

# Independent Expert Report

Independent assessment of ASX's Assurance Program for its Implementation of the CHESSE Replacement Project

Fourth Six Monthly Progress Report

31 December 2023

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# 1. Executive Summary

## Introduction

ASX is undertaking a project to replace its Clearing House Electronic Subregister System (CHES) with a new technology solution (CHES Replacement Project). CHES is used by ASX as a core system to perform clearing, settlement and other post-trade services for the Australian equity market.

ASX has developed an Assurance Program in connection with the CHES Replacement Project, with the purpose of providing confidence to internal and external stakeholders and assisting in ensuring that the project meets its objectives. In November 2021 ASIC imposed certain Licence Conditions on ASX Clear Pty Ltd and ASX Settlement Pty Ltd which included the appointment of an independent expert.

## Scope

In accordance with the relevant Licence Conditions, ASX, with ASIC's and the RBA's consent, engaged EY to assess ASX's Assurance Program for its implementation of the CHES Replacement Project and oversee the implementation of any remedial actions from the trade outage independent expert review recommendations which are relevant to the CHES Replacement Project.

This is our fifth independent expert report under the Licence Conditions and fourth six-monthly progress report.

The objective of this report is to provide an update on the status of the remedial actions from the 30 June 2023 Report and the progress of completed assurance activities in the period. This report also includes an update on the trade outage independent expert review recommendations relevant to the CHES Replacement Project. Refer to section 2.2 for scope details.

## Key events in the period

- Release of the Special Report and Audit Report Response to recommendations made in the CHES Program External Review. On 17 August 2023, ASX released the Special Report and the Audit Report in response to recommendations and findings identified in the CHES Replacement Program External Review Report (the External Review) published in November 2022.
- Establishment of the Cash Equities Clearing and Settlement Advisory Group (the 'Advisory Group'). The Advisory Group was convened in September 2023 and provided advice to the ASX Clear and ASX Settlement (CS) Boards ahead of ASX's announcement of the high-level solution design for CHES Replacement.
- Announcement of Product Based Solution for CHES Replacement. On 20 November 2023, ASX announced that it has completed its reassessment of the solution design to replace CHES and will proceed with a product-based solution to be delivered by a global technology provider.
- Independent assessment of the "Define and Plan" phase of the CHES Replacement Project. ASX engaged EY to independently assess the "Define and Plan" phase of the CHES Replacement Project. EY's report was released on 5 December 2023. EY concluded that ASX followed a robust and appropriate process to select a solution and supplier(s) for the delivery of their critical market infrastructure. EY's assessment found that the deliverables and processes aligned to ASX Frameworks, and were appropriate for the nature, scale and complexity of the CHES Replacement Project.

Considering that the reviews that had been planned under the Assurance Program for the previous iteration of the project were put on hold with the pause in the CHES Replacement Project, no assurance reviews have been completed since our last six-monthly report, aside from the independent assessment of the Define and Plan phase.

ASX will update the Assurance Program in consideration of the new solution design, delivery model, project milestones and timelines. Once formalised by ASX, we will perform a refreshed design assessment over the updated CHES Replacement Assurance Program.

#### Summary findings and recommendations

We found that ASX has satisfactorily closed each of the 8 findings in the period from prior reports and completed assurance reviews. Additionally, 9 findings were satisfactorily closed with no action as they relate to the previous CHES Replacement solution and therefore are no longer applicable. We have no further recommendations.

The closed findings in the period correspond to the following:

- 1 Partially Closed finding from our December 2022 report;
  - 2 Findings from completed assurance reviews;
  - 5 Findings from the trade outage Independent Expert review report;
  - 9 Findings related to the previous solution no longer preferred by ASX.
- 30 June 2023 Assessment Update – ASX closed one Partially Closed finding from our December 2022 report, which relates to the tracking of remedial actions managed by other teams and other projects. We found that ASX has improved the process designed to address the tracking and closure of remedial actions managed by other teams and other projects. We consider this finding closed.

- Assessment of the remedial actions from completed assurance reviews – ASX closed 2 findings since our 30 June report which are related to completed assurance reviews. We found that ASX actions were designed effectively and the artefacts captured to demonstrate closure were sufficient.
- Assessment of the remedial actions from the trade outage Independent Expert review recommendations – ASX closed 5 findings since our 30 June report related to remedial actions from the trade outage Independent Expert review recommendations. We found ASX actions have been designed effectively and the artefacts captured to demonstrate closure were sufficient.
- Assessment of the open findings with re-baselined due dates from completed assurance reviews – ASX re-baselined open findings and defects in the context of the “Define and Plan” phase of the CHES Replacement Project. We found ASX decisions were supported by sufficient artefacts and that these were adequately closed as no longer applicable.

#### Next steps

Our next report under the Licence Condition is due on 30 June 2024.

ASX is refreshing the design of the Assurance Program for the next phase of the CHES Replacement Project. We will assess the design of the updated Assurance Program to determine whether it is sufficiently robust for the nature, scale and complexity of the CHES Replacement Project (fit for purpose).

We will assess any update on the implementation of any remedial actions from the completed assurance activities, including any open recommendations in the “Define and Plan” report.

We acknowledge ASX for its cooperation in undertaking our independent assessment activities to date.

## 2. Introduction

### 2.1 Background

#### CHES Replacement Project

ASX is undertaking a project to replace its Clearing House Electronic Subregister System (CHES) with a new technology solution (CHES Replacement Project). CHES is used by ASX as a core system to perform clearing, settlement and other post-trade services for the Australian equity market.

#### Independent Assessment of the “Define and Plan” phase

ASX engaged EY to independently assess the “Define and Plan” phase of the CHES Replacement Project. The purpose of this review was to assess the “Define and Plan” phase of the project to assist the Boards for ASX Limited, ASX Clear and ASX Settlement in evaluating the process performed to select a solution and supplier(s) for the delivery of critical market infrastructure.

EY’s review of the “Define and Plan” phase commenced in February 2023 and a separate public report has been issued on 5 December 2023.

#### Release of the Special Report and Audit Report Response

On 17 August 2023, ASX released the Special Report in response to recommendations and findings identified in the CHES Replacement Program External Review Report (the External Review) published in November 2022. The Special Report details ASX’s response plan, including remediation actions and timelines. The Audit Report found that the ASX Special Report met the requirements of the relevant notices issued by ASIC on 21 February 2023, however, it included four recommendations to support the timely, quality delivery of the ASX response plan.

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#### Establishment of the Cash Equities Clearing and Settlement Advisory Group (the ‘Advisory Group’)

The Advisory Group was convened following ASIC’s industry roundtable held on 2 August 2023 and a joint letter from ASIC and the RBA on 29 August 2023 setting out regulatory expectations for the group (Letter of Expectations).

Independently chaired, the Advisory Group engaged in a discussion in relation to ASX Clear and ASX Settlement’s cash equities clearing and settlement strategy, the CHES replacement project objectives and functional scope, and the role of the solution integrator. The role of the Advisory Group as a stakeholder forum is to provide input to the CS Boards on strategic matters related to cash equities clearing and settlement services and associated infrastructure and will meet at least quarterly.

The Advisory Group also provided advice to the CS Boards and communicated that it considers the CS Boards are in a position to proceed with their decision-making on the high-level solution design for CHES Replacement. The advice noted that the Advisory Group had considered the product-based solution, the preferred vendor and product, the appointment of solution integrator and the staged implementation approach.

#### CHES Replacement Project Announcement

On 20 November 2023, ASX announced that it has completed its reassessment of the solution design to replace CHES and will proceed with a product-based solution to be delivered by a global technology provider. The CHES Replacement Project will now move to the next phase of detailed design and implementation, with further stakeholder consultation to commence in the first quarter of 2024. ASX proposed to implement the new platform in two main releases, with the clearing

service to be delivered in a first release, and the settlement and sub-register services to follow in a second release.

The indicative timeframe for implementation of the first release (the clearing service) is 2026, and the scenarios being considered for the second release (the settlement and sub-register services) estimate implementation in 2028 or 2029. The delivery timeframes are subject to a number of factors including stakeholder consultation and detailed planning.

Given the scale and complexity of the CHES replacement project, ASX has entered into an agreement with an external party to support ASX's project delivery in the role of solution integrator. The external party will provide additional capability and capacity in technology project delivery and industry expertise.

Stakeholder input has been key to the decision announced on 20 November 2023, including input from the CHES Replacement Technical Committee, the ASX Business Committee and the Cash Equities Clearing and Settlement Advisory Group (Advisory Group). The next formal consultation with stakeholders will commence in the first quarter of 2024 and will cover the high-level project plan and an indicative timeline for the releases, including the design, scope and timing for each of the releases.

### CHES Replacement Project Assurance Program

Considering the announcement of the product-based solution for CHES Replacement on 20 November 2023, and the issuance of the independent review of the "Define and Plan" phase on 5 December 2023, ASX will refresh the Assurance Program with updated areas of focus and timelines for assurance reviews over the CHES Replacement Project.

### ASX Clear and ASX Settlement Licence conditions

As a related matter, in November 2020 an outage occurred following a major upgrade to ASX's equity trading platform (ASX Trade), called the ASX Trade Refresh project. Consequently, the Australian Securities and Investments Commission (ASIC) and the Reserve Bank of Australia (RBA) required an independent expert review of the ASX Trade Refresh project to be completed. The independent expert made recommendations in seven key categories from this review: risk, governance, delivery, requirements, vendor management, testing and incident management (collectively the trade outage independent expert review recommendations).

The combination of the trade outage and the criticality of the CHES Replacement Project has led ASIC (as delegate for the Minister) to impose certain Licence Conditions on ASX Clear and ASX Settlement. Australian CS Facility Licence (ASX Clear Pty Limited) Additional Conditions Notice 2021 (No.1) dated 24 November 2021 and Australian CS Facility Licence (ASX Settlement Pty Limited) Additional Conditions Notice 2021 (No.1) dated 24 November 2021, condition 2 on Schedule 1 "Appointment of an independent expert" required ASX to engage an independent third party (independent expert) to conduct an assessment of its existing Assurance Program on its CHES Replacement Project prior to Go-Live and oversee the implementation of any remedial actions from the trade outage independent expert review recommendations which are relevant to the CHES Replacement Project. ASX subsequently appointed EY as the independent expert on 21 December 2021.

## 2.2 Scope

EY has been engaged to deliver the following scope of work:

1. In accordance with the relevant Licence Conditions, EY will assess ASX's Assurance Program for its implementation of the CHES Replacement Project and oversee the implementation of any remedial actions from the trade outage independent expert review recommendations which are relevant to the CHES Replacement Project.

2. In addition to the Licence Conditions, ASIC has required a Pre Go-Live Confirmation from EY as to our opinion with respect to:
  - a. The Assurance Program meeting its objectives of:
    - i. The successful replacement of CHESSE with a system that meets ASX's functional and non-functional requirements, and
    - ii. Promoting confidence to internal and external stakeholders
  - b. The adequacy of ASX's governance framework for testing, and
  - c. The design adequacy of the CHESSE Replacement Project's 'Go-Live' decision framework (which incorporates both the business decision to implement the new system and implementation activity decision checkpoints over the cut-over weekend) and whether the decision framework has been followed.

Our engagement will deliver the following reports as required by the Licence Conditions and the Pre Go-Live Confirmation:

- ▶ Design Report that was published on 28 February 2022 included an assessment whether the existing Assurance Program was sufficiently robust for the nature, scale and complexity of the CHESSE Replacement Project, identifying any topics that required further independent assessment and any remedial actions.
- ▶ Six Monthly Progress Reports, providing a status update of existing remedial actions and identifying any further remedial actions, and updating on implementation of any remedial actions from the trade outage independent expert review.
- ▶ Pre Go-Live report, which will set out the status of any remedial actions and whether they are necessary to be undertaken prior to Go-Live and an update on findings of the totality of the Assurance Program reviews indicating whether the remedial actions from the

Design Report and Six-Monthly Progress Reports and the relevant trade outage independent expert review recommendations have been appropriately implemented by ASX.

- ▶ Pre Go-Live Confirmation requested by ASIC in addition to the Licence Condition.
- ▶ Two Post-Implementation Reviews (PIR).

This document refers to the fourth Six Monthly Progress Report per the agreed scope of work.

#### Scope of activities included in this Progress Report

The objective of this Six-Monthly Progress Report is to assess the activities completed within the period by the CHESSE Replacement Assurance Program:

- ▶ 30 June 2023 Assessment Update. Evaluate the status of the remediation actions associated with the findings raised in the previous six-monthly Progress Report and the effectiveness of the change management and governance process of the Assurance Program.
- ▶ Assessment of the findings from the completed assurance reviews. Evaluate the status on the implementation of remedial actions arising from completed reviews and assess the adequacy of the validation process undertaken over the closure of those actions.
- ▶ Assessment of the remedial actions from the trade outage Independent Expert review recommendations. Evaluate the status on the implementation of any remedial actions from the trade outage Independent Expert review recommendations which are relevant to the CHESSE Replacement Project.
- ▶ Assessment of the re-baseline of due dates for the findings from completed assurance reviews. Evaluate the rationale and approvals

for the due dates that have been re-baselined in the context of the “Define and Plan” phase of the CHES Replacement Project.

Scope of activities of EY’s review of the “Define and Plan” phase (reported in a separate public report on 5 December 2023)

ASX engaged EY to independently assess the “Define and Plan” phase of the CHES Replacement Project. As agreed with ASX and the regulators, the purpose of this review was to assess whether ASX adopted and followed an appropriate and robust process for selecting a solution and supplier(s) for the delivery of CHES replacement.

The review included the following five key objectives:

1. Define and Plan phase review: evaluate deliverability of the schedule for the “Define and Plan” phase, and whether the breadth of activities is adequate for the nature and expected outcomes of the phase.
2. Robustness of assessment and selection process: evaluate and provide risks, issues and findings regarding the assessment and selection activities and the adherence to an agreed process related to the:
  - a. evaluation of solution options
  - b. assessment and selection of any potential product/solution vendor
  - c. assessment and selection of a solution integration (SI) partner.
3. Deliverables review: conduct a quality review of key inputs and outputs aligned to item 2 above, and other key deliverables aligned to the scope of the review, including the business case.
4. Deliverability review: review project management and governance processes for successful delivery, with

consideration to the complexity profile, capability and maturity for the proposed solution and proposed delivery model.

The review of governance processes will include reviewing the effectiveness of the strategy, plans and processes in place for engaging with industry stakeholders via the CHES Replacement Technical Committee.

5. Review the implementation of project specific actions due in the “Define and Plan” phase which relate to the CHES Replacement External Review (CHES Replacement Application Delivery Review) commissioned by ASX in August 2022 and completed in November 2022.

According to the scope agreed with ASX and regulators, a public report with findings and recommendations was issued on 5 December 2023 for the results of the “Define and Plan” phase. Overall, EY has concluded that ASX followed a robust and appropriate process to select a solution and supplier(s) for the delivery of their critical market infrastructure. EY’s assessment found that the deliverables and processes were aligned to ASX Frameworks, and were appropriate for the nature, scale and complexity of the CHES Replacement Project. A total of 48 risks were raised as part of the review, 46 of which had been subsequently mitigated. 2 risks with ‘Low’ residual ratings and 1 partially addressed recommendation relating to CHES Replacement Program External Review remain open.

We expect the CHES Replacement Assurance Program to oversee the tracking and remediation of the remaining open risks and partially addressed recommendation, and to validate that remediation activities taken by ASX are satisfactory to address the recommendations raised prior to ASX’s closure of the findings. Our future six-monthly reports will assess the closure of any open findings and recommendations included in the final report of the “Define and Plan” phase review.



## 2.3 Approach

In undertaking our assessment for the delivery of this report, our approach was tailored to the activities completed in this six-monthly period (1 July 2023 to 31 December 2023) and the following steps were performed:

1. *Documentation review:* Review and analysis of key governance meeting papers, meeting minutes and supporting documentation as well as evidence of closure for the findings that have been closed in this period. All documentation was provided to EY by ASX based on a documentation request. A list of documentation reviewed can be found in Appendix C.
2. *Assurance Program Governance meetings:* Meetings were held to understand the status and process of closure of the findings from the completed assurance activities including on-going governance and change management activities in relation to the Assurance Program. In addition, we attended as observers the monthly Program Assurance Forum (PAF) meetings held in this six-monthly period.

## 2.4 Limitations

We draw your attention to the limitations inherent in this report:

- ▶ Our work was not performed in accordance with generally accepted auditing, review, or other assurance standards in Australia and accordingly does not express any form of assurance. This report does not constitute legal opinion or advice. We have not conducted a review to detect fraud or illegal acts.
- ▶ Our work does not assume any responsibility for any third-party products, programs or services, their performance or compliance with your specifications or otherwise.

- ▶ Our work did not intend to identify, address, or correct any errors or defects in your computer systems, other devices, or components thereof ("Systems"), whether or not due to imprecise or ambiguous entry, storage, interpretation, or processing or reporting of data. We are not responsible for any defect or problem arising out of or related to data processing in any Systems in relation to the CHES Replacement Project and its Assurance Program.
- ▶ Our review of the closure of the remedial actions associated with the completed assurance reviews was limited to assessing the due diligence of the process undertaken through the review of the documentation provided by ASX as documented evidence to support the closure. Professional scepticism required that our review of issue closure process was based on the artefacts that supported the closure at the time, rather than present day interviews with those involved in historic closures. We did not evaluate the operational implementation and adequacy of the remedial actions.
- ▶ Our review was limited to documents requested by EY and provided by ASX as deemed relevant in line with the agreed scope and EY requests, with the expectation that ASX had those artefacts documented to satisfy its own governance arrangements and executive accountability needs.
- ▶ Our scope under the licence conditions requires us to oversee the implementation of any remedial actions from the trade outage Independent Expert review recommendations which are relevant to the CHES Replacement Project. For the purpose of our engagement, we define oversee as to observe, inspect and test that ASX has implemented the remedial actions. ASX are accountable and responsible for the implementation activities and EY will not act as management or direct the implementation.

## 2.5 Use and disclosure of our reports

We are providing specific advice only for this engagement and for no other purpose and we disclaim any responsibility for the use of our

advice for a different purpose or in a different context. If you plan to use this advice on another transaction or in another context, please let us know and provide us with all material information so that we can provide advice tailored to the appropriate circumstances.

Our Reports (including the EY Summary Reports) may be relied upon by ASX and ASX's regulators ASIC and the RBA in accordance with our engagement for this independent assessment. We understand that ASIC and the RBA, and ASX may issue a media release and/or a public report referring to or publishing the content of our Reports, and may make or issue our Reports or a summary of the content of our Reports. We will prepare a summary of our Reports (EY Summary Reports). We consent to ASIC and the RBA, and ASX publishing our Reports, EY Summary Reports and/or summaries of our Reports.

For the avoidance of doubt, no other party other than ASX, ASIC and the RBA may rely on the Reports. We disclaim all responsibility to any such other party for any loss or liability that the other party may suffer or incur arising from or relating to or in any way connected with the contents of our Reports, the provision of our Reports to the other party or the reliance upon our report by the other party.

### 3. Findings and Recommendations

Detailed below are the findings and recommendations from our 31 December 2023 Progress Report which includes our review and update on the 30 June 2023 Report and status update of existing remedial actions from the completed Assurance Reviews, the assessment of remedial actions from the trade outage Independent Expert review recommendations and the assessment of re-baseline of historic findings.

#### 3.1 30 June 2023 Assessment Update

The objective of this area is to evaluate the status of the remediation actions associated with the findings raised in the 30 June 2023 Report and the continued effectiveness of the change management and governance process of the Assurance Program.

##### Context

Our 31 December 2022 Report considered one finding as Partially Closed, which relates to the tracking of remedial actions managed by other teams and other projects. Our 30 June 2023 Report outlined that this finding would be re-examined after the solution option decision.

##### Findings

ASX's Program Assurance Forum (PAF) on 27 July 2023 agreed that this action was no longer required as the previous solution is no longer preferred and that the assignment and reporting of existing defect due dates would no longer be relevant. The practice would be adopted for reporting on defects from security reviews under the updated CHES Replacement Assurance Program for the delivery phase of the new solution.

We assessed the relevant artefacts, and we did not identify any significant findings on the closure of remediation activities in the period. We will re-examine the process for assigning and reporting defect due

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dates in our assessment of the new CHES Replacement Assurance Program.

#### 3.2 Assessment of completed assurance reviews

The objective of this area is to evaluate the status of the implementation of remedial actions and assess the adequacy of the validation process undertaken over the closure of the remedial actions arising from completed reviews. The assurance reviews completed were related to the previous iteration of the project, prior its pause in November 2022.

##### Context – Status and closure of remedial actions

The table below represents the status of existing remedial actions from the completed assurance reviews as of 21 November 2023.

| CHES Replacement Project tracking of findings  |    |
|--|----|
| Open findings from our 30 June 2023 report     | 27 |
| Findings closed during the period              | 8  |
| Re-baselined findings closed during the period | 9  |
| Total open findings at the date of this Report | 10 |

| Open findings                                  |    |
|--|----|
| Actions due end November 2023                  | 2  |
| Actions due end December 2023                  | 4  |
| Actions due to be reset end March 2024         | 4  |
| Total open findings at the date of this Report | 10 |

Refer to Appendix A for the detailed table outlining the status per assurance review.

We have independently assessed the process for the closure of management actions linked to the completed assurance activities through the review of relevant artefacts provided by ASX.

The project team closed 8 open findings from Assurance Program reviews and 9 re-baselined findings from reviews performed on the previous CHES Replacement solution since our June 2023 Report.

The details of the 8 open findings closed during the period are as follows:

- 1 Partially Closed finding from our December 2022 Report (refer to the Section 3.1 above);
- 5 Findings from the Trade Outage Review Recommendations (refer to Section 3.3 below);
- 2 Findings from the review of the Statement of Work related to the external CHES Replacement Application Delivery Review (addressed as part of final deliverables and review outcomes produced by the independent reviewer).

#### Findings - Status and closure of remedial actions

We assessed the relevant artefacts, and we did not identify any significant findings on the closure of remediation activities in the period. The findings related to the CHES Replacement Project have been closed on the basis that recommendations / actions have been designed effectively. Operating effectiveness will be assessed going forward as part of the updated Assurance Program for the next phases of the CHES Replacement.

We will re-examine the closed findings during our review of the new CHES Replacement Assurance Program to determine whether they are relevant to the new solution and whether the risks they pose are adequately addressed.

Further details on the 5 remedial actions from the trade outage Independent Expert review are included in Appendix B.

### 3.3 Assessment of the remedial actions from the trade outage Independent Expert review recommendations

The objective of this area is to evaluate the status on the implementation of any remedial actions from the trade outage Independent Expert review recommendations which are relevant to the CHES Replacement Project.

#### Context

In November 2020, ASX implemented a major upgrade to the Trade platform through the ASX Trade Refresh Project which resulted in a market outage.

As a result, an Independent Expert was commissioned by ASX to conduct a review of the ASX Trade Refresh Project. The Independent Expert report released in June 2021 provided 59 specific recommendations for improvement which ended up in 20 actionable items for the CHES Replacement Project.

#### Findings

Out of 20 actions, 16 actions have been closed by ASX. 5 actions were closed during this period and 4 are due to be further actioned over the following months.

Out of the 16 closed actions that were closed, 8 were evaluated during the 30 June 2022 report, 2 were assessed during the 31 December 2022 report, 1 was assessed during the 30 June 2023 report and 5 were assessed and closed in this period.

We will assess the status and closure of the 4 remaining actions in our future six-monthly progress reports. Refer to Appendix B for the status of these 20 items.

### 3.4 Assessment of the re-baseline of due dates for the findings from completed assurance reviews

The objective of this area is to evaluate the re-baseline of due dates for the findings from completed assurance reviews.

#### Context

Considering the announcement made in November 2022 to pause the CHES Replacement Project to revisit the solution design, the open findings from completed assurance reviews have been assessed and re-baselined. All open findings were reviewed in the context of the new project and the re-baseline approach and outcomes were approved by the CHES Replacement Program Assurance Forum.

#### Findings

We assessed the relevant artefacts and found that the re-baselining approach and outcomes have been properly documented and approved. No significant findings have been identified on the re-baselining approach.

Out of the 27 open findings from the 30 June 2023 report, 8 have been closed in this period, 10 remain open and will be assessed in future reports and 9 have been closed in the re-baselining process given that they are specific to the previous solution that is no longer preferred.

We assessed the relevant artefacts for the closure of the 9 findings and open defects from the Security reviews related to the previous solution, and we did not identify any significant findings on the closure of open findings and defects as part of the re-baselining process in the period.

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These findings and defects relating to the previous CHES Replacement solution were agreed to be closed, following agreement at key ASX governance forums for the CHES Replacement project to focus its further assessment on a product-based solution archetype as the preferred solution archetype.

Acknowledging that ASX has completed its reassessment of the solution design to replace CHES, we understand that a revised Assurance Program will be developed for the next phase.

## Appendix A Tracking of Assurance reviews by CHES Replacement Assurance Program (as at 21 November 2023)

| Ref | Review   | Comp. Date | Total findings                           | Closed findings | Open findings | Awaiting independent validation   | Closure due Feb | Closure due March | Closure due 1-3 months (Nov -Jan) | Closure due > 3 months (Feb on) |
|-----|--|------------|--|-----------------|---------------|---|-----------------|-------------------|-----------------------------------|---------------------------------|
| 1   | Project health check   | Nov-19     | 27                                       | 27              | 0             |   | -               | -                 | -                                 | -                               |
| 2   | Project Replan   | Sep-20     | 6  | 6               | 0             |   | -               | -                 | -                                 | -                               |
| 3   | Project health check   | May-21     | 7  | 7               | 0             |   | -               | -                 | -                                 | -                               |
| 4   | Trade Outage Review Recommendations - Self Assessment        | Oct-21     | 51                                       | 51              | 0             |   | -               | -                 | -                                 | -                               |
| 5   | Trade Outage Review Recommendations - Independent Assessment | Dec-21     | 20                                       | 16              | 4             | Transferred to new project  |                 |                   |                                   |                                 |
| 8   | Assurance Program Design                                     | Feb-22     | 3  | 3               | 0             |   | -               | -                 | -                                 | -                               |
| 9   | Assurance Program Design Update                              | Jun-22     | 4  | 4               | 0             |   | -               | -                 | -                                 | -                               |
| 10  | Assurance Program Design Update                              | Dec-22     | 11                                       | 7               | 4             | Transferred to new project  |                 |                   |                                   |                                 |
| 13  | Testing approach review (Note 1)                             | Apr-21     | NA                                       |                 |               |   | -               | -                 | -                                 | -                               |
| 17  | Security design review                                       | May-21     | 3  | 3               | 0             | Open findings and defects relating to the previous CHES Replacement solution were agreed to be closed, on the basis that the previous solution is no longer preferred |                 |                   |                                   |                                 |
| 18  | Security Test (Pre-ITE1)                                     | Mar-22     | Defects tracked separately               |                 |               |   |                 |                   |                                   |                                 |
| 19  | Security Assurance Review (ITE2)                             | Aug-22     | Defects tracked separately               |                 |               |   |                 |                   |                                   |                                 |
| 21  | Identity and Access Management                               | Jun-21     | External to Program - tracked separately |                 |               | Removed from ongoing monitoring under the CHES Replacement Assurance Program  |                 |                   |                                   |                                 |
| 22  | Identity and Access Management (ITE2) (Note 2)               | Jun-22     | NA                                       |                 |               |   |                 |                   |                                   |                                 |
| 23  | Technology controls review                                   | Sep-21     | 19                                       | 19              | 0             |   | -               | -                 | -                                 | -                               |
| 27  | Operations controls review                                   | Sep-21     | inc above                                | inc above       | inc above     |   | inc above       | inc above         | inc above                         | inc above                       |
| 38  | Data Migration Review  | Dec-21     | 9  | 7               | 2             | Transferred to new project  |                 |                   |                                   |                                 |
| 41  | Security Design Review                                       | Oct-22     | 6  | 6               | 0             | Open findings and defects relating to the previous CHES Replacement solution were agreed to be closed, on the basis that the previous solution is no longer preferred |                 |                   |                                   |                                 |
|     | Total  |            | 166                                      | 156             | 10            |   |                 |                   |                                   |                                 |

1. Not a formal review but involved third-party resources working with ASX to advise and update the test approach.
2. Review was external to the CHES Replacement Project. Review not specific to the CHES Replacement system.

ASX Limited

Independent assessment of ASX's Assurance Program for its Implementation of the CHES Replacement Project

Fourth Six Monthly Progress Report

## Appendix B Trade outage independent expert review recommendations

The table below outlines the status of the 20 management actions associated with the findings described in the November 2021 Trade Outage Recommendations Report relevant to the CHES Replacement. Currently there are 16 findings assessed as closed and 4 open findings that will be assessed in future progress reports.

| Independent Expert Recommendation Reference | Status for CHES Replacement (as at 21 November 2023) | EY Assessment Result   |
|---|--|--|
| 1.1.1                                       | Closed   | Closed. Evaluated as part of the 30 June 2022 Progress Report.   |
| 1.3.4                                       | Closed   | Closed. Evaluated as part of the 30 June 2022 Progress Report.   |
| 1.3.6                                       | Closed   | Closed. Evaluated as part of the 31 December 2022 Progress Report.   |
| 1.4.1                                       | Closed   | Closed. Evaluated as part of the 30 June 2022 Progress Report.   |
| 3.1.1                                       | Closed   | Closed. Evaluated as part of the 30 June 2022 Progress Report.   |
| 3.1.2                                       | Closed   | Closed. Evaluated as part of the 30 June 2022 Progress Report.   |
| 3.2.1                                       | Closed   | Closed. Evaluated as part of the 30 June 2022 Progress Report.   |
| 3.2.7                                       | Closed   | Closed. Evaluated as part of the 31 December 2022 Progress Report.   |
| 4.1.1                                       | Closed   | Closed. Evaluated as part of the 30 June 2023 Progress Report.   |
| 5.1.1                                       | Open   | N/A. To be reviewed in future progress reports   |
| 5.1.2                                       | Closed   | Closed. Evaluated as part of the 30 June 2022 Progress Report  |
| 6.2.1                                       | Closed   | Closed. Evidence has been provided to demonstrate that the Test Strategy developed for the new CHES Replacement project included the approach for Production-like testing (using production-like data) and Performance testing. It also outlined where Exploratory Testing will be performed, along with all other test types for the best approach to mitigate risk and inclusion in the project test strategy and approach. Finding has been closed on the basis that actions have been designed effectively. Operating effectiveness will be assessed going forward as part of the updated Assurance Program for the next phases of the CHES Replacement. |
| 6.3.2                                       | Closed   | Closed. Evidence has been provided to demonstrate that the Test Strategy developed for the new CHES Replacement project included a testing approach that is aligned to a risk-based model. Finding has been closed on the basis that actions have been designed effectively. Operating effectiveness will be assessed going forward as part of the updated Assurance Program for the next phases of the CHES Replacement.  |
| 6.4.3                                       | Open   | N/A. To be reviewed in future progress reports.  |
| 6.4.4                                       | Closed   | Closed. Evidence has been provided to demonstrate that the Test Strategy developed for the new CHES Replacement project included the approach for IT Disaster Recovery and Business Continuity testing as part of the NFT Stream. Finding has been closed on the basis that actions have been designed effectively. Operating effectiveness will be  |

| Independent Expert Recommendation Reference | Status for CHES Replacement (as at 21 November 2023) | EY Assessment Result   |
|---|--|--|
|   |  | assessed going forward as part of the updated Assurance Program for the next phases of the CHES Replacement.   |
| 6.4.6                                       | Open   | N/A. To be reviewed in future progress reports.  |
| 6.5.1                                       | Closed   | Closed. Evaluated as part of the 30 June 2022 Progress Report.   |
| 6.5.3                                       | Closed   | Closed. Evidence has been provided to demonstrate that the Test Strategy developed for the new CHES Replacement project included the approach to identify, review, agree and track test coverage across all test levels and that QE&T standards are being followed. Finding has been closed on the basis that actions have been designed effectively. Operating effectiveness will be assessed going forward as part of the updated Assurance Program for the next phases of the CHES Replacement. |
| 6.5.4                                       | Closed   | Closed. Evidence has been provided to demonstrate that the Test Strategy developed for the new CHES Replacement project included the approach for reporting quality sentiment (eQSI). Finding has been closed on the basis that actions have been designed effectively. Operating effectiveness will be assessed going forward as part of the updated Assurance Program for the next phases of the CHES Replacement.   |
| 7.1.1                                       | Open   | N/A. To be reviewed in future progress reports.  |



Appendix C Documents reviewed





## Appendix D Release Notice

Ernst & Young ("EY") was engaged on the instructions of ASX Operations Pty Ltd ("ASX", "Client" or "you") to conduct an Independent Assessment of the CHES Replacement Assurance Program ("Project"), in accordance with the engagement agreement dated 8 December 2023 including the General Terms and Conditions ("the Engagement Agreement").

The results of EY's work, including the assumptions and qualifications made in preparing the report, are set out in EY's report dated 20 December 2023 ("Report"). ASX and ASX's regulators ASIC and the RBA, should read the Report in its entirety including any disclaimers and attachments. A reference to the Report includes any part of the Report. No further work has been undertaken by EY since the date of the Report to update it.

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