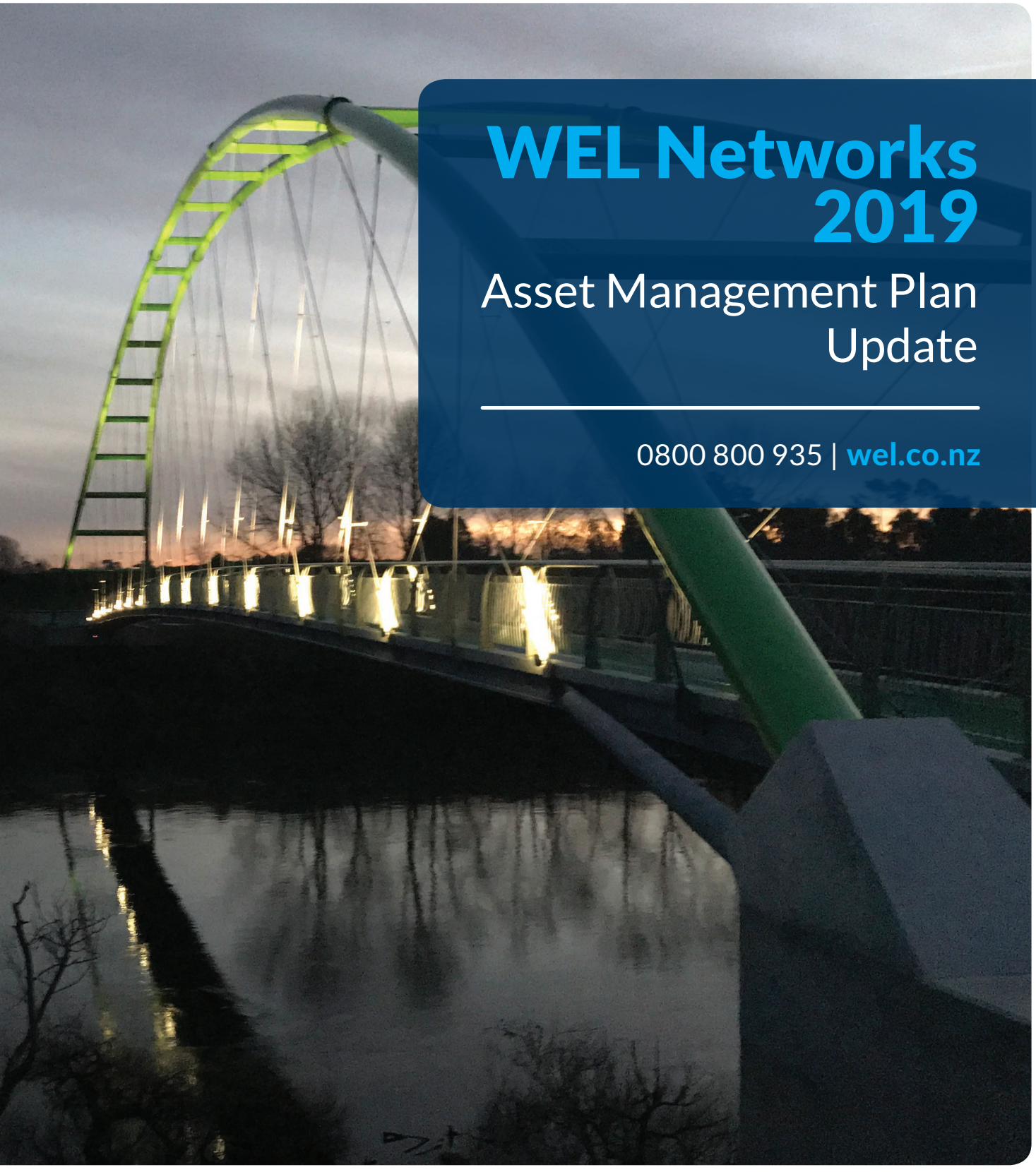

# WEL Networks 2019

## Asset Management Plan Update

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# ENABLING OUR OUR COMMUNITIES TO THRIVE

# CONTENTS

# 1

# EXECUTIVE SUMMARY

# 1 EXECUTIVE SUMMARY

## The 2019 Asset Management Plan (AMP) Update communicates to our stakeholders the material changes in asset management from the 2018 AMP.

Significant growth is being experienced in Hamilton City and the Waikato District. Growth is expected to continue through the 10 year AMP period and beyond. To support this growth, we have updated our investment requirements so we can continue with our vision of "Creating an innovative energy future".

The 2019 AMP Update indicates that our capital investment will increase by $8M annually (in nominal price). This is driven by an increase of $5.7M in Customer Initiated Works, $0.6M in asset renewals and $1.7M in network development. Our operational expenditure will also increase by $1M annually (in nominal price) from increased requirements for system operations and business support.

Our Customer Initiated Works team continuously accommodates the increasing number of connection applications due to the growth we are experiencing. We have updated our network development strategy to optimise existing asset capacity (i.e. moving load to parts of the network with underutilised capacity), we have aligned existing projects to customer requirements (thereby negating the need for new investments) and have introduced a substation and feeder configuration concept to meet our company's vision.

Updates to our asset renewal strategy have been driven by (i) the need to prioritise assets that have a renewal backlog, (ii) targeted inspections and (iii) moving forward the renewal schedule based on optimised work packages. Further to this, we have been able to reduce renewal investment from Failure Mode, Effects and Criticality Analysis (FMECA) outcomes, targeting asset replacements and adopting smarter mitigation. This reduction minimised further increases in renewal investment.

The above are further discussed in Section 3 Asset Management Plan Update Material Changes.

### Period Covered by the AMP

This plan covers a ten year period from 1 April 2019 to 31 March 2029 (AMP period). As with any long-term plan, the integrity and accuracy of the details tend to be more accurate in the earlier years as it is easier to predict the near-term state of our assets and required actions, plans and expenditure.

### Approval Date

This plan was reviewed and approved by the WEL Networks Limited Board of Directors on 21 March 2019.

### Purpose of this document

The purpose of this AMP Update is to inform and communicate to our stakeholders the material changes in asset management from the 2018 AMP. These changes are provided to support the accelerated growth in Hamilton and the Waikato District in a balanced approach to meet our stakeholder requirements in accordance with our asset management strategy and objectives.

The AMP Update should be read in conjunction with the 2018 AMP, which contains a greater level of detail. For the purpose of this AMP Update we have not attempted to duplicate the detailed explanations as set out in the full 2018 AMP.

### Intended Audience

The intended audience for this AMP includes: our stakeholders, community, customers, the Commerce Commission and the Electricity Authority, our staff and contractors, and other interested parties.

# 2

# OVERVIEW OF WEL NETWORKS

# 2 OVERVIEW OF WEL NETWORKS

**WEL Networks (WEL) is owned by the WEL Energy Trust. WEL supplies electricity to the northern Waikato and small networks in Cambridge and Auckland. The network area includes Hamilton which is the main electrical load centre and regional centres of Raglan, Gordonton, Horotiu, Ngaruawahia, Huntly, Te Kauwhata and Maramarua (see Figure 1).**

Our network is supplied by three Grid Exit Points (GXP) owned by Transpower and two large embedded generators at Te Rapa and Te Uku. The GXPs are Hamilton (HAM), Te Kowhai (TWH) and Huntly (HLY). Our 33kV subtransmission connects the GXPs with zone substations which in turn supply our 11kV distribution network. This network then feeds our low voltage network supplying the majority of our customers.


**Figure 1 WEL Networks boundary and small embedded networks in Cambridge and Auckland**

There are over 88,000 connections across WEL's traditional network area and over 1,800 connections within our embedded networks located in Auckland and Cambridge. The breakdown of load by customer group as of 31 March 2018 is set out in the Table 1 below.

| Customer Group | Number of Active ICPs | Electricity Delivered (GWh) | Demand (MW) |
|---|---|---|---|
| Domestic | 74,687 | 499 | 175 (65%) |
| General | 12,180 | 224 | |
| Streetlights and Unmetered | 328 | 12 | |
| Small Scale Distributed Generation | 741 | 8 | |
| Large Commercial | 773 | 495 | 96 (35%) |
| Embedded Network | 1,892 | 15 | |
| **Total** | **90,691** | **1,253** | **271** |

**Table 1 Customer Group and Electricity Delivered**

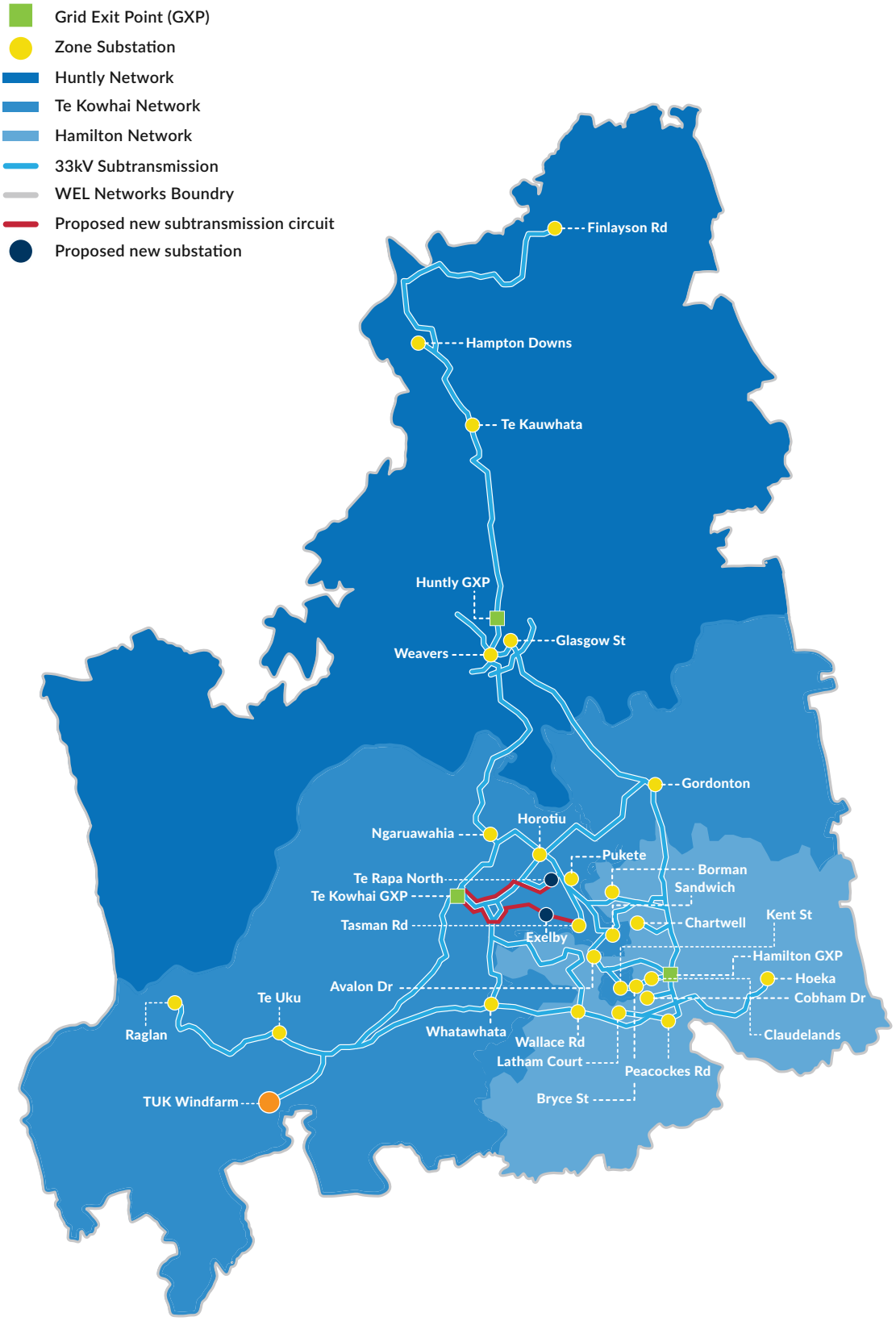



Figure 2 WEL Networks boundary, 33kV Subtransmission, GXP and Zone Substations (existing and proposed)

# 3

# ASSET MANAGEMENT PLAN UPDATE MATERIAL CHANGES

# 3 ASSET MANAGEMENT PLAN UPDATE MATERIAL CHANGES

**The Hamilton and Waikato Districts are experiencing growth in residential, commercial and industrial developments. We have gained a better and clearer understanding of the growth in these areas through discussions with local authorities and associated research.**

Discussions with Hamilton City Council and Waikato District Council indicate that growth will continue through the 10 year AMP planning period and beyond. The growth areas identified in the Future Proof Strategy Planning for Growth plan[1] are progressing and in-fill developments are continuing (we are forecasting 1MW annual peak demand increase in each growth area through 2025). Further to this, we are working towards increasing our information for up and coming developments, gathering details, including planning for a staged approach, as we continuously strive to be ahead of the developments.

It is anticipated that private developers will accelerate residential developments in Hamilton City and the Waikato District. This is reflected through a number of Special Housing Area applications, structure plan changes and consent applications. Commercial and industrial developments are proceeding in Horotiu, Pukete, Rotokauri and Huntly.

To support this growth, we have to manage our capital and operational expenditures with a balanced approach so that we can meet our stakeholder requirements in accordance with our asset management strategy and objectives. The material changes on our expenditure are described in the following sub-sections.

## 3.1 Material Changes to the Network Development

The network development forecast includes system growth, legislative and regulatory, quality of supply and reliability, safety and environment. We have updated our network development forecast to support the growth we are experiencing and the timing of development proposed by our customers. Figure 3 shows the 10 year expenditure forecast compared to the indexed 2018 AMP network development forecast. We have minimised the increase in investment to $1.7M (in nominal price) annually by aligning our projects with customer development timing and optimising network capacity i.e. moving load to parts of the network with surplus capacity.

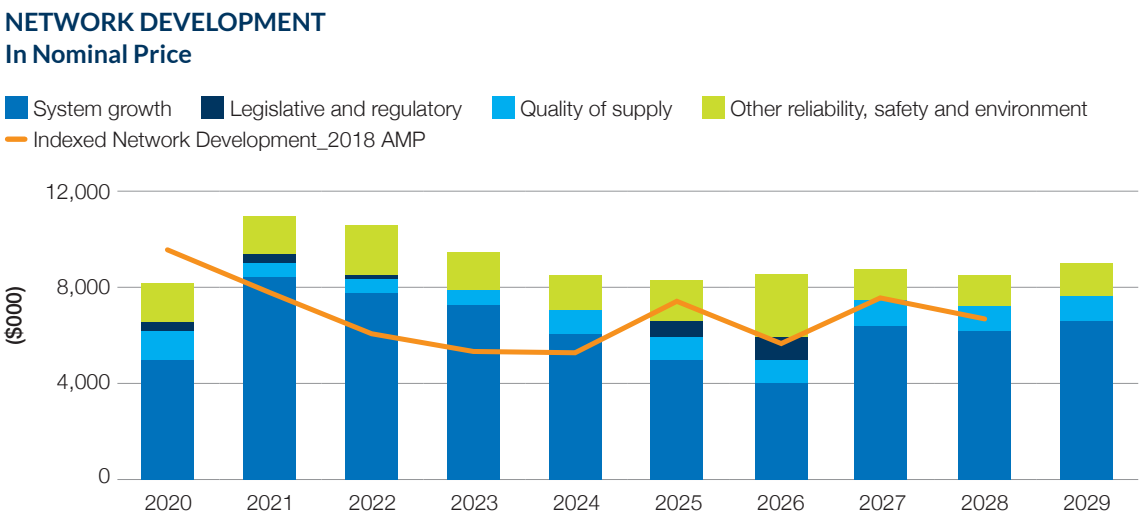



**Figure 3 Network Development Forecast Expenditure**

[1] Future Proof Strategy Planning for Growth is a 30 year growth management plan of Waikato Regional Council, Hamilton City Council, Waikato District Council, Tāngata Whenua and NZTA.

Hamilton and Te Kowhai networks are experiencing continued growth. In the Hamilton network, growth areas Rototuna, northern Ruakura and Peacockes are moving forward with residential and commercial developments. Borman, Chartwell and Peacockes substations supply the areas respectively and we are forecasting a combined annual average of 2MW increase in peak demand to year 2025. In the Te Kowhai network, growth areas Rotokauri, Horotiu and Pukete are proceeding with industrial and residential developments. Tasman, Horotiu and Pukete substations supply the areas respectively and we are forecasting a combined annual average of 4MW increase in peak demand to year 2025. However, the Huntly network has minimal planned growth compared to the two other networks.

The capacity requirement in the Peacockes Structure Plan is forecast to be met by the existing Peacockes substation. The Rototuna and northern Ruakura capacity requirement is envisaged to require a new substation in the latter part of the AMP period. However, the aggregate increase in load impacts HAM33 GXP capacity limit. By 2025, we forecast that the peak demand will be 7MVA over the HAM33 limit for a duration of 7 hours and potentially higher by 2030. To mitigate this, we plan to transfer load from HAM33 GXP to TWH GXP, then TWH GXP to HLY GXP. These transfer investments ($1M over 10 years) are minimal compared to the other considered options as we are utilising existing subtransmission and distribution assets. Other options considered were: (1) third transformer installation ($15M) and (2) distributed battery ($10M). These load transfers to HLY GXP will increase utilisation of its capacity (to an estimated 50% in 2025 from the current 30%). Further transfers are planned and signalled subsequent to the AMP period.

The growth in Rotokauri, Horotiu and Pukete areas in the last three years (5MW combined increase in peak demand) have constrained two of the Te Kowhai subtransmission circuits and the continued growth[2] demand will further increase the constraint. Previous AMPs have included a two-circuit Te Kowhai to Tasman (TWH-TAS) subtransmission project to resolve the constraint. Additionally, we have planned for a third transformer in Tasman substation to cater for the increased capacity requirement in the Rotokauri area.

The industrial growth in Horotiu and Pukete areas will require a new substation and subtransmission circuits to be constructed. To resolve both issues with minimal additional investment, we have revised the plan by rerouting one of the subtransmission circuits to provide supply to the new Te Rapa North substation. The other subtransmission circuit will proceed as intended. The two subtransmission circuits, although via different routes would still provide the same solution as per the original intent.

The planned third transformer and switchgear in Tasman substation will be relocated to a location adjacent to the anticipated load in Rotokauri. This new substation[3] will provide support to Tasman substation by having strong 11kV feeder and robust 400V interconnection.

One of our customers has previously indicated that their demand would increase by 4MW in 2023. This increase cannot be supplied by the existing substation that supplies the customer. To support this we are planning to construct a new substation that will supply the total requirement of the customer but this is entirely dependent on the customer proceeding. The new substation will free up 4MW to the existing substation to supply other load growth in the vicinity.

Later through the AMP period (2026-2029), we have allocated budget for new 11kV feeders on each of the substations in the growth areas. This is in anticipation that the existing feeders will be at their limits due to load growth.

The main changes to Network Development are outlined in Table 2.

[2] We are forecasting additional 18MW combined load by year 2022
[3] Proposed Exelby substation

| Financial Year | Cost ($000) | Description of changes |
|---|---|---|
| FY20 | - 1,500 | ▪ Revise TWH-TAS cabling project schedule to align with customers' development resulting in a cost reduction of (-) $2.4M and spread cost across the next three years.<br>▪ Increase in smart meter installation ($0.9M) for the provision of retailer meter services. |
| FY21 | 3,200 | ▪ Increase of $1.6M due to TWH-TAS cabling cost spread from FY20.<br>▪ Increase of $1.6M for the development of Te Rapa North substation. |
| FY22 | 4,000 | ▪ Increase of $2M for the development of substation for a customer.<br>▪ Move forward $1.2M for the Garden Place Switching Station Refurbishment project from FY25<br>▪ Increase of $0.8M due to TWH-TAS cabling cost spread from FY20. |
| FY23 | 2,000 | ▪ Increase of $1.7M for the development of Exelby substation<br>▪ Move forward $0.3M for the final stage of Garden Place Switching Station Refurbishment project from FY25 |
| FY24 | 1,500 | ▪ Increase of $1M for continuation of Exelby substation development.<br>▪ Increase of $0.25M to transfer Gordonton substation to HLY GXP.<br>▪ Increase of $0.25M to resolve confined spaces as safety initiative. |
| FY25 | 700 | ▪ Increase of $0.7M for substation seismic upgrade. |
| FY26 | 2,800 | ▪ Increase of $0.9M for substation seismic upgrade.<br>▪ Increase of $0.7M for new 11kV feeder at Te Kauwhata substation for residential development.<br>▪ Increase of $0.6M for new 11kV feeder at Peacockes substation for residential development.<br>▪ Increase of $0.6M for new 11kV feeder at Chartwell substation for residential development. |
| FY27 | 1,300 | ▪ Increase of $0.7M for Crosby substation<br>▪ Increase of $0.6M for Exelby substation 11kV distribution |
| FY28 | 1,500 | ▪ Increase of $0.6M for new 11kV feeder at Avalon substation for residential development.<br>▪ Increase of $0.3M for Crosby substation distribution<br>▪ Increase of $0.3M for continuation of Exelby substation 11kV distribution<br>▪ Increase of $0.3M for installation of new communication fibre link |

**Table 2 Material Changes to the Network Development Forecast Expenditure**

## 3.2 Material Changes to Lifecycle Asset Management

Overall, we have slightly increased our asset renewal expenditure forecast by $0.6M (in nominal price) annually through the AMP period. We have prioritised resolution of the Ring Main Units (RMUs) backlog, outcomes from targeted inspection of assets such as poles, distribution transformers and subtransmission cable joints, and moved forward the renewal schedule of 11kV circuit breakers to enable the packaging of works on the same locality. To minimise the increase in expenditure we have carried out the following: (i) a budget reduction on crossarm and insulator renewal (as a result of FMECA outcomes), (ii) completion of the recloser and sectionaliser renewal program and (iii) a decrease in reconductoring due to smarter mitigations such as installation of automated sectionalisers with fault indications (where these indications are sent to our Control Room for operational measures) and network reconfiguration to provide a backfeed to retain power supply during maintenance.

Figure 4 shows the 10 year expenditure compared to the indexed 2018 AMP asset renewal forecast.

**ASSET REPLACEMENT AND RENEWAL**
**In Nominal Price**

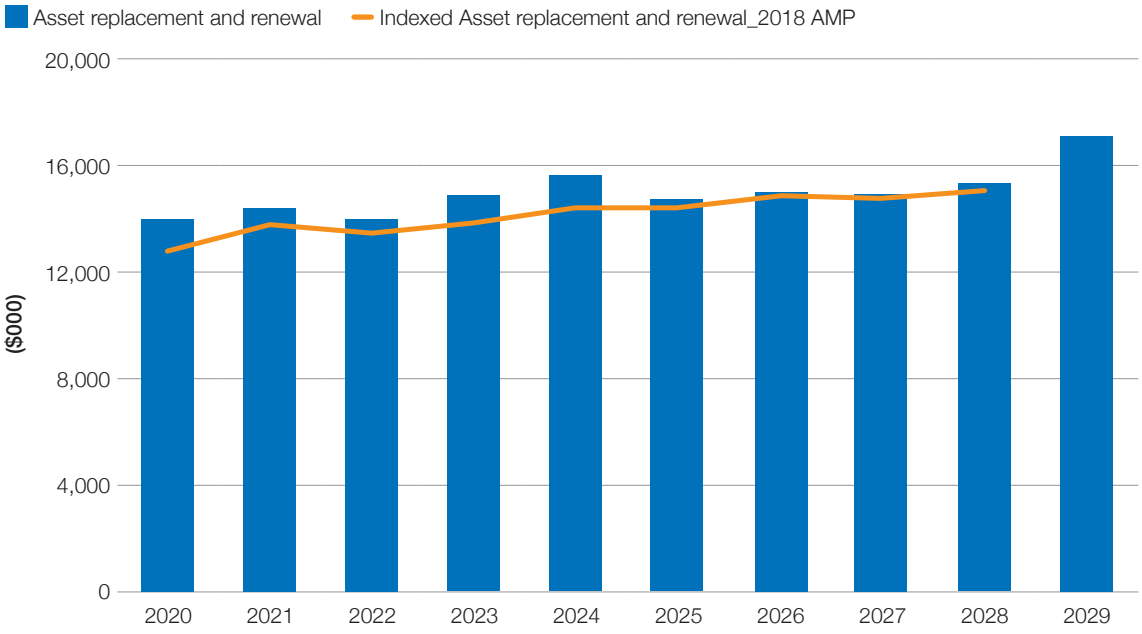



**Figure 4 Asset Renewal Forecast Expenditure**

### WOODEN CROSSARMS

In year 10 we have indicated a budget increase of $1.3M (in nominal price). This is the start of the budget ramp that is required to address our crossarms. Replacements are made on condition but we use age to predict what the condition of our assets is likely to be at the end of the planning period.

The Commerce Commission crossarm expected life is 35 years. This lifespan informs depreciation rates and the Regulatory Asset Base (RAB) valuation. WEL and other EDBs have found that the actual life of crossarms can vary from 35-60 years depending on their installation location. We have found that we can expect a crossarm life of 45-55 years. This is validated by our CBRM[4] condition monitoring.

[4] CBRM – Condition Based Risk Management

In Figure 5 below there are very few crossarms with an age beyond 55 years. These crossarms correlate with the number of crossarms with a Health Index of 7-10 i.e. the cross arms that must be replaced in the next 5 years. Our current crossarm replacement program of 300 crossarms per year addresses these crossarms.

The crossarm age profile also shows a significant number of crossarms that will exceed 55 years old in 10 years. These correlate with the cross arms with Health Index of 4-7. The replacement of these crossarms will begin from year 10 of the AMP period.

## AGE PROFILE OF CROSSARMS

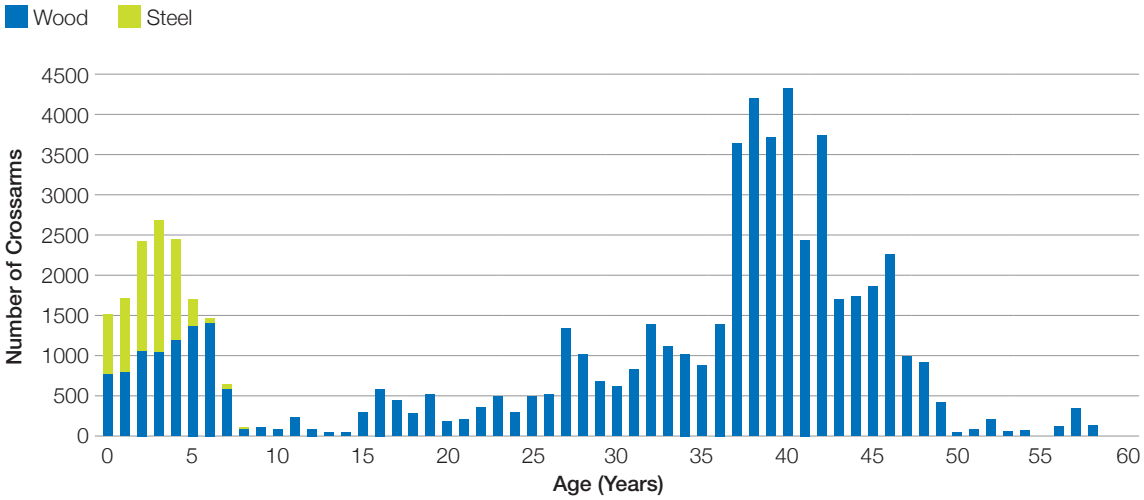



**Figure 5 Crossarms Age Profile**

The graph and table below shows our Crossarm Health Index.

## CROSSARM HEALTH INDEX PROFILE

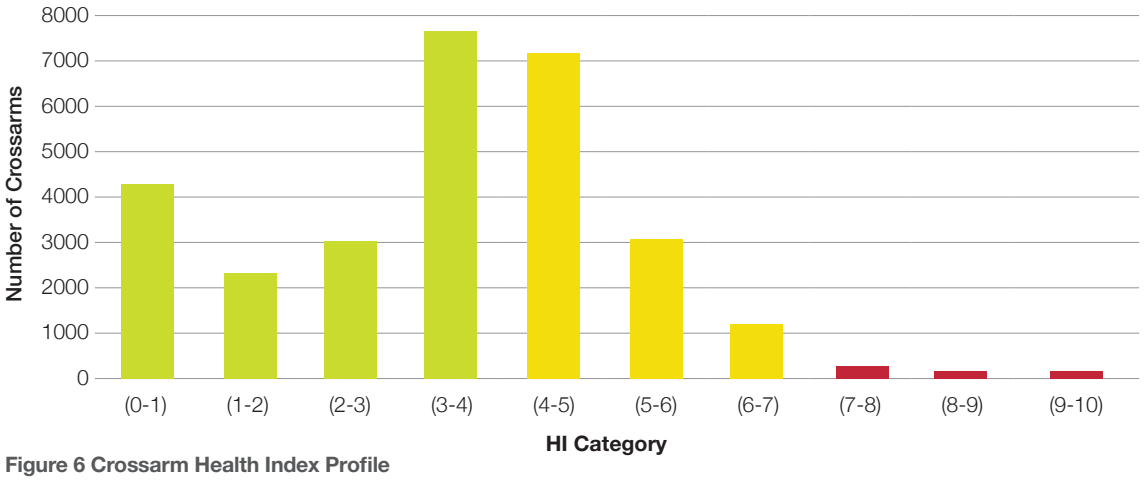



**Figure 6 Crossarm Health Index Profile**

| Condition | Health Index | Remnant Life | Probability of Failure |
|---|---|---|---|
| Bad | 10 | At EOL (<5 years) | High |
| Poor | | 5–10 years | Medium |
| Fair | | 10–20 years | Low |
| Good | 0 | >20 years | Very Low |

**Table 3 CBRM Health Indices**

It is worth noting that half of our replacements are made with steel and fibre crossarms that have a 60 year life expectancy. Therefore as we replace the wooden crossarms, we are halving the magnitude of the replacement required for future asset managers.

The changes to the Life Cycle Asset Management are outlined in Table 4 below.

| Financial Year | Cost ($000) | Description of changes |
|---|---|---|
| FY20 | 600 | Increase in RMU renewal programme to address backlogs and to accommodate the increase on average replacement cost |
| FY20 | 250 | Increase in the medium-mixed projects in FY20 to install track (road) to the Taupiri repeater site. |
| FY20 onwards | 2,000 | Increase in RMU renewal programme to address equipment reliability issues on specific make/model type and to accommodate the increase on average replacement cost to address the 'daisy-chained' issues for the selected units. |
| FY20 onwards | -1,250 | Outcome of network switch renewal programme review is to prioritise ageing fleet (air- break type) and reduce budget as other switches are rescheduled. |
| FY20 onwards | -950 | Reduce recloser and sectionaliser renewal budget as unreliable drop-out sectionalisers and aged reclosers have all been replaced. |
| FY20 to FY24 | -2,350 | Decrease in reconductoring budget, due to smarter mitigation on spur lines. |
| FY23 to FY24 | 1,510 | Increase in circuit breaker, protection (including trunk protection) and SCADA/COMMs[5] renewal programme to replace Rural Bank 11kV switchgear. |
| FY29 | 240 | Increase in circuit breaker renewal programme to replace Weavers 11kV switchgear. |
| FY20 to FY22 | 600 | Increase in poles budget due to issues identified through the targeted inspections and pole testing programme. |
| FY20 to FY26 | -1,700 | Decrease in budget on crossarms and insulators renewal programme due to the outcome of the FMECA. |
| FY20 onwards | 2,200 | Increase in distribution transformer budget over the AMP period to address critical units identified through recent inspections (backlogs) and budget provision for high priority units due to condition. |
| FY20 onwards | 2,350 | Increase in the medium-mixed projects over the 10 year period to address low lines issues and to accommodate the increase on average replacement cost. |
| FY20 onwards | 2,000 | Increase in the 33kV Subtransmission cable to replace critical cable joints identified through testing. |

**Table 4 Material Changes to the Asset Replacement and Renewal Forecast Expenditure**

[5] SCADA/COMMs - Supervisory Control and Data Acquisition/Communications

## 3.3 Material Changes in Customer Initiated Works

The Customer Initiated Works forecast includes consumer connections and asset relocation. Overall Customer Initiated Works have increased by $5.7M (in nominal price) annually through the AMP period. Details of the increase is shown in Table 5.

The growth forecast data analysis from Hamilton City Council (HCC) and Waikato District Council (WDC) has driven the need to increase new connection and subdivision expenditure ($5M annually) over the 10 year period to meet a buoyant market. We anticipate asset relocation would increase ($2M) in the first three years due to roading and subdivision developments. At this stage, the remaining years will have no change in the forecast.

Figure 7 shows the 10 year expenditure compared to the indexed 2018 AMP Customer Initiated Works forecast.

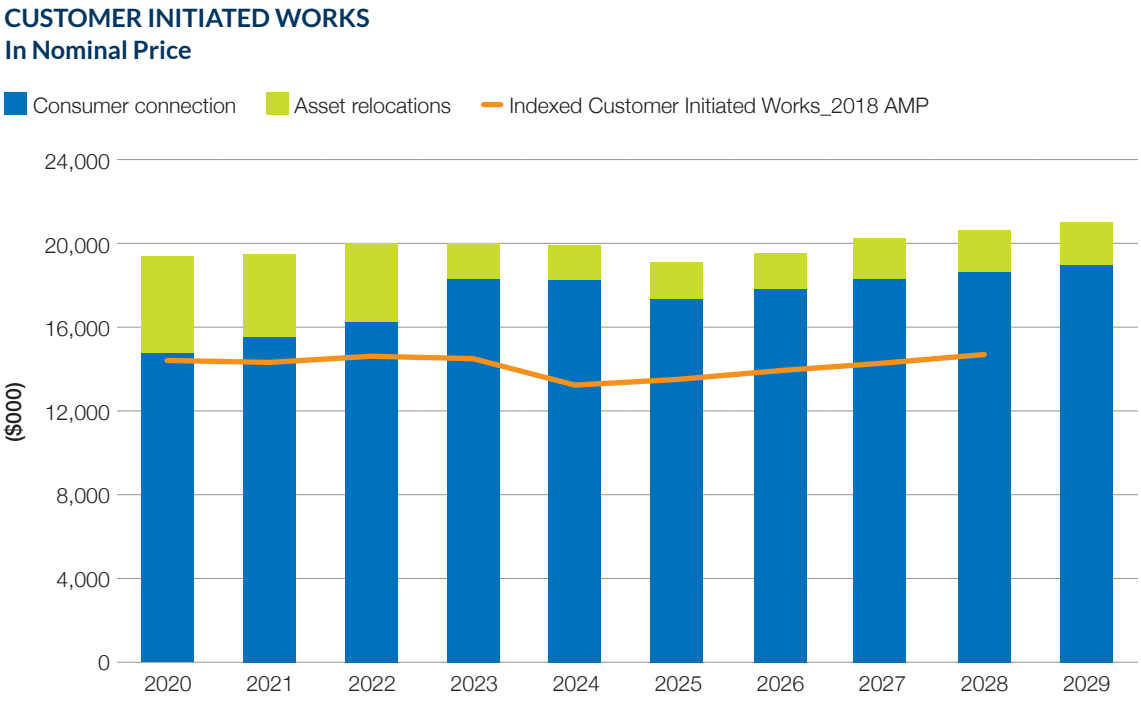



**Figure 7 Customer Initiated Works Forecast Expenditure**

| Financial Year | Cost ($000) | Description of changes |
|---|---|---|
| FY20 | 5,000 | ▪ Increase of $2.5M in consumer connections based on analysis of data from HCC and WDC.<br>▪ Increase of $2.5M in asset relocation based on known projects. |
| FY21 | 5,000 | ▪ Increase of $3M in consumer connections based on analysis of data from HCC and WDC.<br>▪ Increase of $2M in asset relocation for Stage 1 of Peacockes Structure Plan |
| FY22 | 5,000 | ▪ Increase of $3M in consumer connections based on analysis of data from HCC and WDC.<br>▪ Increase of $2M in asset relocation for Rotokauri North and continuation of Stage 1 of Peacockes Structure Plan |
| FY23 onwards | 6,000 | ▪ Increase of $6M in consumer connections based on analysis of data from HCC and WDC. |

**Table 5 Material Changes to the Customer Initiated Works Forecast Expenditure**

## 3.4 Material Changes in Report on Expenditure

The changes to our capital and operational expenditure is discussed below.

### 3.4.1 Material Changes in Schedule 11a Capital Expenditure

Hamilton and the Waikato District are experiencing growth in residential, commercial and industrial developments which is expected to continue through the 10 year AMP period. To support this growth, we have increased our capital expenditure (CAPEX) by an annual average of $8M (in nominal price) from last year's forecast. This is driven by an increase of $5.7M in Customer Initiated Works, $0.6M in asset renewals and $1.7M in network development. The slight change in non-network capital expenditure has been driven by our programme to shift motor vehicles to electric vehicles or hybrids by FY22 and FY24-27.

Figure 8 shows the 10 year expenditure compared to the indexed 2018 AMP CAPEX forecast.

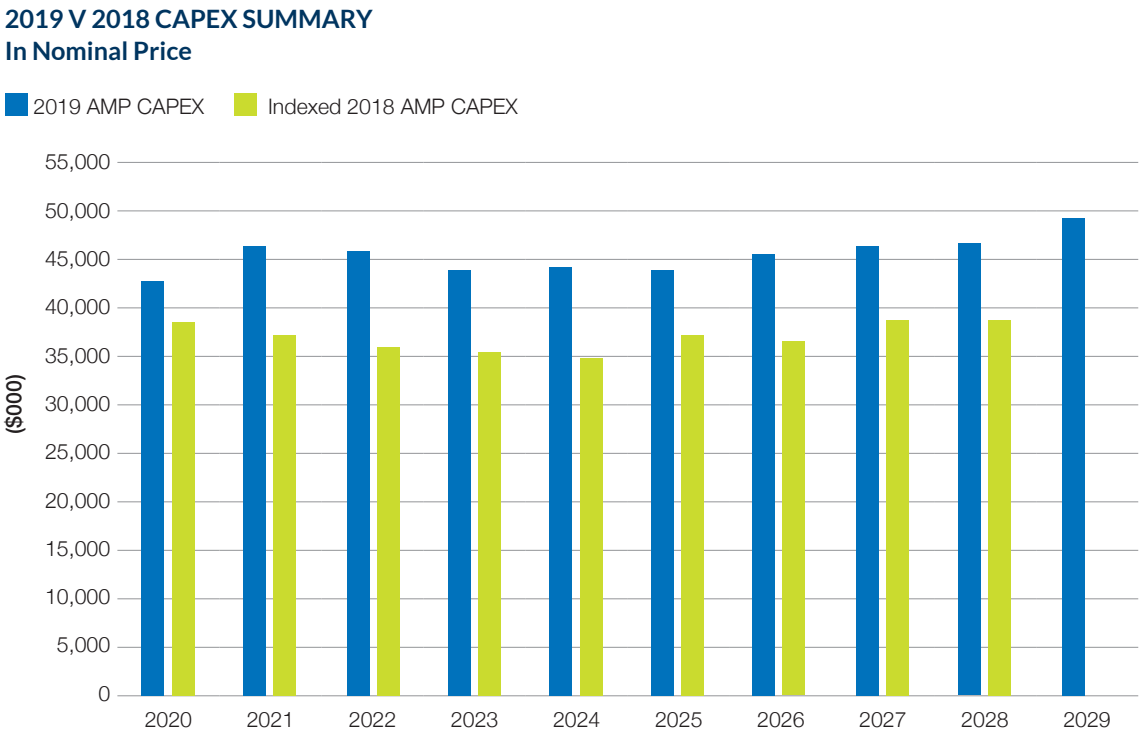



**Figure 8 Capital Expenditure Forecast Comparison**

### 3.4.2 Material Changes in Schedule 11b Operational Expenditure

The material change in operational expenditure (OPEX) (in nominal price) from last year's AMP is the increase by $1M annually through the AMP period. The increase is mainly driven by the non-network component; (1) the system operations and network support due to the labour cost index escalation in salaries and expenses by $0.6M and (2) business support expenditure due to the increase in compliance audit and legal costs of $0.4M.

Figure 9 shows the 10 year expenditure compared to the indexed 2018 AMP OPEX forecast.

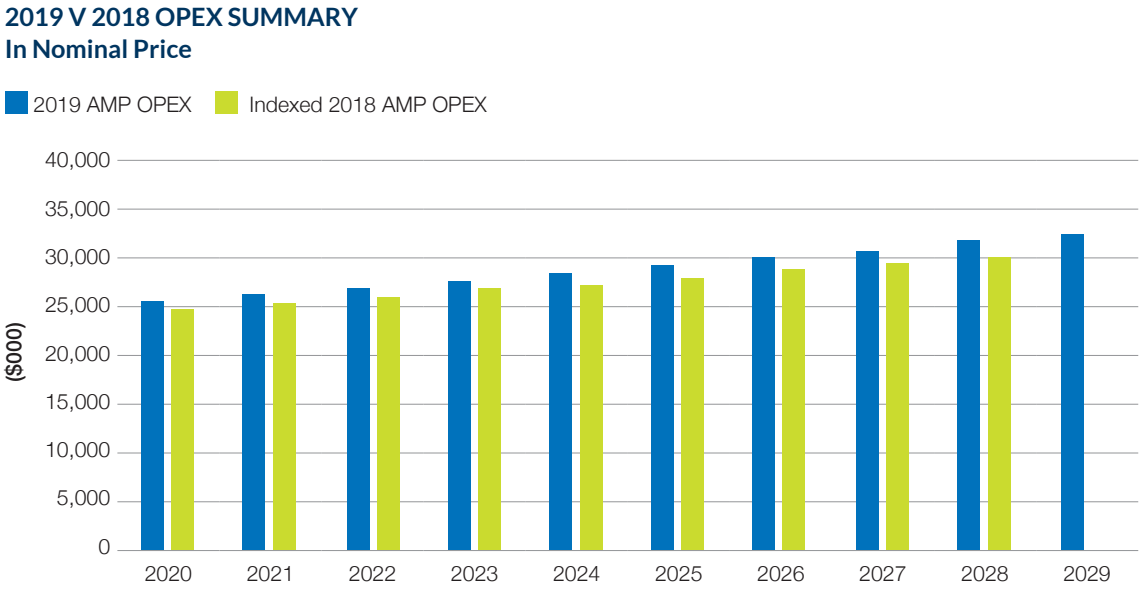



**Figure 9 Operational Expenditure Forecast Comparison**

## 3.5 Material Changes in Schedule 12

### 3.5.1 Schedule 12a – Asset Condition

Overall, asset condition indicated an improvement profile compared to previous years. This is due to the proactive renewal programme targeting high risk and poor condition assets. The replacement programme in the next 5 years will continue to prioritise assets that have been identified through WEL's CBRM process.

### 3.5.2 Schedule 12b – Forecast Capacity

Changes in the forecast capacity reflect the capacity requirement in Tasman and Horotiu substations. This is to be resolved by developing new substations Exelby and Te Rapa North as described in Section 3.1.

### 3.5.3 Schedule 12c - Forecast Network Demand

Changes in the forecast network demand shows the growth being experienced in Hamilton and the Waikato District. Discussions with and data from Hamilton City Council and Waikato District Council indicates that growth will continue through the 10 year AMP planning period and beyond as discussed in Section 3.1.

### 3.5.4 Schedule 12d - Forecast Interruptions and Duration

The planned System Average Interruption and Duration Index (SAIDI) will increase by an average of twenty two minutes per annum in the next five years despite amelioration measures implemented to reduce SAIDI through the use of temporary generation and sectionalising the network. This increase is driven by a variety of reasons including the need to accommodate increasing customer connections and an increase in outage size as we restrict the types of devices that can be used to isolate the network for Arc Flash safety reasons; e.g. we will only isolate transformers from an upstream HV device rather than isolate LV using J-Type fuses.

We expect that unplanned SAIDI will improve by an average of twelve minutes per annum (over 5 years) as a result of network sectionalisation, fewer conductor breaks and improved equipment reliability. The lower failure rate is driven by targeted, condition and risk-based maintenance. We are experiencing fewer conductor breaks as a result of our programme to remove and replace 16mm$^2$ copper conductors from the network.

The impact of the above to the total SAIDI forecast is an average increase of ten minutes through five years. No changes is made on the total System Average Interruption Frequency Index (SAIFI) forecast for the same period.

## 3.6 Schedule 14a Mandatory Explanatory Notes on Forecast Information

### 3.6.1 Commentary on difference between nominal and constant price capital expenditure forecasts (Schedule 11a)

WEL has used the cost index 2.78% for both network and non-network to determine the nominal price. The 2.78% cost index was derived from 50% Labour Costs Index (LCI) and 50% Capital Goods Price Index (CGPI) from the 2018 data of Treasury. We forecast LCI and (CGPI) for 10 years and the average derived was used as the cost index. The LCI was forecast using Treasury forecasts from FY19-22 and we forecast FY23-29 using the average of the FY17-18 actuals and the Treasury forecast. For (CGPI) FY20-29 forecast, we used the average of the FY17-18 actuals.

### 3.6.2 Commentary on difference between nominal and constant price operational expenditure forecasts (Schedule 11b)

WEL has used the cost index 2.68% and 2.66% respectively for network and non-network to determine the nominal price. The 2.68% cost index for network OPEX was derived from 90% LCI and 10% (CGPI) from the 2018 data from Treasury. The 2.66% cost index for non-network OPEX was derived from 90% LCI and 10% (CGPI) from the 2018 data from Treasury.

We forecast LCI and (CGPI) for 10 years and the average derived was used as the cost index. The LCI was forecast using Treasury forecasts from FY19-22 and we forecast FY23-29 using the average of the FY17-18 actuals and the Treasury forecast. For (CGPI) FY20-29 forecast, we used the average of the FY17-18 actuals.

## 3.7 Material Changes to Asset Management Practice

WEL Networks operates on a continuous improvement framework. WEL continually seek opportunities to improve services to meet our stakeholder's requirements. Following are changes we are making for this year's AMP.

### 3.7.1 Changes in Network Development Strategy

We conducted a study this year to identify the constraints in our network considering the accelerated load growth we are presently experiencing and its effect to our network security and reliability in the medium term (2019 to 2025). The remaining three years of the ten year AMP period includes provisions and signals investment on the 11kV distribution in the growth areas. The outcome of the study is an updated network development strategy as described below.

(i) Optimise utilisation of existing asset capacity (i.e. moving load to part of the network with underutilised capacity).

The load growth is localised at Hamilton and Te Kowhai networks and minimal growth is expected in the Huntly network. We forecast that by 2025, Hamilton 33kV capacity limit will be exceeded by 7MVA for 7 hours duration and potentially higher by 2030. To resolve this constraint, we will transfer Wallace substation from Hamilton to the Te Kowhai network using the existing subtransmission network. To make room at Te Kowhai, we will transfer Ngaruawahia and Gordonton substation to the Huntly network using the existing subtransmission network. These substation transfers will increase capacity utilisation of Huntly GXP from 30% (2018) to 50% (2025) at a minimal combined cost of $1M through 10 years.

Other options considered include the installation of a third transformer at HAM33 GXP ($15M) and distributed batteries ($10M) which are not yet economically viable. Further transfers to the Huntly network are considered and signalled in the AMP.

(ii) Align existing projects to customer requirements, thereby negating new investments

We have aligned existing projects to customer timing requirements to avoid additional investments. By aligning our existing projects, we increase the benefit of an existing project by providing a consolidated solution against individual solution. This approach uses information from customers such as location, timing and MW requirement relative to existing projects. Network studies are performed to review security and reliability of proposed alignment and carry out cost estimates for cost benefit analyses. The outcome is assessed against provision of a separate solution. This strategy provides solutions that are both cost effective and time saving.

The use of this approach is described in the last three paragraphs of Section 3.1 wherein we were able to avoid a new subtransmission circuit investment amounting to $5M. By rerouting one of the planned subtransmission circuits, we were able to provide a solution to a new network issue whilst proceeding with the original intent.

(iii) Introduce a substation twin and feeder configuration concept to move towards WEL Networks' vision of "Creating an innovative energy future".

We are introducing a new substation and feeder configuration to the network. The new configuration has been used in large industrial complexes and we are adapting this to our network. The new substation configuration is essentially a third transformer located in a different site instead of within an existing substation. Although the substations are not co-located they are treated as one unit, hence, the firm capacity considers the combined transformer capacity. Both substations will have strong 11kV and robust 400V interconnection for increase security and reliability.

This approach will be utilised with Exelby substation as the twin of Tasman substation. Exelby will provide support to Tasman and vice versa. We are also looking at providing additional interconnection to other adjacent substations. This approach is cost effective and would optimise capacity utilisation of all transformers involved.

These changes are reflected in minimising the increase in network development capital expenditure considering the accelerated growth we are experiencing in Hamilton and the Waikato District.

### 3.7.2 Changes in Asset Replacement and Renewal Strategy

We have reviewed our asset renewal strategy this year and the outcome is to initiate the strategies listed below. This is to optimise our planned investments by increasing efficiency to abate new capital expenditures.

(i) Prioritise assets where there is a renewal backlog

Renewal of Ring Main Units (RMUs) and distribution transformers was impacted by the attention to the pillar issues during previous financial years. In this AMP, we are addressing the backlogs by prioritising these two assets. We have increased our expenditure to a combined $3M total through 10 years to resolve the backlog.

(ii) Outcome of targeted inspections

WEL has instigated a number of inspections targeting high risk concerns such as low lines in road crossings and leaning poles (red/yellow tagged poles). In the first three years of this AMP, we will also be focusing on our pole renewals to resolve this safety concern.

(iii) Optimising work packages.

The AMP Web Tool (further described in Section 3.7.3) will be utilised to consolidate works using the equipment functional location hierarchy, the tool will assist WEL to optimised packaging of works in logical groupings.

### 3.7.3 Adaption of AMP Web Tool

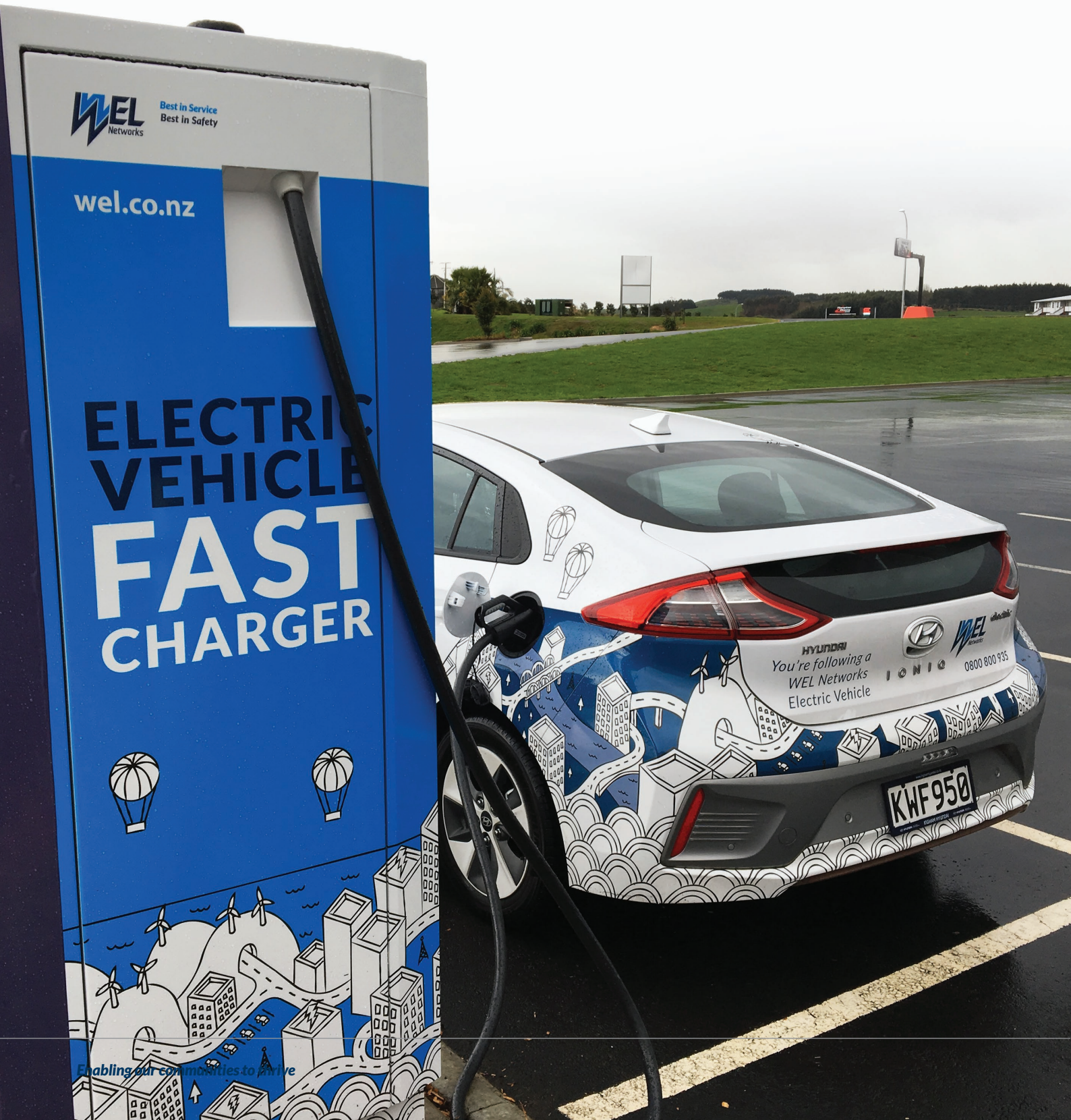
The AMP Web Tool (Tool) is a web-based central repository of issues, solutions and project portfolios of network development, asset renewal and Customer Initiated Works. The Tool aims to provide information such as location, schedule, work scope, resource planning and cost to appropriately package works together and drive efficiency to our works delivery. Our goal is to have a consolidated and efficient way of project planning, works planning and implementation to reduce investment.

The benefit of the Tool is not yet fully determined however, we believe the concept will drive efficiency. We will review and continue to develop the Tool to aid increases in efficiency and reduce our investment needs. We endeavour to ensure that WEL staff will grow accustomed to the Tool by providing staff support and training and expertly use the Tool to communicate issues and propose solutions.

### 3.7.4 Discussion with the Councils

Through discussions with the local authorities and our own research we have gained a better and clearer understanding of the network growth profile in our service area. This is a positive change to our asset management practices as it allows early notification of major projects and updates to growth areas, which will lead to efficient execution of work, cost-effective investments and timesaving. We are working with the Councils on improvements in information sharing and to formalise regular meetings of planners within each organisation. We aim to work closely with the Councils to increase work efficiency, enhance network planning and streamline project schedules in order to enable cost effective projects for the benefit of our stakeholders.

These discussions will provide additional input to our network development and Customer Initiated Works such that we can plan our projects accordingly to meet the growth Hamilton and the Waikato District is presently enjoying.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# 4

# INFORMATION DISCLOSURE SCHEDULES

**WEL Networks**
AMP Planning Period 1 April 2019 – 31 March 2029

# SCHEDULE 11a: REPORT ON FORECAST CAPITAL EXPENDITURE

"This schedule requires a breakdown of forecast expenditure on assets for the current disclosure year and a 10 year planning period. The forecasts should be consistent with the supporting information set out in the AMP. The forecast is to be expressed in both constant price and nominal dollar terms. Also required is a forecast of the value of commissioned assets (i.e., the value of RAB additions)

EDBs must provide explanatory comment on the difference between constant price and nominal dollar forecasts of expenditure on assets in Schedule 14a (Mandatory Explanatory Notes).

This information is not part of audited disclosure information.

| for year ended | Current Year CY 31 Mar 19 | CY+1 31 Mar 20 | CY+2 31 Mar 21 |
|---|---|---|---|
| **11a(i): EXPENDITURE ON ASSETS FORECAST** | **$000 (in nominal dollars)** | | |
| Consumer connection | 15,954 | 14,760 | 15,458 |
| System growth | 120 | 5,718 | 8,837 |
| Asset replacement and renewal | 12,965 | 13,705 | 14,426 |
| Asset relocations | 4,590 | 4,572 | 4,015 |
| Reliability, safety and environment: | | | |
| Quality of supply | 1,615 | 1,203 | 549 |
| Legislative and regulatory | 253 | 447 | 338 |
| Other reliability, safety and environment | 1,029 | 925 | 1,194 |
| **Total reliability, safety and environment** | **2,897** | **2,574** | **2,081** |
| **Expenditure on network assets** | **36,526** | **41,329** | **44,817** |
| Expenditure on non-network assets | 884 | 1,316 | 1,495 |
| **Expenditure on assets** | **37,410** | **42,645** | **46,312** |
| | | | |
| plus Cost of financing | 1,000 | 384 | - |
| less Value of capital contributions | 8,860 | 6,744 | 5,226 |
| plus Value of vested assets | | | |
| **Capital expenditure forecast** | **29,550** | **36,285** | **41,086** |
| Assets commissioned | 36,044 | 28,073 | 34,470 |
| | **$000 (in constant prices)** | | |
| Consumer connection | 15,954 | 14,360 | 14,632 |
| System growth | 120 | 5,563 | 8,364 |
| Asset replacement and renewal | 12,965 | 13,334 | 13,655 |
| Asset relocations | 4,590 | 4,448 | 3,800 |
| Reliability, safety and environment: | | | |
| Quality of supply | 1,615 | 1,170 | 520 |
| Legislative and regulatory | 253 | 435 | 320 |
| Other reliability, safety and environment | 1,029 | 900 | 1,130 |
| **Total reliability, safety and environment** | **2,897** | **2,504** | **1,970** |
| **Expenditure on network assets** | **36,526** | **40,210** | **42,422** |
| Expenditure on non-network assets | 884 | 1,280 | 1,415 |
| **Expenditure on assets** | **37,410** | **41,490** | **43,837** |

| CY+3 31 Mar 22 | CY+4 31 Mar 23 | CY+5 31 Mar 24 | CY+6 31 Mar 25 | CY+7 31 Mar 26 | CY+8 31 Mar 27 | CY+9 31 Mar 28 | CY+10 31 Mar 29 |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| 15,642 | 16,054 | 16,453 | 17,139 | 17,768 | 18,326 | 18,722 | 19,020 |
| 8,294 | 7,772 | 6,635 | 5,465 | 5,457 | 6,964 | 6,684 | 7,113 |
| 13,916 | 14,866 | 15,573 | 14,668 | 15,028 | 14,923 | 15,268 | 17,062 |
| 3,801 | 1,674 | 1,721 | 1,769 | 1,818 | 1,869 | 1,921 | 1,974 |
| | | | | | | | |
| 565 | 580 | 883 | 908 | 933 | 959 | 986 | 1,013 |
| 146 | - | - | 707 | 970 | - | - | - |
| 1,596 | 1,083 | 998 | 1,144 | 1,176 | 835 | 858 | 882 |
| **2,307** | **1,663** | **1,881** | **2,759** | **3,078** | **1,794** | **1,844** | **1,895** |
| **43,960** | **42,030** | **42,264** | **41,800** | **43,150** | **43,875** | **44,439** | **47,065** |
| 1,882 | 1,886 | 1,983 | 2,079 | 2,214 | 2,307 | 2,230 | 2,293 |
| **45,842** | **43,916** | **44,248** | **43,879** | **45,364** | **46,182** | **46,669** | **49,357** |
| | | | | | | | |
| - | - | - | - | - | - | - | - |
| 4,983 | 4,978 | 4,971 | 5,027 | 5,059 | 5,067 | 5,042 | 4,998 |
| | | | | | | | |
| **40,858** | **38,938** | **39,276** | **38,852** | **40,305** | **41,115** | **41,628** | **44,359** |
| 39,031 | 38,815 | 36,992 | 37,312 | 36,909 | 38,290 | 39,059 | 39,546 |
| | | | | | | | |
| 14,405 | 14,384 | 14,342 | 14,535 | 14,661 | 14,711 | 14,622 | 14,452 |
| 7,638 | 6,964 | 5,784 | 4,635 | 4,503 | 5,590 | 5,220 | 5,405 |
| 12,815 | 13,320 | 13,575 | 12,440 | 12,400 | 11,980 | 11,925 | 12,965 |
| 3,500 | 1,500 | 1,500 | 1,500 | 1,500 | 1,500 | 1,500 | 1,500 |
| | | | | | | | |
| 520 | 520 | 770 | 770 | 770 | 770 | 770 | 770 |
| 135 | - | - | 600 | 800 | - | - | - |
| 1,470 | 970 | 870 | 970 | 970 | 670 | 670 | 670 |
| **2,125** | **1,490** | **1,640** | **2,340** | **2,540** | **1,440** | **1,440** | **1,440** |
| **40,483** | **37,657** | **36,841** | **35,450** | **35,603** | **35,221** | **34,707** | **35,762** |
| 1,733 | 1,690 | 1,729 | 1,763 | 1,827 | 1,852 | 1,742 | 1,742 |
| **42,216** | **39,347** | **38,570** | **37,213** | **37,430** | **37,073** | **36,449** | **37,504** |

| for year ended | Current Year CY 31 Mar 19 | CY+1 31 Mar 20 | CY+2 31 Mar 21 |
|---|---|---|---|
| **Subcomponents of expenditure on assets (where known)** | **$000 (in constant prices)** | | |
| Energy efficiency and demand side management, reduction of energy losses | | 370 | 370 |
| Overhead to underground conversion | 4,376 | 4,448 | 3,800 |
| Research and development | | | |

| **Difference between nominal and constant price forecasts** | **$000** | | |
|---|---|---|---|
| Consumer connection | - | 400 | 826 |
| System growth | - | 155 | 472 |
| Asset replacement and renewal | - | 371 | 771 |
| Asset relocations | - | 124 | 215 |
| Reliability, safety and environment: | | | |
| Quality of supply | - | 33 | 29 |
| Legislative and regulatory | - | 12 | 18 |
| Other reliability, safety and environment | - | 25 | 64 |
| **Total reliability, safety and environment** | - | **70** | **111** |
| **Expenditure on network assets** | - | **1,120** | **2,395** |
| Expenditure on non-network assets | - | 36 | 80 |
| **Expenditure on assets** | - | **1,155** | **2,475** |

| CY+3 31 Mar 22 | CY+4 31 Mar 23 | CY+5 31 Mar 24 | CY+6 31 Mar 25 | CY+7 31 Mar 26 | CY+8 31 Mar 27 | CY+9 31 Mar 28 | CY+10 31 Mar 29 |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| 370 | 370 | 370 | 370 | 370 | 370 | 500 | 750 |
| 3,500 | 1,500 | 1,500 | 1,500 | 1,500 | 1,500 | 1,500 | 1,500 |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| 1,237 | 1,670 | 2,111 | 2,604 | 3,108 | 3,615 | 4,100 | 4,568 |
| 656 | 809 | 851 | 830 | 954 | 1,374 | 1,464 | 1,708 |
| 1,101 | 1,547 | 1,998 | 2,228 | 2,628 | 2,944 | 3,344 | 4,098 |
| 301 | 174 | 221 | 269 | 318 | 369 | 421 | 474 |
| | | | | | | | |
| 45 | 60 | 113 | 138 | 163 | 189 | 216 | 243 |
| 12 | - | - | 107 | 170 | - | - | - |
| 126 | 113 | 128 | 174 | 206 | 165 | 188 | 212 |
| **182** | **173** | **241** | **419** | **538** | **354** | **404** | **455** |
| **3,477** | **4,373** | **5,423** | **6,350** | **7,547** | **8,654** | **9,732** | **11,303** |
| 149 | 196 | 254 | 316 | 387 | 455 | 488 | 551 |
| **3,626** | **4,569** | **5,677** | **6,666** | **7,934** | **9,109** | **10,220** | **11,853** |

| for year ended | Current Year CY 31 Mar 19 | CY+1 31 Mar 20 | CY+2 31 Mar 21 | CY+3 31 Mar 22 | CY+4 31 Mar 23 | CY+5 31 Mar 24 |
|---|---|---|---|---|---|---|
| **11a(ii): CONSUMER CONNECTION** | **$000 (in constant prices)** | | | | | |
| *Consumer types defined by EDB* | | | | | | |
| Residential Customers | 12,843 | 12,171 | 12,383 | 12,169 | 12,122 | 12,121 |
| Business Customers | 2,445 | 1,530 | 1,560 | 1,551 | 1,549 | 1,526 |
| Large Customers - Low Voltage 400V | 666 | 660 | 689 | 685 | 713 | 695 |
| Large Customers - Medium Voltage 11kV | | | | | | |
| Large Customers - High Voltage 33kV | | | | | | |
| **Consumer connection expenditure** | **15,954** | **14,360** | **14,632** | **14,405** | **14,384** | **14,342** |
| less Capital contributions funding consumer connection | 5,053 | 3,740 | 3,810 | 3,747 | 3,742 | 3,735 |
| **Consumer connection less capital contributions** | **10,901** | **10,621** | **10,822** | **10,657** | **10,642** | **10,607** |
| **11a(iii): SYSTEM GROWTH** | | | | | | |
| Subtransmission | | 1,549 | 4,163 | 2,779 | 280 | 219 |
| Zone substations | 50 | 1,422 | 3,131 | 2,887 | 3,284 | 1,876 |
| Distribution and LV lines | 55 | | | 331 | | |
| istribution and LV cables | | 590 | 300 | 800 | 2,550 | 2,850 |
| Distribution substations and transformers | 15 | | | | | |
| Distribution switchgear | | | | | | |
| Other network assets | | 2,002 | 770 | 840 | 850 | 840 |
| **System growth expenditure** | **120** | **5,563** | **8,364** | **7,638** | **6,964** | **5,784** |
| less Capital contributions funding system growth | 11 | | | | | |
| **System growth less capital contributions** | **109** | **5,563** | **8,364** | **7,638** | **6,964** | **5,784** |
| **11a(iv): ASSET REPLACEMENT AND RENEWAL** | | | | | | |
| Subtransmission | | 520 | 476 | 482 | 474 | 470 |
| Zone substations | 397 | 291 | 980 | 475 | 806 | 940 |
| Distribution and LV lines | 10,123 | 7,771 | 6,957 | 7,008 | 7,091 | 7,037 |
| Distribution and LV cables | 428 | 1,173 | 1,106 | 1,136 | 848 | 842 |
| Distribution substations and transformers | 634 | 1,283 | 1,120 | 1,150 | 990 | 982 |
| Distribution switchgear | 979 | 2,224 | 2,100 | 2,084 | 2,050 | 1,964 |
| Other network assets | 405 | 71 | 917 | 482 | 1,061 | 1,340 |
| **Asset replacement and renewal expenditure** | **12,965** | **13,334** | **13,655** | **12,815** | **13,320** | **13,575** |
| less Capital contributions funding asset replacement and renewal | 378 | 449 | 449 | 449 | 449 | 449 |
| **Asset replacement and renewal less capital contributions** | **12,587** | **12,885** | **13,207** | **12,367** | **12,871** | **13,127** |

| for year ended | Current Year CY 31 Mar 19 | CY+1 31 Mar 20 | CY+2 31 Mar 21 | CY+3 31 Mar 22 | CY+4 31 Mar 23 | CY+5 31 Mar 24 |
|---|---|---|---|---|---|---|
| **11a(v): ASSET RELOCATIONS** | **$000 (in constant prices)** | | | | | |
| *Project or programme* | | | | | | |
| Dixon Rd round about | | 600 | | | | |
| Greenhill 33kV relocation at Spine Rd | | 1,300 | 300 | | | |
| HCC | | | 1,500 | 1,500 | 500 | 500 |
| NZTA | | | 1,500 | 1,500 | 500 | 500 |
| Safe Roads Alliance SH2 | | 1,048 | | | | |
| Safe Roads Alliance SH23 | | 1,000 | | | | |
| Relocations | 4,350 | | | | | |
| Transit Hamilton Bypass | 214 | | | | | |
| Undergrounding | 26 | 500 | 500 | 500 | 500 | 500 |
| All other project or programmes - asset relocations | | | | | | |
| **Asset relocations expenditure** | **4,590** | **4,448** | **3,800** | **3,500** | **1,500** | **1,500** |
| less Capital contributions funding asset relocations | 3,418 | 2,556 | 968 | 788 | 788 | 788 |
| **Asset relocations less capital contributions** | **1,172** | **1,892** | **2,833** | **2,713** | **713** | **713** |

| | | | | | | |
|---|---|---|---|---|---|---|
| **11a(vi): QUALITY OF SUPPLY** | | | | | | |
| *Project or programme* | | | | | | |
| Network Work Ugrade Due To DG applications | | 20 | 20 | 20 | 20 | 20 |
| Distribution Transformer and LV Feeder Upgrade | 1,157 | 1,150 | 500 | 500 | 500 | 750 |
| Battery energy storage system investigation | 290 | | | | | |
| Power Quality - Works required to correct customer complaints | 168 | | | | | |
| All other projects or programmes - quality of supply | | | | | | |
| **Quality of supply expenditure** | **1,615** | **1,170** | **520** | **520** | **520** | **770** |
| less Capital contributions funding quality of supply | | | | | | |
| **Quality of supply less capital contributions** | **1,615** | **1,170** | **520** | **520** | **520** | **770** |

| for year ended | Current Year CY 31 Mar 19 | CY+1 31 Mar 20 | CY+2 31 Mar 21 | CY+3 31 Mar 22 | CY+4 31 Mar 23 | CY+5 31 Mar 24 |
|---|---|---|---|---|---|---|
| **11a(vii): LEGISLATIVE AND REGULATORY** | **$000 (in constant prices)** | | | | | |
| *Project or programme* | | | | | | |
| AUFLS scheme change | | | 20 | 135 | | |
| Seismic upgrades of substations | 253 | 435 | 300 | | | |
| All other projects or programmes - legislative and regulatory | | | | | | |
| **Legislative and regulatory expenditure** | **253** | **435** | **320** | **135** | **-** | **-** |
| less Capital contributions funding legislative and regulatory | | | | | | |
| **Legislative and regulatory less capital contributions** | **253** | **435** | **320** | **135** | **-** | **-** |
| **11a(viii): OTHER RELIABILITY, SAFETY AND ENVIRONMENT** | | | | | | |
| *Project or programme* | | | | | | |
| Airconditioning for substations | 101 | 100 | 100 | | | |
| Reliability projects (mainly Rural Areas) | 590 | | | | 400 | 500 |
| Confined spaces | | 200 | 200 | 200 | 200 | 200 |
| NGA 11kV Switchgear Replacement | | 327 | | | | |
| RAGCB4 Reliability Improvement | | 191 | | | | |
| Substation Door Upgrade | 16 | 41 | 50 | 50 | | |
| Garden Place Relocation | | | 700 | 1,100 | 200 | |
| LV measurement | | 40 | 80 | 120 | 170 | 170 |
| Substation Site Security Access | 185 | | | | | |
| Weavers Reasonant Earthng | 37 | | | | | |
| Mesh critical streeetlight control | 80 | | | | | |
| Garden Place Switching Station refurbishment | 20 | | | | | |
| All other projects or programmes - other reliability, safety and environment | | | | | | |
| **Other reliability, safety and environment expenditure** | **1,029** | **900** | **1,130** | **1,470** | **970** | **870** |
| less Capital contributions funding other reliability, safety and environment | | | | | | |
| **Other reliability, safety and environment less capital contributions** | **1,029** | **900** | **1,130** | **1,470** | **970** | **870** |

| for year ended | Current Year CY 31 Mar 19 | CY+1 31 Mar 20 | CY+2 31 Mar 21 | CY+3 31 Mar 22 | CY+4 31 Mar 23 | CY+5 31 Mar 24 |
|---|---|---|---|---|---|---|
| **11a(ix): NON-NETWORK ASSETS** | **$000 (in constant prices)** | | | | | |
| ROUTINE EXPENDITURE | | | | | | |
| *Project or programme* | | | | | | |
| Computer Equipment | 187 | 250 | 300 | 407 | 415 | 423 |
| Computer Software | 516 | 750 | 905 | 986 | 1,005 | 1,026 |
| Plant and Equipment | 36 | 100 | 100 | 100 | 100 | 100 |
| Motor Vehicles | 145 | 180 | 110 | 240 | 170 | 180 |
| All other projects or programmes - routine expenditure | | | | | | |
| **Routine expenditure** | **884** | **1,280** | **1,415** | **1,733** | **1,690** | **1,729** |
| ATYPICAL EXPENDITURE | | | | | | |
| All other projects or programmes - atypical expenditure | | | | | | |
| **Atypical expenditure** | **-** | **-** | **-** | **-** | **-** | **-** |
| | | | | | | |
| **Expenditure on non-network assets** | **884** | **1,280** | **1,415** | **1,733** | **1,690** | **1,729** |

**WEL Networks**
AMP Planning Period 1 April 2019 – 31 March 2029

# SCHEDULE 11b: REPORT ON FORECAST OPERATIONAL EXPENDITURE

This schedule requires a breakdown of forecast operational expenditure for the disclosure year and a 10 year planning period. The forecasts should be consistent with the supporting information set out in the AMP. The forecast is to be expressed in both constant price and nominal dollar terms. EDBs must provide explanatory comment on the difference between constant price and nominal dollar operational expenditure forecasts in Schedule 14a (Mandatory Explanatory Notes).

This information is not part of audited disclosure information.

| for year ended | Current Year CY 31 Mar 19 | CY+1 31 Mar 20 | CY+2 31 Mar 21 |
|---|---|---|---|
| **OPERATIONAL EXPENDITURE FORECAST** | **$000 (in nominal dollars)** | | |
| Service interruptions and emergencies | 2,539 | 2,567 | 2,689 |
| Vegetation management | 1,439 | 1,352 | 1,404 |
| Routine and corrective maintenance and inspection | 1,578 | 3,811 | 3,960 |
| Asset replacement and renewal | 2,008 | 813 | 833 |
| **Network Opex** | **7,564** | **8,543** | **8,886** |
| System operations and network support | 9,046 | 8,961 | 9,199 |
| Business support | 7,904 | 7,954 | 8,165 |
| **Non-network opex** | **16,950** | **16,915** | **17,364** |
| **Operational expenditure** | **24,514** | **25,457** | **26,251** |
| | **$000 (in constant prices)** | | |
| Service interruptions and emergencies | 2,539 | 2,500 | 2,550 |
| Vegetation management | 1,439 | 1,316 | 1,332 |
| Routine and corrective maintenance and inspection | 1,578 | 3,711 | 3,756 |
| Asset replacement and renewal | 2,008 | 792 | 790 |
| **Network Opex** | **7,564** | **8,319** | **8,428** |
| System operations and network support | 9,046 | 8,729 | 8,729 |
| Business support | 7,904 | 7,748 | 7,748 |
| **Non-network opex** | **16,950** | **16,477** | **16,477** |
| **Operational expenditure** | **24,514** | **24,796** | **24,905** |
| **Subcomponents of expenditure on assets (where known)** | | | |
| Energy efficiency and demand side management, reduction of energy losses | 210 | 198 | 198 |
| Direct billing* | - | - | - |
| Research and Development | 57 | 50 | 50 |
| Insurance | 392 | 530 | 560 |
| **Direct billing expenditure by suppliers that direct bill the majority of their consumers* | | | |
| **Difference between nominal and real forecasts** | **$000** | | |
| Service interruptions and emergencies | - | 67 | 139 |
| Vegetation management | - | 35 | 72 |
| Routine and corrective maintenance and inspection | - | 100 | 204 |
| Asset replacement and renewal | - | 21 | 43 |
| **Network Opex** | **-** | **223** | **458** |
| System operations and network support | - | 232 | 470 |
| Business support | - | 206 | 417 |
| **Non-network opex** | **-** | **438** | **887** |
| **Operational expenditure** | **-** | **661** | **1,346** |

| CY+3 31 Mar 22 | CY+4 31 Mar 23 | CY+5 31 Mar 24 | CY+6 31 Mar 25 | CY+7 31 Mar 26 | CY+8 31 Mar 27 | CY+9 31 Mar 28 | CY+10 31 Mar 29 |
|---|---|---|---|---|---|---|---|
| 2,761 | 2,835 | 2,911 | 2,989 | 3,069 | 3,152 | 3,236 | 3,323 |
| 1,442 | 1,148 | 1,179 | 1,211 | 870 | 894 | 918 | 942 |
| 3,789 | 4,193 | 4,474 | 4,765 | 5,035 | 5,233 | 5,440 | 5,766 |
| 803 | 1,039 | 1,006 | 639 | 929 | 891 | 978 | 893 |
| **8,796** | **9,216** | **9,569** | **9,603** | **9,903** | **10,169** | **10,572** | **10,924** |
| 9,444 | 9,694 | 9,952 | 10,216 | 10,488 | 10,767 | 11,053 | 11,346 |
| 8,382 | 8,605 | 8,834 | 9,068 | 9,309 | 9,557 | 9,811 | 10,071 |
| **17,826** | **18,299** | **18,786** | **19,285** | **19,797** | **20,323** | **20,863** | **21,418** |
| **26,621** | **27,515** | **28,355** | **28,888** | **29,700** | **30,492** | **31,436** | **32,341** |
| | | | | | | | |
| 2,550 | 2,550 | 2,550 | 2,550 | 2,550 | 2,550 | 2,550 | 2,550 |
| 1,332 | 1,033 | 1,033 | 1,033 | 723 | 723 | 723 | 723 |
| 3,500 | 3,772 | 3,919 | 4,065 | 4,183 | 4,234 | 4,287 | 4,425 |
| 742 | 935 | 881 | 545 | 772 | 721 | 771 | 685 |
| **8,124** | **8,290** | **8,383** | **8,193** | **8,228** | **8,228** | **8,331** | **8,383** |
| 8,729 | 8,729 | 8,729 | 8,729 | 8,729 | 8,729 | 8,729 | 8,729 |
| 7,748 | 7,748 | 7,748 | 7,748 | 7,748 | 7,748 | 7,748 | 7,748 |
| **16,477** | **16,477** | **16,477** | **16,477** | **16,477** | **16,477** | **16,477** | **16,477** |
| **24,601** | **24,767** | **24,860** | **24,670** | **24,705** | **24,705** | **24,808** | **24,860** |
| | | | | | | | |
| 198 | 198 | 198 | 198 | 198 | 198 | 198 | 198 |
| - | - | - | - | - | - | - | - |
| 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| 590 | 620 | 630 | 640 | 650 | 660 | 670 | 680 |
| | | | | | | | |
| 211 | 285 | 361 | 439 | 519 | 602 | 686 | 773 |
| 110 | 115 | 146 | 178 | 147 | 171 | 195 | 219 |
| 289 | 421 | 555 | 700 | 852 | 999 | 1,153 | 1,341 |
| 61 | 104 | 125 | 94 | 157 | 170 | 207 | 208 |
| **672** | **926** | **1,186** | **1,410** | **1,675** | **1,941** | **2,241** | **2,541** |
| 715 | 965 | 1,223 | 1,487 | 1,759 | 2,038 | 2,324 | 2,617 |
| 634 | 857 | 1,086 | 1,320 | 1,561 | 1,809 | 2,063 | 2,323 |
| **1,349** | **1,822** | **2,309** | **2,808** | **3,320** | **3,846** | **4,386** | **4,941** |
| **2,020** | **2,748** | **3,495** | **4,218** | **4,995** | **5,787** | **6,628** | **7,481** |

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# SCHEDULE 12a: REPORT ON ASSET CONDITION

This schedule requires a breakdown of asset condition by asset class as at the start of the forecast year. The data accuracy assessment relates to the percentage values disclosed in the asset condition columns. Also required is a forecast of the percentage of units to be replaced in the next 5 years. All information should be consistent with the information provided in the AMP and the expenditure on assets forecast in Schedule 11a. All units relating to cable and line assets, that are expressed in km, refer to circuit lengths.

| Voltage | Asset category | Asset class |
|---|---|---|
| All | Overhead Line | Concrete poles / steel structure |
| All | Overhead Line | Wood poles |
| All | Overhead Line | Other pole types |
| HV | Subtransmission Line | Subtransmission OH up to 66kV conductor |
| HV | Subtransmission Line | Subtransmission OH 110kV+ conductor |
| HV | Subtransmission Cable | Subtransmission UG up to 66kV (XLPE) |
| HV | Subtransmission Cable | Subtransmission UG up to 66kV (Oil pressurised) |
| HV | Subtransmission Cable | Subtransmission UG up to 66kV (Gas pressurised) |
| HV | Subtransmission Cable | Subtransmission UG up to 66kV (PILC) |
| HV | Subtransmission Cable | Subtransmission UG 110kV+ (XLPE) |
| HV | Subtransmission Cable | Subtransmission UG 110kV+ (Oil pressurised) |
| HV | Subtransmission Cable | Subtransmission UG 110kV+ (Gas Pressurised) |
| HV | Subtransmission Cable | Subtransmission UG 110kV+ (PILC) |
| HV | Subtransmission Cable | Subtransmission submarine cable |
| HV | Zone substation Buildings | Zone substations up to 66kV |
| HV | Zone substation Buildings | Zone substations 110kV+ |
| HV | Zone substation switchgear | 22/33kV CB (Indoor) |
| HV | Zone substation switchgear | 22/33kV CB (Outdoor) |
| HV | Zone substation switchgear | 33kV Switch (Ground Mounted) |
| HV | Zone substation switchgear | 33kV Switch (Pole Mounted) |
| HV | Zone substation switchgear | 33kV RMU |
| HV | Zone substation switchgear | 50/66/110kV CB (Indoor) |
| HV | Zone substation switchgear | 50/66/110kV CB (Outdoor) |
| HV | Zone substation switchgear | 3.3/6.6/11/22kV CB (ground mounted) |
| HV | Zone substation switchgear | 3.3/6.6/11/22kV CB (pole mounted) |

### Asset condition at start of planning period (percentage of units by grade)

| Units | H1 | H2 | H3 | H4 | H5 | Grade unknown | Data accuracy (1–4) | % of asset forecast to be replaced in next 5 years |
|---|---|---|---|---|---|---|---|---|
| No. | | 0.58% | 1.76% | 11.93% | 85.74% | | 3 | 2.00% |
| No. | | 0.87% | 3.74% | 12.04% | 83.36% | | 3 | 3.73% |
| No. | | | | | | | N/A | |
| km | | | | 54.87% | 45.13% | | 1 | |
| km | | | | | | | N/A | |
| km | | | 3.50% | 12.40% | 84.10% | | 1 | 0.20% |
| km | | | | | | | N/A | |
| km | | | | | | | N/A | |
| km | | | 0.81% | 1.21% | 97.98% | | 1 | |
| km | | | | | | | N/A | |
| km | | | | | | | N/A | |
| km | | | | | | | N/A | |
| km | | | | | | | N/A | |
| km | | | | | | | N/A | |
| No. | | | 8.70% | 63.04% | 28.26% | | 4 | |
| No. | | | | | | | N/A | |
| No. | | | | 55.10% | 44.90% | | 4 | |
| No. | | | | 55.10% | 44.90% | | 4 | |
| No. | | | | | | | N/A | |
| No. | | | | 100.00% | | | 4 | |
| No. | | | | | 100.00% | | 4 | |
| No. | | | | | | | N/A | |
| No. | | | | | | | N/A | |
| No. | | | | | | | N/A | |
| No. | | | | | | | N/A | |

| Voltage | Asset category | Asset class |
|---|---|---|
| HV | Zone Substation Transformer | Zone Substation Transformers |
| HV | Distribution Line | Distribution OH Open Wire Conductor |
| HV | Distribution Line | Distribution OH Aerial Cable Conductor |
| HV | Distribution Line | SWER conductor |
| HV | Distribution Cable | Distribution UG XLPE or PVC |
| HV | Distribution Cable | Distribution UG PILC |
| HV | Distribution Cable | Distribution Submarine Cable |
| HV | Distribution switchgear | 3.3/6.6/11/22kV CB (pole mounted) - reclosers and sectionalisers |
| HV | Distribution switchgear | 3.3/6.6/11/22kV CB (Indoor) |
| HV | Distribution switchgear | 3.3/6.6/11/22kV Switches and fuses (pole mounted) |
| HV | Distribution switchgear | 3.3/6.6/11/22kV Switch (ground mounted) - except RMU |
| HV | Distribution switchgear | 3.3/6.6/11/22kV RMU |
| HV | Distribution Transformer | Pole Mounted Transformer |
| HV | Distribution Transformer | Ground Mounted Transformer |
| HV | Distribution Transformer | Voltage regulators |
| HV | Distribution Substations | Ground Mounted Substation Housing |
| LV | LV Line | LV OH Conductor |
| LV | LV Cable | LV UG Cable |
| LV | LV Streetlighting | LV OH/UG Streetlight circuit |
| LV | Connections | OH/UG consumer service connections |
| All | Protection | Protection relays (electromechanical, solid state and numeric) |
| All | SCADA and communications | SCADA and communications equipment operating as a single system |
| All | Capacitor Banks | Capacitors including controls |
| All | Load Control | Centralised plant |
| All | Load Control | Relays |
| All | Civils | Cable Tunnels |

### Asset condition at start of planning period (percentage of units by grade)

| Units | H1 | H2 | H3 | H4 | H5 | Grade unknown | Data accuracy (1–4) | % of asset forecast to be replaced in next 5 years |
|---|---|---|---|---|---|---|---|---|
| No. | | | | 6.25% | 93.75% | | 3 | |
| km | | 10.18% | 4.12% | 18.72% | 66.99% | | 3 | 4.65% |
| km | | | | | | | N/A | |
| km | | | | | | | N/A | |
| km | | | 4.90% | 8.94% | 86.16% | | 1 | |
| km | | | 4.90% | 8.94% | 86.16% | | 1 | |
| km | | | | | | | N/A | |
| No. | | | | | 100.00% | | 4 | 18.98% |
| No. | | | | 41.39% | 58.61% | | 4 | 12.92% |
| No. | | 0.01% | 1.01% | 1.27% | 97.71% | | 4 | 1.21% |
| No. | | | | | | | N/A | |
| No. | | | 1.59% | 16.65% | 81.76% | | 4 | 11.14% |
| No. | | 0.40% | 3.32% | 11.58% | 84.70% | | 3 | 1.83% |
| No. | | 0.48% | 5.56% | 18.76% | 75.20% | | 3 | 5.71% |
| No. | | | | 1.00% | 99.00% | | 4 | |
| No. | | | | | | | N/A | |
| km | | 10.78% | 10.29% | 7.64% | 71.29% | | 1 | 0.06% |
| km | | | 0.24% | 29.67% | 70.09% | | 1 | 0.20% |
| km | | | 9.58% | 17.85% | 72.58% | | 1 | 0.08% |
| No. | | | | | | | N/A | |
| No. | | | 7.73% | 19.32% | 72.95% | | 3 | 15.41% |
| Lot | | | 5.88% | | 84.12% | 10.00% | 3 | 3.69% |
| No. | | | | | 100.00% | | 4 | |
| Lot | | | | 20.00% | 80.00% | | 3 | |
| No. | | | | | | | N/A | |
| km | | | | | | | N/A | |

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# SCHEDULE 12b: REPORT ON FORECAST CAPACITY

This schedule requires a breakdown of current and forecast capacity and utilisation for each zone substation and current distribution transformer capacity. The data provided should be consistent with the information provided in the AMP. Information provided in this table should relate to the operation of the network in its normal steady state configuration.

## 12b(i): SYSTEM GROWTH - ZONE SUBSTATIONS

| *Existing Zone Substations* | Current Peak Load (MVA) | Installed Firm Capacity (MVA) | Security of Supply Classification (type) | Transfer Capacity (MVA) | Utilisation of Installed Firm Capacity % |
|---|---|---|---|---|---|
| Avalon Dr | 17.2 | 23.8 | N-1 | 11.5 | 72% |
| Borman | 15.8 | 20.6 | N-1 | 15.8 | 77% |
| Bryce St | 14.3 | 22.9 | N-1 | 14.3 | 62% |
| Chartwell | 15.1 | 25.9 | N-1 | 15.1 | 58% |
| Claudelands | 20.4 | 22.9 | N-1 | 20.4 | 89% |
| Cobham | 10.5 | 25.9 | N-1 | 10.5 | 41% |
| Finlayson Rd | 3.8 | 7.5 | N | 3.8 | 51% |
| Glasgow St | 7.9 | 10 | N | 7.9 | 79% |
| Gordonton | 7.2 | 10 | N | 7.2 | 72% |
| Hampton Downs | 1.9 | 9.1 | N | 1.9 | 21% |
| Horotiu | 10.9 | 18 | N-1 | 10.9 | 61% |
| Kent St | 17.7 | 22.9 | N-1 | 17.7 | 77% |
| Latham Court | 16.9 | 22.9 | N-1 | 12.7 | 74% |
| Hoeka Rd | 7.4 | 25.9 | N | 7.4 | 29% |
| Ngaruawahia | 6 | 7.5 | N-1 | 6 | 80% |
| Peacockes Rd | 16 | 25.9 | N-1 | 12 | 62% |
| Pukete - Anchor (major customer) | 17.6 | 30 | N-1 | 17.6 | 59% |
| Pukete - WEL's 11kV | 9.6 | 12.6 | N-1 | 9.6 | 76% |
| Raglan | 4.7 | 11.4 | N | 2.9 | 41% |
| HAM 11 kV GXP | 30.6 | 44 | N-1 | 21.3 | 70% |
| Sandwich Rd | 19.1 | 28.2 | N-1 | 19.1 | 68% |
| Tasman | 20 | 25.9 | N-1 | 20 | 77% |
| Te Kauwhata | 4.8 | 10 | N-1 | 4.8 | 48% |
| Te Uku | 2.1 | 10 | N | 2.1 | 21% |
| Wallace Rd | 11.7 | 15.4 | N-1 | 11.7 | 76% |
| Weavers | 8.8 | 9 | N-1 | 8.8 | 98% |
| Whatawhata | 4 | 22.9 | N | 4 | 17% |

[1] *Extend forecast capacity table as necessary to disclose all capacity by each substation*

| Installed Firm Capacity +5 years (MVA) | Utilisation of Installed Firm Capacity + 5yrs % | Installed Firm Capacity Constraint +5 years (cause) | Explanation |
|---|---|---|---|
| 24 | 77 | No constraint within +5 years | |
| 21 | 99 | Subtransmission circuit | Limited by the 33kV OH conductor. |
| 23 | 64 | No constraint within +5 years | |
| 26 | 63 | No constraint within +5 years | |
| 23 | 92 | No constraint within +5 years | |
| 26 | 41 | No constraint within +5 years | |
| 8 | 52 | No constraint within +5 years | |
| 10 | 81 | No constraint within +5 years | |
| 10 | 75 | No constraint within +5 years | |
| 9 | 21 | No constraint within +5 years | |
| 18 | 127 | Transformer | Propose new substation to support new Industrial development |
| 23 | 78 | No constraint within +5 years | |
| 23 | 76 | No constraint within +5 years | |
| 26 | 31 | No constraint within +5 years | |
| 8 | 96 | No constraint within +5 years | |
| 26 | 74 | No constraint within +5 years | |
| 30 | 36 | No constraint within +5 years | 3-winding TX - owned Contact Energy. |
| 13 | 85 | No constraint within +5 years | 3-winding TX - owned Contact Energy. |
| 11 | 52 | Subtransmission circuit | Limited by the 33kV OH conductor. Transfer capacity is limited due to voltage regulation issue. |
| 44 | 73 | No constraint within +5 years | |
| 28 | 74 | No constraint within +5 years | |
| 26 | 109 | Transformer | Propose new substation to support Industrial and residential development |
| 10 | 77 | No constraint within +5 years | |
| 10 | 22 | No constraint within +5 years | |
| 15 | 78 | Subtransmission circuit | Limited by the incoming 33kV OH conductor to 15.4MVA identified |
| 9 | 102 | No constraint within +5 years | 2 MVA load can be transferred to GLA |
| 23 | 18 | No constraint within +5 years | |

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# SCHEDULE 12C: REPORT ON FORECAST NETWORK DEMAND

This schedule requires a forecast of new connections (by consumer type), peak demand and energy volumes for the disclosure year and a 5 year planning period. The forecasts should be consistent with the supporting information set out in the AMP as well as the assumptions used in developing the expenditure forecasts in Schedule 11a and Schedule 11b and the capacity and utilisation forecasts in Schedule 12b.

| | for year ended | Current Year CY 31 Mar 19 | CY+1 31 Mar 20 | CY+2 31 Mar 21 | CY+3 31 Mar 22 | CY+4 31 Mar 23 | CY+5 31 Mar 24 |
|---|---|---|---|---|---|---|---|
| | | Number of connections | | | | | |
| **12c(i): CONSUMER CONNECTIONS** | *Number of ICPs connected in year by consumer type* | | | | | | |
| | *Consumer types defined by EDB* | | | | | | |
| | Residential Customers | 1,240 | 1,249 | 1,200 | 1,200 | 1,150 | 1,150 |
| | Business Customers | 155 | 155 | 150 | 150 | 150 | 150 |
| | Large Customers - Low Voltage 400V | 12 | 11 | 10 | 10 | 10 | 10 |
| | Large Customers - Medium Voltage 11kV | 18 | 13 | 13 | 13 | 13 | 13 |
| | Large Customers - High Voltage 33kV | | | | | | |
| | Asset Specific Customers | | | | | | |
| | Unmetered Customers | | (3) | (3) | (3) | (3) | (3) |
| | **Connections total** | **1,425** | **1,425** | **1,370** | **1,370** | **1,320** | **1,320** |
| | **Distributed generation** | | | | | | |
| | Number of connections | 250 | 312 | 391 | 488 | 510 | 510 |
| | Capacity of distributed generation installed in year (MVA) | 1 | 1 | 2 | 2 | 2 | 2 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **12c(ii): SYSTEM DEMAND** | | | | | | | |
| **Maximum coincident system demand (MW)** | | | | | | | |
| | GXP demand | 197 | 281 | 283 | 284 | 286 | 287 |
| plus | Distributed generation output at HV and above | 81 | - | - | - | - | - |
| | **Maximum coincident system demand** | **278** | **281** | **283** | **284** | **286** | **287** |
| less | Net transfers to (from) other EDBs at HV and above | | | | | | |
| | **Demand on system for supply to consumers' connection points** | **278** | **281** | **283** | **284** | **286** | **287** |
| **Electricity volumes carried (GWh)** | | | | | | | |
| | Electricity supplied from GXPs | 959 | 964 | 965 | 967 | 967 | 967 |
| less | Electricity exports to GXPs | 90 | 90 | 90 | 90 | 90 | 90 |
| plus | Electricity supplied from distributed generation | 439 | 439 | 440 | 440 | 440 | 440 |
| less | Net electricity supplied to (from) other EDBs | (15) | (15) | (15) | (15) | (15) | (15) |
| | **Electricity entering system for supply to ICPs** | **1,323** | **1,328** | **1,330** | **1,332** | **1,332** | **1,332** |
| less | Total energy delivered to ICPs | 1,264 | 1,269 | 1,271 | 1,273 | 1,274 | 1,274 |
| | **Losses** | **59** | **59** | **59** | **59** | **58** | **58** |
| | **Load factor** | **54%** | **54%** | **54%** | **54%** | **53%** | **53%** |
| | **Loss ratio** | **4.5%** | **4.4%** | **4.4%** | **4.4%** | **4.4%** | **4.4%** |

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# SCHEDULE 12d: REPORT FORECAST INTERRUPTIONS AND DURATION

This schedule requires a forecast of SAIFI and SAIDI for disclosure and a 5 year planning period. The forecasts should be consistent with the supporting information set out in the AMP as well as the assumed impact of planned and unplanned SAIFI and SAIDI on the expenditures forecast provided in Schedule 11a and Schedule 11b.

| for year ended | Current Year CY 31 Mar 19 | CY+1 31 Mar 20 | CY+2 31 Mar 21 | CY+3 31 Mar 22 | CY+4 31 Mar 23 | CY+5 31 Mar 24 |
|---|---|---|---|---|---|---|
| **SAIDI** | | | | | | |
| Class B (planned interruptions on the network) | 41.1 | 60.0 | 62.0 | 64.0 | 65.5 | 67.0 |
| Class C (unplanned interruptions on the network) | 71.3 | 61.2 | 60.2 | 59.1 | 58.2 | 57.2 |
| **SAIFI** | | | | | | |
| Class B (planned interruptions on the network) | 0.20 | 0.30 | 0.31 | 0.32 | 0.33 | 0.33 |
| Class C (unplanned interruptions on the network) | 1.09 | 1.00 | 0.99 | 0.97 | 0.96 | 0.95 |


hamilton

# 5

# DIRECTORS' CERTIFICATE

# 5 DIRECTORS' CERTIFICATE

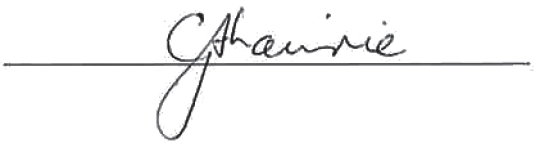
## CERTIFICATE FOR YEAR-BEGINNING DISCLOSURES

### Pursuant to clause 2.9.1 of Section 2.9

We, Geoff Lawrie, and Tony Steele being directors of WEL Networks Limited certify that, having made all reasonable enquiry, to the best of our knowledge -

**a)** the following attached information of WEL Networks Limited prepared for the purposes of clause 2.6.1 and 2.6.5(3) of the Electricity Information Disclosure Determination 2012 in all material respects complies with that determination; and

**b)** the prospective financial or non-financial information included in the attached information has been measured on a basis consistent with regulatory requirements or recognised industry standards.



**Geoff Lawrie**
**Date 21/3/2019**

**Tony Steele**
**Date 21/3/2019**


vodafone


WEL NETWORKS
NEW ZEALAND

# CREATING AN INNOVATIVE ENERGY FUTURE

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