10 September 2021

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Dear Robert

Response to Nuttall Consulting's draft expert opinion

This response relates to the Nuttall Consulting's draft expert opinion on Wellington Electricity Lines Limited (**WELL**) quality standard non-compliance 2016/17 and 2017/18 (**the Report**) provided 27 May 2021. WELL thanks the Commerce Commission (**Commission**) for the invitation to comment on the Report and thanks Nuttall Consulting for considering our feedback as they finalise the Report.

1. The non-compliance event was beyond WELL's reasonable control

We note Nuttall Consulting's key findings that the SAIDI exceedance in both Regulatory Years (**RY**) and SAIFI exceedance in RY17 would have occurred even absent any of the deficiencies Nuttall Consulting has identified[1]. This confirms WELL's position that these were exceptional years, and the non-compliance event overall was due to events beyond WELL's reasonable control. Specifically, the Report confirmed WELL's position that:

1. The combination of the unusually high wind strength plus the earthquake event meant that performance in RY17 would likely be above the SAIDI and SAIFI limit, irrespective of whether WELL's practices aligned with good industry practice[2] (and even though WELL's practices do overall align with good industry practice).
2. In line with Nuttall Consulting's analysis, the high number of car vs pole events in RY18 was an outlier compared to historical levels and there is no indication of a worsening trend prior to this year. The analysis also suggested the high number of underground cable failures in RY18

[1] Paragraph E25 of the Report
[2] Paragraph E15

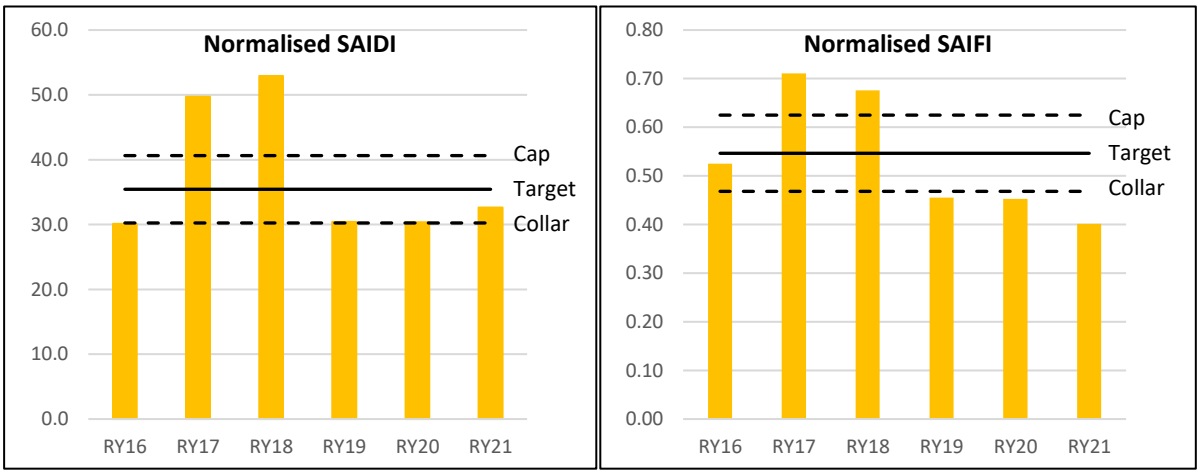
was an outlier compared to historical levels and there is no indication of a worsening trend prior to this year[3]. That is, WELL had limited if any indicators or advance warning at that stage that further measures were needed in this area to ensure we maintained our good industry performance levels.

3. The causes of the unplanned outages changed from RY17 to RY18 which would have (and did) make reliability in the RY18 year more difficult to manage.

The Report also confirmed that overall WELL's practices and actions "to a very large extent" could be considered good industry practice in regard to reliability performance[4]. This included undertaking actions to understand, prevent and mitigate further failures to meet the reliability targets and comply with future reliability assessment[5].

WELL's controls in response to the breach have returned actual reliability performance back to target levels with SAIDI and SAIFI for the following three regulatory periods being just above or below the reliability collar. The effectiveness of the controls is illustrated in figure 1 below

Figure 1: Improved SAIDI and SAIFI Performance since the Exceedance



It is also important to note that Nuttall Consulting did not find any evidence of under-investment in the network, which is again in line with WELL's position. It is reassuring that two independent Commission initiated reports (Strata for13-14RY and Nuttall Consulting for 17-18RY) reached similar conclusions. The findings of the Report confirmed that WELL increased expenditure in its vegetation

[3] Shown in the explanation in paragraph E16 and in the Table E2 analysis.
[4] Paragraph E18
[5] Paragraph E21

management, generation and "worst performing feeder" programmes as part of the controls implemented to maintain reliability performance.

2. WELL takes any exceedance seriously

WELL takes any exceedance of the quality targets seriously. We have responded strongly to the events causing the exceedance in RY17 and RY18. Our positive and proactive attitude towards addressing quality exceedances was highlighted in the CEO's statement that was provided before the video conference interview held in December 2019. The Report provided a detailed list of the controls that successfully returned WELL's quality performance to below the average of the reference period[6] and highlighted WELL's commitment to finding the causes of the exceedance and putting in place controls to improve reliability performance[7]. Since the exceedance of the quality targets WELL has continued to monitor and analyse its quality performance and has implemented new tools in response to trends and changes in its quality performance. These include:

1. Predictive analysis for the main outage classes and the overall quality performance against the quality targets (an improvement opportunity highlighted in the Report);
2. Trialling a software package that overlays WELL's assets with a high-resolution weather forecast, to improve WELL's ability to predict outages caused by weather, and
3. Engaging an external asset modelling specialist to assist with the development of predictive overhead conductor models.

Nuttall Consulting said that WELL's asset management practices were 'to a very large extent' aligned with good industry practice and highlighted some areas for improvement. Our own ongoing review of our reliability management processes have themselves identified similar opportunities to improve our practices as those highlighted in the Report. We have already implemented a number of new controls in response. For other aspects we believe that we did have appropriate practices at the time of the exceedance but have been delivering them in a different way than what was contemplated by Nuttall Consulting. We potentially would have gained closer alignment with Nuttall Consulting through a site visit to discuss how priorities across the business were being managed. The Report also suggested new improvement ideas which we are now considering – we welcome the feedback and value the independent review of our practices, providing further opportunities to improve our processes.

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[6] The controls were summarized in paragraph E19
[7] Summarised in paragraph E18.

2.1. Value of a site visit

There are aspects of WELL's reliability management and circumstances of the 2017 and 2018 operating environment that are not visible or obvious from written submissions or from an oral interview. We believe that a site visit would have provided Nuttall Consulting with the opportunity to uncover the wider context in which WELL is providing governance and reliability management highlighted in the previous section of this response (and which Nuttall Consulting have raised as areas where WELL may have been out of alignment with good practice at the time of exceedance).

A site visit would have also allowed WELL to relate the first-hand account of the difficulties operating the network immediately following the 2016 Kaikoura earthquake compounded by a severe storm within the following 24hr period. Experiencing the damage to the network, WELL's own office and building infrastructure plus Wellington's commercial building stocks resulted in a significant impact and prolonged strain on WELL's operational activities.

Specifically, a site visit would have:

1. Highlighted that the post Kaikoura earthquake operating environment was not 'business as unusual' and was outside of the normal business operating environment represented in the quality reference period. Specifically:
    a. Provision of essential services in Wellington is part of our core responsibilities to be able to respond quickly following a natural event.
    b. Power was restored to customers within 18 hours by re-establishing the business control centre and business continuity team to our Disaster Response Centre (Haywards Substation).
    c. For the extended three-to-six-month period after the earthquake, WELL staff continued to work from the Disaster Recovery Centre. Some staff worked remotely.
    d. The lease of a new building and the re-establishment and transition of the business to new headquarters and the eventual demolition of the previous business location, all had business impacts which were unexpected and not part of a normal year of operation.
    e. Work programmes were amended to provide post-earthquake activities of isolating, managing assets and implementing temporary substations for damaged building (20

high rise buildings in Wellington have been or are expected to be demolished and there were 2,540 insurance claims lodged from commercial building owners[8]).

f. Operations were briefed on the expectation that there was a high potential of a major aftershock (GNS Science reporting a 98% chance of an aftershock of 6 to 6.9 within the next year) where weakened buildings could fail – an operating environment very different to business-as-usual operations[9].

g. The post-earthquake responses occurring at a time when Wellington was experiencing a higher wind profile than experienced during a normal year and quite often staff were uncomfortable as strong gusts resembled tremors.

2. Allowed Nuttall Consulting to meet the Board (teleconference) and to discuss their approach to governing WELL's reliability performance. This would have highlighted the Boards international experience in operating and governing distribution networks across Australia, UK, HK and Canada, which included regulated water, gas and electricity systems. Discussion could also have included the Boards wider reliability expectations and discussions not captured by records taken in Board minutes.
3. Provided an opportunity to examine the controls that were implemented in response to WELL's analysis of outages. This would have demonstrated the deeper understanding of the time required to analyse and implement new controls against already allocated program funding and whether reallocation of allowances would have provided improved results.
4. Demonstrate the implementation of the Earthquake Readiness program which was implemented in response to Government enquiries about how prepared infrastructure providers were for aftershocks and recovering post event. This would have included the process to propose and receive Government, Policy and Regulatory approval for additional spending to increase our response capability following another major earthquake event (as experienced in Christchurch in the 2010-11 series) as part of forward planning for enhanced reliability controls.
5. Demonstrate the thinking and development path behind our underground cable testing methods for predicting cable replacement and WELL's successful risk-based vegetation management program. This would have provided a more realistic and accurate assessment of the SAIDI assigned to systemic deficiencies.

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[8] https://www.stuff.co.nz/business/93861720/insurance-claims-total-184-billion-for-kaikoura-earthquake

[9] As described in WELL's response 'Wellington Electricity quality investigation – request for clarifying information' provided 24 August 2020.

6. Provided a deeper understanding of the price/quality trade-off as it relates to the various tensions which co-exist and are specific to operating the Wellington network. This would have provided context for WELL's application of new controls, specifically the level of evidence needed before an investment occurs. The meeting could have included a discussion about balancing funding for existing controls and the redeploying funding to new controls. It would also allow discussion on how some new controls designed to improve reliability have done the opposite and ended up becoming a liability to network security and the recovery required to address this risk.
7. Context of WELL's very low planned SAIDI allowances compared to similar networks and the impact it has on managing SAIDI/SAIFI in years when multiple uncontrollable events occur. The network is capable of managing a couple of unexpected disruptions within the performance targets but struggles when there are many small or several large additional coincident events.

2.2. **Governance**

The Report has suggested a lack of governance challenge contributed towards controls being applied later than they could have been. The feedback was based on samples of Board minutes which were submitted as part of the investigation. In response, WELL's Board meeting minutes are action orientated and do not record details of the related discussion held outside of the formal Board meeting or during site field visits.

WELL's reliability is seen as a business performance measure and a standing Board agenda item. As such, WELL's quality performance was a key Board focus during the 17 and 18 regulatory years with the Board informed of causes of the exceedances and response plans of the business. Site visits would have helped to highlight the extent of the discussions not captured in the Board minutes. A site visit could have included arrangements to meet with Board members to discuss these concerns.

For example, the Board supported WELL meeting with our sister company, South Australia Power Networks to understand the potential impact of the new Health and Safety At Work Act (**HSAW**) prior to this being introduced (the new legislation was based on Australian legislation). Similarly, the Board were supportive for WELL to engage with our sister company United Kingdom Power Networks and their Health and Safety team on the control requirements of maintaining a live work capability, as opposed to following the approach of other New Zealand distribution networks and Transpower to halt live work in response to the perceived risk under new HSAW legislation.

2.3. **Reliability Strategy Document**

The Report suggested that WELL lacked a separately documented Reliability Strategy that would have provided it with the process to adequately investigate and develop risks and controls. While WELL did not have this separately documented, the strategy for maintaining reliability was well understood by the business and summarised in our annual disclosure document to the Commission (WELL's AMP). The AMP contains the critical components of a separate strategy document including a formal reliability investigation process, a risk-based defect management process and Asset Health and Criticality analysis. The AMP also contains an Asset Management Maturity Assessment Tool to understand how gaps in WELL's asset management practices are identified and provides progress updates on improvements.

As outlined above, because the events which caused the exceedance did not have trends sufficient to develop controls, a standalone Reliability Strategy document is unlikely to have delivered a different outcome than the existing documented processes. As shown in Figure 1, the current approach outlined in WELL's AMP has been effective in returning reliability to pre-breach levels.

2.3.1. Improvements in response to feedback

WELL continues to develop its reliability strategy. Key developments since the breach are:

- Introduction of fortnightly reliability meetings, including representation from field service contractors, to discuss recent faults, examine trends, and identify opportunities for improvement.
- Introduction of asset fleet specific reliability strategies into the Asset Fleet Strategies.
- Increased use of predictive analysis in asset fleet management and reliability reporting.

The different elements are being updated as part of our AMP review process which is used to drive allowances for regulatory reset periods. This will ensure the consistent transfer of knowledge and the continued support of the internal audit process (WELL is part of a global internal audit programme of the group's infrastructure businesses).

2.4. **Predictive modelling**

By its nature, the predicative analysis tools and reports are tuned as analysis is adapted from the feedback obtained from trends returned by the reliability performance data. As highlighted above, since the quality exceedance WELL has enhanced its focus on implementing predictive modelling of its quality performance. The results are incorporated into operational and governance reporting.

3. Predicative analysis and control response times

The Report suggests WELL should have had better predictive analysis in place in 2017 which led to WELL's reliability management practices being too reactionary. The Report indicates that this would have led to WELL implementing controls earlier than we did and therefore would have reduced the SAIDI and SAIFI impacts experienced by customers. The report also suggests that some incidents did not form a trend which would have initiated the need for additional controls until after the events had occurred. This highlights the dilemma lines companies face of redirecting resources to manage allocations of interruption minutes and controls funding when both of these assigned levels are very tight.

The approach taken by Nuttall Consulting is to observe the trends in reliability performance at the year before the exceedance and to assess whether there were any trends indicating a worsening quality performance and to assess whether controls should have been applied (immediately) in response. Unfortunately, we are exposed to the outage minutes being incurred by the start of the trend, ahead of the knowledge that the trend will proceed to a level requiring intervention. The effectiveness of the control is unlikely to be instant and hence the trend will continue to build before it is reduced by the period that it takes for a control to be consistently applied. This has often seen in vegetation management where tree growth (if controls are relaxed), will take 2-3 years before a reliability problem occurs and then a further 3-5 years for a reactive trimming program to return the vegetation clearances to previous reliability levels.

There will also be exposure from single year occurrences which don't repeat on a yearly basis. The complexity of weather and natural disaster events is difficult to forecast, hence other regulatory systems around the world tend to zero rate their impact to look at what is within the control of the network company. Customers are reluctant to fund resilience investment for low probability, high impact events. Our Earthquake Readiness Project demonstrated an appetite for an improved response and recovery spend rather than the more expensive risk reduction program.

WELL agrees that further controls will be needed for new trends affecting reliability performance, however, WELL does not agree with the Report that analysis would have shown that strong trends existed before the breach period and that there was enough evidence to apply controls in response to this ahead of the existing control set already being applied.

WELL's view is that the trends highlighted in the Report were not yet clear enough to justify the redeployment of costs of applying a control at the time the Report suggested The Report suggests controls should have been applied as soon as a weak trend was observed. However, as the Commission

is aware, this does not reflect the funding environment for Electricity Network Businesses' (**EDBs**) in New Zealand. Responding to trends that are weak or uncertain would sometimes result in controls being applied unnecessarily – that is controls could be being applied in response to natural variation in the data rather than in response to an actual issue or trend.

While Nuttall Consulting's approach would likely result in a reduction of SAIDI and SAIFI should the trend develop, it would be at a much higher relative cost to the customer and the Report remains silent on how the additional funds would be passed through under a DPP. Such higher cost and quality in the absence of clear trends is outside of the DPP price/quality path. It also doesn't support feedback from customers who are currently unwilling to pay more for transient events affecting underlying quality.

WELL also notes that some controls take time to implement, and the quality improvements would not be immediately realised (as expressed in the assessment of SAIDI/SAIFI relating to systemic deficiencies). For example:

- The application of risk-based vegetation management first requires a visual assessment of the network before the selective cutting program is applied (assuming the tree owner is proactive or alternatively decides to take the risk of the identified hazard not occurring). The network assessment and the subsequent vegetation management programme follow after the vegetation surveys have occurred.
- The application of generation to de-energised planned works could only be applied once it had been confirmed which work practices could still be implemented live. On the Wellington network this decision was informed by the WorkSafe summary of facts hearing (as outlined in WELL's response to question 81 of the Commission's investigation questions). Until the summary of facts concerning work adjacent to live works was concluded, WELL was unable to proceed with certain works either live or adjacent to live works (which may have been through the application of generation).

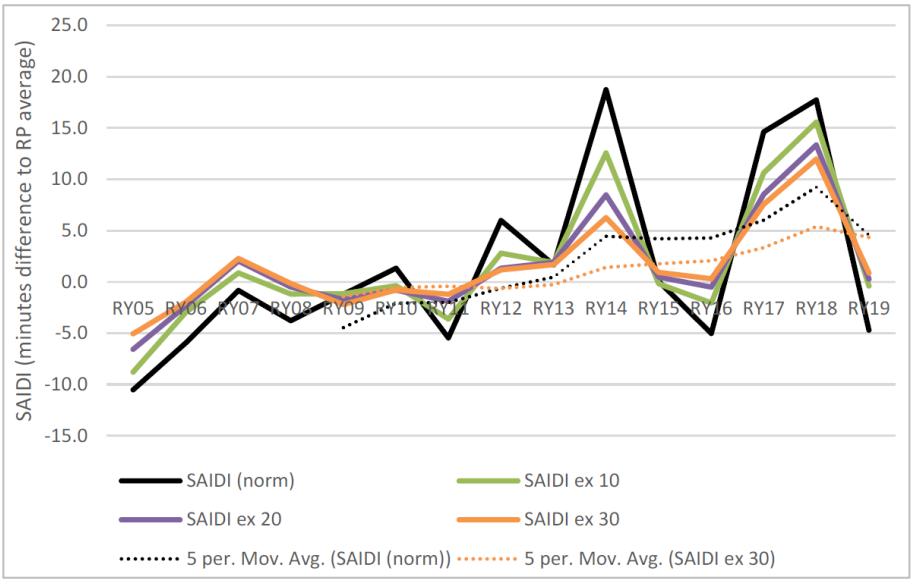
WELL has analysed reliability data and has provided alternative analysis that tests whether strong negative trends were present at the beginning of the breach years and whether WELL should have applied controls earlier than it did. The alternative analysis highlights that in the majority of cases the trends were unclear or weak at the start of the regulatory years and did not provide the evidence needed to implement controls earlier. The following Section 3.1 provides analysis of the overall reliability position and Section 3.2 provides analysis of two specific outage types that the Report suggested controls should have been applied earlier.

3.1. **Overall forecast position**

The Report addresses the overall trend in reliability performance, providing analysis that suggests that WELL should have identified a worsening overall trend in reliability performance and triggered an earlier escalation of the risk of breaching.

Figure 4 from the report provides a good representation of the Report's analysis – that there was a clear trend of worsening reliability performance. which we have reproduced below.

Figure 2: Figure 4 from the Report showing trend in SAIDI (excluding worst SAIDI days)



We question the value of the analysis that removes the worst 30 days as a means of identifying underlying trends. The high level of reliability of the WELL network means that removing 30 days from a normal year removes 20% of the days that have unplanned outages and 75% of the annual unplanned SAIDI. Furthermore, as the primary drivers behind annual reliability performance change from year to year[10], excluding a set number of days changes what proportion of outages due to a particular cause are included in the underlying trend, with proportionally more outages being added to the trend as successful interventions reduce the impact of that particular outage cause. As a result, any trend identified would only be at the margin and in practice is swamped by the 30 days that drive the overall year's performance.

3.1.1. **Assessing the overall reliability trend at the start of the breach period**

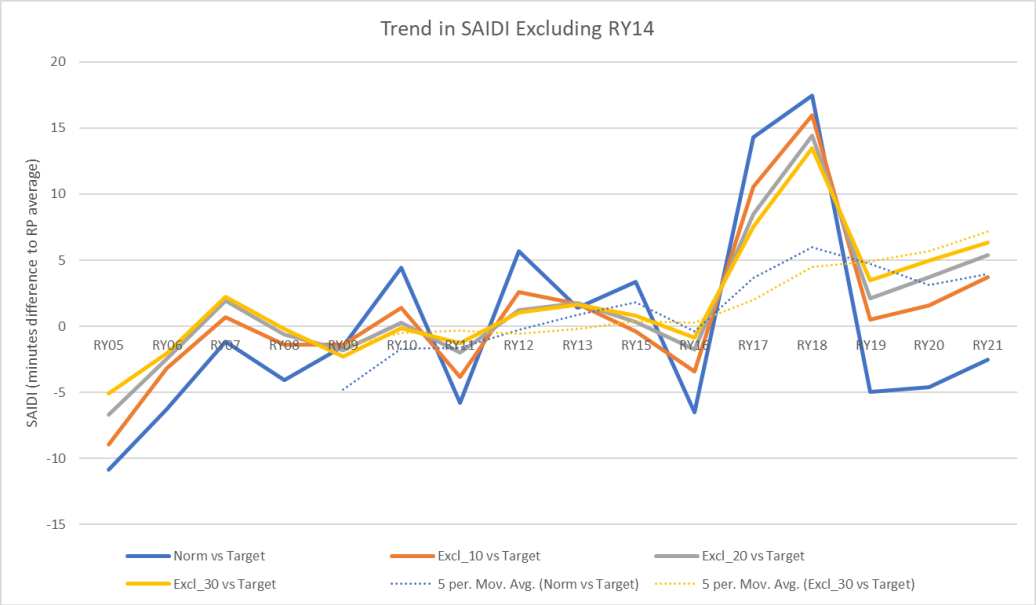
The analysis provided in paragraphs 48 to 53 of the Report assesses whether there was a trend of underperformance at the start of the breach period. Paragraph 54 concluded the analysis, stating

[10] Paragraph E17

“These figures suggest, all things equal to the reference period, by the start of RY17 SAIDI could have been approximately 5 minutes poorer relative to the reference period average, with SAIFI 0.05 interruptions poorer”.

This statement refers to Figure 4 and Figure 5 of the Report, which apply a five-year rolling average to the Normalised SAIDI and SAIFI. This rolling average includes RY14, which included five SAIDI major event days and the 1-in-50-year storm of 21 June 2013. Including RY14 has a disproportionate effect on the use on rolling averages as a trending tool. This is shown by the rolling averaged difference to the reference period (as used in Figure 4 and Figure 5 of the Report) being approximately zero at the start of RY17. If RY14 is excluded from the trend due to it being an extreme outlier, then the analysis shows no strong trend in worsening reliability performance at the start of the breach period. Figure 3 illustrates the restated trend analysis with RY14 removed.

Figure 3: Impact of Excluding RY14 Outlier from Rolling Average

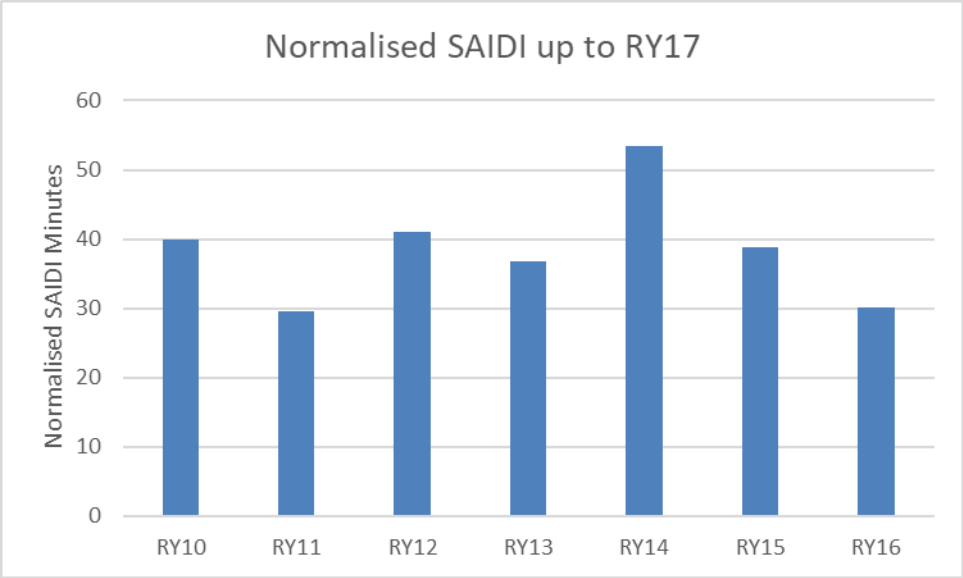


RY14 was an extreme outlier and skews the rolling average analysis. Removing the year for the analysis shows that RY14 was responsible for the entire 5 SAIDI minute trend indicated in the Report analysis. WELL supports the analysis of longer-term trends and the use of rolling average. WELL has implemented a number of the methods used in the Report since the Breach. However, care must be taken to remove unrepresentative data so that real underlying trends are correctly revealed, and misleading trends are not created.

Comparing normalised SAIDI provides an alternative test of whether a worsening trend in reliability performance could have be seen at the beginning of the breach period. Normalisation removes the impact of higher-than-average storms and other outlying events that can skew a rolling average trend

analysis (like the storm events in RY14 that were skewing the rolling average trend analysis in the Report). Figure 4 compares normalised SAIDI before the start of the breach period. The graph shows no discernible trend in these overall figures that would have indicated increased risk of Breach at the start of RY17.

Figure 4: Normalised SAIDI up to the start of RY17



In conclusion, removing the outlying RY14 from the rolling average analysis and comparing normalised SAIDI shows that there was not an overall trend of worsening reliability. WELL disagrees with the Reports conclusion that sufficient information was available at the start of the regulatory period to escalate the risk of a future exceedance[11]. The alternative analysis shows there was no trend of worsening reliability performance at the start of the breach period.

3.1.2. Assessing the overall reliability trend during the breach period

The Report assessed whether the reliability performance data indicated enough of a trend by 30 September 2016 for controls to have been implemented earlier than they were. Specifically, that concerns should have been raised to the Board and new control put in place.

While considering this question and the supporting analysis, it is important to consider what was known at the time, and not let hindsight of the eventual RY17 and RY18 results influence the assessment.

[11] Paragraph 95

Figure 5 shows the cumulative SAIDI performance for the first half of RY17 (April 2016 to October 2016). Figure 6 provides the monthly SAIDI results.

Figure 5: Cumulative SAIDI during RY17 to up 31 October

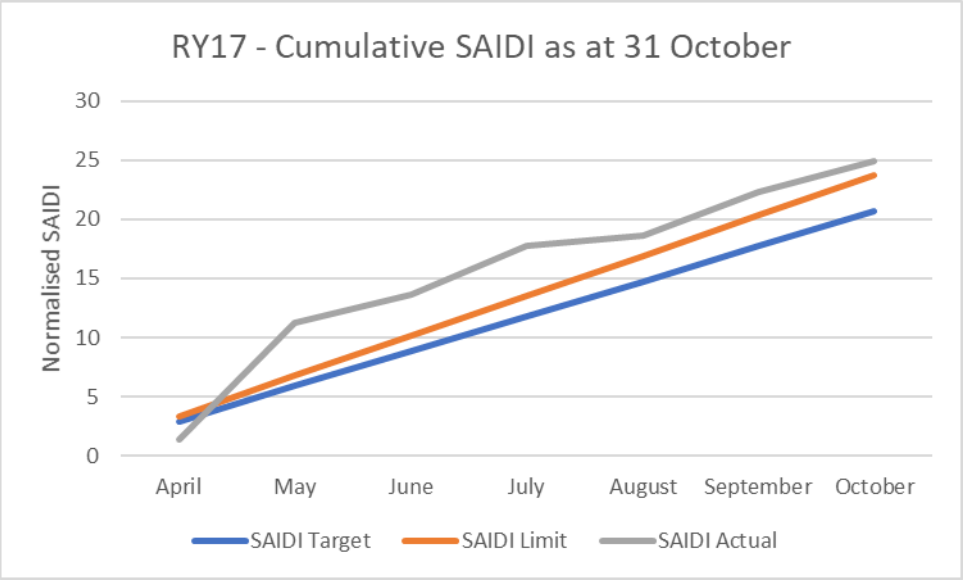
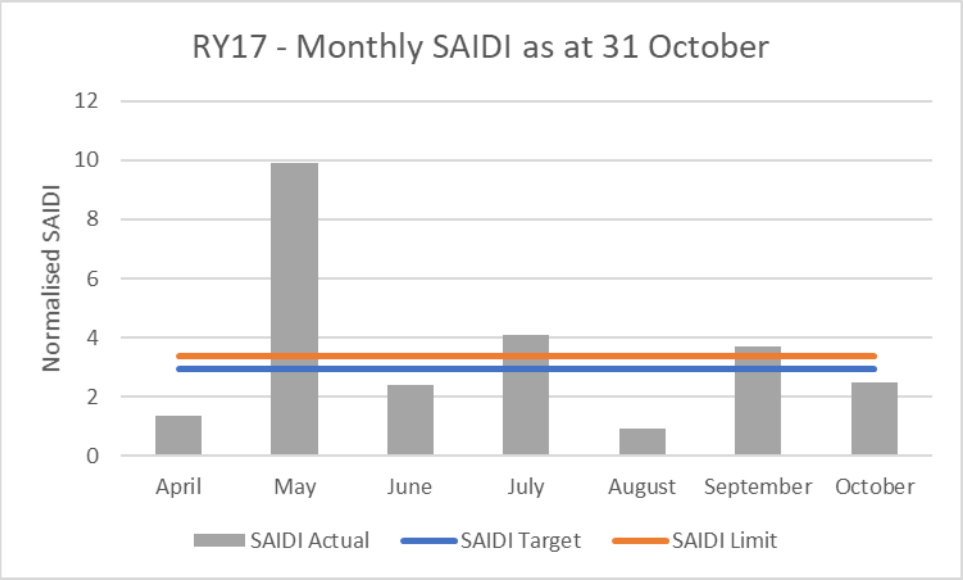


Figure 6: Monthly SAIDI during RY17 to up 31 October



The year-to-date position (shown by figure 5) was dominated by the poor performance in May 2016, which up until October 2016, contributed ~40% of SAIDI to date (shown by Figure 6). However, April and the months following May averaged below the SAIDI Collar. In September 2016 management were aware of the 'one-off' poor performing month in May but were confident that the ongoing good performance in the other six months would lead to the average reverting to the long-term average. The performance in the proceeding regulatory year (RY16) supported the view that May 2016 was an

outlier month. WELL was confident that at that point in time, it would recover from the poor performance in May and return back to target by the end of the regulatory year.

The period following 31 October 2016 was significantly worse than our forecasting tool would have indicated, particularly on the overhead network, including two additional Major Event Days. This period from November 2016 to March 2017 included the Kaikoura earthquake on 14 November. In addition to being a Major Event Day, the earthquake caused a significant disruption to WELL operations, with its head office being so badly damaged that business continuity plans were implemented to respond to the earthquake event and subsequent storm event from the Haywards Disaster Recovery site with most staff asked to work from home. The Wellington Electricity business premises has subsequently been demolished. The breach was mainly due to a string of unexpected events occurring after October 2016. The report noted that these events, including the earthquake, were largely out of WELL's control and were therefore unlikely to be predicted midway through RY17 nor form part of the setting the quality targets for this period.

The large outages occurring between November 2016 and January 2017 made the expectation of bringing network performance back to target levels unachievable. The risk and resulting actions and controls were highlighted to the Board in February 2017 and May 2017. Large outages occurring late in the regulatory year meant that there was little time to either defer planned outages or benefit from implementing new controls.

The one standard deviation band between the quality target and cap is one of the reasons why the regulatory model provides the "two out of three" year buffer for when a quality breach is triggered. It provides time for a network to correct outages occurring late in one regulatory year so that similar outages don't impact the next year. The Report confirmed that WELL's controls in response to the outages in RY17 were effective and those outages didn't continue into RY18. The quality exceedance in RY18 was due to quite separate events. rather than a continuing year on year trend.

3.1.3. In Summary

From the perspective of overall reliability performance:

1. WELL believes that there was no clear trend of worsening reliability performance leading into the regulatory year.
2. WELL believes that it was reasonable to expect to be able to return quality performance back to the long term average midway through RY17. Reliability performance had been normal following only one month of high weather-related SAIDI in May 2016.

3. A large earthquake followed by storms between November 2017 and February 2018 increased SAIDI and SAIFI to the point that the overall performance was unrecoverable – there was not enough time for control to make an effective difference before the end of the year. However, WELL acted quickly to respond to overhead network performance trends by the end of RY17, which prevented overhead equipment from being a contributor to the RY18 exceedance. Controls put in place for the causes of the RY17 exceedance were effective. The Report highlighted that the causes of the RY18 exceedance were different to those in RY17[12] , noting "It is important to also acknowledge that the change in unplanned outage causes from one year to the next presented some unique challenges to WE*, and made it harder to manage the event of RY18 given the different factors affecting performance that year compared to the previous". The Report also noted that the controls put in place were sufficient to return quality performance back to reference period levels[13].
4. WELL acknowledges that the emerging trend in planned outages would have been addressed earlier with hindsight. However, there were circumstances and evidence that lead to WELL's assessment that the reliability impact of the legislative changes would be minimal as we were committed to retain live working provided it remained safe to do so. This is discussed in detail in the next section.

3.2. Detailed analysis of specific outage types

The Report summarised its analysis of the outages that contributed to the breach in Table E2. The analysis classified outage causes into those which the Report considered systemic deficiencies', non-systemic deficiencies and those which were a natural variation of the reference period data set. The Report considered those which were caused by systemic deficiencies as an outage caused by WELL not executing good industry practice and not implementing timely controls. Non-systemic deficiencies were outages caused by errors made by the application of incorrect practices, rather than the underlying practice not being in line with good industry practice. Figure 7 below extracts the SAIDI associated with systemic and non-systemic deficiencies.

[12] Paragraph E18
[13] Paragraph E21.

Figure 7: Summary of systemic and non-systemic caused outages

Cause			systemic deficiency		non-systemic deficiency	
			RY17	RY18	RY17	RY18
Unplanned	Wind-related	vegetation	2.0	2.0		
		no fault found	1.4			
Planned (50% of actual)			2.0	5.8	1.0	1.0
Network intendents					0.6	0.7
Total			5.4	7.8	1.6	1.7

This table summarises the critical areas that the Report believed that WELL's reliability management practices contributed to the size of the quality exceedance (noting that the exceedance itself was largely outside of WELLs control[14]). WELL was pleased with the Report findings that the controls put in place in response to these outages would "most likely" be effective[15]. However, the Report asserts that these controls could have been implemented sooner[16] – the delay led to the SAIDI summarised in Figure 7. The Report acknowledges and WELL agrees, that this can be a fine line as acting with more controls in response to noise in the data rather than sustained trends will not be cost effective or in the interest of customers[17].

WELL believes that in some cases the trend data did not show that there was worsening quality at the point that the Report suggests the controls should have been implemented from. Applying controls at the point suggested represents a level of quality beyond what WELL is funded to provide and what our customers have indicated they would be willing to pay for[18].

The Report highlighted several areas where trend analysis highlighted worsening trends and good industry practice would have led to controls being implemented earlier. WELL has reviewed each of these outage categories, testing whether there was a worsening reliability trend that should have resulted in an earlier application of controls. We have not assessed whether the controls applied were appropriate as the Report has already indicated that overall they were effective.[19]

[14] Paragraph E25
[15] Paragraph 369
[16] Paragraph 378
[17] Paragraph 383
[18] WELL surveys customers after an outage asking them if they want a higher level of quality and whether they are willing to pay for it. The rests are published in out Asset Management Plan which can be found on WELL's website.
[19] Paragraph E21

3.2.1. Vegetation

Table E2 in the Report (and summarised in Figure 7) concludes that systemic deficiencies in vegetation management added 2 SAIDI minutes to both RY17 and RY18. It states that it was WELL's slow response to vegetation trends that were considered to drive these extra minutes.

Vegetation outages have long been a known risk area for WELL being located within a high wind zone often visited by severe gale strength wind events. These wind events contributed to WELL's previous breaches in 2013/14 RY, as despite power line corridors being cleared of at-risk vegetation, out-of-zone tree debris (and roofing iron, trampolines) liberated from severe gale strength wind impacted the above ground infrastructure. In response to the earlier breaches, WELL has implemented a number of different controls.

Figure 8 shows the trend in monthly SAIDI due to vegetation outages through until 31 March 2016, the start of the breach period. There is no clear evidence in the 12-month rolling average of a trend in vegetation outages at the start of RY17 that could have been acted upon.

Figure 8: Monthly Vegetation SAIDI to 31 March 2016

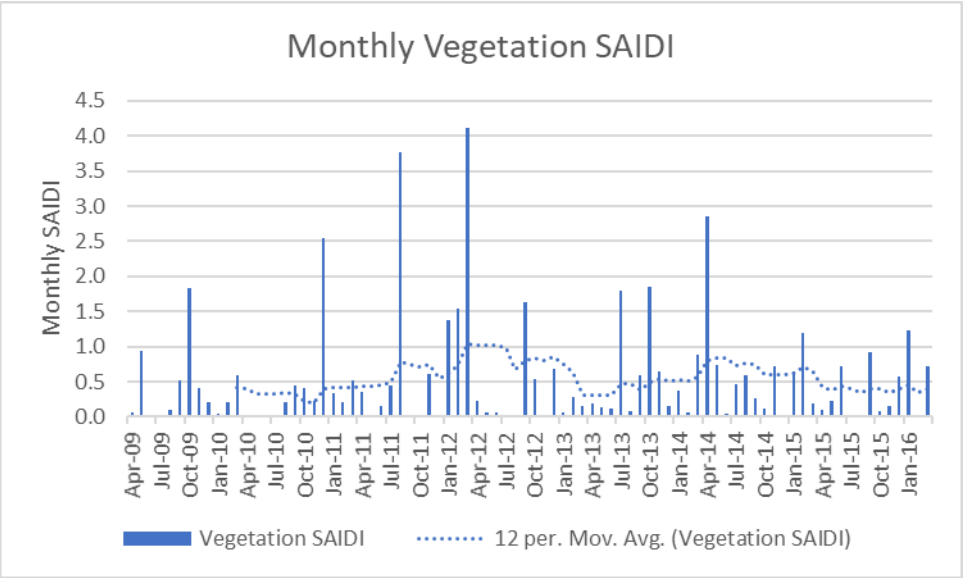
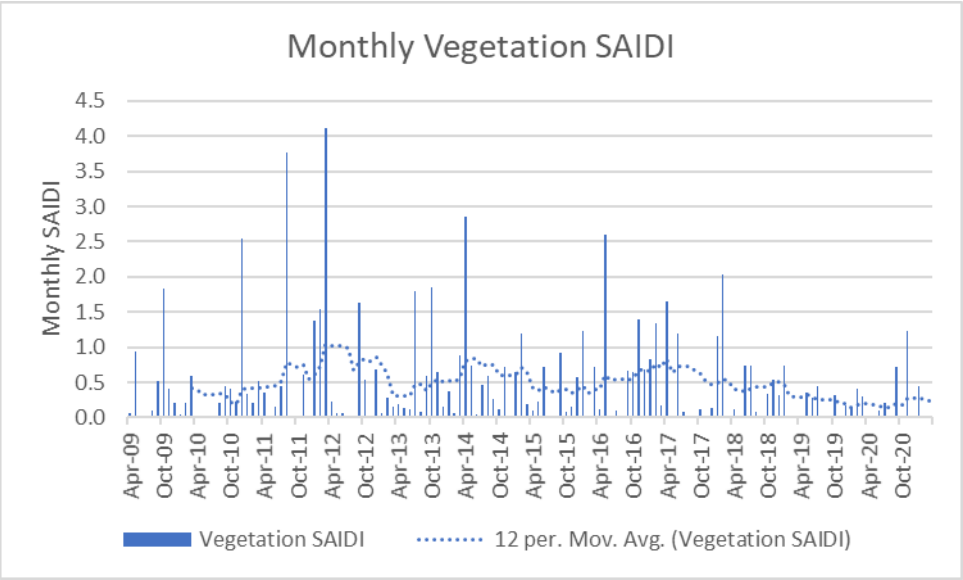


Figure 9 extends this view out to the end of RY21. This shows that, aside from the bad month of May 2016 noted in Section 2.1, the increasing trend in vegetation outages began in September 2016 and ran through to May 2017, with additional vegetation outage controls being implemented in May 2017. With September being the first month of the trend of increasing vegetation outages, the trend would not have been apparent at 30 September 2016, the midpoint of RY17, at which point WELL believed that meeting the reliability limits was realistic.

Figure 9: Monthly Vegetation SAIDI to 31 March 2021



WELL believes that the identification of the trend of increasing vegetation outages, and development and implementation of controls within a period of eight months of the start of the trend is an acceptable timeframe, given the need to avoid inefficiently reacting to isolated events rather than real trends.

3.2.2. Planned Outages

Planned outage management has emerged as a major industry challenge following the introduction of the Health and Safety at Work Act 2016 (HSWA). Table E2 in the Report concludes that systemic deficiencies in planned management added 2 SAIDI minutes in RY17 and 5.8 SAIDI minutes in RY18, and that WELL's response to planned outage trends caused these extra minutes.

Figure 10 shows the trend in monthly SAIDI due to planned outages through until 31 March 2016. There is an increasing trend in the rolling average up to approximately 0.4 SAIDI minutes per month. This level of planned outage SAIDI was expected to be sustained, as indicated in Schedule 12d of the Asset Management Plan published on 31 March 2016, forecasting future Planned SAIDI at 5.3 minutes per year.

WELL had identified the risk, forecasting a 4.8 minute increase in expected SAIDI. WELL also planned to offset the increase by reducing unplanned SAIDI down to 30.1 minutes, in order to continue to meet the overall regulatory target of 35.44 minutes.

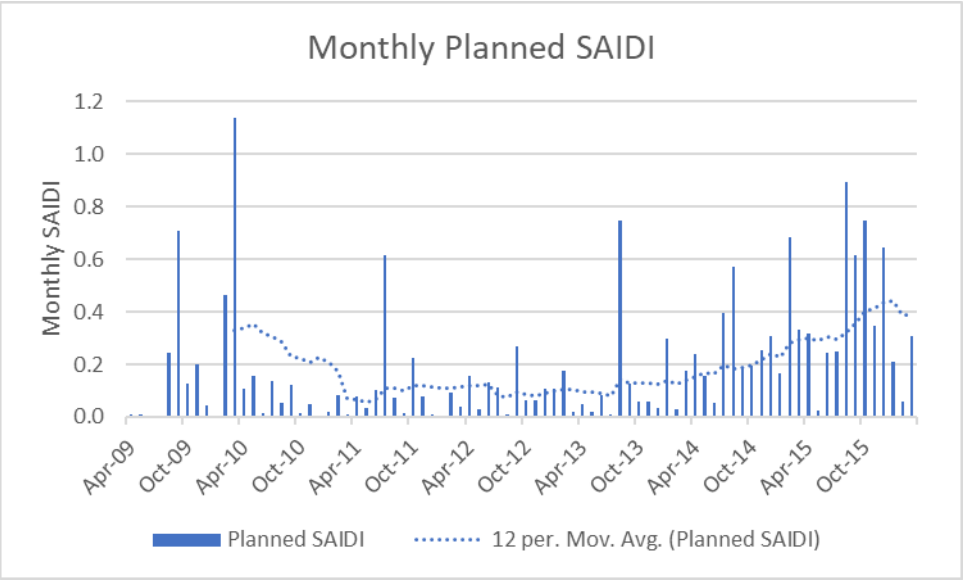
The actions to do this were listed in Section 4.2.3 of the 2016 AMP:

- Mitigating, where practicable, the impact of severe storms by using line sectionalisers and reclosers and by employing well-practiced emergency restoration plans;
- Analysing all significant outages (over 0.45 SAIDI minutes) to identify root causes and recommendations to prevent recurrence;
- Monitoring trends in outages causes and other asset failures to identify changes in maintenance practices and to confirm assets to be upgraded;
- Monitoring of field response and repair times for major faults to identify causes of prolonged outages and develop strategies to improve restoration times;
- Analysis of worst performing feeders;
- Further refinement of the targets to reflect consumer segments (for example, Wellington CBD requires a higher level of security than rural consumers);
- Extending risk based analysis to cover conductors and underground cables; and
- Further analysis of wind speed and wind direction forecasting.

WELL had identified the increasing trend in planned work that began in 2013 and was signalling that the reference period average of 0.5 minutes was no longer realistic given expected levels of planned work. WELL disagrees with the Reports conclusion that the "the effect that the increasing trend in planned outages was having on quality standard compliance risk were not adequately identified and controlled prior to RY17[20]". WELL had controls in place to offset the regulatory SAIDI allowance of 0.5 with reductions in unplanned outages. It was due to the extraordinary events in the RY17 and RY18 that were out of WELL's control (high winds and the earthquake in RY17[21] and Car vs pole and earthquake damaged cables in RY17[22]) with higher-than-average SAIDI that meant WELL did not have the same headroom in unplanned SAIDI to efficiently offset such a large increase in planned outages. Since RY18, in years which did not have extraordinary events outside of WELLs control, the higher planned SAIDI has been offset with unplanned SAIDI, as demonstrated in Figures 1 in the first section of this response. Exceeding the planned outage allowance was not a systemic deficiency – the increase was expected and planned for.

[20] Paragraph 376
[21] Paragraph E15
[22] Paragraph E16

Figure 10: Monthly Planned SAIDI to 31 March 2016



The Report also notes that WELL was slow to respond to the changes in HSAW Act[23]. The report commented that WELL's assumption that the impact of the Act would be minimal and had not been challenged and investigated sufficiently prior to its introduction in 2018. In hindsight WELL did underestimate the impact of the HSWA. However, WELL underwent extensive challenge and investigation that even reviewing now, looked to be sufficient. This included:

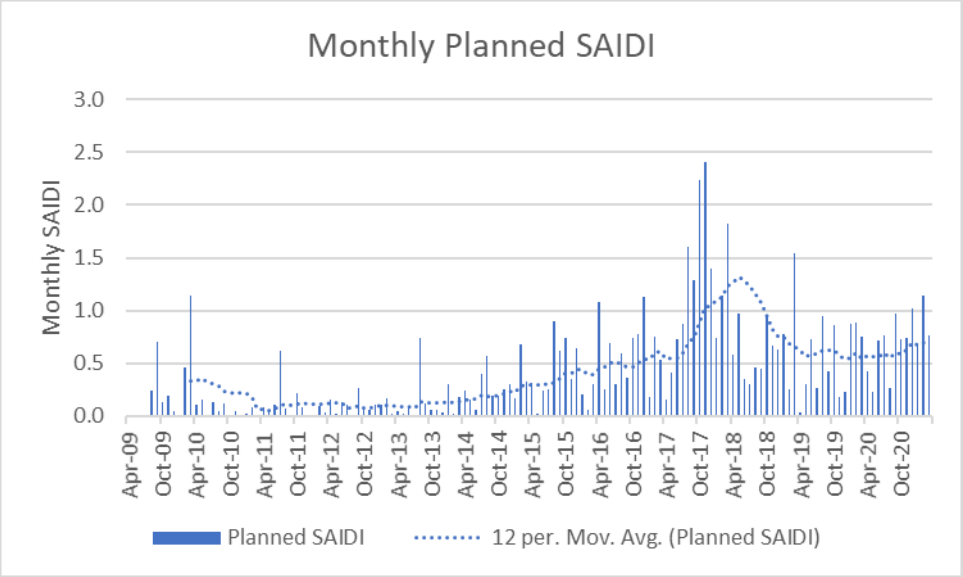
- WELL engaged with other CKI companies that had been operating under similar legislation including al visit to sister company SAPN to discuss these changes in early 2016.[24] These interviews showed that a similar Act in Australia had little impact on reliability performance.
- Confirmation that live practices could continue to be used (with sufficient training and safety systems) in an Energy Safety Summary of Facts hearing which questioned application of live working or working de-energised adjacent to live works.
- Our internal assessment of each live work practice against the requirements of the Act.

What was difficult to predict at the time due to uncertainty in the industry, was the impact that other asset owners would have on the overall NZ practices. Practices applied by other networks were then also starting to be applied by the owners of our field crews in Wellington. This resulted in more de-energised work than expected.

[23] Paragraph 378
[24] Paragraph 240

Once the full impact of the changes in legislation were understood, WELL responded with new controls, specifically the introduction of generation. Figure 11 extends the monthly view out to the end of RY21. This clearly shows the extent to which Planned SAIDI increased after the start of RY17, and how the controls implemented were effective, to the extent that the increasing trend had reversed by the end of RY18.

Figure 11: Monthly Planned SAIDI to 31 March 2021



As acknowledged by the Report[25], WELL now has practices in place which reflect good industry practice for managing the impact of planned outages, which have reduced Planned SAIDI down to RY17 levels for the period from RY19 to RY21. We believe it is not conclusive for the Report to attribute the high amounts of systemic SAIDI minutes to the RY18 due to the uncertainty created by the introduction of the HSAW Act. WELL does not believe it was reasonable to expect WELL to be able to predict the impact that other networks reducing their live practices, would have had on the Wellington network.

3.2.3. Conclusion from the Detailed Analysis of Forecasting Sophistication

WELL found the analysis provided in the Report useful, as it provides alternative views on methods for forecasting reliability performance. We also values the Report's confirmation that the actions WELL has undertaken since the Breach reflect good industry practice.

Based on the alterative analysis provided, WELL believes that the Report overstates the degree to which the RY17 performance could have been predicted at the end of RY16, as the underlying trends

[25] Paragraph 242

that drove the RY17 exceedance are only visible with hindsight. As a result, WELL believes that the Report is unrealistic in its expectation of the speed with which these trends should have been identified, and controls developed and implemented. WELL also believes that the application of systemic SAIDI doesn't take into account that trends take time to form and controls take time to apply and to then take effect. It is unrealistic to expect the full benefits of a control to apply immediately. Even with an earlier introduction, WELL considers that there would still have been some adverse impact of quality while the controls were taking effect. A current example of this is the global Covid pandemic where vaccinations, even at 70% of the population, are still not effective to reduce the daily infection numbers which continue to grow in many overseas countries.

It is important to note that in a normal year without the major events outside of WELL's reasonable control, WELL would have been able to manage this level of SAIDI (even without restating for more reasonable control application timeframes) within the quality allowances. Multiple events occurring at once (the high wind year and earthquake in RY17 and spike in car vs pole and HSAW changes in RY18) meant that WELL did not have the headroom we normally have to manage these types of fluctuations in quality drivers. Additional headroom could be provided to cater for multiple uncontrollable events falling at the same time, but this would require a significant investment in the network beyond what is currently funded and has been generally unsupported when engaging with customers facing these higher investment costs. The impact of the combination of multiple events occurring at once was discussed in the CEOs statement made at the start of the December 2019 phone interview and would have been a key discussion point if a site visit had occurred.

4. Planned SAIDI targets

WELL is concerned that the planned SAIDI/SAIFI allowances provided under the DPP2 methodology may not fully represent the allowances needed to implement the necessary work programmes. Specifically, the reference period used to calculate the DPP2 planned quality allowances is not representative of DPP2 work programmes and work practices. As highlighted in the previous section, WELL recognised that SAIDI was increasing and implemented new controls to manage this by offsetting planned exceedances with savings in other outage categories. In the RY17 and RY18, the uncontrollable events highlighted in the Report[26] removed the headroom that WELL would normally have used to offset these increases. WELL's ability to offset the higher than target planned outages was further reduced by the Health and Safety and Work Act which required the removal of less

[26] Paragraph E15, E16 and Table E2.

frequently used live techniques which increased planned outages. As WELL had an outsourced workforce, it was immediately obvious which live techniques were used often and retained and which were discarded as marginal. This is why the impact of the legislative changes was not obvious until later in the regulatory period. This section expands on WELL's planned outage allowance and WELL's diminishing ability to offset exceedances, providing further context for the Commission's assessment of the quality breach.

4.1. **Low planned allowance is unrepresentative of current planned works programme**

WELL's planned SAIDI and SAIFI allowances are small compared to other networks as there has been traditionally low growth. Work programmes have not needed to included brown fields capacity investment and green field investments were at a level which could be readily accommodated. As a ratio of planned SAIDI compared to the work programme (represented by capex and network opex) WELL has the lowest planned SAIDI allowances of any network – as shown in Figure 12 below. The analysis shows WELL has the lowest planned ratio for expenditure (proxy for the associated work programme size) and line length and ICP's (proxy for network size). The analysis uses the DPP2 reference period quality data that was used to calculate the DPP2 quality targets. The data excludes Orion as it was on a CPP at the time.

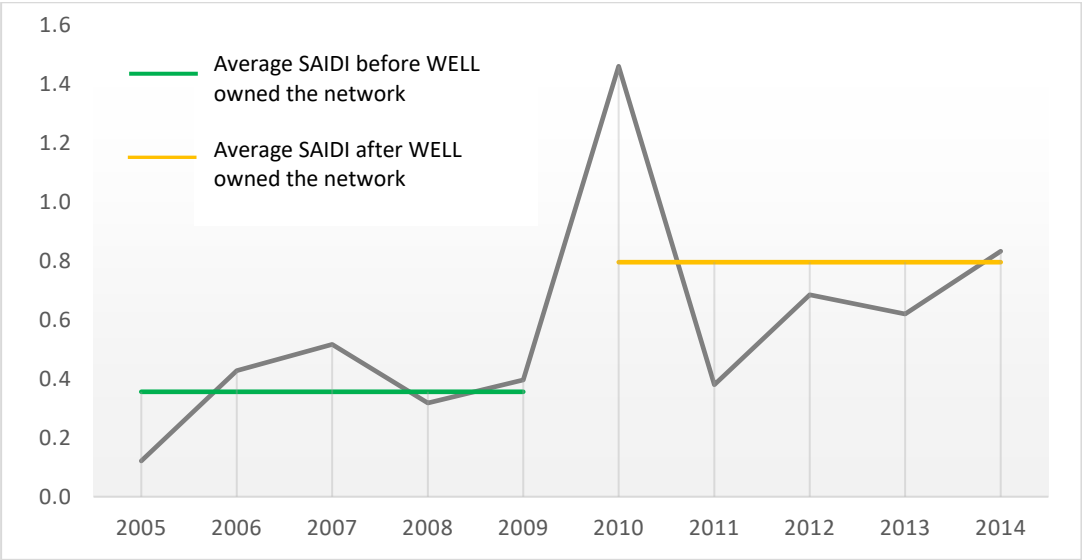
Figure 12: Comparison of Planned SAIDI/Network work programme ratios

					Ratios		
For the 2013 to 2019 period	Planned SAIDI (average)	Network capex/opex ($m)	lines length (1,000km	ICPs (1,000)	SAIDI per $1m opex/capex spent ($m)	SAIDI per 1,000km of line length	SAIDI per 1000 ICPs
WELL	0.6	45	5	188	0.01	0.1	0.0
Vector Lines	5.9	197	19	651	0.03	0.3	0.0
Unison	7.0	32	7	97	0.22	1.1	0.1
Aurora Energy	2.0	6	1	18	0.32	3.1	0.1
Invercargill	16.7	49	9	120	0.34	1.8	0.1
Alpine Energy	20.8	25	4	36	0.83	5.1	0.6
Lines Company	9.9	11	3	26	0.91	3.8	0.4
EA Networks	29.4	20	3	22	1.46	9.5	1.3
Tasman	20.8	14	4	44	1.47	5.7	0.5
Nelson	24.4	16	4	35	1.52	5.7	0.7
Horizon Energy	29.4	14	4	26	2.05	7.4	1.1
Eastland	7.6	4	0	10	2.15	25.4	0.8
Top Energy	42.9	14	4	26	2.97	9.8	1.6
OtagoNet	78.2	15	5	20	5.32	17.0	3.9
Centralines	28.0	5	2	9	6.10	15.5	3.2

WELL's low SAIDI allowance is partly due to the 11kV underground cable ring design of the Wellington city network which allows power to remain on by back-feeding from other parts of the network during planned works. However, only Wellington city has this network design and the rest of the network, including WELL's rural feeders, do not have the same ability. Other networks (Vector, Orion, Nelson, Invercargill) also have parts of their networks with this similar design.

The relatively low planned outage allowance (0.6 SAIDI munities) is also a result of very low actual planned outages in the early years of the reference period before WELL owned and operated the network (before 2009). Figure 13 shows planned outages over the reference period used to calculate the planned quality targets. The figure highlights that the reference period used to calculate the planned allowances was strongly influenced by the 2004 to 2009 period which had an average planned SAIDI of 0.4 minutes. The portion of the reference period after which WELL operated the network had an average SAIDI double that of the earlier period – a SAIDI of 0.8 which his still significantly lower than any other network. WELL does not have operational data from the period before it operated the network and is not able to say why planned SAIDI was so low before 2009. Reasons for the low SAIDI could be that planned SAIDI was recorded differently or the work programme was a lot less than is currently occurring. However, when comparing it to the other network (Figure 2) and to actual planned SAIDI since 2009, the of planned SAIDI quality targets do not look realistic.

Figure 13: Planned SAIDI over the reference period



4.2. **Further increases due to changes in live work practices**

The increase in planned outages was exacerbated further with the introduction of the HSAW Act – the change in legislation leading to a 3.8 minute or 500% increase in planned SAIDI that was not captured

in the reference period the quality targets were based on. While WELL has minimised the impact of the Act by continuing to use live work practices where possible, the residual effect is still significant. As highlighted by the Report, since the breach WELL has used temporary generation to offset approximately half of the 3.8 minute increase with the remaining 1.8 minutes being uncontrolled and having to be offset with savings elsewhere[27]. This residual increase is significant. WELL has 5.4 SAIDI minutes between the reference period average and the cap[28], that it has on average to manage uncontrolled increases. The increase due to changes in live line practices uses most of this headroom.

4.3. **Limited ability to respond to the increase in RY17 and RY18**

WELL agrees with the Report's finding that planned outages have significantly increased. Good industry practice means that a network operator would respond by implementing controls that reduce the outage or provide offsetting savings from other outage types. WELL has partially reduced the increase by using generation funded from outperformance of the targets within the quality incentive scheme. As highlighted by the Report, this left an approximately 4 minutes[29] residual SAIDI which is uncontrolled. WELL did not consider reducing the work programme as this would adversely impact reliability even further and could also impact public safety.

WELL has been managing the residual increase by offsetting it against savings in other outage areas. However, the spike in car vs pole outages in RY18 and the unexpected impact of the new business rules driven from HSAW changes meant that WELL did not have the headroom it needed to offset the increase. The residual SAIDI of 4.0 minutes is a large amount when compared to WELL's entire SAIDI allowance of 40.63 – WELL is having to find a 10% saving in other reliability allowances to offset the increase. WELL is finding savings using a number of our continuous improvement initiatives.

5. Non-systemic deficiencies

The Report also raises an important consideration about who should bear the risks associated with events that are 'one-off' and do not represent an on-going, underlying trend. We agree with Nuttall Consulting's view that these types of one-off events will always occur from time to time, especially on activities that are complex and involve field service contractors not under direct observations from

[27] Paragraph 248
[28] WELL have an average of 35.2 SAIDI minutes and a cap of 40.6 SAIDI minutes – as provided in Table E1 of the Report
[29] 2min (paragraph 218) relating to an increasing trend in planned outage which reflects WELL's increasing work programme plus the approximate 2m that temporary generation does not offset (paragraph 248).

WELL. Nuttall consulting commented that they would expect a small number of these events to occur each year[30].

WELL notes that Nuttall Consulting did not suggest any necessary changes to WELL's practices resulting from these events.

6. Compliance and enforcement guidelines

WELL would like to take this opportunity to comment on the enforcement process, specifically about improvements that would clarify an EDB's direct and indirect quality responsibilities. WELL believes the Regulatory Compliance function at the Commerce Commission should provide publicly disclosed enforcement standards/guidelines which align with the level of quality funded under the price-quality path.

At the moment enforcement is based on whether the EDBs reliability practices are aligned with 'good industry practice", while price/quality regulation is based on quality performance not deteriorating and the level of quality meets customer price/quality expectations. The difference could result in networks being funded to provide a level of quality which may not meet the enforcement standards. WELL believes specific areas of improvement could be:

- Publish enforcement standards and clear evaluation criteria. We understand this is on the Commission work programme.
- If the enforcement standards continue to use 'Good Industry Practice' as an assessment criterion, then 'Good Industry Practice' should be defined so that EDBs can invest in their processes and systems to ensure they align with regulatory expectations.
- Align price/quality and enforcement assessment criteria of how reliability performance is measured.

Making these changes would go a long way to ensure that networks are correctly funded and are delivering a level of quality which is consistently applied across the expectations of lines businesses and their regulators or external consultants.

7. Closing

WELL takes its responsibility to provide a reliable service to our customers seriously and we hope the Commission recognises that we have worked hard to return our quality performance back to levels

[30] Paragraph 383

expected by our Wellington consumers at an affordable price. This has been demonstrated by the reliability performance for the three years since the breach being at or below the reliability collar. While Nuttall Consulting have confirmed that the non-compliance event overall was beyond WELL's control, WELL has responded strongly with controls to the events causing the exceedance in RY17 and RY18.

In line with the findings of the Report, the controls implemented in response to the breach have addressed the exceedance. We do believe that Nuttall Consulting's assessment of when the controls could have been applied was more aggressive than is reasonable or realistic to have been applied at the time and is not in-line with the DPP2 funding assumptions.

While this doesn't change the key findings of the Report, we believe this has led the Report to overstate the impact of deficiencies in the reliability management practices highlighted in the Report. The underlying causes of the exceedance of the quality standards are complex and understanding WELL's response to the exceedance is difficult without the context of the network and the operating environment at the time. We believe a site visit would have helped to provide the wider context of the regulatory price/quality relationship and the operating landscape under which WELL provides distribution services to our customers.

If you have any questions or there are aspects you would like to discuss, please don't hesitate to contact Scott Scrimgeour, Commercial and Regulatory Manager, at sscrimgeour@welectricity.co.nz

Yours sincerely

Greg Skelton

Chief Executive Officer

Wellington Electricity Lines Limited