b> [17] - 949:23, 949:39, 952:7, 960:45, 963:20, 963:33, 968:39, 970:28, 970:30, 972:2, 998:19, 1005:44, 1018:1, 1031:14, 1038:20, 1039:25, 1046:40 <b>fourth</b> [2] - 1025:15, 1025:18 <b>fracture</b> [1] - 990:16 <b>frame</b> [6] - 1022:44, 1023:45, 1024:37, 1029:33, 1039:23, 1050:29	<b>framed</b> [1] - 1037:14 <b>frames</b> [1] - 1005:43 <b>Frankston</b> [3] - 943:6, 975:23, 1007:10 <b>free</b> [2] - 942:45, 1052:24 <b>frequency</b> [1] - 1015:46 <b>frequently</b> [1] - 1022:24 <b>FROM</b> [2] - 974:7, 1046:3 <b>fruition</b> [1] - 1044:7 <b>full</b> [9] - 943:2, 957:26, 962:32, 972:10, 975:20, 1007:6, 1017:8, 1036:2, 1045:17 <b>fully</b> [3] - 1018:25, 1026:1, 1028:13 <b>function</b> [3] - 1039:2, 1039:5, 1040:42 <b>functions</b> [1] - 1010:2 <b>future</b> [3] - 1014:8, 1037:2, 1043:23 <b>Futures</b> [1] - 960:40 <b>FY25</b> [1] - 1042:6 <b>FY26</b> [1] - 1036:25	999:28, 1015:3, 1015:5, 1015:10 <b>gestures</b> [1] - 1040:17 <b>GIS</b> [3] - 979:19, 980:8, 1006:15 <b>given</b> [25] - 945:30, 954:24, 956:32, 958:7, 958:17, 961:11, 968:27, 969:37, 970:43, 972:2, 972:3, 972:7, 973:43, 974:32, 994:6, 994:8, 996:32, 1013:33, 1015:35, 1022:39, 1023:13, 1032:12, 1039:22, 1045:32, 1050:36 <b>glad</b> [1] - 986:2 <b>glass</b> [2] - 942:46, 975:16 <b>globally</b> [1] - 1012:30 <b>glove</b> [1] - 1014:3 <b>governance</b> [3] - 1036:37, 1036:46, 1037:2 <b>governed</b> [1] - 984:41 <b>gradual</b> [1] - 953:22 <b>gradually</b> [1] - 977:14 <b>graduate</b> [1] - 977:1 <b>graduated</b> [1] - 1008:42 <b>graduates</b> [1] - 976:18 <b>grainy</b> [4] - 955:1, 979:16, 979:28, 980:28 <b>granted</b> [2] - 1016:29, 1026:36 <b>graph</b> [27] - 949:1, 949:3, 949:12, 954:19, 954:20, 954:40, 954:47, 957:3, 957:10, 957:15, 960:27, 986:29, 986:31, 986:32, 986:38, 987:24, 987:29, 987:32, 988:10, 989:8, 989:9, 989:14, 989:19, 989:23, 989:26, 989:36 <b>grate</b> [12] - 991:31, 995:6, 995:14, 995:19, 995:26, 995:28, 995:32, 995:36, 995:46, 996:4, 996:15, 996:20 <b>grates</b> [1] - 992:43	<b>gravity</b> [3] - 982:14, 983:29, 984:39 <b>great</b> [3] - 947:32, 956:26, 1019:42 <b>greater</b> [2] - 971:19, 1048:11 <b>green</b> [4] - 954:43, 954:47, 980:38, 981:21 <b>Greta</b> [1] - 972:45 <b>grew</b> [3] - 960:15, 990:36, 1035:18 <b>ground</b> [7] - 983:31, 985:15, 985:20, 985:23, 990:18, 1019:18, 1023:30 <b>group</b> [15] - 943:9, 943:10, 943:37, 970:21, 993:27, 993:30, 993:37, 993:39, 1000:6, 1000:16, 1010:14, 1010:15, 1010:18, 1034:10, 1038:14 <b>groups</b> [1] - 952:1 <b>grow</b> [4] - 957:16, 960:13, 990:37 <b>grows</b> [1] - 957:14 <b>growth</b> [1] - 957:14 <b>guess</b> [12] - 967:38, 971:20, 981:3, 984:10, 989:16, 991:38, 999:29, 1016:21, 1031:20, 1035:32, 1036:12, 1038:39 <b>guesses</b> [1] - 959:47 <b>guesswork</b> [1] - 959:45 <b>guide</b> [4] - 994:23, 997:35, 997:38, 1023:21 <b>guidelines</b> [1] - 998:14 <b>guys</b> [2] - 1022:23, 1023:19
<hr/>				
<b>G</b>				
<hr/>				
<b>gap</b> [1] - 959:32 <b>gaps</b> [1] - 1043:30 <b>garden</b> [1] - 1050:3 <b>Gary</b> [1] - 991:39 <b>gate</b> [1] - 1006:11 <b>gauge</b> [1] - 985:21 <b>general</b> [23] - 945:25, 947:15, 976:36, 983:34, 984:20, 985:12, 990:28, 996:35, 997:44, 998:4, 998:28, 1002:40, 1007:13, 1009:20, 1009:23, 1009:26, 1009:33, 1010:1, 1014:18, 1034:10, 1037:10, 1038:13, 1050:7 <b>generally</b> [13] - 978:10, 980:21, 983:47, 990:11, 995:22, 995:23, 1001:3, 1020:11, 1024:40, 1025:38, 1027:46, 1031:22, 1032:40 <b>generated</b> [1] - 984:38 <b>generous</b> [1] - 962:42 <b>geographic</b> [4] -				
<hr/>				
<b>H</b>				
<hr/>				
<b>halfway</b> [1] - 1004:5 <b>hand</b> [4] - 946:42, 978:41, 979:8, 1014:3 <b>hand-in-glove</b> [1] - 1014:3 <b>handed</b> [4] - 943:16, 975:33, 975:34, 1013:42 <b>handful</b> [4] - 993:21, 996:36, 1039:38,				

1039:43	1025:1, 1025:20,	<b>hope</b> [2] - 997:13,	<b>identified</b> [13] -	1047:31
<b>hands</b> [1] - 1024:15	1026:33, 1026:34,	1038:19	946:13, 947:1,	<b>including</b> [8] - 949:41,
<b>happy</b> [5] - 1008:1,	1026:39, 1027:27,	<b>hopefully</b> [4] - 971:43,	958:8, 959:32,	964:16, 978:7,
1022:31, 1022:33,	1027:28, 1028:18,	1021:11, 1034:42,	964:38, 989:39,	980:19, 1009:17,
1039:45, 1039:47	1029:2, 1029:8,	1038:33	994:30, 1026:12,	1024:26, 1028:45,
<b>hard</b> [5] - 979:29,	1029:11, 1029:18,	<b>hoping</b> [1] - 980:31	1026:47, 1029:2,	1044:9
987:34, 1016:15,	1029:20, 1029:25,	<b>horizon</b> [1] - 1039:23	1031:43, 1047:47,	<b>incorporates</b> [1] -
1025:12, 1038:29	1029:30, 1029:34,	<b>Horton</b> [10] - 998:1,	1051:24	962:17
<b>harder</b> [2] - 955:34,	1031:10, 1031:16,	998:5, 998:11,	<b>identifies</b> [1] -	<b>incorrect</b> [2] - 979:10,
1019:16	1031:27, 1032:16,	998:23, 998:34,	1035:23	980:6
<b>harness</b> [1] - 1011:29	1032:18, 1035:45,	999:2, 999:24,	<b>identify</b> [4] - 1025:29,	<b>incorrectly</b> [3] -
<b>hash</b> [4] - 946:41,	1045:42, 1047:9,	999:47, 1000:6,	1033:19, 1037:38,	946:14, 947:26,
946:47, 948:24,	1048:4, 1048:6,	1000:43	1040:34	979:2
981:29	1048:11, 1049:10,	<b>host</b> [1] - 1003:44	<b>identifying</b> [4] -	<b>increase</b> [13] - 949:12,
<b>hashes</b> [3] - 951:47,	1049:14, 1049:19,	<b>hot</b> [2] - 952:19,	944:10, 1031:29,	949:18, 952:39,
952:1, 952:8	1049:27, 1049:30,	1017:38	1031:47, 1032:23	953:22, 953:23,
<b>head</b> [8] - 950:29,	1049:40, 1050:6,	<b>hours</b> [5] - 971:37,	<b>ignore</b> [1] - 1034:23	953:25, 953:32,
956:12, 957:28,	1050:47	971:38, 1005:44,	<b>imagine</b> [1] - 1020:33	955:16, 957:8,
986:43, 1012:4,	<b>high-consumption</b> [1]	1018:1, 1022:28	<b>immediate</b> [2] -	957:17, 971:6,
1014:36, 1015:31,	- 1025:20	<b>house</b> [4] - 1012:38,	958:16, 988:45	971:11, 971:14
1020:33	<b>high-level</b> [2] - 994:3,	1020:15, 1020:19,	<b>immediately</b> [5] -	<b>increased</b> [3] -
<b>headed</b> [1] - 1015:44	995:34	1051:10	947:43, 966:45,	953:26, 977:14,
<b>heading</b> [2] - 1016:44,	<b>higher</b> [9] - 956:18,	<b>houses</b> [4] - 1012:41,	982:2, 982:26, 989:2	988:17
1042:6	959:30, 960:26,	1017:13, 1021:5,	<b>Immediately</b> [1] -	<b>increases</b> [1] - 971:1
<b>headline</b> [3] - 957:40,	984:26, 1027:39,	1024:3	947:46	<b>incumbent</b> [1] -
958:13, 961:8	1027:44, 1031:28,	<b>human</b> [1] - 962:17	<b>impact</b> [2] - 952:35,	1027:17
<b>heap</b> [1] - 1018:24	1032:19, 1032:46	<b>hundred</b> [1] - 957:42	966:25	<b>independently</b> [2] -
<b>heaps</b> [1] - 1035:47	<b>highest</b> [9] - 960:27,	<b>hundreds</b> [1] - 1021:4	<b>impacted</b> [1] - 953:7	966:21, 1027:13
<b>hear</b> [1] - 1020:20	1011:32, 1015:35,	<b>hydrant</b> [1] - 1022:20	<b>impacts</b> [1] - 952:33	<b>indicate</b> [7] - 947:4,
<b>heard</b> [6] - 977:13,	1022:40, 1030:30,	<b>hydrants</b> [1] - 1021:47	<b>implement</b> [1] -	951:34, 969:27,
1018:18, 1023:16,	1030:36, 1048:20,	<b>hydraulic</b> [4] - 1002:6,	1014:29	973:31, 974:26,
1039:3, 1045:29,	1048:27, 1048:46	1015:22, 1034:7,	<b>implementation</b> [1] -	980:33, 1025:21
1052:12	<b>highlighted</b> [1] -	1035:31	1034:18	<b>indicated</b> [1] - 982:40
<b>HEARING</b> [1] -	1035:24	<b>hydrogeologist</b> [1] -	<b>implementing</b> [1] -	<b>indicates</b> [2] -
1052:38	<b>highly</b> [3] - 968:47,	996:23	1039:24	1004:24, 1030:26
<b>hearing</b> [8] - 978:29,	1002:31, 1006:17	<b>hydrological</b> [2] -	<b>important</b> [6] -	<b>indicating</b> [1] -
991:39, 1022:11,	<b>hill</b> [6] - 984:24,	1001:8, 1002:14	955:19, 978:15,	1047:16
1044:30, 1052:28,	984:26, 984:28,	<b>hydrophone</b> [1] -	1004:26, 1016:13,	<b>indication</b> [4] - 991:4,
1052:34, 1052:35,	984:31, 984:35	1021:26	1034:11, 1045:33	996:32, 996:35,
1052:36	<b>historic</b> [1] - 1015:39	<b>hyper</b> [2] - 1022:45,	<b>improve</b> [2] - 1009:28,	1017:17
<b>hearings</b> [2] -	<b>historical</b> [2] - 949:23,	1037:42	1037:8	<b>indicative</b> [1] -
1044:36, 1050:20	949:41	<b>hyper-care</b> [1] -	<b>improved</b> [2] - 981:5,	1006:18
<b>heavily</b> [1] - 949:31	<b>history</b> [4] - 944:37,	1022:45	981:6	<b>indicator</b> [1] - 955:19
<b>held</b> [3] - 1009:6,	949:28, 961:21,		<b>IN</b> [1] - 943:35	<b>indicators</b> [1] - 980:19
1009:14, 1009:41	961:22		<b>in/rubbish</b> [1] -	<b>individual</b> [3] -
<b>Helen</b> [1] - 974:4	<b>hit</b> [2] - 1015:8,		1002:22	967:12, 988:7,
<b>HELEN</b> [1] - 974:7	1035:28		<b>inaudible</b> [1] - 993:33	1005:7
<b>help</b> [7] - 994:1,	<b>hoc</b> [1] - 1037:44	<b>I-O-T-A</b> [1] - 1008:39	<b>inaudible</b> [1] - 976:6	<b>industry</b> [3] - 976:32,
1010:4, 1018:21,	<b>hole</b> [2] - 960:18,	<b>i.e</b> [1] - 1022:38	<b>incident</b> [1] - 977:13	976:33, 1023:16
1020:8, 1021:6,	990:33	<b>ice</b> [1] - 981:14	<b>include</b> [6] - 944:32,	<b>infer</b> [3] - 1002:32,
1023:20, 1035:11	<b>holes</b> [3] - 1003:44,	<b>ID</b> [2] - 974:4, 1046:7	951:21, 967:41,	1022:14, 1031:4
<b>helpful</b> [3] - 982:46,	1004:14, 1005:6	<b>idea</b> [4] - 948:23,	967:45, 977:4,	<b>inferred</b> [1] - 996:5
984:20, 996:40	<b>holiday</b> [3] - 971:7,	954:16, 958:18,	1042:8	<b>inferring</b> [2] -
<b>helping</b> [1] - 992:37	971:12, 1020:19	993:36	<b>included</b> [7] - 950:16,	1005:46, 1033:28
<b>high</b> [46] - 959:40,	<b>holistic</b> [1] - 1035:41	<b>ideal</b> [2] - 1027:47,	951:15, 960:1,	<b>influenced</b> [2] -
978:19, 982:14,	<b>home</b> [5] - 952:33,	1043:30	970:30, 986:7,	949:31, 949:34
984:14, 984:16,	970:32, 970:44,	<b>ideally</b> [1] - 1028:6	986:29, 1043:4	<b>inform</b> [2] - 994:23,
984:35, 994:3,	970:45, 971:3	<b>ideas</b> [1] - 1019:42	<b>includes</b> [6] - 944:30,	1018:21
995:34, 1015:39,	<b>honest</b> [2] - 958:17,	<b>identical</b> [1] - 948:20	961:46, 962:3,	<b>information</b> [30] -
1023:25, 1023:27,	1043:18	<b>identifiable</b> [1] -	979:19, 998:15,	957:32, 973:29,
		950:46		

979:21, 979:24,  
989:13, 990:45,  
991:10, 994:30,  
994:34, 994:36,  
994:39, 1022:3,  
1024:23, 1024:25,  
1024:29, 1025:16,  
1025:27, 1025:33,  
1027:41, 1029:39,  
1029:41, 1031:15,  
1031:18, 1035:37,  
1036:9, 1036:14,  
1046:40, 1050:6,  
1050:10  
**informed** [1] - 1001:18  
**infrastructure** [11] -  
946:33, 946:40,  
948:15, 948:28,  
978:20, 981:1,  
1014:36, 1040:34,  
1051:5, 1051:10,  
1051:15  
**initial** [13] - 946:35,  
946:39, 947:4,  
972:10, 981:3,  
994:44, 999:12,  
999:26, 999:38,  
1000:1, 1008:5,  
1038:26, 1039:10  
**initiated** [1] - 1037:37  
**input** [4] - 1011:27,  
1011:29, 1014:25,  
1014:31  
**inputs** [1] - 1036:32  
**inquiry** [12] - 943:13,  
975:30, 977:10,  
977:21, 1005:15,  
1007:16, 1007:21,  
1020:46, 1035:13,  
1044:22, 1050:10,  
1050:35  
**Inquiry** [1] - 941:4  
**inquiry's** [1] - 1005:17  
**inroads** [1] - 1012:7  
**inside** [1] - 1012:45  
**inspection** [1] -  
1004:21  
**install** [2] - 1021:18,  
1052:8  
**installation** [1] -  
1024:34  
**installed** [13] - 983:45,  
1017:3, 1019:40,  
1020:31, 1020:44,  
1031:36, 1032:26,  
1042:40, 1045:25,  
1045:34, 1045:37,  
1046:20, 1051:43  
**installing** [2] -  
1023:29, 1052:13

**installs** [2] - 1042:37,  
1043:2  
**instances** [1] -  
1031:34  
**instantaneous** [1] -  
987:4  
**instantly** [1] - 1018:6  
**instead** [4] - 991:17,  
1007:39, 1014:24,  
1048:34  
**instigated** [2] -  
977:27, 978:38  
**Institute** [1] - 960:40  
**instructions** [1] -  
1013:33  
**instrument** [1] -  
1033:11  
**instruments** [1] -  
1021:17  
**integral** [1] - 998:23  
**intend** [1] - 994:31  
**intended** [1] - 1023:38  
**intends** [1] - 1021:17  
**intensive** [1] - 1023:43  
**intent** [3] - 1021:3,  
1021:8, 1023:1  
**intention** [7] - 963:2,  
981:31, 994:28,  
1001:9, 1036:7,  
1038:24, 1043:44  
**intents** [1] - 1022:8  
**interacts** [2] - 992:33,  
993:1  
**interchangeable** [1] -  
1021:24  
**interchangeably** [1] -  
1010:41  
**interest** [2] - 982:19,  
992:35  
**interested** [6] - 958:9,  
973:35, 985:2,  
992:30, 992:36,  
992:37  
**interface** [1] - 1036:1  
**interim** [1] - 965:1  
**internal** [2] - 985:18,  
1025:10  
**international** [2] -  
992:9, 992:14  
**Internet** [1] - 1013:9  
**interrelated** [1] -  
1037:39  
**interrelationships** [1] -  
1037:34  
**interrogate** [1] -  
954:27  
**interruption** [1] -  
988:29  
**interval** [2] - 963:41,  
986:44

**intervals** [2] - 986:39,  
988:12  
**introduced** [1] -  
1023:33  
**investigate** [5] -  
977:29, 994:20,  
994:21, 1013:14,  
1033:38  
**investigating** [2] -  
995:21, 1037:12  
**investigation** [6] -  
946:13, 952:17,  
972:11, 978:25,  
993:7, 1025:10  
**investigations** [2] -  
994:1, 1034:29  
**invisible** [1] - 1019:8  
**invoice** [1] - 1027:20  
**involved** [8] - 961:16,  
962:1, 977:8,  
977:32, 978:23,  
978:25, 1024:5,  
1041:5  
**involvement** [1] -  
977:14  
**involving** [1] -  
1011:33  
**IoT** [3] - 1013:9,  
1013:46, 1018:11  
**lota** [1] - 1008:39  
**irrigating** [1] - 1050:2  
**irrigation** [4] -  
1017:39, 1017:40,  
1049:35  
**ish** [1] - 1044:2  
**isolation** [1] - 1037:30  
**issue** [7] - 972:44,  
991:26, 993:24,  
1026:5, 1050:27,  
1050:28, 1051:19  
**issued** [5] - 1025:28,  
1026:13, 1026:47,  
1050:17, 1050:47  
**issues** [9] - 953:6,  
955:30, 972:16,  
972:18, 1002:41,  
1020:32, 1033:44,  
1035:19, 1044:22  
**it'll** [3] - 990:21,  
996:11, 996:12  
**iterative** [1] - 981:2  
**ITS** [1] - 1008:22  
**itself** [9] - 956:22,  
959:26, 961:10,  
968:36, 988:8,  
1029:31, 1032:38,  
1035:28, 1038:12

## J

**January** [10] - 977:11,  
977:20, 1042:36,  
1043:35, 1043:42,  
1044:4, 1044:23,  
1044:24, 1044:33,  
1044:34  
**Jason** [1] - 991:41  
**job** [3] - 943:47, 944:9,  
1003:27  
**job's** [1] - 944:2  
**joining** [2] - 988:8,  
988:34  
**JONATHAN** [3] -  
942:41, 943:34,  
974:7  
**Jonathan** [7] - 943:3,  
943:31, 974:4,  
977:28, 978:45,  
990:35, 1034:2  
**Jonathan's** [2] -  
1001:43, 1002:5  
**Julian** [8] - 948:13,  
957:41, 957:44,  
958:5, 975:22,  
976:5, 1045:16,  
1045:47  
**JULIAN** [3] - 975:12,  
976:8, 1046:3  
**July** [4] - 996:40,  
996:43, 996:44,  
1043:1  
**jump** [1] - 1020:19  
**June** [5] - 941:24,  
1030:6, 1030:7,  
1030:15, 1031:42  
**justification** [2] -  
1015:44, 1016:45

## K

**KC** [3] - 941:11,  
941:32, 941:35  
**keep** [3] - 954:47,  
1022:33, 1039:47  
**key** [5] - 970:47,  
994:18, 994:34,  
995:8, 1011:7  
**kicked** [1] - 960:45  
**kilolitres** [5] -  
1028:22, 1028:25,  
1028:33, 1028:34,  
1030:11  
**kilometres** [1] -  
1012:38  
**kilopascals** [1] -  
985:36  
**kind** [9] - 984:15,  
990:18, 990:19,

990:29, 995:27,  
1001:8, 1002:22,  
1003:44, 1051:25  
**Kittikhoun** [3] -  
941:32, 942:25,  
1046:41  
**KITTIKHOUN** [10] -  
1006:43, 1007:3,  
1007:5, 1008:15,  
1008:24, 1039:34,  
1052:3, 1052:5,  
1052:7, 1052:21  
**knife** [1] - 1006:11  
**Knight** [23] - 942:26,  
1006:44, 1007:5,  
1007:7, 1008:18,  
1008:24, 1010:24,  
1022:31, 1024:19,  
1029:45, 1032:21,  
1039:34, 1040:4,  
1041:15, 1041:18,  
1041:25, 1041:41,  
1045:2, 1046:19,  
1048:35, 1051:41,  
1052:7, 1052:24  
**KNIGHT** [2] - 1007:1,  
1008:21  
**Knight's** [1] - 1040:8  
**knowing** [3] - 968:2,  
1005:47, 1026:22  
**knowledge** [1] -  
994:22  
**known** [2] - 967:3,  
1031:19  
**knows** [1] - 1024:4  
**Kobus** [1] - 992:26  
**kPa** [1] - 985:36  
**KPI** [1] - 1022:44  
**KPIs** [1] - 1023:26

## L

**lab** [1] - 998:27  
**lab-tested** [1] - 998:27  
**laboratory** [1] -  
1000:30  
**laid** [1] - 1043:47  
**land** [2] - 1044:28,  
1050:3  
**Landslide** [1] -  
1047:21  
**landslide** [19] - 941:4,  
977:22, 1019:38,  
1020:6, 1023:34,  
1026:16, 1029:41,  
1030:21, 1030:36,  
1032:24, 1035:15,  
1036:5, 1036:17,  
1037:7, 1037:18,  
1047:16, 1048:21,

1048:28	1013:16, 1014:7,	1041:31, 1041:33	1042:25, 1042:27	954:8, 955:9, 957:9,
<b>landslides</b> [9] -	1015:40, 1016:8,	<b>learning</b> [1] - 1036:13	<b>line</b> [7] - 946:45,	959:4, 960:16,
977:20, 977:25,	1016:11, 1016:13,	<b>least</b> [5] - 951:34,	979:37, 988:6,	962:38, 963:6,
1036:11, 1041:27,	1016:21, 1016:23,	964:41, 979:8,	988:8, 1007:37,	967:24, 969:24,
1041:32, 1044:22,	1016:27, 1016:29,	1028:2, 1030:22	1019:40, 1044:18	970:5, 978:15,
1044:27, 1044:34,	1016:31, 1016:37,	<b>leave</b> [8] - 942:9,	<b>linear</b> [1] - 957:13	979:46, 981:36,
1045:33	1016:38, 1017:18,	942:12, 952:43,	<b>lined</b> [2] - 971:8,	995:9, 1010:5,
<b>Lane</b> [1] - 1045:11	1017:43, 1018:31,	974:13, 977:11,	975:35	1012:44, 1013:28,
<b>Lara</b> [1] - 1010:11	1019:6, 1019:13,	1021:14, 1039:38,	<b>lines</b> [3] - 952:7,	1021:34, 1024:13,
<b>large</b> [8] - 951:47,	1019:17, 1021:1,	1039:41	979:38, 979:39	1031:4, 1035:20
952:1, 956:27,	1022:3, 1023:9,	<b>leaving</b> [2] - 944:40,	<b>linked</b> [1] - 1047:47	<b>looked</b> [14] - 944:37,
956:28, 962:33,	1023:27, 1024:27,	992:46	<b>list</b> [3] - 994:35,	954:39, 955:11,
1016:40, 1021:5,	1024:28, 1024:39,	<b>left</b> [3] - 945:15,	1015:45, 1032:44	955:13, 955:30,
1023:18	1024:46, 1024:47,	982:30, 988:16	<b>listed</b> [1] - 1030:20	959:40, 963:30,
<b>larger</b> [18] - 952:41,	1025:3, 1025:10,	<b>legacy</b> [2] - 1015:19,	<b>listen</b> [1] - 1012:38	963:31, 963:36,
958:19, 962:13,	1025:11, 1025:21,	1027:35	<b>listened</b> [1] - 1034:1	965:37, 969:34,
962:31, 1012:3,	1025:29, 1025:39,	<b>legend</b> [2] - 980:31,	<b>listening</b> [1] - 1021:25	980:7, 1003:17,
1020:21, 1020:22,	1025:43, 1025:47,	981:5	<b>listens</b> [2] - 1012:36	1028:19
1021:10, 1043:11,	1026:32, 1026:36,	<b>legitimate</b> [1] -	<b>literally</b> [10] - 1012:43,	<b>looking</b> [30] - 947:34,
1043:16, 1043:28,	1026:37, 1026:38,	1017:43	1013:39, 1015:18,	948:34, 952:6,
1043:30, 1043:34,	1026:42, 1026:47,	<b>length</b> [7] - 942:28,	1021:37, 1033:11,	956:18, 963:33,
1044:2, 1044:6,	1027:5, 1027:12,	959:8, 964:2, 969:7,	1035:27, 1036:26,	969:25, 977:38,
1044:9, 1044:12	1027:14, 1027:18,	991:2, 991:3, 991:4	1037:43, 1038:18	978:4, 979:45,
<b>larger-size</b> [1] -	1029:27, 1029:31,	<b>lengths</b> [1] - 961:32	<b>litres</b> [10] - 1001:41,	982:1, 982:27,
1044:2	1031:11, 1031:21,	<b>less</b> [11] - 952:32,	1001:45, 1022:39,	985:20, 992:45,
<b>largest</b> [1] - 962:2	1031:27, 1033:20,	952:35, 952:38,	1028:25, 1028:37,	995:31, 1002:6,
<b>last</b> [15] - 942:25,	1033:21, 1033:27,	956:6, 970:47,	1029:21, 1030:16,	1002:7, 1002:9,
960:17, 960:18,	1033:38, 1034:29,	971:13, 987:8,	1031:46, 1032:2,	1002:10, 1002:13,
982:22, 998:38,	1035:18, 1039:14,	998:12, 998:18,	1032:13	1004:43, 1004:45,
1008:5, 1008:6,	1047:3, 1049:40,	1036:22	<b>live</b> [2] - 1035:6,	1011:12, 1021:11,
1008:9, 1009:34,	1050:36, 1051:4,	<b>letter</b> [1] - 1027:43	1038:19	1021:14, 1028:11,
1011:42, 1036:26,	1051:6, 1051:9,	<b>level</b> [18] - 953:10,	<b>liveable</b> [1] - 1014:34	1031:14, 1037:2,
1039:6, 1048:16,	1051:13, 1051:14,	957:11, 959:40,	<b>Lloyd</b> [9] - 972:23,	1038:6, 1044:22
1051:3	1051:18, 1051:23,	979:22, 984:32,	972:26, 972:44,	<b>looks</b> [7] - 953:15,
<b>late</b> [4] - 951:6,	1051:25, 1051:28	984:42, 985:15,	1009:35, 1011:22,	957:11, 988:24,
979:46, 1002:26,	<b>leakage</b> [4] - 1016:15,	985:16, 985:23,	1012:22, 1020:47,	1013:23, 1017:11,
1019:35	1025:13, 1029:15,	985:24, 994:3,	1023:16, 1037:24	1035:45, 1041:21
<b>lead</b> [8] - 960:41,	1031:15	994:47, 995:34,	<b>Lloyd's</b> [1] - 972:18	<b>lose</b> [1] - 1032:9
970:37, 973:38,	<b>leaked</b> [1] - 987:11	1002:43, 1011:32,	<b>locate</b> [2] - 1004:14,	<b>loss</b> [11] - 969:15,
974:36, 977:15,	<b>leaking</b> [1] - 1021:27	1032:35, 1033:14	1006:14	973:5, 986:47,
977:19, 977:20,	<b>leaks</b> [43] - 944:1,	<b>levelled</b> [1] - 988:17	<b>located</b> [1] - 1036:4	989:4, 989:21,
990:46	944:10, 944:32,	<b>levels</b> [3] - 956:29,	<b>location</b> [4] - 947:17,	999:13, 999:26,
<b>leading</b> [2] - 1010:4,	1012:39, 1013:14,	1015:39, 1035:9	999:28, 999:35,	999:39, 1000:1,
1037:18	1015:35, 1015:46,	<b>liabilities</b> [1] - 1024:2	1000:14	1031:45, 1032:13
<b>leading-edge</b> [1] -	1017:12, 1017:20,	<b>licensed</b> [1] - 1012:30	<b>locations</b> [3] - 999:35,	<b>loss/continuing</b> [4] -
1010:4	1018:37, 1019:4,	<b>Liew</b> [1] - 966:38	1006:16, 1017:8	999:13, 999:26,
<b>leads</b> [1] - 969:32	1019:23, 1019:24,	<b>light</b> [2] - 956:42,	<b>logger</b> [1] - 1022:21	999:39, 1000:1
<b>leak</b> [98] - 945:20,	1019:26, 1021:4,	959:13	<b>logistics</b> [3] -	<b>lost</b> [6] - 944:15,
952:40, 952:44,	1021:7, 1022:38,	<b>lighting</b> [1] - 1022:47	1043:20, 1043:28,	1024:27, 1029:27,
953:8, 953:11,	1022:47, 1023:1,	<b>likelihood</b> [1] -	1043:46	1030:44, 1039:4,
955:12, 955:21,	1023:19, 1023:38,	1002:19	<b>logs</b> [4] - 967:46,	1048:32
957:8, 957:19,	1023:46, 1024:20,	<b>likely</b> [14] - 942:32,	968:23, 974:20,	<b>Loudon</b> [4] - 953:47,
958:11, 959:7,	1024:25, 1024:35,	953:15, 956:18,	974:32	954:28, 956:37,
959:31, 960:13,	1026:26, 1026:27,	957:41, 964:43,	<b>longitudinal</b> [6] -	958:14
960:17, 961:23,	1027:27, 1031:6,	968:47, 969:3,	990:26, 990:27,	<b>Loudon's</b> [6] - 954:23,
962:47, 963:7,	1031:19, 1031:30,	970:45, 977:42,	990:37, 990:41,	957:26, 957:34,
968:3, 968:5,	1031:43, 1031:47,	989:4, 995:5,	991:2	958:16, 958:22,
972:37, 973:32,	1032:1, 1032:5,	995:21, 996:18,	<b>look</b> [26] - 948:1,	960:3
974:24, 974:35,	1032:6, 1032:23,	1002:36	950:38, 952:21,	<b>low</b> [3] - 956:26,
1000:25, 1000:29,	1039:15, 1040:13,	<b>limited</b> [3] - 963:23,	952:44, 953:30,	1012:33, 1026:29
	1040:34, 1040:38,			

**lower** [3] - 957:12,  
984:28, 1049:9  
**lunch** [2] - 983:2,  
983:3  
**lying** [1] - 980:29

## M

**m'hmm** [4] - 973:6,  
981:19, 981:46,  
1046:42  
**machines** [1] - 984:15  
**Madam** [19] - 942:3,  
943:28, 972:16,  
973:47, 974:10,  
975:6, 976:2, 983:1,  
983:11, 1002:47,  
1006:24, 1006:33,  
1006:43, 1008:15,  
1011:7, 1039:43,  
1046:15, 1051:36,  
1052:21  
**madam** [2] - 1039:37,  
1045:44  
**magnetised** [2] -  
1022:2, 1022:19  
**mail** [1] - 1028:2  
**mailbox** [1] - 1025:39  
**main** [29] - 944:3,  
947:21, 950:5,  
960:11, 965:35,  
965:43, 965:47,  
966:6, 966:8,  
966:14, 966:19,  
966:23, 967:8,  
972:34, 972:37,  
983:27, 985:5,  
985:41, 1004:15,  
1006:3, 1006:10,  
1011:15, 1014:37,  
1018:27, 1020:46,  
1021:2, 1021:8  
**mains** [10] - 946:15,  
977:5, 985:7,  
988:38, 988:42,  
1021:11, 1021:18,  
1021:32, 1021:47,  
1051:10  
**maintenance** [9] -  
988:19, 989:10,  
989:13, 989:17,  
990:43, 1014:33,  
1018:15, 1025:9,  
1025:29  
**major** [1] - 983:45  
**majored** [2] - 1008:30,  
1008:31  
**majority** [4] - 976:40,  
1005:24, 1020:25,  
1043:13

**man** [1] - 979:5  
**manage** [1] - 989:41  
**managed** [1] - 990:46  
**management** [5] -  
991:10, 1013:38,  
1036:37, 1036:40,  
1037:9  
**manager** [13] - 943:9,  
943:38, 976:28,  
1007:13, 1009:17,  
1009:20, 1009:23,  
1009:33, 1010:1,  
1034:10, 1038:14  
**manipulate** [1] -  
989:41  
**manner** [1] - 1034:5  
**manual** [12] - 1027:29,  
1027:32, 1027:40,  
1028:3, 1028:6,  
1028:13, 1028:16,  
1037:38, 1037:45,  
1038:3, 1038:27,  
1038:37  
**manually** [5] -  
1011:11, 1011:13,  
1025:1, 1026:9,  
1038:29  
**map** [9] - 946:33,  
946:40, 947:4,  
947:12, 948:16,  
948:17, 948:27,  
979:37, 1006:13  
**MARCH** [1] - 1046:4  
**March** [3] - 1000:25,  
1019:35, 1046:1  
**mark** [1] - 949:11  
**marked** [1] - 979:47  
**market** [2] - 1021:13,  
1021:34  
**Marsh** [1] - 991:41  
**mass** [8] - 1011:38,  
1011:45, 1012:4,  
1014:16, 1014:41,  
1017:5, 1019:30,  
1040:26  
**Mass** [2] - 1041:45,  
1043:33  
**masse** [1] - 1034:45  
**massive** [3] - 1016:23,  
1033:30  
**match** [1] - 989:11  
**material** [7] - 967:46,  
990:1, 990:11,  
990:13, 990:23,  
1013:2  
**materials** [1] - 990:9  
**mathematical** [6] -  
945:26, 959:5,  
960:16, 963:10,  
978:8, 978:12

**mathematically** [1] -  
964:43  
**mathematics** [3] -  
943:41, 943:42,  
1008:31  
**matter** [1] - 977:9  
**matters** [1] - 956:42  
**maximum** [2] -  
984:44, 1012:47  
**McCrae** [62] - 941:4,  
943:46, 944:25,  
969:44, 978:21,  
978:33, 978:40,  
983:25, 984:23,  
993:24, 993:27,  
999:32, 1010:15,  
1019:29, 1019:34,  
1019:38, 1019:39,  
1019:40, 1020:11,  
1020:13, 1020:28,  
1020:44, 1022:37,  
1023:34, 1023:38,  
1024:20, 1024:25,  
1026:12, 1026:14,  
1026:15, 1027:1,  
1029:3, 1029:41,  
1030:20, 1030:36,  
1031:35, 1031:44,  
1032:24, 1035:15,  
1036:42, 1037:7,  
1037:18, 1038:28,  
1038:32, 1038:38,  
1039:28, 1040:47,  
1041:10, 1041:19,  
1041:26, 1044:23,  
1044:28, 1044:29,  
1044:34, 1044:35,  
1044:39, 1045:33,  
1047:16, 1047:21,  
1047:41, 1048:20,  
1048:28  
**McDermott** [1] -  
941:35  
**mean** [17] - 952:35,  
952:39, 958:38,  
962:46, 965:6,  
971:35, 995:23,  
999:32, 1000:18,  
1024:24, 1027:32,  
1034:9, 1034:30,  
1034:35, 1044:14  
**means** [17] - 944:24,  
947:29, 952:37,  
959:44, 966:17,  
967:33, 971:9,  
978:26, 990:11,  
998:18, 1002:32,  
1004:31, 1020:16,  
1033:16, 1037:33,

1043:29, 1051:9  
**meant** [3] - 965:43,  
971:5, 971:13  
**measure** [2] - 985:27,  
1011:2  
**measured** [3] -  
967:30, 986:38,  
991:3  
**measurement** [2] -  
985:35, 985:37  
**measures** [3] -  
983:35, 986:24,  
1022:10  
**measuring** [8] - 966:9,  
966:10, 985:22,  
985:36, 987:29,  
987:35, 1033:10,  
1033:13  
**mechanical** [17] -  
1010:6, 1010:36,  
1010:40, 1011:2,  
1011:8, 1011:11,  
1011:17, 1011:33,  
1014:22, 1015:6,  
1016:14, 1024:41,  
1024:44, 1027:29,  
1027:34, 1028:17,  
1029:28  
**mechanism** [1] -  
1026:4  
**median** [2] - 963:17  
**meet** [1] - 992:47  
**meeting** [2] - 993:36,  
994:11  
**meetings** [1] - 977:32  
**megalitre** [1] - 962:27  
**megalitres** [17] -  
944:14, 960:20,  
960:23, 960:26,  
962:14, 962:20,  
987:3, 987:15,  
987:20, 989:4,  
989:22, 989:32,  
998:40, 999:39,  
999:45, 999:47,  
1000:2  
**Melbourne** [1] -  
941:18  
**member** [1] - 1031:23  
**memory** [1] - 997:41  
**mention** [1] - 951:11  
**mentioned** [7] -  
958:23, 960:3,  
993:38, 998:13,  
1014:45, 1021:42,  
1028:4  
**mentioning** [1] -  
1017:22  
**message** [2] -  
1018:25, 1018:26

**messaging** [1] -  
1023:9  
**met** [1] - 1035:10  
**metadata** [8] -  
1005:10, 1005:14,  
1005:17, 1005:20,  
1005:22, 1005:25,  
1005:26, 1005:27  
**meter** [93] - 945:6,  
946:18, 946:44,  
947:18, 947:19,  
947:20, 947:23,  
947:39, 947:40,  
948:23, 950:26,  
950:37, 951:12,  
951:25, 955:10,  
956:21, 956:28,  
961:34, 962:6,  
962:23, 965:21,  
965:33, 965:44,  
966:6, 966:14,  
966:18, 966:19,  
966:23, 966:29,  
967:39, 972:33,  
972:34, 1010:40,  
1010:44, 1010:45,  
1010:46, 1011:8,  
1011:9, 1011:11,  
1012:43, 1015:6,  
1015:20, 1017:17,  
1017:25, 1017:29,  
1018:1, 1018:2,  
1018:19, 1018:20,  
1019:7, 1019:25,  
1020:28, 1021:45,  
1022:2, 1022:17,  
1022:22, 1022:25,  
1025:16, 1025:17,  
1027:34, 1027:36,  
1029:14, 1031:1,  
1031:16, 1031:24,  
1031:28, 1039:16,  
1040:42, 1041:10,  
1042:10, 1042:14,  
1042:18, 1042:27,  
1042:38, 1042:39,  
1043:3, 1043:26,  
1044:39, 1044:45,  
1045:13, 1045:24,  
1045:33, 1045:37,  
1047:15, 1047:47,  
1049:34, 1051:10,  
1051:14, 1051:42  
**metered** [1] - 1015:21  
**metering** [12] - 944:3,  
1010:6, 1011:22,  
1015:9, 1015:13,  
1015:18, 1015:25,  
1015:30, 1017:9,  
1023:17, 1043:24,

1044:43	999:16, 999:24, 999:26, 999:39, 999:47, 1000:6, 1000:43	<b>mindset</b> [1] - 1035:32	1002:27, 1002:35	<b>must</b> [1] - 1002:3
<b>meters</b> [114] - 944:3, 944:24, 945:2, 946:14, 950:10, 951:5, 951:9, 952:9, 955:33, 955:34, 955:39, 956:23, 959:33, 959:34, 959:38, 959:39, 959:43, 962:8, 962:10, 964:24, 965:22, 965:24, 965:35, 965:36, 965:38, 965:47, 966:5, 966:20, 967:3, 967:8, 967:11, 967:19, 967:27, 967:29, 1010:7, 1010:25, 1010:29, 1010:32, 1010:36, 1010:37, 1011:2, 1011:17, 1011:23, 1011:24, 1011:28, 1011:33, 1011:34, 1011:47, 1012:6, 1012:10, 1012:11, 1012:12, 1012:19, 1012:23, 1012:35, 1013:6, 1014:12, 1014:22, 1015:4, 1017:3, 1017:6, 1017:7, 1017:25, 1020:22, 1020:31, 1020:38, 1020:43, 1020:45, 1022:7, 1022:46, 1023:7, 1023:29, 1024:35, 1026:27, 1027:29, 1028:12, 1028:17, 1031:8, 1031:36, 1031:47, 1033:26, 1034:45, 1040:7, 1040:12, 1040:22, 1041:6, 1042:9, 1042:17, 1042:24, 1042:25, 1042:26, 1042:28, 1043:9, 1043:11, 1043:16, 1043:17, 1043:23, 1043:29, 1043:30, 1043:34, 1043:44, 1044:2, 1044:12, 1045:14, 1045:41, 1046:20, 1046:26, 1046:30, 1049:37, 1052:9	<b>methodologies</b> [1] - 961:12	<b>mine</b> [1] - 954:35	<b>month</b> [9] - 996:40, 996:43, 996:44, 1012:6, 1020:6, 1038:2, 1042:37, 1043:2	<b>mustn't</b> [1] - 1002:3
<b>methodology</b> [4] - 961:9, 961:10, 961:11, 962:34	<b>methods</b> [8] - 970:35, 997:31, 998:1, 998:6, 999:8, 999:9, 999:23, 1002:15	<b>minimal</b> [1] - 963:26	<b>months</b> [11] - 1021:39, 1034:19, 1034:25, 1036:19, 1037:18, 1038:20, 1038:42, 1039:26, 1041:2, 1042:38, 1045:38	
<b>metreage</b> [1] - 985:42	<b>metres</b> [14] - 984:43, 984:44, 984:45, 985:14, 985:19, 985:25, 985:34, 986:4, 1000:24, 1000:37, 1013:4, 1020:40, 1021:4, 1043:15	<b>minimum</b> [17] - 955:2, 955:6, 955:8, 955:18, 955:27, 955:33, 955:38, 955:43, 955:45, 956:1, 956:4, 956:17, 956:43, 973:10, 973:31, 973:35, 1024:11	<b>Moorabbin</b> [1] - 952:22	
<b>microphone</b> [1] - 1021:26	<b>mid</b> [2] - 977:11, 1039:6	<b>minor</b> [3] - 969:21, 973:37, 1000:25	<b>morning</b> [4] - 942:1, 942:3, 1018:5, 1018:8	
<b>mid-January</b> [1] - 977:11	<b>middle</b> [6] - 945:47, 982:31, 982:32, 986:38, 1004:6, 1022:21	<b>minute</b> [5] - 986:39, 986:42, 986:44, 988:9, 988:12	<b>Mornington</b> [7] - 941:39, 1039:37, 1040:5, 1041:16, 1050:11, 1050:16, 1050:46	
<b>might</b> [46] - 954:18, 955:47, 956:6, 956:16, 959:2, 961:39, 963:18, 969:42, 977:26, 978:43, 982:7, 984:20, 985:27, 987:28, 991:17, 991:43, 992:47, 993:4, 994:19, 994:37, 995:7, 997:28, 999:33, 1001:11, 1002:21, 1006:17, 1016:37, 1018:7, 1018:8, 1018:17, 1019:29, 1020:17, 1025:19, 1025:26, 1026:37, 1033:30, 1033:38, 1034:17, 1035:6, 1035:20, 1035:44, 1038:2, 1038:13, 1039:3, 1045:16, 1051:42	<b>mis</b> [1] - 1003:40	<b>misleading</b> [2] - 999:36, 1003:40	<b>Morris</b> [1] - 974:4	
	<b>mid-February</b> [1] - 977:11	<b>mislocated</b> [1] - 979:44	<b>MORRIS</b> [1] - 974:7	
	<b>mid-March</b> [1] - 977:11	<b>miss</b> [2] - 1028:6, 1037:1	<b>most</b> [10] - 950:4, 957:41, 958:10, 968:32, 969:6, 980:16, 985:38, 991:33, 1016:21, 1020:35	
	<b>mid-April</b> [1] - 977:11	<b>missed</b> [2] - 1028:5, 1028:8	<b>mostly</b> [1] - 978:2	
	<b>mid-May</b> [1] - 977:11	<b>mistake</b> [2] - 965:42, 980:8	<b>move</b> [8] - 952:33, 987:23, 991:19, 1012:3, 1019:29, 1034:17, 1037:17, 1038:44	
	<b>mid-June</b> [1] - 977:11	<b>mixture</b> [1] - 989:15	<b>moved</b> [1] - 1034:14	
	<b>mid-July</b> [1] - 977:11	<b>mobile</b> [2] - 1019:46, 1019:47	<b>movement</b> [1] - 990:18	
	<b>mid-August</b> [1] - 977:11	<b>model</b> [1] - 999:9	<b>moving</b> [1] - 1035:46	
	<b>mid-September</b> [1] - 977:11	<b>modelling</b> [1] - 1001:8	<b>MPSC3</b> [2] - 1046:1, 1046:3	
	<b>mid-October</b> [1] - 977:11	<b>moderate</b> [1] - 962:42	<b>MPSC4</b> [2] - 1046:11, 1046:13	
	<b>mid-November</b> [1] - 977:11	<b>modification</b> [1] - 946:16	<b>MRO</b> [3] - 1040:30, 1041:1, 1041:19	
	<b>mid-December</b> [1] - 977:11	<b>moment</b> [12] - 950:31, 951:24, 956:16, 980:18, 987:43, 1003:22, 1014:8, 1024:15, 1037:41, 1037:45, 1045:6, 1051:44	<b>MSC.5031.0001.4385</b> [1] - 1045:2	
	<b>mid-January</b> [1] - 977:11	<b>Monash</b> [1] - 1008:30	<b>MSC.5073.0001.0001</b> [3] - 1041:14, 1046:9, 1046:13	
	<b>mid-February</b> [1] - 977:11	<b>money</b> [1] - 1026:44	<b>Mukheibi</b> [1] - 960:41	
	<b>mid-March</b> [1] - 977:11	<b>monitor</b> [1] - 1024:35	<b>Mukheibir</b> [1] - 960:42	
	<b>mid-April</b> [1] - 977:11	<b>monitored</b> [1] - 1013:7	<b>multiple</b> [9] - 965:21, 970:35, 984:10, 984:23, 1037:19, 1037:27, 1037:34, 1037:38, 1038:45	
	<b>mid-May</b> [1] - 977:11	<b>monitoring</b> [1] - 1039:25	<b>multiplicative</b> [1] - 964:10	
	<b>mid-June</b> [1] - 977:11	<b>Montage</b> [12] - 953:9, 990:41, 990:44, 991:9, 1001:4, 1003:18, 1004:27, 1004:35, 1004:42, 1005:24, 1005:30, 1005:37		
	<b>mid-July</b> [1] - 977:11	<b>Monte</b> [5] - 1002:16, 1002:18, 1002:21,		
	<b>mid-August</b> [1] - 977:11			
	<b>mid-September</b> [1] - 977:11			
	<b>mid-October</b> [1] - 977:11			
	<b>mid-November</b> [1] - 977:11			
	<b>mid-December</b> [1] - 977:11			
	<b>mid-January</b> [1] - 977:11			
	<b>mid-February</b> [1] - 977:11			
	<b>mid-March</b> [1] - 977:11			
	<b>mid-April</b> [1] - 977:11			
	<b>mid-May</b> [1] - 977:11			
	<b>mid-June</b> [1] - 977:11			
	<b>mid-July</b> [1] - 977:11			
	<b>mid-August</b> [1] - 977:11			
	<b>mid-September</b> [1] - 977:11			
	<b>mid-October</b> [1] - 977:11			
	<b>mid-November</b> [1] - 977:11			
	<b>mid-December</b> [1] - 977:11			
	<b>mid-January</b> [1] - 977:11			
	<b>mid-February</b> [1] - 977:11			
	<b>mid-March</b> [1] - 977:11			
	<b>mid-April</b> [1] - 977:11			
	<b>mid-May</b> [1] - 977:11			
	<b>mid-June</b> [1] - 977:11			
	<b>mid-July</b> [1] - 977:11			
	<b>mid-August</b> [1] - 977:11			
	<b>mid-September</b> [1] - 977:11			
	<b>mid-October</b> [1] - 977:11			
	<b>mid-November</b> [1] - 977:11			
	<b>mid-December</b> [1] - 977:11			
	<b>mid-January</b> [1] - 977:11			
	<b>mid-February</b> [1] - 977:11			
	<b>mid-March</b> [1] - 977:11			
	<b>mid-April</b> [1] - 977:11			
	<b>mid-May</b> [1] - 977:11			
	<b>mid-June</b> [1] - 977:11			
	<b>mid-July</b> [1] - 977:11			
	<b>mid-August</b> [1] - 977:11			
	<b>mid-September</b> [1] - 977:11			
	<b>mid-October</b> [1] - 977:11			
	<b>mid-November</b> [1] - 977:11			
	<b>mid-December</b> [1] - 977:11			
	<b>mid-January</b> [1] - 977:11			
	<b>mid-February</b> [1] - 977:11			
	<b>mid-March</b> [1] - 977:11			
	<b>mid-April</b> [1] - 977:11			
	<b>mid-May</b> [1] - 977:11			
	<b>mid-June</b> [1] - 977:11			
	<b>mid-July</b> [1] - 977:11			
	<b>mid-August</b> [1] - 977:11			
	<b>mid-September</b> [1] - 977:11			
	<b>mid-October</b> [1] - 977:11			
	<b>mid-November</b> [1] - 977:11			
	<b>mid-December</b> [1] - 977:11			
	<b>mid-January</b> [1] - 977:11			
	<b>mid-February</b> [1] - 977:11			
	<b>mid-March</b> [1] - 977:11			
	<b>mid-April</b> [1] - 977:11			
	<b>mid-May</b> [1] - 977:11			
	<b>mid-June</b> [1] - 977:11			
	<b>mid-July</b> [1] - 977:11			
	<b>mid-August</b> [1] - 977:11			
	<b>mid-September</b> [1] - 977:11			
	<b>mid-October</b> [1] - 977:11			
	<b>mid-November</b> [1] - 977:11			
	<b>mid-December</b> [1] - 977:11			
	<b>mid-January</b> [1] - 977:11			
	<b>mid-February</b> [1] - 977:11			
	<b>mid-March</b> [1] - 977:11			
	<b>mid-April</b> [1] - 977:11			
	<b>mid-May</b> [1] - 977:11			
	<b>mid-June</b> [1] - 977:11			
	<b>mid-July</b> [1] - 977:11			
	<b>mid-August</b> [1] - 977:11			
	<b>mid-September</b> [1] - 977:11			
	<b>mid-October</b> [1] - 977:11			
	<b>mid-November</b> [1] - 977:11			
	<b>mid-December</b> [1] - 977:11			
	<b>mid-January</b> [1] - 977:11			
	<b>mid-February</b> [1] - 977:11			
	<b>mid-March</b> [1] - 977:11			
	<b>mid-April</b> [1] - 977:11			
	<b>mid-May</b> [1] - 977:11			
	<b>mid-June</b> [1] - 977:11			
	<b>mid-July</b> [1] - 977:11			
	<b>mid-August</b> [1] - 977:11			
	<b>mid-September</b> [1] - 977:11			
	<b>mid-October</b> [1] - 977:11			
	<b>mid-November</b> [1] - 977:11			
	<b>mid-December</b> [1] - 977:11			
	<b>mid-January</b> [1] - 977:11			
	<b>mid-February</b> [1] - 977:11			
	<b>mid-March</b> [1] - 977:11			
	<b>mid-April</b> [1] - 977:11			
	<b>mid-May</b> [1] - 977:11			
	<b>mid-June</b> [1] - 977:11			
	<b>mid-July</b> [1] - 977:11			
	<b>mid-August</b> [1] - 977:11			
	<b>mid-September</b> [1] - 977:11			
	<b>mid-October</b> [1] - 977:11			
	<b>mid-November</b> [1] - 977:11			
	<b>mid-December</b> [1] - 977:11			
	<b>mid-January</b> [1] - 977:11			
	<b>mid-February</b> [1] - 977:11			
	<b>mid-March</b> [1] - 977:11			
	<b>mid-April</b> [1] - 977:11			
	<b>mid-May</b> [1] - 977:11			
	<b>mid-June</b> [1] - 977:11			
	<b>mid-July</b> [1] - 977:11			
	<b>mid-August</b> [1] - 977:11			
	<b>mid-September</b> [1] - 977:11			
	<b>mid-October</b> [1] - 977:11			
	<b>mid-November</b> [1] - 977:11			
	<b>mid-December</b> [1] - 977:11			
	<b>mid-January</b> [1] - 977:11			
	<b>mid-February</b> [1] - 977:11			
	<b>mid-March</b> [1] - 977:11			
	<b>mid-April</b> [1] - 977:11			
	<b>mid-May</b> [1] - 977:11			
	<b>mid-June</b> [1] - 977:11			
	<b>mid-July</b> [1] - 977:11			
	<b>mid-August</b> [1] - 977:11			
	<b>mid-September</b> [1] - 977:11			
	<b>mid-October</b> [1] - 977:11			
	<b>mid-November</b> [1] - 977:11			
	<b>mid-December</b> [1] - 977:11			
	<b>mid-January</b> [1] - 977:11			
	<b>mid-February</b> [1] - 977:11			
	<b>mid-March</b> [1] - 977:11			
	<b>mid-April</b> [1] - 977:11			
	<b>mid-May</b> [1] - 977:11			
	<b>mid-June</b> [1] - 977:11			
	<b>mid-July</b> [1] - 977:11			
	<b>mid-August</b> [1] - 977:11			
	<b>mid-September</b> [1] - 977:11			
	<b>mid-October</b> [1] - 977:11			
	<b>mid-November</b> [1] - 977:11			
	<b>mid-December</b> [1] - 977:11			
	<b>mid-January</b> [1] - 977:11			
	<b>mid-February</b> [1] - 977:11			
	<b>mid-March</b> [1] - 977:11			
	<b>mid-April</b> [1] - 977:11			
	<b>mid-May</b> [1] - 977:11			
	<b>mid-June</b> [1] - 977:11			
	<b>mid-July</b> [1] - 977:11			
	<b>mid-August</b> [1] - 977:11			
	<b>mid-September</b> [1] - 977:11			
	<b>mid-October</b> [1] - 977:11			
	<b>mid-November</b> [1] - 977:11			
	<b>mid-December</b> [1] - 977:11			
	<b>mid-January</b> [1] - 977:11			
	<b>mid-February</b> [1] - 977:11			
	<b>mid-March</b> [1] - 977:11			
	<b>mid-April</b> [1] - 977:11			
	<b>mid-May</b> [1] - 977:11			
	<b>mid-June</b> [1] - 977:11			
	<b>mid-July</b>			



988:34, 1009:10, 1010:30, 1010:32, 1012:11, 1012:33, 1012:37, 1013:8, 1013:18, 1014:13, 1014:23, 1019:23, 1019:25, 1019:45, 1023:1, 1028:30, 1028:42, 1028:43, 1029:43, 1030:11, 1030:15, 1030:22, 1030:27, 1030:40, 1032:27, 1033:26, 1033:45, 1038:23, 1039:5, 1039:25, 1040:23, 1040:38, 1047:18, 1049:41, 1051:13, 1051:14, 1051:18	<b>non-return</b> [1] - 982:38 <b>non-revenue</b> [4] - 973:39, 1039:3, 1039:7, 1039:17 <b>non-standard</b> [1] - 1024:11 <b>none</b> [3] - 1032:19, 1033:23, 1039:28 <b>normal</b> [9] - 953:10, 963:34, 963:46, 964:1, 964:4, 989:37, 1023:7, 1027:39 <b>normally</b> [4] - 982:44, 983:45, 1005:39, 1016:40 <b>note</b> [2] - 1025:38, 1052:18 <b>nothing</b> [3] - 971:29, 1015:22, 1020:20 <b>nothing's</b> [1] - 964:38 <b>notice</b> [6] - 991:21, 1007:16, 1025:34, 1026:8, 1028:3, 1031:22 <b>noticeable</b> [1] - 949:18 <b>noticed</b> [2] - 992:34, 992:39 <b>notices</b> [14] - 1025:7, 1025:8, 1025:27, 1025:28, 1026:13, 1026:23, 1026:24, 1031:15, 1031:17, 1046:44, 1050:17, 1050:19, 1050:28, 1050:40 <b>notification</b> [8] - 1025:1, 1027:28, 1028:18, 1028:23, 1029:19, 1029:25, 1029:31, 1048:6 <b>notifications</b> [10] - 1027:28, 1029:3, 1029:9, 1029:11, 1031:16, 1031:28, 1047:9, 1049:14, 1049:20, 1050:47 <b>notified</b> [1] - 946:16 <b>notify</b> [4] - 1018:29, 1050:16, 1050:35, 1050:46 <b>noting</b> [1] - 961:46 <b>November</b> [11] - 967:33, 976:22, 1003:11, 1003:38, 1004:6, 1004:25, 1009:34, 1009:42, 1020:44, 1044:23,	1044:28 <b>now-ish</b> [1] - 1044:2 <b>nowhere</b> [2] - 1022:21, 1024:36 <b>nuance</b> [2] - 1014:26, 1047:28 <b>nuisance</b> [3] - 1034:23, 1035:7 <b>null</b> [2] - 950:43, 950:46 <b>number</b> [33] - 944:24, 944:26, 945:9, 945:39, 949:45, 953:5, 953:13, 956:19, 957:40, 958:1, 958:13, 958:15, 958:16, 958:19, 960:14, 965:37, 970:19, 971:18, 971:19, 971:25, 972:35, 974:18, 992:40, 1007:32, 1011:12, 1013:4, 1015:35, 1020:29, 1026:23, 1026:28, 1027:5, 1028:42, 1032:5 <b>number"</b> [1] - 1002:40 <b>numbers</b> [5] - 973:31, 999:30, 999:33, 999:35, 1002:42 <b>numerous</b> [1] - 988:45	945:40 <b>occupants</b> [1] - 1049:44 <b>occupation</b> [3] - 943:8, 975:25, 1007:12 <b>occupier</b> [1] - 1025:46 <b>occupier's</b> [1] - 1025:42 <b>occupying</b> [1] - 949:36 <b>occur</b> [2] - 972:41, 1043:10 <b>occurred</b> [12] - 945:8, 951:1, 972:29, 972:37, 977:16, 977:20, 1003:16, 1004:2, 1004:25, 1004:37, 1044:23, 1044:27 <b>occurrence</b> [1] - 1041:27 <b>occurring</b> [5] - 967:37, 999:10, 1019:38, 1029:32, 1038:45 <b>occurs</b> [1] - 1026:10 <b>OF</b> [3] - 943:34, 976:8, 1008:21 <b>offer</b> [3] - 961:30, 963:18, 968:27 <b>office</b> [1] - 986:43 <b>old</b> [1] - 1049:6 <b>Olsen</b> [3] - 1010:11, 1035:13, 1035:23 <b>once</b> [20] - 945:36, 964:28, 964:34, 1004:28, 1012:2, 1012:35, 1013:39, 1018:5, 1022:25, 1025:47, 1030:22, 1034:36, 1034:39, 1034:43, 1034:45, 1036:13, 1038:22, 1040:33, 1045:17, 1045:20 <b>one</b> [139] - 944:25, 945:22, 945:31, 946:13, 946:15, 946:46, 948:34, 948:37, 948:38, 948:42, 948:44, 949:8, 949:33, 950:6, 950:7, 950:26, 951:8, 951:12, 952:19, 953:42, 953:43, 953:46, 954:43, 954:47, 955:1, 955:45, 956:1,	956:4, 961:24, 961:34, 962:23, 964:15, 966:37, 967:24, 968:38, 969:5, 969:8, 969:10, 969:23, 969:47, 970:7, 970:36, 971:40, 972:26, 972:32, 972:36, 973:18, 974:30, 979:15, 979:20, 979:25, 979:28, 979:30, 979:31, 979:36, 979:46, 980:2, 980:3, 980:17, 981:13, 981:21, 982:5, 982:10, 982:30, 982:32, 982:39, 983:16, 983:24, 984:16, 984:30, 985:38, 987:31, 987:37, 989:47, 990:28, 990:43, 990:46, 995:37, 997:13, 998:1, 998:11, 998:25, 998:29, 1000:43, 1001:40, 1002:25, 1005:25, 1006:33, 1010:5, 1011:15, 1012:44, 1012:45, 1014:23, 1015:8, 1016:16, 1016:21, 1017:42, 1019:44, 1020:36, 1023:13, 1024:47, 1025:5, 1025:18, 1026:20, 1027:7, 1027:24, 1028:32, 1031:4, 1031:8, 1032:19, 1034:37, 1035:18, 1035:36, 1035:44, 1039:9, 1043:27, 1043:31, 1044:46, 1045:19, 1045:29, 1045:30, 1046:44, 1047:3, 1047:9, 1047:47, 1049:26, 1049:40, 1050:1, 1050:37, 1051:36, 1051:46, 1052:3 <b>one-off</b> [1] - 949:33 <b>ones</b> [16] - 945:22, 952:5, 956:26, 964:34, 982:16, 982:43, 1014:37, 1020:15, 1020:21, 1020:24, 1021:46, 1022:26, 1032:8,
---	--	---	---	--

1032:34, 1038:34, 1049:37	<b>orientate</b> [1] - 1003:22	999:44, 1003:21, 1003:47, 1004:5, 1004:6, 1008:6, 1008:9, 1014:39, 1040:9, 1040:21, 1040:46, 1041:25, 1042:1, 1042:5, 1042:21, 1042:32, 1042:44, 1043:38, 1046:18, 1046:39, 1048:18	946:41, 948:8, 950:2, 950:7, 952:21, 955:32, 956:45, 967:19, 967:28, 979:43, 983:43, 985:31, 1013:7, 1015:20, 1015:21, 1015:34, 1017:17, 1029:32, 1030:45, 1034:40, 1035:20, 1035:25	971:11, 973:35, 978:22, 978:42, 993:44, 1003:31, 1011:11, 1014:35, 1015:7, 1023:30, 1028:2, 1034:23, 1036:44, 1037:11
<b>onsite</b> [1] - 1003:41	<b>original</b> [3] - 947:17, 947:25, 951:20	<b>papers</b> [4] - 992:31, 992:34, 992:39	<b>particularly</b> [4] - 952:19, 952:20, 1000:42, 1033:20	<b>people's</b> [3] - 971:22, 1012:40, 1024:5
<b>onwards</b> [1] - 1046:21	<b>originally</b> [4] - 951:15, 954:24, 972:3, 1020:5	<b>paragraph</b> [35] - 945:18, 945:44, 945:46, 951:11, 956:15, 956:34, 956:36, 956:40, 975:35, 975:39, 989:2, 989:45, 992:7, 995:8, 997:18, 997:19, 999:44, 1007:29, 1007:34, 1007:35, 1007:37, 1009:38, 1009:40, 1022:35, 1031:33, 1040:10, 1040:22, 1040:47, 1041:4, 1041:17, 1041:19, 1046:19, 1046:40, 1048:18	<b>partly</b> [1] - 1041:26	<b>Peppler</b> [1] - 941:35
<b>operate</b> [3] - 983:18, 985:10, 988:35	<b>orthodox</b> [1] - 985:27	<b>parent</b> [1] - 1023:15	<b>partner</b> [1] - 1023:17	<b>per</b> [20] - 957:23, 957:42, 960:19, 960:20, 960:23, 962:8, 963:41, 987:3, 1014:11, 1017:20, 1020:4, 1020:14, 1022:7, 1022:22, 1022:39, 1025:9, 1025:19, 1032:2, 1032:13, 1034:47
<b>operates</b> [3] - 982:11, 982:13	<b>OTHERS</b> [2] - 974:8, 1046:4	<b>paragraphs</b> [1] - 944:44	<b>parts</b> [7] - 980:33, 994:44, 995:15, 995:16, 995:19, 1004:38, 1014:31	<b>percentage</b> [4] - 949:36, 973:5, 1000:14, 1002:19
<b>operation</b> [1] - 983:25	<b>otherwise</b> [1] - 987:19	<b>parameters</b> [5] - 998:20, 998:21, 999:25, 999:32, 1000:43	<b>passed</b> [1] - 966:14	<b>percentages</b> [7] - 973:14, 973:15, 973:28, 973:36, 973:37, 973:39, 1000:12
<b>operational</b> [6] - 967:46, 974:19, 1009:17, 1009:27, 1010:7, 1013:13	<b>ought</b> [1] - 988:22	<b>parent</b> [1] - 1023:15	<b>passes</b> [3] - 951:46, 966:13, 983:36	<b>perfectly</b> [1] - 957:13
<b>operationally</b> [1] - 983:17	<b>outage</b> [4] - 950:27, 950:36, 950:41, 950:46	<b>Parkes</b> [9] - 947:1, 980:3, 980:7, 983:24, 983:25, 983:27, 984:28, 984:42, 985:15	<b>passing</b> [1] - 960:31	<b>perform</b> [7] - 970:32, 971:17, 971:19, 971:24, 972:8, 994:27
<b>operations</b> [7] - 980:13, 1013:18, 1013:42, 1032:40, 1034:11, 1035:10, 1038:14	<b>outages</b> [1] - 951:1	<b>part</b> [30] - 945:24, 959:18, 964:32, 978:39, 993:27, 995:16, 996:2, 996:17, 996:26, 997:42, 997:45, 1001:29, 1001:33, 1010:14, 1010:18, 1014:23, 1022:37, 1025:20, 1026:19, 1030:1, 1036:41, 1037:41, 1038:46, 1039:7, 1039:8, 1039:19, 1050:9, 1050:34, 1052:17	<b>past</b> [2] - 978:1, 1039:39	<b>performance</b> [4] - 943:9, 943:38, 1009:29, 1033:44
<b>operator</b> [14] - 954:18, 1013:28, 1013:33, 1040:7, 1040:46, 1041:14, 1041:23, 1041:40, 1045:1, 1046:17, 1047:37, 1048:15, 1048:31, 1048:33	<b>outbound</b> [1] - 1018:26	<b>part</b> [30] - 945:24, 959:18, 964:32, 978:39, 993:27, 995:16, 996:2, 996:17, 996:26, 997:42, 997:45, 1001:29, 1001:33, 1010:14, 1010:18, 1014:23, 1022:37, 1025:20, 1026:19, 1030:1, 1036:41, 1037:41, 1038:46, 1039:7, 1039:8, 1039:19, 1050:9, 1050:34, 1052:17	<b>patches</b> [1] - 1001:4	<b>performing</b> [2] - 948:45, 954:34
<b>operators</b> [4] - 1013:13, 1013:41, 1035:26, 1035:39	<b>outline</b> [2] - 944:22, 976:36	<b>part</b> [30] - 945:24, 959:18, 964:32, 978:39, 993:27, 995:16, 996:2, 996:17, 996:26, 997:42, 997:45, 1001:29, 1001:33, 1010:14, 1010:18, 1014:23, 1022:37, 1025:20, 1026:19, 1030:1, 1036:41, 1037:41, 1038:46, 1039:7, 1039:8, 1039:19, 1050:9, 1050:34, 1052:17	<b>path</b> [1] - 996:18	<b>perhaps</b> [5] - 947:32, 961:38, 980:27, 985:32, 987:28
<b>opportunities</b> [1] - 1037:7	<b>output</b> [2] - 973:5, 973:10	<b>particle</b> [1] - 998:29	<b>patterns</b> [1] - 952:22	<b>period</b> [40] - 944:40, 949:17, 949:27, 949:33, 951:1, 951:6, 955:14, 959:42, 959:44, 960:14, 967:35, 967:36, 967:40, 970:30, 970:46, 978:46, 979:1, 987:5, 987:35, 987:36, 988:10, 988:29, 988:38, 988:45, 989:28, 989:31, 1017:46, 1018:7, 1022:45, 1024:20, 1024:22, 1024:26, 1026:14, 1026:24, 1027:6,
<b>opportunity</b> [2] - 956:33, 1004:9	<b>outside</b> [10] - 962:27, 962:35, 962:39, 1001:30, 1025:12, 1050:9, 1050:15, 1050:34, 1050:45, 1051:26	<b>particular</b> [22] -	<b>paying</b> [2] - 1023:46, 1023:47	
<b>opposed</b> [7] - 944:3, 946:47, 949:8, 952:43, 957:8, 959:26, 1029:26	<b>overarching</b> [2] - 1039:27, 1039:29		<b>payload</b> [2] - 1018:5, 1018:9	
<b>opts</b> [1] - 1014:33	<b>overcome</b> [2] - 1035:22, 1035:35		<b>peak</b> [4] - 953:10, 955:13, 1001:41, 1001:44	
<b>opted</b> [1] - 1020:16	<b>overestimate</b> [1] - 957:18		<b>peaking</b> [2] - 952:38, 971:10	
<b>optimise</b> [2] - 1009:28, 1021:6	<b>overestimated</b> [1] - 957:23		<b>peaks</b> [2] - 960:27, 987:14	
<b>opting</b> [1] - 1020:29	<b>overlays</b> [1] - 1036:12		<b>peer</b> [8] - 960:35, 960:39, 960:44, 960:47, 961:16, 964:38, 969:20, 969:47	
<b>oral</b> [1] - 1035:13	<b>overnight</b> [2] - 955:5, 956:21		<b>peninsula</b> [1] - 1035:31	
<b>order</b> [6] - 945:30, 945:38, 960:20, 987:16, 1000:37, 1016:29	<b>oversee</b> [1] - 1010:2		<b>Peninsula</b> [7] - 941:39, 1039:38, 1040:5, 1041:16, 1050:11, 1050:16, 1050:46	
<b>ordered</b> [1] - 1030:30	<b>overweight</b> [1] - 949:32		<b>Penny</b> [1] - 1045:11	
<b>ordinarily</b> [6] - 944:9, 985:41, 1050:10, 1050:16, 1050:35, 1050:46	<b>overwhelming</b> [1] - 969:15		<b>people</b> [25] - 949:36, 952:33, 957:10, 967:31, 970:19, 970:31, 970:43, 970:45, 971:2, 971:4, 971:7,	
<b>ordinary</b> [6] - 943:46, 944:8, 997:45, 1001:30, 1050:25, 1051:30	<b>own</b> [9] - 958:15, 978:44, 985:40, 993:43, 1001:10, 1021:35, 1023:22, 1036:33, 1037:44			
<b>organisation</b> [1] - 976:16	<b>owner</b> [1] - 1025:46			

## P

**paddock** [1] - 1022:20  
**page** [35] - 943:25,  
943:26, 946:29,  
956:35, 975:47,  
980:27, 986:30,  
987:23, 991:20,  
997:1, 998:35,

1029:4, 1037:47,  
1043:3, 1048:26,  
1048:46  
**Period** <sup>[1]</sup> - 1024:23  
**periods** <sup>[5]</sup> - 948:46,  
949:4, 950:42,  
953:17, 989:31  
**permanent** <sup>[5]</sup> -  
1021:12, 1021:46,  
1023:39, 1023:44,  
1039:14  
**permanently** <sup>[2]</sup> -  
1021:15, 1022:26  
**person** <sup>[7]</sup> - 966:38,  
970:12, 970:21,  
991:46, 992:21,  
1004:27, 1005:2  
**personal** <sup>[3]</sup> - 990:42,  
1001:10, 1008:25  
**personally** <sup>[1]</sup> -  
1045:29  
**phase** <sup>[14]</sup> - 1011:38,  
1011:42, 1011:45,  
1012:3, 1012:5,  
1019:30, 1019:39,  
1021:37, 1039:30,  
1040:26, 1040:33,  
1042:36, 1042:38,  
1043:1  
**Phase** <sup>[4]</sup> - 1042:2,  
1042:33, 1042:45,  
1042:46  
**phase** <sup>[1]</sup> - 1043:39  
**phases** <sup>[1]</sup> - 1039:15  
**PhD** <sup>[1]</sup> - 943:42  
**Phillips** <sup>[3]</sup> - 941:38,  
1040:5, 1046:6  
**PHILLIPS** <sup>[8]</sup> -  
1039:37, 1039:43,  
1040:2, 1040:4,  
1045:44, 1046:9,  
1046:15, 1051:34  
**phone** <sup>[2]</sup> - 1019:46,  
1019:47  
**photo** <sup>[2]</sup> - 991:41  
**photograph** <sup>[2]</sup> -  
1005:10, 1005:21  
**photos** <sup>[5]</sup> - 955:1,  
1005:16, 1005:18,  
1005:24, 1005:27  
**phrase** <sup>[1]</sup> - 1002:33  
**physical** <sup>[2]</sup> - 989:47,  
998:10  
**physically** <sup>[3]</sup> -  
988:31, 1031:23,  
1045:21  
**physics** <sup>[1]</sup> - 943:42  
**pick** <sup>[3]</sup> - 974:31,  
1000:15, 1022:13  
**picked** <sup>[2]</sup> - 1013:16,  
1020:45  
**picking** <sup>[1]</sup> - 1046:31  
**picture** <sup>[2]</sup> - 1035:37,  
1036:2  
**piece** <sup>[1]</sup> - 1035:36  
**pieces** <sup>[3]</sup> - 979:24,  
994:34, 1032:26  
**Pierre** <sup>[1]</sup> - 960:41  
**piezo** <sup>[1]</sup> - 1022:10  
**pinpoint** <sup>[1]</sup> - 1033:32  
**pipe** <sup>[41]</sup> - 959:19,  
959:25, 966:10,  
983:36, 983:40,  
984:39, 985:1,  
985:22, 986:11,  
986:23, 988:33,  
988:34, 988:43,  
990:4, 990:5,  
990:10, 990:12,  
990:15, 990:19,  
990:25, 990:31,  
990:43, 992:32,  
995:9, 995:17,  
995:43, 995:44,  
1000:28, 1002:4,  
1003:10, 1005:11,  
1013:2, 1021:28,  
1022:9, 1022:12,  
1022:18, 1032:9,  
1051:9  
**pipes** <sup>[9]</sup> - 946:15,  
979:20, 990:1,  
1001:33, 1012:40,  
1021:5, 1021:7,  
1042:18  
**pipework** <sup>[2]</sup> - 981:32,  
1024:3  
**piping** <sup>[1]</sup> - 1017:12  
**pit** <sup>[6]</sup> - 991:23, 997:6,  
997:13, 997:15,  
997:22, 1001:23  
**pivoted** <sup>[1]</sup> - 1039:30  
**place** <sup>[4]</sup> - 1024:12,  
1028:16, 1038:27,  
1038:37  
**Place** <sup>[16]</sup> - 972:29,  
972:32, 972:36,  
972:41, 973:33,  
983:20, 984:3,  
984:4, 984:30,  
984:44, 984:46,  
986:15, 986:25,  
986:32, 986:33,  
1037:20  
**placed** <sup>[3]</sup> - 946:14,  
983:44, 999:19  
**Plan** <sup>[2]</sup> - 1041:45,  
1043:34  
**plan** <sup>[22]</sup> - 1014:20,  
1014:35, 1021:38,  
1036:14, 1038:47,  
1039:1, 1039:7,  
1039:8, 1039:12,  
1039:13, 1039:18,  
1039:20, 1039:28,  
1039:29, 1039:32,  
1043:15, 1043:18,  
1043:21, 1043:45,  
1044:7, 1045:17  
**planned** <sup>[2]</sup> - 1020:5,  
1043:10  
**planning** <sup>[2]</sup> -  
1014:34, 1019:41  
**plans** <sup>[1]</sup> - 1043:47  
**plant** <sup>[2]</sup> - 1009:8,  
1009:10  
**plastic** <sup>[1]</sup> - 990:10  
**platform** <sup>[3]</sup> - 1013:7,  
1013:10, 1032:38  
**plausible** <sup>[1]</sup> -  
1002:41  
**playing** <sup>[1]</sup> - 988:8  
**plumber** <sup>[4]</sup> - 1016:25,  
1023:22, 1027:21  
**plumbing** <sup>[1]</sup> -  
1023:18  
**Point** <sup>[25]</sup> - 984:32,  
1030:35, 1044:29,  
1044:35, 1044:39,  
1045:12, 1045:25,  
1047:31, 1048:19,  
1048:27, 1048:36,  
1048:41, 1049:2,  
1049:7, 1049:13,  
1049:23, 1049:33,  
1050:8, 1051:43,  
1051:45, 1052:16  
**point** <sup>[28]</sup> - 957:13,  
967:24, 967:28,  
968:33, 972:26,  
988:30, 990:30,  
996:42, 1002:6,  
1012:33, 1013:42,  
1013:43, 1016:34,  
1020:34, 1026:7,  
1031:21, 1032:33,  
1032:35, 1034:14,  
1034:22, 1034:41,  
1035:20, 1035:42,  
1035:43, 1041:11,  
1043:43, 1044:4,  
1045:26  
**pointed** <sup>[6]</sup> - 968:44,  
979:35, 979:42,  
980:5, 989:45,  
1030:34  
**pointing** <sup>[2]</sup> - 947:34,  
948:30  
**points** <sup>[5]</sup> - 956:33,  
963:20, 963:23,  
963:34, 971:46  
**pool** <sup>[1]</sup> - 1026:43  
**pops** <sup>[1]</sup> - 1033:16  
**popular** <sup>[1]</sup> - 998:11  
**population** <sup>[1]</sup> -  
949:35  
**porous** <sup>[1]</sup> - 1019:20  
**portable** <sup>[1]</sup> - 1042:10  
**position** <sup>[4]</sup> - 1006:16,  
1043:34, 1051:17,  
1051:24  
**positions** <sup>[1]</sup> -  
1009:14  
**positive** <sup>[1]</sup> - 969:4  
**possibility** <sup>[1]</sup> -  
969:29  
**possible** <sup>[7]</sup> - 950:29,  
954:41, 969:25,  
985:44, 1021:33,  
1049:40, 1049:44  
**possibly** <sup>[1]</sup> - 996:44  
**potable** <sup>[3]</sup> - 1042:12,  
1042:14, 1042:27  
**potential** <sup>[3]</sup> - 973:32,  
1031:29, 1037:33  
**potentially** <sup>[13]</sup> -  
945:40, 949:18,  
952:42, 956:26,  
971:32, 981:32,  
1016:38, 1018:26,  
1024:1, 1033:29,  
1036:23, 1041:30,  
1041:36  
**pour** <sup>[2]</sup> - 942:45,  
975:16  
**PR** <sup>[4]</sup> - 946:46,  
948:25, 951:40,  
986:33  
**practicable** <sup>[1]</sup> -  
1024:29  
**practice** <sup>[1]</sup> - 985:18  
**practices** <sup>[1]</sup> - 1014:7  
**preceding** <sup>[1]</sup> -  
1000:44  
**precise** <sup>[2]</sup> - 999:35,  
1004:40  
**precisely** <sup>[2]</sup> - 1005:5,  
1026:22  
**predecessor** <sup>[2]</sup> -  
979:8, 979:9  
**predominant** <sup>[1]</sup> -  
1028:9  
**predominantly** <sup>[3]</sup> -  
1021:18, 1027:42,  
1033:10  
**preferential** <sup>[1]</sup> -  
970:37  
**preliminary** <sup>[5]</sup> -  
961:2, 961:5, 961:8,  
994:5, 996:46  
**preparation** <sup>[1]</sup> -  
1052:34  
**prepare** <sup>[2]</sup> - 958:4,  
1030:1  
**prepared** <sup>[8]</sup> - 945:43,  
953:38, 953:47,  
1007:20, 1029:46,  
1046:47, 1047:6,  
1047:12  
**prepares** <sup>[1]</sup> - 979:17  
**preparing** <sup>[2]</sup> -  
958:31, 986:7  
**presence** <sup>[1]</sup> -  
1031:11  
**present** <sup>[3]</sup> - 980:42,  
1024:10, 1038:12  
**presented** <sup>[1]</sup> - 960:11  
**presenting** <sup>[2]</sup> -  
948:33, 949:21  
**pressed** <sup>[2]</sup> - 1004:31,  
1005:2  
**pressure** <sup>[40]</sup> - 956:7,  
959:19, 959:26,  
959:30, 981:10,  
981:17, 981:22,  
984:1, 984:4, 984:5,  
984:8, 984:9,  
984:11, 984:13,  
984:15, 984:18,  
984:29, 984:40,  
984:43, 984:45,  
985:6, 985:7,  
985:10, 985:11,  
985:12, 985:19,  
985:21, 985:23,  
985:27, 985:41,  
990:30, 990:31,  
990:32, 1033:4  
**pressures** <sup>[3]</sup> - 956:3,  
984:35, 984:38  
**presumably** <sup>[2]</sup> -  
992:43, 1005:22  
**pretty** <sup>[8]</sup> - 1009:34,  
1016:20, 1020:15,  
1023:31, 1027:35,  
1032:8, 1034:44,  
1044:18  
**prevailing** <sup>[1]</sup> - 998:23  
**prevent** <sup>[1]</sup> - 984:35  
**previous** <sup>[14]</sup> - 944:37,  
944:38, 947:20,  
953:31, 957:15,  
968:39, 971:40,  
974:29, 976:41,  
977:28, 987:31,  
987:32, 987:37,  
1048:12  
**previously** <sup>[2]</sup> -  
953:42, 953:46  
**price** <sup>[1]</sup> - 1012:33

<b>primary</b> [4] - 945:22, 982:16, 996:13, 1003:43	1035:22, 1035:41, 1037:38, 1037:40, 1037:41, 1037:45, 1038:3, 1038:27, 1038:35, 1038:37, 1038:41, 1039:24, 1051:26	<b>properties</b> [36] - 944:36, 945:9, 949:37, 952:2, 967:12, 971:4, 972:36, 984:25, 984:27, 1020:27, 1020:30, 1021:1, 1026:12, 1027:1, 1028:43, 1029:3, 1029:8, 1029:41, 1030:20, 1030:30, 1031:7, 1031:29, 1031:35, 1032:10, 1032:17, 1033:32, 1040:39, 1041:9, 1043:9, 1047:16, 1048:5, 1048:10, 1049:31, 1049:36, 1050:7, 1052:9	<b>PSI</b> [1] - 985:28	<b>PVC</b> [5] - 990:4, 990:10, 990:19, 990:25
<b>principles</b> [2] - 1014:44, 1015:2			<b>publication</b> [1] - 1000:12	<b>pyramid</b> [1] - 981:37
<b>priorities</b> [2] - 1015:41, 1018:42			<b>pull</b> [2] - 964:42, 1038:11	<b>pyramids</b> [3] - 981:36, 981:38, 982:2
<b>prioritisation</b> [4] - 1014:44, 1015:2, 1022:37, 1041:26	<b>processes</b> [1] - 1028:13		<b>pulled</b> [1] - 1027:10	
<b>prioritise</b> [1] - 1014:27	<b>procurement</b> [1] - 1043:20		<b>Pullen</b> [3] - 972:45, 973:4, 973:42	<b>Q</b>
<b>prioritised</b> [4] - 1015:8, 1019:30, 1019:39, 1041:1	<b>produce</b> [5] - 977:30, 979:18, 979:24, 989:26, 1024:43		<b>pump</b> [6] - 982:3, 982:4, 982:12, 982:15, 983:46, 1032:30	<b>Q1</b> [1] - 1036:25
<b>prioritising</b> [1] - 1015:10	<b>produced</b> [3] - 974:39, 989:23, 1005:14		<b>pumped</b> [1] - 983:24	<b>qualifications</b> [2] - 1008:25, 1008:28
<b>priority</b> [6] - 1015:36, 1019:23, 1022:40, 1023:25, 1032:46, 1045:42	<b>professional</b> [2] - 1008:28, 1008:29		<b>pumping</b> [1] - 984:39	<b>quantify</b> [1] - 962:26
<b>private</b> [17] - 945:2, 945:5, 1011:3, 1018:16, 1018:31, 1024:25, 1024:35, 1025:30, 1031:35, 1031:44, 1032:17, 1040:13, 1040:35, 1040:39, 1041:31, 1049:41, 1051:5	<b>professor</b> [4] - 992:22, 995:9, 995:37, 995:42	<b>property</b> [25] - 1011:4, 1018:16, 1020:31, 1024:6, 1024:25, 1025:30, 1029:20, 1029:32, 1029:36, 1030:44, 1030:45, 1031:2, 1031:5, 1031:7, 1031:44, 1040:14, 1040:35, 1041:31, 1044:38, 1045:34, 1045:42, 1047:28, 1048:19, 1049:41, 1051:5	<b>purely</b> [1] - 974:21	<b>quarter</b> [14] - 1011:18, 1028:21, 1028:22, 1028:26, 1028:31, 1028:34, 1028:37, 1028:42, 1029:22, 1030:12, 1030:17, 1042:8, 1042:22, 1047:18
<b>private-side</b> [1] - 1024:35	<b>Professor</b> [17] - 960:41, 993:11, 993:15, 993:17, 993:29, 993:42, 994:6, 994:13, 994:26, 994:41, 995:4, 995:21, 996:18, 996:31, 997:14, 999:1, 1001:19		<b>purpose</b> [19] - 943:13, 948:8, 975:29, 982:39, 983:19, 983:23, 983:28, 984:9, 985:31, 986:6, 996:13, 1001:31, 1003:43, 1007:21, 1014:6, 1014:19, 1014:27, 1021:6, 1021:40	<b>Quarter</b> [1] - 1042:6
<b>privy</b> [2] - 1018:43, 1044:31	<b>Professor's</b> [1] - 992:25	<b>proportion</b> [4] - 997:4, 997:12, 1020:30, 1029:26	<b>purposes</b> [7] - 964:44, 986:3, 1011:29, 1014:2, 1017:9, 1022:9, 1025:22	<b>quarterly</b> [2] - 1016:16, 1028:19
<b>probability</b> [3] - 962:26, 962:34, 962:39	<b>program</b> [10] - 1010:29, 1010:30, 1011:22, 1011:32, 1011:38, 1012:10, 1012:15, 1012:18, 1036:41, 1044:43	<b>propose</b> [1] - 1029:9	<b>push</b> [2] - 1010:3, 1027:41	<b>quarters</b> [6] - 1030:6, 1030:10, 1030:23, 1030:26, 1030:41, 1048:25
<b>probable</b> [2] - 969:14, 1040:13	<b>progress</b> [1] - 994:11	<b>prospect</b> [1] - 963:23	<b>pushing</b> [3] - 990:31, 990:32	<b>questions</b> [36] - 963:9, 963:11, 970:26, 972:14, 974:11, 974:13, 974:18, 974:44, 977:9, 979:30, 992:35, 994:6, 994:14, 994:16, 994:35, 994:38, 995:3, 996:6, 996:13, 1002:46, 1003:2, 1006:20, 1006:22, 1010:24, 1010:31, 1011:21, 1024:20, 1032:22, 1033:1, 1037:14, 1039:35, 1039:39, 1040:6, 1051:3, 1051:34, 1052:21
<b>problem</b> [3] - 1002:11, 1028:9, 1035:33	<b>progressed</b> [1] - 1034:26	<b>provided</b> [12] - 966:38, 967:1, 994:31, 994:39, 999:25, 1005:21, 1024:23, 1024:24, 1024:29, 1027:17, 1028:29, 1035:41	<b>put</b> [26] - 977:10, 977:26, 978:41, 979:5, 979:27, 989:25, 991:17, 995:3, 1007:39, 1012:32, 1012:34, 1014:26, 1016:16, 1018:47, 1021:38, 1021:46, 1022:11, 1022:45, 1023:2, 1023:7, 1025:38, 1026:8, 1032:7, 1032:28, 1032:41, 1035:26	<b>quick</b> [2] - 989:38, 1051:37
<b>problems</b> [1] - 1010:8	<b>project</b> [1] - 1003:27	<b>proven</b> [1] - 1012:2	<b>putting</b> [5] - 988:33, 1012:5, 1017:5, 1036:20, 1047:40	<b>quickly</b> [2] - 971:44, 1023:31
<b>procedures</b> [1] - 1032:23	<b>projects</b> [1] - 976:19	<b>provide</b> [12] - 966:38, 967:1, 994:31, 994:39, 999:25, 1005:21, 1024:23, 1024:24, 1024:29, 1027:17, 1028:29, 1035:41	<b>puzzle</b> [1] - 994:44	<b>quite</b> [18] - 950:29, 958:30, 959:37, 976:15, 977:37, 988:11, 989:37, 990:36, 990:44, 995:1, 998:9, 1002:27, 1005:40, 1011:47, 1020:23, 1023:10, 1039:31,
<b>proceed</b> [2] - 950:34, 1039:45	<b>prominent</b> [1] - 968:33	<b>provides</b> [3] - 998:21, 999:27, 1004:1	<b>PV</b> [1] - 990:15	
<b>proceedings</b> [4] - 1050:9, 1050:15, 1050:34, 1050:45	<b>prompt</b> [1] - 1018:15	<b>provided</b> [10] - 950:44, 960:15, 966:33, 967:6, 994:33, 1001:12, 1005:17, 1007:25, 1025:33, 1050:11		
<b>process</b> [36] - 971:41, 978:39, 981:2, 989:23, 992:9, 1009:7, 1009:8, 1022:38, 1023:8, 1023:33, 1023:37, 1024:11, 1025:18, 1026:2, 1027:15, 1027:29, 1027:33, 1028:3, 1028:6, 1028:11, 1028:16, 1033:43, 1033:45,	<b>prompted</b> [1] - 1036:39	<b>proximity</b> [3] - 973:44, 1012:37, 1040:38		
	<b>prone</b> [1] - 973:37	<b>proxy</b> [1] - 1018:37		
	<b>pronounced</b> [2] - 949:11, 952:32	<b>PRVs</b> [1] - 1034:38		
	<b>proof</b> [6] - 1016:26, 1016:34, 1025:11, 1026:41, 1031:21, 1034:18			
	<b>propagation</b> [1] - 966:31			
	<b>properly</b> [2] - 946:17, 978:16			

1043:47

---

## R

---

**rain** [3] - 998:15,  
1000:42, 1001:5  
**Rainfall** [2] - 997:32,  
998:13  
**rainfall** [5] - 998:8,  
998:17, 1000:40,  
1000:43  
**raise** [1] - 1005:20  
**raised** [2] - 993:36,  
1026:32  
**raises** [1] - 994:38  
**rang** [1] - 977:12  
**range** [18] - 960:34,  
962:13, 962:20,  
962:27, 962:31,  
962:35, 962:39,  
968:27, 968:31,  
976:17, 977:27,  
977:33, 985:11,  
1002:30, 1002:31,  
1002:38, 1002:42,  
1012:47  
**range-based** [1] -  
968:27  
**ranges** [2] - 961:30,  
974:25  
**ranked** [1] - 1049:9  
**rapidly** [1] - 957:17  
**rate** [17] - 956:5,  
960:26, 986:39,  
986:47, 987:9,  
987:14, 987:19,  
988:4, 989:19,  
989:20, 993:2,  
993:3, 993:5,  
1001:22, 1002:5,  
1002:19, 1046:34  
**rates** [6] - 945:40,  
968:1, 977:36,  
977:42, 977:43,  
1001:33  
**rather** [5] - 979:36,  
1005:47, 1035:9,  
1035:42, 1038:34  
**rationale** [1] - 983:44  
**raw** [8] - 967:47,  
1024:1, 1025:16,  
1031:16, 1031:28,  
1047:15, 1047:47  
**Rd** [1] - 1045:12  
**re** [1] - 974:46  
**re-examination** [1] -  
974:46  
**reach** [1] - 944:22  
**reached** [2] - 944:13,  
999:38

**reaches** [1] - 1033:15  
**reaction** [1] - 958:16  
**read** [27] - 956:40,  
958:36, 958:38,  
960:7, 960:10,  
960:13, 967:20,  
967:30, 967:31,  
967:32, 967:35,  
980:31, 1004:9,  
1011:11, 1011:17,  
1025:1, 1025:16,  
1029:34, 1043:26,  
1045:6, 1045:7,  
1046:6, 1047:15,  
1047:47  
**readers** [1] - 1015:20  
**readily** [4] - 989:39,  
1040:35, 1041:31,  
1043:23  
**reading** [11] - 959:43,  
966:19, 992:31,  
992:33, 992:39,  
1002:25, 1027:35,  
1027:39, 1039:17,  
1049:6, 1049:19  
**readings** [7] - 965:21,  
965:33, 965:37,  
965:38, 966:19,  
966:29, 1027:36  
**reads** [2] - 967:39,  
1016:16  
**ready** [6] - 988:34,  
996:33, 1019:47,  
1020:23, 1021:37,  
1043:47  
**real** [5] - 962:3,  
1017:36, 1022:28,  
1034:5, 1040:14  
**real-time** [2] -  
1022:28, 1034:5  
**real-world** [1] -  
1017:36  
**realistically** [1] -  
1021:38  
**really** [16] - 959:40,  
963:19, 1012:7,  
1014:20, 1016:15,  
1017:21, 1018:29,  
1025:12, 1029:15,  
1035:45, 1036:1,  
1036:33, 1038:29,  
1038:31, 1038:32,  
1039:18  
**reason** [14] - 946:23,  
951:17, 951:18,  
960:11, 967:29,  
971:20, 1020:31,  
1041:26, 1049:30,  
1049:40, 1049:44,  
1050:1, 1050:39,

1050:42  
**reasonable** [4] -  
949:39, 956:24,  
993:5, 1021:34  
**reasonably** [4] -  
945:27, 971:44,  
1005:40, 1013:41  
**reasons** [8] - 956:10,  
956:45, 979:42,  
1017:6, 1017:18,  
1026:39, 1050:2,  
1051:42  
**rebate** [2] - 1016:24,  
1016:26  
**recalibration** [1] -  
1033:45  
**receipt** [1] - 996:30  
**receive** [5] - 957:26,  
984:13, 996:42,  
1007:16, 1028:18  
**received** [7] - 951:8,  
961:5, 965:4,  
969:19, 1029:8,  
1037:19, 1049:14  
**receives** [2] - 983:20,  
1026:33  
**recent** [2] - 1041:27,  
1044:19  
**recently** [6] - 949:32,  
952:21, 958:30,  
958:33, 993:18,  
993:20  
**recognise** [2] -  
1037:25, 1037:26  
**recollection** [3] -  
980:32, 994:46,  
999:40  
**recollections** [1] -  
991:1  
**reconsider** [2] -  
958:15, 959:13  
**record** [8] - 943:2,  
1004:36, 1004:42,  
1004:43, 1005:22,  
1005:39, 1007:6,  
1040:17  
**recorded** [1] - 988:11  
**recording** [3] - 988:4,  
1011:12, 1017:27  
**records** [8] - 953:9,  
985:40, 989:10,  
989:13, 989:17,  
1001:4, 1003:31,  
1029:8  
**recruitment** [1] -  
976:17  
**rectify** [1] - 1051:27  
**recycled** [1] - 1042:28  
**red** [24] - 946:41,  
946:47, 948:24,

982:2, 982:7,  
982:20, 989:14,  
1025:7, 1025:8,  
1025:27, 1025:33,  
1026:8, 1026:13,  
1026:23, 1030:26,  
1031:15, 1031:17,  
1031:22, 1046:44,  
1050:17, 1050:19,  
1050:28, 1050:39  
**reduce** [3] - 942:28,  
984:9, 1027:23  
**reduced** [4] - 955:44,  
984:18, 984:29,  
984:45  
**reducing** [7] - 981:10,  
981:17, 981:23,  
984:1, 984:4, 984:5,  
984:8  
**reduction** [1] -  
1026:35  
**refer** [15] - 945:18,  
945:44, 952:1,  
953:9, 963:40,  
985:18, 992:8,  
992:14, 997:17,  
1024:21, 1027:26,  
1029:39, 1031:33,  
1034:28, 1034:30  
**reference** [9] - 945:2,  
950:19, 1000:11,  
1002:14, 1015:2,  
1019:11, 1019:12,  
1027:7, 1032:6  
**references** [2] -  
982:28, 1000:12  
**REFERRED** [1] -  
943:35  
**referred** [13] - 943:32,  
945:7, 951:8,  
978:46, 997:20,  
1010:14, 1010:46,  
1026:31, 1031:15,  
1039:1, 1040:30,  
1042:2, 1047:21  
**referring** [9] - 986:31,  
993:26, 1025:23,  
1026:14, 1038:47,  
1042:17, 1044:5,  
1046:26, 1050:21  
**refilled** [1] - 988:44  
**refine** [2] - 1035:11,  
1036:24  
**refinement** [1] -  
1034:20  
**reflected** [1] - 975:42  
**reflections** [1] - 959:2  
**regard** [19] - 948:4,  
948:18, 954:3,  
954:12, 957:34,

959:22, 959:38,  
960:9, 964:39,  
965:23, 965:30,  
965:47, 966:7,  
967:18, 974:19,  
989:8, 999:2,  
1000:40, 1005:43  
**regarding** [1] -  
1001:22  
**regardless** [4] -  
998:39, 1019:8,  
1043:26, 1051:20  
**registered** [1] - 947:20  
**regular** [1] - 966:40  
**regularly** [2] - 950:10,  
1035:8  
**regulations** [1] -  
950:16  
**relate** [1] - 967:7  
**related** [4] - 945:20,  
990:28, 1033:44,  
1050:28  
**relates** [2] - 950:13,  
962:23  
**relation** [8] - 966:42,  
973:29, 973:43,  
1005:26, 1007:27,  
1013:30, 1038:27,  
1038:46  
**relationship** [2] -  
963:11, 966:18  
**relative** [1] - 985:22  
**relatively** [2] - 976:16,  
989:34  
**release** [1] - 1045:27  
**relevance** [3] - 986:24,  
990:8, 992:35  
**Relevant** [1] - 1024:22  
**relevant** [12] - 949:4,  
951:42, 964:13,  
964:32, 966:29,  
971:22, 986:16,  
986:23, 1024:26,  
1024:27, 1026:13,  
1029:4  
**relevantly** [1] - 970:17  
**reliability** [1] - 963:10  
**reliable** [1] - 1016:21  
**relied** [4] - 946:39,  
948:37, 949:45,  
951:20  
**relies** [2] - 968:37,  
974:20  
**rely** [3] - 946:36,  
948:37, 1021:18  
**relying** [1] - 994:23  
**remain** [5] - 1020:28,  
1038:37, 1038:39,  
1038:41, 1041:9  
**remainder** [2] -

944:40, 953:33	982:43, 982:44, 1005:3	<b>resume</b> <sup>[1]</sup> - 1006:37	1002:46, 1051:36, 1051:39, 1051:41, 1052:1	1048:37, 1048:40, 1048:41, 1049:2
<b>remediating</b> <sup>[1]</sup> - 1018:31	<b>representation</b> <sup>[1]</sup> - 963:32	<b>RESUMING</b> <sup>[1]</sup> - 1006:41	<b>robust</b> <sup>[1]</sup> - 963:18	<b>rubbish</b> <sup>[1]</sup> - 1002:22
<b>remembering</b> <sup>[4]</sup> - 1018:45, 1023:28, 1043:18, 1050:28	<b>representative</b> <sup>[2]</sup> - 968:40, 969:26	<b>return</b> <sup>[4]</sup> - 982:38, 983:7, 996:46, 1006:36	<b>robustness</b> <sup>[1]</sup> - 964:30	<b>rudimentary</b> <sup>[2]</sup> - 978:24, 1016:20
<b>remiss</b> <sup>[1]</sup> - 949:19	<b>representing</b> <sup>[2]</sup> - 981:1, 1031:45	<b>returned</b> <sup>[1]</sup> - 977:11	<b>rock</b> <sup>[1]</sup> - 1038:33	<b>rules</b> <sup>[2]</sup> - 1018:24, 1027:38
<b>remit</b> <sup>[2]</sup> - 1025:8, 1050:18	<b>represents</b> <sup>[2]</sup> - 981:31, 982:38	<b>returning</b> <sup>[1]</sup> - 1028:16	<b>rock-solid</b> <sup>[1]</sup> - 1038:33	<b>run</b> <sup>[6]</sup> - 956:23, 962:7, 971:43, 988:35, 1013:43, 1039:39
<b>remove</b> <sup>[1]</sup> - 1004:15	<b>request</b> <sup>[1]</sup> - 967:4	<b>reveal</b> <sup>[1]</sup> - 1037:7	<b>role</b> <sup>[12]</sup> - 944:6, 966:5, 976:14, 976:15, 976:22, 977:15, 977:18, 984:8, 1009:6, 1009:32, 1009:41, 1010:1	<b>running</b> <sup>[4]</sup> - 1017:33, 1017:38, 1017:40, 1049:35
<b>removed</b> <sup>[2]</sup> - 953:32, 971:46	<b>requested</b> <sup>[1]</sup> - 1024:24	<b>revealed</b> <sup>[1]</sup> - 1004:21	<b>roles</b> <sup>[2]</sup> - 1009:14, 1009:35	<b>runoff</b> <sup>[1]</sup> - 998:8
<b>Renée</b> <sup>[1]</sup> - 941:11	<b>requests</b> <sup>[3]</sup> - 994:36, 1026:35, 1027:12	<b>reveals</b> <sup>[1]</sup> - 1031:42	<b>roll</b> <sup>[23]</sup> - 1010:25, 1011:23, 1011:38, 1011:45, 1012:4, 1014:16, 1014:27, 1014:29, 1014:41, 1017:5, 1017:14, 1019:30, 1019:31, 1019:34, 1019:39, 1020:10, 1040:7, 1040:22, 1040:26, 1041:4, 1041:17, 1043:8, 1043:15	<b>Runoff</b> <sup>[2]</sup> - 997:32, 998:13
<b>repair</b> <sup>[10]</sup> - 968:6, 968:13, 988:20, 990:47, 1000:29, 1004:25, 1023:21, 1025:42, 1051:21, 1051:25	<b>require</b> <sup>[1]</sup> - 963:35	<b>revenue</b> <sup>[4]</sup> - 973:39, 1039:3, 1039:7, 1039:17	<b>roll-out</b> <sup>[22]</sup> - 1010:25, 1011:23, 1011:38, 1011:45, 1012:4, 1014:16, 1014:27, 1014:29, 1014:41, 1017:5, 1017:14, 1019:30, 1019:31, 1019:34, 1019:39, 1020:10, 1040:7, 1040:22, 1040:26, 1041:4, 1041:17, 1043:8, 1043:15	<b>runs</b> <sup>[1]</sup> - 998:18
<b>repaired</b> <sup>[5]</sup> - 953:11, 953:14, 990:43, 1024:28, 1025:47	<b>required</b> <sup>[3]</sup> - 946:17, 1013:29, 1025:46	<b>review</b> <sup>[9]</sup> - 960:36, 960:44, 960:47, 961:10, 964:38, 969:47, 1029:10, 1036:39, 1036:42	<b>Roll</b> <sup>[2]</sup> - 1041:45, 1043:33	<hr/> <b>S</b> <hr/>
<b>repairing</b> <sup>[1]</sup> - 1051:18	<b>reserve</b> <sup>[1]</sup> - 981:38	<b>reviewed</b> <sup>[2]</sup> - 960:35, 964:41	<b>roll</b> <sup>[23]</sup> - 1010:25, 1011:23, 1011:38, 1011:45, 1012:4, 1014:16, 1014:27, 1014:29, 1014:41, 1017:5, 1017:14, 1019:30, 1019:31, 1019:34, 1019:39, 1020:10, 1040:7, 1040:22, 1040:26, 1041:4, 1041:17, 1043:8, 1043:15	<b>safe</b> <sup>[1]</sup> - 1052:13
<b>repairs</b> <sup>[1]</sup> - 953:13	<b>reservoir</b> <sup>[7]</sup> - 951:43, 981:39, 981:41, 983:21, 984:34, 1033:13	<b>reviewer</b> <sup>[2]</sup> - 961:17, 969:20	<b>Roll</b> <sup>[2]</sup> - 1041:45, 1043:33	<b>sample</b> <sup>[8]</sup> - 998:26, 1000:13, 1000:15, 1000:18, 1000:19, 1000:29, 1000:30, 1000:32
<b>repeat</b> <sup>[2]</sup> - 990:47, 1049:16	<b>residential</b> <sup>[4]</sup> - 945:2, 945:5, 1028:47, 1029:2	<b>reviewing</b> <sup>[5]</sup> - 960:39, 976:18, 980:5, 1033:43, 1036:37	<b>roll-out</b> <sup>[22]</sup> - 1010:25, 1011:23, 1011:38, 1011:45, 1012:4, 1014:16, 1014:27, 1014:29, 1014:41, 1017:5, 1017:14, 1019:30, 1019:31, 1019:34, 1019:39, 1020:10, 1040:7, 1040:22, 1040:26, 1041:4, 1041:17, 1043:8, 1043:15	<b>sand</b> <sup>[2]</sup> - 1000:12, 1000:14
<b>repeated</b> <sup>[1]</sup> - 991:1	<b>resolution</b> <sup>[1]</sup> - 947:32	<b>reviews</b> <sup>[2]</sup> - 1038:45, 1039:24	<b>roll-out</b> <sup>[22]</sup> - 1010:25, 1011:23, 1011:38, 1011:45, 1012:4, 1014:16, 1014:27, 1014:29, 1014:41, 1017:5, 1017:14, 1019:30, 1019:31, 1019:34, 1019:39, 1020:10, 1040:7, 1040:22, 1040:26, 1041:4, 1041:17, 1043:8, 1043:15	<b>sandy</b> <sup>[4]</sup> - 1000:10, 1019:5, 1019:11, 1019:16
<b>replace</b> <sup>[3]</sup> - 1004:22, 1015:7, 1043:16	<b>resource</b> <sup>[1]</sup> - 1023:43	<b>revised</b> <sup>[1]</sup> - 980:11	<b>roll-out</b> <sup>[22]</sup> - 1010:25, 1011:23, 1011:38, 1011:45, 1012:4, 1014:16, 1014:27, 1014:29, 1014:41, 1017:5, 1017:14, 1019:30, 1019:31, 1019:34, 1019:39, 1020:10, 1040:7, 1040:22, 1040:26, 1041:4, 1041:17, 1043:8, 1043:15	<b>sat</b> <sup>[2]</sup> - 965:6, 965:11
<b>replacing</b> <sup>[2]</sup> - 1015:6, 1045:14	<b>respect</b> <sup>[11]</sup> - 956:19, 967:11, 968:47, 977:21, 987:36, 989:35, 998:33, 1005:4, 1005:29, 1009:10, 1012:22	<b>revisit</b> <sup>[1]</sup> - 974:36	<b>roll-out</b> <sup>[22]</sup> - 1010:25, 1011:23, 1011:38, 1011:45, 1012:4, 1014:16, 1014:27, 1014:29, 1014:41, 1017:5, 1017:14, 1019:30, 1019:31, 1019:34, 1019:39, 1020:10, 1040:7, 1040:22, 1040:26, 1041:4, 1041:17, 1043:8, 1043:15	<b>saw</b> <sup>[11]</sup> - 952:35, 954:23, 954:25, 959:20, 968:12, 968:16, 971:14, 991:1, 1004:15, 1005:6, 1035:30
<b>replicate</b> <sup>[1]</sup> - 999:9	<b>respective</b> <sup>[1]</sup> - 956:19, 967:11, 968:47, 977:21, 987:36, 989:35, 998:33, 1005:4, 1005:29, 1009:10, 1012:22	<b>revisiting</b> <sup>[1]</sup> - 974:27	<b>roll-out</b> <sup>[22]</sup> - 1010:25, 1011:23, 1011:38, 1011:45, 1012:4, 1014:16, 1014:27, 1014:29, 1014:41, 1017:5, 1017:14, 1019:30, 1019:31, 1019:34, 1019:39, 1020:10, 1040:7, 1040:22, 1040:26, 1041:4, 1041:17, 1043:8, 1043:15	<b>SCADA</b> <sup>[6]</sup> - 1013:10, 1013:45, 1032:32, 1032:38, 1036:43, 1038:13
<b>replicating</b> <sup>[1]</sup> - 999:4	<b>respond</b> <sup>[1]</sup> - 1013:34	<b>right-hand</b> <sup>[1]</sup> - 946:42	<b>roll-out</b> <sup>[22]</sup> - 1010:25, 1011:23, 1011:38, 1011:45, 1012:4, 1014:16, 1014:27, 1014:29, 1014:41, 1017:5, 1017:14, 1019:30, 1019:31, 1019:34, 1019:39, 1020:10, 1040:7, 1040:22, 1040:26, 1041:4, 1041:17, 1043:8, 1043:15	<b>scales</b> <sup>[1]</sup> - 964:9
<b>replied</b> <sup>[1]</sup> - 994:34	<b>response</b> <sup>[8]</sup> - 977:16, 977:19, 977:21, 1013:29, 1022:40, 1022:43, 1023:5, 1023:24	<b>rigour</b> <sup>[2]</sup> - 963:10, 1014:21	<b>roll-out</b> <sup>[22]</sup> - 1010:25, 1011:23, 1011:38, 1011:45, 1012:4, 1014:16, 1014:27, 1014:29, 1014:41, 1017:5, 1017:14, 1019:30, 1019:31, 1019:34, 1019:39, 1020:10, 1040:7, 1040:22, 1040:26, 1041:4, 1041:17, 1043:8, 1043:15	<b>scanning</b> <sup>[1]</sup> - 1017:26
<b>report</b> <sup>[41]</sup> - 946:3, 946:9, 946:11, 946:25, 946:26, 946:35, 946:36, 946:39, 948:39, 950:17, 950:19, 950:26, 950:35, 951:21, 954:7, 957:30, 957:35, 960:3, 960:4, 961:2, 961:3, 961:5, 961:8, 965:1, 965:12, 969:21, 969:22, 974:39, 974:41, 996:31, 996:42, 996:44, 1003:18, 1003:47, 1004:35, 1005:31, 1005:38, 1010:11, 1018:3, 1025:46	<b>respond</b> <sup>[1]</sup> - 1013:34	<b>ring</b> <sup>[1]</sup> - 984:29	<b>roll-out</b> <sup>[22]</sup> - 1010:25, 1011:23, 1011:38, 1011:45, 1012:4, 1014:16, 1014:27, 1014:29, 1014:41, 1017:5, 1017:14, 1019:30, 1019:31, 1019:34, 1019:39, 1020:10, 1040:7, 1040:22, 1040:26, 1041:4, 1041:17, 1043:8, 1043:15	<b>scenario</b> <sup>[1]</sup> - 962:10
<b>reported</b> <sup>[2]</sup> - 991:7, 1024:27	<b>response</b> <sup>[7]</sup> - 944:20, 952:14, 961:18, 963:15, 966:2, 967:9, 969:17	<b>rings</b> <sup>[1]</sup> - 1047:44	<b>roll-out</b> <sup>[22]</sup> - 1010:25, 1011:23, 1011:38, 1011:45, 1012:4, 1014:16, 1014:27, 1014:29, 1014:41, 1017:5, 1017:14, 1019:30, 1019:31, 1019:34, 1019:39, 1020:10, 1040:7, 1040:22, 1040:26, 1041:4, 1041:17, 1043:8, 1043:15	<b>scene</b> <sup>[1]</sup> - 944:13
<b>reports</b> <sup>[5]</sup> - 945:43, 946:10, 946:22, 958:4, 1015:40	<b>responsibility</b> <sup>[9]</sup> - 1011:24, 1018:20, 1018:22, 1025:42, 1036:29, 1051:18, 1051:25, 1051:27, 1051:31	<b>risk</b> <sup>[3]</sup> - 969:1, 1036:5, 1036:17	<b>roll-out</b> <sup>[22]</sup> - 1010:25, 1011:23, 1011:38, 1011:45, 1012:4, 1014:16, 1014:27, 1014:29, 1014:41, 1017:5, 1017:14, 1019:30, 1019:31, 1019:34, 1019:39, 1020:10, 1040:7, 1040:22, 1040:26, 1041:4, 1041:17, 1043:8, 1043:15	<b>scheduled</b> <sup>[1]</sup> - 1012:15
<b>represent</b> <sup>[4]</sup> - 981:10,	<b>responsible</b> <sup>[1]</sup> - 1018:30	<b>road</b> <sup>[1]</sup> - 1006:2	<b>roll-out</b> <sup>[22]</sup> - 1010:25, 1011:23, 1011:38, 1011:45, 1012:4, 1014:16, 1014:27, 1014:29, 1014:41, 1017:5, 1017:14, 1019:30, 1019:31, 1019:34, 1019:39, 1020:10, 1040:7, 1040:22, 1040:26, 1041:4, 1041:17, 1043:8, 1043:15	<b>schematic</b> <sup>[2]</sup> - 980:33, 980:47
	<b>rest</b> <sup>[1]</sup> - 1037:12	<b>Road</b> <sup>[26]</sup> - 984:32, 989:47, 997:6, 1021:1, 1030:35, 1044:29, 1044:35, 1044:39, 1045:25, 1047:31, 1048:20, 1048:27, 1048:36, 1048:42, 1049:3, 1049:13, 1049:23, 1049:33, 1050:8, 1050:9, 1051:43, 1051:45, 1052:16	<b>roll-out</b> <sup>[22]</sup> - 1010:25, 1011:23, 1011:38, 1011:45, 1012:4, 1014:16, 1014:27, 1014:29, 1014:41, 1017:5, 1017:14, 1019:30, 1019:31, 1019:34, 1019:39, 1020:10, 1040:7, 1040:22, 1040:26, 1041:4, 1041:17, 1043:8, 1043:15	<b>science</b> <sup>[1]</sup> - 1008:31
	<b>restored</b> <sup>[2]</sup> - 988:46, 1003:42	<b>Roberts</b> <sup>[2]</sup> - 941:41, 942:4	<b>roll-out</b> <sup>[22]</sup> - 1010:25, 1011:23, 1011:38, 1011:45, 1012:4, 1014:16, 1014:27, 1014:29, 1014:41, 1017:5, 1017:14, 1019:30, 1019:31, 1019:34, 1019:39, 1020:10, 1040:7, 1040:22, 1040:26, 1041:4, 1041:17, 1043:8, 1043:15	<b>scientific</b> <sup>[1]</sup> - 1018:46
	<b>result</b> <sup>[6]</sup> - 962:47, 965:13, 969:8, 1012:19, 1032:24, 1044:42	<b>ROBERTS</b> <sup>[11]</sup> - 942:9, 972:16, 972:20, 972:22, 973:47, 974:10,	<b>roll-out</b> <sup>[22]</sup> - 1010:25, 1011:23, 1011:38, 1011:45, 1012:4, 1014:16, 1014:27, 1014:29, 1014:41, 1017:5, 1017:14, 1019:30, 1019:31, 1019:34, 1019:39, 1020:10, 1040:7, 1040:22, 1040:26, 1041:4, 1041:17, 1043:8, 1043:15	<b>scope</b> <sup>[3]</sup> - 994:8, 994:10, 995:14
	<b>results</b> <sup>[1]</sup> - 974:32		<b>roll-out</b> <sup>[22]</sup> - 1010:25, 1011:23, 1011:38, 1011:45, 1012:4, 1014:16, 1014:27, 1014:29, 1014:41, 1017:5, 1017:14, 1019:30, 1019:31, 1019:34, 1019:39, 1020:10, 1040:7, 1040:22, 1040:26, 1041:4, 1041:17, 1043:8, 1043:15	<b>scramble</b> <sup>[1]</sup> - 1023:30
			<b>roll-out</b> <sup>[22]</sup> - 1010:25, 1011:23, 1011:38, 1011:45, 1012:4, 1014:16, 1014:27, 1014:29, 1014:41, 1017:5, 1017:14, 1019:30, 1019:31, 1019:34, 1019:39, 1020:10, 1040:7, 1040:22, 1040:26, 1041:4, 1041:17, 1043:8, 1043:15	<b>screen</b> <sup>[10]</sup> - 946:28,

951:23, 954:17,  
978:34, 979:6,  
979:10, 986:30,  
992:8, 995:7,  
1033:17  
**scroll** [3] - 954:18,  
954:46, 1049:32  
**se** [3] - 1022:22,  
1025:9, 1025:19  
**season** [1] - 1028:34  
**seasonal** [9] - 952:12,  
952:32, 952:35,  
953:30, 957:5,  
969:28, 971:6,  
974:27, 974:29  
**seasonality** [2] -  
1035:30, 1049:26  
**second** [25] - 945:36,  
946:3, 946:29,  
946:45, 951:31,  
957:9, 957:35,  
958:26, 967:35,  
968:38, 972:44,  
995:44, 998:38,  
999:12, 1001:41,  
1001:45, 1004:21,  
1007:37, 1009:38,  
1009:40, 1016:44,  
1019:23, 1026:31,  
1027:39, 1048:45  
**second-last** [1] -  
998:38  
**seconds** [5] -  
1017:27, 1017:30,  
1017:31  
**section** [12] - 979:36,  
979:37, 980:34,  
981:21, 984:9,  
988:33, 1004:22,  
1004:45, 1004:46,  
1005:37, 1005:38  
**see** [87] - 945:35,  
945:38, 946:28,  
946:41, 947:43,  
948:22, 949:23,  
950:10, 950:42,  
951:20, 951:27,  
952:4, 953:8,  
953:10, 954:11,  
954:19, 954:27,  
955:43, 955:44,  
956:32, 956:41,  
957:9, 957:15,  
957:21, 958:38,  
958:44, 959:9,  
960:3, 960:47,  
961:27, 962:2,  
963:37, 964:23,  
965:4, 965:8, 967:6,  
967:15, 967:45,  
968:20, 969:25,  
970:21, 970:25,  
972:23, 977:35,  
977:46, 978:6,  
979:29, 980:10,  
980:34, 981:29,  
981:35, 981:45,  
982:18, 982:23,  
982:42, 985:27,  
988:16, 988:22,  
988:37, 992:36,  
995:15, 996:47,  
997:27, 997:44,  
998:33, 999:6,  
999:12, 1000:5,  
1000:32, 1001:2,  
1002:13, 1002:25,  
1004:5, 1004:12,  
1005:17, 1007:25,  
1012:47, 1016:44,  
1017:16, 1033:37,  
1035:2, 1036:4,  
1036:36, 1037:45,  
1048:41, 1049:18  
**seeing** [5] - 970:16,  
978:33, 1017:31,  
1029:14, 1031:23  
**seek** [6] - 942:9,  
948:7, 967:11,  
973:47, 974:13,  
1039:38  
**seeking** [3] - 959:29,  
966:29, 1002:14  
**seem** [3] - 952:23,  
964:44, 981:21  
**sees** [1] - 1017:29  
**segmentation** [1] -  
1028:44  
**select** [3] - 970:36,  
974:31, 998:20  
**selected** [1] - 998:1  
**selecting** [2] - 961:16,  
998:30  
**selection** [2] - 961:20,  
970:37  
**send** [9] - 1013:22,  
1018:5, 1018:6,  
1018:8, 1018:11,  
1019:45, 1029:35,  
1050:26  
**sense** [15] - 945:25,  
985:32, 1009:36,  
1015:11, 1017:14,  
1019:5, 1021:29,  
1021:31, 1024:16,  
1032:46, 1034:17,  
1036:16, 1036:34,  
1046:27, 1046:29  
**sensing** [2] - 1021:47,  
1022:14  
**sensitive** [4] -  
1022:13, 1022:46,  
1036:5, 1036:17  
**sensitivity** [2] -  
1023:14, 1035:3  
**sensor** [8] - 1012:32,  
1013:16, 1013:20,  
1014:13, 1021:43,  
1022:12, 1022:19,  
1033:34  
**sensors** [11] -  
1012:23, 1012:28,  
1013:1, 1013:6,  
1013:12, 1013:14,  
1013:23, 1020:39,  
1021:2, 1021:3,  
1032:29  
**sent** [8] - 946:24,  
973:12, 973:13,  
973:43, 986:42,  
986:43, 991:22,  
1029:3  
**sentence** [3] - 998:38,  
1043:39, 1043:42  
**separate** [3] - 992:19,  
1013:10, 1013:45  
**separated** [1] - 972:31  
**series** [6] - 944:4,  
944:8, 945:22,  
961:25, 988:41,  
1005:3  
**server** [3] - 1011:10,  
1032:32  
**serves** [2] - 982:39,  
983:28  
**Service** [5] - 1022:41,  
1023:5, 1023:14,  
1023:15, 1023:26  
**service** [9] - 979:20,  
979:23, 1003:41,  
1009:23, 1012:40,  
1014:32, 1021:7,  
1036:32, 1048:22  
**service-wide** [1] -  
1048:22  
**session** [1] - 1039:4  
**set** [13] - 944:13,  
971:42, 971:47,  
983:15, 984:43,  
985:23, 989:1,  
998:34, 999:24,  
1029:21, 1034:29,  
1034:43, 1048:16  
**sets** [2] - 1014:40,  
1035:37  
**setting** [3] - 1022:24,  
1026:22, 1035:9  
**seven** [2] - 955:32,  
955:33  
**several** [4] - 968:32,  
984:16, 993:32,  
1002:20  
**severity** [1] - 1032:43  
**SEW** [1] - 991:22  
**SEW.0001.0001.0032**  
[1] - 972:47  
**SEW.0001.0001.0036**  
[1] - 954:17  
**SEW.0001.0001.4857**  
[4] - 972:46, 973:19,  
974:1, 974:5  
**SEW.0001.0001.4914**  
[1] - 946:29  
**SEW.0001.0001.4915**  
[1] - 980:26  
**SEW.0001.0001.4918**  
[2] - 948:19, 979:6  
**SEW.0001.0001.4919**  
[1] - 956:35  
**SEW.0001.0001.4933**  
[1] - 1003:14  
**SEW.0001.0001.4942**  
[1] - 986:30  
**SEW.0001.0001.5005**  
[1] - 1041:41  
**SEW.0001.0001.5006**  
[1] - 1047:37  
**SEW.0001.0001.5007**  
[1] - 1014:18  
**SEW.0001.0001.5013**  
[1] - 1048:32  
**SEW.0001.0001.5014**  
[3] - 1009:40, 1040:9,  
1046:18  
**SEW.0001.0001.5173**  
[1] - 991:19  
**SEW.0001.0001.5175**  
[1] - 1029:44  
**SEW3** [1] - 974:7  
**sewer** [1] - 1009:11  
**shading** [1] - 1030:26  
**shared** [3] - 964:40,  
964:47, 965:5  
**shifts** [1] - 952:30  
**Shin** [1] - 966:38  
**Shire** [7] - 941:39,  
1039:38, 1040:5,  
1041:16, 1050:12,  
1050:16, 1050:46  
**shire** [8] - 942:14,  
942:16, 974:17,  
977:33, 991:7,  
991:11, 1003:9,  
1050:36  
**shoes** [1] - 1035:26  
**short** [4] - 953:17,  
974:18, 977:26,  
1017:41  
**shorter** [2] - 949:29,  
987:35  
**shortly** [1] - 1008:41  
**show** [5] - 956:34,  
1006:15, 1024:16,  
1025:20, 1027:20  
**showing** [2] - 957:3,  
988:10  
**shown** [2] - 958:35,  
986:46  
**shows** [5] - 951:24,  
989:36, 991:10,  
1031:34, 1046:22  
**shut** [1] - 1004:15  
**sic** [2] - 1023:27,  
1042:10  
**side** [29] - 959:6,  
960:16, 979:27,  
981:26, 984:24,  
1010:3, 1012:37,  
1015:22, 1015:35,  
1015:46, 1016:21,  
1019:12, 1019:24,  
1022:38, 1022:47,  
1023:38, 1023:46,  
1024:20, 1024:35,  
1024:44, 1026:29,  
1027:27, 1031:6,  
1035:8, 1041:33,  
1051:6, 1051:23  
**sideways** [1] - 948:30  
**sign** [6] - 943:25,  
975:47, 1008:5,  
1008:6, 1008:7,  
1036:38  
**signed** [1] - 1037:5  
**significant** [5] -  
955:47, 961:13,  
968:33, 970:31,  
970:44  
**significantly** [2] -  
955:44, 988:17  
**silver** [1] - 1033:24  
**similar** [14] - 948:20,  
950:47, 954:29,  
954:33, 969:29,  
969:43, 970:10,  
971:20, 979:22,  
987:17, 1032:19,  
1036:18, 1042:22,  
1042:46  
**simple** [5] - 984:25,  
984:40, 999:8,  
1028:40, 1029:36  
**simpler** [1] - 989:34  
**simplest** [2] - 984:12,  
985:13  
**simplify** [1] - 998:10  
**simply** [9] - 946:24,  
947:29, 952:1,  
955:13, 961:42,  
973:36, 988:8,

1049:45, 1051:36  
**simulation** [2] -  
1002:16, 1002:18  
**single** [6] - 953:2,  
964:21, 964:25,  
969:16, 1002:39,  
1043:27  
**sit** [4] - 981:8, 993:23,  
1008:35, 1013:40  
**site** [13] - 985:16,  
988:19, 988:31,  
990:47, 998:28,  
999:29, 1003:31,  
1003:35, 1005:5,  
1005:36, 1005:45,  
1006:1, 1026:16  
**site-specific** [1] -  
999:29  
**sites** [2] - 983:45,  
984:1  
**sits** [2] - 947:40,  
1022:9  
**sitting** [5] - 970:12,  
978:29, 1022:18,  
1022:20  
**situation** [7] - 963:19,  
989:38, 1002:23,  
1006:1, 1023:7,  
1026:33  
**situations** [2] -  
1026:38, 1028:17  
**six** [5] - 1014:40,  
1021:39, 1030:39,  
1039:26, 1048:21  
**size** [16] - 944:1,  
945:20, 945:30,  
945:32, 952:40,  
956:21, 957:18,  
958:11, 959:7,  
961:14, 964:24,  
984:39, 998:29,  
1043:26, 1044:2,  
1045:19  
**sized** [2] - 956:28,  
993:5  
**sizes** [4] - 1042:39,  
1043:4, 1044:6,  
1044:9  
**sketch** [4] - 978:41,  
978:45, 978:47,  
981:3  
**skills** [2] - 995:28,  
1023:18  
**slight** [1] - 990:18  
**slightly** [5] - 948:29,  
979:16, 998:7,  
1012:3, 1049:9  
**slope** [2] - 949:11,  
1002:4  
**slow** [1] - 1004:22  
**small** [10] - 949:31,  
956:28, 963:28,  
969:33, 973:37,  
976:39, 990:33,  
993:4, 1021:7,  
1039:2  
**smaller** [12] - 949:18,  
952:45, 953:5,  
956:19, 957:16,  
962:20, 962:47,  
963:7, 971:11,  
979:28, 981:38  
**smallest** [2] - 955:3,  
955:9  
**smart** [2] - 1010:44,  
1010:46  
**SME** [1] - 964:41  
**SMEC** [14] - 974:40,  
977:31, 992:15,  
994:42, 994:47,  
995:38, 995:44,  
996:27, 997:3,  
997:18, 997:19,  
999:4, 1001:15,  
1002:36  
**SMEC's** [3] - 995:28,  
997:11, 999:7  
**SMS** [1] - 1028:1  
**snap** [1] - 990:20  
**snaps** [2] - 990:13,  
990:17  
**snipped** [1] - 987:40  
**software** [4] -  
1034:13, 1038:10,  
1038:16, 1038:22  
**soil** [24] - 990:31,  
992:33, 993:1,  
998:16, 998:17,  
998:24, 998:26,  
998:27, 998:28,  
998:30, 998:41,  
998:45, 1000:7,  
1000:10, 1000:13,  
1000:15, 1000:18,  
1000:29, 1000:32,  
1019:5, 1019:11  
**soils** [2] - 1000:16,  
1019:16  
**solely** [1] - 995:4  
**solicitors** [1] -  
1052:33  
**solid** [1] - 1038:33  
**solutions** [2] -  
1014:35, 1021:13  
**solve** [1] - 1010:8  
**someone** [10] -  
966:40, 979:1,  
981:3, 1002:17,  
1013:18, 1018:15,  
1028:7, 1038:10,  
1038:30, 1043:25  
**sometimes** [7] -  
964:8, 982:11,  
985:43, 985:47,  
994:17, 1033:29,  
1043:46  
**somewhat** [1] -  
992:31  
**somewhere** [5] -  
970:17, 996:9,  
996:12, 1017:11,  
1022:21  
**soon** [11] - 946:10,  
946:23, 1021:12,  
1021:33, 1021:37,  
1023:26, 1023:28,  
1036:19, 1044:45,  
1045:28, 1045:40  
**sooner** [1] - 1038:34  
**sophisticated** [2] -  
1012:32, 1034:3  
**sorry** [41] - 944:38,  
947:38, 956:43,  
960:4, 960:10,  
960:18, 960:42,  
963:42, 965:17,  
972:47, 973:9,  
974:31, 979:38,  
981:41, 982:9,  
982:12, 982:27,  
982:30, 986:32,  
1001:41, 1005:35,  
1008:2, 1008:7,  
1009:33, 1020:13,  
1020:36, 1023:3,  
1023:6, 1023:24,  
1025:8, 1026:18,  
1033:2, 1039:10,  
1039:13, 1040:16,  
1041:24, 1042:14,  
1043:36, 1043:43,  
1048:41, 1049:16  
**sort** [56] - 944:31,  
945:26, 945:41,  
946:21, 954:12,  
956:22, 958:30,  
959:25, 962:32,  
969:7, 971:12,  
980:16, 981:36,  
984:29, 1009:8,  
1010:3, 1011:29,  
1013:3, 1013:11,  
1013:38, 1014:2,  
1015:19, 1016:42,  
1017:12, 1018:41,  
1018:42, 1019:8,  
1021:4, 1021:26,  
1021:29, 1021:35,  
1022:45, 1023:47,  
1024:1, 1024:15,  
1024:16, 1024:46,  
1027:21, 1027:23,  
1028:45, 1034:4,  
1034:13, 1034:19,  
1034:46, 1035:11,  
1035:19, 1035:24,  
1037:1, 1037:11,  
1037:14, 1037:42,  
1043:19, 1044:30,  
1050:21, 1051:26  
**Sotto** [4] - 1021:43,  
1021:44, 1022:6,  
1022:8  
**sought** [3] - 960:44,  
978:17, 991:30  
**sound** [1] - 961:11  
**sounds** [2] - 979:4,  
1050:41  
**source** [11] - 954:27,  
954:29, 979:20,  
979:21, 1016:44,  
1018:34, 1025:15,  
1026:31, 1027:26,  
1029:39, 1031:18  
**sources** [10] - 979:18,  
980:2, 1015:45,  
1016:2, 1016:5,  
1018:39, 1025:26,  
1031:14, 1046:40  
**South** [103] - 941:41,  
942:4, 942:9,  
943:38, 951:5,  
953:42, 953:46,  
964:41, 966:10,  
969:34, 974:39,  
976:25, 976:31,  
977:10, 977:15,  
977:19, 977:46,  
977:47, 978:2,  
978:20, 978:40,  
985:18, 985:40,  
991:11, 992:4,  
992:8, 993:23,  
997:3, 1005:44,  
1006:13, 1007:13,  
1008:35, 1008:41,  
1009:1, 1009:5,  
1009:13, 1009:27,  
1010:28, 1010:32,  
1011:37, 1012:29,  
1012:36, 1013:7,  
1014:12, 1015:3,  
1016:24, 1018:18,  
1021:17, 1021:35,  
1021:42, 1024:10,  
1024:24, 1024:33,  
1025:28, 1025:35,  
1025:47, 1026:34,  
1027:13, 1027:37,  
1028:11, 1028:29,  
1028:35, 1028:43,  
1029:40, 1029:42,  
1030:1, 1030:10,  
1030:22, 1030:40,  
1031:22, 1032:22,  
1032:26, 1033:42,  
1035:21, 1036:9,  
1036:36, 1036:40,  
1037:8, 1037:19,  
1037:24, 1037:32,  
1037:37, 1038:23,  
1038:46, 1039:24,  
1040:33, 1041:15,  
1043:15, 1043:34,  
1044:14, 1044:16,  
1047:18, 1048:22,  
1050:11, 1050:15,  
1050:25, 1050:35,  
1050:45, 1051:15,  
1051:17, 1051:19,  
1051:24, 1052:8  
**speaking** [6] - 944:18,  
978:10, 983:47,  
1009:47, 1010:35,  
1013:20  
**special** [1] - 1023:37  
**specific** [11] - 948:45,  
963:44, 964:4,  
994:6, 994:45,  
999:29, 999:34,  
1009:44, 1014:2,  
1017:9, 1021:6  
**specifically** [6] -  
1010:31, 1014:39,  
1027:10, 1029:46,  
1042:33, 1050:7  
**specification** [2] -  
961:35, 962:6  
**specifics** [1] - 1006:9  
**spectrum** [2] - 962:32,  
1032:16  
**spending** [1] -  
1038:30  
**spent** [3] - 970:31,  
970:43, 970:45  
**spike** [3] - 953:21,  
986:37, 987:9  
**spits** [1] - 999:33  
**split** [6] - 990:27,  
990:37, 990:40,  
991:2, 992:46  
**spoken** [1] - 964:34  
**spreadsheet** [21] -  
989:25, 989:26,  
989:27, 1029:7,  
1029:10, 1029:46,  
1031:34, 1046:22,  
1046:28, 1047:6,  
1047:12, 1047:46,  
1048:31, 1048:33,



1048:35, 1048:37,  
1048:40, 1048:41,  
1049:6, 1049:20,  
1049:32  
**square** [2] - 951:27,  
951:31  
**squarely** [1] - 1011:24  
**staff** [3] - 1024:14,  
1025:29, 1031:23  
**stage** [1] - 953:11  
**staggered** [1] - 984:35  
**stamp** [2] - 1004:30,  
1005:11  
**stamping** [1] - 988:5  
**stamps** [2] - 1004:36,  
1004:46  
**stand** [1] - 994:13  
**standalone** [1] -  
1022:18  
**standard** [18] - 944:5,  
949:13, 950:13,  
950:20, 950:23,  
961:43, 963:29,  
963:32, 963:35,  
963:36, 964:25,  
999:24, 1006:10,  
1006:11, 1012:43,  
1020:24, 1024:11,  
1043:16  
**standards** [2] -  
976:19, 997:27  
**start** [13] - 955:46,  
956:25, 957:11,  
957:16, 965:26,  
991:20, 994:17,  
1009:32, 1014:23,  
1024:5, 1025:27,  
1032:24, 1052:36  
**started** [10] - 955:12,  
978:40, 988:32,  
991:33, 991:36,  
1008:41, 1009:5,  
1009:35, 1012:2,  
1041:19  
**starting** [7] - 1030:6,  
1036:22, 1040:6,  
1041:17, 1042:36,  
1043:1, 1043:42  
**starts** [5] - 987:47,  
988:27, 989:28,  
1046:35  
**State** [1] - 941:36  
**state** [8] - 943:2,  
975:20, 1007:6,  
1034:42, 1040:47,  
1043:23, 1043:31,  
1048:18  
**STATEMENT** [4] -  
943:34, 943:35,  
976:8, 1008:21  
**statement** [64] -  
943:12, 943:19,  
943:22, 943:29,  
943:31, 943:32,  
944:44, 945:1,  
945:19, 945:45,  
951:11, 956:16,  
956:35, 958:31,  
965:2, 973:20,  
975:29, 975:44,  
976:2, 976:5,  
983:39, 986:7,  
987:17, 987:24,  
989:46, 991:39,  
998:34, 999:41,  
1003:18, 1005:21,  
1007:20, 1007:24,  
1007:27, 1008:2,  
1008:15, 1008:18,  
1009:39, 1009:45,  
1010:28, 1011:37,  
1014:17, 1020:15,  
1020:27, 1022:35,  
1024:22, 1026:32,  
1027:10, 1027:26,  
1029:7, 1029:47,  
1030:35, 1031:33,  
1034:28, 1036:36,  
1038:44, 1040:8,  
1041:11, 1041:24,  
1041:42, 1044:30,  
1046:17, 1047:23,  
1047:41, 1048:17  
**statements** [2] -  
1018:18, 1048:36  
**States** [2] - 998:12,  
1000:11  
**states** [3] - 1042:6,  
1042:34, 1045:9  
**station** [3] - 982:3,  
982:13, 1032:30  
**stations** [3] - 982:4,  
983:47, 984:1  
**statistical** [1] - 963:10  
**status** [1] - 1020:10  
**stay** [3] - 952:33,  
971:4, 1023:10  
**steady** [2] - 953:23,  
953:25  
**step** [3] - 993:43,  
1017:47, 1027:40  
**stepping** [1] - 1031:14  
**steps** [1] - 1029:36  
**sticking** [1] - 1048:16  
**still** [11] - 942:20,  
971:21, 980:47,  
1023:40, 1026:10,  
1032:36, 1037:47,  
1049:10, 1051:21,  
1052:9  
**stint** [1] - 976:41  
**stop** [2] - 955:42,  
955:43  
**stopped** [2] - 988:15,  
988:18  
**stops** [1] - 989:29  
**storages** [1] - 981:42  
**store** [2] - 966:25,  
983:23  
**stored** [1] - 986:44  
**stormwater** [7] -  
991:23, 991:40,  
995:5, 997:6,  
997:12, 997:21,  
998:45  
**story** [3] - 982:10,  
1004:45, 1017:41  
**straightaway** [3] -  
991:42, 1023:20,  
1036:21  
**strategy** [6] - 993:27,  
1010:15, 1014:17,  
1014:20, 1014:28,  
1015:36  
**Stream** [4] - 1023:5,  
1023:14, 1023:15,  
1023:27  
**Stream** [1] - 1022:41  
**Street** [26] - 941:18,  
943:6, 946:46,  
947:1, 948:24,  
948:25, 951:39,  
951:40, 975:22,  
980:1, 980:3, 980:7,  
982:23, 982:27,  
982:28, 983:24,  
983:26, 983:28,  
984:27, 984:28,  
984:42, 985:15,  
1007:10, 1032:13,  
1037:20  
**streets** [2] - 1011:12,  
1015:21  
**stress** [1] - 1017:6  
**stressed** [1] - 1022:11  
**stretch** [1] - 990:14  
**stretches** [1] - 990:11  
**strike** [2] - 1026:24,  
1032:4  
**striking** [1] - 1029:12  
**strong** [2] - 1026:40,  
1027:19  
**stronger** [1] - 1036:46  
**structure** [2] - 1023:2,  
1037:15  
**studies** [1] - 997:42  
**stuff** [7] - 1015:19,  
1019:43, 1021:47,  
1034:4, 1036:26,  
1038:6, 1047:40  
**style** [1] - 983:24  
**subject** [2] - 968:32,  
1052:9  
**submeter** [4] - 966:6,  
966:13, 966:23,  
972:37  
**submeters** [8] -  
944:26, 945:7,  
965:36, 966:1,  
966:8, 966:19,  
967:8, 972:35  
**submitting** [1] -  
1011:13  
**subquestion** [3] -  
995:39, 995:42,  
995:44  
**subquestions** [5] -  
995:37, 995:38,  
995:41, 996:6,  
996:14  
**subsequent** [1] -  
980:4  
**subsidiary** [2] -  
1008:36, 1008:38  
**substantial** [1] -  
989:46  
**substantially** [1] -  
988:12  
**substituting** [1] -  
965:43  
**subtract** [1] - 945:14  
**subtracted** [1] -  
971:13  
**suburb** [5] - 1026:15,  
1031:44, 1040:47,  
1041:6, 1047:42  
**suburb** [1] - 1032:1  
**suburbs** [1] - 1027:9  
**subzone** [1] - 984:10  
**subzones** [1] - 972:32  
**successful** [1] -  
1012:4  
**sudden** [1] - 953:21  
**sufficient** [3] - 963:23,  
980:32, 993:42  
**sufficiently** [2] -  
966:45, 969:43  
**suggested** [3] - 949:3,  
949:12, 1002:17  
**suggestion** [1] -  
969:23  
**suggestions** [2] -  
961:12, 969:47  
**suggests** [1] - 998:39  
**sum** [2] - 944:29,  
947:27  
**summary** [2] -  
1003:22, 1004:29  
**summed** [2] - 967:27,  
989:27  
**summer** [8] - 944:35,  
952:39, 953:32,  
957:9, 971:2, 971:7,  
971:11, 1017:38  
**super** [5] - 1018:45,  
1032:18, 1034:46,  
1045:42, 1047:27  
**super-high** [1] -  
1045:42  
**supervision** [1] -  
1036:30  
**supplemented** [1] -  
1001:18  
**supplied** [1] - 946:12  
**supplies** [1] - 984:41  
**supply** [7] - 944:27,  
945:23, 960:22,  
980:2, 983:22,  
983:29, 988:28  
**support** [1] - 993:46  
**supporting** [1] -  
976:17  
**suppose** [5] - 957:4,  
962:31, 990:16,  
995:33, 1035:19  
**surface** [20] - 992:11,  
993:2, 993:4, 993:6,  
995:10, 995:13,  
995:17, 995:18,  
995:22, 995:25,  
995:28, 995:32,  
995:43, 995:46,  
996:3, 996:19,  
997:21, 998:18,  
1003:35, 1019:6  
**surfacing** [1] -  
1037:20  
**surprise** [2] - 958:20,  
1026:28  
**surprised** [2] -  
1029:16, 1034:25  
**surprising** [1] -  
1026:24  
**surrounding** [1] -  
1044:22  
**susceptible** [1] -  
1036:10  
**suspect** [5] - 956:12,  
957:36, 958:17,  
970:23, 983:3  
**Sustainable** [1] -  
960:40  
**swapped** [1] - 1009:35  
**Sydney** [1] - 960:37  
**symbols** [1] - 981:6  
**system** [23] - 973:5,  
973:10, 975:43,  
979:19, 986:40,  
986:42, 989:24,  
991:10, 991:40,

1004:27, 1006:15, 1013:45, 1013:46, 1018:11, 1025:2, 1027:35, 1027:41, 1027:42, 1033:39, 1035:30, 1036:44, 1038:13, 1049:35	992:41 <b>technologies</b> [1] - 1021:11 <b>Technology</b> [1] - 960:37 <b>technology</b> [16] - 1009:17, 1009:28, 1010:4, 1010:7, 1012:2, 1012:29, 1014:4, 1017:7, 1021:19, 1021:31, 1021:36, 1021:42, 1022:1, 1022:6, 1036:31, 1043:45	<b>testimony</b> [1] - 1034:2 <b>testing</b> [4] - 1002:30, 1012:1, 1017:6, 1043:46 <b>testing"</b> [1] - 1002:31 <b>text</b> [3] - 1018:25, 1018:26 <b>themselves</b> [3] - 945:33, 1023:22, 1037:29 <b>theory</b> [1] - 1014:22 <b>thereabouts</b> [1] - 988:40 <b>therefore</b> [4] - 953:15, 955:42, 956:27, 973:38 <b>thereto</b> [1] - 943:29 <b>they have</b> [6] - 961:21, 1004:29, 1004:30, 1016:25, 1025:47, 1028:21 <b>they've</b> [11] - 955:10, 957:11, 961:11, 969:23, 972:27, 1004:28, 1005:7, 1021:5, 1023:17, 1049:35, 1050:20 <b>thinking</b> [4] - 991:34, 991:36, 1006:3, 1043:20 <b>third</b> [7] - 957:13, 996:2, 1006:43, 1018:34, 1027:26, 1047:9 <b>thirds</b> [1] - 1001:41 <b>thousand</b> [1] - 1012:41 <b>thousands</b> [6] - 1012:5, 1012:6, 1021:7, 1032:44, 1033:12, 1035:31 <b>three</b> [31] - 942:22, 953:39, 953:41, 957:2, 957:4, 957:18, 957:22, 958:22, 960:45, 971:46, 972:4, 982:7, 998:19, 1024:22, 1024:46, 1026:13, 1026:24, 1028:20, 1029:42, 1030:21, 1030:27, 1034:19, 1034:25, 1034:38, 1036:19, 1037:43, 1038:20, 1039:7, 1039:13, 1039:29, 1047:17 <b>three-year</b> [5] - 1024:22, 1026:13, 1026:24, 1039:7,	1039:13 <b>threshold</b> [6] - 1029:21, 1033:16, 1034:24, 1035:28, 1035:29, 1036:39 <b>thresholds</b> [5] - 1034:28, 1034:35, 1035:2, 1036:6, 1036:45 <b>throughout</b> [3] - 969:38, 1009:13, 1020:44 <b>ticking</b> [1] - 1031:24 <b>tied</b> [1] - 1031:18 <b>Tim</b> [4] - 1009:35, 1020:47, 1021:10, 1023:16 <b>time"</b> [1] - 1035:43 <b>time/date</b> [1] - 1004:46 <b>timeline</b> [1] - 1045:38 <b>timing</b> [2] - 946:22, 993:18 <b>title</b> [1] - 975:26 <b>TO</b> [3] - 943:35, 974:7, 1046:3 <b>today</b> [9] - 942:22, 983:2, 1006:33, 1006:44, 1007:17, 1016:35, 1034:2, 1039:23, 1051:42 <b>today's</b> [1] - 1008:12 <b>together</b> [6] - 965:6, 965:11, 978:41, 1008:19, 1045:21, 1047:41 <b>TOGETHER</b> [1] - 1008:21 <b>took</b> [11] - 973:42, 980:11, 980:43, 991:41, 1000:29, 1000:32, 1000:41, 1005:29, 1005:35, 1005:44, 1046:41 <b>tool</b> [4] - 1013:11, 1013:13, 1013:22, 1013:40 <b>top</b> [16] - 946:42, 950:29, 956:12, 957:28, 981:36, 982:20, 982:23, 984:26, 984:42, 985:15, 1014:36, 1015:31, 1020:33, 1030:5, 1032:44, 1049:33 <b>topic</b> [7] - 992:30, 994:24, 995:1, 997:1, 1037:17, 1038:44, 1040:7	<b>topics</b> [1] - 994:37 <b>total</b> [10] - 944:29, 945:38, 960:30, 964:25, 973:5, 973:10, 986:47, 1028:41, 1030:30, 1031:43 <b>totals</b> [1] - 989:31 <b>towards</b> [2] - 971:6, 1012:3 <b>towers</b> [2] - 1019:46, 1019:47 <b>traditionally</b> [1] - 1012:33 <b>train</b> [2] - 1013:40, 1036:42 <b>trained</b> [1] - 978:6 <b>training</b> [1] - 1013:34 <b>transcript</b> [3] - 958:39, 993:16, 1040:17 <b>transfer</b> [1] - 1022:24 <b>transformation</b> [6] - 943:10, 1007:13, 1009:33, 1010:1, 1010:3, 1013:39 <b>transit</b> [1] - 1003:28 <b>transmits</b> [3] - 1011:10, 1022:23, 1032:31 <b>travel</b> [5] - 952:34, 994:26, 997:5, 997:12, 997:15 <b>travelled</b> [4] - 991:23, 991:31, 995:5, 995:26 <b>treatment</b> [2] - 1009:8, 1009:10 <b>tri4d</b> [1] - 953:31 <b>triages</b> [2] - 1013:11, 1036:34 <b>trial</b> [2] - 1021:37, 1021:40 <b>trailing</b> [1] - 1011:47 <b>trials</b> [1] - 1012:1 <b>triangle</b> [5] - 947:35, 947:38, 947:41, 947:47, 955:14 <b>triangles</b> [7] - 948:30, 980:19, 980:35, 980:38, 981:9, 981:14, 981:35 <b>trickier</b> [2] - 947:25, 1043:12 <b>tricky</b> [3] - 944:35, 949:30, 974:28 <b>tried</b> [5] - 944:39, 962:44, 962:45, 1045:18, 1047:43 <b>trigger</b> [3] - 1013:16, 1016:40, 1033:37
<hr/>				
<b>T</b>				
<hr/>				
<b>table</b> [7] - 1014:40, 1015:34, 1018:34, 1024:43, 1029:40, 1029:44, 1046:47 <b>tables</b> [2] - 999:25, 1032:7 <b>tackles</b> [2] - 1039:15, 1039:16 <b>talks</b> [1] - 998:14 <b>tank</b> [18] - 948:24, 951:39, 951:47, 955:41, 955:46, 982:23, 982:27, 982:28, 983:20, 983:22, 983:24, 983:25, 983:27, 983:28, 984:41, 984:42, 985:15, 985:24 <b>tanks</b> [17] - 945:23, 945:28, 945:29, 945:30, 945:32, 945:33, 950:6, 966:25, 981:43, 981:45, 983:16, 983:18, 983:19, 983:27, 983:31, 983:46 <b>target</b> [3] - 1012:42, 1042:37, 1043:2 <b>task</b> [4] - 966:44, 970:16, 1003:22, 1004:45 <b>tasks</b> [1] - 1004:32 <b>team</b> [13] - 1013:13, 1013:43, 1014:33, 1014:34, 1032:40, 1036:29, 1036:31, 1036:32, 1036:33, 1039:2, 1045:41, 1046:28 <b>teams</b> [1] - 1036:25 <b>technical</b> [4] - 975:26, 976:18, 977:15,	992:41 <b>technologies</b> [1] - 1021:11 <b>Technology</b> [1] - 960:37 <b>technology</b> [16] - 1009:17, 1009:28, 1010:4, 1010:7, 1012:2, 1012:29, 1014:4, 1017:7, 1021:19, 1021:31, 1021:36, 1021:42, 1022:1, 1022:6, 1036:31, 1043:45 <b>telecommunications</b> [1] - 1019:45 <b>telegraphed</b> [1] - 1011:22 <b>temporary</b> [2] - 1021:13, 1023:38 <b>tend</b> [4] - 956:23, 957:18, 973:37, 988:42 <b>tended</b> [3] - 952:33, 952:35, 971:3 <b>tender</b> [6] - 943:28, 973:47, 976:2, 1008:15, 1045:44, 1046:7 <b>tendered</b> [1] - 991:19 <b>tends</b> [2] - 957:16, 988:43 <b>term</b> [3] - 952:37, 1002:31, 1034:42 <b>terminology</b> [4] - 966:15, 970:6, 1003:39, 1051:4 <b>terms</b> [36] - 944:4, 947:15, 947:24, 948:39, 950:41, 951:38, 953:27, 955:21, 955:31, 958:32, 959:41, 961:24, 962:33, 963:31, 965:31, 966:41, 967:19, 967:47, 976:36, 977:38, 983:34, 984:25, 984:40, 985:12, 985:25, 990:28, 996:28, 996:35, 998:4, 1004:35, 1009:26, 1010:40, 1014:18, 1016:24, 1024:1, 1048:45 <b>test</b> [2] - 964:29, 1021:39 <b>tested</b> [2] - 998:27, 1000:30	<b>testimony</b> [1] - 1034:2 <b>testing</b> [4] - 1002:30, 1012:1, 1017:6, 1043:46 <b>testing"</b> [1] - 1002:31 <b>text</b> [3] - 1018:25, 1018:26 <b>themselves</b> [3] - 945:33, 1023:22, 1037:29 <b>theory</b> [1] - 1014:22 <b>thereabouts</b> [1] - 988:40 <b>therefore</b> [4] - 953:15, 955:42, 956:27, 973:38 <b>thereto</b> [1] - 943:29 <b>they have</b> [6] - 961:21, 1004:29, 1004:30, 1016:25, 1025:47, 1028:21 <b>they've</b> [11] - 955:10, 957:11, 961:11, 969:23, 972:27, 1004:28, 1005:7, 1021:5, 1023:17, 1049:35, 1050:20 <b>thinking</b> [4] - 991:34, 991:36, 1006:3, 1043:20 <b>third</b> [7] - 957:13, 996:2, 1006:43, 1018:34, 1027:26, 1047:9 <b>thirds</b> [1] - 1001:41 <b>thousand</b> [1] - 1012:41 <b>thousands</b> [6] - 1012:5, 1012:6, 1021:7, 1032:44, 1033:12, 1035:31 <b>three</b> [31] - 942:22, 953:39, 953:41, 957:2, 957:4, 957:18, 957:22, 958:22, 960:45, 971:46, 972:4, 982:7, 998:19, 1024:22, 1024:46, 1026:13, 1026:24, 1028:20, 1029:42, 1030:21, 1030:27, 1034:19, 1034:25, 1034:38, 1036:19, 1037:43, 1038:20, 1039:7, 1039:13, 1039:29, 1047:17 <b>three-year</b> [5] - 1024:22, 1026:13, 1026:24, 1039:7,	1039:13 <b>threshold</b> [6] - 1029:21, 1033:16, 1034:24, 1035:28, 1035:29, 1036:39 <b>thresholds</b> [5] - 1034:28, 1034:35, 1035:2, 1036:6, 1036:45 <b>throughout</b> [3] - 969:38, 1009:13, 1020:44 <b>ticking</b> [1] - 1031:24 <b>tied</b> [1] - 1031:18 <b>Tim</b> [4] - 1009:35, 1020:47, 1021:10, 1023:16 <b>time"</b> [1] - 1035:43 <b>time/date</b> [1] - 1004:46 <b>timeline</b> [1] - 1045:38 <b>timing</b> [2] - 946:22, 993:18 <b>title</b> [1] - 975:26 <b>TO</b> [3] - 943:35, 974:7, 1046:3 <b>today</b> [9] - 942:22, 983:2, 1006:33, 1006:44, 1007:17, 1016:35, 1034:2, 1039:23, 1051:42 <b>today's</b> [1] - 1008:12 <b>together</b> [6] - 965:6, 965:11, 978:41, 1008:19, 1045:21, 1047:41 <b>TOGETHER</b> [1] - 1008:21 <b>took</b> [11] - 973:42, 980:11, 980:43, 991:41, 1000:29, 1000:32, 1000:41, 1005:29, 1005:35, 1005:44, 1046:41 <b>tool</b> [4] - 1013:11, 1013:13, 1013:22, 1013:40 <b>top</b> [16] - 946:42, 950:29, 956:12, 957:28, 981:36, 982:20, 982:23, 984:26, 984:42, 985:15, 1014:36, 1015:31, 1020:33, 1030:5, 1032:44, 1049:33 <b>topic</b> [7] - 992:30, 994:24, 995:1, 997:1, 1037:17, 1038:44, 1040:7	<b>topics</b> [1] - 994:37 <b>total</b> [10] - 944:29, 945:38, 960:30, 964:25, 973:5, 973:10, 986:47, 1028:41, 1030:30, 1031:43 <b>totals</b> [1] - 989:31 <b>towards</b> [2] - 971:6, 1012:3 <b>towers</b> [2] - 1019:46, 1019:47 <b>traditionally</b> [1] - 1012:33 <b>train</b> [2] - 1013:40, 1036:42 <b>trained</b> [1] - 978:6 <b>training</b> [1] - 1013:34 <b>transcript</b> [3] - 958:39, 993:16, 1040:17 <b>transfer</b> [1] - 1022:24 <b>transformation</b> [6] - 943:10, 1007:13, 1009:33, 1010:1, 1010:3, 1013:39 <b>transit</b> [1] - 1003:28 <b>transmits</b> [3] - 1011:10, 1022:23, 1032:31 <b>travel</b> [5] - 952:34, 994:26, 997:5, 997:12, 997:15 <b>travelled</b> [4] - 991:23, 991:31, 995:5, 995:26 <b>treatment</b> [2] - 1009:8, 1009:10 <b>tri4d</b> [1] - 953:31 <b>triages</b> [2] - 1013:11, 1036:34 <b>trial</b> [2] - 1021:37, 1021:40 <b>trailing</b> [1] - 1011:47 <b>trials</b> [1] - 1012:1 <b>triangle</b> [5] - 947:35, 947:38, 947:41, 947:47, 955:14 <b>triangles</b> [7] - 948:30, 980:19, 980:35, 980:38, 981:9, 981:14, 981:35 <b>trickier</b> [2] - 947:25, 1043:12 <b>tricky</b> [3] - 944:35, 949:30, 974:28 <b>tried</b> [5] - 944:39, 962:44, 962:45, 1045:18, 1047:43 <b>trigger</b> [3] - 1013:16, 1016:40, 1033:37

**triggered** <sup>[4]</sup> - 1017:45, 1029:19, 1033:2, 1048:6  
**trimmed** <sup>[1]</sup> - 963:17  
**troubleshooting** <sup>[1]</sup> - 976:19  
**true** <sup>[4]</sup> - 943:22, 971:38, 975:44, 1008:2  
**truly** <sup>[1]</sup> - 942:31  
**trunk** <sup>[5]</sup> - 1021:2, 1021:10, 1021:18, 1021:32, 1021:46  
**try** <sup>[19]</sup> - 949:39, 952:43, 956:22, 960:11, 961:42, 963:3, 963:6, 970:29, 973:31, 974:31, 978:41, 985:43, 991:47, 999:9, 1002:18, 1010:8, 1015:7, 1029:37, 1032:28  
**trying** <sup>[21]</sup> - 949:14, 955:32, 958:10, 959:31, 962:34, 963:4, 964:31, 973:30, 994:45, 995:34, 995:35, 996:12, 1001:31, 1005:46, 1010:3, 1012:38, 1024:5, 1032:45, 1034:1, 1034:23, 1038:30  
**Tuesday** <sup>[1]</sup> - 941:24  
**Tully** <sup>[22]</sup> - 942:25, 948:13, 957:44, 958:5, 958:7, 958:13, 975:6, 975:9, 975:20, 975:22, 975:34, 976:5, 976:10, 982:46, 983:6, 983:13, 1002:25, 1002:46, 1003:8, 1006:26, 1045:47  
**TULLY** <sup>[3]</sup> - 975:12, 976:8, 1046:3  
**turbidity** <sup>[1]</sup> - 1033:13  
**turn** <sup>[3]</sup> - 1005:29, 1005:45, 1025:27  
**turned** <sup>[9]</sup> - 988:15, 988:20, 988:28, 988:29, 988:37, 988:40, 988:42, 1005:31, 1006:8  
**tweaking** <sup>[1]</sup> - 1036:21  
**twenty** <sup>[1]</sup> - 1018:1  
**twenty-four** <sup>[1]</sup> - 1018:1

**two** <sup>[63]</sup> - 945:22, 945:43, 946:10, 946:23, 946:45, 948:45, 950:4, 950:7, 957:2, 961:30, 961:32, 961:38, 961:39, 972:3, 972:7, 972:8, 972:16, 972:30, 978:33, 979:18, 979:23, 979:27, 979:38, 980:2, 980:34, 982:4, 982:16, 982:28, 983:27, 989:31, 990:9, 990:28, 995:15, 995:16, 995:19, 995:36, 995:41, 996:5, 997:30, 997:31, 999:22, 1001:41, 1002:9, 1002:10, 1005:25, 1005:43, 1010:36, 1015:33, 1016:2, 1017:30, 1018:39, 1020:6, 1028:17, 1034:19, 1034:25, 1034:38, 1035:27, 1036:19, 1037:43, 1045:44, 1049:9  
**two-thirds** <sup>[1]</sup> - 1001:41  
**type** <sup>[11]</sup> - 955:19, 964:15, 967:47, 969:7, 969:29, 985:5, 992:39, 998:26, 999:31, 1004:29, 1006:7  
**types** <sup>[6]</sup> - 951:33, 965:34, 998:24, 1010:36, 1042:39, 1043:4  
**typical** <sup>[4]</sup> - 953:32, 953:35, 961:43, 963:13  
**typically** <sup>[7]</sup> - 950:42, 952:9, 952:31, 958:18, 1011:17, 1018:4, 1023:6

## U

**ultimately** <sup>[8]</sup> - 995:13, 1001:14, 1006:8, 1011:30, 1012:4, 1012:34, 1013:11, 1018:24  
**unascribed** <sup>[1]</sup> - 944:41  
**unavailable** <sup>[2]</sup> - 1018:40, 1018:41  
**uncertainties** <sup>[3]</sup> - 961:47, 968:32, 968:33  
**uncertainty** <sup>[18]</sup> - 961:27, 961:31, 961:40, 962:2, 962:3, 962:4, 962:6, 962:8, 962:13, 962:33, 963:37, 964:8, 964:24, 964:25, 966:32, 968:35, 968:45, 969:2  
**uncharacteristically** <sup>[1]</sup> - 1029:20  
**under** <sup>[9]</sup> - 955:14, 982:14, 982:15, 983:29, 985:6, 985:7, 1016:44, 1036:29, 1042:5  
**undergoing** <sup>[1]</sup> - 960:36  
**undergraduate** <sup>[2]</sup> - 943:41, 976:44  
**underneath** <sup>[1]</sup> - 946:45  
**understandably** <sup>[1]</sup> - 959:10  
**understood** <sup>[1]</sup> - 967:7  
**undertake** <sup>[3]</sup> - 994:32, 997:4, 1002:36  
**undertaken** <sup>[3]</sup> - 997:30, 1004:33, 1037:40  
**undertaking** <sup>[3]</sup> - 993:47, 995:29, 997:11  
**unexpected** <sup>[1]</sup> - 1026:34  
**unexplained** <sup>[1]</sup> - 1026:39  
**unfortunately** <sup>[1]</sup> - 978:45  
**unison** <sup>[1]</sup> - 1010:8  
**unit** <sup>[1]</sup> - 985:35  
**United** <sup>[2]</sup> - 998:12, 1000:11  
**units** <sup>[6]</sup> - 985:37, 985:43, 986:3, 986:4, 987:2, 987:3  
**university** <sup>[2]</sup> - 976:40, 992:23  
**University** <sup>[3]</sup> - 960:37, 993:11, 1008:30  
**unknown** <sup>[1]</sup> - 947:28

**unless** <sup>[5]</sup> - 1006:36, 1033:24, 1036:45, 1049:18, 1050:31  
**unlike** <sup>[1]</sup> - 960:14  
**unlikely** <sup>[5]</sup> - 953:12, 964:42, 969:7, 1050:30, 1050:42  
**unmetered** <sup>[3]</sup> - 944:31, 953:6, 953:13  
**unseasonal** <sup>[1]</sup> - 952:18  
**UNTIL** <sup>[1]</sup> - 1052:38  
**unusual** <sup>[3]</sup> - 1027:5, 1029:12, 1032:4  
**up** <sup>[66]</sup> - 945:11, 946:26, 947:27, 948:16, 949:30, 950:37, 951:23, 952:37, 952:40, 953:33, 971:42, 972:46, 973:18, 978:34, 978:43, 979:16, 979:27, 980:23, 980:27, 981:36, 984:26, 986:29, 988:9, 988:11, 988:34, 989:27, 989:32, 991:18, 997:13, 997:14, 1003:14, 1003:15, 1003:44, 1004:14, 1013:16, 1013:28, 1018:19, 1020:45, 1022:13, 1022:24, 1022:47, 1026:4, 1026:8, 1026:9, 1027:38, 1028:7, 1029:45, 1033:1, 1033:16, 1033:40, 1037:5, 1037:18, 1040:8, 1041:14, 1041:17, 1041:24, 1044:36, 1045:1, 1046:17, 1047:26, 1047:30, 1047:37, 1048:17, 1048:31, 1049:32  
**updated** <sup>[3]</sup> - 981:5, 1041:12, 1048:34  
**upgraded** <sup>[1]</sup> - 1020:1  
**UPON** <sup>[1]</sup> - 1006:41  
**upside** <sup>[2]</sup> - 981:36, 982:1  
**upside-down** <sup>[2]</sup> - 981:36, 982:1  
**urgency** <sup>[1]</sup> - 1024:16  
**urgent** <sup>[1]</sup> - 1034:8  
**usage** <sup>[62]</sup> - 944:31, 944:38, 944:41, 945:2, 945:5, 945:11, 947:28, 949:13, 953:14, 953:16, 953:33, 959:35, 959:46, 961:25, 961:45, 967:23, 967:27, 967:34, 967:35, 968:38, 970:29, 1016:15, 1025:12, 1026:39, 1027:27, 1027:28, 1027:44, 1028:18, 1029:3, 1029:8, 1029:11, 1029:18, 1029:19, 1029:21, 1029:25, 1029:30, 1030:27, 1030:31, 1030:36, 1031:10, 1031:16, 1031:27, 1047:9, 1047:17, 1048:5, 1048:6, 1048:11, 1048:20, 1048:27, 1048:46, 1049:10, 1049:14, 1049:19, 1049:31, 1049:40, 1050:6, 1050:47  
**useful** <sup>[6]</sup> - 961:39, 994:21, 1019:4, 1033:20, 1033:21, 1033:28  
**users** <sup>[1]</sup> - 1025:21  
**uses** <sup>[6]</sup> - 953:6, 953:7, 980:18, 999:24, 1019:44, 1022:10  
**usual** <sup>[1]</sup> - 1030:2  
**utility** <sup>[3]</sup> - 956:17, 967:28, 1009:20  
**UTS** <sup>[1]</sup> - 961:21

## V

**validate** <sup>[1]</sup> - 951:5  
**value** <sup>[5]</sup> - 978:43, 993:47, 1032:35, 1032:41, 1032:42  
**values** <sup>[1]</sup> - 999:27  
**valve** <sup>[19]</sup> - 981:11, 981:18, 981:23, 981:26, 982:38, 984:1, 984:5, 984:8, 988:15, 988:20, 988:32, 988:40, 1005:29, 1005:32, 1005:45, 1006:7, 1006:9, 1006:11, 1006:15  
**valve's** <sup>[2]</sup> - 988:37, 988:42

<b>valves</b> [4] - 982:43, 982:44, 1006:10, 1006:13	1020:43, 1024:10, 1038:40	986:33, 1037:20	995:25, 995:27, 995:31, 995:35, 995:43, 995:45, 996:3, 996:14, 996:19, 997:5, 997:12, 997:15, 997:21, 998:18, 998:40, 998:44, 1006:2, 1006:3, 1006:4, 1006:9, 1009:10, 1011:3, 1014:35, 1015:13, 1015:22, 1015:26, 1017:26, 1020:45, 1021:25, 1022:9, 1022:17, 1024:27, 1026:33, 1026:34, 1026:39, 1028:25, 1028:30, 1028:37, 1028:41, 1029:19, 1029:20, 1029:26, 1029:43, 1030:16, 1030:30, 1030:36, 1030:39, 1030:44, 1031:10, 1031:45, 1032:9, 1033:4, 1033:7, 1034:30, 1034:32, 1037:20, 1039:3, 1039:4, 1039:8, 1039:17, 1040:7, 1041:37, 1042:12, 1044:39, 1047:17, 1048:20, 1048:21, 1048:27, 1049:30, 1049:45, 1050:2, 1050:6, 1051:5, 1051:10, 1051:44	1028:30, 1028:35, 1029:40, 1029:43, 1030:1, 1030:11, 1030:22, 1030:40, 1031:23, 1033:42, 1035:21, 1036:9, 1036:37, 1036:40, 1037:8, 1037:19, 1037:37, 1040:34, 1041:16, 1043:15, 1044:14, 1044:16, 1047:18, 1048:22, 1050:11, 1050:15, 1050:25, 1050:35, 1050:46, 1051:15, 1051:19, 1052:8
<b>van</b> [19] - 992:26, 992:28, 993:11, 993:15, 993:16, 993:17, 993:29, 993:42, 994:6, 994:13, 994:26, 994:41, 995:4, 995:21, 996:18, 996:31, 997:14, 999:1, 1001:19	<b>View</b> [24] - 1030:35, 1044:28, 1044:35, 1044:39, 1045:12, 1045:25, 1047:31, 1048:19, 1048:27, 1048:36, 1048:41, 1049:2, 1049:7, 1049:13, 1049:23, 1049:33, 1050:8, 1051:43, 1051:45, 1052:16	<b>wants</b> [1] - 1037:4	<b>water</b> [188] - 942:46, 943:45, 944:14, 944:25, 944:27, 944:28, 944:29, 944:35, 945:12, 945:15, 945:23, 945:29, 945:31, 945:36, 945:37, 947:23, 947:26, 947:39, 947:40, 950:3, 951:24, 951:42, 954:20, 955:10, 955:40, 955:42, 955:46, 955:47, 956:6, 956:20, 956:28, 957:6, 959:24, 959:26, 959:31, 959:32, 959:41, 959:46, 960:19, 960:22, 960:31, 961:22, 961:25, 961:44, 961:45, 961:47, 962:9, 965:36, 966:10, 966:13, 966:22, 966:25, 966:26, 967:39, 969:15, 970:47, 972:33, 972:35, 973:4, 973:39, 975:16, 976:32, 976:42, 977:5, 980:13, 981:33, 981:42, 982:14, 982:39, 983:20, 983:23, 983:36, 984:13, 984:42, 985:5, 985:7, 985:15, 985:24, 985:25, 985:34, 986:4, 986:24, 986:47, 987:5, 987:11, 988:28, 989:4, 989:21, 989:30, 990:32, 991:22, 991:31, 991:42, 991:44, 992:10, 992:32, 992:43, 992:45, 992:46, 993:1, 993:4, 995:5, 995:9, 995:12, 995:16, 995:17, 995:18, 995:22,	<b>water's</b> [3] - 988:46, 1003:42, 1021:27
<b>VAN</b> [1] - 993:16	<b>views</b> [1] - 992:4	<b>wash</b> [1] - 1028:8	<b>Water</b> [77] - 941:41, 942:5, 942:10, 943:38, 951:5, 953:42, 953:46, 964:41, 969:34, 974:39, 976:25, 976:31, 977:10, 977:46, 977:47, 978:2, 978:40, 991:12, 992:4, 997:3, 1005:44, 1006:13, 1007:14, 1008:35, 1008:41, 1009:1, 1009:5, 1009:13, 1009:27, 1011:37, 1012:29, 1012:37, 1015:3, 1016:24, 1021:17, 1021:42, 1024:10, 1024:24, 1024:33, 1025:35, 1025:47, 1026:35, 1027:13, 1027:37, 1028:11,	<b>Water's</b> [26] - 966:11, 977:16, 977:19, 978:20, 985:18, 985:40, 992:9, 993:23, 1010:28, 1010:32, 1013:8, 1014:13, 1018:19, 1021:35, 1025:28, 1028:43, 1032:23, 1032:27, 1037:25, 1037:32, 1038:23, 1038:46, 1039:24, 1043:34, 1051:17, 1051:24
<b>variables</b> [1] - 1002:20	<b>visibility</b> [1] - 1020:7	<b>washing</b> [1] - 984:14	<b>Water-built</b> [1] - 1027:37	
<b>variants</b> [1] - 963:29	<b>visual</b> [2] - 948:34, 963:32	<b>water</b> [188] - 942:46, 943:45, 944:14, 944:25, 944:27, 944:28, 944:29, 944:35, 945:12, 945:15, 945:23, 945:29, 945:31, 945:36, 945:37, 947:23, 947:26, 947:39, 947:40, 950:3, 951:24, 951:42, 954:20, 955:10, 955:40, 955:42, 955:46, 955:47, 956:6, 956:20, 956:28, 957:6, 959:24, 959:26, 959:31, 959:32, 959:41, 959:46, 960:19, 960:22, 960:31, 961:22, 961:25, 961:44, 961:45, 961:47, 962:9, 965:36, 966:10, 966:13, 966:22, 966:25, 966:26, 967:39, 969:15, 970:47, 972:33, 972:35, 973:4, 973:39, 975:16, 976:32, 976:42, 977:5, 980:13, 981:33, 981:42, 982:14, 982:39, 983:20, 983:23, 983:36, 984:13, 984:42, 985:5, 985:7, 985:15, 985:24, 985:25, 985:34, 986:4, 986:24, 986:47, 987:5, 987:11, 988:28, 989:4, 989:21, 989:30, 990:32, 991:22, 991:31, 991:42, 991:44, 992:10, 992:32, 992:43, 992:45, 992:46, 993:1, 993:4, 995:5, 995:9, 995:12, 995:16, 995:17, 995:18, 995:22,	<b>Water-wide</b> [3] - 1029:43, 1030:11, 1030:22	
<b>variation</b> [6] - 952:12, 961:34, 961:41, 961:43, 963:31, 966:24	<b>volition</b> [1] - 993:43	<b>water</b> [188] - 942:46, 943:45, 944:14, 944:25, 944:27, 944:28, 944:29, 944:35, 945:12, 945:15, 945:23, 945:29, 945:31, 945:36, 945:37, 947:23, 947:26, 947:39, 947:40, 950:3, 951:24, 951:42, 954:20, 955:10, 955:40, 955:42, 955:46, 955:47, 956:6, 956:20, 956:28, 957:6, 959:24, 959:26, 959:31, 959:32, 959:41, 959:46, 960:19, 960:22, 960:31, 961:22, 961:25, 961:44, 961:45, 961:47, 962:9, 965:36, 966:10, 966:13, 966:22, 966:25, 966:26, 967:39, 969:15, 970:47, 972:33, 972:35, 973:4, 973:39, 975:16, 976:32, 976:42, 977:5, 980:13, 981:33, 981:42, 982:14, 982:39, 983:20, 983:23, 983:36, 984:13, 984:42, 985:5, 985:7, 985:15, 985:24, 985:25, 985:34, 986:4, 986:24, 986:47, 987:5, 987:11, 988:28, 989:4, 989:21, 989:30, 990:32, 991:22, 991:31, 991:42, 991:44, 992:10, 992:32, 992:43, 992:45, 992:46, 993:1, 993:4, 995:5, 995:9, 995:12, 995:16, 995:17, 995:18, 995:22,	<b>waterways</b> [1] - 998:19	
<b>varies</b> [1] - 1028:33	<b>voltage</b> [2] - 1022:14, 1022:15	<b>water</b> [188] - 942:46, 943:45, 944:14, 944:25, 944:27, 944:28, 944:29, 944:35, 945:12, 945:15, 945:23, 945:29, 945:31, 945:36, 945:37, 947:23, 947:26, 947:39, 947:40, 950:3, 951:24, 951:42, 954:20, 955:10, 955:40, 955:42, 955:46, 955:47, 956:6, 956:20, 956:28, 957:6, 959:24, 959:26, 959:31, 959:32, 959:41, 959:46, 960:19, 960:22, 960:31, 961:22, 961:25, 961:44, 961:45, 961:47, 962:9, 965:36, 966:10, 966:13, 966:22, 966:25, 966:26, 967:39, 969:15, 970:47, 972:33, 972:35, 973:4, 973:39, 975:16, 976:32, 976:42, 977:5, 980:13, 981:33, 981:42, 982:14, 982:39, 983:20, 983:23, 983:36, 984:13, 984:42, 985:5, 985:7, 985:15, 985:24, 985:25, 985:34, 986:4, 986:24, 986:47, 987:5, 987:11, 988:28, 989:4, 989:21, 989:30, 990:32, 991:22, 991:31, 991:42, 991:44, 992:10, 992:32, 992:43, 992:45, 992:46, 993:1, 993:4, 995:5, 995:9, 995:12, 995:16, 995:17, 995:18, 995:22,	<b>ways</b> [7] - 983:19, 1002:9, 1002:10, 1016:19, 1024:38, 1035:22	
<b>variety</b> [1] - 976:20	<b>volume</b> [36] - 944:10, 945:38, 949:45, 953:1, 953:37, 955:9, 955:16, 955:40, 955:47, 956:20, 957:36, 957:39, 958:32, 960:19, 960:30, 961:44, 962:9, 967:23, 967:27, 967:39, 970:47, 971:14, 977:30, 978:3, 987:5, 987:10, 989:21, 991:31, 998:39, 1017:28, 1024:27, 1028:41, 1029:11, 1032:6, 1043:1	<b>water</b> [188] - 942:46, 943:45, 944:14, 944:25, 944:27, 944:28, 944:29, 944:35, 945:12, 945:15, 945:23, 945:29, 945:31, 945:36, 945:37, 947:23, 947:26, 947:39, 947:40, 950:3, 951:24, 951:42, 954:20, 955:10, 955:40, 955:42, 955:46, 955:47, 956:6, 956:20, 956:28, 957:6, 959:24, 959:26, 959:31, 959:32, 959:41, 959:46, 960:19, 960:22, 960:31, 961:22, 961:25, 961:44, 961:45, 961:47, 962:9, 965:36, 966:10, 966:13, 966:22, 966:25, 966:26, 967:39, 969:15, 970:47, 972:33, 972:35, 973:4, 973:39, 975:16, 976:32, 976:42, 977:5, 980:13, 981:33, 981:42, 982:14, 982:39, 983:20, 983:23, 983:36, 984:13, 984:42, 985:5, 985:7, 985:15, 985:24, 985:25, 985:34, 986:4, 986:24, 986:47, 987:5, 987:11, 988:28, 989:4, 989:21, 989:30, 990:32, 991:22, 991:31, 991:42, 991:44, 992:10, 992:32, 992:43, 992:45, 992:46, 993:1, 993:4, 995:5, 995:9, 995:12, 995:16, 995:17, 995:18, 995:22,	<b>WB130</b> [4] - 946:44, 951:12, 951:21, 979:43	
<b>various</b> [5] - 972:26, 1009:14, 1017:6, 1017:8, 1032:26	<b>Volume</b> [1] - 1042:45	<b>water</b> [188] - 942:46, 943:45, 944:14, 944:25, 944:27, 944:28, 944:29, 944:35, 945:12, 945:15, 945:23, 945:29, 945:31, 945:36, 945:37, 947:23, 947:26, 947:39, 947:40, 950:3, 951:24, 951:42, 954:20, 955:10, 955:40, 955:42, 955:46, 955:47, 956:6, 956:20, 956:28, 957:6, 959:24, 959:26, 959:31, 959:32, 959:41, 959:46, 960:19, 960:22, 960:31, 961:22, 961:25, 961:44, 961:45, 961:47, 962:9, 965:36, 966:10, 966:13, 966:22, 966:25, 966:26, 967:39, 969:15, 970:47, 972:33, 972:35, 973:4, 973:39, 975:16, 976:32, 976:42, 977:5, 980:13, 981:33, 981:42, 982:14, 982:39, 983:20, 983:23, 983:36, 984:13, 984:42, 985:5, 985:7, 985:15, 985:24, 985:25, 985:34, 986:4, 986:24, 986:47, 987:5, 987:11, 988:28, 989:4, 989:21, 989:30, 990:32, 991:22, 991:31, 991:42, 991:44, 992:10, 992:32, 992:43, 992:45, 992:46, 993:1, 993:4, 995:5, 995:9, 995:12, 995:16, 995:17, 995:18, 995:22,	<b>weak</b> [1] - 990:29	
<b>vary</b> [2] - 961:45, 985:12	<b>volumes</b> [3] - 965:39, 973:35, 977:38	<b>water</b> [188] - 942:46, 943:45, 944:14, 944:25, 944:27, 944:28, 944:29, 944:35, 945:12, 945:15, 945:23, 945:29, 945:31, 945:36, 945:37, 947:23, 947:26, 947:39, 947:40, 950:3, 951:24, 951:42, 954:20, 955:10, 955:40, 955:42, 955:46, 955:47, 956:6, 956:20, 956:28, 957:6, 959:24, 959:26, 959:31, 959:32, 959:41, 959:46, 960:19, 960:22, 960:31, 961:22, 961:25, 961:44, 961:45, 961:47, 962:9, 965:36, 966:10, 966:13, 966:22, 966:25, 966:26, 967:39, 969:15, 970:47, 972:33, 972:35, 973:4, 973:39, 975:16, 976:32, 976:42, 977:5, 980:13, 981:33, 981:42, 982:14, 982:39, 983:20, 983:23, 983:36, 984:13, 984:42, 985:5, 985:7, 985:15, 985:24, 985:25, 985:34, 986:4, 986:24, 986:47, 987:5, 987:11, 988:28, 989:4, 989:21, 989:30, 990:32, 991:22, 991:31, 991:42, 991:44, 992:10, 992:32, 992:43, 992:45, 992:46, 993:1, 993:4, 995:5, 995:9, 995:12, 995:16, 995:17, 995:18, 995:22,	<b>weather</b> [2] - 952:18, 952:22	
<b>vast</b> [1] - 1005:24	<b>volumetric</b> [1] - 961:24	<b>water</b> [188] - 942:46, 943:45, 944:14, 944:25, 944:27, 944:28, 944:29, 944:35, 945:12, 945:15, 945:23, 945:29, 945:31, 945:36, 945:37, 947:23, 947:26, 947:39, 947:40, 950:3, 951:24, 951:42, 954:20, 955:10, 955:40, 955:42, 955:46, 955:47, 956:6, 956:20, 956:28, 957:6, 959:24, 959:26, 959:31, 959:32, 959:41, 959:46, 960:19, 960:22, 960:31, 961:22, 961:25, 961:44, 961:45, 961:47, 962:9, 965:36, 966:10, 966:13, 966:22, 966:25, 966:26, 967:39, 969:15, 970:47, 972:33, 972:35, 973:4, 973:39, 975:16, 976:32, 976:42, 977:5, 980:13, 981:33, 981:42, 982:14, 982:39, 983:20, 983:23, 983:36, 984:13, 984:42, 985:5, 985:7, 985:15, 985:24, 985:25, 985:34, 986:4, 986:24, 986:47, 987:5, 987:11, 988:28, 989:4, 989:21, 989:30, 990:32, 991:22, 991:31, 991:42, 991:44, 992:10, 992:32, 992:43, 992:45, 992:46, 993:1, 993:4, 995:5, 995:9, 995:12, 995:16, 995:17, 995:18, 995:22,	<b>website</b> [2] - 999:27, 999:31	
<b>vendors</b> [2] - 1012:30, 1044:15	<b>Vui</b> [1] - 966:38	<b>water</b> [188] - 942:46, 943:45, 944:14, 944:25, 944:27, 944:28, 944:29, 944:35, 945:12, 945:15, 945:23, 945:29, 945:31, 945:36, 945:37, 947:23, 947:26, 947:39, 947:40, 950:3, 951:24, 951:42, 954:20, 955:10, 955:40, 955:42, 955:46, 955:47, 956:6, 956:20, 956:28, 957:6, 959:24, 959:26, 959:31, 959:32, 959:41, 959:46, 960:19, 960:22, 960:31, 961:22, 961:25, 961:44, 961:45, 961:47, 962:9, 965:36, 966:10, 966:13, 966:22, 966:25, 966:26, 967:39, 969:15, 970:47, 972:33, 972:35, 973:4, 973:39, 975:16, 976:32, 976:42, 977:5, 980:13, 981:33, 981:42, 982:14, 982:39, 983:20, 983:23, 983:36, 984:13, 984:42, 985:5, 985:7, 985:15, 985:24, 985:25, 985:34, 986:4, 986:24, 986:47, 987:5, 987:11, 988:28, 989:4, 989:21, 989:30, 990:32, 991:22, 991:31, 991:42, 991:44, 992:10, 992:32, 992:43, 992:45, 992:46, 993:1, 993:4, 995:5, 995:9, 995:12, 995:16, 995:17, 995:18, 995:22,	<b>week</b> [2] - 961:3, 994:11	
<b>verbally</b> [1] - 954:24	<b>wait</b> [1] - 1029:44	<b>water</b> [188] - 942:46, 943:45, 944:14, 944:25, 944:27, 944:28, 944:29, 944:35, 945:12, 945:15, 945:23, 945:29, 945:31, 945:36, 945:37, 947:23, 947:26, 947:39, 947:40, 950:3, 951:24, 951:42, 954:20, 955:10, 955:40, 955:42, 955:46, 955:47, 956:6, 956:20, 956:28, 957:6, 959:24, 959:26, 959:31, 959:32, 959:41, 959:46, 960:19, 960:22, 960:31, 961:22, 961:25, 961:44, 961:45, 961:47, 962:9, 965:36, 966:10, 966:13, 966:22, 966:25, 966:26, 967:39, 969:15, 970:47, 972:33, 972:35, 973:4, 973:39, 975:16, 97		

<b>weighting</b> [1] - 1015:36	1006:29, 1006:31, 1039:47, 1052:26	971:5, 971:10, 978:24, 1008:45, 1009:34, 1010:21, 1011:42, 1012:41, 1019:36, 1024:22, 1026:13, 1026:24, 1028:20, 1039:6, 1039:7, 1039:13, 1039:29, 1043:19, 1048:12	980:7, 982:23, 983:17, 984:3, 984:11, 984:27, 984:28, 984:33, 984:34, 984:44, 984:45, 984:46, 986:15, 986:25, 986:33, 1015:22, 1026:17, 1026:18, 1026:19, 1033:23, 1033:25, 1033:32, 1034:7, 1034:29, 1034:37, 1034:39, 1034:40, 1034:44, 1035:46, 1052:10, 1052:17
<b>weightings</b> [2] - 1018:43, 1018:44	<b>witnesses</b> [2] - 942:22, 942:29	<b>year's</b> [1] - 953:33	<b>zone"</b> [2] - 982:28, 984:4
<b>Wells</b> [3] - 943:6, 975:22, 1007:10	<b>wonder</b> [1] - 1039:44	<b>yearly</b> [1] - 963:31	<b>zones</b> [35] - 944:27, 951:35, 951:37, 951:46, 956:19, 969:43, 970:10, 970:17, 972:26, 972:27, 972:30, 972:37, 984:18, 984:19, 984:23, 984:29, 984:34, 1015:9, 1015:13, 1015:14, 1015:18, 1015:22, 1015:25, 1015:26, 1015:30, 1017:2, 1017:9, 1034:3, 1034:30, 1034:32, 1035:36, 1036:18, 1036:20, 1047:42
<b>whereas</b> [3] - 946:39, 990:12, 999:25	<b>word</b> [4] - 966:8, 993:16, 1033:47, 1049:25	<b>years</b> [29] - 949:23, 949:39, 949:42, 952:13, 952:16, 952:18, 953:31, 963:13, 963:30, 968:39, 970:29, 970:30, 970:31, 970:33, 970:43, 971:13, 971:18, 971:19, 971:25, 972:2, 972:3, 972:5, 972:7, 972:9, 976:37, 997:40, 1011:47, 1039:15, 1039:29	<b>zoomed</b> [2] - 987:30, 987:38
<b>White</b> [2] - 1001:26, 1001:36	<b>wording</b> [1] - 997:19	<b>years'</b> [3] - 944:37, 944:38, 974:29	<b>zoomed-in</b> [1] - 987:30
<b>whoever's</b> [1] - 980:46	<b>words</b> [4] - 975:34, 975:35, 977:26, 1002:32	<b>yesterday</b> [6] - 972:18, 972:23, 972:45, 1011:23, 1012:22, 1037:24	<b>Zyl</b> [18] - 992:26, 992:28, 993:11, 993:15, 993:17, 993:29, 993:42, 994:6, 994:13, 994:26, 994:41, 995:4, 995:21, 996:18, 997:14, 999:1, 1001:19
<b>whole</b> [9] - 944:25, 976:34, 979:23, 993:6, 1003:43, 1017:38, 1018:23, 1041:6, 1047:42	<b>workarounds</b> [1] - 1028:14	<b>yourself</b> [8] - 942:45, 956:40, 973:13, 975:16, 977:35, 1000:33, 1017:35, 1035:26	<b>Zyl's</b> [1] - 996:31
<b>wide</b> [9] - 976:16, 976:20, 977:33, 1028:30, 1029:43, 1030:11, 1030:22, 1030:40, 1048:22	<b>workflow</b> [1] - 1037:4		
<b>William</b> [2] - 941:18, 1040:4	<b>workings</b> [2] - 957:27, 957:35		
<b>window</b> [2] - 986:42, 1018:4	<b>workplace</b> [1] - 975:22		
<b>wish</b> [4] - 956:41, 1007:26, 1007:45, 1009:41	<b>works</b> [9] - 986:40, 991:9, 992:22, 994:2, 1004:27, 1017:28, 1022:6, 1023:10, 1032:28		
<b>WITH</b> [2] - 1008:22, 1046:13	<b>world</b> [6] - 1009:8, 1016:14, 1017:36, 1023:7, 1024:41, 1029:14		
<b>withdraw</b> [1] - 1033:2	<b>worried</b> [1] - 971:20		
<b>WITHDREW</b> [3] - 975:4, 1006:31, 1052:26	<b>worries</b> [1] - 1015:33		
<b>witness</b> [49] - 942:26, 942:39, 943:12, 943:19, 943:29, 945:18, 945:45, 946:7, 951:11, 956:15, 956:34, 958:31, 958:41, 958:45, 961:28, 965:2, 968:10, 970:9, 975:6, 975:10, 975:29, 975:44, 976:2, 977:28, 983:39, 986:7, 987:17, 987:23, 990:2, 991:39, 998:34, 999:41, 1005:20, 1006:33, 1006:44, 1007:20, 1007:24, 1007:25, 1007:27, 1009:38, 1018:18, 1020:14, 1020:27, 1027:10, 1029:47, 1044:30, 1046:17, 1047:40	<b>worry</b> [1] - 970:34		
	<b>worst</b> [1] - 962:10		
	<b>worth</b> [6] - 946:21, 957:2, 957:3, 961:45, 993:45, 1017:22		
	<b>worthwhile</b> [1] - 1002:21		
	<b>WP208FT1</b> [1] - 950:6		
	<b>WP222</b> [1] - 950:8		
	<b>WP222FT3</b> [2] - 950:27, 950:40		
	<b>writing</b> [2] - 976:18, 1038:10		
	<b>written</b> [8] - 945:46, 959:20, 965:2, 987:17, 999:41, 1038:16, 1038:18, 1052:18		
	<b>wrote</b> [1] - 1045:16		
	<b>X</b>		
	<b>Xs</b> [1] - 982:43		
	<b>Y</b>		
<b>WITNESS</b> [5] - 975:4,	<b>year</b> [26] - 952:19, 952:24, 963:13, 968:40, 969:28,	971:5, 971:10, 978:24, 1008:45, 1009:34, 1010:21, 1011:42, 1012:41, 1019:36, 1024:22, 1026:13, 1026:24, 1028:20, 1039:6, 1039:7, 1039:13, 1039:29, 1043:19, 1048:12	980:7, 982:23, 983:17, 984:3, 984:11, 984:27, 984:28, 984:33, 984:34, 984:44, 984:45, 984:46, 986:15, 986:25, 986:33, 1015:22, 1026:17, 1026:18, 1026:19, 1033:23, 1033:25, 1033:32, 1034:7, 1034:29, 1034:37, 1034:39, 1034:40, 1034:44, 1035:46, 1052:10, 1052:17

## Z

**Z-Y-L** [1] - 993:17  
**Zealand** [1] - 992:23  
**zero** [3] - 949:10,  
949:19, 1017:32  
**zeros** [1] - 1032:34  
**zone** [59] - 944:25,  
945:23, 945:37,  
946:46, 947:1,  
947:26, 948:24,  
948:25, 951:24,  
951:39, 951:40,  
951:43, 952:4,  
956:21, 956:27,  
970:5, 972:29,  
972:30, 972:32,  
972:34, 972:36,  
972:41, 973:33,  
973:37, 978:34,  
980:1, 980:3, 980:4,