

# Major augmentation proposal

## Regulatory Test Submission

Capacity expansion project: Proposed Baldivis zone substation

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## Glossary

The list of abbreviations and acronyms used and relevant to this document is shown below.

Acronym / Abbreviation	Definition / Meaning
AA	Access Arrangement
Access Code	Electricity Networks Access Code
AEMO	Australian Energy Market Operator
AUD	Australian dollars
AS	Australian Standard
BESS	Battery Energy Storage Systems
BVS	Baldivis Zone Substation
Capex	Capital Expenditure
CPI	Consumer Price Index
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DER	Distribution Energy Resource
DPLH	Department of Planning, Lands and Heritage
DPV	Domestic Photovoltaic system
DSM	Demand-Side Management
DSR	Demand-Side Response
DTC	Distribution Transfer Capacity
EPWA	Energy Policy Western Australia
ERA	Economic Regulation Authority
ESMR	Energy System and Market Rules
ESOO	Electricity Statement of Opportunities
ESS	Essential System Services
EV	Electric Vehicle
FAB	Fixed Asset Base, Western Power owns assets but does not fully recover costs.
FY	Financial Year
HV	High Voltage
IRR	Internal Rate of Return
kV	kilo Volt
LGA	Local Government Authority
MH	Mandurah Zone Substation
MRS	Metropolitan Region Scheme

Acronym / Abbreviation	Definition / Meaning
MSS	Meadow Springs Zone Substation
MTF	Medium Term Forecast
MVA	Mega Volt Ampere
MWh	Mega Watt-Hour
N-1	System maintains an operational state with one transmission element out of service
NCESS	Non-Co-Optimised Essential System Services
NCR	Normal Cyclic Rating
NFIT	New Facilities Investment Test
NNS	Non-Network Solution
NPC	Net Present Cost
NQRS	Electricity Industry (Networks Quality and Reliability of Supply) Code 2005
OHEW	Overhead Earth Wire
Opex	Operational Expenditure
PoE	Probability of Exceedance
PV	Photovoltaic
RAB	Regulatory Asset Base, that is Western Power recovers costs of these assets.
SWIS	South-West Interconnected System
TSP	Transmission System Plan
VPP	Virtual Power Plant
WACC	Weighted Average Cost of Capital
WAI	Waikiki Zone Substation
WEM	Wholesale Electricity Market
WPN	Western Power Network

## Executive summary

Western Australia is growing and so is the demand for electricity. Between 2015 and 2025, our population increased from 2.6 million to around 3 million. Baldivis and its surrounds, have been at the heart of this growth, consistently ranking highly amongst WA's fastest-growing communities. With increasing population there is more demand for electricity, and although the network around Waikiki (WAI) zone substation has worked tirelessly to keep up, it's reaching its limits<sup>1</sup>.

**The Problem:** The WAI substation is envisaged to exceed its planning capacity in 2026. The proposal is to create a new zone substation in Baldivis (BVS) and relieve WAI of its Baldivis distribution network loads (approximately 53% of WAI load). This approach includes distribution feeder reconfigurations and improves reliability for Baldivis consumers. Doing this defers into the medium- or long-term, costly upgrades otherwise needed now to restore WAI and its distribution feeder capacity to compliant capacity levels.

**The Process:** the Electricity Networks Access Code (Access Code) requires projects of this nature and size to be subject to the Regulatory Test process. Accordingly:

1. the Regulatory Test processes (as per Access Code Ch. 9) have been followed to provide the requisite net-benefit assessment inputs; and,
2. public consultation has been undertaken in accordance with Access Code Appendix 7<sup>2</sup>.

The Access Code regulatory test requires a *net benefit test*:

**Regulatory test purpose:** select the *major augmentation* option that maximises the net benefit (in present value terms, where possible) to those who generate, transport, and consume electricity after considering alternative options. The Regulatory Test guidelines explain more about preparing applications to the ERA for approval.

**Net benefit definition & method guidance:** the ERA's Net Benefits Guideline (Dec-2021) sets out *acceptable methods* to value net benefits and the *factors* the ERA will consider (incl. WEM participants' cost/benefit, excluding transfer payments, using credible engineering & economic models, and sensitivity testing). An early net benefits assessment is also related to the proposed augmentation works later meeting New Facilities Investment Test (NFIT) – but it is noted that does not replace or pre-empt later testing against NFIT (Access Code, s. 6.52).

**The Outcome:** the Option Paper's "augmentation option (Option 3)" which provides the required best net benefit value is proposed (e.g., estimated positive \$81.69 million net present cost).

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<sup>1</sup> See Attachment 1 – also available online: [Options Paper | Capacity Expansion Project - Proposed Baldivis zone substation | Let's Talk Power](#)

<sup>2</sup> See Attachment 2 - [Public Consultation Summary and Response](#)

# 1. Introduction

## 1.1 Background

Currently, Baldvis electricity network consumers rely mainly on the Waikiki (WAI) zone substation, supported to a lesser extent to the South by Meadow Springs (MSS) zone substation. The three closest zone substations WAI, MSS, and Mandurah (MH) — along with an increasing number of the distribution feeders exiting and interconnecting loads with them — are already operating at, or above capacity during peak demand periods. Thus, the present distribution network arrangements between WAI and Baldvis loads — even though it has effectively helped to defer high estimated investment to create a new zone substation at Baldvis (BVS) — requires urgent reconfiguration.

Without proactive and strategically planned augmentation measures, capacity constraints are likely to intensify, and reliability risks will increase. The risk of supply interruptions is growing, and on current network data, local WAI supply is at elevated risk if remediation is not in place by 2030. Prior to 2030, operational measures will be required to manage peak supply overloads and capacity shortfalls.

## 1.2 Objective

This major augmentation proposal is submitted to the Economic Regulation Authority (ERA) under section 9.15 of the Electricity Networks Access Code 2004 (Access Code) for assessment against the Regulatory Test. The proposed augmentation exceeds the Regulatory Test threshold, and thus, this submission's objective is to demonstrate that the selected option, to construct and commission a new zone substation at Baldvis (BVS), maximises net-benefits for the proposal.

The purpose of the proposed WAI and BVS augmentation and reconfiguration works is to rebalance the network loads at WAI, and to create a new zone substation central to the Baldvis loads. Under this approach WAI will transfer its role in supplying growing Baldvis loads across to the new BVS. Doing this will also relieve the present lengthy Baldvis distribution feeders emanating from WAI — which are at, or near their maximum operating ratings.

## 1.3 Options Paper and public consultation

A range of technical options were assessed to address the supply constraints being experienced in arriving at this proposal, e.g. constraints for WAI transformers and for WAI-Baldvis feeders and those which are continuing to emerge in the areas of Waikiki and Baldvis. Those options have been compared in Western Power's [Options Paper](#) and have undergone a period of public consultation in accordance with the Access Code's regulatory test (Chapter 9) and consultation requirements (Appendix 7).

In accordance with the requirements of the Access Code, Western Power published its Options Paper and undertook public consultation over the period from 22 November 2025 to 19 December 2025. The aim of the Options Paper was to inform the public and interested parties of the major augmentation proposal and to obtain input and feedback with regards to any additional or alternative considerations. Key stakeholders were encouraged to comment on the Options Paper.

A summary of the outcomes of the public consultation and submissions received has been recorded in our Response to Submissions document (see Attachment 2).

Following a comprehensive review of the responses received, Western Power does not propose to make any modifications to the original recommendation, Option (3), constructing and commissioning BVS as outlined in the Options Paper.

## 1.4 What's being proposed?

Western Power has explored valid solutions to meet the growing energy needs of Baldivis and surrounding communities by increasing network capacity. Several options have been assessed, as explained in more detail in the [Options Paper](#). In summary, the range of options identified, including: increasing transformer capacity at the Waikiki zone substation; building a new zone substation in Baldivis; and implementing non-network solutions.

**Table 1 Options summary**

Option	Description	Cost (NPC <sup>3</sup> )	Type of solution
1	Do nothing	-	Operations and maintenance
2	Additional transformer at WAI zone substation	\$110.60 million	Network
3	Establish a new substation at Baldivis (BVS) in 2030	\$81.69 million	Network
4	Contract network support services cost for deferral of BVS by 3 years, [includes the 2033 cost to construct BVS]	\$102.68 million	Non-network and network hybrid
5	Contract network support services cost for deferral of BVS by 5 years, [includes the 2035 cost to construct BVS]	\$127.08 million	Non-network and network hybrid

After careful analysis, building a new substation at BVS is proposed as the most cost-effective and reliable long-term solution. At this level of investment, the proposed BVS work is subject to the regulatory test. This major network augmentation will:

- a. relieve the existing WAI substation capacity constraints
- b. ensure there is adequate capacity to meet future demand as more people move into the area
- c. improve the reliability of electricity supply for everyone in Baldivis and nearby suburbs.

## 1.5 Attachments

**Attachment 1:** Options Paper – Capacity expansion program: Proposed BVS zone substation.

**Attachment 2:** Public Consultation Summary and Responses – Capacity expansion program: Proposed BVS zone substation.

<sup>3</sup> Net present cost (NPC) can be broadly defined as the present (today's) value of all the costs of installing and operating the Option.

## 2. Regulatory Test Requirements

### 2.1 Major Augmentation

Under Chapter 9.2 of the Access Code a service provider must not commit to a major augmentation before the regulatory test is satisfied. Section 9.2 is reproduced below:

#### ***No major augmentation without regulatory test determination***

9.2 A service provider must not commit to a major augmentation before the Authority determines, or is deemed to determine, under section 9.13 or 9.18, as applicable, that the test in section 9.14 or 9.20, as applicable, is satisfied.

The Access Code defines an augmentation to the network to be a major augmentation where the investment exceeds \$46.8<sup>4</sup> million for transmission works, or combined transmission and distribution works (2025 adjusted figure). The ERA updates and publishes threshold amounts adjusted for changes in the CPI<sup>5</sup> annually.

The definition of a major augmentation is reproduced below:

**"major augmentation"** means an augmentation for which the new facilities investment for the shared assets:

- d. exceeds \$10 million (\$15.6 million 2025 CPI adjusted), where the network assets comprising the augmentation are, or are to be, part of a distribution system; and
- e. exceeds \$30 million (\$46.8 million 2025 CPI adjusted), where the network assets comprising the augmentation are, or are to be, part of:
  - (i) a transmission system; or
  - (ii) both a distribution system and a transmission system.

The option proposed in this Regulatory Test Submission, by Western Power is estimated to be at a Net Present cost of \$81.69 million and therefore exceeds the threshold under b) above.

### 2.2 Regulatory Test Process

Section 9.16 of Access Code is reproduced below.

#### ***Regulatory test not as part of access arrangement approval process***

9.16 A major augmentation proposal submitted under section 9.15:

- a. must describe in detail each major augmentation to which the major augmentation proposal relates; and
- b. must state that, in the service provider's view, each proposed major augmentation maximises the net benefit after considering alternative options; and
- c. must demonstrate that the service provider has conducted a consultation process in respect of each proposed major augmentation which:
  - (i) included public consultation under Appendix 7; and

<sup>4</sup> See Access Code p31, which further explains this.

<sup>5</sup> Consumer Price Index Adjustments - Economic Regulation Authority Western Australia

- (ii) gave all interested persons a reasonable opportunity to state their views and to propose alternative options to the proposed major augmentations, and that the service provider had regard to those views and alternative options; and
- (iii) involved the service provider giving reasonable consideration to any information obtained under sections 9.16(c)(i) and 9.16(c)(ii) when forming its view under section 9.16(b);

and

- d. must comply with the current requirements published under section 9.17.*
- e. may include a request that the Authority give prior approval under section 6.72 in respect of the new facilities investment for one or more proposed major augmentations.*
- f. may include information from the whole of system plan if relevant to the major augmentation proposal.*

## 2.3 Public consultation

Western Power has undertaken a comprehensive and inclusive public consultation process as required under clause 9.16 of the Access Code and has been undertaken in accordance with Appendix 7 of the Access Code.

A summary of the consultation process, the feedback received and Western Power's responses for this submission<sup>6</sup> are attached as [Attachment 2](#) to this submission.

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<sup>6</sup> [Public Consultation Summary and Responses](#)

### 3. Network supply configuration

#### 3.1 Network reconfiguration

A significant portion of the WAI power flows supplying Balddivis loads connect via lengthy 22 kV distribution feeders. By removing that source of loading (which is subject to escalating future growth) at WAI, the resulting levels of load remaining at WAI (subject to lower demand growth) become acceptable into the foreseeable future. Hence, the recommendation is to establish a new BVS zone substation.

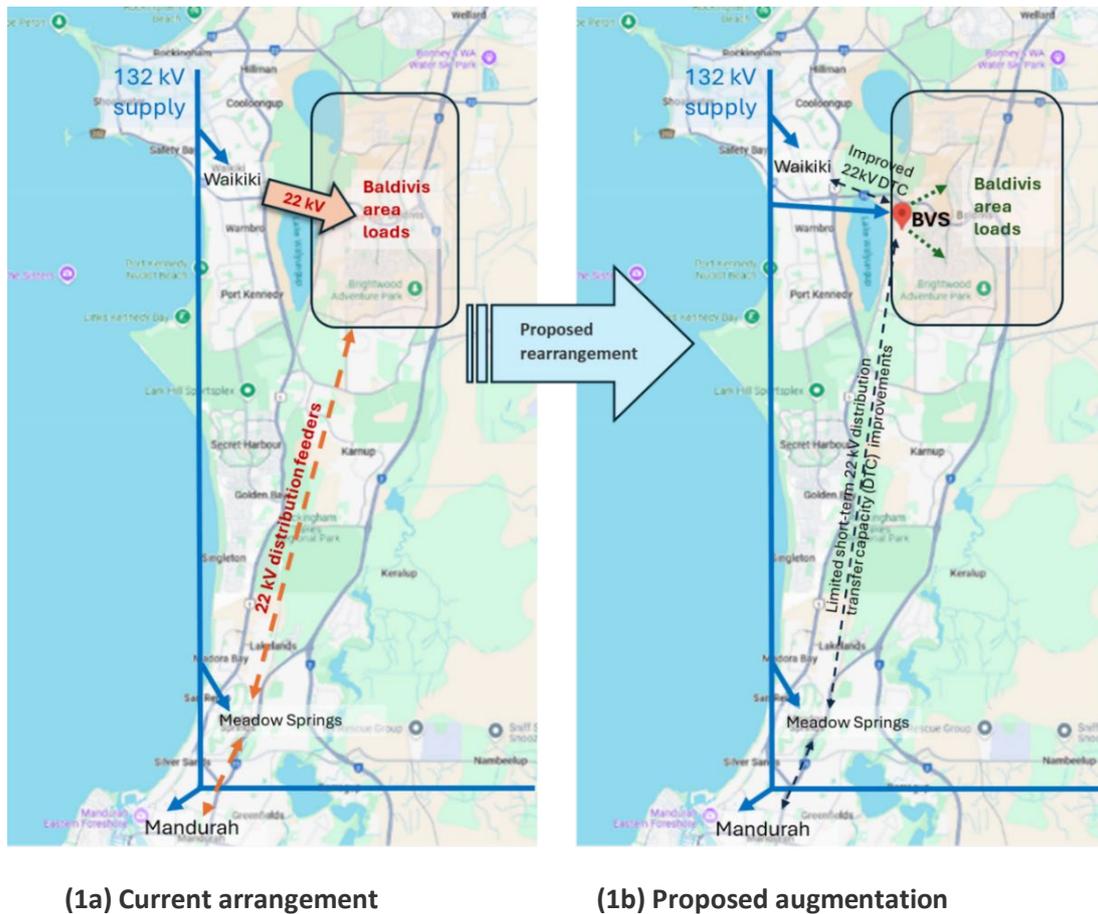


Figure 1 Conceptual rearrangement for a sustainable Balddivis distribution network supply.

As detailed in the BVS [Options Paper](#), the proposal for implementing Option 3 will deliver the highest net benefit to covered network electricity users and electricity market participants over the long term. The preferred option provides a robust solution that maximises net benefit over the longer term compared with feasible alternative options. It:

- adapts the WAI distribution supply for Balddivis via a change to inherently more reliable transmission supply flows to meet forecast escalating demand growth;
- relieves WAI overloads and enhances network resilience and redundancy;
- provides a better WPN configuration for the integration of future renewable generation and distribution energy resources (DER);
- minimises lifecycle costs through the proposed durable infrastructure augmentation investment;
- aligns with the relevant rules and Access Code objectives; and,

- f. presents a balanced risk profile, with a clear implementation pathway and minimal environmental or land-use constraints.

The provision of a new zone substation at Baldivis is a strategic investment that:

- establishes a long-term transmission voltage supply arrangement for Baldivis
- brings a significant inbuilt improvement in supply reliability – because Baldivis supply will transition from present distribution network N-0 reliability level (see WPN Technical Rules cl. 2.5.5.3 and 2.5.2)
- provides a degree of relief to the nearby zone substations (presently WAI and MSS), which are facing increasing high peak loading, whilst also dealing with higher than previously forecast growth in their load area aggregate demand.

## 3.2 Summary of investment drivers

The proposed investment was developed to achieve the following objectives:

- a. relieve pressure on the existing WAI substation, which is becoming overloaded
- b. ensure there's enough capacity to meet future demand as more people move into the area
- c. improve the reliability of electricity supply for network users in Baldivis and nearby suburbs.

The preferred option is to undertake a major network augmentation work to establish the new BVS zone substation at 60 Pike Rd, Baldivis<sup>7</sup>. This option has the lowest NPC, and meets the requirements of the Regulatory Test, after considering the feasible alternative options.

### 3.2.1 Allowances for future growth

Item 3.3 (c), above, enables future expansion at BVS without the need for significant supply disruptions to carry out upgrade project works. By providing the 'low incremental cost' earthworks, footings, busbars and the associated upgrade work now enables the more costly future works (e.g. power transformers and their interconnections) to be done later, after it is established that it will be fully utilised.

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<sup>7</sup> The proposed 60 Pike Rd. site is owned by Western Power

## 4. Project efficiency considerations

### 4.1 This proposal relative to the AA5 submission

The ERA delivered its final decision on our fifth Access Arrangement (AA5) on 31 March 2023 for the period July 2022 to June 2027. A substation in Baldivis was not contemplated in the AA5 final decision. However, since that time, peak demand forecasts for Baldivis have increased. These are linked to external influencing factors – related predominantly to population growth across the wider Rockingham, Waikiki and Baldivis areas, which are in the Mandurah load area.

### 4.2 Peak demand forecast

Higher growth trajectories for Baldivis are linked to external influencing factors, including, but not limited to high rates of population growth; optimistic economic conditions; and include increasing rates of photovoltaic (PV) installations.

Western Power uses the annual Medium-Term Forecasts (MTF 25) peak demand forecasts, being the latest approved forecasts for 2025, and thus, these were used as a basis for the development of the Options Paper (Attachment 1). These forecasts are validated against the latest long-term forecasts in the "Transmission System Plan 2024<sup>8</sup>" developed by Western Power. As such, effectively align effectively with the sensitivity analysis for feasible options, with the preferred BVS option remaining the recommended pathway.

The 10-year peak forecast demand for the WAI substation and the associated Baldivis area loads show that these areas are experiencing increasing demand. While the forecast increased peak demand in the region will not trigger new constraints without a significant block customer load connection, the existing voltage capacity limitations are expected to increase further due to significant growth forecast in the area in the medium- and longer-term.

### 4.3 Escalation and variability factors

Our Options Paper establishes baselines used in forecasting, for example the demand forecasts are based on MTF 25, 10% PoE at zone-substation level, and expected higher than previous (or previously expected) population growth in areas to the south-east of Rockingham (e.g. Waikiki and Baldivis).

There is a clear narrative presented about the high demand forecasts, and expected additional growth uncertainty due to:

- a. rapid Baldivis population growth (and locations of land developments in the area):
  - (i) emerging development south of Baldivis (e.g. Karnup, and further south in Keralup)
  - (ii) growth driving the need for additional zone substations to north, and east of Baldivis
- b. potential future zone substation siting impacts of environmentally sensitive areas, and climate change impacts
- c. EV uptake and DER impacts (acknowledged qualitatively).

The sensitivities for the proposed BVS investment are categorised and listed in Table 2.

<sup>8</sup> [Transmission System Plan 2024](#) (see information on Metro South Region, commencing p. 62)

**Table 2 Relevant sensitivities**

Sensitivity Cases	Expected outcomes
Central case	Medium-term Forecast 2025 (*MTF 25), *10% PoE demand trajectory (baseline), i.e. this is the most likely scenario.
High-growth / early-trigger case	WAI transformer/feeder constraints trigger 2–3 years earlier than base Equivalent to upper-bound PoE, pessimistic MTF 25 forecast, increased connection applications either at WAI or in Baldvis distribution connection zones.
Low-growth / delayed case	WAI/feeder constraints trigger 2–3 years later than base Reflects optimistic MTF 25 figures, slower subdivision release, delayed population uptake

\*the Options Paper explains how these apply.

**4.3.1 Capital cost sensitivity**

The Options Paper demonstrates that from the conceptual design perspectives:

- a. cost estimates are concept-level, based on standard building blocks
- b. risk allowances are included
- c. Option 2 is inherently more complex than Option 3
- d. no evidence of extreme geotechnical or land risk at Pike Road (although allowances are made for site works which are required to ensure the site is level and stable).
- e. Table 3 considers the cost impact for delivery risk, that is, if project work is possible earlier, or if delays are encountered.

**Table 3 Cost escalation exposure**

Option	Cost sensitivity (held constant against current NPC)	Outcomes
Option 2 (Expand WAI) by 2028	Shorter term	Occurs sooner, thus there is less scope for escalation.
Option 3 (BVS) by 2030	Medium term, escalation will be elevated with delays	Delays will likely elevate costs, e.g. due to land purchases/transfers/etc/ and/or key asset procurement.
Options 4–5 (NNS deferral) until BVS commissioned.	Opex may vary over time, likely would escalate if contract extended past current BVS in-service date.	Extensions imply that additional cost must be met, with negative benefit resulting if BVS is delayed.

**4.3.2 Commissioning / timing sensitivity**

Options for Baldvis differ in terms of deliverability risk. Table 4 shows delivery risks using timing sensitivity of ±1–2 years around the central Option 3 commissioning year 2030. As shown, the impacts must be interpreted independently, as Options can be delivered with (different) specified 'in-service dates'.

**Table 4 Delivery time sensitivities**

Option	Timing sensitivity	Outcomes	Rationale	Risk rating (use O&M mitigation)
Option 2 (Expand WAI) by 2028	±1 year	Early delivery will allow better planned/unplanned outage accommodation.  Delays will result in longer periods of overloading, requiring operational and maintenance (O&M) measures to deal with them.	Brownfield complexity; limited practical design and construction flexibility.	Low
	±2 years	Amplified outcomes listed for 1 year.		Medium
Option 3 (BVS) by 2030	±1 year	Early delivery excluded. Delays exacerbate WAI overloading.	Greenfield site; clearer delivery path.	N/A
	±2 years	Further delays lead to amplified outcomes listed for 1 year.		High
Options 4–5 (NNS deferral) until BVS commissioned.	Target date fixed initially to 2030	Delays see Opex escalate, hence no benefit if BVS delayed, as overloads will become more prevalent.	Contracts absorb timing risk via cost.	High

#### 4.4 Meeting NFIT

This project (via Option 3, to construct BVS zone substation at 60 Pike Rd Baldivis) is expected to ultimately meet NFIT in full. Thus, the BVS facility project (and the related) assets will be fully capitalised and be added to the regulatory asset base (RAB).

#### 4.5 Network planning drivers

In keeping with Western Power's obligations in relation to maintaining security, reliability and quality of supply as defined in the Technical Rules (December 2016-Rev 3) and the NQRS, the Western Power owned BVS zone substation is planned under the N-1 criterion<sup>9</sup>.

Maximum supportable demand at WAI is approaching exceedance at times of peak loading – requiring timely network augmentation to meet accelerating forecast demand. System studies, as detailed in Attachment 1, our BVS Options Paper, reveal that in the network serving Waikiki and Baldivis capacity issues arise relating to zone substation transformers at WAI and intervening distribution feeder overloading between WAI and Baldivis loads. This results in imminent substation transformer and distribution feeder constraints, breaching which can be expected to ultimately lead to:

- f. planned and unplanned outages, load shedding and or other supply reliability issues
- g. substation and feeder asset deterioration due to increasing overloading.

Please refer to the analysis contained in the Options Paper for a more detailed explanation of the relevant network considerations.

<sup>9</sup> [Technical Rules](#) (see cl. 2.5.2 and 2.5.4, pps 20 and 24 resp.)

## 5. Risk Assessment

### 5.1 Purpose and approach

This section evaluates the uncertainties that could materially affect the costs, benefits, timing and feasibility of the credible options considered for addressing capacity constraints in the Waikiki–Baldivis area. The assessment focuses on risks that influence the net benefit to those who generate, transport and consume electricity (in present value terms to the extent possible), consistent with Chapter 9 of the Access Code and the ERA’s Regulatory Test Guideline. The approach is to (i) identify material risk categories, (ii) compare how these risks manifest across options, and (iii) link each risk to the sensitivity testing used in the Regulatory Test to demonstrate robustness of the preferred option under reasonable scenario variations.

This risk assessment is economic and regulatory in focus. Technical risks are considered to the extent they affect net benefit, schedule and deliverability. Risks are treated symmetrically across options using consistent inputs, estimating methods, and sensitivity ranges—an approach consistent with the ERA’s Guideline and the methodology adopted in our previous Regulatory Test submissions.

#### 5.1.1 Scope of options

The options assessed in this section correspond to those described in Section [Options] of this submission:

**Option 1** – Do nothing (retain current arrangements).

**Option 2** – Add a fourth transformer and associated works at WAI.

**Option 3** – Establish a new BVS 132/22 kV zone substation (cut in/out of MH–WAI/MSS 81), with three × 33 MVA transformers.

**Options 4–5** – Hybrid non network deferral approaches (contracted network support services to defer Option 3 by ~3–5 years).

To maintain consistency, please refer to the Baldivis Options Paper for the detailed scope, NPC and qualitative evaluation underpinning the Regulatory Test submission.

#### 5.1.2 Risk categories

The key and relevant risk categories are:

**Demand and growth uncertainty** - there is uncertainty in the timing and magnitude of Baldivis load growth due to residential development phasing and emerging growth to the south (e.g., Karnup/Keralup). While central forecasts indicate sustained growth, variability around the trajectory can alter the timing of constraint breaches and the scale of short-term mitigations required.

**Timing and deliverability** - works at constrained, built-up sites (e.g., expanding WAI beyond its original design envelope) face higher constructability and staging risk than a greenfield substation. Live network interfaces, access limitations and site extensions can compress outage windows and increase schedule risk; by contrast, a greenfield BVS provides a clearer critical path with fewer integration constraints.

**Cost and estimation** - all options include estimating allowances consistent with Western Power practice. However, options reliant on non-network services introduce Opex escalation and contract renewal risk over time; and options with complex brownfield site works (e.g., WAI fourth transformer plus long express feeders) have higher delivery cost variability than a standardised zone substation build.

**Non network solution (NNS) feasibility and performance** - hybrid deferral solutions depend on the maturity, availability, siting and operational reliability of contracted network support (BESS/DER/firm generation). Risks include site acquisition and approvals, community acceptance, interconnection constraints on already highly loaded distribution feeders, contract tenure/renewal risk, and performance under coincident peak across the Mandurah load area.

**Network performance, reliability and compliance** - continuing with the present arrangements or only incrementally expanding WAI heightens exposure to feeder overloading, limited distribution transfer capacity (DTC), and power quality non compliances during high demand and credible contingency conditions. Such conditions will potentially lead to increasing power outages at times of high demand – planned outages to deal with overloads, and/or unplanned outages as protection trips, load is shed, or as assets’ condition will deteriorate due to overloading and may fail in service.

Transitioning Baldivis supply to a transmission fed zone substation materially reduces these risks. This improves operational resilience both for Baldivis loads, and also at WAI (WAI loads are being reduced upon BVS being commissioned).

**Strategic alignment and future flexibility** - solution that rebalances the Mandurah load area, reduces long feeder losses, and positions the network for future EV/DER integration is strategically preferred. BVS option aligns with these objectives and avoids locking in short lived assets that become sub-optimal or redundant post BVS.

## 5.2 Comparative risk view by option

Table 5 summarises how key risks manifest across the credible options.

**Table 5 Key risks against Options**

Risk category	Option 1: Do-nothing	Option 2: Expand WAI (4th transformer + feeders)	Option 3: New BVS substation (preferred)	Options 4–5: Hybrid non-network deferral
<b>Demand/growth uncertainty</b>	<b>High</b> – early growth accelerates non-compliance and unserved energy risk	<b>High–Med</b> – short-term headroom; risk of rapid re-congestion immediately as Baldivis grows-term headroom; risk of rapid re-congestion immediately as Baldivis grows	<b>Low–Med</b> – scalable capacity at the load centre; less sensitive to early growth	<b>Med–High</b> – scale and duration of NSS uplift grows steeply with higher/faster demand
<b>Timing &amp; deliverability</b>	<b>High</b> – reliance on operational workarounds, limited DTC	<b>Med–High</b> – complex brownfield works; site constraints; extended outages	<b>Low</b> – standardised zone substation delivery; fewer live network interfaces-network interfaces	<b>Med–High</b> – dependency on third-party delivery, sites, approvals; multisite integration-party delivery, sites, approvals; multi-site integration

Risk category	Option 1: Do-nothing	Option 2: Expand WAI (4th transformer + feeders)	Option 3: New BVS substation (preferred)	Options 4–5: Hybrid non-network deferral
<b>Cost &amp; estimation</b>	<b>High</b> – rising Opex from faults/constraints; reputational impacts	<b>High</b> – complex site extension and long feeders; risk of scope growth	<b>Low–Med</b> – standard build cost profile; defined scope	<b>High</b> – Opex escalation, contract renewal/availability risk; cumulative cost exceeds network option
<b>NNS feasibility &amp; performance</b>	N/A	Limited applicability (feeder congestion persists)	N/A (may enable future tactical NNS on more robust backbone)	<b>Med–High</b> – siting and performance risk under coincident peak; market availability uncertainty
<b>Reliability &amp; compliance</b>	<b>High</b> – increasing non-compliance exposure	<b>Med–High</b> – short-term relief; residual feeder and DTC constraints-term relief; residual feeder and DTC constraints	<b>Low</b> – robust compliance via transmission supply, reduced feeder stress	<b>Med–High</b> – defers but does not resolve underlying constraints; residual reliability risk
<b>Strategic alignment</b>	<b>Poor</b>	<b>Weak</b> – risks stranded/underutilised assets post BVS-utilised assets post-BVS	<b>Strong</b> – supports Mandurah corridor reinforcement, loss reduction, DER/EV readiness	<b>Weak–Med</b> – short-term lever; not an efficient long-term pathway-term lever; not an efficient long-term pathway

### 5.3 Risks linkage to sensitivity testing

In accordance with the ERA Guideline, key risks have been incorporated in the Regulatory Test sensitivities as follows:

**Demand trajectory and timing** - central forecasts are (routinely) tested against plausible high/low and earlier/later timing of constraint onset to ensure that development phasing uncertainty in Baldvis and adjacent areas is captured (for example, via annual TSP<sup>10</sup> processes and publications).

**Capital cost variation** -  $\pm$ (appropriate percentage) on capex building blocks for all options (applied symmetrically) to reflect estimating uncertainty and delivery market conditions.

**Commissioning timing** - tested earlier/later in-service commissioning dates for each option to reflect scheduling and approvals variability (including brownfield constructability at WAI vs greenfield BVS).

**Discount rate / WACC** - sensitivity to the regulated cost of capital bounds to test NPC robustness.

**Operating cost of non-network services** - escalation and contract rollover sensitivities for Options 4–5 to reflect availability/market price uncertainty.

It is noted that these sensitivities satisfy the ERA Regulatory Test guideline’s requirements for “reasonable market development scenarios” and “testing alternative timings”.

#### 5.3.1 Results of sensitivities (summary of implications)

Across the tested sensitivities (see Section 5.3 Economic Assessment & Sensitivities] for full results):

<sup>10</sup> Transmission system plan & network opportunity map

**Option 3** BVS remains the lowest NPC and highest net benefit in all reasonable downside scenarios considered.

**Option 2** (WAI expansion) is highly sensitive to demand and cost variations; even with optimistic assumptions, it provides short lived relief and becomes dominated by Option 3 once Baldivis growth materialises.

Hybrid non network deferrals (**Options 4–5**) become increasingly unattractive as Opex and contract risk accumulates, especially under earlier/higher demand outcomes.

## 5.4 Risk management and mitigations

The following mitigations are embedded in the recommended approach and delivery plan:

- h. scalable, load centred capacity via transmission connected BVS, reducing sensitivity to demand timing and lowering network losses
- i. standardised scope and proven delivery model for zone substations to control schedule and cost risk
- j. right sizing of enabling works on distribution feeders to capture reliability gains and restore DTC between BVS/WAI/MSS
- k. procurement strategy that maintains market competitive tension and manages escalation/contingency within governance thresholds
- l. contingency use of targeted NNS as an operational back up support mechanism, if required during construction, but not as a long-term substitute for network capacity.

### 5.4.1 Sensitivity testing

Sensitivity testing has been tailored to reflect the key variabilities identified in the Options Paper, including the timing of demand growth in Baldivis, capital cost estimation uncertainty at the concept stage, and the delivery and cost risks associated with non-network deferral options.

Demand sensitivities have been represented through earlier and later constraint trigger scenarios rather than arbitrary demand uplifts, consistent with the event-driven nature of network investment decisions. Capital cost sensitivities of  $\pm 20\%$  have been applied to all network options on a consistent basis, reflecting standard planning-stage uncertainty.

Additional operating cost sensitivities have been applied to non-network options to reflect contract price and escalation risk over extended deferral periods. These sensitivities are consistent with the ERA Regulatory Test Guideline and demonstrate the robustness of the recommended option under reasonable market development scenarios.

## 5.5 Conclusion

Consistent with the ERA Guideline and the comparative risk analysis above, the BVS zone substation (Option 3) is the least risk and most robust pathway to deliver the Regulatory Test objective:

- *to maximise net benefit after considering alternative options.*

This risk assessment shows that it materially reduces reliability and compliance risks associated with the current configuration, is less exposed to demand timing uncertainty than alternatives, avoids the cost, configuration and renewal risks inherent in deferrals enabled by hybrid options, and supports the long-term strategic configuration of the Mandurah load area.

Further discussion on the net benefit context of this proposal follows in the next section.

## 6. Net benefits analysis

### 6.1 Regulatory Test net benefit framework

The network planning assessment of potential long term development strategies for the Baldivis subnetwork of the Mandurah load area presented here, for the next 10 – 20-year period, has specifically focused on the following key net benefit and network investment drivers:

- m. address the existing and emerging reliability, loading limits, and asset condition risks
- n. increase the maximum supportable demand to meet the long-term forecast growth
- o. align with Western Power's obligations and meet Regulatory Test objectives.

In addition the submission provides assurance that the proposed BVS major augmentation (also) maximises the net benefit, measured in present value terms to the extent possible, to those who generate, transport and consume electricity after considering all reasonable alternative options.

The ERA's Regulatory Test guideline defines net benefit as the difference between the present value of benefits and the present value of costs, calculated on a consistent basis across the alternative options.

#### 6.1.1 Approach to preparing for net benefit assessment

The preparation of information for the net benefit assessment for the proposed BVS zone substation augmentation has been undertaken by comparing a range of credible network and non-network alternative options which would address the forecast capacity constraints in the Waikiki–Baldivis area. Six alternative options are discussed in the BVS major augmentation Options Paper. These include consideration of *“alternatives to part or all of the major augmentation, including demand-side management and generation solutions (such as distributed generation), either instead of or in combination with network augmentation”*, as is specified in the ERA [Guideline for application of the Regulatory Test](#)<sup>11</sup>.

Each option has been assessed over a relatable evaluation period using consistent assumptions for demand forecasting, asset life, discount rate and cost escalation. Net benefit has been evaluated based on NPC, noting that for options delivering comparable levels of service, the option with the lowest NPC represents the highest net benefit.

This approach is consistent with the ERA Regulatory Test Guideline and our previous successful Regulatory Test submissions.

#### 6.1.2 Costs included in the net benefit assessment

The following categories of costs have been included, to the extent practicable, in the net benefit assessment for all options:

- a. capital expenditure for network assets, including substation works, transmission line works and associated distribution feeder reconfiguration
- b. project on-costs, risk allowances and escalation
- c. operating and maintenance costs over the evaluation period
- d. operating costs associated with contracted network support services for non-network and hybrid options.

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<sup>11</sup> See p. 3.

Cost estimates are based on concept-level scopes developed in the Options Paper and have been derived using consistent estimating methodologies across all options.

### 6.1.3 Benefits included in the net benefit assessment

The benefits of each option have been assessed as the extent to which the option:

- a. maintains compliance with security, reliability and quality of supply obligations
- b. provides sufficient capacity to meet forecast electricity demand
- c. reduces the risk of involuntary load shedding or supply interruptions
- d. improves operational flexibility and distribution transfer capacity within the Mandurah load area
- e. reduces electrical losses associated with long, highly-loaded distribution feeders
- f. supports efficient long-term development of the network.

Where benefits cannot be readily quantified in monetary terms, they have been considered qualitatively and consistently across options, in accordance with the ERA Guideline.

## 6.2 Net benefit comparison of options

The net benefit assessment demonstrates that Option 3 – establishment of a new Baldivis 132/22 kV zone substation delivers the highest net benefit:

- a. minimal disruption and seamless integration for new (growth related) loads being added into the WEM market (i.e. generators' benefit, with minimal market disruption);
- b. network constraints are addressed for full zone substation life cycle (at WAI and BVS); (i.e. transporters' benefit);
- c. ensures supply and reliability is maintained for our Baldivis customers presently at risk of emerging capacity and feeder constraints; and,
- d. the proposed Option 3 also has the lowest NPC of the credible options considered and is likely to pass an NFIT assessment later in the project life cycle.

### 6.2.1 Options' disbenefit considerations

Options involving incremental expansion of the existing Waikiki substation and short term NCESS contracted support services provide short-term capacity relief (i.e. with an NNS approach). These options require substantial additional investment as demand continues to grow. Hybrid non-network options that defer the construction of the BVS zone substation incur increasing operating costs over time and do not efficiently resolve the underlying network constraints in an economically prudent manner.

As a result, these alternatives have higher NPC and lower net benefit compared to the proposed BVS zone substation option.

## 6.3 Sensitivity and robustness of option selection

Sensitivity testing has been undertaken to assess the robustness of the net benefit outcome under reasonable variations in key assumptions, including:

- a. earlier and later demand growth scenarios
- b. capital cost variation consistent with planning-stage uncertainty

- c. variations in the timing of option commissioning
- d. changes in the discount rate.

Across all sensitivities tested, the relative ranking of options remains unchanged, with the BVS zone substation option continuing to exhibit the lowest net present cost. This demonstrates that the preferred option is robust to uncertainty and continues to maximise net benefit under a wide range of plausible future scenarios.

The recommended option will see the design construction and commissioning of BVS zone substation. The details of the project are discussed in the Options Paper, (Option 3 – construct zone substation at 60 Pike Rd Baldivis). A view showing the proposed site in include below in Figure 2.

## 6.4 Business and stakeholder benefits

The recommended option provides benefits to Western Power and its external stakeholders through:

- a. addressing the safety, reliability and security and supply risks associated with deteriorated asset condition issues
- b. increases the maximum supportable demand beyond the forecast peak demand and facilitates to accommodate future growth opportunities in the area. The maximum supportable demand increases under the full implementation of the investment
- c. rationalisation of assets in the Waikiki sub-network of the Mandurah load area with associated operating cost and network benefit
- d. improvement to security of supply to BVS substation in the event of a contingency with the terminal transformers.

## 6.5 Net benefit conclusion

Given the existing distribution network constraints, e.g. for WAI transformers and 22 kV Baldivis feeders as explained in the BVS Options Paper, transmission alternatives involving generation solutions (such as additional generation or power flows into WAI), either instead of or in combination with network augmentation cannot be accommodated. There is insufficient WAI substation and transfer capacity under the present 22 kV Baldivis feeds from WAI. Net benefits in this constrained context remain negative for all parties, i.e. network generators, transporters and consumers.

Based on the assessment undertaken, and after considering all reasonable alternative options, Western Power concludes that the proposed BVS zone substation augmentation maximises the net benefit to those who generate, transport and consume electricity. Accordingly, the proposal satisfies the Regulatory Test set out in Section 9.20 of the Electricity Networks Access Code 2004.

## 7. Public Consultation

A summary of the process, and the themes which have emerged through our conversations and engagements in relation to the proposal to construct and commission the new BVS zone substation<sup>12</sup>.

### 7.1 Commencing public consultation

#### 7.1.1 ERA notice

Prior to deciding the timeframe and methods to best deliver the key stakeholder and public consultation for this augmentation, the ERA was advised of the upcoming regulatory test. Then to commence the formal public consultation process, we provided the related supporting document (the Options Paper), along with program and event details so they were able to publish their Notice of 24 November 2025:

[Notice - Western Power invites submissions on proposed Baldivis zone substation](#)

#### 7.1.2 Western Power's Baldivis (BVS) web page

Concurrently with the ERA notice, we published Western Power's central point of contact for Baldivis feedback:

[Have your say | Capacity Expansion Project - Proposed Baldivis zone substation | Let's Talk Power](#)

Opportunities provided to enable public and key stakeholders to learn more about the proposal, speak to the project team, ask questions, and thus, to seek opinions, comments and feedback in this context.

**Table 6 Public consultation sessions (BVS zone substation), Nov – Dec 2025**

Event	Date and time details	Description
Library pop-up session	6 Dec 2025 9:00 AM - 6 Dec 2025 12:00 PM	Outside Mary Davies Library and Community Centre, 17 Settlers Avenue, Baldivis
Community drop-in session	10 Dec 2025 4:00 PM - 10 Dec 2025 6:00 PM	Mary Davies Library and Community Centre, Boobook Room, 17 Settlers Avenue, Baldivis WA, Australia
Stakeholder briefing	11 Dec 2025 2:00 PM - 11 Dec 2025 3:00 PM	Online Event - A presentation for stakeholders on the capacity expansion options to meet growing demand in Baldivis and surrounding areas, including our preferred approach.

### 7.2 Submissions and Western Power Response

Western Power invited submissions by web form, email and/or post, undertook stakeholder face-to-face meetings, whilst also taking notes, comments and questions at the public forums. Our Public Consultation Summary and Responses report<sup>13</sup> was published on 30 January 2026 and is included as Attachment 2 with our BVS Regulatory Test Submission.

<sup>12</sup> See Attachment 2, [Public Consultation Summary and Responses report](#) for submissions we received and our responses.

<sup>13</sup> See Attachment 2, [Public Consultation Summary and Responses report](#) for submissions we received and our responses.

### 7.3 Methodology

The Access Code requires Western Power to detail the methodology adopted in dealing with the information (e.g. submissions from interested parties) obtained and how regard was given to any alternative options proposed and issues raised during the consultation process.

Based on our analysis, Western Power determined how the information, issues, and options would be incorporated into the region’s overall long-term strategy. Where certain information or options were not considered appropriate, a clear rationale for our responses has been provided.

### 7.4 Context of submissions received

Stakeholder input was sought, assessed and incorporated into the development of options, including the final option submitted for approval. This demonstrates compliance with our regulatory public consultation requirements and maintains a suitable level of transparency and accountability throughout the proposed augmentation decision-making process<sup>14</sup>.

**Table 7 Responses to submissions and queries received**

Stakeholder type	Submissions
Resident	48
Landowner	3
Local government	1
Ratepayer	1
Not given	1

The majority of respondents fall within the broad category of residents or future residents (i.e. 52), with the City of Rockingham representing the only other stakeholder group, and with one remaining unknown.

By analysing the detailed feedback, we gained a clearer understanding of overall support for the additional capacity and reliability offered by the proposed major augmentation project. Mixed responses were received which were generally supportive, but raised concerns about potential impacts, while the negative submissions expressed strong objections.

Overall, the feedback indicates broad support for the proposal.

### 7.5 Analysis of submissions and feedback

From analysis of the submission contents (see Appendix D) the themes shown in Table 8 were apparent, being raised consistently across multiple submissions.

<sup>14</sup> See [Capacity Expansion Project - Proposed Baldivis zone substation | Let’s Talk Power](#) web page for the associated information and documentation.

**Table 8 Themes emerging from the submissions**

Theme	Description
Need	Has need for the proposed augmentation in this growing area been adequately established? (e.g. recommended option is justified for efficient capacity increase and increased reliability).
Impact	Asks if the potential impact(s) are effectively mitigated? (or will they be mitigated?).
Process	Considers if the processes, and/or consultation adequate.

Submission topics are addressed in the responses we have compiled across the themes, as listed in Table 8. Each theme is examined in detail in the following three sections to provide a structured and transparent response to the issues identified. Table 9 summarises the alignment between themes identified, submissions, and our responses.

**Table 9 Summary of responses against each theme**

Theme	Comments
<p><b>Theme 1: Need</b>  <b>Issue:</b> Is the augmentation justified?</p>	<p><b>Background to response:</b> The need for this augmentation is established through the Options Paper – and the net benefit is assessed under the Regulatory Test per Chapter 9 of the <i>Electricity Networks Access Code 2004</i>.</p> <p><b>Submissions:</b> A high proportion of submissions (positively) acknowledge the need and support the provision and construction of a new zone substation in Baldivis.</p>
<p><b>Theme 2: Impact</b>  <b>Issue:</b> Are impacts identified and mitigated within the applicable regulations?</p>	<p><b>Response:</b>  The project acknowledges potential impacts and considers mitigation measures consistent with the Access Code, AS 2067, WA environmental and planning regulations, and good utility practice. These include impacts such as: visual amenity, EMF/health, noise, construction impacts, traffic, property/easements, environment, safety, cost/tariffs – and alternative locations and/or approaches. Each of the impacts mentioned in submissions (and others) are either mitigated or managed through established standards and regulatory frameworks.</p> <p><b>Submissions:</b> This theme is included due to a number of submissions raising concerns about impacts of the zone substation proposed in Baldivis.</p>
<p><b>Theme 3: Process</b>  <b>Issue:</b> Was consultation adequate?</p>	<p><b>Response:</b> The “public consultation” and engagement processes followed align with Access Code Chapter 9 and Appendix 7 requirements:</p> <ul style="list-style-type: none"> <li>• publication of an Options Paper outlining need, alternatives, and impacts.</li> <li>• invitation for public submissions and transparent consideration of feedback.</li> <li>• issuance of a Final Report responding to submissions and documenting the preferred option.</li> </ul> <p><b>Submissions:</b> A small number of submissions noted concerns about the timing and scope of the engagement process. The process was carried out in accordance with the Economic Regulation Authority’s guidelines and the requirements of the <i>Electricity Networks Access Code 2004</i>, including clause 9.16(c). This approach is consistent with established industry practice and aims to provide interested parties with a reasonable opportunity to participate.</p>

## 8. Conclusion

### 8.1 Summary

Western Power submits that a major augmentation is required to address constrained network conditions in the Waikiki and Baldivis areas (within the Mandurah load area). This is required to maintain adherence to the technical compliance obligations in the region (in particular, Technical Rules section 2 requirements). Without the proposed augmentation (i.e. Option 3 in the Options Paper) Western Power will be non-compliant to the Technical Rules and customers would be exposed to reliability impacts.

### 8.2 Community engagement

It is noted here that Western Power carries out ongoing engagement programs when major projects are in progress. The 'public consultation' insights and process followed are discussed here, and the two related documents are attached: 1. the '[Options Paper](#)', and 2. the '[Public Consultation Summary and Responses](#)'.

### 8.3 Proposed work

The total estimated NPC of the preferred development option is \$81.69 million, inclusive of project on costs, risk allowances and escalation, determined as part of the cost estimate process through Western Power's Estimation and Value Assurance Section.

The main elements of this proposal are:

- e. establish BVS zone substation
- f. re-configure distribution feeders in the Mandurah load area. Particularly the northern sections, i.e. Waikiki – Baldivis area – but also relevant work to the south of Baldivis, between Baldivis loads and MSS substation
- g. use appropriate measures to transfer former eastern facing Waikiki-supplied loads across to the new BVS zone substation
- h. use appropriate measures to transfer former northern facing Meadow Springs-supplied loads across to the new BVS zone substation.



**Figure 2 An aerial view of Lot 3001, 60 Pike Road, Baldivis**

In Western Power's view Option 3 (as set out in Options Paper – see Attachment 1 to this regulatory test submission) maximises the net benefit after considering alternative options and thereby satisfies section 9.16(b) of the Access Code.

#### **8.4 Recommendation**

Western Power requests that the ERA determines that the proposed major augmentation under Option 3, at a total estimated real cost of \$85.56 million, satisfies the regulatory test as set out in the Access Code.