

C1. Financial Stability Standards for Central Counterparties

The Financial Stability Standards for Central Counterparties (CCP Standards) are made up of 21 headline standards, each of which is accompanied by a number of more detailed sub-standards. In assessing whether a facility has met each of the CCP Standards, the Reserve Bank takes into account associated guidance.¹

The following provides details of how ASX Clear and ASX Clear (Futures) observe each of the CCP Standards (including sub-standards). It also sets out the Bank’s assessment of how well ASX Clear and ASX Clear (Futures) complied with each of the CCP Standards as at 30 June.²

Standard 1: Legal basis

A central counterparty should have a well-founded, clear, transparent and enforceable legal basis for each material aspect of its activities in all relevant jurisdictions.

ASX Clear	ASX Clear (Futures)
Observed	Observed

1.1 A central counterparty should be a legal entity which is separate from other entities that may expose it to risks unrelated to those arising from its function as a central counterparty.

ASX Clear and ASX Clear (Futures) are wholly owned subsidiaries of ASX Clearing Corporation Limited (ASXCC), which is itself a wholly owned subsidiary of ASX Limited. As separate legal entities, each of the ASX central counterparties’ (CCPs’) central clearing activities are separate from the activities conducted by each of the other ASX clearing and settlement (CS) facilities and the rest of the ASX Group, notwithstanding the sharing of operational resources across multiple entities within the group.

ASX Clear’s services are limited to CCP clearing of ASX-quoted cash securities and derivatives transactions executed on the ASX markets, as well as ASX- and non-ASX-quoted cash market securities transacted on Approved Market Operator (AMO) platforms under the Trade Acceptance Service (TAS), in accordance with the ASX Clear Operating Rules and Procedures. Accordingly, ASX Clear does not provide any services that have a distinct profile from, or pose additional risks to, its activity of operating a CCP.

ASX Clear (Futures)’ services are limited to CCP clearing of futures and options products that are traded on the ASX 24 market and certain over-the-counter (OTC) derivatives, in accordance with the ASX Clear (Futures) Operating Rules and Procedures, the OTC Rules and the OTC Handbook. Accordingly, ASX Clear (Futures) does not provide any services that have a distinct profile from, or pose additional risks to, its activity of operating a CCP.

1 The standards and guidance are available at <<https://www.rba.gov.au/payments-and-infrastructure/financial-market-infrastructure/clearing-and-settlement-facilities/standards/central-counterparties/2012/>>.

2 For an explanation of the Bank’s Assessment approach and the ratings scale used, see the introduction to Appendix C.

1.2 The legal basis should provide a high degree of certainty for each material aspect of a central counterparty's activities in all relevant jurisdictions.

Legal basis

ASX Clear and ASX Clear (Futures) novate and net transactions submitted for clearing by their respective participants. These activities require a high degree of legal certainty. Key components of the legal framework under which the CCPs operate are listed below:

- The ASX CCPs each hold a CS facility licence under Part 7.3 of the Corporations Act. These licences are administered by the Australian Securities and Investments Commission (ASIC) in consultation with the Bank. The Minister acts as ultimate decision-maker on licensing matters, although this responsibility has been delegated to authorised ASIC officers since April 2016.³
- The ASX CCPs have defined Operating Rules and Procedures. Under section 822B of the Corporations Act, these Rules have effect as a contract under seal between: the relevant ASX CCP and each of its respective participants; each participant and each other participant; and each participant and each issuer. The Operating Rules and Procedures set out the rights and obligations of participants and the relevant CCP, including in the event of default or suspension.
- ASX Clear and ASX Clear (Futures) are approved as 'netting markets' under Part 5 of the *Payment Systems and Netting Act 1998* (PSNA), which provides certain legal protections (see CCP Standard 1.5).

While both CCPs are recognised in the EU and ASX Clear (Futures) is exempt from registration in the US, the Operating Rules of both CCPs are governed by Australian law.⁴ ASX has not identified any legal risks arising from the CCPs' recognition or exemption in other jurisdictions. The legal basis of the ASX CCPs' activities is reviewed by ASX Legal whenever it judges that there are material amendments to the Operating Rules or Procedures.

Rights and interests

The rights and interests of each CCP, its participants and, where relevant, its participants' customers in cleared positions and collateral are defined in their respective Operating Rules and Procedures. ASX Clear (Futures) has further established the OTC Rules and Handbook, which sets out the rights and interests associated with participation in its OTC derivatives clearing service.

The capacity to deal with cash or non-cash collateral held by the ASX CCPs in circumstances of a participant default is an important risk protection. The Operating Rules of each CCP provide the CCPs with the right to deal with collateral of a participant in default to address losses or costs, or to meet other obligations arising from the default management process. Part 5 of the PSNA provides certain legal protections to the enforcement of security interests held by the CCPs in the event of a participant default (see also CCP Standard 1.5).

3 While the Minister has delegated responsibility for certain decisions under Chapter 7 of the Corporations Act to authorised ASIC officers, the Minister may still exercise the powers delegated by 'calling up' the matter.

4 ASX Clear (Futures) has been recognised as a third-country CCP by the European Securities and Markets Authority (ESMA) and has been exempted from registration as a Derivatives Clearing Organisation (DCO) by the Commodity Futures Trading Commission (CFTC) in the US. ASX Clear has been recognised as a third-country CCP by ESMA.

1.3 A central counterparty should have rules, procedures and contracts that are clear, understandable and consistent with relevant laws and regulations.

Section 822A of the Corporations Act establishes a framework to prescribe the matters that must be dealt with in the Operating Rules and those that may instead be considered under the Procedures. Operating rule changes are subject to a Ministerial disallowance process, although the Minister's role in this process is delegated to authorised ASIC officers. The Corporations Act also establishes how any inconsistency between the licensed facility's rules and applicable laws and regulations (in particular, derivative transaction rules and derivative trade repository rules) would be resolved.

The rules and procedures of each CCP are published on the ASX public website and the Customer Portal, ASX's restricted participant website. These documents are supplemented with explanatory material to support participants' (and prospective participants') understanding of the risks they face through participation in the system. In addition to the Operating Rules and Procedures, publicly available material includes high-level descriptions of the ASX CCPs' risk management framework, the Cash Market Margining (CMM) and CME Standard Portfolio Analysis of Risk (SPAN) margining methodologies, business continuity arrangements and the CCPs' DMRF. Participants have access to additional manuals, reports and explanatory notes covering such topics as the application process for new participants, compliance, technical and operational details, counterparty risk assessment, and fees.

There is a clear process for changing the ASX CCPs' Operating Rules and Procedures. In practice, proposed Operating Rule changes are submitted informally to ASIC. In consultation with the Bank, ASIC considers the changes and advises ASX of any regulatory concerns. Once such concerns are satisfactorily addressed, ASIC invites formal submission of the proposed Operating Rule changes, which triggers a 28-day disallowance period (referred to above), during which the Minister may choose to disallow the Operating Rule changes. The Minister or delegate must consider a number of factors when deciding whether to disallow Operating Rule changes, including whether the proposed changes are consistent with the public interest.⁵ In addition, the Minister or delegate must ensure that there has been adequate consultation with the Bank when deciding whether to disallow Operating Rule changes, and consider any advice and recommendations from the Bank and ASIC staff.⁶ If changes to the Operating Rules are not disallowed by the Minister or delegate, they are notified to participants via the ASX website.

1.4 A central counterparty should be able to articulate the legal basis for its activities to the Reserve Bank and other relevant authorities, participants and, where relevant, participants' customers, in a clear and understandable way.

The legal basis for the activities of the ASX CCPs and the protection of each facility as an approved netting market under the PSNA (see also CCP Standard 1.5) are in the Disclosure Framework document available on ASX's public website. This document sets out in detail how each CS facility meets the requirements of each Principle within the *Principles for Financial Market Infrastructures* (PFMI)

5 Section 827A of the Corporations Act sets out the matters the Minister must have regard to, available at <http://www.austlii.edu.au/au/legis/cth/consol_act/ca2001172/s827a.html>.

6 For more information see 'Guidelines for the Exercise of Powers Delegated to ASIC under Chapter 7 of the Corporations Act 2001', available at <<https://treasury.gov.au/publication/guidelines-for-the-exercise-of-powers-delegated-to-asic-2016/>>.

developed by Committee on Payments and Market Infrastructures (CPMI) and the International Organization of Securities Commissions (IOSCO) (see CCP Standard 20.5).⁷

On behalf of each licensed entity within the ASX Group, including all ASX CS facilities, ASX Limited submits an annual report to ASIC under section 792F of the Corporations Act that is shared with the Bank. This report sets out the extent to which each licensee has complied with its obligations under Chapter 7 of the Corporations Act.

The ASX CCPs may seek independent legal opinions on relevant legal matters relating to significant new services, including any implications that their introduction may have for the legal basis of existing functionality. These opinions may, in some circumstances, be shared with participants or other stakeholders for their information, particularly to demonstrate that new Operating Rules will have the intended legal effect.

1.5 A central counterparty should have rules, procedures and contracts that are enforceable in all relevant jurisdictions. There should be a high degree of certainty that actions taken by the central counterparty under such rules and procedures will not be voided, reversed or subject to stays, including in the event that the central counterparty enters into external administration or that one or more of its participants defaults or is suspended.

The respective rules and procedures of ASX Clear and ASX Clear (Futures) set out how each CCP assumes risk in relation to its participants, arrangements for netting offsetting exposures and obligations of participants, and the risk controls that apply in respect of participants' net exposures. Measures that contribute to ensuring a high degree of certainty in respect of the ASX CCPs' activities are detailed below. Measures in respect to settlement finality are not covered below, but are detailed in CCP Standard 8.2.

Assumption of risk

The ASX CCPs assume risk on cleared trades through the process of novation, whereby matched trades between participants are replaced by separate contracts between the buyer and the CCP, and the seller and the CCP. Through novation, the obligations of the ASX CCPs are to each participant as principal. Equally, participants' obligations are to the relevant ASX CCP for all transactions that have been novated. For individual client accounts in ASX Clear (Futures) the CCP also has a direct legal relationship with the client holding the account, but the clearing participant remains fully liable for any open positions associated with that account.

The point of novation is established by the relevant ASX CCP's Operating Rules:

- *ASX Clear.* For cash market securities, the ASX Clear Operating Rules specify that, in the normal course of business, a transaction executed on the ASX market or an AMO platform is novated with effect from the matching of a bid and offer (subject to notification to ASX Clear of the transaction).⁸ For exchange-traded and OTC equity derivatives, novation occurs in ASX Clear upon acceptance and registration of that transaction within the clearing system.

7 Available at <<http://www.asx.com.au/documents/asx-compliance/pfmi-disclosure-framework.pdf>>. Before 1 September 2014, CPMI was known as the Committee on Payment and Settlement Systems (CPSS).

8 During the September 2016 ASX Trade disruption, certain transactions were not fully processed and trade information was not properly generated. Consequently, CHESSE did not receive notification of the trades and therefore they were not novated. In light of the September 2016 ASX Trade outage, ASX has initiated a review of the point of novation during a trading system outage.

- *ASX Clear (Futures)*. For exchange-traded derivatives in ASX Clear (Futures), the CCP's Operating Rules specify that a transaction on the ASX 24 market is novated upon the recording of a matched trade by the market, which occurs in ASX 24's trading system. Non-market trades are novated once their details have been approved and registered by ASX Clear (Futures). Acceptance rules for registration of OTC derivatives trades are set out in the OTC Rules. Requirements include, for example, that the OTC transaction has been submitted in accordance with procedures and eligibility criteria in the OTC Handbook, that participants are authorised and not in default, and that the transaction passes limit checks. If an OTC transaction satisfies the requirements and is accepted by ASX Clear (Futures) for registration, the transaction is novated with effect from the time at which the transaction details were received by ASX Clear (Futures).

Part 5 of the PSNA provides certain legal protections to the effectiveness of the process of novation outlined in the ASX Clear and ASX Clear (Futures) Operating Rules, by virtue of the ASX CCPs' status as approved netting markets.

Netting

Part 5 of the PSNA also provides certain legal protections to several aspects of the netting of exposures and payments entered into in accordance with the ASX Clear and ASX Clear (Futures) Operating Rules:

- the process of reducing each participant's contracts to a net exposure (reflecting the relevant CCP's exposure to the participant's portfolio of contracts)
- The relevant CCP's rules covering default, such that future exposures may be terminated and a net payout obligation calculated
- payments made on a net basis, by protecting against the voiding of net payments in the event of insolvency of a participant.

Enforceability of rules under external administration or recovery

The enforceability of the ASX CCPs' rules in circumstances when a participant has entered external administration is provided certain legal protections by Part 5 of the PSNA. The definition of external administration in Part 5 of the PSNA includes resolution measures for bank and non-bank financial institutions. These protections help ensure that the ASX CCPs can enforce key rights under their Operating Rules (including netting or termination of obligations and enforcement of security) in relation to a participant in external administration, despite any provision of insolvency law that might otherwise interfere with such rights.

ASX has identified no material legal risk to the enforceability of the ASX CCPs' respective Operating Rules upon a CCP's entry into external administration. The ASX CCPs' rules give participants the right to close out future obligations (i.e. terminate novated contracts) in the event that the relevant CCP defaulted on its obligations as established by the rules. The rules do not interfere with the ASX CCPs' existing liquidity management arrangements. The continued appropriateness of these close-out netting rights will need to be assessed in light of future developments in financial market infrastructure (FMI) resolution.

ASX has carried out analysis on the legal basis of tools available under each of the ASX CCPs' recovery plans (see CCP Standards 3.5, 4.8, 7.9 and 14.3). This analysis has not identified any material legal risk to enforceability of these tools or the application of protections under Part 5 of the PSNA to payment haircutting, termination powers, offsetting transaction arrangements (OTAs) or the allocation of investment losses.

1.6 A central counterparty conducting business in multiple jurisdictions should identify and mitigate the risks arising from any potential conflicts of law across jurisdictions. A central counterparty should provide the Reserve Bank with a legal opinion that demonstrates the enforceability of its rules and addresses relevant conflicts of law across the jurisdictions in which it operates. This should be reviewed on a periodic basis or when material changes occur that may have an impact on the opinion, and updated where appropriate.

Participants of ASX Clear and ASX Clear (Futures) include Australian-based subsidiaries and branches of entities that are domiciled in foreign countries (including Canada, France, Germany, Hong Kong, Switzerland, United Kingdom and United States); in addition, one ASX Clear (Futures) participant clears remotely from the United Kingdom. For both CCPs, however, their respective operating rules are governed by Australian law and require that all participants submit to the jurisdiction of New South Wales courts.

ASX Legal’s analysis of potential conflicts of law across jurisdictions has identified no material legal risks.

Standard 2: Governance

A central counterparty should have governance arrangements that are clear and transparent, promote the safety of the central counterparty, and support the stability of the broader financial system, other relevant public interest considerations, and the objectives of relevant stakeholders.

ASX Clear	ASX Clear (Futures)
Broadly observed	Broadly observed

2.1 A central counterparty should have objectives that place a high priority on the safety of the central counterparty and explicitly support the stability of the financial system and other relevant public interest considerations.

The high-level objectives of the ASX CCPs are set out in the CS Boards’ Charter, which is available on the ASX public website. The objectives prioritise the boards’ responsibilities in the area of risk management and, in particular, the ASX CCPs’ responsibility for complying with relevant financial stability standards (FSS).

The ASX CCPs’ objectives recognise the public interest. These objectives are reflected in the ASX Limited Board Charter, which provides that the Board has a responsibility to oversee the conduct of the ASX Group consistent with licence obligations, as well as public policy objectives directed at financial market and payments system integrity. The CS Boards’ Charter also specifically acknowledges the boards’ public interest responsibilities, as well as the CCPs’ obligations under Part 7.3 of the Corporations Act. These include that the ASX CCPs, to the extent that it is reasonably practicable to do so, comply with relevant FSS and do all other things necessary to reduce systemic risk arising from their services, and that they provide their services in a fair and effective way. The CS Boards’ Charter also notes that ASX’s Cash Equities Clearing and Settlement Code of Practice reflects its commitment

to comply with the *Regulatory Expectations for the Conduct of Cash Equity Clearing and Settlement Services in Australia*.⁹

To support the interests of its customers, ASX maintains a customer charter, which is referenced in the CS Boards' Charter and is available on the ASX public website.¹⁰ The ASX customer charter establishes commitments that ASX: works with its customers to deliver products and services that meet their needs and provide them with choice; makes its products and services available on a non-discriminatory basis and on reasonable commercial terms; and manages its businesses and operations on a commercial basis to benefit its customers and provide appropriate returns to ASX shareholders. The ASX customer charter recognises ASX's role as a provider of critical infrastructure to the Australian financial markets and commits to make the necessary investments to ensure it can fulfil this role and provide confidence to market participants, investors and regulators.

The ASX CCPs' governance arrangements allow for appropriate consideration of stakeholder views. When considering new services or major operational or risk management changes, ASX uses stakeholder forums and other formal and informal consultation processes to communicate proposed changes to relevant stakeholders (see CCP Standard 2.8). Consultations and non-confidential responses to consultations are made available on the ASX public website. In addition, the ASX Group has disclosure obligations under the Corporations Act and Listing Rules, which it manages in accordance with those laws and rules.

2.2 A central counterparty should have documented governance arrangements that provide clear and direct lines of responsibility and accountability. These arrangements should be disclosed to owners, the Reserve Bank and other relevant authorities, participants and, at a more general level, the public.

The governance arrangements of ASX Clear and ASX Clear (Futures) are documented on the ASX public website. This documentation includes the charters of the ASX Limited Board, the CS Boards (which include the ASX Clear Board and the ASX Clear (Futures) Board), and board committees. The charters provide information about the role and composition of the CS Boards and board committees. The CS Boards are responsible for the oversight and risk management of the ASX CS facilities (see CCP Standard 2.3). The board committees advise the ASX Limited Board on a number of matters:

- The Audit and Risk Committee is responsible for the oversight of ASX Group enterprise-wide risk. The committee monitors ASX's financial management, internal controls, audit function and legal compliance, and assists the CS Boards in fulfilling their responsibility for the oversight of risk management of the ASX CS facilities.
- The Remuneration Committee oversees the remuneration and incentive framework for the Managing Director and Chief Executive Officer (CEO), non-executive directors, senior executives, and ASX staff more generally (see CCP Standard 2.5).
- The Nomination Committee is responsible for reviewing matters relating to board composition and performance, succession planning, and training for non-executive board members (see CCP Standard 2.4).

9 These are set out in the Council of Financial Regulators' *Regulatory Expectations for the Conduct of Cash Equity Clearing and Settlement Services in Australia*, available at <<https://www.cfr.gov.au/publications/cfr-publications/2016/regulatory-expectations-policy-statement/>>.

10 The CS Boards' Charter is available at <<https://www.asx.com.au/documents/about/CS-Board-Charter.pdf>>.

The charters also provide information about the key senior managers of the CCPs, including the Managing Director and CEO, and the Chief Risk Officer (CRO). Profiles of CS facility directors are also publicly available online. Key governance policies and charters are reviewed regularly by the relevant boards and committees. Each of the charters of ASX Limited and the CS Boards are reviewed and approved by the respective board on an annual basis.

The ASX Limited Annual Report provides information about ASX Group's risk management arrangements, including the roles of boards, key committees, key subsidiary boards (including the CS Boards), and the roles of Group Executives who report directly to the Managing Director and CEO. Explanatory documentation on the ASX website also describes: the FSS and the Principles; group and business structure, including biographies of Group Executives; and risk management policies (in summary form). ASX's response to the CPMI-IOSCO Disclosure Framework also summarises key governance and risk management arrangements (see CCP Standard 20.5).

Under the Corporations Act, ASX must notify ASIC as soon as practicable after a person becomes or ceases to be a director, secretary or senior manager of the ASX CCPs, including when a person changes from one of those positions to another. Changes to these positions and senior risk management personnel are also notified to the Bank.

During the assessment period, an independent external review of ASX's technology governance, operational risk and control frameworks identified that ASX's three lines of defence model for risk management, in particular the risk management and compliance functions for operations and technology, had been under-resourced and lacked clarity regarding roles and responsibilities for risk activities across the organisation. ASX has commenced work to strengthen its three lines of defence model in these areas (see section 3.2).

2.3 The roles and responsibilities of a central counterparty's board of directors (or equivalent) should be clearly specified, and there should be documented procedures for its functioning, including procedures to identify, address and manage member conflicts of interest. The board should regularly review both its overall performance and the performance of its individual board members.

Ultimate responsibility for the oversight of risks faced by ASX Clear and ASX Clear (Futures) lies with the ASX Limited Board and each CCP's respective board. The ASX Limited Board is accountable for the overall management of the ASX Group. Its responsibilities include:

- reviewing the Group's corporate strategy and approving major initiatives
- overseeing and monitoring the ASX Group's performance consistent with its strategic goals, licence obligations and public policy objectives
- reviewing and approving financial plans, and monitoring financial performance
- appointing and assessing the performance of the Managing Director and CEO
- overseeing the risk management, internal control and compliance functions, including the implementation of ASX's enterprise risk management policy
- ensuring that appropriate mechanisms are in place for identifying, controlling, monitoring and reporting significant risks
- reporting to, and communicating with, shareholders.

The ASX Limited Board Charter describes the responsibilities of the CS boards. The CS Boards provide oversight of the clearing and settlement operations of the CS subsidiaries, including the management of clearing risk. The CS Boards are responsible for (among other matters) overseeing the adequacy of management, systems and processes, and culture to achieve ongoing compliance with the FSS. The CS Boards' Charter elaborates on the roles and responsibilities of the ASX Clear and ASX Clear (Futures) boards. The CS Boards' Charter places requirements on the structure of the CS Boards, including that the majority of directors and the Chair be independent. The ASX Clear and ASX Clear (Futures) boards (the Clearing Boards) meet regularly and receive detailed reports on each CCP's business and operations, risk management and financial performance. During the assessment period, the ASX Clear Board and the ASX Clear (Futures) Board each had eight formal meetings. In addition, the directors of ASX Clear that are not also directors of ASX Limited met six times to consider conflict-sensitive matters.

Board performance is reviewed periodically by the relevant board. The process may be facilitated by external independent consultants. A number of tools may be used, including skills matrices and surveys, and externally facilitated group discussions. Details of board performance reviews are set out in the ASX Limited Annual Report (the same process applies for the key subsidiary boards).

The CS Boards' Charter sets out how the boards address directors' interests and potential conflicts. Directors of the CS Boards must disclose all material personal interests (such as shareholdings, directorships and consultancy arrangements) which may potentially conflict with their duties. If there is a change in a director's material personal interests, the director must notify that change at the next meeting of the CS Boards. If there is a real possibility of a material conflict of interest and duty on a matter being voted on at a meeting of the CS Boards, the director must not be present for the discussion or vote related to that matter.

2.4 The board should comprise suitable members with the appropriate skills and incentives to fulfil its multiple roles. This typically requires the inclusion of non-executive board member(s).

At the end of the assessment period:

- the ASX Limited Board had nine members, comprising the Chairman, the Managing Director and CEO, and seven non-executive directors
- the ASX Clear Board comprised one executive director (the ASX Managing Director and CEO) and five independent non-executive directors, two of whom were members of the ASX Limited Board
- the ASX Clear (Futures) Board comprised one executive director (the ASX Managing Director and CEO) and seven independent non-executive directors, four of whom were members of the ASX Limited Board.

There are five directors that serve on all four CS Boards; one additional director serves on both the ASX Clear and ASX Settlement boards and three additional directors serve on both the ASX Clear (Futures) and Austraclear boards. The differences between the composition of the CS Boards, and between the CS Boards and ASX Limited, are primarily for business reasons, but also support ASX's conflict handling arrangements (see CCP Standard 2.9).

As set out in the CS Boards' Charter, directors of the CS facilities are appointed by the relevant CS Boards with input from the Nomination Committee. In addition, the ASX Limited Board may appoint or remove directors from the CS Boards. Directors are selected based on relevant skills and expertise. Two of the non-executive directors of ASX Clear and four of the non-executive directors of ASX Clear (Futures) are also members of the ASX Limited Board, while the remaining three are external directors

appointed for their expertise in clearing and settlement operational and risk management matters. This helps to ensure that directors have the capacity to conduct informed independent review of relevant issues. The directors of ASX Clear and ASX Clear (Futures) have experience in senior roles across a range of financial sectors globally, including international banking, asset management, and financial, derivatives and capital markets.

The CS Boards' Charter sets out the ASX policy that the majority of directors on each CS board must be independent. The *Board Policy and Guideline to Relationships Affecting Independent Status* is available on the ASX website.¹¹ The independence of directors is assessed according to this policy, which is aligned to the ASX Corporate Governance Council's *Corporate Governance Principles and Recommendations* for listed companies. Each board considers whether directors are free of business or other relationships that could materially interfere with, or could reasonably be perceived to interfere with, the independent exercise of the director's judgement. The biographies of the directors, which show their relationship with other ASX Group companies, are set out on the ASX website.¹²

Selection, succession planning and training for board members are matters that are addressed by the Nomination Committee and boards at appropriate intervals. New directors receive a comprehensive induction co-ordinated by the Company Secretariat. The boards also receive regular briefings at board meetings, workshops, customer engagement meetings and site visits. This helps to ensure that directors are kept informed of relevant market and industry developments, and assists in developing the skills and technical knowledge of the boards.

Directors' fees at ASX Limited, ASX Clear and ASX Clear (Futures) are considered at regular intervals by the ASX Limited Remuneration Committee. ASX's fee structure is designed to assist it in attracting and retaining appropriately skilled and qualified non-executive directors and recognises the workload and level of skill and expertise that a director must have to effectively meet their responsibilities. Remuneration of directors is determined by the ASX Limited Board on the recommendation of the Remuneration Committee. In conducting a review, the ASX Limited Board may take advice from an external remuneration consultant. The process involves benchmarking against a group of peer companies. ASX reviewed its non-executive director fee structure in August 2017 and made changes that became effective in October 2017. Under the new fee structure, ASX Limited non-executive director remuneration comprises a single base fee (plus superannuation) in respect of a director's appointment to the ASX Limited Board and any committee or subsidiary boards (including the CS Boards). There were no changes to the fees paid to directors on the CS Boards who are not also directors of ASX Limited.

2.5 The roles and responsibilities of management should be clearly specified. A central counterparty's management should have the appropriate experience, mix of skills and integrity necessary to effectively discharge its responsibilities for the operation and risk management of the central counterparty. Compensation arrangements should be structured in such a way as to promote the soundness and effectiveness of risk management.

ASX has clear and direct reporting lines between management and the CS Boards. These are set out in the CS Boards' Charter, along with the roles and responsibilities of the Managing Director and CEO, Chief Operating Officer (COO) and the CRO.

In the normal course, the Managing Director and CEO has responsibility for the overall operational and business management and profit performance of ASX, while the CRO has responsibility for the

11 Available at <<https://www.asx.com.au/documents/about/ASXL-guidelines-affecting-independent-status.pdf>>.

12 Available at <<http://www.asx.com.au/about/board-and-management.htm>>.

overall clearing risk management of the ASX CS facilities and for ensuring that CS facility licence obligations are met. The COO is also responsible for the delivery of overall operations of the ASX Group and reports directly to the CEO, as does the CRO. The Chief Information Officer (CIO) and Executive General Manager Operations report to the COO. Both COO and CRO have a direct reporting line to the CS Boards and are entitled to attend and be heard at CS Board meetings. The CRO and COO are invited to attend and present at meetings of the ASX Limited Board and Audit and Risk Committee as required.

ASX has a remuneration policy and performance management framework in place, which aims to ensure that management personnel have an appropriate mix of skills and experience to discharge their responsibilities. The ASX Limited Remuneration Committee has delegated responsibility from the ASX Limited Board to conduct detailed examination of certain matters under ASX's remuneration and incentive framework, including succession plans, recruitment, and retention strategies. The committee also reviews the remuneration arrangements of the ASX Group directors and the remuneration and incentive framework for all ASX staff, including the Managing Director and CEO, the Deputy CEO, Group Executives and General Managers. The committee members are appointed by the ASX Limited Board, and must consist of at least three members, a majority of whom must be independent non-executive directors, and an independent chair who is not the Chairman of ASX Limited. The committee has direct access to ASX senior management and the authority to seek independent advice. The CS Boards have delegated responsibility to the committee for compensation arrangements and performance management processes relating to the CRO and COO. The CS Boards provide input on the setting of key performance indicators and may review the performance outcomes for these positions.

ASX carries out succession planning and management processes in order to promote leadership continuity in key positions, and develop intellectual depth and business knowledge. This includes the periodic review of a 'talent assessment tool' by Group Executives and Human Resources to identify and manage the development of high potential staff according to individual and business needs. Succession and contingency planning is conducted for Group Executives, General Managers and other key staff.

2.6 The board should establish a clear, documented risk management framework that includes the central counterparty's risk tolerance policy, assigns responsibilities and accountability for risk decisions, and addresses decision-making in crises and emergencies. Governance arrangements should ensure that the risk management and internal control functions have sufficient authority, independence, resources and access to the board, including through the maintenance of a separate and independent internal audit function.

ASX has a documented risk management framework, which is described under CCP Standard 3.1. The ASX Limited Board has established a group-wide risk appetite statement. ASX intends to update this risk appetite statement by March 2019 in response to a finding of the external review of technology governance, operational risk and controls that the current statement lacks the level of detail required to be an effective decision-making tool. The CS Boards are responsible for the management of CS licensees within the ASX risk appetite and operational tolerances set by the ASX Limited Board. The CS Boards are also responsible for approving and reviewing high-level risk management policies relevant to clearing and settlement operations. The boards have oversight of all new clearing and settlement risk policies and standards, as well as material changes to existing clearing and settlement policies and standards. Each board considers these policies and standards in accordance with its respective obligations. Board feedback is incorporated before risk policies and standards are approved.

Responsibilities under the high-level risk management policy relevant to CCP risk are distributed as follows:

- Key policies and standards under ASX's Clearing Risk Policy Framework, such as margin policy, stress test standards and investment mandates, are reviewed by the CS Boards on an annual basis. Reporting to the CS Boards occurs quarterly on the operation of the CCPs and their compliance with risk management policies and standards, and on broader management and operational matters. Internal Audit conducts a rotational risk-based independent audit program (see CCP Standard 2.7); this includes review of whether relevant operational functions comply with board-approved policies and standards, where necessary using external specialists to assist with reviews. The CS Boards may also request external reviews.
- The Audit and Risk Committee has responsibility for the oversight of the Enterprise Risk Management Framework.

During the assessment period, ASX introduced a new structure for its management committees:

- The Risk Committee is a senior management committee responsible for managing the framework associated with risk management of the ASX Group. The committee is chaired by the CRO, who exercises delegated authority from the CEO. The CRO is the sole decision-maker on the committee and the remaining committee members may provide recommendations to assist the CRO in making decisions. The Risk Committee replaces two previous committees – the Enterprise Risk Management Committee and the Capital and Liquidity Committee (CALCO).
- The Regulatory Committee is a senior management committee responsible for managing the processes associated with the development of ASX policies in relation to the licenced entities in the ASX Group, including the CS facilities. The committee is chaired by the ASX Group General Counsel and Company Secretary.
- The Technology, Operations and Security Committee is a senior management committee chaired by the COO. The primary responsibility of the committee is to oversee ASX's technology, operations and security strategies, and the investments that support such strategies. The COO is the sole decision-maker on the committee and the remaining committee members may provide recommendations to assist the COO in making decisions.
- Individual functions are responsible for: identifying business-specific risks; applying controls; maintaining risk management systems; reporting on the effectiveness of risk controls; and implementing enhancements and taking remedial action as appropriate. Each function is required to maintain a record of its risk profile, reviewing this on a six-monthly basis and updating as appropriate. This record includes key risk indicators and action plans to address any identified risk that is not adequately mitigated. Documented policies and standards specify requirements for periodic formal review. More frequent reviews are undertaken where there are potential changes to technology, legal or regulatory requirements, or business drivers.

The CRO has a direct reporting line to the CS Boards. Within ASX's management structure, the functions primarily responsible for CCP financial risk management report to the CRO, who, in the normal course, in turn reports directly to the CEO. None of the functions within the CRO's portfolio have a primary revenue or profit objective (see CCP Standard 2.5). There are two teams with primary responsibility for CCP financial risk management: Clearing Risk Quantification and Development (CRQD); and Clearing Risk Policy and Management (CRPM). The CRO has a separate team for managing enterprise risk (see 'ASX Group Structure' in Appendix B.1). In addition, ASX maintains working groups that discuss matters relevant to financial risk management (see CCP Standard 3.1).

Directors are entitled to obtain independent advice. The ASX Limited Annual Report addresses directors' access to information, management and advice. To the extent that directors wish to seek independent advice, they can raise this in board meetings, with the Managing Director and CEO, or with the Chairman. The participant Risk Consultative Committees (RCCs) (see CCP Standard 2.8) also provide advice to the ASX Clear and ASX Clear (Futures) boards on risk management matters, consistent with the Bank's supplementary interpretation of this sub-standard (see introduction to Appendix C). ASX Clear also obtains participant feedback on risk management matters through a number of other channels, including the Business Committee and an Advisory User Group for matters relating to exchange-traded options (ETOs).

Model validation

The Clearing Boards regularly review and discuss with management matters of risk policy, including changes to margin and stress test methodologies.

ASX has developed a framework for model validation, set out in its Model Validation Standard. This framework identifies models to be validated, defines what constitutes 'model validation', describes the model validation approach to be applied to the identified models, and specifies model validation governance arrangements. Key models at the CCPs include the capital stress-testing model, liquidity stress-testing model, CME SPAN margin model, the OTC interest rate derivatives (IRD) Filtered Historical Simulation Value at Risk (FHSVaR) model for OTC derivatives, and CMM (ASX Clear only). Oversight of these models, model validation strategy and the model validation framework is provided by the Risk Quantification Working Group (RQWG) in the first instance, which is responsible for recommending changes to the CRO, Risk Committee or CS Boards, depending on the materiality of the change.

ASX amended its Model Validation Standard during the assessment period, in order to reintroduce a requirement for annual validation of key risk models. Previously the frequency of validation was set according to risk-based thresholds, which created the potential for inconsistency with the frequency requirements of CCP Standards 4.5, 6.7 and 7.8. ASX have engaged an independent third-party for model validations, which will validate all clearing risk models over a three-year period under the oversight of ASX Internal Audit. ASX has also updated its Model Validation Standard to include enhancements to its approach to sensitivity analysis and backtesting.

The scope of ASX's model validation includes evaluation of conceptual soundness, verification of model processes and benchmarking, and ongoing analysis of model outcomes including backtesting (see CCP Standards 4.5, 4.6, 5.3, 6.5, 6.6 and 7.8). The ASX CCPs' approach to independent model validation is discussed in more detail under CCP Standards 4.5 and 6.7.

2.7 A central counterparty's operations, risk management processes, internal control mechanisms and accounts should be subject to internal audit and, where appropriate, periodic external independent expert review. Internal audits should be performed, at a minimum, on an annual basis. The outcome of internal audits and external reviews should be notified to the Reserve Bank and other relevant authorities.

ASX maintains an internal audit plan that provides for a three-to-five-year review cycle of key operational and risk management processes, and internal control mechanisms that are governed by ASX's enterprise risk management framework, business continuity framework and enterprise compliance framework, using the internal audit methodology. The internal audit plan is approved by the ASX Limited Audit and Risk Committee, and those aspects of the audit plan that are relevant to the CS Boards are approved by those boards. ASX's internal audit arrangements are set out in the

Internal Audit Charter, which is reviewed and approved by the ASX Limited Audit and Risk Committee every two years and made available on the ASX public website.

The internal audit function operates independently of other functions within ASX's Risk Group. Its principal objective is to 'provide independent, objective assurance and advisory activity designed to add value and improve the operations of ASX'. Its scope covers the policies, processes and procedures of all risk management and internal control systems. Internal Audit also has reporting lines to the Audit and Risk Committee and Managing Director and CEO for audit purposes and to the CRO for administrative purposes. Internal Audit also has reporting lines to the CS Boards for matters relating to the CS facilities. If a potential conflict arises between Internal Audit and the CRO, Internal Audit would use the reporting lines to the Managing Director and CEO, Audit and Risk Committee or the CS Boards.

The role and performance of the internal audit function is regularly reviewed by the ASX Limited Audit and Risk Committee. Internal Audit is also reviewed by external independent auditors on a three-year cycle. Following the external review of technology governance and operational risk and control frameworks in late 2017, the next such audit will be aligned to the timeline for enhancing ASX's three lines of defence model, and is planned for 2019-20. The last such audit, conducted in October/November 2014, concluded that Internal Audit was appropriately carrying out its role as the key provider of assurance services within ASX, and was operating in accordance with the *International Standards for the Professional Practice of Internal Auditing*. The performance of the General Manager, Internal Audit is also assessed each year by the Audit and Risk Committee.

ASX has a clearly defined methodology for internal audit, based on the *International Professional Practices Framework* set out by the Institute of Internal Auditors.¹³ The internal audit methodology allows for ad hoc reviews if, for example, material new risks are identified or other changes to ASX's business occur. This is a matter which the General Manager, Internal Audit and the Audit and Risk Committee consider. The CS Boards may also request ad hoc reviews.

During the assessment period, the Bank was notified of findings from internal audit reports and external reviews, including those related to ASX's operational risk management, technology governance and cyber resilience (also see CCP Standard 16). The reviews identified a number of weaknesses, including that information provided to executive and board forums was often in summarised form that lacked detailed analysis, and that there was limited formal sharing of information across the risk governance structure. ASX has made changes to its management committee structure and arrangements for Board meetings that are designed to address these concerns (see CCP Standard 2.6). Additional changes to address review findings are planned over the coming years, including the implementation of a governance, risk and compliance system to support information requirements.

2.8 Governance arrangements should ensure that the central counterparty's design, rules, overall strategy and major decisions reflect appropriately the legitimate interests of its direct and indirect participants and other relevant stakeholders. Governance arrangements should provide for consultation and stakeholder engagement through appropriate forums on operational arrangements, risk controls and default management rules and procedures. Major decisions should be clearly disclosed to relevant stakeholders and, where there is a broad market impact, the public.

13 The Institute of Internal Auditors is the leading international organisation representing internal auditors. It has developed a set of standards that provides a framework for carrying out and evaluating the performance of internal audits.

The interests of direct and indirect participants and other relevant stakeholders are recognised in the ASX Limited Board Charter, the CS Boards' Charter and the ASX Customer Charter (see CCP Standard 2.1).

The views of participants and other stakeholders are sought through formal and informal means. ASX routinely conducts public consultations when considering major changes to existing services or new service offerings. These consultations allow for written submissions and discussion in both bilateral and open forums. Participants' views may also be gathered through the induction program for new participants, as well as ongoing participant liaison and compliance checks.

ASX Clear also maintains several standing forums for participant consultation.

- The ASX Clear RCC, comprising of representatives from nine participants and their clients, is a self-governing body chaired by an elected member. The RCC is consulted on material changes to default management processes, the margining methodology, the default fund, position and liquidity limits, participation criteria, and other changes affecting ASX Clear's risk management practices or related rules. The RCC's proposals and recommendations are presented to the ASX Clear Board. While the board is not obliged to accept the RCC's proposals or recommendations, it is required to provide reasons for any decision not to do so. During the assessment period, the RCC discussed a range of issues including: the annual review of default fund and liquidity resources; default management fire drill outcomes; the use of OTAs; liquidity and concentration margin add-ons; the implementation of CPMI-IOSCO guidance on CCP resilience; and the features of ASX Clear's recovery tools.
- The Business Committee is a stakeholder consultative group for ASX's cash market clearing and settlement services, established under the *Code of Practice for Clearing and Settlement of Cash Equities in Australia* (the Code of Practice). The Business Committee comprises representatives of a broad range of cash market clearing participants, settlement participants, AMOs and industry associations representing relevant stakeholders. The key objective of the Business Committee is to provide user input to the boards of ASX Clear and ASX Settlement on the design, operation and development of the clearing and settlement services and infrastructure for the Australian cash equity market, and provide a formal mechanism for ASX Clear and ASX Settlement to consult users on their strategic plans and investment decisions in relation to these services. The Business Committee's proposals and recommendations are presented to the ASX Clear and ASX Settlement boards for consideration. Although the boards are not obliged to accept the Business Committee's advice, they are required to provide reasons for any decision not to do so. Where it considers it appropriate, the Business Committee can appoint a Technical Committee to assist with the performance of its duties. During the assessment period, the Business Committee discussed a range of initiatives, including the CHES Replacement project, the performance of ASX's cash market clearing and settlement service performance and regulatory matters.
- ASX Clear seeks participant feedback on matters relating to ETOs through an ETO Advisory User Group, as well as regular engagement with the ETO subcommittee of the Stockbrokers Association of Australia. The ETO Advisory User Group, representing participants, clients and financial advisers is a forum for participants to advise ASX on the developments of the ETO market, and provides a forum for broader user feedback, including on risk management matters.

Similarly, ASX Clear (Futures) also maintains several standing structures for participant consultation.

- The ASX Clear (Futures) RCC, comprising representatives from 19 futures and OTC participants, is a self-governing body chaired by an elected member. Client representatives must have held an

individual client account for at least six months and have a margin requirement of at least \$2 million at the time of selection; currently there are no client representatives on the committee. The RCC is consulted on material changes to default management processes, the margining methodology, the default fund, position or liquidity limits, participation criteria, new products, and other changes affecting ASX Clear (Futures)' risk management practices or related rules. The RCC's proposals and recommendations are presented to the ASX Clear (Futures) Board, which is not obliged to accept the RCC's advice but is required to provide reasons for any decision not to follow such advice. During the assessment period, the Risk Consultative Committee discussed a range of issues including: client representation in the membership of the ASX Clear (Futures) RCC; liquidity and concentration multipliers; default management fire drill outcomes; the annual review of the ASX Clear (Futures) default fund; the implementation of CPMI-IOSCO guidance on CCP resilience; and the features of ASX Clear (Futures)' recovery tools.

- The ASX Rates Product Advisory User Group consists of participants and other end users of ASX 24 interest rate products. The User Group may be consulted by ASX Clear (Futures) on matters related to exchange-traded and OTC IRD products, including business, operational and technical aspects of new interest rates product and service offerings and material changes to the ASX Clear (Futures) Operating Rules. The committee meets on a quarterly basis. ASX is also advised on matters related to specific asset classes by a number of other user groups representing key participants and end users: the ASX 24 Futures Clearing User Group; the Energy Product User Group; the Equity Derivatives User Group; and the Agricultural Product Advisory User Group.
- ASX Clear (Futures) has also established a Default Management Group (DMG), comprised of experts from OTC participants for an annual term (see CCP Standard 12.1). The DMG is consulted on aspects of the default management process as set out in the Operating Rules, and while the ASX Clear (Futures) Board is not obliged to accept the DMG's advice, it is required to provide reasons for any decision not to follow such advice. The DMG most recently met in September 2017 in connection with the annual OTC default management fire drill (see CCP Standard 12.4).

In addition, ASX Clear (Futures) has formalised in its Operating Rules a requirement that it consult participants on proposed rule amendments, except those requested by its regulators or required to enable ASX Clear (Futures) to comply with its CS facility licence or other regulatory obligations.

2.9 A central counterparty that is part of a group of companies should ensure that measures are in place such that decisions taken in accordance with its obligations as a central counterparty cannot be compromised by the group structure or by board members also being members of the board of other entities in the same group. In particular, such a central counterparty should consider specific procedures for preventing and managing conflicts of interest, including with respect to intragroup outsourcing arrangements.

ASX has conflict-handling arrangements to manage potential conflicts of interest that its directors and staff may face. The potential for intragroup conflicts arising from ASX's group structure is addressed by intragroup service agreements, which set out the basis on which other group entities will provide services to the CS facilities and specify that the entities providing the services must have sufficient financial and other resources to meet their obligations. These agreements provide that ASX Group staff are under a duty to act in the best interests of the facility that is receiving the services.

ASX's governance arrangements are designed to ensure that shared directorships within the ASX Group cannot compromise each CS facility's compliance with its licence obligations, including observance of the FSS. ASX considers that there is limited potential for shared directorships to create conflicts between ASX's group-wide commercial interests and the risk management function of the CS

facilities. More broadly, it considers that conflicts between directors' roles on the CS Boards and the ASX Limited Board are unlikely given the distinct roles the separate entities perform, and in view of group-wide arrangements to manage matters such as operations and compliance. If a conflict were to arise, a director sitting on multiple CS Boards would be expected to make decisions in the best interests of each facility.

The structure of the ASX Clear Board further limits the potential for conflict related to the clearing of cash equities. Two directors are able to form a quorum of the ASX Clear Board, allowing matters that raise potential conflicts of interest in relation to AMOs and Approved Listing Market Operators (ALMOs) to be considered and decided as required without the involvement of directors that are also on the ASX Limited Board. The independent directors of ASX Clear that are not also directors of ASX Limited met on six occasions during the assessment period to consider conflict-sensitive information.

Standard 3: Framework for the comprehensive management of risks

A central counterparty should have a sound risk management framework for comprehensively managing legal, credit, liquidity, operational and other risks.

ASX Clear	ASX Clear (Futures)
Observed	Observed

3.1 A central counterparty should have risk management policies, procedures and systems that enable it to identify, measure, monitor and manage the range of risks that arise in or are borne by the central counterparty. This risk management framework should be subject to periodic review.

Identification of risk

ASX's high-level framework for risk management is described in its Enterprise Risk Management Policy. Specific risks are identified and assessed on how likely it is the risk event will occur within the next 12 months and the potential impact. Reputational and participant impacts are considered along with the financial, operational and regulatory impacts of risks.

Comprehensive risk policies, procedures and controls

ASX's Enterprise Risk Management Policy has been developed with reference to the international standard ISO 31000 *Risk Management – Principles and Guidelines*.¹⁴ At a high level, the ASX Enterprise Risk Management Policy outlines: the overall risk environment in the ASX Group; the objectives of risk management policies; the process by which risks are identified and assessed; the controls in place to detect and mitigate risks; and how risks are monitored and communicated. ASX's stated tolerance for financial, operational, legal and regulatory risks is 'very low'.

ASX uses key risk indicators to measure levels of risk in the organisation and categorise risk levels according to a scale: satisfactory; below or at target risk tolerance, action required to further control the level of risk; above target residual risk but within risk tolerance; or unsatisfactory, exceeding ASX's risk tolerance.

¹⁴ ISO is an international standard-setting body and ISO 31000 is considered to be relevant guidance for enterprise risk management. The ISO 31000 standard has been reproduced by Standards Australia and Standards New Zealand as AS/NZS 31000.

The Enterprise Risk Management Policy also sets out how specific risk responsibilities across the ASX Group, including to the ASX Limited Board of Directors, the Audit and Risk Committee, the Risk Committee, the General Manager, Enterprise Risk, and managers of individual functions are assigned. Managers of relevant functions are responsible for identifying and monitoring risks relevant to their function's activities, as well as for designing and implementing risk management controls to manage identified risks. As part of the risk profiling and assessment process, management assesses the appropriateness and operational effectiveness of these controls twice a year; these assessments are reviewed by the Risk Committee.

ASX's Clearing Risk Policy Framework sets out a comprehensive set of clearing and treasury risk policies to support the risk management approach of ASX's CCPs. These policies govern more granular internal standards, which in turn govern detailed procedures for the management of clearing and treasury risk. The structure of policies, standards and procedures reflects the requirements of the FSS.

A number of boards and internal committees oversee clearing risk management policy, including:

- *The CS Boards.* Each CS facility has a board (see CCP Standard 2.3 and 'ASX Group Structure' in Appendix B.1), which shares members with the other ASX CS facilities. The Clearing Boards have oversight of the Clearing Risk Policy Framework, and are responsible for any significant amendments. Policies and designated key standards under the Framework are also governed by the Clearing Boards.
- *Risk Committee.* The Risk Committee is constituted to ensure the adequacy and appropriateness of the risk management frameworks, policies, processes and activities of the ASX Group. This includes overseeing the implementation and adequacy of the Enterprise Risk Management Policy and reviewing and approving key risk management policies, standards and procedures. It is chaired by the CRO and comprises the CEO, Deputy CEO, Chief Financial Officer (CFO), COO and Group General Counsel and Company Secretary. The Risk Committee meets at a minimum on a quarterly basis.
- *Regulatory Committee.* The Regulatory Committee is chaired by the ASX Group General Counsel and Company Secretary and is made up of the CEO, Deputy CEO, Chief Compliance Officer, COO and CRO. The committee manages the processes associated with the development and execution of policy in relation to the operation and conduct of the ASX CS facilities, and ASX's licences, markets and other operations. It also oversees regulatory and legal management processes across ASX, amongst other responsibilities. The Regulatory Committee meets on a quarterly basis
- *RQWG.* RQWG is chaired by the General Manager, CRQD (or the CRO as alternate) and is made up of key staff from ASX's CRQD and CRPM functions most familiar with ASX's margin and other risk management models. The focus of the group is the review and application of quantitative risk policies and the Model Validation Framework, including oversight of model governance and the outcomes and recommendations of regular reviews of margining and stress test models. The group meets at least on a monthly basis or more frequently as required.
- *DMRWG.* DMRWG is chaired by the CRO and comprises key representatives from ASX Legal, Compliance, Operations and Risk. The DMRWG provides oversight of the CCPs' DMRF. DMRWG currently meets at least on a six weekly basis or more frequently as required.

Each CCP also maintains a participant RCC, which is consulted on material changes to default management processes, the margin methodology, the default fund, position or liquidity limits, participation criteria, new products, and other changes affecting the risk model or related rules (see

CCP Standard 2.8). The RCCs' proposals and recommendations are presented to the respective CCP's board for consideration. Each committee meets three times per year.

Information and control systems

The ASX CCPs employ information systems that are designed to provide timely and accurate information relevant to its risk policies, procedures and controls. This includes information on risk exposures to individual participants, as well as aggregated information on risk exposures across the CCPs. Key information systems include:

- *Margining.* ASX Clear uses the CME SPAN system for margining of derivatives, and CMM for the daily margining of cash equity transactions using a mixture of historical simulation of value at risk (HSVaR) and flat rates for less liquid securities. ASX Clear (Futures) uses the CME SPAN system for margining of exchange-traded derivatives and the FHSVaR-based Calypso margin system for OTC derivatives (see CCP Standard 6).
- *Credit and liquidity stress testing.* Stress testing is carried out daily to gauge the adequacy of each CCP's financial resources and to monitor the risks associated with individual participants' positions. Credit stress tests estimate the loss that would result from the default of two participants and their affiliates in extreme but plausible market conditions (see CCP Standard 4). Liquidity stress tests estimate the liquidity exposures that would arise under such circumstances, or under other extreme circumstances (see CCP Standard 7).

Senior management of the ASX CCPs monitor daily risk management reports produced by their information management systems to identify changes in positions that may require mitigating action. The CCPs' information systems also provide information to participants about positions and margin requirements, which assists in their management of credit and liquidity positions. ASX publishes detailed margining information on its website, including descriptions of the margining methodology, schedules of margin rates, and daily CME SPAN margin parameter files. This information is sufficient for participants to perform their own margin calculations on hypothetical or actual portfolios. To facilitate this, a number of third-party vendors use this information to provide margin estimation software to participants.

Internal controls

ASX's documented risk management policies and standards specify requirements for periodic formal review, although more frequent reviews may occur depending on changes to technology, business drivers or legal requirements. Reviews are conducted by specific working groups and committees as required. Clearing risk policies and standards are reviewed on an annual basis by the Clearing Risk Policy function within CRPM. The Risk Committee approves enterprise-wide policies and standards. Under the Enterprise Risk Management Policy, ASX updates its risk profile every six months at a functional level, identifying relevant risks and setting out planned actions to respond to those risks.

Risk management arrangements are also subject to periodic review by Internal Audit. Such audits aim to provide assurance that the risk management framework continues to be effective. Risk management arrangements may also be subject to review by external experts from time to time.

The Enterprise Risk Management Policy is reviewed by the Audit and Risk Committee on a two-year cycle, with the most recent review taking place in February 2016. In late 2017, ASX commenced a three-year plan to refresh its enterprise risk management approach (see section 2.3.2).

3.2 A central counterparty should ensure that financial and other obligations imposed on participants under its risk management framework are proportional to the scale and nature of individual participants' activities.

Financial obligations are imposed upon participants through the ASX CCPs' *ex ante* and *ex post* risk controls. These are position-based controls.

Both CCPs collect initial margin from participants based on actual positions. The CCPs will also collect additional initial margin (AIM) where positions produce stress test losses beyond a predetermined threshold (see CCP Standards 4.2 and 4.4). AIM is also collected where stress test losses are high compared with the participant's underlying capital (see Section 2.1.5).¹⁵ Since margin is proportional to the size and volatility of a participant's positions, it is proportional to the scale and nature of the individual participant's activities.

The CCPs have different risk management arrangements if losses were to exceed margin held.

ASX Clear

All of ASX Clear's prefunded pooled financial resources or 'default fund' consists of own capital. Under ASX Clear's Operating Rules, if this default fund were to be exhausted, participants may be required to meet a 'Recovery Assessment' (see CCP Standard 4.8). Such an assessment is capped at \$300 million in aggregate. The value of assessment obligations would be proportional to participants' quarterly average daily initial margin in the quarter preceding the default, subject to a variable cap. This cap is also based on participants' quarterly average daily initial margin in the three months preceding the default, but is calculated relative to the total pool of initial margin excluding the two participants and their affiliates with the highest quarterly initial margin.

Participants may also be required to contribute to replenishment of ASX Clear's default fund if this were drawn upon in a default scenario. Individual participants' replenishment contributions would be determined in proportion to the risk associated with positions held by the participant prior to the default. The aggregate value of participant replenishment contributions is capped at \$75 million, but ASX would retain the capacity to call additional clearing participant and ASX's own contributions in equal proportion, to restore the default fund to pre-recovery levels as part of a recalibration at the end of the quarter following a default, should stress tests reveal that post-recovery exposures were not being adequately covered.

Participants may also be required to provide liquidity under OTAs to support the timely settlement of ASX Clear's cash equity settlement obligations in the event that a participant default was to create significant payment obligations for the CCP (see CCP Standards 7.3 and 7.9). Participants' obligations under OTAs are linked to their positions due to settle in the relevant settlement batch.

ASX Clear's Operating Rules also set out non-financial participation requirements, such as operational requirements. These requirements are not prescriptive, and take into account the size and nature of a participant's business.

ASX Clear (Futures)

ASX Clear (Futures)' default fund is comprised of both own capital and participant contributions. Futures participants' contributions to the default fund are currently \$100 million (see CCP Standard

¹⁵ A participant of ASX Clear (Futures) that is a bank or, in certain circumstances, a subsidiary of a bank or bank holding company supervised in ASX-approved jurisdictions is exempt from this requirement.

4.4), with each participant contributing a fixed component of \$2 million and a variable component that is recalculated quarterly based on each participant's share of average initial margin over the previous quarter. OTC derivatives participants' prefunded contributions to the default fund are also \$100 million. Each OTC derivatives participant's contribution is currently fixed at \$12.5 million. However, once aggregate initial margin in the OTC derivatives clearing services exceeds \$500 million and at least four participants each contribute 15 per cent of initial margin, each participant's contributions will instead comprise a fixed component of \$5 million and a variable component that is recalculated quarterly based on each participant's share of average initial margin over the previous quarter. At 30 June 2018, aggregate initial margin from OTC derivatives participants totalled \$329 million.

Furthermore, the order in which survivors' default fund contributions would be used (i.e. the default waterfall) is proportional to the profile of the defaulter's activities. The proportion of futures and OTC derivatives participant contributions that would be used after each tranche of ASX Clear (Futures) capital is based on the defaulter's share of initial margin for exchange-traded compared with OTC derivatives products (including portfolio-margined futures) over the previous 90 days (see CCP Standard 12). ASX reviews at least annually the appropriateness of supporting both exchange-traded and OTC derivatives products with a single default fund. OTC participants are also required to bid competitively in any auction of a defaulted participant's OTC derivatives portfolio; otherwise, their default fund contributions may be used ahead of the contributions of other non-defaulting participants (see CCP Standard 12.1).

Under ASX Clear (Futures)' recovery arrangements, participants may be required to meet a Recovery Assessment should a loss caused by a participant default exhaust ASX Clear (Futures)' default fund (see CCP Standard 4.8). The value of an assessment would be capped at the level of each participant's default fund contribution for a single default, ensuring that any amount called would be proportional to the scale and nature of each participant's activities, with the cap rising to three times this amount if multiple defaults occur within 22 business days of completion of the default management process in relation to a default. Should ASX Clear (Futures) suffer losses estimated to exceed even the loss absorbing capacity of its recovery assessment powers, participants may be required to absorb further losses via payment haircutting (pro rata reductions to expected payment receipts; see CCP Standard 4.8). This is a position-based tool.

Participants may also be required to contribute to replenishment of ASX Clear (Futures)' default fund if this were drawn upon in a default scenario. Individual participants' replenishment contributions would be determined in proportion to the risk associated with positions held by the participant prior to the default. The aggregate value of participant replenishment contributions is capped at \$200 million, but ASX would retain the capacity to call additional clearing participant contributions and increase its own contributions in equal proportion, to restore the default fund to pre-recovery levels as part of a recalibration at the end of the quarter following a default, should stress tests reveal that post-recovery exposures were not being adequately covered.

ASX Clear (Futures)' Operating Rules also set out non-financial participation requirements, such as operational requirements. These requirements are not prescriptive, and take into account the size and nature of a participant's business.

3.3 A central counterparty should provide incentives to participants and, where relevant, their customers to manage and contain the risks they pose to the central counterparty.

The use of margin and AIM at ASX Clear and ASX Clear (Futures) creates an incentive for participants to manage the exposures that they bring to the CCP, as does the requirement to contribute to the default fund in proportion to initial margin obligations at ASX Clear (Futures). Participants are also

required to post additional collateral or increase their capital levels if they create exposures that are large relative to the size of their capital.¹⁶ ASX is proactive in monitoring participant exposures and utilises conservatively set triggers for additional monitoring or action, such as requiring participants to actively manage down exposures (see CCP Standard 4.2).

The ASX CCPs may also apply sanctions to, or place additional requirements or restrictions on, participants as it deems appropriate (including where participants fail to comply with the CCPs' Operating Rules).

3.4 A central counterparty should regularly review the material risks it bears from and poses to other entities (such as other FMIs, money settlement agents, liquidity providers and service providers) as a result of interdependencies, and develop appropriate risk management tools to address these risks.

ASX Clear and ASX Clear (Futures) review the material risks that they bear from and pose to other entities in the context of their ongoing review of enterprise risks (such as the six-monthly update of risk profiles; see CCP Standard 3.1), and their processes for identifying risks associated with new activities. In the case of new products and services, ASX carries out risk assessments when undertaking an expansion of its activities or in the event of material changes to its business. Risk assessments are built into ASX's project management framework (see CCP Standards 14.1, 16.4).

The interdependency between ASX Clear and ASX Settlement for the settlement of securities transactions, and both CCPs' interdependencies with Austraclear for the settlement of margin obligations are managed within the context of ASX Group's broader risk management framework (see CCP Standard 19).

3.5 A central counterparty should identify scenarios that may potentially prevent it from being able to provide its critical operations and services as a going concern and assess the effectiveness of a full range of options for recovery or orderly wind-down. A central counterparty should prepare appropriate plans for its recovery or orderly wind-down based on the results of that assessment. Where applicable, a central counterparty should also provide relevant authorities with the information needed for purposes of resolution planning.

ASX Clear and ASX Clear (Futures) have established a recovery plan that identifies scenarios that could threaten the ASX CCPs' ongoing provision of critical services, describes events that would trigger the activation of the recovery plan, and sets out how ASX would respond to such scenarios. It also describes the suite of tools available to the CCPs in recovery and details the governance arrangements both for the use of these tools and for review of the recovery planning framework. Under their respective operating rules, the ASX CCPs have the power to:

- address uncovered credit losses and liquidity shortfalls via Recovery Assessments and variation margin gains haircutting (at ASX Clear (Futures) only). ASX Clear also has the power to address a liquidity shortfall associated with cash equity settlement via OTAs (CCP Standard 7.9). If these tools fail to comprehensively address uncovered credit and liquidity shortfalls both CCPs have the option – in the context of complete termination of all open contracts – of applying a haircut to any settlement payments to participants (CCP Standards 4.8 and 7.9).

¹⁶ A participant of ASX Clear (Futures) that is a bank or, in certain circumstances, a subsidiary of a bank or bank holding company supervised in an ASX-approved jurisdiction is exempt from this requirement.

- restore a matched book via partial or complete termination of contracts if normal close-out processes cannot be carried out (CCP Standard 12.1)
- replenish their default funds via a combination of ASX and participant replenishment contributions (CCP Standards 4.8 and 12.1)
- address non default-related losses via business risk capital and the allocation of certain investment losses in excess of \$75 million to participants (see CCP Standard 14.3).

In developing its recovery tools, ASX has performed an assessment in an attempt to ensure the tools: are comprehensive, effective and transparent; provide appropriate incentives; and minimise negative impacts on participants and markets.

To complement the recovery plan, ASX has information management tools to support decision-making in a recovery scenario. ASX has integrated the testing and review of the recovery plan into its broader framework for testing and review of risk and default management policies and processes.

Standard 4: Credit risk

A central counterparty should effectively measure, monitor and manage its credit exposures to participants and those arising from its clearing processes. A central counterparty should maintain sufficient financial resources to cover its credit exposure to each participant fully with a high degree of confidence.

ASX Clear	ASX Clear (Futures)
Broadly observed	Broadly observed

4.1 A central counterparty should establish a robust framework to manage its credit exposures to its participants and the credit risks arising from its clearing processes. Credit exposures may arise from current exposures, potential future exposures, or both.

ASX Clear and ASX Clear (Futures) maintain a comprehensive framework for managing credit exposures to their participants. The core components of this framework comprise: a stress test regime (see CCP Standards 4.5 to 4.7); the use of variation margin to mark positions to market (see CCP Standard 6); and the maintenance of prefunded financial resources. These financial resources comprise initial margin (see CCP Standard 6), other collateral calls based on participants' positions, and a fully prefunded default fund of \$250 million at ASX Clear and \$650 million at ASX Clear (Futures) (see CCP Standard 4.4). The ASX CCPs also have in place comprehensive arrangements to address any credit losses in excess of their prefunded resources (see CCP Standard 4.8).

Financial resources received in cash from both CCPs are re-invested by ASXCC. To mitigate the credit risk arising from these investments, ASXCC has established an investment policy that includes counterparty limits and minimum credit ratings (see CCP Standard 15).

4.2 A central counterparty should identify sources of credit risk, routinely measure and monitor credit exposures, and use appropriate risk management tools to control these risks. To assist in this process, a central counterparty should ensure it has the capacity to calculate exposures to participants on a timely basis as required, and to receive and review timely and accurate information on participants' credit standing.

The Counterparty Risk Assessment (CRA) team is responsible for monitoring participants' credit standing and ASX's Validation and Oversight team monitors the ASX CCPs' credit exposures to participants. Validation and Oversight monitors day-to-day developments in, among other things, open positions, market price moves and settlement obligations to the CCPs.

Participants' positions are marked to market and the CCPs calculate initial and variation (or mark-to-market) margin requirements at the end of each business day. The CCPs also call margin on an intraday basis when, due to changes in market value and the opening of new positions, uncollateralised exposures exceed predefined limits. Intraday margin calls for both CCPs equal the total shortfall in initial and variation margin if triggered (see CCP Standard 6.4).

The ASX CCPs currently identify only those credit risk factors that have a direct impact on the valuation of participant positions and use these risk factors to construct historical, theoretical and hypothetical credit stress testing scenarios (see CCP Standard 4.6). During the assessment period, ASX initiated work to more comprehensively define, justify and document its identified credit factors, including unobservable risk factors such as bid-ask spreads.

To manage the additional credit risk exposure arising from offering real-time novation of OTC products, ASX Clear (Futures) places a limit on the interest rate sensitivity of new transactions (currently set to \$500 000 per basis point), conducts frequent portfolio exposure checks and may prevent further novation until an intraday margin call is met. By imposing pre-novation limits on the interest rate sensitivity of each trade (set using the maximum present value of a basis point shift in interest rates), ASX Clear (Futures) minimises the possibility that novating a single large trade results in a significant increase in credit exposure.

ASX Clear and ASX Clear (Futures) conduct daily stress tests to monitor the effects of extreme but plausible scenarios on participants' portfolios. Where stress test results are above a defined limit, AIM is called (see CCP Standard 4.4).

CRA is responsible for ongoing monitoring, assessment and investigation of matters relating to financial requirements (including participants' monthly financial statements). CRA is also responsible for determining an internal credit rating (ICR) for each participant by drawing on information provided by participants in regular financial returns to ASX and other information, including external credit ratings for the participant or its parent, compliance performance and governance arrangements. ASX Clear and ASX Clear (Futures) may call additional margin from a participant with a large portfolio relative to its capital, or where it has other counterparty credit risk concerns (see CCP Standard 4.3).

CRA also coordinates a 'watch list' of participants deemed to warrant more intensive monitoring. Inclusion on the watch list occurs following actual or potential adverse changes, such as: actual or rumoured financial distress; corporate restructures; operational incidents; risk management controls or significant or repeated compliance or capital issue. Watch list factors are monitored across a number of functions including CRA, Participants Compliance and Operations. Based on an assessment of watch list factors, ASX Clear and ASX Clear (Futures) may decide to place restrictions on a participant's trading, clearing and settlement activities (see CCP Standard 4.3).

ASX's Concentration Risk Standard sets out a risk-based approach to monitoring concentration risks faced by the CCPs. This monitoring is only performed on products for which ASX believes there to be a high or medium risk of concentration occurring, which currently is only futures, low exercise price options (LEPOs) and ETOs. The three areas monitored by ASX in these products are:

- Concentrations in participants' exposures to their clients (see CCP Standard 18).
- Concentrations of individual participants' positions in particular products for ASX Clear (ETOs and related collateral). Evidence of such concentration indicates individual participant exposure to large price movements in a particular product that could challenge its capacity to meet obligations to the CCP. CRPM monitors the concentration of participants' positions in single-name ETOs, by applying a 90 per cent price reduction to the underlying contract and reviewing the resulting exposure against participants' stress test exposure limits (STELs). Further review would be triggered should exposure to a particular product exceed a specified share of a participant's total portfolio, subject to a materiality threshold.
- Concentration of positions in a market in a single participant. Evidence of a single participant accounting for a large share of positions in a particular market segment could indicate the potential for complications in closing out or transferring these positions if the participant were to default. CRPM monitors the market shares of participants in each product. Further review would be triggered if a single participant held more than 40 per cent at ASX Clear or 25 per cent at ASX Clear (Futures) of the contracts in the market for that product and the size of the position (relative to average market turnover for that period) suggested that it could take more than two days to close out that participant's position.

If a trigger was met under its Concentration Risk Standard, ASX would not automatically take action. In determining whether further investigation or action was warranted, ASX would take into account a number of factors, including the materiality of the breach, and the credit standing and activity profile of the relevant participant (see CCP Standard 4.3).

Under its risk-based approach to monitoring concentration risk, ASX Clear has prioritised formal concentration monitoring for derivatives products over cash market products. This reflects the short-term nature of exposures generated by cash market transactions (which settle on a two-day cycle). ASX Clear nevertheless monitors concentration risks in the cash market via its ongoing monitoring of participant credit exposures, investigating whether identified issues are related to concentrated holdings in particular securities.

Likewise, ASX Clear (Futures) has prioritised formal concentration monitoring for exchange-traded products over OTC products, reflecting the currently relatively low level of exposures generated by OTC derivatives transactions. ASX Clear (Futures) nevertheless monitors concentration risks in OTC products via its ongoing monitoring of participant credit exposures.

For details of the ASX CCPs' other participation requirements and participant monitoring arrangements, see CCP Standard 17.

4.3 A central counterparty should have the authority to impose activity restrictions or additional credit risk controls on a participant in situations where the central counterparty determines that the participant's credit standing may be in doubt.

Participants may be subject to conditions and/or restrictions on their admission or additional credit risk controls. For instance, they may be subject to calls for additional margin, higher capital requirements, additional capital reporting requirements, or a reduced STEL (such that additional

margin would be called at a lower level of credit stress test exposure (see CCP Standard 4.7)). The application of restrictions, conditions or additional credit controls is at ASX's sole discretion.

ASX Clear and ASX Clear (Futures) will also call capital-based position limit (CBPL) AIM from a participant with a large portfolio (measured by initial margin requirements) relative to its liquid capital or Tier 1 Capital (see Appendix B.3 for a description of this methodology). Participants that are a bank, a subsidiary of a bank, or a bank holding company (where the subsidiary has a minimum \$200 million of net tangible assets (NTA)) are subject to a fixed limit of \$1.5 billion for their initial margin liabilities, reflecting the more comprehensive prudential supervision and capital adequacy requirements that these entities are subject to. In order to qualify for this fixed limit, the bank or bank holding company must be subject to prudential supervision by a supervisory authority in a jurisdiction approved by ASX; a bank holding company must also be designated as a Global Systemically Important Bank by the Financial Stability Board. The CBPL for remaining participants at ASX Clear (Futures) and for all participants at ASX Clear is set at three times their level of capital.

The ASX CCPs may also make a call for AIM on the basis of other counterparty credit risk concerns.

4.4 A central counterparty should cover its current and potential future exposures to each participant fully with a high degree of confidence using margin and other prefunded financial resources (see CCP Standard 5 on collateral and CCP Standard 6 on margin). In addition, a central counterparty that is involved in activities with a more complex risk profile or that is systemically important in multiple jurisdictions should maintain additional financial resources to cover a wide range of potential stress scenarios that should include, but not be limited to, the default of the two participants and their affiliates that would potentially cause the largest aggregate credit exposure for the central counterparty in extreme but plausible market conditions. All other central counterparties should maintain additional financial resources sufficient to cover a wide range of potential stress scenarios that should include, but not be limited to, the default of the participant and its affiliates that would potentially cause the largest aggregate credit exposure for the central counterparty in extreme but plausible market conditions. In all cases, a central counterparty should document its supporting rationale for, and should have appropriate governance arrangements relating to, the amount of total financial resources it maintains.

ASX Clear's \$250 million default fund currently consists entirely of its own equity. ASX Clear (Futures)' \$650 million default fund consists of \$450 million in ASX capital (across three tranches), and \$200 million in participant contributions (across two tranches). The order of application (in the event of a futures participant default) would be as follows: \$120 million of own equity; \$100 million from futures participants; \$150 million of own equity; \$100 million from OTC participants; and \$180 million of own equity. The ordering of OTC and futures participant contributions would be reversed in the event of an OTC participant default (see CCP Standard 12.1).

ASX Clear and ASX Clear (Futures) conduct daily stress tests to determine whether the level of each CCP's prefunded financial resources would be sufficient to cover the default of the two participants and their affiliates that would potentially cause the largest aggregate credit exposure to the CCP under a wide range of scenarios (see CCP Standards 4.5 to 4.7).

Since ASX Clear clears only transactions in cash securities and equity futures and options and ASX Clear (Futures) clears primarily transactions in exchange-traded futures and OTC IRD, the Bank does not consider that ASX Clear and ASX Clear (Futures) are involved in activities with a complex risk profile. Nonetheless, the Bank has concluded that both CCPs are systemically important in multiple jurisdictions and are therefore subject to higher financial resource requirements (i.e. Cover 2). This conclusion reflects that ASX Clear and ASX Clear (Futures) are recognised as foreign CCPs in the EU by

ESMA and the Bank's supplementary interpretation of the FSS identifies the need for a CCP to seek recognition in other jurisdictions as one possible indicator of systemic importance in multiple jurisdictions.^{17,18}

Under the ASX CCPs' AIM methodology, a participant is required to post additional collateral should stress test outcomes reveal that the potential loss arising from its positions (as at the close of the previous day) exceeds a predetermined STEL (see CCP Standard 4.7). The objective of this regime is to provide additional participant-specific cover against non-systematic spikes in individual participants' exposures. This mitigates the risk that the default of a participant with a large exposure, in more extreme market conditions than are contemplated by regular initial margin, may deplete or even exhaust the CCPs' default funds. By upholding the 'defaulter pays' principle, the AIM regime also provides an incentive for participants to manage the risk they bring to the CCPs. During the assessment period, the ASX CCPs reduced STELs for all participants to reduce the potential for breaches in Cover 2 requirements caused by a sudden change in stressed exposures (see CCP Standard 4.7).

4.5 A central counterparty should, through rigorous stress testing, determine the amount and regularly test the sufficiency of its total financial resources available in the event of a default or multiple defaults in extreme but plausible market conditions. Stress tests should be performed daily using standard and predetermined parameters and assumptions. On at least a monthly basis, a central counterparty should perform a comprehensive and thorough analysis of stress-testing scenarios, models and underlying parameters and assumptions used to ensure they are appropriate for determining the central counterparty's required level of default protection in light of current and evolving market conditions. A central counterparty should perform this analysis of stress testing more frequently when the products cleared or markets served display high volatility, become less liquid, or when the size or concentration of positions held by a central counterparty's participants increases significantly. A full validation of a central counterparty's risk management model should be performed at least annually.

ASX Clear and ASX Clear (Futures) use daily credit stress tests to monitor risk exposures to individual participants and the adequacy of their financial resources.

At ASX Clear, credit stress tests are based on a range of scenarios covering extreme price moves and volatility shifts at the market-wide, sector and individual stock levels (see CCP Standard 4.6). ASX Clear applies a set of underlying parameters and assumptions in performing credit stress tests, including:

- profits in client accounts cannot be used to offset house losses, or losses on other client accounts
- for equity derivatives, excess collateral posted by participants and their clients is available to cover stress test exposures
- for equity derivatives, at least some client accounts can be transferred rather than closed out, including a worst case assumption that no loss-making client accounts are transferred

17 For more information, see 'Supplementary interpretation of CCP Standards' in Appendix C.

18 The RBNZ has also stated that ASX Clear (Futures) may be of systemic importance in New Zealand and may therefore be designated for oversight as an offshore FMI under the RBNZ's proposed new oversight regime for FMIs. For more information, see 'An Enhanced Oversight Framework for Financial Market Infrastructures', available at <http://www.rbnz.govt.nz/-/media/ReserveBank/Files/regulation-and-supervision/financial-market-infrastructure-oversight/regulatory%20developments/FMIs-Cabinet-paper.pdf?la=en>.

- prices may rebound following a large fall (a rebound scenario); price and volatility move independently
- the holding period is three days.

At ASX Clear (Futures), credit stress tests are based on a range of scenarios covering extreme price moves and volatility shifts in equity, interest rate and electricity contracts (see CCP Standard 4.6). The scenarios have been developed based on statistical analysis of historical market movements, which takes into account correlations between contracts and uses a Student's t-distribution (allowing for more extreme events than a normal distribution), complemented by a set of forward-looking scenarios based on hypothetical macroeconomic or market-wide events (see CCP Standard 4.6). Other key underlying parameters and assumptions include that:

- profits in client accounts (including client omnibus accounts) cannot be used to offset house losses, or losses on other client accounts
- exchange-traded derivatives can be closed out within three days and OTC derivatives can be closed out within five days.

On a monthly basis the RQWG reviews daily price and implied volatility changes for the month to determine whether there is any evidence of stress that would support a change to scenarios. Any observed changes in price or volatility at both CCPs, or interest rate curves at ASX Clear (Futures) in excess of the stress test scenarios would constitute an event beyond what was previously considered to be extreme but plausible. Accordingly, it is likely that a revision to the relevant stress test scenario would be presented for consideration by the Clearing Boards.

ASX's Model Validation Standard requires that models used at the ASX CCPs in their credit, collateral, margining and liquidity risk management systems must undergo a full independent annual validation (see CCP Standard 2.6). Under this framework the credit stress test model must be validated annually using an independent expert.

4.6 In conducting stress testing, a central counterparty should consider the effect of a wide range of relevant stress scenarios in terms of both defaulters' positions and possible price changes in liquidation periods. Scenarios should include relevant peak historic price volatilities, shifts in other market factors such as price determinants and yield curves, multiple defaults over various time horizons, simultaneous pressures in funding and asset markets, and a spectrum of forward-looking stress scenarios in a variety of extreme but plausible market conditions.

ASX Clear and ASX Clear (Futures) use their credit stress tests to establish the overall adequacy of prefunded financial resources and to determine whether a participant is required to post STEL AIM (see CCP Standard 4.4). Prefunded financial resources are sized to cover projected Cover 2 losses under the active scenarios, and only active scenarios may trigger a STEL AIM call.

The CCPs' stress test regime is based on a range of both single and multi-factor scenarios based on either historical observations or forward-looking hypothetical scenarios. The regime aims to capture extreme market moves that have a probability of occurring once in 20 years (i.e. covering 99.98 per cent of price and volatility movements). In ASX's view, a 20 year look-back period is appropriate given the contemporary structure and functioning of the market.

Both CCPs' stress test frameworks incorporate intraday price movements; that is, price changes are based on the most extreme close-to-high or close-to-low price movements observed over the relevant holding period. The assumed holding periods (or, stressed period of risk (SPOR)) vary by product type:

- three days for exchange-traded derivatives (including ETOs) and cash equities
- five days for OTC derivatives.

ASX is conducting work to define, justify and document its SPOR assumptions at both CCPs.

Review of scenarios used in the CCPs' credit stress tests against observed market movements occurs on a monthly basis (see CCP Standard 4.5).

Active stress test scenarios in ASX Clear

To meet the target level of coverage, ASX Clear calibrates market-wide and sector-specific stress test scenarios to cover the most extreme observed movement in the previous 20 years of price and volatility data. Currently, ASX Clear does not have a formal process to ensure that historical periods of stress that fall beyond the 20-year lookback period remain incorporated within stress testing scenarios unless explicitly excluded. Scenarios for individual stocks are calibrated to ensure that the assumed price movements always provide at least the targeted level of cover, verified by back-testing based on 20 years of price history where available. The following suite of scenarios is currently active in ASX Clear:

- Six market-wide scenarios that cover price movements ranging from a 15.5 per cent decrease to an increase of either 9.8 per cent or 13.0 per cent (depending on recent market conditions), increases in volatility of up to 170 per cent, and scenarios that combine changes in price and increases in volatility.
- Other scenarios that cover 10 broad market sectors (including consumer staples, energy, financials, consumer discretionary, utilities and information technology), applying hypothetical extreme increases and decreases in price across these sectors, and increases in volatility of up to 170 per cent.
- Scenarios for 25 individual stocks, chosen based on total open derivatives positions; one set of scenarios cover price movements of 30 per cent with a 170 per cent movement in volatility, and another set cover a 250 per cent increase in volatility with no change in price.

Currently, ASX Clear's active stress test scenarios apply sector-specific shocks in isolation, assuming that prices remain stable in all other sectors and the market as a whole. However, in addition to its suite of active scenarios, ASX Clear reviews on a monthly basis the daily results from 25 multi-sector scenarios covering five forward-looking hypothetical macro events such as an inflation or commodity price shock. These monthly reviews may trigger ad hoc calls for AIM. ASX Clear is intending to make these forward-looking, multi-sector shock scenarios active through longer-term enhancements to its credit stress test system.

In practice, the largest stress test exposures are commonly generated by market-wide price movements, i.e. the market down or market up scenarios. However, small or medium-sized participants that have less diversified/more concentrated positions often record their largest stress test results against single-stock stress test scenarios.

Active stress test scenarios at ASX Clear (Futures)

ASX Clear (Futures)' stress test regime comprises a suite of portfolio and single-contract stress test scenarios based on statistical analysis of historical market movements. To meet the targeted level of coverage, single-asset stress test scenarios use the most extreme observed movement in the previous 20 years. Multi-asset scenarios are calibrated to cover 99.98 per cent of a simulated distribution of price and volatility movements, based on a sample of 20 years of price and volatility data. ASX Clear

(Futures) does not currently have a formal process to ensure that historical periods of stress that fall beyond the 20-year lookback period remain incorporated within stress testing scenarios unless explicitly excluded. ASX plans to address this as part of its next credit stress testing review.

For participants that clear exchange-traded derivatives, ASX Clear (Futures) currently uses 100 scenarios that involve movements of price and volatility across the SPI 200 equity index futures, the five AUD interest rate futures contracts (20-year bond, 10-year bond, 3-year bond, 90-day bank accepted bill and 30-day interbank cash), and Australian electricity derivatives. Together, these contracts cover 98 per cent of ASX Clear (Futures)' potential future risk exposure (measured by initial margin requirements).

In total, there are 54 scenarios that apply relative (i.e. percentage) shocks to yields. These comprise:

- multi-asset scenarios that combine movement in the SPI 200 and electricity contracts with parallel shifts in the yield curve, represented by approximately equal shocks to the 30-day, 90-day, 3-year, 10-year and 20-year contracts. For example, the 'equities down, rates up, electricity up' scenario includes a fall in the SPI 200 of 12.5 per cent, electricity price increase of 35 per cent and yield increases of between 10.4 and 12.9 per cent for interest rate futures contracts.
- multi-asset scenarios that model combinations of price movements across the five major contracts (SPI 200, 30-day, 90-day, 3-year, 10-year and 20-year). These scenarios model a range of tilts, twists and bends of the yield curve, as represented by different yield shocks across the 30-day, 90-day, 3-year, 10-year and 20-year contracts; for example, the 'tilt (back end up)' scenario has a 4.2 per cent move in the SPI 200, with progressively increasing yield shocks from short-term to long-term interest rate contracts (a 3 per cent move in the yield of the 30-day and 90-day contracts, a 13 per cent move in the yield of the three-year contract, a 17.4 per cent move in the yield of the 10-year and a 18.7 per cent move in the price of the 20-year contracts).
- single contract scenarios that model extreme price movements in the SPI 200 and five interest rate contracts individually.
- scenarios that model large movements in the interest rate contracts with no movement in equities.
- scenarios that cover a 35 per cent change in the price of electricity contracts.
- scenarios that model a widening or narrowing in the basis between interest rate futures contracts and OTC derivatives.
- forward-looking hypothetical scenarios that represent macroeconomic or market-wide events, such as a commodity price collapse, or an offshore sovereign default.

ASX Clear (Futures) applies 46 additional multi-asset, single contract and interest rate scenarios that incorporate absolute (i.e. basis point) shocks to yields.

For participants that clear OTC derivatives, ASX Clear (Futures) applies 72 multi-asset, single contract and interest rate scenarios, with extensions to capture movements in AUD and NZD swap rates (BBSW, AONIA, BKBM and NZONIA). These scenarios test shocks to exchange-traded derivatives and OTC IRD simultaneously. Shocks to NZD rates and additional NZD scenarios were added during the assessment period, alongside the introduction of the NZD OTC clearing service. These include shocks to the correlation between AUD and NZD rates. The BBSW, BKBM, AONIA and NZONIA curves are split into segments based on differences in participation and activity in the underlying market. Currently,

the price shocks are calibrated using 20 years of data history for the Australian IRD market, and take into account the assumed five-day holding period for OTC derivatives transactions. As for the futures-only scenario, the combined futures and OTC scenarios are sized to be equivalent to once-in-20-year events.

All scenarios for OTC derivatives and portfolio-margined futures apply absolute (i.e. basis point) shocks to yields.

For-information scenarios at both CCPs

In order to better understand the impact of potentially severe market events, ASX also has 'for-information' stress test scenarios (12 in ASX Clear and 77 in ASX Clear (Futures)). These are scenarios that are considered by ASX to go beyond the level of 'extreme but plausible'; accordingly, AIM is not called based on the results of these scenarios.

The CCPs' for-information scenarios include hypothetical event-based scenarios representing macroeconomic or market-wide events – such as a cyber attack on the ASX exchange – and other scenarios based in full or in part on historical market movements both within and outside the 20 year look-back used for credit stress testing.

In addition to the scenarios discussed above, ASX Clear (Futures) also runs for-information scenarios that model shocks affecting a single tenor, the effect of assuming an increased holding period and the impact of an absolute interest rate shock.

Reverse stress testing at both CCPs

In July 2017, the ASX CCPs implemented a new reverse stress testing approach, which involves scaling up a selection of existing stress test scenarios that typically result in the largest stress test losses for each CCP; the aim is to determine the magnitude of shock that would be required to exhaust prefunded financial resources. ASX also considers the impact of the simultaneous default of its largest three, four and five participants (and affiliates). ASX performs reverse stress testing on a monthly basis.

4.7 A central counterparty should have clearly documented and effective rules and procedures to report stress-test information to appropriate decision-makers and ensure that additional financial resources are obtained on a timely basis in the event that projected stress-test losses exceed available financial resources. Where projected stress-test losses of a single or only a few participants exceed available financial resources, it may be appropriate to increase non-pooled financial resources; otherwise, where projected stress-test losses are frequent and consistently widely dispersed across participants, clear processes should be in place to augment pooled financial resources.

Credit stress test exposures are routinely reported to ASX management, the Clearing Boards and the Bank. Participant stress test losses are used to gauge the adequacy of ASX Clear's and ASX Clear (Futures)' prefunded financial resources, with widespread and/or large STEL breaches and Cover 2 capital breaches an indicator that resources may need to be increased. In addition to being reported to ASX management, all Cover 2 capital breaches are escalated in the first instance to the CRO and the Risk Committee, and are further reported to the CEO and CS Boards. The CS Boards and ASX Limited Board are responsible for approving any increase to the default fund where this is considered necessary (see below).

Each participant in ASX Clear or ASX Clear (Futures) is allocated a STEL based on its ICR. During the assessment period, the ASX CCPs introduced a buffer for the purposes of setting participants' STELs

such that the maximum STEL now represents less than half of the default fund for the relevant CCP. Previously, the highest STEL for a participant was set at half of the total default fund of the relevant CCP, reflecting that the ASX CCPs hold prefunded financial resources to cover two participant defaults (and the default of their affiliates). The lowered STELs provide a buffer of pooled prefunded financial resources which, if breached, will trigger an AIM call (see below). This reduces the potential for prefunded financial resources to be breached as a result of a rapid increase in exposures. At ASX Clear, where a group of participants are affiliated (i.e. part of the same corporate group), and the sum of affiliated participants' STELs that would apply if based solely on ICRs exceeds the maximum STEL, an adjustment is applied to the STELs of the affiliated participants. The adjustment ensures that ASX Clear's combined exposure to affiliated participants cannot therefore increase above the assigned group-wide STEL without triggering an AIM call (see below). Since there are only a limited number of affiliated participant groups with combined ICR-based STELs that would exceed ASX Clear's default fund, ASX Clear allows input from these groups as to how the required reduction in STELs is distributed across the group. Currently no ASX Clear (Futures) participants are affiliates.

Where a participant's projected stress test losses exceed its STEL, ASX will call for STEL AIM. At ASX Clear, typically AIM calls are made by 9.30 am and must be met with AUD cash within two hours. At ASX Clear (Futures), STEL AIM is calculated overnight, notified to participants by approximately 8.00 am the next day, and must be met by 11.00 am. Participants may meet ASX Clear (Futures) AIM calls using AUD cash or certain highly rated securities (see CCP Standard 5.1).

In deciding whether ASX Clear and ASX Clear (Futures) have sufficient prefunded pooled financial resources, ASX considers the size, frequency, duration and distribution of AIM calls across participants. ASX Clear and ASX Clear (Futures) would consider increasing these resources if stress test results in excess of prefunded pooled resources were persistent, significant and widespread. In other cases, the CCPs would generally rely on additional collateral collected under the AIM regime.

4.8 A central counterparty should establish explicit rules and procedures that address fully any credit losses it may face as a result of any individual or combined default among its participants with respect to any of their obligations to the central counterparty. These rules and procedures should address how potentially uncovered credit losses would be allocated, including the repayment of any funds a central counterparty may borrow from liquidity providers. These rules and procedures should also indicate the central counterparty's process to replenish any financial resources that the central counterparty may employ during a stress event, so that the central counterparty can continue to operate in a safe and sound manner.

ASX Clear and ASX Clear (Futures) have loss allocation arrangements to fully address any uncovered credit losses that they may face (see CCP Standard 3.5). Further, ASX Clear (Futures) has the power to reduce (i.e. haircut) outgoing payments to participants. The ASX CCPs' also have put in place arrangements to allow for replenishment of their default funds following a draw-down of the funds in the event of a participant default.

Allocation of credit losses

Uncovered credit losses would initially be addressed via Recovery Assessments called from surviving participants:

- At ASX Clear, this would be capped at \$300 million across all participants and distributed in proportion to each participant's average daily initial margin in the quarter prior to the default triggering the loss. A variable cap on individual participant assessments is set based on the participant's average daily initial margin for the quarter prior to the default (see CCP Standard 3.2).

- At ASX Clear (Futures), Recovery Assessments would be capped at the level of participants' default fund contributions, if assessments were called in relation to a single default (a maximum of \$200 million in aggregate); or at three times the level of participants' default fund contributions (a maximum of \$600 million in aggregate), if assessments were called in relation to multiple participants defaulting within a defined default period.¹⁹

If there was a reasonable expectation that Recovery Assessments could be insufficient to address an uncovered loss, ASX Clear (Futures) would have the power to reduce (haircut) outgoing payments to participants in order to allocate losses suffered on the defaulting participant's portfolio. For example, a haircut could be applied to variation margin payments due to participants with net in-the-money positions in the event of mark-to-market loss on the defaulter's portfolio. Payment haircuts could be applied to a broad range of ASX Clear (Futures)' payment obligations, excluding the return of initial margin. There is no cap on the use of payment haircutting to allocate uncovered losses, although ASX Clear (Futures) would consult with the RCC in determining whether to continue payment haircutting if losses allocated via this tool exceed \$650 million or where haircutting continued for a period of more than seven business days.

Any residual losses that could not be addressed via Recovery Assessments or payment haircutting could be allocated to participants via a power available to both CCPs to completely terminate all open contracts. Complete termination would be reserved as a last resort tool if there was no other means of addressing an uncovered loss (including via intervention of the Bank as resolution authority if current proposals for a special resolution regime for FMIs are implemented). Under complete termination, all open contracts at the CCPs would be settled with participants at their current market value, with any residual losses of the CCPs allocated by haircutting settlement payments to participants. Recovery Assessments at ASX Clear are set at a level that seeks to minimise the potential for reliance on complete termination as a loss allocation tool. Reliance on complete termination is also considered extremely unlikely at ASX Clear (Futures), since payment haircutting provides an uncapped mechanism to allocate losses associated with market risk on the defaulter's portfolio. ASX Clear also has a limited capacity to haircut payments, but this only applies to settlement payments in the context of complete termination (see below).

Replenishment

ASX has established a staged process for replenishment of the CCP default funds in the event that these were exhausted or partially drawn down following a participant default. At the end of a 22 business-day 'cooling-off period', the ASX Clear and ASX Clear (Futures) default funds would be fully replenished to up to \$150 million and \$400 million, respectively.²⁰

The enhanced arrangements comprise three key stages: Initial Interim Replenishment, Further Interim Replenishment, and Final Replenishment.

- *Initial Interim Replenishment.* As soon as practicable following the conclusion of the default management process, ASX would contribute an Initial Interim Replenishment amount to restore the default fund up to at least the Minimum Fund Size. In order to reach full financial cover

¹⁹ The cap on assessments for multiple defaults remains in place until the expiry of a 'default period' that commences with the default of the first participant and concludes 22 business days after completion of the default management process for the final defaulting participant, where each default is separated from completion of the default management process for the preceding one by 22 business days or less.

²⁰ The cooling-off period concludes 22 business days after the conclusion of the final default management process initiated during the period. The default funds may be replenished to a level below the pre-default size, subject to the CCP still meeting the cover 2 requirement (see CCP Standard 4.4).

during the cooling-off period, ASX would expect to supplement this contribution with AIM called from participants. The Minimum Fund Sizes for ASX Clear and ASX Clear (Futures) are set at \$37.5 million and \$100 million, respectively. In determining these amounts, ASX sought to balance the liquidity impact of relying on non-pooled resources (i.e. AIM) with the risk of the interim contribution being used to absorb further losses from a subsequent default. ASX expects to review these amounts during the next assessment period.

- *Further Interim Replenishment.* At any time during the cooling-off period, ASX would have the discretion to call for a Further Interim Replenishment amount from clearing participants. This amount would be capped at the level of the Minimum Fund Size for each CCP. Individual clearing participant contributions would be determined in proportion to the risk associated with positions held by the participant prior to the default, and capped at the level of the participant’s maximum Recovery Assessment. Participants would not be required to contribute to Further Interim Replenishment if they satisfied all conditions for resignation prior to the call being made. Participants would be given at least five business days’ notice of their obligations so as to provide sufficient time for approval processes to be completed and funding to be arranged.²¹ ASX would consult with the relevant RCC in determining whether to call for Further Interim Replenishment (including the amount and timing of the call).

Irrespective of the number of defaults within a cooling-off period, the maximum required amount of interim replenishment would be capped at \$75 million for ASX Clear and \$200 million for ASX Clear (Futures), split 50/50 between ASX and its clearing participants. ASX also reserves the right to make additional contributions to the default fund beyond this amount, if it determined this to be appropriate. In the event of a subsequent default during the cooling-off period, ASX’s interim contribution and any funds remaining from the existing waterfall would be used prior to participants’ interim contributions.

- *Final Replenishment.* At the end of the cooling-off period, the CCP default funds would be fully replenished to up to \$150 million for ASX Clear and \$400 million for ASX Clear (Futures), with contributions split 50/50 between the CCP and its participants. ASX would retain the capacity to call additional clearing participant and ASX contributions to restore the default funds to pre-recovery levels as part of a recalibration at the end of the quarter, should stress tests reveal that post-recovery exposures were not being adequately covered.

Standard 5: Collateral

A central counterparty that requires collateral to manage its or its participants’ credit exposures should accept collateral with low credit, liquidity and market risks. A central counterparty should also set and enforce appropriately conservative haircuts and concentration limits.

ASX Clear	ASX Clear (Futures)
Observed	Observed

²¹ If a subsequent default during the cooling-off period depleted the default fund below the Minimum Fund Size, participants could be required to make the contribution as soon as reasonably practicable following completion of that default management process, and potentially as soon as the next day.

5.1 A central counterparty should generally limit the assets it (routinely) accepts as collateral to those with low credit, liquidity and market risks.

The CCPs' approach to collateral is documented in ASX's Collateral Policy and a Collateral Standard. These documents set out the CCPs' collateral eligibility criteria, procedures for review of eligibility, basis for calibrating haircuts, and arrangements for the review of collateral settings. Both ASX Clear and ASX Clear (Futures) review the eligibility of securities accepted as collateral on at least an annual basis, and more frequently if market circumstances dictate.

ASX Clear

Initial and premium margin obligations may be met by posting either AUD cash or non-cash collateral.²² Non-cash collateral is subject to a haircut. Variation and intraday margin obligations must be settled in cash (see CCP Standard 6).

ASX Clear specifies criteria for eligible securities collateral. Acceptable collateral includes: S&P/ASX 200 index constituent stocks (with the exception of ASX Limited stock); exchange-traded funds that ASX Clear determines to be mature and liquid, and for which issuer risk is considered low (currently there are 14 such funds); and other stocks lodged as specific cover for call options written on the same stock. The list of acceptable collateral is reviewed at least quarterly, including to reflect changes to the S&P/ASX 200 index constituent list.

ASX Clear prohibits the use by participants of stock issued by related entities except when it is used as specific cover for a call option written on that stock. ASX Clear also restricts the use as collateral of related entity-issued stocks to client transactions (subject to strict concentration limits), in order to manage the potential risk of the simultaneous default of a participant and the collateral issuer (wrong-way risk). Collateral must be unencumbered.

ASX Clear prohibits the use of bank guarantees to meet ETO margin obligations.

ASX Clear (Futures)

The acceptable collateral in ASX Clear (Futures) depends upon the type of margin called:

- Futures participants generally meet their initial margin obligations using AUD cash, although they may also use high-quality non-cash collateral, such as eligible debt securities, and deposits in major foreign currencies. The acceptable types of non-cash collateral are Australian Government and some semi-government securities, and US Treasury bills. Acceptable foreign currencies are NZD, EUR, JPY, USD and GBP. Acceptable collateral is reviewed annually, with haircuts applied to all non-cash collateral posted and all cash collateral that is not in the same currency as the product being covered.
- Participants may meet STEL AIM obligations using AUD cash or non-cash collateral, including Australian Government and some semi-government securities. Foreign currencies are not eligible for STEL AIM calls.
- Variation margin and intraday margin must be settled in cash.

In order to reduce wrong-way risk, ASX Clear (Futures) does not accept collateral that is issued by a clearing participant or associated entity for any margin calls. ASX Clear (Futures) does not accept bank guarantees or letters of credit as collateral.

²² Premium margin is used to cover the amount that would be required to close out short positions in ETOs (see CCP Standard 6.1).

5.2 In determining its collateral policies, a central counterparty should take into consideration the broad effect of these policies on the market. As part of this, a central counterparty should consider allowing the use of collateral commonly accepted in the relevant jurisdictions in which it operates.

ASX Clear and ASX Clear (Futures) take into account market liquidity in determining the eligibility of collateral:

- ASX Clear considers the equity securities that it will accept as collateral – stocks in the S&P/ASX 200 index and eligible exchange-traded funds – to be sufficiently liquid that the eligibility of these assets as collateral will not have any material impact on market liquidity or price
- ASX Clear (Futures) considers the debt securities that it will accept as collateral – Australian Government and semi-government securities and US Treasury bills – to be sufficiently liquid that the eligibility of these assets as collateral will not have any material impact on market liquidity or price.

In light of the depth of liquidity in these assets, ASX Clear and ASX Clear (Futures) would expect to be able to liquidate such collateral in a timely fashion as required. These assets are well known and understood by participants in the Australian market and are commonly accepted in the Australian market, including by the Bank.

5.3 A central counterparty should establish prudent valuation practices and develop haircuts that are regularly tested and take into account stressed market conditions.

ASX Clear

Since S&P/ASX 200 stocks and eligible exchange-traded funds are highly liquid, price information is readily available. ASX values collateral on a daily basis using end-of-day prices. If there is no price information available for a particular day (for example due to a corporate action), ASX Clear uses the previous day's price to value the relevant asset.

ASX Clear sets three haircut tiers for equity securities placed as collateral: 15%, 20% and 30%. Each security in the eligible exchange-traded funds is assigned to a tier based on a 99.9 per cent confidence level for price moves in that security over a three-day period, based on 20 years of price history (where available). This is equivalent to the fifth-worst price move over a 20 year period. ASX Clear values collateral in its stress testing framework using the same stressed downward price moves that it uses for positions (based on the largest 20-year price fall; see CCP Standard 4.6).²³

ASX does not apply a haircut where participants lodge as collateral the exact amount of a specific stock underlying a short call option position (known as 'specific cover' collateral). If such a participant were to default, any increase in the price of the call option would be matched or exceeded by an increase in the price of the posted collateral.

ASX Clear (Futures)

Since the eligible assets for non-cash collateral at ASX Clear (Futures) – Australian Government and some semi-government securities and US Treasury bills – are highly liquid, price information is readily available. ASX values non-cash collateral on a daily basis using end-of-day prices.

23 If a 20 year look back period is not available, ASX will use the available price history. For example if only 10 years of price history is available, then the haircut is based on the 99.9% worst loss during the 10 years i.e. the 2nd worst loss.

ASX Clear (Futures) sets haircuts on non-cash collateral to cover a fall in the collateral value of securities over a three-day period at a 99.9 per cent confidence level, based on 20 years of price history, where available. This coverage is equivalent to the fifth worst price move over the price history. ASX also applies haircuts using the same methodology to cash collateral lodged to meet margin requirements for products denominated in a currency other than the collateral, although using a one-day holding period. Unlike ASX Clear, ASX Clear (Futures)' current credit stress test framework does not stress collateral using extreme but plausible price moves. Instead ASX monitors on a quarterly basis the impact of the worst price move over the last 20 years on the value of non-cash and non-AUD margin collateral. ASX Clear (Futures) has plans to determine and implement an approach to stress testing collateral in its credit and liquidity stress tests during the next assessment period.

ASX reviews collateral haircut rates in both CCPs at least semi-annually and on a more frequent basis if there are changes in market conditions or collateral eligibility. These reviews take into account any changes to historically observed volatility trends.

5.4 In order to reduce the need for procyclical adjustments, a central counterparty should establish stable and conservative haircuts that are calibrated to include periods of stressed market conditions, to the extent practicable and prudent.

In setting haircuts, ASX Clear and ASX Clear (Futures) use 20 years of price history, which includes the extreme volatility observed during the 2008-09 financial crisis. Determining haircuts using this long time period is intended to ensure that haircuts remain stable over the business cycle, even in stressed market conditions.

5.5 A central counterparty should avoid concentrated holdings of certain assets where this would significantly impair the ability to liquidate such assets quickly without significant adverse price effects.

ASX Clear

ASX Clear limits and mitigates concentration risk in its collateral holdings by restricting non-cash collateral (other than specific cover) to the constituent securities of eligible exchange-traded funds and applying haircuts calibrated to cover a fall in the value of these securities equivalent to the fifth worst price move over a 20 year period. During the assessment period, the maximum value of non-cash collateral held by ASX Clear was \$3.4 billion, after haircuts, which was used to cover around \$1 077 million of margin requirements (of which \$394 million was met with cash). The remaining amount represented excess collateral lodged by participants on both their house and client accounts. On average, around 34 per cent of margin requirements were met using cash collateral during the assessment period.

ASX Clear (Futures)

At ASX Clear (Futures), to date non-cash collateral has comprised only a relatively small share of total initial margin, and cash remains the sole form of collateral utilised by the majority of participants. The maximum holding of non-cash collateral during the assessment period was \$532 million (around 11 per cent of total initial margin). ASX also considers that the assets eligible for non-cash collateral – Australian Government and some semi-government securities and US Treasury bills – are sufficiently liquid that concentration is unlikely to be a significant concern. However, should the materiality of non-cash collateral increase, ASX would expect to apply a similar policy on concentration limits to that applied in the investment mandate (see Standard 15.4). Concentration risk in foreign currencies is

considered whenever a participant approaches ASX for approval to lodge foreign currency collateral (see CCP Standard 5.6).

ASX maintains a risk-based policy for managing concentration risks in both CCPs (see CCP Standards 4.2, 18.4). However, this policy does not address concentration risk in ASX Clear's and ASX Clear (Futures)' collateral holdings.

5.6 A central counterparty that accepts cross-border collateral should mitigate the risks associated with its use and ensure that the collateral can be used in a timely manner.

ASX Clear does not accept any cross-border non-cash or cash collateral.

ASX Clear (Futures) accepts cross-border collateral for initial margin; namely, selected foreign currencies and US Treasury bills. During the assessment period, maximum foreign cash holdings were around \$375 million (AUD equivalent) in comparison to average total collateral holdings of around \$6.4 billion (daily average of collateral holdings during the assessment period), while no US Treasury bills were held.

ASX Clear (Futures)' acceptance of cash margin denominated in a currency other than the currency of the product is subject to its discretion and pre approval on a case-by-case basis. Participants must lodge a request to post foreign currency, which is reviewed and then approved or denied by the Portfolio Risk Management team. In making this determination, the Portfolio Risk Manager takes into account the limits on foreign currency, as well as the concentration risk in accepting the request.

In addition, ASXCC's Investment Mandate specifies metrics for large or concentrated holdings of non-AUD collateral. Escalation to the CRO is triggered:

- if the net present value of a basis point in any single non-AUD currency exceeds \$5000; or
- if non-AUD holdings exceed 25 per cent of liquid assets held by ASXCC. During the next assessment period, ASX plans to replace this threshold with one that applies to non-AUD holdings lodged by each individual participant.

Haircuts are applied to both foreign cash collateral and US Treasury bills (see CCP Standard 5.3).

ASX Clear (Futures) has the ability to use foreign exchange swaps to facilitate the timely use of collateral posted in foreign currencies to cover payment obligations that would arise from a participant default. Arrangements for the settlement of foreign currencies are described in CCP Standard 9.

5.7 A central counterparty should use a collateral management system that is well designed and operationally flexible.

Collateral management system

ASX Clear manages the calculation and execution of margin calls for its equity derivative products through its Derivatives Clearing System (DCS) and Intraday Margining System, and for cash securities through its CMM Razor System. These systems monitor initial and variation margin levels and flows on an intraday basis (although intraday margin is not calculated or called for cash securities, other than AIM for significant net settlement positions; see CCP Standard 6.4). The timely deposit, withdrawal and substitution of non-cash collateral are facilitated by CHES.

ASX Clear (Futures) manages the calculation and execution of margin calls through internal risk analysis and margin management systems. These are linked to its core Genium system for information on positions, SPAN Margin Engine Service for margin parameters and margining, and Austraclear's

EXIGO system for the lodgement of settlement instructions. These systems help ASX Clear (Futures) monitor initial and variation margin levels and flows on an intraday basis. The direct link to Austraclear facilitates the timely deposit, withdrawal and substitution of non-cash collateral and settlement of cash collateral.

ASX Clear (Futures)' participants can also make use of ASX's collateral management service, ASX Collateral, for the management of non-cash collateral lodged with the CCP. However, ASX Collateral was not used for the lodgement of any collateral at ASX Clear (Futures) during the assessment period.

Re-use of collateral

ASX Clear and ASX Clear (Futures) do not re-use non-cash collateral posted by participants and the re-use of such collateral is not permitted under their Operating Rules.

Standard 6: Margin

A central counterparty should cover its credit exposures to its participants for all products through an effective margin system that is risk based and regularly reviewed.

ASX Clear	ASX Clear (Futures)
Broadly observed	Broadly observed

6.1 A central counterparty should have a margin system that establishes margin levels commensurate with the risks and particular attributes of each product, portfolio and market it serves.

Variation (or mark-to-market) margin is called by ASX Clear on cash market positions for equities in the All Ordinaries Index and long and short LEPOs; it is collected from the participant with a mark-to-market loss and, depending on the product, either passed through in cash to the participant with a mark-to-market gain, or recognised as a credit (see CCP Standard 6.4). ASX Clear also calls premium margin on short ETO positions, updating this daily to reflect mark-to-market changes in the close-out price. ASX Clear (Futures) calls variation margin on all products.

ASX Clear and ASX Clear (Futures) apply initial margin to all products, using a variety of models.

Cash equities

ASX Clear's CMM approach involves the calculation and collection of initial margin requirements in respect of most unsettled cash securities transactions. The selected methodology for initial margin calculation for most of the more liquid securities is based on HSVaR. The HSVaR methodology uses historical price moves to calculate hypothetical changes in the value of a portfolio of securities, and determines a margin requirement from these taking into account the desired degree of confidence (see CCP Standard 6.3). For less liquid stocks, or securities with an insufficient price history to apply HSVaR, ASX Clear applies flat rate margins. Currently 49 of the 500 stocks that make up the All Ordinaries Index are margined on a flat rate basis. Margins calculated using HSVaR currently make up around 40 per cent of initial margin collected through the CMM system. Around 50 per cent of flat rate margin collections relate to trades in warrants and stocks outside the All Ordinaries Index, which attract higher margin rates. Transactions in depository interests in Australian Government securities are margined according to the flat rate applied to fixed interest products. CMM margin rates are reviewed on a three-monthly cycle.

Cash securities transactions generated by exercise of ETOs or LEPOs are also margined using CMM between exercise and settlement. The settlement obligations of the ETO or LEPO buyer include the exercise price, final margin payments and the outstanding balance of the premium. Prior to exercise, ETOs and LEPOs are margined using CME SPAN (described below).

Derivatives

Both ASX Clear and ASX Clear (Futures) use a variant of CME SPAN for the margining of derivatives positions (see CCP Standard 6.3). CME SPAN margin parameters are reviewed on a three-monthly cycle. Regular margin rate reviews are supplemented with ad hoc reviews during especially volatile market conditions.

OTC derivatives

ASX Clear (Futures) margins OTC derivatives portfolios, including interest rate futures that have been allocated for portfolio margining with OTC derivatives positions (see CCP Standard 6.5), using an FHSVaR model within the Calypso margin system.

6.2 A central counterparty should have a reliable source of timely price data for its margin system. A central counterparty should also have procedures and sound valuation models for addressing circumstances in which pricing data are not readily available or reliable.

ASX Clear and ASX Clear (Futures) have access to timely price data for the majority of exchange-traded products. Price data for cash market products and exchange-traded derivatives are sourced from the ASX Trade and ASX Trade 24 markets. For less liquid stocks (e.g. stocks outside the All Ordinaries Index and warrants) and new stocks for which there is insufficient historical price data ASX Clear applies flat rate margins. Flat rates are based on available price information for individual stocks in the All Ordinaries Index or for grouped categories of other products.

The settlement value of ETOs cleared by ASX Clear is calculated throughout the day using the Derivatives Pricing System (DPS). The DPS uses traded prices where available but the system is able to extrapolate prices from previous pricing periods or untraded bids and offers where traded price data are not available. For less liquid stock options, DPS compares calculated prices against trades in similar options, takes into account limits on implied volatilities, and smooths and imposes restrictions on the slope and convexity of deemed volatility curves. For OTC equity options, ASX Clear interpolates the value using the prices of similar ETOs.

To value cleared OTC derivatives products ASX Clear (Futures) uses a range of BBSW, ICAP and Reuters pricing points, the official cash rate, pricing from 90-day bank bill futures contracts, and swap yields for contracts greater than three years. These sources provide sufficient pricing points to value the OTC derivatives products that ASX Clear (Futures) clears, even when some pricing data are not readily available or reliable. Prices are also compared against Bloomberg prices for second source validation, and ASX may contact brokers for indicative pricing information if other sources are unavailable. Prices for the OTC IRD margin system are updated hourly. Participants are given all information necessary to create an end-of-day yield curve and independently calculate the net present value of any contract.

OTC valuations and exposures based on these prices are combined with data covering other positions cleared on ASX Clear (Futures) to calculate each participant's overall margin requirement. This task is performed on an hourly basis, and may also be performed on an ad hoc basis as market conditions warrant (see CCP Standard 6.4).

ASX has procedures and contingencies in place for situations in which prices are not available or are deemed to be unreliable (for example, in a market outage). The ASX CCPs rely on the last traded price

unless there is evidence of material market movements from related products. In that case, ASX may model the price of exchange-traded derivatives using the underlying asset. For example, for equities in the S&P/ASX 200 ASX may use price movements in the SPI futures contract, or other indices or information from brokers, as a proxy.

6.3 A central counterparty should adopt initial margin models and parameters that are risk based and generate margin requirements sufficient to cover its potential future exposure to participants in the interval between the last margin collection and the close out of positions following a participant default. Initial margin should meet an established single-tailed confidence level of at least 99 per cent with respect to the estimated distribution of future exposure. For a central counterparty that calculates margin at the portfolio level, this requirement applies to each portfolio's distribution of future exposure. For a central counterparty that calculates margin at more granular levels, such as at the sub-portfolio level or by product, the requirement should be met for corresponding distributions of future exposure. The model should: use a conservative estimate of the time horizons for the effective hedging or close out of the particular types of products cleared by the central counterparty (including in stressed market conditions); have an appropriate method for measuring credit exposure that accounts for relevant product risk factors and portfolio effects across products; and to the extent practicable and prudent, limit the need for destabilising, procyclical changes.

The ASX CCPs apply different margin models for exchange-traded derivatives, OTC derivatives and cash security transactions.

Exchange-traded derivatives (CME SPAN)

For exchange-traded derivatives transactions, ASX Clear and ASX Clear (Futures) calculate initial margin requirements using the CME SPAN methodology. For both CCPs, each house or client account is considered a separate portfolio when calculating margin under the CME SPAN methodology.

The key parameters in the CME SPAN methodology are the price scanning range (PSR) and the volatility scanning range (VSR). These scanning ranges are individually calibrated to the distribution of price and volatility movements for a set of related contracts, such that the ranges cover a pre-specified confidence interval of price and volatility movements. The scanning ranges are then varied to create a set of 16 hypothetical risk scenarios which represent different combinations of changes in price and volatility. For example, in one risk scenario, price increases by one-third of the PSR and volatility falls by the full VSR, while in another scenario price falls by the full PSR and volatility rises by the half of the VSR. The CCPs then calculate a portfolio's hypothetical loss under each of the scenarios, and the margin rate is based on the highest estimated loss across the 16 scenarios.

ASX Clear and ASX Clear (Futures) base the scanning ranges on key volatility statistics; namely, the higher of 2.75 standard deviations (a confidence interval of 99.7 per cent assuming a normal distribution) of a 60-day or 252-day sample distribution, using the higher of one- or two-day price movements for the majority of products. In using two sample periods, ASX aims to balance incorporating recent market conditions with avoiding destabilising procyclical changes. ASX does not currently have a formal process to assess the relevance of historical periods of stress in its margin sample periods.

During the assessment period, ASX updated its Margin Policy to increase the frequency at which margin parameters are reviewed from quarterly to monthly, and extended the historical sample period used to calibrate margin parameters for exchange-traded derivatives (ETD) at ASX Clear (Futures) from one year to five years, as well as reducing the target confidence level of initial margin coverage for these products from 99.7 per cent to 99.5 per cent. ASX has introduced the change in

target confidence level for electricity products and plans to implement the other changes in the next assessment period.

During the assessment period ASX also amended its backtesting approach to incorporate the maximum possible time between the point at which it last collected margin from the defaulting participant and the point at which the market risk on the portfolio has been extinguished. ASX introduced 'point of default' tests which assess the adequacy of initial margin to cover losses on a participant's portfolio as it would be at the point of a hypothetical default. These tests take into account that initial margin held may have been collected in respect of a participant's positions as they were on the day before default, since the default may occur before the receipt of the previous day's end-of-day margin. ASX plans to develop an approach to incorporating default prior to the receipt of variation margin in its stress testing at ASX Clear (Futures) during the next assessment period.

In response to a recommendation made in the previous assessment, ASX has carried out analysis of the margin period of risk (MPOR) assumptions used in initial margin models for all products, and reviewed these assumptions in light of this analysis (also discussed in relation to OTC derivatives and cash securities below). ASX concluded that a two-day MPOR is appropriate for the majority of exchange-traded derivatives products at ASX Clear and ASX Clear (Futures), with the exception of electricity derivatives in ASX Clear (Futures) (see section 2.1.2). The MPOR used to determine initial margin parameters for electricity derivatives was increased to three days in January 2018.

ASX Clear and ASX Clear (Futures) also apply a series of adjustments within CME SPAN to account for correlations and specific risks.

- *Intra-commodity spread charge (ASX Clear (Futures) only)*. This is an upward adjustment to the margin requirement for a given set of related futures contracts, to account for less-than-perfect correlation between contracts with different expiries. The adjustment is based on a participant's actual net position at each expiry month multiplied by an 'intra-commodity charge rate', which is itself based on observed price correlations between the different expiries. The default setting is to apply a single charge rate across all expiries of a single product. However, for some contracts ASX Clear (Futures) varies charge rates across expiries to account for differences in correlations between sets of expiries.
- *Inter-commodity spread concession (ICC)*. ASX Clear and ASX Clear (Futures) apply ICC offsets designed to account for reliable correlations across different contract types or across different stock option positions (see CCP Standard 6.5). These offsets reflect that, while the scanning risk for each related contract – a 'combined commodity' in CME SPAN terminology – is set based on the worst-case risk scenario for that combined commodity, it is highly unlikely that the set of worst-case scenarios occurs simultaneously. This is particularly the case if a participant holds net long and net short positions in different related contracts that have a robust positive correlation.

ASX applies two different types of ICCs: hedging offsets and stability offsets. Hedging offsets are provided where a participant has offsetting positions in contracts with robust positive correlations (where losses from one contract are likely to be offset by gains in the other contract). Stability offsets, only recognised at ASX Clear, are provided where a participant has long/long or short/short positions in two contracts, in recognition of the risk-reducing benefits provided by portfolio diversification.

The ICC is calculated by applying, in a defined order, a spread ratio and concession rate to a participant's actual net positions in pairs of related contracts. The spread ratio determines

the number of net positions in one related contract required to offset a position in another related contract. The concession rate is specified as a percentage of the scanning risk for both contracts in the pair. For example, for 10-year bond futures relative to 90-day bank bill futures, a spread ratio of 1:4 and a concession rate of 40 per cent would mean that one net position in the 10-year bond contract is offset against four net positions in the 90-day bank bill contract, and that the concession for that pairing will be 40 per cent of the scanning risk of the contracts subject to the offset. ASX calculates these parameters in the same manner as the price movement for the intra-commodity spread charge.

- *Other adjustments.* ASX Clear and ASX Clear (Futures) apply an adjustment to cover the CCP's exposure on the day of contract expiry, since expiring positions are otherwise not included in that day's initial margin calculations. ASX Clear also maintains a minimum margin requirement on short positions to ensure the collection of margin on deep out-of-the-money options that would otherwise return no scanning range.

ASX targets coverage from the major inputs (including the PSR and VSR) to a 99.7 per cent confidence level. Other inputs are calibrated to exceed a 99 per cent confidence interval.

ASX applies add-ons to key CME SPAN parameters to address the risk that bid/offer spreads widen when ASX is closing out a defaulting participant's portfolio (i.e. liquidity risk on these products).²⁴ The spread risk add-ons are applied to agriculture futures and less actively traded ETOs. The add-ons are not applied to ETOs on SPI futures and the 20 most actively traded stocks, as ASX has indicated the spread risk is not significant enough to require an add-on charge. To calibrate the add-ons for each product, ASX uses a 99.7 per cent confidence interval over a 12-month sample of bid/offer spreads, using the most conservative 12-month sample from the last five years. In its September 2017 assessment, the Bank recommended ASX Clear and ASX Clear (Futures) should complete the implementation of add-ons to manage liquidity risk for cash equities and products margined using the CME SPAN model. During the assessment period, ASX began investigating a new, alternative, approach to capturing liquidity risk in its margin models. The Bank will review ASX's new approach in due course.

OTC derivatives

ASX Clear (Futures) uses an FHSVaR model to calculate margin requirements for OTC derivatives, based on a historical sample period since June 2008. The inclusion of extreme observations from the second half of 2008 aims to ensure that the methodology remains conservative and limits the need for procyclical changes during periods of elevated market volatility. ASX does not currently have a formal process to assess the relevance of historical periods of stress in its margin sample periods. ASX Clear (Futures) calibrates initial margin based on a 99.7 per cent confidence interval with an assumed holding period of five days, consistent with the Bank's supplementary interpretation of this sub-standard. ASX uses its OTC default management fire drills to test the MPOR assumptions used in the FHSVaR initial margin model. ASX concluded that there was no need to revise the current MPOR for OTC products, set at five days for house positions and seven days for client positions. ASX plans to develop an approach to incorporating default prior to the receipt of variation margin in its stress testing at ASX Clear (Futures) during the next assessment period (see 'Exchange-traded derivatives' above).

The FHSVaR model uses historical interest rate moves to calculate a hypothetical distribution of potential changes in a portfolio's value over the close-out period. In an FHSVaR model, historical price

24 CME SPAN parameters are typically calculated using mid prices.

movements are 'filtered' or scaled to reflect the level of current market volatility. For instance, if current volatility is high relative to previous periods, price changes from previous periods would be scaled up. As a result, margin requirements better reflect the volatility observed in current market conditions compared with an HSVaR model. Volatility is calculated using an exponential decay factor (currently 0.97), which places greater weight on more recent observations.

ASX also applies a floor to its volatility scaling factor, which limits the extent to which margin requirements are reduced in low volatility conditions, helping to limit procyclicality. For the past few years, ASX has maintained this floor at or above 100 per cent. This means that while margin requirements may be scaled up in high volatility periods, they are not scaled down in low volatility periods. This reduces the potential for variability in margin requirements if a low volatility period is followed by a high volatility period.

To account for additional costs that might arise from the close-out of a large and/or illiquid OTC derivative portfolio, ASX applies a liquidity multiplier to the initial margin requirement calculated using the FHSVAr model. The size of the applicable liquidity multipliers are calculated as a percentage of initial margin requirements, based on participant estimates of the market capacity and liquidity costs that may be faced in a close-out scenario. ASX administers an annual survey asking OTC participants to report on the largest volume of OTC IRD that they believe they could execute at the quoted market price for a range of tenor points, and an estimate of the additional cost that would be incurred should a counterparty need to execute a range of larger trades. Currently, the multipliers range from 5 per cent for OTC initial margin requirements above \$50 million, to 33 per cent for initial margin above \$500 million.

Cash securities (CMM)

For securities in the ASX 500 All Ordinaries index with more than two years of continuous price data ASX Clear uses an HSVaR-based model to calculate margin requirements. ASX Clear splits HSVaR-margined securities into two groups – ASX 200 securities and other All Ordinaries securities – and calculates initial margin independently for each group. The HSVaR model is calibrated and adjusted to meet a single-tailed confidence interval of 99.7 per cent of the estimated distribution of future exposure. Estimates of the distribution of future exposure under this model are based on 2 years of 1-day price moves (see CCP Standard 6.5). ASX does not currently have a formal process to assess the relevance of historical periods of stress in its margin sample periods.

Since HSVaR requires reliable and uninterrupted price data, it is only applied to transactions in sufficiently liquid securities, namely those in the ASX 500 All Ordinaries with more than two years of price history. Even so, the small number of observations of price movements beyond the 99th percentile makes it difficult to construct reliable estimates of the desired 99.7 per cent margin coverage. ASX therefore applies a portfolio add-on factor (currently 30 per cent) to the HSVaR estimate of potential future exposure at a 99 per cent confidence level to achieve the desired 99.7 per cent level of cover.

For securities that do not have the required price history to apply HSVaR, ASX applies flat rate margin intended to cover 1-day price moves with a 99.7 per cent confidence at a portfolio level. Flat rates are based on available price information for individual stocks in the All Ordinaries Index, or for grouped categories of other products. Margin obligations are calculated by applying the relevant flat rate to the net novated settlement obligation for an individual security or category of products, with no offsets permitted between different flat rate groups. In order to achieve the desired confidence level at the portfolio level, confidence intervals and holding periods applied to individual stocks differ according to liquidity and available price information. Stocks in the S&P/ASX 200 target a 99.7 per

cent confidence interval applied to a 1-day holding period; other stocks in the All Ordinaries target a 97 per cent confidence interval over a 2-day holding period; and all other products target a 95 per cent confidence interval over a 3-day holding period. The lower confidence intervals for the latter two groups reflect the difficulty of constructing reliable estimates of the extremities of the distributions of price movements for securities with limited price history and/or liquidity. Longer holding periods for these securities are assumed in order to approximate a higher coverage level over a 1-day holding period. Backtesting seeks to verify that the flat rates for less liquid securities provide cover for both the target confidence interval and holding period at the level of the individual security or product grouping, and to at least a 99.7 per cent confidence interval at the cash security portfolio level (see CCP Standard 6.6).²⁵ ASX's analysis of MPOR assumptions used in the CMM initial margin model concluded that it should increase the MPOR from one day to two days for products margined using the HSVaR model and for ASX 200 products margined on a flat-rate basis. The analysis concluded that the current two- or three-day MPORs used for remaining flat-rate products are appropriate. ASX plans to develop an approach to incorporating default prior to the receipt of variation margin in its stress testing at ASX Clear and ASX Clear (Futures) during the next assessment period (see 'Exchange-traded derivatives' above).

Both CCPs – all products

Discretion

Under ASX's internal Margin Standard, management discretion can be used if the application of the standard statistical analysis would result in inappropriate outcomes, for example, if the backward-looking statistical analysis does not take appropriate account of expected future price movements. Other reasons for using management discretion include insufficient historical data (e.g. where a product is new), seasonality in some products, and isolated spikes in price movements that result in a distortion of statistical recommendations. The ASX Margin Standard also allows exceptions to the normal margin rate-setting process based on a broader risk assessment. Where such exceptions are made outside of a RQWG approved margin review, they require the approval of the General Manager of CRPM and the General Manager of CRQD.

Wrong way risk

Specific wrong-way risk arises when there is a direct relationship between the CCP's exposure to a participant and that participant's credit quality. This can occur if a participant clears a product directly related to them, or if they post collateral issued by them. The ASX CCPs do not accept collateral issued by a clearing participant (or associated entity) for any margin calls, except at ASX Clear when the collateral is used as specific cover for a call option written on that stock (see CCP Standard 5.1). ASX Clear also allows use of related-entity stocks as collateral for client transactions, but this is subject to strict concentration limits. ASX also monitors participants posting stock as collateral for short put options on that stock; in the event this risk was substantial or persistent, ASX would liaise with the participant and may impose additional margin requirements or require the participant to reduce their exposure to the stock.

25 Flat rates effectively assume independence of price movements between securities subject to flat rates. Unless a portfolio is highly concentrated in a small number of flat rate securities, it is likely that this assumption would lead to coverage at the portfolio level that exceeds the targeted confidence interval for individual securities.

6.4 A central counterparty should mark participant positions to market and collect variation margin at least daily to limit the build-up of current exposures. A central counterparty should have the authority and operational capacity to make intraday margin calls and payments, both scheduled and unscheduled, to participants.

ASX Clear

Margin requirements are calculated overnight, with variation, mark-to-market, and premium margins based on closing prices each day. These are notified to participants the next morning. All margin obligations are settled via Austraclear and regular calls must be met by 10.30 am.

- For cash market transactions, mark-to-market margin is calculated in respect of securities in the All Ordinaries Index and added to initial margin if prices have moved against the participant. If prices have moved in favour of the participant then an offset may be applied to the participant's initial margin requirement, but this is capped by the level of initial margin. Mark-to-market margin is not called on securities that are not within the All Ordinaries as up-to-date price data may not be available for all of these securities.
- Variation margin is levied on all LEPO and futures positions to reflect observed price movements. Variation margin is collected from the participant with a mark-to-market loss and passed through in cash to the participant with a mark-to-market gain.
- ASX Clear levies premium margin on net short ETO positions, updating this daily to reflect mark-to-market changes in the close-out price. Premium margin is conceptually similar to variation margin and based on daily mark-to-market changes in the value of the net position. Premium margin collected is held by ASX.

ASX Clear does not perform scheduled intraday margin calculations, but an intraday margin run will be triggered in response to large market movements on derivatives positions. ASX will recalculate margin requirements if there is a movement in the S&P/ASX 200 exceeding 1 per cent, or a movement in a stock price (for stocks underlying ETOs) exceeding 15 per cent. If one of these triggers is met, ASX would calculate the net mark-to-market losses on all derivatives positions and the initial margin on any new derivatives positions opened during the day.

To determine if intraday margin is required, a nominal call amount is calculated for each portfolio of the participant (house and client) based on the combined initial and variation margin that would be due at the time of the intraday calculation. This is compared with the total margin posted by the participant. Where a participant's margin shortfall relative to the calculated requirement is greater than \$100 000 and represents an erosion of initial margin of 25 per cent or more, ASX Clear calls intraday margin. The settlement deadline for intraday margin calls from participants is two hours.

ASX Clear (Futures)

Margin requirements for both futures and OTC participants are calculated overnight, with variation margins based on closing prices each day, and notified to participants the next morning. All margin obligations are settled via Austraclear and regular calls must be matched in Austraclear by 10.30 am and settled by 11.00 am.

ASX Clear (Futures) offers clearing services on a 24/6 basis and so it faces intraday risk during both during the day, and overnight.

Day Session (8.30 am to 4.30 pm)

ASX Clear (Futures) conducts two scheduled intraday margin runs during its Day Session, at 11.10 am and 1.30 pm. ASX Clear (Futures) is also able to conduct ad hoc intraday margin runs during the Day Session, and will do so in response to large price movements in key contracts. Ad hoc runs are triggered if the change in price of an individual contract exceeds 100 per cent of its margin rate (the PSR in CME SPAN)²⁶ or the ASX/S&P 200 index price changes by 1 per cent or more intraday. Intraday margin calls must be met by participants within one hour of notification.

ASX also recalculates margin on OTC derivatives hourly, and may call for additional margin during the Day Session if one or more participants' margin requirement exceeds their excess collateral lodged with ASX. ASX also runs pre-novation checks on back-loaded OTC trades or trades transferred from another CCP and may require pre-collateralisation on these trades. Relative to new trades, ASX has a low appetite for accepting pre-existing trades on an uncollateralised basis, given the potential for these trades to have larger immediate exposures. During the assessment period, ASX Clear (Futures) also halved the previous risk-based erosion thresholds that applied to intraday calls. These changes are designed to ensure that a greater proportion of intraday exposures are collateralised in the lead-up to the Night Session.

Night Session (5.10 pm to 7.00 am)

ASX Clear (Futures) runs hourly margin calculations during the Night Session; however, participants are unable to make AUD margin payments overnight since the Australian payments system is closed. During the assessment period, ASX Clear (Futures) implemented a number of measures to improve its management of intraday exposures created during the Night Session:

- ASX Clear (Futures) introduced a 2am call for initial margin from Futures and OTC clearing participants that meet certain criteria.²⁷ Calls are made in USD to cover any initial margin shortfalls greater than \$3m for house accounts and \$5m for client accounts.
- Participants subject to the 2am call are also required to post additional collateral to reduce the likelihood that a call for variation margin would be required overnight. The size of the required buffer for each account is calculated based on the 80th percentile of daily mark-to-market movements between the final call of the day session and the 2am call. ASX calculates the buffer based on one year's worth of data and plans to recalibrate the buffer quarterly.
- An additional intraday margin run at 8.05 am, which applies to all ASX Clear (Futures) clearing participants, was introduced, reducing the duration of overnight margin exposures by around two hours.
- In line with a recommendation from the previous assessment, ASX is continuing its work to put in place arrangements to monitor and manage intraday exposures created during the Night Session on a near real-time basis. ASX expects to implement its proposed arrangements for ASX Clear (Futures) by end 2018.

26 For the NZ 90-day bank bill traded on the New Zealand Futures & Options Exchange, an ad hoc run is triggered if the change in the price of the contract exceeds 50 per cent of its margin rate.

27 The criteria are that the participant: accounts for more than 2 per cent of total initial margin and experiences a build up in overnight exposures of \$10 million (over the review period) for either of its house or client accounts; or the clearing participant accounts for more than 25 per cent of clearing for night session activity.

Both CCPs

Under ASX Clear's and ASX Clear (Futures)' AIM methodology, a participant is required to post additional collateral should stress test outcomes reveal potential losses that exceed a predetermined STEL, or if certain participants have large portfolios relative to their capital (see CCP Standards 4.3 and 4.7). During the assessment period, ASX also introduced processes to monitor net settlement positions at ASX Clear on an intraday basis and call for AIM if necessary. This aims to address the risk that a large intraday build-up in a participant's cash equities positions could contribute to a breach of the Cover 2 requirement.

For all intraday and end-of-day margin calls, ASX monitors the payment progress of participants in the period prior to the time payment is due, in order to identify any participant that hasn't matched and settled. In most cases, the early intervention and relevant escalation processes result in any operational problems being solved ahead of the payment deadline. If a margin payment is not made by the required time, ASX has the right to call a default event. Such circumstances are rare.

6.5 In calculating margin requirements, a central counterparty may allow offsets or reductions in required margin across products that it clears or between products that it and another central counterparty clear, if the risk of one product is significantly and reliably correlated with the risk of the other product. Where a central counterparty enters into a cross-margining arrangement with one or more other central counterparties, appropriate safeguards should be put in place and steps should be taken to harmonise overall risk management systems. Prior to entering into such an arrangement, a central counterparty should consult with the Reserve Bank.

CME SPAN

In applying the CME SPAN methodology to derivatives transactions, ASX Clear and ASX Clear (Futures) allow offsets in the form of ICCs (see CCP Standard 6.3). These offsets reduce margin requirements to account for reliable correlations observed across related contracts. ASX applies two different types of ICC: hedging offsets and stability offsets. Hedging offsets are provided where a participant has offsetting positions in contracts with robust positive correlations (where losses from one contract are likely to be offset by gains in the other contract). Stability offsets, which are only recognised at ASX Clear, are provided where a participant has long/long or short/short positions in two contracts, in recognition of the risk-reducing benefits provided by portfolio diversification.

ICCs are only applied at ASX Clear where measures of correlation between contracts exceed 30 per cent, while at ASX Clear (Futures) ICCs may be applied if either the correlation coefficient or the calculated ICC exceeds 30 per cent. Hedging offsets are subject to a cap of 40 per cent at ASX Clear and 80 per cent at ASX Clear (Futures), and stability offsets are subject to a 20 per cent cap.

Changes to ICCs must be approved by the RQWG, which considers whether changes identified by CME SPAN appropriately reflect underlying economic relationships, including in periods of market stress.

During the assessment period, ASX completed implementation of its revised sensitivity analysis framework (see CCP Standard 6.6). The revised framework includes tests of the robustness of the offsets in ASX's margin models to changes in correlations, including the impact of a complete erosion of correlations underlying its ICC offsets.

VaR Models

ASX's VaR-based models for cash market products and OTC derivatives calculate margin based on the historical distribution of the portfolio's value over the sample period. As a result, offsets based on historically observed price correlations between products are inherently recognised in the margin calculation.

ASX Clear (Futures) also facilitates the allocation of a set of interest rate futures in an OTC participant's house account to be margined (using FHSVAr) within the portfolio of the participant's cleared OTC derivatives. Offsets for these futures, including against OTC derivatives, are similarly implicitly recognised within the FHSVAr model. ASX offers participants a tool which can automatically optimise the allocation of futures positions to a participant's OTC derivatives portfolio. This tool identifies and allocates eligible futures contracts within a participant's portfolio that will, if reallocated to the participant's OTC derivatives portfolio, lead to a reduction in total calculated OTC exposure – and therefore also total initial OTC margin – without increasing the aggregate of OTC and ETD margin. Prior to the introduction of this tool, participants had to manually identify and allocate specific futures contracts for portfolio margining.

Portfolio margining recognises the economic relationship between AUD IRD and AUD interest rate futures and, to the extent that positions are indeed offsetting, would be expected to result in a reduction in the amount of initial margin required relative to the case in which positions were margined independently. The robustness of the empirical relationship between AUD IRD and AUD interest rate futures in a variety of market conditions is addressed through the Historic VaR margining process, which captures variation in the basis during a variety of market conditions. In particular, the use of an extended look-back period helps to validate the reliability of the historical correlations during periods of market stress. The significance and reliability of the correlations underlying offsets in both the CMM HSVAr and the OTC FHSVAr models are also subject to regular verification through backtesting (see CCP Standard 6.6).

In the case of the NZD IRD contracts, ASX uses the existing VaR model used to calculate AUD OTC margins to calculate margins on a combined AUD and NZD OTC portfolio, with initial margin payable in AUD and variation margin payable in NZD. The model reflects the correlation of AUD interest rate and foreign exchange movements.

ASX Clear and ASX Clear (Futures) do not currently have any cross-margining arrangements with any other CCPs.

6.6 A central counterparty should analyse and monitor its model performance and overall margin coverage by conducting rigorous daily backtesting and at least monthly, and more frequent where appropriate, sensitivity analysis. A central counterparty should regularly conduct an assessment of the theoretical and empirical properties of its margin model for all products it clears. In conducting sensitivity analysis of the model's coverage, a central counterparty should take into account a wide range of parameters and assumptions that reflect possible market conditions, including the most volatile periods that have been experienced by the markets it serves and extreme changes in the correlations between prices.

Backtesting

Under ASX's Model Validation Standard, daily backtesting of the CME SPAN, CMM and the OTC IRD FHSVAr margin models is used to test, on an ongoing basis, whether the margin models reliably cover price movements to a 99.7 per cent confidence interval. Daily backtesting is performed against participant and client portfolios. ASX also tests key model parameters, including the PSR and VSR in CME SPAN, and flat rates for cash market products. In the case of a participant or client portfolio, backtesting involves the comparison of actual initial margin collected from a participant or client against hypothetical variation margin calculated over the relevant close-out period, while holding the

portfolio composition constant.²⁸ This simulates initial margin erosion on a defaulted participant's portfolio prior to successful close-out or hedging of the portfolio by ASX. When total variation margin is greater than initial margin an 'exception' is recorded. Validation and Oversight compares the number of exceptions to the expected number of exceptions, based on a 99.7 per cent confidence interval. ASX also backtests key model parameters, including the PSR and VSR in CME SPAN and flat rates for cash market products.

A report summarising the results of backtesting is automatically generated and circulated to relevant staff in the Risk division. Results are also disclosed to participants and the Bank on a quarterly basis. Further analysis is undertaken by ASX when an exception is recorded, both to investigate model performance and to investigate the potential financial implications of the exception given the particular participant and portfolio affected. Where an exception is recorded against an individual client account, this investigation will proceed only if the dollar value of the exception breaches a materiality threshold. Further investigation also takes place if the actual number of exceptions exceeds the expected number. By investigating further, ASX determines whether any follow-up actions are required, such as the calling of additional margin or the managing down of positions.

Daily backtesting reports are aggregated into a monthly backtesting report which compares the number of observed exceptions to expected exceptions for the previous month, quarter and year. This report is reviewed by the RQWG and used to identify the need for further investigation of margin model performance. RQWG will take into account the frequency and magnitude of any breaches in determining whether to commission additional analysis from CRQD.

Sensitivity analysis

During the assessment period, ASX implemented an updated sensitivity analysis framework and expanded the product scope covered by this analysis. ASX's approach assesses the sensitivity of margin requirements to changes in all key margin parameters, including the MPOR, look-back period and confidence interval. ASX also conducts 'reverse sensitivity analysis' on CME SPAN margin models, to determine the degree to which key CME SPAN parameters need to be varied in order to breach target initial margin coverage. ASX performs its sensitivity analysis on the CME SPAN, OTC FHSVAr and CMM models on a monthly basis. The revised sensitivity analysis framework extends ASX's CMM backtesting to test the coverage of the HSVaR component of the CMM model and the flat rate component of the CMM model both separately and at a combined level.

6.7 A central counterparty should regularly review and validate its margin system.

ASX's Model Validation Standard requires that all models relating to ASX Clear's and ASX Clear (Futures)' margin methodologies (Calypso, CME SPAN, Margin Optimiser and CMM/Razor) undergo a full annual validation and ongoing review (see CCP Standard 2.6). The RQWG is responsible for reviewing the regular reviews of models carried out by CRQD, while Internal Audit coordinates the independent validation process with CRQD input.

At ASX, the CCPs' margining processes are governed by an internal Margin Policy and Margin Standard which is reviewed annually, with material changes approved by the Clearing Boards. The authorisation and documentation process for margin parameter changes and guidelines for the application of management discretion are also reviewed annually.

28 For the CME SPAN and CMM models, initial margin is compared against variation margin collected over the following one or two days, depending on which is the larger amount. For the OTC interest rate swap FHSVAr model initial margin is compared against variation margin collected over the following five days.

ASX publishes detailed information on the CCPs' margining arrangements on its website, including descriptions of the margining methodology, schedules of margin rates, and daily CME SPAN margin parameter files. These files allow participants to perform margin calculations on hypothetical or actual portfolios. A number of third-party vendors use this information to provide margin estimation software to participants. ASX also maintains a web-based margin estimator that participants and their clients can use to calculate margin requirements on ETO positions, as well as a margin simulator that allows OTC participants to estimate margin requirements on OTC derivatives and portfolio-margined futures positions.

6.8 In designing its margin system, a central counterparty should consider the operating hours of payment and settlement systems in the markets in which it operates.

ASX Clear's services are limited to CCP clearing of ASX-quoted cash securities and derivatives transactions executed on the ASX markets, as well as ASX- and non-ASX-quoted cash market securities transacted on AMO platforms under the TAS. ASX Clear's operating hours are consistent with the relevant payment and settlement systems (ASX Settlement, Austraclear and the Reserve Bank Information and Transfer System (RITS)).

ASX Clear (Futures) primarily provides clearing services for the Australian-based ASX 24 market and the AUD-denominated OTC interest rate swap market. ASX Clear (Futures)' timetables for margin calculation and collection are consistent with the operating hours of the relevant payment and settlement systems (Austraclear and RITS, as well as NZClear for NZD margin). However, as ASX Clear (Futures) clears trades during a Night Session it also needs to have arrangements to manage exposures from trades entered into outside of these hours (see Section 3.6.2).

Standard 7: Liquidity risk

A central counterparty should effectively measure, monitor and manage its liquidity risk. A central counterparty should maintain sufficient liquid resources in all relevant currencies to effect same-day and, where appropriate, intraday and multiday settlement of payment obligations with a high degree of confidence under a wide range of potential stress scenarios that should include, but not be limited to, the default of the participant and its affiliates that would generate the largest aggregate liquidity obligation for the central counterparty in extreme but plausible market conditions.

ASX Clear	ASX Clear (Futures)
Broadly observed	Broadly observed

7.1 A central counterparty should have a robust framework to manage its liquidity risks from its participants, commercial bank money settlement agents, nostro agents, custodians, liquidity providers and other entities.

Sources of liquidity risk

ASX Clear and ASX Clear (Futures) face liquidity risk from two sources:

- *Default liquidity risk.* The primary source of liquidity risk in ASX Clear and ASX Clear (Futures) is the potential payment obligations arising from the default of a participant. CCPs rely on incoming payments from participants to meet their obligations to other participants. Payment obligations to and from participants may be in the form of payments for settlement of a securities

transaction, or initial and variation margin, or related to the cash settlement of contracts. If a participant were to default, the CCP could face a liquidity shortfall. The size of these contingent payment obligations would generally be proportional to the credit exposures faced by the CCPs to its participants.

In the case of ASX Clear, however, in the event of the default of a participant with net securities settlement-related payment obligations, its liquidity needs may be significantly greater than its credit exposure. From a credit risk perspective, ASX Clear is exposed only to replacement cost risk from an adverse price movement affecting the resale of any securities due to be purchased, including any transaction costs that may be incurred in closing out the defaulted participant's portfolio. Funds received from the sale may be used to offset the CCP's payment obligation. However, there is a timing mismatch between the point at which ASX Clear must meet the defaulted participant's payment obligation in relation to the purchased securities and that at which it receives funds from the resale of these (typically two days later). This creates a gross liquidity exposure for ASX Clear that may significantly exceed any replacement cost exposure on the same default.

ASX Clear also faces liquidity risk from its material holdings of equity collateral against derivatives positions. If ASX Clear were to liquidate the defaulting participants' equity collateral, it would likely have to wait two days to receive the proceeds of the sale.

- *Investment liquidity risk.* ASX Clear's and ASX Clear (Futures)' pooled prefunded resources, as well as a portion of margin posted by participants, are in the form of cash. These assets are reinvested and held by ASXCC, the holding company for the two CCPs, according to a defined investment policy and investment mandate (see CCP Standard 7.3). ASX Clear and ASX Clear (Futures) face liquidity risk from this reinvestment since ASXCC would have to convert its assets into cash to meet any obligations arising from a participant default or for day-to-day liquidity requirements. The day-to-day liquidity obligations primarily arise from the CCPs' collection of cash initial margin. If initial margin requirements were to decline (e.g. due to lower open positions) or participants substituted their cash collateral for non-cash collateral, the CCPs may need to liquidate investments in order to return cash margin to participants.

For the majority of their payment obligations, the ASX CCPs do not rely on commercial bank money settlement agents, nostro agents, or custodians in meeting their payment obligations. The only exceptions are:

- ASX Clear has some reliance on liquidity providers, namely participants' provision of liquidity via OTAs (see CCP Standard 7.3) and liquidity provision by ASX Limited under a \$150 million committed liquidity facility. ASX Clear (Futures) does not rely on liquidity providers other than the Bank in meeting its payment obligations. The Bank provides the ASX CCPs access to liquidity on a secured basis through its standing facilities (see CCP Standard 7.7).
- ASX Clear (Futures) relies on commercial settlement banks to settle USD intraday margin payments made during the overnight session, and to facilitate its acceptance of foreign currency collateral that is not NZD-denominated. Payment obligations involving commercial settlement banks account for less than 3 per cent of ASX Clear (Futures)' total payment obligations.

Managing liquidity risk

ASX Clear and ASX Clear (Futures) minimise the size of their default liquidity obligations to participants through daily (and in some cases, intraday) settlement of variation margin. This prevents the build-up of large liquidity (and credit) exposures. The CCPs' framework for managing their

remaining liquidity risks involves the monitoring of liquidity exposures through daily and monthly stress tests (see CCP Standard 7.8) and the maintenance of sufficient liquid resources to be able to meet these modelled potential liquidity exposures (see CCP Standard 7.3).

ASX Clear and ASX Clear (Futures) also provide participants with information to help them manage their liquidity needs and risks, which in turn protects the CCPs to the extent this enhances participants' own liquidity risk management. Participants are provided with sufficient information to understand their intraday margin call obligations, and replicate stress test outcomes. ASX publishes a daily CME SPAN and CMM margin parameter file that allows participants to estimate payment obligations associated with margin requirements for actual or hypothetical ETD or cash market portfolios. Advance warnings and communications in respect of calls for additional margin and margin rate changes also assist participants in their liquidity planning. For example, participants are notified if their stress test results approach their STELs. Also, ASX works closely with participants where new obligations are likely to affect their liquidity needs. ASX Clear also provides monthly disclosures on participants' contingent liquidity exposures, including the potential liquidity impact of the use of OTAs (see CCP Standards 7.3 and 7.9).

7.2 A central counterparty should have effective operational and analytical tools to identify, measure and monitor its settlement and funding flows on an ongoing and timely basis, including its use of intraday liquidity.

Daily cash flows and investment of funds across the ASX CCPs are monitored and managed by the Portfolio Risk Management team. In addition, CRPM reviews a daily report of key risk indicators related to liquidity demands. Any issues are escalated to the CRO. Funding arrangements, such as settlement flows, are also monitored in real time by the CRPM and treasury functions.

Portfolio Risk Management uses reports provided by CRPM to monitor CME SPAN-calculated margin flows originating from ASX Clear's DCS and ASX Clear (Futures)' Collateral Management System, which feed into ASX's Treasury Management System. Portfolio Risk Management enters trades required to manage daily cash-flows into ASX's Treasury Management System. Post Trade Operations uses daily settlement reports produced by the Treasury Management System to generate settlement instructions in Austraclear. Resulting cash flow movements are monitored in RITS. Margin payments from ASX Clear's participants must be made by 10.30 am, and margin payments from ASX Clear (Futures)' participant must be matched in Austraclear by 10.30 am and settled by 11.00 am. Outward payments to participants from both CCPs are manually managed in the RITS queue, and are only released once all incoming margin obligations have been settled (generally by 12.00 pm).

7.3 A central counterparty should maintain sufficient liquid resources in all relevant currencies to settle securities-related payments, make required variation margin payments and meet other payment obligations on time with a high degree of confidence under a wide range of potential stress scenarios that should include, but not be limited to, the default of the participant and its affiliates that would generate the largest aggregate payment obligation to the central counterparty in extreme but plausible market conditions. In addition, a central counterparty that is involved in activities with a more complex risk profile or that is systemically important in multiple jurisdictions should consider maintaining additional liquidity resources sufficient to cover a wider range of potential stress scenarios that should include, but not be limited to, the default of the two participants and their affiliates that would generate the largest aggregate payment obligation to the central counterparty in extreme but plausible market conditions.

Reflecting the Bank's supplementary interpretation of the FSS, the Bank has concluded that ASX Clear and ASX Clear (Futures) are systemically important in multiple jurisdictions and therefore subject to

the higher financial resource requirement that each CCP should maintain additional liquid resources to cover liquidity needs in the event of the default of the two participants and their affiliates that would generate the largest aggregate payment obligation to the CCP in extreme but plausible market conditions.

Consistent with the supplementary interpretation, a major objective of the ASX Liquidity Risk Policy is for the CCPs to maintain, with a high degree of confidence, sufficient liquidity to manage the default of two participants and their affiliates and meet reasonably foreseeable operational cash flows.

Default liquidity risk

The primary resources the CCPs would rely on to meet the payment obligations arising directly from the default of the two participants and their affiliates is the defaulting participant's initial margin and each CCP's Available Financial Resources (AFR). ASX Clear (Futures)' AFR is comprised entirely of the CCP's default fund, currently sized at \$650 million. ASX Clear's AFR is also defined in its internal documentation to include only the CCP's default fund, currently sized at \$250 million, but ASX would also have recourse to a \$150 million committed liquidity facility from ASX Limited, of which \$100 million is backed by a committed liquidity facility from one of the major banks to ASX Limited.

To address the timing mismatch for securities-related payment obligations discussed above (CCP Standard 7.1), ASX Clear can supplement its AFR and committed liquidity facility with additional liquidity from OTAs to settle cash market transactions when due. If a participant were to default due to a shortfall of funds, the ASX Default Management Committee (DMC) would first determine whether ASX Clear could inject sufficient liquidity, from the combined AFR and committed liquidity facility of \$400 million, to ensure that settlement of payment obligations occurred as expected.

It is expected that available liquidity resources would first be injected. In recognition of this, ASX Clear has implemented a target minimum cash market liquidity buffer of \$100 million, which is monitored on a daily basis (see CCP Standard 7.8). However, if it was not possible or prudent to rely solely on available liquidity, ASX Clear would settle transactions by entering into OTAs with participants that were due to deliver securities to the defaulted participant. In these circumstances, ASX Settlement's back-out algorithm would identify settlement instructions in the batch that, if removed, would reduce ASX Clear's payment obligations on behalf of the defaulted participant to the amount injected by ASX Clear, while avoiding (or at least minimising) any increase in net payment obligations for other participants (see Appendix C.2, SSF Standard 10.2). ASX Clear would then settle the novated trades that have been identified by the back-out algorithm by entering into OTAs with participants due to deliver securities under these trades. OTAs enable the CCP to settle its payment obligations with these participants on the intended settlement date through an arrangement to offset the underlying settlement obligations to and from those participants.

Under the first leg of the OTA, ASX Clear would, in effect, re-deliver the stock to the relevant non-defaulting participant in return for payment equal to the amount of the payment obligation of ASX Clear to that participant. Under these arrangements, ASX Clear would agree to repurchase the stock the next business day under the second and final leg of the transaction. If this transaction was unable to be settled on the next business day, subsequent OTAs would be entered into on a daily basis until the settlement of on-market close-out trades had taken place.

Investment liquidity risk

To mitigate investment liquidity risk, ASXCC's treasury investment policy requires that a minimum portion of ASXCC's investments must be in liquid assets to meet its minimum liquidity requirements. ASX assesses the value of its liquid resources against its liquidity requirements on a daily basis.

Liquidity Requirements

ASX's primary liquidity requirement is the Core Liquidity Requirement (CLR). The CLR is calculated as the sum of the Default Liquidity Requirement (DLR) for each CCP and Ordinary Liquidity Requirement (OLR) across both CCPs. The DLR for each CCP is the amount required to cover the estimated payment obligations in the event of the joint default of the two largest participants (as measured by payment obligations to the CCP) and their affiliates under the stressed market conditions envisaged in the CCP's liquidity stress test (see CCP Standard 7.8). ASX uses two different methodologies to calculate each CCP's DLR:

- ASX Clear's DLR is the sum of the CCP's default fund and the aggregate margin requirement for the two largest defaulted participants and their affiliates. The default fund, in turn, is calibrated to cover the largest stressed liquidity exposures to any two participants and their affiliates arising from derivatives transactions and a portion of exposures arising from cash market transactions (see CCP Standard 7.8).
- ASX Clear (Futures)' DLR for AUD is the sum of:
 - the liquidity stress test result for the two participants and their affiliates that result in the largest payment obligation for the CCP (see CCP Standard 7.8)
 - the aggregate margin requirement of the two largest participants and their affiliates, used to cover payment obligations associated with variation margin or the close-out of positions in normal market conditions.

ASX Clear (Futures) separately calculates a DLR for each non-AUD cleared currency (currently only NZD) which comprises Cover 2 participants' total margin requirement for NZD-denominated positions and an estimate of their stress testing exposures (calculated as 130 per cent of their initial margin requirement in NZD).

The OLR is intended to cover day-to-day liquidity requirements, such as the return of margin to participants, and is specified as a percentage of the ASXCC investment portfolio. This portfolio comprises both CCPs' pooled prefunded resources as well as the cash margin posted at both CCPs. ASX sets currency-specific OLRs for each currency in which it has payment obligations. The OLRs for AUD and NZD are calibrated to the maximum one-day margin outflow in the ASXCC investment portfolio (as a percentage of the value of the sub-portfolio in each currency) over the last 12 months, subject to a floor of 10 per cent. The current OLRs for AUD and NZD are 10 and 20 per cent respectively. The OLR rates for non-cleared currencies which ASX Clear (Futures) accepts as collateral (currently EUR, GBP, JPY and USD) are set at 100 per cent of the ASXCC portfolio denominated in these currencies. OLR rates are reviewed annually.

The ASX CCPs also have an Additional Liquidity Requirement (ALR) which is designed to reflect the potential for unexpected non-default-related liquidity needs. ASX has calibrated the AUD and NZD currency-specific ALRs to ensure that it has sufficient liquid assets to cover the maximum historical AUD or NZD one-day margin outflow in the ASXCC investment portfolio (as a percentage of the value of the sub-portfolio in each currency) since late 2008 (the earliest date from which data are available). The current ALRs for AUD and NZD are 11 and 21 per cent of AUD and NZD-denominated assets in the ASXCC portfolio respectively. ASX has created liquidity-specific stress tests to assess the adequacy of the liquidity requirements related to the CCPs' investment portfolio and the actual liquidity of the portfolio (see CCP Standard 7.8).

In June 2018, ASX updated its investment mandate to place a limit of 25 per cent for each participant on the proportion of initial margin requirements that can be met with collateral in currencies other than the margin requirement currency (non-matching cash collateral). This replaced a previous limit placed on the percentage of total liquid assets that ASXCC could hold in non-AUD currencies. ASX does not conduct liquidity stress tests in non-AUD currencies.

Definition of liquid assets

ASXCC's investment mandate establishes a clear definition of liquid assets: liquid assets comprise cash available for use within two hours, and securities traded in a liquid market which can be sold for same day value with settlement proceeds available within two hours and which are eligible for repurchase with the Bank.

ASX measures whether it has enough liquid assets to meet the combined value of the CLR and ALR on a daily basis. ASX applies haircuts to the value of its investments when assessing the adequacy of its liquid resources against its core and additional liquidity requirements. These haircuts incorporate historical extreme but plausible (once-in-20-year) movements in the prices of securities over a three-day holding period, as well as the relevant haircut that would apply if these securities were used to collateralise a repurchase agreement at the Bank. Non-AUD denominated cash and investments held to meet AUD margin requirements are also adjusted by a haircut calibrated to the worst single-day foreign exchange movement in the last 20 years. ASX Clear (Futures) does not currently stress non-cash collateral using extreme but plausible price moves but has plans to determine and implement an approach to stressing non-cash collateral in its credit and liquidity stress tests during the next assessment period. Currently, ASX does not use forward-looking scenarios to estimate liquid resources in stressed conditions.

ASX places further restrictions on the types of assets that can be used to meet the CLR. The CLR must be met with high quality liquid assets such as cash held in accounts at the Bank, the Reserve Bank of New Zealand (RBNZ), or at creditworthy commercial banks, securities issued by the Australian Commonwealth or state governments or the New Zealand government (held outright or via repo), and eligible securities issued by the German, Japanese, UK and US governments (held as collateral for repo transactions). All other AUD and NZD liquid assets in its portfolio are eligible to meet the ALR.

ASX assesses the value of its currency-specific liquid resources against its liquidity requirements in each currency on a daily basis. If a breach of the requirements occurs at either CCP, it is reported to the CRO and CFO. ASX would also review the circumstances and nature of the breach, the size of the breach and possible mitigants. Breaches are also reported on a quarterly basis to the Risk Committee. In addition, if there were three breaches in a calendar quarter, this would require an emergency meeting of the Risk Committee, which would decide on the response. The primary potential response to a breach would be to increase the proportion of liquid assets held in the relevant currency in ASXCC's investment portfolio.

7.4 For the purpose of meeting its minimum liquid resource requirement, a central counterparty's qualifying liquid resources in each currency include cash at the central bank of issue and at creditworthy commercial banks, committed lines of credit, committed foreign exchange swaps and committed repos, as well as highly marketable collateral held in custody and investments that are readily available and convertible into cash with prearranged and highly reliable funding arrangements, even in extreme but plausible market conditions. If a central counterparty has access to routine credit at the central bank of issue, the central counterparty may count such access as part of the minimum requirement to the extent it has collateral that is eligible

for pledging to (or for conducting other appropriate forms of transactions with) the relevant central bank. All such resources should be available when needed.

ASXCC holds an Exchange Settlement Account (ESA) at the Bank to facilitate money settlements on behalf of ASX Clear and ASX Clear (Futures) (see CCP Standard 7.7). Under this arrangement, ASXCC is eligible for access to AUD liquidity under the Bank's overnight and intraday liquidity facilities (against eligible collateral specified by the Bank that is held within ASXCC's investment portfolio), including in times of market stress.

The ASX Liquidity Stress Testing and Liquidity Requirement Standard and the ASXCC Investment Mandate require the Portfolio Risk Management team to meet ASX Clear's and ASX Clear (Futures)' currency-specific minimum liquidity resource requirements, or CLR, with high-quality liquid assets consistent with the definition of qualifying liquid assets under this standard. High-quality liquid assets must be cash held in accounts at the Bank, the RBNZ, or at creditworthy commercial banks that is available for use within two hours, or held in a restricted set of highly liquid securities eligible for repurchase transactions with the Bank. Securities that could be used to meet the CLR include eligible securities issued by the Australian Commonwealth or state governments or the New Zealand government (held outright or via repo), and eligible securities issued by the German, Japanese, UK and US governments (held as collateral for repo transactions). All other AUD and NZD liquid assets in ASXCC's portfolio, such as bank bills, negotiable certificates of deposit and authorised deposit-taking institution (ADI) issued securities are eligible to meet the ALR. Eligible investment counterparties are discussed under CCP Standard 15. OTAs with participants (see CCP Standard 7.3) also meet the definition of qualifying liquid resources for the purpose of this standard, since they are prearranged, committed and reliable (given that they effectively utilise funds otherwise due to participants).

ASX Clear's committed liquidity facility with ASX Limited is contractually based. ASX Limited would source funds to support the facility from a combination of its own cash resources (\$50 million), which are not routinely utilised in any other part of ASX's operations, and a committed liquidity facility with one of the major banks (\$100 million). The bank facility is also contractually based, and could only be drawn down by ASX Limited for the purposes of funding ASX Clear's default management liquidity requirements. ASX conducts six-monthly due diligence to ensure that the facility could be drawn upon if needed (see CCP Standard 7.6).

7.5 A central counterparty may supplement its qualifying liquid resources with other forms of liquid resources. If the central counterparty does so, these liquid resources should be in the form of assets that are likely to be saleable or acceptable as collateral for lines of credit, swaps or repos on an ad hoc basis following a default, even if this cannot be reliably prearranged or guaranteed in extreme market conditions. Even if a central counterparty does not have access to routine central bank credit, it should still take account of what collateral is typically accepted by the relevant central bank, as such assets may be more likely to be liquid in stressed circumstances. A central counterparty should not assume the availability of emergency central bank credit as part of its liquidity plan.

ASX Clear and ASX Clear (Futures) do not supplement their qualifying liquid resources with other forms of liquid resources.

7.6 A central counterparty should obtain a high degree of confidence, through rigorous due diligence, that each provider of its minimum required qualifying liquid resources, whether a participant of the central counterparty or an external party, has sufficient information to understand and to manage its associated liquidity risks, and that it has the capacity to perform as required under its commitment. Where relevant to assessing a liquidity provider's performance

reliability with respect to a particular currency, a liquidity provider's potential access to credit from the central bank of issue may be taken into account. A central counterparty should regularly test its procedures for accessing its liquid resources at a liquidity provider.

ASX Clear's qualifying liquid resources include contingent contributions from participants and other liquidity providers. ASX Clear (Futures) does not rely on liquidity providers other than the Bank. Both CCPs have similar procedures for accessing liquid resources. The Bank provides the ASX CCPs access to liquidity on a secured basis through its standing facilities (see CCP Standard 7.7).

ASX Clear's participants

ASX Clear's participants commit to provide overnight liquidity to the CCP up to the value of their outstanding cash equity exposures to the CCP. This commitment arises from ASX Clear's reliance on OTAs to meet its minimum liquid resource requirement. Unlike other liquidity providers, however, participants' capacity to perform on these commitments is guaranteed, as participants entering into OTAs with ASX Clear provide liquidity in the form of funds they were due to receive as part of that day's cash equity settlement.

The exact size of a participant's potential liquidity exposure to OTAs in the event a participant were to default is dependent on the mix and profile of transactions scheduled for settlement after the event of default. Consequently, it is not possible for ASX to provide detailed *ex ante* information to participants on their contingent liquidity exposures to OTAs. Nonetheless, to assist participants to understand and manage the potential liquidity risks associated with OTAs, ASX Clear provides monthly disclosures on participants' contingent liquidity exposures. This disclosure shows the daily 'worst-case' liquidity exposure for each participant arising from the default of the two participants and their affiliates that would cause the greatest liquidity exposure for the clearing house on a particular day. ASX has also engaged with participants on their liquidity management, including their consideration of OTAs and the implications of these contingent liquidity exposures for participants' liquidity requirements.

ASX Clear's guidance note *Managing Liquidity Requirements*, sets out the minimum liquidity management arrangements a participant should have to meet its obligations under the ASX Clear Operating Rules. Under this guidance, participants other than ADIs or related bodies corporate of ADIs are generally required to have:

- a formal liquidity risk management framework in place that is appropriate to the nature, scale and complexity of their activities
- a nominated officer responsible for liquidity management
- a board-approved annual liquidity plan which considers 'normal' and stress' conditions
- robust liquidity-related operational processes and management reporting.²⁹

ASX Clear's committed liquidity facility

ASX Clear also relies on a \$150 million committed liquidity facility from ASX Limited in meeting its minimum liquid resource requirement. \$100 million of this is backed by a committed liquidity facility from one of the major banks to ASX Limited. The contract governing this facility details, among other things, the events of default that may trigger activation of the facility. ASX conducts due diligence to

²⁹ ASX exempts ADI participants from these requirements as these entities are subject to more stringent liquidity risk management requirements under APRA regulations. Related bodies corporate of ADIs are also exempt under certain conditions, including that the related ADI is responsible for the entity's liquidity risk management.

ensure that the committed liquidity facility from ASX Limited to ASX Clear could be drawn upon if needed. This includes six-monthly checks of whether ASX Limited continues to meet the requirements set out in its agreement with the major bank liquidity provider, whether ASX Limited has enough funds to deliver on its portion of the facility, and analysis of the combined exposure of ASX Clear to the major bank liquidity provider, including via any affiliated participant.

Procedures for accessing liquid resources

Consistent with the guidance related to this substandard, ASX has internal procedures for using its liquidity resources to complete settlement during a liquidity shortfall. The Portfolio Risk Management team, in consultation with the CRO, is responsible for the provision of timely liquidity to fund margin and settlement obligations to non-defaulting participants. The Default Management Standard (see CCP Standard 12.1) provides a high-level summary of the factors to be considered in the liquidation of participant non-cash collateral, as well as the liquidation of treasury investments representing participant cash collateral and other prefunded financial resources. While the order of use of particular collateral types will depend on the particular circumstances, a typical order of use may be AUD cash first, followed by non-cash collateral and foreign currency collateral. The order of liquidation of non-cash and foreign currency collateral to meet funding requirements will depend on factors such as prevailing market conditions, liquidity needs and the amount of funds required relative to the size of each collateral lodgement. Procedures for dealing with liquid assets in the treasury investment portfolio are documented, and are available for the Portfolio Risk Management team at both primary and backup sites.

ASX has processes to periodically test its procedures for accessing its liquid resources. Every six months, ASX reviews the range of transactions conducted over the period to confirm that it has tested its operational capability to conduct transactions to liquidate the full range of assets held by ASXCC. ASX also conducts repos with the Bank and commercial banks on at least a six monthly basis to confirm operational readiness, and regularly review the terms of its committed liquidity facility to ensure ongoing compliance with those terms. ASX most recently tested its operational capacity to liquidate assets held by ASXCC and its readiness to conduct repos with the Bank and commercial banks in January 2018.

7.7 A central counterparty with access to central bank accounts, payment services or securities services should use these services, where practical, to enhance its management of liquidity risk. A central counterparty that the Reserve Bank determines to be systemically important in Australia and has obligations in Australian dollars should operate its own Exchange Settlement Account, in its own name or that of a related body corporate acceptable to the Reserve Bank, to enhance its management of Australian dollar liquidity risk.

ASXCC holds an ESA. Under this arrangement, ASX Clear and ASX Clear (Futures) may, via ASXCC, access AUD liquidity under the Bank's standing facilities (against eligible collateral specified by the Bank). ASX Clear (Futures) may also, via ASXCC, access NZD liquidity under similar arrangements with the RBNZ. ASXCC's investment mandate clarifies its ability to make use of these services, by specifying the list of securities (from the Bank's and RBNZ's eligible securities list) available for repurchase, including the securities of the Commonwealth government, certain state governments, the New Zealand Government, and ADIs (CCP Standard 15).³⁰

30 A list of securities eligible for use in the Reserve Bank's domestic market operations is available at <<https://www.rba.gov.au/mkt-operations/resources/tech-notes/eligible-securities.html>>. The list of repo-eligible

ASX Clear and ASX Clear (Futures) use ASXCC's ESA to settle their AUD margin and cash settlement obligations in RITS (see also CCP Standard 9). NZD settlement obligations at ASX Clear (Futures) are settled on a real-time gross settlement (RTGS) basis across ASXCC's Exchange Settlement Account System (ESAS) account at the RBNZ.

7.8 A central counterparty should determine the amount and regularly test the sufficiency of its liquid resources through rigorous stress testing. A central counterparty should have clear procedures to report the results of its stress tests to appropriate decision-makers at the central counterparty and to use these results to evaluate the adequacy of, and adjust, its liquidity risk management framework. In conducting stress testing, a central counterparty should consider a wide range of relevant scenarios. Scenarios should include relevant peak historic price volatilities, shifts in other market factors such as price determinants and yield curves, multiple defaults over various time horizons, simultaneous pressures in funding and asset markets, and a spectrum of forward-looking stress scenarios in a variety of extreme but plausible market conditions. Scenarios should also take into account the design and operation of the central counterparty, include all entities that might pose material liquidity risks to the central counterparty (such as commercial bank money settlement agents, nostro agents, custodians, liquidity providers and linked FMIs) and, where appropriate, cover a multiday period. In all cases, a central counterparty should document its supporting rationale for, and should have appropriate governance arrangements relating to, the amount and form of total liquid resources it maintains.

ASX Clear and ASX Clear (Futures) use daily liquidity stress tests to assess the adequacy of their liquidity arrangements in a default scenario. These stress tests are supplemented by liquidity-specific stress tests conducted at the end of each month using daily data, which are used to assess the adequacy of the CCPs' core and additional liquidity requirements and the actual liquidity of the ASXCC investment portfolio.

Default-related liquidity stress tests

ASX's daily liquidity stress tests, which are adapted from the CCPs' credit stress tests (described under CCP Standard 4), estimate the maximum liquid funds that the CCPs would need to access in order to meet obligations arising in the event of the joint default of two clearing participants and their affiliates (including affiliations between participants involved in OTC and futures clearing at ASX Clear (Futures)) in extreme but plausible market conditions.

ASX Clear

The liquidity stress test exposure for an ASX Clear participant comprises two components: a derivatives market exposure and a cash market exposure. ASX Clear conducts separate liquidity stress tests to determine the potential liquidity exposure arising from derivatives transactions only and from both derivatives and cash market transactions. This approach reflects the fact that liquidity exposures generated by the securities settlement cycle in excess of ASX Clear's default fund and committed liquidity facility could be addressed through OTAs entered into with non-defaulting participants (see CCP Standard 7.3), whereas liquidity exposures arising from derivatives transactions cannot be met using OTAs. The stress test result used in the liquidity stress test model is taken from the day with the largest cumulative three-day requirement. The cash market and derivatives stress tests each apply three default scenarios, combined with a number of market change scenarios (described below).

securities at the RBNZ is available at <<https://www.rbnz.govt.nz/markets-and-payments/domestic-markets/repo-eligible-securities-and-haircuts>>.

In its liquidity stress testing, ASX Clear currently applies the two market-wide scenarios that typically result in the largest losses in credit stress testing: an increase of either 9.8 per cent or 13.0 per cent (depending on recent market conditions), and a decrease of 15.5 per cent. Other market scenarios, such as sector- or stock-specific shocks, are not currently used in liquidity stress testing. ASX Clear has plans to review its liquidity stress testing model following the completion of its work to define, justify and document its SPOR and risk factors used in credit stress testing (see CCP Standards 4.2 and 4.6).

The market-wide scenarios are then combined with three different close-out scenarios in which four assumptions are varied, three related to the cash market and one to the derivatives market. For the cash market these assumptions relate to:

- the priming of settlement accounts before default (either 90 per cent or 100 per cent of deliverable securities are assumed to be in the defaulted participant's settlement account)
- the use of non-novated transactions to offset obligations in respect of novated transactions
- whether the defaulter's sell transactions are deferred for two days or settled as soon as securities are available.

For the derivatives liquidity stress test, the assumption relates to ASX Clear's ability to transfer all, some or no loss-making client accounts. In June 2018, ASX updated its Liquidity Stress Testing and Liquidity Requirements Standard to remove this porting assumption from ASX Clear's stress testing model, in favour of the more conservative assumption that it will not be able to transfer any customer positions in the event of default. ASX implemented the removal of the porting assumption from ASX Clear's stress testing model in July.

Since securities settle on a two-day cycle, to measure cash market exposures in liquidity stress tests, projected cash inflows and outflows from settlements and margin payments are used to calculate the cumulative liquidity requirement for each of the three days following a participant default. In addition, ASX Clear's liquidity stress tests make a worst-case assumption with respect to the timing of variation margin and option premium payment receipts: default is assumed to occur just prior to receipt of the previous day's variation margin and option premium payments, if owed by the defaulter.

ASX Clear (Futures)

The liquidity stress test exposure for an ASX Clear (Futures) participant comprises two components: the credit stress test result for that participant, and the actual variation margin payable by, or due to, that participant on that day. The addition of actual variation margin is intended to serve as a proxy for any additional liquidity needs that ASX may face over and above any credit losses incurred over the close-out period. Scenarios are based on those used in credit stress testing; historical moves have been set so that they replicate extreme market moves that have a probability of occurrence of once in 20 years (see CCP Standard 4.6). Scenarios cover single-asset price moves, as well as movements in price and volatility occurring jointly across the equity index futures, AUD interest rate futures, and electricity futures contracts. In addition, scenarios also cover movements in the AONIA, BBSW, NZONIA and BKBM rates that are used as the reference rates for AUD and NZD OTC IRD. Additional scenarios account for various forms of basis risk between futures and OTC prices, and the AONIA, BBSW, NZONIA and BKBM curves at various tenors. Scenarios also cover a range of hypothetical macroeconomic and market events, such as a commodity collapse, or sovereign default. Stress test scenarios reflect the most extreme close-to-high or close-to-low price movements observed over the relevant holding period, including intraday price movements.

ASX Clear (Futures)' liquidity stress tests make a worst-case assumption with respect to the timing of AUD variation margin flows.

ASX Clear (Futures) does not conduct liquidity stress tests for non-AUD currencies.

Reporting of Results – Both CCPs

The results of ASX Clear (Futures)' liquidity stress tests are compared with the CCP's default fund of \$650 million (see CCP Standard 4.4). For ASX Clear, the results from the derivatives-only liquidity stress test are reviewed against a threshold of \$300 million; this threshold reflects the level of the CCP's default fund and committed liquidity facility after subtracting the cash market liquidity buffer of \$100 million. This 'buffer' approach is designed to assess whether ASX Clear would be able to cover a pre-specified value of stressed liquidity exposures arising from cash market transactions, while continuing to maintain sufficient liquid resources to cover the stressed liquidity exposures arising from derivatives transactions.

If a liquidity stress test breach occurs at either CCP, it is reported to the CRO and CFO. ASX would also review the circumstances and nature of the breach, the size of the breach and possible mitigants. Breaches are also reported on a quarterly basis to the Risk Committee. In addition, if there were three breaches in a quarter, this would require an emergency meeting of the Risk Committee, which would decide on the response. Potential responses to a breach could be to increase the CCPs' prefunded resources, or establish or increase the size of committed liquidity facilities. When assessing the materiality of a liquidity stress test breach, the CCPs will consider contributing and mitigating factors, such as changes in the ICR of the participant, atypical trading activity, and any STEL AIM, intraday margin and overnight margin buffer that is being held.

Liquidity-specific stress test scenarios

ASX supplements its daily default liquidity stress testing with four liquidity-specific stress test scenarios. These scenarios consider stresses to cash margin outflows arising from various sources across both CCPs.

- *Market contraction resulting from a market stress event.* An extreme but plausible market event is assumed to result in a significant decline in cash market turnover and derivatives open interest, resulting in margin outflows.
- *Market contraction resulting from the default of two ASX participants.* In addition to the default-related liquidity stresses outlined above, the close-out of the defaulted participants' portfolios is assumed to result in margin outflows from non-defaulting participants. ASX assumes that the decline in non-defaulter derivatives open interest over a three day period is equal to 50 per cent of the net positions held by the two defaulted participants.
- *Historical scenario (decline in open interest from other sources).* ASX applies historical declines in open interest to current portfolios in order to determine hypothetical margin outflows. The liquidity stress test result is based on the largest hypothetical margin outflow based on historical three-day changes in open interest since 2004.
- *Collateral substitution.* Participants are assumed to replace 25 per cent of cash collateral with non-cash collateral, across all markets.

ASX conducts its liquidity-specific stress tests on a monthly basis using daily data. The results from these scenarios are presented to the Risk Committee, and are used to assess the adequacy of the

CCPs' core and additional liquidity requirements and the actual liquidity of the ASXCC investment portfolio.

Although ASX identifies the failure of settlement banks or central securities depositories (CSDs) as a source of liquidity risk, ASX does not capture this risk in liquidity-specific stress tests since it does not identify the risk as material.

Review and validation

ASX's Model Validation Standard requires that models used by the ASX CCPs in their credit, collateral, margining and liquidity risk management systems must undergo a full annual validation (see CCP Standard 2.6). Under this framework the liquidity stress test model must be validated annually by an independent expert.

ASX conducts sensitivity analysis on the effect of the priming assumption on ASX Clear's liquidity stress test exposures. The analysis involves varying the priming assumption to either 70 or 80 per cent in its liquidity stress tests in ASX Clear, from the current assumption of either 90 or 100 per cent. ASX conducts this sensitivity analysis annually.

7.9 A central counterparty should establish explicit rules and procedures that enable the central counterparty to effect same-day and, where appropriate, intraday and multiday settlement of payment obligations on time following any individual or combined default among its participants. These rules and procedures should address unforeseen and potentially uncovered liquidity shortfalls and should aim to avoid unwinding, revoking or delaying the same-day settlement of payment obligations. These rules and procedures should also indicate the central counterparty's process to replenish any liquidity resources it may employ during a stress event, so that it can continue to operate in a safe and sound manner.

ASX Clear's OTAs aim to enable the CCP, in all circumstances, to fully address any liquidity obligations related to the settlement of securities transactions (see CCP Standard 7.3). Although OTAs cannot be directly used to address liquidity shortfalls related to derivatives transactions or the return of cash market margin, OTAs used to meet payment obligations for settlements may allow for greater use of prefunded liquid resources for these other obligations.

ASX Clear and ASX Clear (Futures) have arrangements that allow them to comprehensively address a liquidity shortfall (including on derivatives transactions). Under these arrangements, prefunded liquid resources (and OTAs at ASX Clear) are supplemented by the following additional tools:

- *Recovery Assessments.* A remaining liquidity shortfall resulting from a participant default would initially be addressed, where possible, via Recovery Assessments called in cash from surviving participants (see CCP Standard 4.8). ASX Clear's Recovery Assessments would be capped at \$300 million; ASX Clear (Futures)' Recovery Assessments would be capped at the level of participants' default fund contributions (a maximum of \$200 million in aggregate) if assessments were called in relation to a single default; or at three times the level of participants' default fund contributions (a maximum of \$600 million in aggregate), if assessments were called in relation to multiple participants defaulting within a defined default period.³¹ Each CCP has the flexibility to call for assessments where it anticipates a liquidity shortfall resulting from a participant default,

31 The cap on assessments for multiple defaults remains in place until the expiry of a 'default period' that commences with the default of the first participant and concludes 22 business days after completion of the default management process for the final defaulting participant, where each default is separated from completion of the default management process for the preceding default by 22 business days or less.

increasing the likelihood that these funds will be available to meet liquidity needs on a timely basis.

- *Payment haircutting.* ASX Clear (Futures) would also have the power to reduce (haircut) outgoing payments to participants. For example, a haircut could be applied to variation margin payments due to participants with net in-the-money positions in the event of mark-to-market loss on the defaulter’s portfolio. Payment haircuts could be applied to a broad range of ASX Clear (Futures)’ payment obligations, excluding the return of initial margin. There is no cap on the use of payment haircutting to address a liquidity shortfall, although ASX Clear (Futures) would consult with the RCC in determining whether to continue payment haircutting if losses allocated via this tool exceed \$650 million. ASX Clear also has a limited capacity to haircut payments, but this only applies to settlement payments in the context of complete termination (see below).
- *Complete termination.* Any residual liquidity shortfall that could not be addressed via Recovery Assessments or payment haircutting would be addressed via a power to completely terminate all open contracts. Complete termination would be reserved as a last resort tool if there was no other means of addressing a liquidity shortfall (including via intervention of the Bank as resolution authority if current proposals for a special resolution regime for FMIs are implemented). Under complete termination, all open contracts at the CCPs would be settled with participants at their current market value, with any residual liquidity shortfall of the CCPs addressed by haircutting settlement payments to participants. Prefunded liquid resources and Recovery Assessments at ASX Clear are set at a level that seeks to minimise the potential for reliance on complete termination to address a residual derivatives-related liquidity shortfall. Similarly, reliance on complete termination is considered extremely unlikely at ASX Clear (Futures), since payment haircutting provides an uncapped mechanism to address liquidity obligations associated with the majority of payment flows.

Standard 8: Settlement finality

A central counterparty should ensure clear and certain final settlement, at a minimum by the end of the value date. Where necessary or preferable, a central counterparty should facilitate final settlement intraday or in real time.

ASX Clear	ASX Clear (Futures)
Observed	Observed

8.1 A central counterparty’s rules and procedures should clearly define the point at which settlement is final.

The settlement of obligations arising in ASX Clear and ASX Clear (Futures) is governed by the CCPs’ Operating Rules and Procedures, and those of ASX (for ASX Clear) and ASX 24 (for ASX Clear (Futures)).

For ASX Clear (Futures), all AUD payment obligations are settled via Austraclear; NZD payment obligations are settled via NZClear. For ASX Clear, payment obligations other than those linked to settlement of securities transfers (e.g. margin payments) are settled via Austraclear. The respective interbank obligations arising from Austraclear and NZClear are settled on an RTGS basis across ESAs at the Bank, via RITS, and the RBNZ, via ESAS. The point at which settlements in Austraclear, RITS,

NZClear and ESAS are final is set out in the Austraclear and RITS Regulations, and the NZClear Rules and ESAS Terms and Conditions (see Appendix C.2, SSF Standard 7.1).

Securities settlements arising from cash equity trades novated by ASX Clear are required to be settled in ASX Settlement. Settlement occurs on a DvP Model 3 basis, whereby cash payments and securities transfers are settled simultaneously in a single daily multilateral net batch (see CCP Standard 11). Within this batch, ASX Settlement nets both transactions novated by ASX Clear and non-novated transactions. The securities leg of equities trades takes place in ASX Settlement and the linked interbank cash obligations settles via RITS on a multilateral net basis. The lodgement of non-cash collateral also occurs in ASX Settlement. The point at which these securities settlements are final is set out in the ASX Settlement Operating Rules and Procedures. The point of settlement of the interbank payment obligations is set out in the RITS Regulations (see Appendix C.2, SSF Standard 7.1).

The settlement of derivatives contracts cleared by ASX Clear (Futures) in some cases involves the transfer of a security or physical asset, with a corresponding transfer of cash. For each type of security or asset, ASX Clear (Futures) arrangements ensure that delivery occurs if, and only if, payment occurs. For 90-day bank bill futures, ASX Clear (Futures) requires that the standard DvP Model 1 settlement process in Austraclear is utilised (see Appendix C.2, SSF Standard 10.2). For grain contracts, delivery is via commodity warehouses, with ASX Clear (Futures) retaining title documentation until payment has been made (see CCP Standard 10.2).

ASX Clear (Futures) also accepts as collateral for initial margin certain highly liquid debt securities, such as Australian Government securities, and cash collateral in NZD and a small number of other foreign currencies. ASX Clear (Futures) has accounts at the Bank, Austraclear and RBNZ for settling AUD- and NZD-denominated collateral, respectively. The finality of settlements in these systems is defined in the Austraclear Regulations and NZClear Rules, respectively. Collateral denominated in other currencies is settled indirectly via relationships with Clearstream and commercial banks.

8.2 A central counterparty should ensure final settlement no later than the end of the value date, and preferably intraday or in real time, to reduce settlement risk.

Cash settlements

In Austraclear, payments are settled in real-time and are final when they are credited or debited to ASXCC's ESA (see Appendix C.2, SSF Standard 7). The legal certainty of the finality of transactions settled in Austraclear and RITS is supported by each of these facilities being approved as an RTGS system under Part 2 of the PSNA. With this approval, a transaction settled in Austraclear or RITS at any time on the day on which a participant enters external administration has the same standing as if the participant had gone into external administration on the next day (in the case of a winding up) or as if the participant had not gone into external administration (in the case of other forms of external administration). Accordingly, in the event of insolvency all transactions settled on the day of the insolvency are irrevocable and cannot be unwound simply because of the event of external administration (i.e. they are protected from the 'zero-hour' rule).

NZD payments in NZClear are settled in real-time and are final when they are credited or debited to ASXCC's Exchange Settlement Account at RBNZ. The NZClear settlement system has been declared a 'designated settlement system' for the purposes of Part 5C of the *Reserve Bank of New Zealand Act 1989* (NZ), which gives legislative backing to the finality of settlements effected in accordance with the rules of the system. ASX Clear (Futures) also accepts collateral in currencies that are not AUD or NZD. Transactions in these currencies are settled through ASXCC's accounts with Clearstream and commercial banks.

Cash obligations in other currencies are settled via arrangements with commercial banks. Settlement of these obligations is considered final once the payment is cleared in ASX's account with the commercial bank.

Securities settlement

The settlement of equities trades novated by ASX Clear occurs in ASX Settlement. This involves the use of a DvP Model 3 mechanism and settlement in a multilateral net batch, with the interbank cash leg settling across ESAs in RITS (see Appendix C.2, SSF Standard 10). Settlement is usually completed with finality by around 12.30 pm. Failed settlements are removed from the multilateral net batch via the CHES back-out algorithm (for a securities shortfall), and rescheduled for settlement on the next day as long as the participant is not in default (see Appendix C.2, SSF Standard 11). In the case of a failed settlement caused by a funds shortfall for a cleared trade, ASX Clear will inject funds into the settlement batch or enter into an OTA with sellers of affected securities to facilitate timely settlement (see CCP Standard 7.3).

The only contract which requires the delivery of securities in ASX Clear (Futures) is the 90-day bank accepted bill future. Trading in this contract ceases on noon of the last trading day, with settlement occurring by 3.00 pm on the day after the last trading day (the value date for this contract). Settlement occurs on a DvP Model 1 basis with the securities-leg settled in Austraclear and the interbank cash leg in RITS (see CCP Standard 11.1).³²

The multilateral netting of securities and payments obligations in ASX Settlement is supported by ASX Settlement's approval under Part 3 of the PSNA as an approved netting arrangement. This approval ensures that netting in accordance with ASX Settlement's Rules and Procedures is legally certain, even in the event that a participant had gone into external administration on the next day (in the case of a winding up) or as if the participant had not gone into external administration (in the case of other forms of external administration). Any interbank transactions arising from these settlements are settled in real time in RITS, across ESAs held with the Bank. Finality of funds transfers in RITS is supported by the approval of RITS under Part 2 of the PSNA.

ASX Clear (Futures) and ASX Clear accept AUD-denominated securities as collateral via Austraclear and ASX Settlement, respectively. Securities are lodged as collateral by way of transfer of ownership in ASX Clear (Futures). When securities are lodged as collateral at ASX Clear, ownership is retained in the name of the registered holder but subject to a security interest in favour of ASX Clear. The PSNA provides certain legal protections to the enforcement of security interests held by ASX Clear in accordance with its Operating Rules in the event of a participant default (see also CCP Standard 1.5).

Physical delivery

With regard to contracts which require physical delivery, ASX Clear (Futures)' arrangements for delivery are described under CCP Standard 10. The details of final settlement of deliverable contracts vary according to the contract specifications. ASX Clear (Futures) monitors and enforces compliance with delivery procedures. To mitigate its own settlement risk, ASX Clear (Futures) also has procedures in place to ensure that margin of matched participants is not released until ASX can confirm that both participants have fulfilled their obligations.

³² The seller is required to enter the 90-day bank bill into Austraclear by 10.00 am. This must be matched by the buyer by 11.00 am and settled by 3.00 pm.

8.3 A central counterparty should clearly define the point after which unsettled payments, transfer instructions or other obligations may not be revoked by a participant.

The ASX Clear Operating Rules and Procedures define the point after which payment or transfer instructions may not be revoked. For derivatives and OTC equity transactions, this occurs once the instruction has been submitted to ASX Clear. In the case of cash equity trades, participants are able to request that a trade be removed from novation prior to the calculation of participants' net settlement obligations at the end of the transaction date. Participants are not able to revoke a payment or transfer instruction once it has been submitted to ASX Clear (Futures).

Standard 9: Money settlements

A central counterparty should conduct its money settlements in central bank money where practical and available. If central bank money is not used, a central counterparty should minimise and strictly control the credit and liquidity risk arising from the use of commercial bank money.

ASX Clear	ASX Clear (Futures)
Observed	Observed

9.1 A central counterparty should conduct its money settlements in central bank money, where practical and available, to avoid credit and liquidity risks. A central counterparty that the Reserve Bank determines to be systemically important in Australia and has Australian dollar obligations should settle its Australian dollar obligations across an Exchange Settlement Account held at the Reserve Bank, in its own name or that of a related body corporate acceptable to the Reserve Bank.

ASX Clear

ASX Clear's money settlements are all settled in central bank money. Margin payments occur via Austraclear, with the interbank obligations settled on an RTGS basis across ESAs at the Bank, via RITS. ASX Clear uses ASXCC's ESA to settle these obligations in RITS.

The interbank element of net securities-related payment obligations arising in the CHES settlement batch administered by ASX Settlement (see CCP Standard 8.2) are also settled across ESAs at the Bank, via RITS. These obligations are settled on behalf of participants between commercial settlement banks known as payment providers.

ASX Clear (Futures)

AUD and NZD money settlements in ASX Clear (Futures) are settled in central bank money. Non AUD or NZD cash collateral (currently EUR, JPY, USD and GBP) are settled via arrangements with commercial banks.

AUD settlements, which represent the vast majority of money settlement in ASX Clear (Futures), are initiated via the submission of standard settlement instructions to Austraclear. Any interbank settlements arising from these instructions occur on an RTGS basis across ESAs at the Bank, via RITS. ASX Clear (Futures) uses ASXCC's ESA to settle its obligations in RITS.

NZD settlements are undertaken via NZClear and settled on an RTGS basis across ASXCC's Exchange Settlement Account at the RBNZ. Transfers arising via NZClear are settled in ESAS between the RBNZ Exchange Settlement account of ASXCC and the RBNZ Exchange Settlement accounts of ASX Clear (Futures) participants or their Participating ES Accountholders. Settlement of these transfers occurs in

central bank money in real time. ASXCC manages credit and liquidity exposures in respect of post-settlement balances held in its account at RBNZ in accordance with the ASXCC investment mandate (see CCP Standard 15).

9.2 If central bank money is not used, a central counterparty should conduct its money settlements using a settlement asset with little or no credit or liquidity risk.

ASX Clear's money settlements are all settled in central bank money.

For ASX Clear (Futures), cash payments in foreign currencies other than NZD (i.e. EUR, JPY, USD and GBP) are settled in commercial bank money via arrangements with commercial banks; this includes USD intraday margin payments made during the overnight session (see CCP Standard 6.4). Commercial bank money settlement agents and commercial settlement banks used for settlement of foreign currency transactions must be highly rated and subject to appropriate prudential regulation in order to limit any credit or liquidity risk associated with settlement in commercial bank money (see CCP Standard 9.3).

9.3 If a central counterparty settles in commercial bank money or its participants effect settlements using commercial settlement banks, it should monitor, manage and limit credit and liquidity risks arising from the commercial bank money settlement agents and commercial settlement banks. In particular, a central counterparty should establish and monitor adherence to strict criteria for commercial banks appropriate to their role in the settlement process, taking account of matters such as their regulation and supervision, creditworthiness, capitalisation, access to liquidity and operational reliability. A central counterparty should also monitor and manage the concentration of its and its participants' credit and liquidity exposures to commercial bank money settlement agents and settlement banks.

ASX Clear

ASX Clear does not settle in commercial bank money or effect settlement using a commercial settlement bank. The role of commercial settlement banks acting on behalf of participants is covered by the terms of the CHES Payment Interface Standard Payments Provider Deed entered into by ASX Clear, ASX Settlement, the Australian Payments Network Limited (AusPayNet) and the relevant commercial bank. This deed sets out payment authorisation deadlines and other operational requirements for payment providers that act as commercial settlement banks for participants.

The process of updating the deed involves negotiation with AusPayNet and payment providers, which could create delays in implementing changes to authorisation deadlines or other operational requirements required to support changes to the settlement process. ASX, working with AusPayNet, has established a framework for formally engaging payment providers on changes to settlement processes in response to regulatory or market-driven change. This is in the form of an AusPayNet standing sub-committee comprising representatives of the payment providers, with ASX acting as an observer. The role of the committee is to consider and provide feedback on proposed amendments to the CHES Payment Interface Standard Payments Provider Deed, facilitate consultation with payment providers, and help ensure that payment providers are notified of any upcoming developments.

ASX Clear (Futures)

ASX has developed a CCP Settlement Policy designed to address settlement risks arising from payment, clearing and settlement processes. The policy includes a list of approved settlement banks for each currency. A commercial bank must meet certain criteria before it can be used by ASX Clear (Futures) as a money settlement agent for foreign currency payments other than NZD. Commercial banks must be an approved counterparty, have a minimum S&P short- and long-term rating of A-1

and A respectively, and offer a banking platform and connectivity that are compatible with ASX processes and procedures. Arrangements for settlement of foreign currencies other than NZD make use of standard web interfaces for banking, with instructions via phone available as a contingency. In addition, the Portfolio Risk Management team monitors intraday its exposures to settlement banks against a counterparty exposure limit of \$75 million. In order to manage its exposure to any individual settlement bank, ASX uses multiple settlement banks for the settlement of overnight USD margin payments at ASX Clear (Futures). In the event that its exposure to a commercial settlement bank exceeds this amount, ASX is required to notify the General Manager of CRPM and the CRO. The CRO would determine the appropriate actions and escalations if required.

All foreign currency lodgements are monitored by ASX Clear (Futures)' risk management and treasury functions, and ASX Clear (Futures) is in regular contact with the participant until funds are received. In cases where participants wish to post cash collateral in a different currency to the underlying requirement, participants must lodge a request, which is reviewed and then approved or denied by the Portfolio Risk Management team. In determining whether the foreign currency cover request is approved or denied, the Portfolio Risk Manager will take into account the limits on foreign currency, as well as the concentration risk in accepting the request. The CCP also has put in place thresholds for large or concentrated holdings of non-AUD collateral which trigger escalation to senior management if breached (see CCP Standard 5.6).

ASXCC also maintains funds in foreign currencies to cover its exposure to liquidity risk if it needed to make foreign currency payments. During the assessment period, foreign currency collateral peaked at around \$375 million (AUD equivalent) – around 6 per cent of average total collateral levels at ASX Clear (Futures) during the year. The aggregate level of foreign currency payments at ASX Clear (Futures) is low, comprising around 2.6 per cent of total money settlements.

9.4 If a central counterparty conducts money settlements on its own books, it should minimise and strictly control its credit and liquidity risks.

ASX Clear and ASX Clear (Futures) do not conduct money settlements on their own books.

9.5 A central counterparty's legal agreements with any commercial bank money settlement agents should state clearly when transfers on the books of the relevant commercial bank are expected to occur, that transfers are to be final when effected, and that funds received should be transferable as soon as possible, at a minimum by the end of the day and ideally intraday, in order to enable the central counterparty and its participants to manage credit and liquidity risks.

ASX Clear does not conduct settlements via commercial bank money settlement agents.

For ASX Clear (Futures), payments in foreign currencies made via commercial banks are generally covered by standard terms and conditions for commercial accounts at those banks, including general information about timing of transactions and availability of funds. ASX maintains close contact with its commercial banks in order to monitor and manage the risk of its foreign currency payments.

Standard 10: Physical deliveries

A central counterparty should clearly state its obligations with respect to the delivery of physical instruments or commodities and should identify, monitor and manage the risks associated with such physical deliveries.

ASX Clear did not clear any contracts with physical delivery obligations during the assessment period. The Bank has concluded that CCP Standard 10 does not apply to ASX Clear.

ASX Clear	ASX Clear (Futures)
Not applicable	Observed

10.1 A central counterparty’s rules should clearly state its obligations with respect to the delivery of physical instruments or commodities.

In some cases, the settlement of derivatives contracts cleared by ASX Clear (Futures) involves the transfer of a security or physical asset. Examples of contracts that require delivery of physical instruments or commodities are wheat and other grain futures, and renewable energy certificates. ASX Clear (Futures)’ Operating Rules and Procedures clearly state its obligations with respect to physical delivery.

10.2 A central counterparty should identify, monitor and manage the risks and costs associated with the storage and delivery of physical instruments or commodities.

ASX Clear (Futures)’ Operating Rules and Procedures define detailed mandatory arrangements for delivery of physical assets. Deliveries of commodities must follow a maturity calendar, approved warehouses and locations, guides for buyers and sellers, and rules for delivery documentation (including appropriate certification).

ASX Clear (Futures) mitigates the risks associated with physical delivery by minimising its involvement in the storage and delivery process. Participants that have delivery obligations are matched with those due to receive the commodities or documents, and any legal recourse of the receiving participant in respect of the delivered goods is to the delivering participant. Participants may cash settle contracts in the event of a default by the delivering party.

ASX Clear (Futures) nevertheless monitors and enforces compliance with delivery procedures. In particular, there is regular monitoring of deliveries by Post Trade Operations in the lead up to expiry, including a daily review and reconciliation of contracts versus holdings via a physical position reconciliation report. Overnight reporting to participants occurs on current commodity holdings. ASX Clear (Futures) communicates directly with participants to confirm their intentions on delivery and lodgement of physical assets. In addition, compliance reviews are undertaken on targeted topics, as well as ad hoc compliance investigations arising from referrals from ASX’s operations areas. These compliance checks aim to ensure that participants have the necessary systems and resources to be able to fulfil their physical delivery obligations.

Standard 11: Exchange-of-value settlements

If a central counterparty is involved in the settlement of transactions that comprise two linked obligations (for example, securities or foreign exchange transactions), it should eliminate principal risk by ensuring that the final settlement of one obligation is conditional upon the final settlement of the other.

ASX Clear	ASX Clear (Futures)
Observed	Observed

11.1 A central counterparty should eliminate principal risk associated with the settlement of any obligations involving two linked obligations by ensuring that the payment system or securities

settlement facility employed operates in such a way that the final settlement of one obligation occurs if and only if the final settlement of the linked obligation also occurs, regardless of whether the securities settlement facility settles on a gross or net basis and when finality occurs.

ASX Clear eliminates principal risk by ensuring that settlement of all securities transactions takes place in ASX Settlement using a DvP Model 3 settlement mechanism (see CCP Standard 11.2).

For ASX Clear (Futures), in those cases where settlement of derivatives contracts involves the transfer of a security or physical asset with a corresponding transfer of cash, the CCP's arrangements ensure that delivery occurs if and only if payment occurs. For 90-day bank bill futures, ASX Clear (Futures) utilises the standard DvP Model 1 settlement process in Austraclear; that is, sellers deliver and receive payment for their bills, and buyers pay for and take delivery of the bills as a single exchange of value (see Appendix C.2, SSF Standard 10). For grain contracts, delivery is via commodity warehouses, with ASX Clear (Futures) retaining title documentation until payment has been made.

11.2 A central counterparty should eliminate principal risk associated with the settlement of linked obligations by ensuring that it employs an appropriate delivery versus payment (DvP), delivery versus delivery (DvD) or payment versus payment (PvP) settlement mechanism.

ASX Clear employs the DvP Model 3 settlement mechanism in ASX Settlement to eliminate principal risk associated with its securities transactions. Under this arrangement, settlement of novated and non-novated transactions takes place in a daily batch process run in CHES. All scheduled securities transfers are reduced to a single multilateral net transfer per line of stock for each participant. Payments associated with these transactions are similarly settled on a multilateral net basis in RITS, contemporaneously with the securities transfers (see Appendix C.2, SSF Standard 10.2 for a detailed description of ASX Settlement's settlement model).

The use of a DvP Model 3 settlement mechanism is acceptable for ASX Clear given the relatively low average value of securities transactions involved. In the assessment period, the average value of individual gross settlement instructions in ASX Settlement for novated transactions cleared by ASX Clear was around \$3 200. This compares with an average of \$36.1 million for an individual DvP settlement instruction for debt securities in Austraclear. The value of Australian Government securities cleared by ASX Clear and settled within the CHES batch remains very low compared with values settled within Austraclear (see Appendix C.2, SSF Standard 10.2).

Settlement of ASX Clear (Futures) derivatives transactions that involve securities transfers occurs on a DvP Model 1 basis in Austraclear. This involves the simultaneous transfer of cash and securities obligations between the buyer and seller on a transaction-by-transaction basis through the settlement cycle.

Standard 12: Participant default rules and procedures

A central counterparty should have effective and clearly defined rules and procedures to manage a participant default. These rules and procedures should be designed to ensure that the central counterparty can take timely action to contain losses and liquidity pressures and continue to meet its obligations.

ASX Clear	ASX Clear (Futures)
Observed	Observed

12.1 A central counterparty should have default rules and procedures that enable the central counterparty to continue to meet its obligations in the event of a participant default and that address the replenishment of resources following a default. A central counterparty should ensure that financial and other obligations created for non-defaulting participants in the event of a participant default are proportional to the scale and nature of individual participants' activities.

The respective Operating Rules and Procedures of ASX Clear and ASX Clear (Futures) provide each CCP with the authority and flexibility to deal with a participant default using a range of methods. The powers available to each CCP to close-out or otherwise manage the positions of a defaulted participant vary based on product type.

Cash equities – ASX Clear

For cash market transactions, ASX Clear has the power to:

- carry the defaulted participant's outstanding cash equity transactions through to settlement
- enter into market transactions to sell or purchase securities to facilitate the settlement of novated transactions
- enter into an OTA in respect of any settlements involving the failed participant or those affected by its failure (see CCP Standard 7.3).

If standard close-out processes could not be successfully carried out, ASX's recovery arrangements would allow ASX Clear to apply partial or (as a last resort) complete termination powers in order to restore its matched book.

Exchange-traded derivatives – ASX Clear and ASX Clear (Futures)

For exchange-traded derivatives, ASX Clear and ASX Clear (Futures) may employ a variety of methods to close out or otherwise manage the positions of the defaulted participant. These may include:

- transfer or port some or all of the defaulted participant's clients to another participant if certain conditions are met
- on- or off-market liquidation or close-out by entering into equal-but-opposite transactions
- exercise or expiry of contracts
- hedging of contracts.

As above, if standard close-out processes could not be successfully carried out, ASX's recovery arrangements would allow the ASX CCPs to apply partial or (as a last resort) complete termination powers in order to restore its matched book.

OTC derivatives – ASX Clear (Futures)

In the event of default of an OTC participant, ASX Clear (Futures) may first suspend the defaulted participant and would then look to hedge its exposure arising from the defaulting participant's portfolio. ASX Clear (Futures) may engage the relevant DMG to assist in this process (see 'Documentation and governance' below). To close-out the defaulter's portfolio, ASX Clear (Futures) may then conduct one or more auctions of the portfolio (including the hedges) to non-defaulted participants. ASX Clear (Futures) may set a reserve price on the default auction(s).

All OTC participants that have positions in the relevant products are required to bid in the auction of a defaulter's portfolio. ASX utilises a 'juniorisation' mechanism that is designed to ensure that non-defaulting participants bid competitively in the auction of a defaulter's portfolio. For the participants

obliged to take part in the auction, the juniorisation mechanism determines the order in which their contributions to the OTC-only part of the ASX Clear (Futures) default fund would be applied to losses on the default in the event that the auction crystallises losses beyond the defaulter's margin and the first tranche of ASX capital (see below).

ASX Clear (Futures), in consultation with the DMG, could conduct the auction in one of the following forms:

- The defaulted participant's portfolio could be auctioned in a single pool to the single highest bidder, or split into multiple identical units auctioned off to several bidders. In the latter case, the order of application of participant contributions to losses would be based on the lowest bid for any unit within the pool.
- Alternatively, the defaulted participant's portfolio could be broken up into separate pools with shared characteristics (for example currency, product, tenor, carry or trade volume), with separate auctions in respect of each pool. Each of these pools could be auctioned off in a single unit or multiple identical units. The application of bidding participants' contributions to losses would be based on the ranking of bids in each of these pools, weighted according to the relative risk of each pool.

As an alternative to an auction, ASX Clear (Futures) could agree the transfer of equivalent contracts with a non-defaulting participant, but in doing so would seek to avoid crystallising losses that would require the application of non-defaulting participants' commitments. If neither an auction nor transfer could be successfully carried out, ASX's recovery arrangements would allow ASX Clear (Futures) to apply partial or (as a last resort) complete termination powers in order to restore its matched book.

Use and sequencing of financial resources

Following a declaration of default, ASX Clear and ASX Clear (Futures) may, among other things, suspend the defaulted participant's authority to clear some or all market transactions. In circumstances where all clearing activities were suspended, there would be no further payments or collateral movements to the participant. This enables the CCPs to 'crystallise' the defaulted participant's position and generate detailed account and position data (including collateral held). This establishes the basis for the close-out of exposures to the defaulted participant.

In the first instance, ASX Clear and ASX Clear (Futures) would meet obligations arising from a participant default using collateral lodged by that participant. Collateral may be in the form of cash or eligible securities (see CCP Standard 5.1). In the event that the defaulted participant's contributions were insufficient, ASX Clear and ASX Clear (Futures) could draw upon their respective default fund (see CCP Standard 4).

ASX Clear's \$250 million default fund is fully funded by the CCP's equity.

ASX Clear (Futures)' \$650 million default fund is fully prefunded with contributions from both ASX and clearing participants. The default fund comprises \$450 million in ASX capital (across three tranches), and \$200 million in participant contributions (across two tranches). The order in which losses would be applied to the default fund (i.e. the default waterfall) is as follows:

1. First tranche of ASX capital (\$120 million)
2. Futures and/or OTC participant contributions (\$100 million)
3. Second tranche of ASX capital (\$150 million)

4. Futures and/or OTC participant contributions (\$100 million)
5. Third tranche ASX capital (\$180 million).

The two tranches of participant contributions are commingled across futures and OTC products. While not essential, ASX regards the commingling of financial resources as appropriate in light of the homogeneity of both the products to be cleared and the clearing participants. The commingled default fund adopted by ASX Clear (Futures) simplifies the default management process when the defaulter's portfolio contains both OTC derivatives and portfolio-margined futures positions. The order and proportion in which participants' futures and OTC contributions would be used is based on the scope of the defaulter's activities, i.e. the defaulter's level of initial margin for exchange-traded and OTC derivatives products (including portfolio-margined futures) over the previous 90 days. For example, if the defaulter cleared only futures products, losses would first be applied to futures participant contributions.

The method of allocating losses across participants' contributions, which are proportional to the scale and nature of individual participants' activities (see CCP Standard 3.2), depends on the product. For futures products, losses would be applied to individual participant contributions on a pro-rata basis. For OTC products, losses would be applied according to a juniorisation mechanism. Under this mechanism, the allocation would be related to the size of participants' bids in the auction of the defaulter's portfolio, so that the winner of the auction has its contribution applied last and the participant with the lowest bid has its contribution applied first, subject to bids exceeding a minimum threshold determined by ASX. Participants that are not required to take part in an auction (for example, participants that lack the capacity to manage particular product types within an auction pool) would have their contributions applied at the same point as the winner of the auction.

In the event that a CCP's prefunded resources were exhausted, each of ASX Clear and ASX Clear (Futures) have the power to call Recovery Assessments from participants (see CCP Standard 4.8). Recovery Assessments at ASX Clear are capped at \$300 million, while at ASX Clear (Futures) a call could be made of up to a further \$200 million in Recovery Assessments from participants for a single default, or up to \$600 million if multiple participants were to default. The allocation of Recovery Assessments across individual participants is proportional to the risk associated with positions held by participants prior to the default. Beyond this, ASX Clear (Futures) would be able to reduce (haircut) a range of its outgoing payment obligations to participants to allocate remaining financial exposures stemming from the default. The allocation of payment haircuts is linked to the positions held by participants. As a last resort, the CCPs would have the power in recovery to allocate losses by reducing settlement payments in the context of complete termination of all open contracts.

Replenishment of financial resources

ASX has established a staged process for replenishment of the CCP default funds in the event that these were partially drawn down or exhausted following a participant default. At the end of a 22-business-day cooling-off period, the ASX Clear and ASX Clear (Futures) default funds would be fully replenished up to \$150 million and \$400 million, respectively. Participants' contributions are capped at half of the amount needed to replenish the CCPs' default funds to those levels. Individual participants' replenishment contributions would be determined in proportion to the risk associated with positions held by the participant prior to the default. A participant's replenishment contribution is independent of its Recovery Assessment. If further increases to the default fund were required following full replenishment, these would be met 50/50 by the ASX CCPs and participant contributions as part of the quarterly recalibration of the default fund. Participant contributions arising from this

quarterly recalibration would also be broadly proportional to the risk associated with positions held by that participant (see CCP Standard 3.2).

Documentation and governance

The CCPs' Rules and Procedures form part of ASX's CCP Default Management and Recovery Framework (DMRF), a collection of internal and public documents that set out the guiding principles and procedures for managing a clearing participant default. An important part of the DMRF is the Default Management Policy and Default Management Standard, applicable to both ASX Clear and ASX Clear (Futures), which assist in the management of a clearing participant default. These new documents, together with updates to the existing DMRF documentation, were finalised in the assessment period.

The DMRF is based on high-level principles regarding the management of a default that have been approved by the CS Boards. In particular, these principles specify that the key aim in handling a default is to minimise the impact of the event on ASX, its participants and the broader market. The DMRWG provides oversight and review of the DMRF, including discussion of proposed changes prior to submission to the CS Boards.

The Default Management Standard and accompanying procedures provide guidance on each stage of a default, from the identification of a default event, to the management of the defaulter's position, real-time monitoring of financial solvency, and financial offset and reconciliation. The standard is intended to be flexible, rather than prescriptive, allowing ASX to adapt its default management approach to the specific circumstances as appropriate.

The DMRF outlines the key roles and responsibilities in managing a clearing participant default. The ASX Group has established a DMC, comprising senior management from relevant areas within ASX, to be the primary forum for the management of a default. The DMC's responsibilities range from recommending declarations of default and suspensions, to devising a risk neutralisation plan and overseeing its implementation.

In the event of the default of an OTC participant, ASX Clear (Futures) would convene the relevant DMG, which comprises non-defaulting clearing participants invited or nominated to participate by ASX Clear (Futures). Currently there is only one DMG: while ASX Clear (Futures) clears two categories of OTC derivatives (AUD IRD and NZD IRD), members of the DMG are considered to have expertise in both product types. The DMG comprises representatives of at least six and a maximum of ten OTC participants. The DMG would advise and be consulted by ASX Clear (Futures) on the management of an OTC participant default. ASX Clear (Futures) is not obliged to follow the recommendations of the DMG, but would be required to provide reasoning where it did not accept the DMG's advice. DMG representatives are also tasked with periodically convening to review the default management process and recommend amendments. Each OTC derivatives clearing member is involved directly in simulations of the hedging and auction stages of the default management process (see CCP Standard 12.4).

12.2 A central counterparty should be well prepared to implement its default rules and procedures, including any appropriate discretionary procedures provided for in its rules. This requires that the central counterparty should:

- (a) require its participants to inform it immediately if they:**
 - (i) become subject to, or aware of the likelihood of external administration, or have reasonable grounds for suspecting that they will become subject to external administration; or**

- (ii) have breached, or are likely to breach, a risk-control requirement of the central counterparty; and**
- (b) have the ability to close out, hedge or transfer, a participant's open contracts in order to appropriately control risk of a participant that:**
 - (i) becomes subject to external administration; or**
 - (ii) breaches a risk-control requirement of the central counterparty.**

Each CCP's Operating Rules set out the circumstances in which it may declare a participant to be in default, or when it may otherwise impose restrictions on a participant's rights and activities. In the case of clearing participants, these include scenarios in which a participant becomes subject to external administration, is unable to fulfil the obligations arising from its open contracts, defaults at another exchange or CS facility, or breaches the CCP's risk-control requirements. An event of default may also arise where the CCP suspects that a participant would not be able to fulfil its obligations or otherwise comply with the CCP's rules. The CCPs' participants are obliged to inform ASX immediately if an event of default has occurred or may reasonably be suspected to occur.

ASX's response to a potential clearing participant default would depend on whether the incident was a financial, operational or other compliance breach. This differentiation is intended to reflect the severity of the breach and potential consequences of declaring an event of default.

- A financial breach arises when a participant is unable to meet its existing financial obligations, or there is considerable uncertainty about the participant's ongoing ability to meet such obligations
- An operational breach occurs when a participant has sufficient assets to meet its obligations but is unable to settle these obligations due to a technical or operational failure
- Other compliance breaches may result from a participant's failure to otherwise comply with the CCP's Operating Rules.

Although the ASX Clear and ASX Clear (Futures) Operating Rules set out specific events of default, declaration of a default would never be automatic. Instead, the ASX CCPs maintain the right to investigate a potential default fully, taking into account any extenuating circumstances. The process of investigating, and the subsequent handling of, a potential default would generally depend on its nature. Specifically, ASX distinguishes between 'financial', 'operational' and other 'compliance' defaults. This differentiation is intended to reflect the severity of the breach and potential ramifications of a declaration of default. The Participant Incident Response Group (PIRG), which is chaired by the Executive General Manager, Operations and made up of senior staff from operational, risk management, compliance and legal functions, is responsible for monitoring and managing clearing participant incidents and the escalation of potential default events to the DMC (see Appendix C.2, SSF Standard 3.1 for further detail on the PIRG). Ultimately, the declaration of any default is the responsibility of the Managing Director and CEO of ASX (or relevant delegates), under delegated responsibility from the CS Boards.

The Operating Rules and Procedures allow ASX Clear and ASX Clear (Futures) to employ a variety of methods to close out or otherwise manage the positions of a defaulted participant, including one that has been subject to external administration or breached a risk control requirement (see CCP Standard 12.1).

12.3 A central counterparty should publicly disclose key aspects of its default rules and procedures.

ASX Clear's Operating Rules and Procedures, ASX Clear (Futures)' Operating Rules and Procedures and the OTC Rules and OTC Handbook are available on the ASX public website. These rules outline when the CCPs may take action against a participant and the powers of the CCPs in the event of a default, including the ability of ASX to transfer client derivative positions to other participants. The CCPs' Operating Rules set out the treatment of proprietary and customer positions. In addition, ASX has published on its website a high-level overview of each CCPs' approach to managing a clearing participant default, a guidance note on each CCPs' approach to the suspension and termination of participants, as well as a client fact sheet that outlines the segregation and portability arrangements in ASX Clear (Futures) and the rights of clients in the event of their clearing participant's default. The OTC Handbook provides a description of the default management auction process for OTC derivatives, including numerical examples of the juniorisation process.

In addition to the default management information provided on its website, ASX provides detailed responses to any targeted requests for information by clearing participants. Clearing participants have the ability to provide feedback and seek further information on default processes through this mechanism.

12.4 A central counterparty should involve its participants and other stakeholders in the testing and review of the central counterparty's default procedures, including any close out procedures. Such testing and review should be conducted at least annually and following material changes to the rules and procedures to ensure that they are practical and effective.

The DMRF is reviewed on an annual basis, or more frequently as needed, and is regularly tested by in-house default management fire drills. The fire drills assist in ensuring that relevant ASX personnel are familiar with the default management process and identify areas where the DMRF should be updated. Findings, including any recommended enhancements to the DMRF, are reported to the DMRWG after each fire drill. ASX conducted three fire drills during the assessment period, one focused on ASX Clear, one on OTC derivatives (see below) and one on settlement failures (see SSF Standard 11.4). The Bank was invited to the first two of these fire drill exercises and will continue to observe future fire drills. In recent years, the DMRF has been updated on several occasions to reflect experiences gained from managing defaults and learnings from fire drills. The DMRF is expected to be further updated once the proposed FMI resolution regime has been finalised.

Currently, participants are not directly involved in default management fire drills for ASX Clear and those that test ASX Clear (Futures)' default management procedures for exchange-traded products. This allows ASX to more freely incorporate scenarios based on actual participants and portfolios into its fire drills, involving the use of confidential information that cannot be shared with other participants. Nevertheless, after each fire drill ASX engages its default brokers to test their operational capability to execute the close-out trades as well as to consider the process that the brokers would use to close out, how long it would take and what price the broker would expect in the fire drill scenario. During the assessment period, ASX continued engagement with its default brokers to improve the operational efficiency of the default process, while ASX Clear implemented a change to its Operating Rules that allows it to require any clearing participant to act as a default broker. ASX Clear (Futures) engaged an additional default broker during the assessment period, taking its total number to three; ASX Clear has four active default brokers and anticipates appointing additional default brokers during the next assessment period.

Separate fire drills for ASX Clear (Futures)' OTC clearing service are conducted by the DMG, the most recent of which took place in September 2017. This fire drill assessed the effectiveness of changes to ASX's OTC default management processes introduced in June 2017. These amendments included changes to simulate the pricing of hedging trades by obtaining hypothetical quotes from participants, and to strengthen the governance of hedging decisions made by the DMG by referring these to the DMC for approval.

The ASX CCPs' default arrangements take into account, as far as possible, the implementation of any resolution regime that governs the CCPs' participants. ASX has undertaken analysis on the impact of resolution proceedings for ADIs and banks in several other jurisdictions on a CCP's default management processes. This analysis was most recently updated in May 2018. While acknowledging that bank resolution authorities may have broad powers to intervene in the arrangements of an insolvent bank participant, the analysis suggests that, in general, resolution proceedings should not impede a CCP's default management processes. ASX will be conducting further analysis on the interaction between ADI and FMI resolution once the proposed framework for FMI resolution has been finalised.

12.5 A central counterparty should demonstrate that its default management procedures take appropriate account of interests in relevant jurisdictions and, in particular, any implications for pricing, liquidity and stability in relevant financial markets.

The DMRF identifies that the key aim in handling a default is to minimise the impact of the event on the ASX CCPs, their participants and the market. Since close-out decisions by the DMC are complex and involve careful consideration of the specific circumstances surrounding the default, documented default management procedures are not prescriptive. Rather, the CCPs would consider a range of high-level factors in a default situation, including: any systemic risk implications; potential contagion and implications for wider market liquidity; interdependencies with other entities; the impact on the CCP's risk profile and financial standing; additional risks that could be incurred by participants; and market conditions and default portfolio complexity.

ASX Clear's participants include both Australian and overseas brokers with a significant domestic presence, including subsidiaries of Australian and overseas banks. Products cleared by ASX Clear are traded on Australian markets and denominated in AUD. Accordingly, default management actions would be taken during the local time zone for all participants.

At ASX Clear (Futures), futures participants are predominantly large foreign banks or subsidiaries of these banks that have a significant domestic presence. However, one futures participant clears remotely from the United Kingdom. All OTC participants are Australian banks, Australian branches of foreign banks or Australian incorporated subsidiaries of foreign banks. In addition, products cleared by ASX Clear (Futures) are AUD-denominated, with the exception of NZD contracts (which make up around 2 per cent of initial margin requirements). Accordingly, default management actions would be taken during the local time zone for all but one participant (taking into consideration the extended trading hours of the ASX 24 market). ASX has not identified any impediments to carrying out its default management processes in the event of the default of a remote clearing participant, although ASX would consider additional factors such as the potential impact of time zone differences, as well as interactions with foreign CCPs and external administrators.

Standard 13: Segregation and portability

A central counterparty should have rules and procedures that enable the segregation of positions of a participant's customers and the collateral provided to the central counterparty with respect to those positions.

ASX Clear	ASX Clear (Futures)
Observed	Observed

13.1 A central counterparty should, at a minimum, have segregation and portability arrangements that effectively protect a participant's customers' positions and related collateral from the default or insolvency of that participant. If the central counterparty additionally offers protection of such customer positions and collateral against the concurrent default of the participant and a fellow customer, the central counterparty should take steps to ensure that such protection is effective.

ASX Clear's account structure

ASX Clear maintains a segregated account structure for its options which separates client positions from the participant's proprietary (house) positions. For these products, clients are able to access individually segregated accounts that offer protection against the concurrent default of the participant and a fellow client (see CCP Standard 13.2).

Although ASX Clear utilises a single (commingled) account for each participant's house and client cash market transactions, its arrangements provide clients with protections that are materially equivalent to those afforded by segregated house/client omnibus accounts (see CCP Standard 13.2).

ASX Clear (Futures)' account structure

ASX Clear (Futures) enables both OTC and exchange-traded participants the ability to offer their clients the choice of holding their positions in either a client omnibus account or an individually segregated account. Under these account structures, the positions and collateral of clients are segregated and identifiable from those of clearing participants; accordingly, clients are not directly exposed to losses related to their participant's proprietary (house) activity in the event of that participant's default.

Within the individually segregated account structure, ASX Clear (Futures) offers two options – 'initial margin value' and 'asset attribution' – which offer different levels of protection for client collateral in the event of a participant default. Under both options, ASX Clear (Futures) maintains a record of positions and the value of initial margin attributable to each client, with the collateral posted by clients to support these positions held in a single commingled collateral account at the participant level. Under the initial margin value account structure, ASX Clear (Futures) guarantees the transfer or return to the client of value equal to the initial margin requirement of each client (net of any close-out costs), even if the return of the specific securities posted is not possible (see CCP Standard 13.2). This approach is similar to the 'Legally Segregated Operationally Commingled' segregation model mandated in the US by the CFTC. The asset attribution account structure additionally guarantees the transfer or return of excess collateral and any specifically identified securities lodged as collateral by each client. Under these arrangements, ASX Clear (Futures) would transfer or return the 'collateral value' (i.e. margin requirements plus the value of excess collateral) that had been attributed to an individual client account in the event of a participant default (see CCP Standard 13.2).

13.2 A central counterparty should employ an account structure that enables it readily to identify positions of a participant's customers and to segregate related collateral. A central counterparty should maintain customer positions and collateral in individual customer accounts or in omnibus customer accounts, or equivalent.

ASX Clear

ASX Clear offers individual client segregation for options. For these products, client collateral cannot be used to offset losses arising from a participant's proprietary (house) account. Non-cash collateral (including excess collateral) lodged with ASX Clear in respect of options transactions remains registered in the name of the client. Participants can also offer clients the option for clients' excess cash collateral posted against options positions to be held directly with ASX Clear and attributed to an individual client account. Under these arrangements, ASX Clear would transfer or return to the participant's client trust account any excess cash collateral that had been attributed to an individual client account (net of any close-out costs).

ASX Clear currently does not offer segregation of client margin for cash market transactions in individual customer or omnibus accounts. Instead, it has arrangements that provide clients with materially equivalent – but not identical – protections to those offered under house/client omnibus segregation while utilising a commingled house/structure.³³ These arrangements aim to ensure that participants employ best practice in processing client trades during the pre-settlement period, namely: that client securities due for delivery that are held in the participant's accumulation account remain the beneficial property of the client until they are placed into the participant's settlement account (see Appendix C.2, SSF Standard 10.2); and that client monies to fund a purchase must remain in trust accounts until the purchased stock is registered in the client's name.³⁴ The ASX Settlement Operating Rules also require daily reconciliation by participants of unsettled stock held beneficially for the client. ASX's proposed replacement for the CHES system is expected to have functionality that can be configured to support segregation of a participant's clients' positions and collateral from those of the participant during the pre-settlement period.

The settlement processing is also designed to minimise client principal exposure to the participants acting on their behalf. Under these arrangements, participants are required to fund any movements of beneficially held client stock to the settlement account on the day that the movement occurs by placing the required amount into trust for the client concurrent with the CHES batch settlement process. Participants are able to pre-schedule movements of beneficially held client stock to their settlement account. These 'pre-positioning' transactions settle in the first stage of batch processing, with payment providers being notified of a net amount to be transferred between participants' general accounts and client trust accounts. These arrangements aim to ensure that client assets and funds remain in the beneficial ownership of clients for all but a brief window during the settlement period. These arrangements protect clients from principal losses in the event of a participant default but will not protect clients against the cost of replacing trades in such an event.

33 In particular, ASX's alternative arrangements do not provide a client with protection against replacement cost risk if its clearing participant defaulted.

34 Participants maintain 'accumulation' and 'settlement' accounts to manage the processing of securities for settlement. Client securities due for delivery are typically initially placed in accumulation accounts prior to transfer to the participant's settlement account, at which point the participant takes effective control over the use of securities. Securities are delivered to and from settlement accounts as part of ASX Settlement's batch settlement process.

ASX Clear (Futures)

ASX Clear (Futures) enables both OTC and exchange-traded futures participants to offer clients the choice of holding their positions in either an individually segregated account or a client omnibus account. Clearing participants are not obliged to offer both individually segregated and omnibus client accounts, but must provide their clients with a client fact sheet, developed by ASX, which explains the types of accounts that are available, and the advantages and disadvantages of each option (see CCP Standard 13.4). Initial margin is calculated separately for positions held in each individual or omnibus client account. Portfolio margining of interest rate futures against OTC positions (see CCP Standard 6.5) is only permitted for clients that have individual client accounts for both types of products with the same participant.

Under the initial margin value individually segregated account structure, only positions are segregated at the individual client account level. Operationally, collateral is not segregated: gross collateral requirements are aggregated across all client accounts and managed by the participant within a single commingled client collateral account. In the event of a default, the value of the initial margin applied to the client's position in an individual client account would either be transferred to another participant or returned to the client (net of any close-out costs). Under these arrangements, any excess collateral would be returned to the administrator of the defaulted participant. That is, ASX Clear (Futures) guarantees only the transfer or return of the value of each client's initial margin requirement, not the individual collateral securities or any excess collateral that may have been posted.

Under the asset attribution account structure, cash and securities lodged as margin or excess collateral are attributed to individual client accounts. While all client collateral is operationally managed in a single commingled account under these arrangements, ASX Clear (Futures) would transfer or return the collateral value for an individual client account (that is, the greater of the initial margin requirement or the value of attributed assets, net of any close-out costs). Subject to exceptions set out in the rules, ASX Clear (Futures) would transfer or return to the client equivalent (*in specie*) securities to those that had been attributed. Participants that offer individually segregated accounts are not obliged to offer the asset attribution option.

Under both individually segregated account structures, variation margin payments (and other cash flows) to and from clearing participants are netted. Accordingly, there is a risk that a participant could default before passing on to each client the gross flows underlying the net payment. Despite this, ASX's individually segregated account structures each provide significant protections for client collateral posted to the CCP relative to the omnibus segregation structure.

13.3 To the extent reasonably practicable under prevailing law, a central counterparty should structure its portability arrangements in a way that makes it highly likely that the positions and collateral of a defaulting participant's customers will be transferred to one or more other participants.

Both ASX Clear and ASX Clear (Futures) have the capacity to transfer (port) participants' clients' positions and collateral under their Operating Rules (see CCP Standard 13.3). Part 5 of the PSNA provides legal protections to facilitate the transfer of a defaulted participant's client positions and collateral (as provided for by its Operating Rules) without the need to seek approval from the participant's external administrator. ASX maintains an internal policy governing the segregation and portability arrangements at ASX Clear and ASX Clear (Futures), which formally aligns with the requirements of this standard.

The likelihood that positions and collateral of a defaulting participant's customers will be transferred to one or more other participants depends, in part, on the account structure.

Individually segregated client accounts - OTC and exchange-traded derivatives

The segregation of accounts for each individual client supports the transfer of client positions and collateral to another participant in the event of a clearing participant default. Under individually segregated structures, margin requirements are calculated on a gross basis (i.e. individually for the positions held by each client). Accordingly, there should be sufficient collateral available to support the transfer of each client's positions to another clearing participant. In ASX Clear, all client derivatives accounts are individually segregated. In ASX Clear (Futures), individually segregated accounts are available for both OTC and exchange-traded derivatives. Notwithstanding the above, portability cannot be guaranteed since it relies on clients having established arrangements with alternate clearing participants and the willingness and capacity of those participants to take on the affected clients within a short period of time.

For ASX Clear (Futures) only, clients may nominate in advance an alternative (backup) clearing participant to which it would seek to port its positions (and any associated collateral value) in the event of default of its clearing participant. Advance nomination of a backup clearing participant is optional and, even if nominated, a backup clearing participant may in the event be unwilling or unable to take on the positions. However, given the short timeframe for decisions in the event of a default, pre-nomination should increase the likelihood that a successful transfer could be achieved.

Omnibus client accounts – ASX Clear (Futures) OTC derivatives and futures

Participants of ASX Clear (Futures) have the option of operating an omnibus client account structure for OTC derivatives and futures. A fully collateralised transfer of an individual client's positions within an omnibus account is unlikely, since these positions are margined on a net basis. ASX would therefore expect to manage a defaulted participant's client omnibus account as a single client account – that is, no individual client within an omnibus account would be transferred separately from the others. Since porting requires the consent of the receiving participant and each individual client, the simultaneous transfer of all clients within an omnibus account would be challenging.

Commingled house and client accounts – Cash market transactions

The commingled account structure used for cash market transactions creates practical difficulties for portability. The commingled account structure makes it difficult to identify client positions and, even if positions could be identified, since house and client positions are margined on a net basis across the commingled account, there is unlikely to be sufficient collateral at the CCP to achieve the fully collateralised transfer of individual client positions to alternative clearing participants. Accordingly, ASX would expect to manage a defaulted participant's commingled account as a single client account – that is, no individual client would be transferred separately from the others. Since porting requires the consent of the receiving participant and each individual client, the simultaneous transfer of a large number of clients would be challenging. However, even under a segregated account structure the scope for transfer of cash market positions would be limited due to the short (two-day) equity settlement cycle.

13.4 A central counterparty should disclose its rules, policies and procedures relating to the segregation of a participant’s customers’ positions and related collateral. In particular, the central counterparty should disclose whether customer collateral is segregated on an individual or omnibus basis. In addition, a central counterparty should disclose any constraints, such as legal or operational constraints, that may impair its ability to segregate or port a participant’s customers’ positions and related collateral.

Current arrangements for segregation and portability are defined in the ASX Clear and ASX Clear (Futures) Operating Rules and Procedures (including ASX Clear (Futures)’ OTC Rulebook and Handbook). ASX has also published a public overview of clearing participant default arrangements, which outlines the current operational constraints to portability and the implications of different account structures.³⁵

ASX has published a client fact sheet and a brochure on its client protection model, which outline segregation and portability arrangements in ASX Clear (Futures), the rights of clients in the event of a default, and protection available for excess client collateral. ASX Clear (Futures) participants are required to make the fact sheet available to all of their direct clients. The fact sheet and brochure are also available on ASX’s public website.³⁶ In addition, during previous assessment periods, ASX has publicly consulted stakeholders on segregation and portability arrangements for both OTC and exchange-traded derivatives. These consultations have outlined the implications of different account structures used by ASX Clear (Futures) and identified operational constraints to portability.

Standard 14: General business risk

A central counterparty should identify, monitor and manage its general business risk and hold, or demonstrate that it has legally certain access to, sufficient liquid net assets funded by equity to cover potential general business losses so that it can continue operations and services as a going concern if those losses materialise. Further, liquid net assets should at all times be sufficient to ensure a recovery or orderly wind-down of critical operations and services.

ASX Clear	ASX Clear (Futures)
Observed	Observed

14.1 A central counterparty should have robust management and control systems to identify, monitor and manage general business risks, including losses from poor execution of business strategy, negative cash flows or unexpected and excessively large operating expenses.

ASX’s approach to business risk is consistent with its overall Enterprise Risk Management Policy and Framework (see CCP Standard 3). Under the framework, formal policies are in place for individual risk

³⁵ Available at <http://www.asx.com.au/documents/clearing/131001_Default_Management_-_Public_Information_Document_v2.pdf>.

³⁶ The client fact sheet is available at <<http://www.asx.com.au/documents/clearing/ASXClientClearingClientFactSheet22January2016.pdf>>; the brochure on the client protection model is available at <https://www.asx.com.au/documents/clearing/ASX_CPM_Brochure.pdf>. A related fact sheet describing the legal model used in ASX Clear (Futures)’ client clearing arrangements is available at <http://www.asx.com.au/documents/clearing/ClientProtectionModelFactSheet_31August2015.pdf>.

categories such as accounting, authorisations, business continuity, technology, fraud control and procurement.

ASX monitors a variety of financial business risks, including market risk, credit risk, liquidity risk and capital risk:

- Group funds (as distinct from collateral lodged by participants) may be exposed to market risk arising from changes in market variables such as interest rates and foreign exchange rates. Mitigants for market risk include hedging of foreign exchange and limits with respect to weighted average maturity of investments, with appropriate capital allocation.
- Credit risk for the group's general business activities arises in the collection of receivables, which principally comprise fees from market participants, issuers, users of market data and other customers. Mitigants include active collection procedures on trade receivables and review of the 'ageing' of receivable amounts, as well as ceasing to provide services where receivables remain unpaid. The ASX CCPs novate the income from receivables to a related entity that bears the responsibility for collecting receivables.
- Liquidity risk arises from the group's time-critical payables. This is mitigated by ASX's liquidity management arrangements, including forward planning and forecasting of liquidity requirements and holding sufficient liquid assets to meet payment obligations.
- ASX may be exposed to capital risk if equity in its group entities falls below prudent or regulatory minimum levels. ASX manages its capital at a group level, with an objective of maintaining a prudent level of surplus net tangible equity above its capital allocation. Ongoing monitoring of cash flows and capital adequacy is conducted via quarterly meetings of the Risk Committee.

ASX undertakes periodic strategic risk assessments in the context of its overall business plans. Through this process, ASX identifies new strategic business initiatives. These are subject to financial analysis, including sensitivity analysis on cash flows. Impacts on capital are also determined and analysed.

ASX conducts risk assessments when undertaking any expansion of its activities or in the event of material changes to its business. Risk assessments are built into ASX's project management framework (see CCP Standard 16.4). Under this framework, an initial high-level risk indication is defined at the project concept stage. This is followed by a formal project risk assessment covering both project delivery risks and impacts to business activities. ASX typically conducts a series of workshops involving a range of stakeholders to discuss risks associated with any planned new service. Prior to the approval of a project for launch/production, ASX prepares an operational readiness summary and conducts a final workshop to discuss possible risks associated with initial launch. This includes consideration of potential failure scenarios and workarounds, procedures for escalation of issues, customer readiness, and help desk and key staff availability.

Following launch, the risks of a new activity are captured in risk profiles that are prepared by relevant management every six months. The Risk Committee also monitors actual and forecast capital and liquidity requirements on a quarterly basis, including requirements related to new projects.

14.2 A central counterparty should hold, or demonstrate that it has legally certain access to, liquid net assets funded by equity (such as common stock, disclosed reserves or other retained earnings) so that it can continue operations and services as a going concern if it incurs general business losses. The amount of liquid net assets funded by equity a central counterparty should hold, or have access to, should be determined by its general business risk profile and the length of

time required to achieve a recovery or orderly wind-down, as appropriate, of its critical operations and services if such action is taken.

As at 30 June 2018, ASX set aside \$35 million and \$40 million for ASX Clear's and ASX Clear (Futures)' operational and business risks, respectively. In determining the sufficiency of these capital levels, ASX has estimated the capital required to cover: six months of current operating expenses (see CCP Standard 14.3); operational and legal risk; non-covered credit and counterparty credit risk; non-covered market risk; and business risk.

ASX Clear and ASX Clear (Futures) also undertake periodic loss scenario analysis in order to validate whether the business risk capital is sufficient to meet the potential single largest uninsured business loss event for the CCPs. ASX has in place a number of insurance policies to reduce its exposure to a broad range of risks, including professional indemnity, fraud, and operational risks such as computer manipulation and equipment failure. However, this insurance provides limited direct cover for the CCPs due to the nature of ASX's intragroup arrangements and the type of losses that the CCPs could be directly exposed to. The other factors driving ASX's business risk capital calculation limit the extent to which the level of ASX's insurance cover could reduce the level of capital that it holds.

Since ASX has identified constraints to making business risk capital bankruptcy remote within the CCP, this capital is held at the ASX Group level to ensure that it cannot be applied to meet losses caused by a participant default. Each CS facility has a separate allocation for business risk capital that is explicitly recognised within group-wide capital holdings. These holdings include an additional buffer against potential losses sustained elsewhere in the group. The ASX Group Support Agreement places an obligation on ASX to maintain sufficient capital to support ASX Clear's and ASX Clear (Futures)' continued operations in the event of general business losses, supporting the legal certainty of the CCPs' access to business risk capital as required.

14.3 A central counterparty should maintain a viable recovery or orderly wind-down plan and should hold, or have legally certain access to, sufficient liquid net assets funded by equity to implement this plan. At a minimum, a central counterparty should hold, or have legally certain access to, liquid net assets funded by equity equal to at least six months of current operating expenses. These assets are in addition to resources held to cover participant defaults or other risks covered under CCP Standard 4 on credit risk and CCP Standard 7 on liquidity risk. However, equity held under international risk-based capital standards can be included where relevant and appropriate to avoid duplicate capital requirements.

ASX Clear and ASX Clear (Futures)' recovery planning arrangements have been developed with reference to the CPMI-IOSCO guidance on recovery planning (see CCP Standard 3.5). In calculating the quantum of business risk capital described under CCP Standard 14.2, ASX has sought to ensure access to sufficient liquid net assets to fund operations during the execution of the CCPs' recovery plan or to cover a minimum of six months of current operating expenses.

The ASX CCPs' recovery approach establishes arrangements to address non-default losses that may arise from losses on treasury investments or a range of general business risks:

- In the case of investment losses (other than those resulting from fraud of, or material non-compliance with the investment policy of, the ASX CCPs; see CCP Standard 15), ASX would apportion any losses in excess of \$75 million between participants (see CCP Standard 14.5)
- Other non-default, general business losses to ASX Clear and ASX Clear (Futures) would be absorbed by ASX through application of general business risk capital. Unlike investment losses (referred to above), general business losses from causes such as a decline in revenues or an

increase in operating expenses are likely to be relatively slow-moving in nature. This recovery approach takes into account that ASX has in place a number of insurance policies to reduce its exposure to a broad range of risks (see CCP Standard 14.2). ASX Limited has also committed to maintaining adequate levels of business risk capital for the CCPs and securities settlement facilities (SSFs), recapitalising these funds as required (see CCP Standard 14.5).

The ASX CCPs' approach assumes that the \$75 million general business risk capital across both CCPs may also be used to absorb losses resulting from custody and investment losses (see CCP Standard 15). To achieve consistency with the CCP resilience guidance, in July 2018 ASX set aside an additional \$71 million in liquid net assets funded by equity to cover non-default, general business losses, while maintaining \$75 million as a separate pool to cover custody and investment losses (see section 4.5).

14.4 Assets held to cover general business risk should be of high quality and sufficiently liquid in order to allow the central counterparty to meet its current and projected operating expenses under a range of scenarios, including in adverse market conditions.

The risk capital for ASX's CS facilities is invested in accordance with the ASX Limited and ASX Operations Pty Limited Investment Mandate. The Investment Mandate specifies investment objectives, responsibilities, approved products and counterparties, and audit and maintenance of the mandate. Approved products are generally highly rated and liquid products such as: cash deposits; bank bills, negotiable certificates of deposit and floating rate notes issued by Australian Prudential Regulation Authority (APRA) approved ADIs; foreign exchange in specified currencies; Australian Government securities; and selected semi-government securities. Limits are applied against counterparty, liquidity and market risks. Liquidity limits are specified for maximum instrument maturity and weighted average maturity.

14.5 A central counterparty should maintain a viable plan for raising additional equity should its equity fall close to or below the amount needed. This plan should be approved by the board of directors and updated regularly.

As noted, ASX Limited manages its operational and business risk capital at the group level. The ASX Limited Board monitors the ongoing capital adequacy of the ASX Group as part of its regular capital planning activities. The Board determines the most appropriate means of raising additional capital when needed, giving due consideration to prevailing market conditions and available alternative financing mechanisms. This was most recently reviewed and approved by the Board in August 2017.

The ASX CCPs' recovery approach depends on timely and reliable recapitalisation processes to address general business losses. Accordingly, the CCPs have established an intragroup service agreement which commits ASX Limited to maintaining adequate levels of business risk capital for the CCPs, recapitalising these funds as required. ASX Limited maintains a plan that sets out how it would fulfil its obligations to recapitalise ASX Clear and ASX Clear (Futures). The elements of this plan include the use of existing group cash reserves and raising additional capital through an equity issuance by ASX Limited.

In the case of investment losses, reliance on recapitalisation alone is unlikely to be sufficiently timely to address losses in excess of general business risk capital. ASX would apportion any losses (other than those resulting from fraud of, or material non-compliance with the investment policy of, the ASX CCPs; see CCP Standard 15) in excess of \$75 million (an amount equal to the ASX CCPs' total general business risk capital) between participants. This would be done in proportion to the amount of cash each participant has provided to the CCPs (including margin, default fund contributions and excess cash).

Standard 15: Custody and investment risks

A central counterparty should safeguard its own and its participants' assets and minimise the risk of loss on and delay in access to these assets. A central counterparty's investments should be in instruments with minimal credit, market and liquidity risks.

ASX Clear	ASX Clear (Futures)
Observed	Observed

15.1 A central counterparty should hold its own and its participants' assets at supervised and regulated entities that have robust accounting practices, safekeeping procedures and internal controls that fully protect these assets.

The AUD-denominated assets of the ASX CCPs and their participants are administered and held within the ASX Group. Intragroup arrangements allow ASX Clear and ASX Clear (Futures) to fully understand the nature of their risk exposure to ASXCC and other group entities such as Austraclear (at which ASXCC's AUD-denominated debt securities are held). This exposure is managed within the context of ASX's overall Clearing Risk Policy Framework. ASX has accounting practices, safekeeping procedures and internal controls to protect its own and its participants' assets (as described under CCP Standard 2.7).

ASX Clear's AUD-denominated non-cash collateral is held in CHESS; ASX Clear (Futures)' AUD-denominated non-cash collateral is held in the CCP's account in Austraclear. ASX Clear's and ASX Clear (Futures)' Operating Rules and Procedures define how collateral is used. The CCPs do not re-use non-cash collateral posted by participants.

Non-AUD-denominated securities held as investments or posted as non-cash collateral are held outside the ASX Group. NZD-denominated investment securities are held in NZClear, which is owned and operated by the Reserve Bank of New Zealand. Non-cash collateral and investment securities denominated in other currencies (i.e. G4 currencies) are held in Clearstream, an international central securities depository owned and operated by Deutsche Börse and subject to the supervision of the Commission de Surveillance du Secteur Financier in Luxembourg and the German Federal Financial Supervisory Authority.

Cash collateral and cash contributed to the default funds (including equity, restricted capital reserves and participant contributions) are controlled by ASXCC, of which ASX Clear and ASX Clear (Futures) are subsidiaries (see 'ASX Group Structure' in Appendix B.1). ASXCC makes its investments in accordance with its Investment Mandate and ASX's Investment Risk Policy, which together define investment objectives, investment specifications, and audit and maintenance of the policy (see CCP Standard 15.4).

15.2 A central counterparty should have prompt access to its assets and the assets provided by participants, when required.

AUD-denominated assets invested on behalf of ASX Clear, ASX Clear (Futures) and their participants are held within the ASX Group and subject to ASX's exclusive custody. Cash investments are held directly by ASXCC. AUD-denominated non-cash collateral is lodged directly with ASX Clear in CHESS or ASX Clear (Futures) in Austraclear. NZD-denominated assets are held in NZClear. Assets denominated in G4 currencies are held in Clearstream. The Operating Rules require that collateral from participants is unencumbered. These arrangements aim to ensure that ASX has prompt and legally certain access

to participant collateral and its own contributions to prefunded financial resources, including in the event of a participant default.

15.3 A central counterparty should evaluate and understand its exposures to its custodians, taking into account the full scope of its relationships with each.

ASXCC does not use custodians to hold assets invested on behalf of ASX Clear or ASX Clear (Futures). ASX Clear (Futures) uses Clearstream to hold US treasury bills posted as collateral. Currently no US treasury bills are held by ASX Clear (Futures) as collateral. ASX plans to undertake a risk assessment of Clearstream within the next 12 months.

15.4 A central counterparty's investment strategy should be consistent with its overall risk management strategy and fully disclosed to its participants, and investments should be secured by, or be claims on, high-quality obligors. These investments should allow for quick liquidation with little, if any, adverse price effect.

ASXCC is the controlling entity for the investments of both CCPs. In respect of both cash margin collected and pre-funded pooled risk resources, ASXCC invests funds in accordance with a defined investment policy, endorsed by the ASXCC Board and itself governed by the ASX Enterprise Risk Management Policy. The investment policy, set out in the high-level Investment Risk Policy and the more detailed ASXCC Investment Mandate, articulates the basis for the CCPs' mitigation of investment-related credit, market and liquidity risks (CCP Standard 7). ASXCC's investment mandate recognises the primacy of maintaining liquidity and credit quality over achieving investment return, given that funds under management are a critical source of liquidity in the event of a market disruption or clearing participant default. The performance of the investment portfolio within the parameters of this policy is closely monitored by ASXCC, with trigger points to automatically escalate potential issues to the CRO before binding limits are reached. For example, trigger points are defined for weighted average maturity.

The ASXCC Investment Mandate defines investment counterparty eligibility criteria and sets investment limits in order to control counterparty investment risk:

- *Counterparty eligibility criteria.* Counterparties must be Australian Commonwealth or state government entities (including the Bank), the New Zealand government or RBNZ, Australian or New Zealand Authorised ADIs, or off-shore bank counterparties. ADIs and off-shore bank counterparties must also have a S&P short-term issuer credit rating of A-1 or above (A-2 or above if approved only as a repo counterparty). Off-shore bank counterparties are only approved for the investment of NZD, EUR, GBP, JPY and USD cash and reverse repo, both on an overnight basis.

The ASXCC Investment Mandate does not permit investments in securities of ASX Group entities, consistent with the Bank's supplementary interpretation of CCP Standard 15.4 (see introduction to Appendix C). ASXCC is also not permitted to create unsecured exposures to any investment counterparty that is a participant or affiliated with a participant, other than the four major Australian banks.

- *Counterparty investment limits.* Counterparty investment limits are determined according to factors such as the credit quality of the counterparty or obligor, the size of the AFR, and whether eligible investment counterparties and their affiliates are also clearing participants. Individual unsecured exposures to non-government related issuers or counterparties are limited to the level of business risk capital held across the two CCPs (\$75 million), meaning that ASX could absorb losses arising from the default of any single investment counterparty or issuer without

allocating losses to participants (see CCP Standard 14.3). To achieve consistency with the CCP resilience guidance (see section 4.5), in July 2018 ASX established a separate pool of liquid net assets funded by equity that would provide cover for custody and investment losses up to a maximum of \$75 million, without drawing upon the capital set aside for other general business risks. Concentration limits are set on both the proportion of the portfolio that can be invested in state government counterparties and the absolute amount that can be invested with a single counterparty.

ASXCC's investment mandate requires that a portion of its portfolio be held in liquid asset form to cover liquidity risks from both general business risks and risks related to the CCPs' clearing activities (see CCP Standard 7.3). The investment mandate aims for quick liquidation of investments with little, if any, price effect. Only investments in AUD and NZD-denominated instruments that can be liquidated or repurchased for cash within two hours are treated as 'liquid' products. These are defined based on the depth of market liquidity and the terms of investment, including whether the instruments are eligible for repurchase transactions with the Bank and the RBNZ (see CCP Standard 7.4). 'Liquid' products in other currencies (EUR, GBP, JPY and USD) are defined as those that can be sold for settlement the following business day and which are judged to have an active repo market providing same day liquidity.

ASXCC has set a minimum value per currency of its total investment portfolio that must be invested in liquid assets, called the CLR (see CCP Standard 7.3). For AUD and NZD, ASXCC restricts the asset types eligible to meet the currency-specific CLR to cash held in accounts at central banks or creditworthy commercial banks, and securities issued by the Australian or state governments or the New Zealand Government (held outright or via repo). For EUR, GBP, JPY and USD, the asset types eligible to meet the currency-specific CLR are restricted to government securities issued in the government's own currency. For AUD and NZD, ASXCC also has a currency-specific ALR designed to reflect the potential for unexpected non-default related liquidity needs in these currencies. ASX calibrates the ALR to ensure that it has sufficient liquid assets in AUD and NZD to cover the peak historical one day outflow in each currency from the ASXCC investment portfolio in percentage terms since 2008 (the earliest date from which data are available). The ALR has been calculated as 11 and 21 per cent of ASXCC's AUD and NZD portfolios, respectively. No ALR is set for EUR, GBP, JPY and USD since the asset types eligible to meet the CLR in these currencies are also eligible to meet the ALR. All other liquid assets in its portfolio are counted against the ALR.

As set out in ASX's investment risk policy, market risks are managed by appropriate limits based on the duration, maximum maturity, unrealised mark-to-market losses and VaR of the ASXCC investment portfolio.

The ASXCC investment mandate is reviewed and approved annually by the ASXCC Board and CS Boards and presented to the RCCs for noting. The investment risk policy is reviewed and approved by the ASX Limited Board. The broad approach to investment and investment holdings is disclosed publicly in the ASX Annual Report. In accordance with the CPMI-IOSCO *Public quantitative disclosure standards for central counterparties*, ASX also discloses the high-level composition of ASXCC's investment holdings on a quarterly basis (see CCP Standard 21.2). ASX's disclosure on investment risk also includes participants' contingent exposure to CCP investment losses. Under ASX's recovery arrangements, ASX would allocate any losses in excess of \$75 million between participants, in proportion to the amount of cash each participant has provided to the CCPs. The disclosure provides participants with the calculation steps necessary to determine their contingent exposure if an investment loss greater than \$75 million were to be realised.

At end June 2018, over 80 per cent of the investment portfolio was invested in government or semi-government bonds, or reverse repurchase agreements secured by such bonds. The remainder of the portfolio was primarily invested in Bank-eligible securities, or held in deposits with ADIs.

Standard 16: Operational risk

A central counterparty should identify the plausible sources of operational risk, both internal and external, and mitigate their impact through the use of appropriate systems, policies, procedures and controls. Systems should be designed to ensure a high degree of security and operational reliability and should have adequate, scalable capacity. Business continuity management should aim for timely recovery of operations and fulfilment of the central counterparty’s obligations, including in the event of a wide-scale or major disruption.

ASX Clear	ASX Clear (Futures)
Partly observed	Partly observed

Identifying and managing operational risk

16.1 A central counterparty should establish a robust operational risk management framework with appropriate systems, policies, procedures and controls to identify, monitor and manage operational risks.

ASX’s operational risk policies and controls have been developed in accordance with ASX’s group-wide Enterprise Risk Management Policy (see CCP Standard 3.1). Under this framework, the ASX Limited Board is responsible for reviewing and overseeing the group’s risk management systems (see CCP Standard 2.6). The board delegates review of the Enterprise Risk Management Policy to its Audit and Risk Committee. The Risk Committee, a management committee comprising executives across ASX, is responsible for approving enterprise risk policies and reviewing controls, processes and procedures to identify and manage risks, as well as the formal approval of significant operational risk policies prepared by individual functions (see CCP Standard 16.2 and CCP Standard 2.6). Under the Enterprise Risk Management Policy, functions across ASX are also responsible for: identifying business-specific risks; applying controls; maintaining risk management systems; reporting on the effectiveness of risk controls; and implementing enhancements and taking remedial action.

Dedicated security teams have responsibility for assessing both physical and cyber security risks, and are overseen by the Technology Operations and Security Committee (TOSC; see CCP Standard 16.3).

Review of technology governance and operational risk and controls

During the assessment period, an independent external review of ASX’s technology governance, operational risk and control frameworks was undertaken at the Bank and ASIC’s request, covering ASX’s licensed markets and CS facilities. The review identified that ASX’s operational risk framework lacks clarity and creates uncertainty regarding roles and responsibilities for managing risk across the organisation, in part due to a lack of effective processes, documented procedures and appropriate systems or tools. It also found evidence of inconsistencies in operational risk monitoring across the organisation and that key risk indicators were not sufficiently forward-looking, which limited ASX’s ability to generate strategic insights for more effective risk management. ASX has commissioned a project to address the findings of the review, ‘Building Stronger Foundations’, described in Section 3.

16.2 A central counterparty's board of directors should clearly define the roles and responsibilities for addressing operational risk and should endorse the central counterparty's operational risk management framework. Systems, operational policies, procedures and controls should be reviewed, audited and tested periodically and after significant changes.

The ASX Limited Board, the CS Boards, the Audit and Risk Committee, the Risk Committee and individual departments all have responsibilities within the ASX CS facilities' operational risk management framework. These roles and responsibilities are defined in the CS Boards' Charter, the Audit and Risk Committee Charter, the Risk Committee Charter and the Enterprise Risk Management Framework.

During the assessment period, ASX replaced the Enterprise Risk Management Committee with the Risk Committee. ASX also established the TOSC, which has absorbed the functions of the Business Continuity Steering Committee and the former Security Steering Committee (see CCP Standard 2).

Policies and procedures are the subject of internal and external review. ASX's internal audit function routinely reviews compliance with operational policy, reporting to the Audit and Risk Committee on a quarterly basis. Scheduled reviews carried out by Internal Audit include business process and operational audits and information technology reviews. Internal Audit also reviews major projects and carries out special investigations as required (e.g. following a major operational incident). Audit findings may prompt a review of policy, which would be conducted in consultation with key stakeholders.

DCS and CHES – ASX Clear's core systems – are also subject to an annual independent audit, the results of which are released to the market. The audits cover certain information processing facilities and internal controls of DCS and CHES, as well as the integrity and accuracy of information gathered by the systems.

ASX benchmarks its operational risk framework against relevant international standards. For example:

- *ISO 31000 – Risk Management Principles and Guidelines* is used to benchmark ASX's overarching framework for operational risk management.
- The business continuity framework is benchmarked against the *Business Continuity Institute's Good Practice Guidelines 2013*, and the international standard *ISO 22301:2012 Business Continuity Management Systems*. ASX is currently reviewing its business continuity framework as part of a broader review that also covers crisis management.
- ASX has taken into consideration the NIST cyber security framework in developing its information security framework. During the assessment period, ASX commissioned an external review of its cyber resilience arrangements against industry standards and performed a self-assessment against the *CPMI-IOSCO Guidance on cyber resilience for financial market infrastructures* (see section 2.3.4).
- The compliance framework is benchmarked to the AS 3806-2006: Compliance Programs.
- The ASX Fraud Control Policy is benchmarked against *AS 8001-2008: Fraud and Corruption Control*.

The Enterprise Risk Management Policy defines a variety of control procedures to support the core operational systems. These include audit logs, segregation of duties controls such as dual input checks and approval, management sign-off and processing checklists as the primary preventative controls, supported by reconciliations and management reviews of activity.

Change management and project management

ASX Clear and ASX Clear (Futures) operate separate test environments for their core systems, and have a formal change management process which is documented in the ASX Technology Change Management Policy and Guideline. The policy and guideline covers the requirements for the notification, risk assessment, testing and implementation of technology changes for all ASX CS facilities, as well as the key roles and responsibilities in relation to technology change management. There are also defined procedures for communicating details of technology upgrade releases with participants and vendors, which include regular notices to participants of upcoming changes. Aspects of the change management process are externally reviewed each year. The external review of ASX's technology governance, operational risk and control framework identified shortcomings in the tools used by ASX in managing change. As part of its Building Stronger Foundations program, ASX plans to implement an IT service management tool that includes improved change management functionality (see section 3).

Major projects are overseen by the Portfolio Governance Group (PGG), which is comprised of representatives of the Group Executive. The PGG is responsible for assessing project priorities across the ASX Group and overseeing the quality of project execution. Project management of major projects is undertaken by the Project Delivery Team. Projects incorporate testing processes, which verify that systems or services meet benchmarks set prior to implementation. Testing addresses both technical and operational aspects of projects. The project management process includes engagement with customers and third-party vendors of supporting systems where appropriate, particularly in customer testing. Project plans also include formal checkpoints which are intended to ensure that all appropriate risk management controls are in place prior to live use of a new or updated system or service.

A key project ASX has underway is the replacement of the CHES clearing and settlement system. This replacement is an important element of ensuring that ASX's core infrastructure for the cash equities market meets international best practice, and that its performance, resilience, security and functionality continue to meet the needs of its users. ASX has selected Digital Asset Holdings, to assist in developing a replacement system for CHES based on a permissioned, private distributed ledger technology (DLT) system. ASX expects the replacement system to commence operation in late 2020 or early 2021.

16.3 A central counterparty should have clearly defined operational reliability objectives and should have policies in place that are designed to achieve those objectives. These policies include, but are not limited to, having: exacting targets for system availability; scalable capacity adequate to handle increasing stress volumes; and comprehensive physical and information security policies that address all potential vulnerabilities and threats.

Operational reliability and availability

Availability targets are documented and defined formally for critical services. Both CCPs' key systems are required to meet a minimum availability target of 99.8 per cent; during the assessment period DCS, Genium Clearing and Calypso were available 100 per cent of the time, with availability of CHES at 99.99 per cent.

Operational capacity

System capacity is monitored on an ongoing basis, with regular reviews of current and projected capacity requirements. The results are reviewed against established guidance for capacity headroom over peak recorded values for all critical systems; that is, to maintain minimum capacity 50 per cent over peak recorded daily volumes, with the ability to rapidly increase to 100 per cent over peak within

six months should the need arise. Capacity data are reported to the CRO, CFO, CIO, Executive General Manager Operations and COO on a monthly basis and to the TOSC and Audit and Risk Committee on a quarterly basis. Average capacity utilisation of DCS and CHES during the assessment period was 7 per cent and 24 per cent respectively, while peak utilisation was 18 per cent for DCS and 31 per cent for CHES. The average capacity utilisation of Genium during the assessment period was 9 per cent, while peak utilisation was 18 per cent; average capacity utilisation of Calypso was 44 per cent, while peak capacity utilisation was 49 per cent. ASX Clear and ASX Clear (Futures) consider that they have sufficient technical and human resources to operate DCS, CHES, Genium and Calypso during peak periods, including in the event of operational incidents or system failure.

Physical and information security

Physical access is controlled at both an enterprise and function level. The key systems supporting ASX's clearing and settlement processes are operated within secure buildings.

ASX's approach to information security is set out in its cyber security plan and strategy, and complemented by more granular policies and standards. The cyber security plan and strategy is reviewed annually by Technology Security and endorsed by the TOSC, with formal approval by the Audit and Risk Committee.

ASX's cyber security is tested at a number of levels. This includes penetration testing against the ASX perimeter and vulnerability testing within the perimeter. Both CCPs perform security testing on a periodic basis. ASX operates a suite of controls designed to prevent and detect cyber attacks on its systems, such as denial of service or malware threats. These controls include continuous monitoring of its network for cyber intrusions and malicious code, steps to monitor suspicious internet traffic, regular scans of both the network perimeter and system assets to confirm they remain secure, and the maintenance of spare capacity to manage legitimate or malicious surges in internet traffic, as well as steps to regulate access to ASX systems.

Application testing is carried out in test environments (see CCP Standard 16.2). Testing reports are documented, with identified problems escalated to management and tracked through to remediation. Similarly, any technology-based operational incidents are reported to senior management and issues are tracked through to resolution via regular updates to management.

16.4 A central counterparty should ensure that it can reliably access and utilise well-trained and competent personnel, as well as technical and other resources. These arrangements should be designed to ensure that all key systems are operated securely and reliably in all circumstances, including where a related body becomes subject to external administration.

Access to resources

ASX Clear and ASX Clear (Futures) have arrangements in place which aim to ensure that they have well-trained and competent personnel operating the core systems supporting the ASX CCPs. Staff are provided with relevant policies and guidelines from commencement of employment, with periodic communications thereafter. Staff are evaluated with reference to each defined operational process and broader skills matrices, with training provided for identified areas of weakness. Both ASX CCPs have formal succession planning and management processes in place for key staff. However, the external review of ASX's technology governance and operational risk and controls identified that ASX was overly reliant on individual experts in key areas. ASX has placed additional resource into these areas and will be taking steps to improve knowledge management in order to reduce reliance on experts as part of its Building Stronger Foundations program (see section 3). ASX has continued to

automate certain routine technology-related processes and reporting during the assessment period, freeing up additional staff resources that would otherwise be devoted to these tasks.

ASX has a customer support centre within ASX's Australian Liquidity Centre.³⁷ The customer support centre brings together operations, technology and market surveillance staff in a single location, which is ASX's primary operations base and primary data centre.³⁸ To facilitate rapid recovery in the event of an operational disruption, around 30 per cent of ASX's operational staff are based at its secondary operations site. In case of a disruption to staffing arrangements at the primary site for staff, the secondary operations site has capacity to house 65 per cent of all operational staff. ASX also has a Customer Experience Team led by a General Manager. This team is responsible for the development and delivery of the ASX customer experience.

Resources shared with a related body

Within the ASX group structure, most operational resources are provided by ASX Operations, a subsidiary of ASX Limited (see Appendix B.1), under a contractual support agreement. ASX Operations is also required under the support agreement to provide the Bank with reasonable rights of access in respect of information relating to its operation of critical functions provided to ASX Clear and ASX Clear (Futures) (see CCP Standard 16.10 in respect of broader rights of access provided to the Bank by the ASX CCPs' critical service providers).

In the event that ASX Operations became subject to external administration, to the extent permissible by law, provisions within the support agreement provide for the ASX CCPs and the other clearing and settlement corporate entities to retain the use of operational resources. Under proposals currently under consideration by the government in the context of establishing of a special resolution regime for CS facilities (see CCP Standard 16.11), the Bank would have the power to issue directions to related entities such as ASX Operations that provide critical services to a CS facility under *ex ante* legal agreements. This proposed directions power would further safeguard the ASX CS facilities' access to critical services provided by ASX Operations.

Resourcing of major projects

The PGG is tasked with ensuring that ASX has sufficient well-qualified personnel to cope with periods in which it is simultaneously undertaking a number of projects, including those resulting in significant changes to business (see CCP Standard 16.2). The Project Delivery Team rates projects to ensure that they receive appropriate access to resources.

16.5 A central counterparty should identify, monitor and manage the risks that key participants, other FMIs and service and utility providers might pose to its operations. A central counterparty should inform the Reserve Bank of any critical dependencies on utilities or service providers. In addition, a central counterparty should identify, monitor and manage the risks its operations might pose to its participants and other FMIs. Where a central counterparty operates in multiple jurisdictions, managing these risks may require it to provide adequate operational support to participants during the market hours of each relevant jurisdiction.

37 The Australian Liquidity Centre provides market participants with the option to co-locate their servers with ASX's data centre.

38 ASX currently maintains three main sites for its operations and data processing: a primary operations site that also operates as the primary data centre (where the majority of staff are located); a secondary operations site; and a backup data centre.

Dependencies on participants and other FMIs

ASX identifies, monitors and mitigates potential dependencies on participants in a number of ways:

- by holding regular discussions with participants on risk management processes (see CCP Standard 3.1)
- through participation requirements related to operational resources and capabilities, and business continuity arrangements (see CCP Standards 16.6 and 17.2)
- as part of its assessments of project-related risks (see CCP Standard 14.1)
- through general monitoring of risks under its risk management framework (see CCP Standard 3.1).

ASX Clear and ASX Clear (Futures) have operational interdependencies with Austraclear, which is used to settle margin payments. ASX Clear also has an operational interdependence with ASX Settlement, with which it shares the CHES system (see CCP Standard 19). Operational risk associated with these interdependencies is managed within the context of the ASX Group's operational risk management framework. ASX Clear and ASX Clear (Futures) do not have significant operational interdependencies with other FMIs.

Dependencies on service providers

ASX has a formal policy that sets out the process for entering into, maintaining and exiting key outsourcing arrangements. If a key service is to be provided by an external service provider, ASX would conduct a tender or other process in which proposals from potential vendors are assessed against relevant criteria. Arrangements have been implemented under which ASX would consult with the Bank before entering into new agreements with third parties for critical services. ASX also provides the Bank with a list of critical outsourcing arrangements on an annual basis. Issues relating to outsourcing and service provision are escalated as appropriate to executive management via the ASX Technology vendor management group and the relevant operational support area.

ASX assesses the operational performance of its service providers on an ongoing basis against its own operational policies, aiming to ensure that service providers meet the resilience, security and operational performance requirements of the FSS. ASX maintains current information on its service providers' operations and processes through ongoing liaison, and in turn provides relevant updates to service providers regarding ASX operations. Service providers are also assessed through software 'regression testing' when there is a major system upgrade.³⁹ Contractual arrangements with critical service providers require the approval of ASX Operations or the relevant contracting entity before the service provider can itself outsource material elements of its service.

During the assessment period, an internal audit review identified that ASX's vendor management and procurement processes had not been followed in some cases. In response, ASX is taking steps to educate staff of requirements under these policies and has increased staff resources in its vendor management team. ASX is also reviewing the vendor management framework and will be amending its processes to more clearly define expectations for risk-based monitoring of its vendors.

³⁹ When a component of software is updated, regression testing aims to perform checks on the full software to verify that the operation of other software components has not been inadvertently affected by the update.

All core ASX Clear operational functions are performed within ASX. However, external suppliers are used for utilities, hardware maintenance, operating system and product maintenance, and certain security-related specialist independent services.

ASX Clear (Futures)' core exchange-traded clearing system, Genium, is provided by a third-party vendor. ASX Clear (Futures) has responsibility for business continuity arrangements and computer-system support. The vendor provides support where changes to the system components or underlying source code are involved, under an agreement which extends to 2026. ASX Clear (Futures) has an escrow arrangement in place that would allow it to access source code for Genium in the event that the vendor was unable to continue providing support.

All other ASX Clear (Futures) operational functions are performed within ASX. However, external suppliers are used for utilities, hardware maintenance, operating system and product maintenance, and certain security-related specialist independent services.

ASX has put in place a number of mitigants to address the risks associated with dependencies on utilities and service providers:

- Primary and backup data centres are connected to different electricity grids and telecommunication exchanges.
- Each data centre has backup power generators with capacity to run the site at full load for at least 44 hours, and 72 hours in the case of the primary data centre.
- All external communications links to data centres are via dual geographically separated links.
- ASX conducts regular testing of backup arrangements. Major systems are tested annually. Participants take part in these business continuity tests and are notified of the tests in advance through ASX notices.
- ASX also performs a periodic assessment of suppliers, including consideration of contingency arrangements should externally provided services not be available (such as the use of alternative suppliers), as well as incident escalation procedures and contacts.

Disclosure

The nature and scope of ASX Clear's and ASX Clear (Futures)' dependencies on critical service providers are disclosed to participants through: operating rules; guidance notes; notices and bulletins; technical documentation available on the ASX participant website; more general information available on the ASX public website; and in one-on-one meetings with participants, both during the induction process for new participants and on an ongoing basis.

Operational Support

ASX Clear and ASX Clear (Futures) provide telephone and email support to participants via a helpdesk in its customer support centre. The service operates from 8.00 am to 7.30 pm.

16.6 A participant of a central counterparty should have complementary operational and business continuity arrangements that are appropriate to the nature and size of the business undertaken by that participant. The central counterparty's rules and procedures should clearly specify operational requirements for participants.

Participant business continuity requirements are set out in the ASX Clear and ASX Clear (Futures) Operating Rules and Procedures, supplemented by additional guidance issued by ASX. These require large participants to maintain adequate business continuity arrangements (see CCP Standard 16.8) to

allow the recovery of usual operations preferably within two hours, and no more than four hours, following a contingency event. The targeted recovery time for smaller participants is preferably four hours, and no more than six. If a participant fails to maintain business continuity arrangements consistent with these recovery targets, it may become subject to sanctions or restrictions on its activities. Spot checks of participants' business continuity management are conducted if risk factors are identified, such as where a participant has experienced operational problems. These spot checks examine the participant's governance and processes for resilience and business continuity.

The Operating Rules and Procedures also require more broadly that participants have facilities, procedures and personnel that are adequate to meet technical and performance requirements. ASX's preferred approach to dealing with operational issues is to work collaboratively with the participant to educate them on their obligations. If the matter is serious, ASX may require that the participant address the weakness as a matter of priority. ASX may also impose conditions on participation, or require that the participant appoint an independent expert to assist with the remediation task.

Business continuity arrangements

16.7 A central counterparty should have a business continuity plan that addresses events posing a significant risk of disrupting operations, including events that could cause a wide-scale or major disruption. The plan should incorporate the use of a secondary site and should be designed to ensure that critical information technology systems can resume operations within two hours following disruptive events. Business continuity arrangements should provide appropriate redundancy of critical systems and appropriate mitigants for data loss. The business continuity plan should be designed to enable the central counterparty to facilitate settlement by the end of the day of the disruption, even in case of extreme circumstances. The central counterparty should regularly test these arrangements.

Business continuity management

ASX's approach to business continuity is defined in the ASX Business Continuity Management Policy. This policy describes the incident management and business continuity arrangements for all ASX CS facilities, including the appropriate operational response to a CS facility disruption, and the key roles and responsibilities in relation to business continuity. The ASX Business Continuity Management Policy is supported by a range of other internal documents, including the Business Resumption Plan, the Pandemic Response Plan, and the testing policy for ASX's Business Continuity and Disaster Recovery Plans.

The Group Business Continuity Manager is responsible for developing business continuity management policies and procedures, and coordinating business continuity activities and training across the ASX CS facilities. The outcomes of these activities are overseen by the TOSC, which is chaired by the COO and includes the CEO, Executive General Manager Operations, CIO, CRO and GM Technology Security and Governance. The Risk Committee is responsible for approving ASX's overall business continuity strategy and any related policies.

The ASX Business Continuity Management Policy requires that failover to the backup data centre should occur within two hours. Plans for recovery of key systems apply to both physical and cyber threats to business continuity; these cover scenarios such as the loss of systems or site access (with or without damage to internal site infrastructure), mass unavailability of staff or a pandemic event.

ASX Clear and ASX Clear (Futures) employ a variety of technologies to ensure a high degree of redundancy in their systems – both across sites and within a single site. ASX maintains both primary

and backup data centres, with broadly equivalent operational requirements. Key plant and equipment at the primary site are designed to the Uptime Institute Tier 3 standard of concurrent maintainability.⁴⁰ The main computer network is connected via point-to-point optical fibre, which ASX operates with its own technology, thereby reducing the potential for outages due to operational problems with the telecommunications provider. All core systems employ multiple servers with spare capacity. Front-end servers handling communications with participants are configured to provide automatic failover across sites. Failover of the more critical data servers is targeted to take place within two hours, but would generally be expected to occur within an hour, under the control of management.

Disruption to participants in such circumstances would be mitigated by the high degree of redundancy in front-end system components. In most circumstances, these would be expected to maintain communications with participants' systems and queue transactions until the data servers were reactivated. The integrity of transactions would be supported by: queuing messages until they could be processed; storing all transactions in the database with unique identifiers, thereby preventing the loss or duplication of transactions; and synchronising replication of database records between the primary and backup data centres. Furthermore, in the event that a significant part of a system or an operational site failed, the ASX CCPs have contingency arrangements to activate an additional tier of 'cold' redundancy arrangements (either by converting test systems into production systems or rebuilding systems from readily available hardware) within 24 hours to meet the contingency of any further service interruption.

ASX Clear and ASX Clear (Futures) regularly test their business continuity and technology disaster recovery arrangements against the range of identified business interruption scenarios. The testing requirements are set out in ASX's Business Continuity and Disaster Recovery Plans Testing Policy. Dual site operational teams across the primary and secondary operations sites effectively test backup operational processes on a continuous basis. These arrangements are supplemented by periodic desktop simulations, and exercises that test remote access and attendance at the secondary site. ASX also participates in industry-wide tests of business continuity arrangements. For teams not located across both sites, connectivity and procedural testing of the secondary site are performed monthly by representatives from those teams. Live technology tests, where clearing services are provided in real time from the backup data centre, are conducted on a two-year cycle. The use of live tests ensures that participant connectivity to the backup data centre is also tested. Test results are formally documented and reported to ASX senior management and are also made available to internal and external auditors. In addition to receiving the results of business continuity tests, Internal Audit also reviews technology operational incidents, contributes to business continuity policy updates, and helps ensure that business continuity elements have been considered in project risk assessments. ASX's business continuity framework is audited externally every three to five years; the most recent audit, completed in November 2015, found that ASX's business continuity standards were broadly consistent with widely recognised global standards and did not identify any major areas of concern.

Incident management

ASX Clear and ASX Clear (Futures) have defined procedures for crisis and event management. These procedures, as well as key roles and responsibilities for managing an incident, are documented in

40 The Uptime Institute is an IT consulting organisation that has developed a widely adopted classification system for the level of redundancy arrangements in data centres. 'Tier 3' is the second highest standard of redundancy, indicating that a data centre has redundant components, multiple independent power and cooling systems, and a high degree of availability.

ASX's Crisis Management Plan. The procedures cover incident notification (including notification and incident reporting to the Bank and ASIC), emergency response (including building evacuation), incident response (including overall incident assessment and monitoring), and incident management testing. The procedures were updated during the assessment period to clarify when specific incidents should be reported to the Bank's supervisory as well as operational functions. ASX maintains a crisis management team that includes senior representatives of the core business activities, as well as facilities management, business continuity, and media and communications. The procedures identify responsibilities, including for internal communication and external communication to emergency services, the market, industry and media. As part of these procedures, ASX maintains a multi-market communication protocol for communicating information to participants and stakeholders should any disruption to market, clearing or settlement services eventuate, including where this affects market operators accessing ASX Clear via the TAS.

The ASX Business Services Incident Management Procedure would be invoked in the event of a high severity technology or operational incident. The incident management procedure provides guidelines for system recovery prioritisation and resource allocation, and the actions that would need to be taken in the event of an incident. The procedure also outlines the key roles and responsibilities for managing an incident, as well as indicative communication and notification requirements.

The external review of ASX's technology governance and operational risk and controls identified a number of areas in which ASX's incident management arrangements require strengthening. The review observed limitations in ASX's analysis of incident data, as well as the lack of a defined system for managing identified incidents and issues. The review also observed significant dependence on subject matter knowledge experts within ASX, in part resulting from the lack of a centralised knowledge repository that could provide an end-to-end view of system operations. ASX has plans to address these findings as part of its Building Stronger Foundations program (see section 3).

16.8 A central counterparty should consider making contingency testing compulsory for the largest participants to ensure they are operationally reliable and have in place tested contingency arrangements to deal with a range of operational stress scenarios that may include impaired access to the central counterparty.

The ASX Clear and ASX Clear (Futures) Operating Rules and Procedures require participants to maintain adequate business continuity arrangements that are appropriate to the nature and size of their business as a participant. The Operating Rules specify that participants must have arrangements that allow for the recovery of usual operations (see CCP Standard 16.6). It is the CCPs' expectation (set out in guidance) that this would be within two to four hours following a contingency event for large participants. These arrangements are reviewed as part of the participant admissions process. Participants are also subject to risk-based spot checks of their ongoing compliance with the ASX Clear and ASX Clear (Futures) Operating Rules. Spot checks may be based on topical themes, in some cases arising from observations of general business developments, and in other cases motivated by a participant that has been experiencing operational problems. If a participant fails to implement any recommendations arising from a check, ASX may impose sanctions.

Participants are involved in the contingency testing of the ASX CCPs' systems, as this testing is conducted in a live environment. ASX conducts comprehensive business continuity testing of key systems at least every two years, with participants being notified of the start and completion of testing. Participants are also involved in testing of major system changes or in advance of the introduction of a new system. ASX Clear and ASX Clear (Futures) conduct regular connectivity tests and maintain an external testing environment for system changes.

Outsourcing and other dependencies

16.9 A central counterparty that relies upon, outsources some of its operations to, or has other dependencies with a related body, another FMI or a third-party service provider (for example, data processing and information systems management) should ensure that those operations meet the resilience, security and operational performance requirements of these CCP Standards and equivalent requirements of any other jurisdictions in which it operates.

ASX has developed a set of standard clauses for inclusion in contracts with third-party service providers of critical services to ASX Clear and ASX Clear (Futures) (see CCP Standard 16.5). Similar clauses are also included in the support agreement between the CCPs and ASX Operations Pty Limited, which provides all internal operational services for the facilities. The clauses seek to ensure that the service providers meet the resilience, security and operational performance requirements of the FSS. The clauses also allow the Bank to gather information from the service provider about the operation of critical functions (see CCP Standard 16.10). In the event that the Bank concluded that the terms of the service provider agreement did not meet FSS requirements, the clauses also require the service provider to negotiate acceptable new terms with ASX in good faith. Furthermore, if ASX Clear or ASX Clear (Futures) were to become insolvent, the clauses provide for the Bank to negotiate with the service provider to continue service provision (see CCP Standard 16.11). ASX applies these clauses to all new agreements with service providers, and has incorporated them into all of its key existing service agreements. This includes: ASX Clear's agreement with a third-party vendor for support of risk management software for CMM; ASX Clear (Futures)' agreement with a third-party vendor for support of Genium, which also incorporates EXIGO software support; and ASX Clear (Futures)' agreement with another third-party vendor for support of Calypso.

16.10 All of a central counterparty's outsourcing or critical service provision arrangements should provide rights of access to the Reserve Bank to obtain sufficient information regarding the service provider's operation of any critical functions provided. A central counterparty should consult with the Reserve Bank prior to entering into an outsourcing or service provision arrangement for critical functions.

ASX's standard clauses for service providers require the provider to grant reasonable access to the Bank in respect of information relating to its operation of a critical function provided to the ASX CCPs. ASX applies these clauses to all new agreements with service providers, and has incorporated them into all of its key existing service agreements.

16.11 A central counterparty should organise its operations, including any outsourcing or critical service provision arrangements, in such a way as to ensure continuity of service in a crisis and to facilitate effective crisis management actions by the Reserve Bank or other relevant authorities. These arrangements should be commensurate with the nature and scale of the central counterparty's operations.

Standard clauses in ASX Clear and ASX Clear (Futures)' agreements with service providers (described in CCP Standards 16.9 and 16.10) require that providers give the Bank notice of any intention to terminate the agreement as a consequence of a CCP's failure to pay fees, or in the event of the insolvency of one of the CCPs or any other relevant ASX entity. This is intended to give the Bank an opportunity to take action to remedy the breach or otherwise ensure continued service provision.

The ASX CCPs' arrangements to ensure continuity of operations in the event of a crisis will be shaped by the proposed introduction into Australian law of a special resolution regime for FMIs. For example, under the proposed regime the Bank would have powers to direct related entities (such as

ASX Operations) to perform obligations under *ex ante* agreements to provide critical services (see CCP Standard 16.4). The Council of Financial Regulators (CFR) agencies are currently developing a legislative proposal to implement the regime, as well as the operational arrangements to support the regime once implemented.

Standard 17: Access and participation requirements

A central counterparty should have objective, risk-based and publicly disclosed criteria for participation, which permit fair and open access.

ASX Clear	ASX Clear (Futures)
Observed	Observed

17.1 A central counterparty should allow for fair and open access to its services, including by direct and, where relevant, indirect participants and other FMIs, based on reasonable risk-related participation requirements.

ASX Clear and ASX Clear (Futures) have objective and transparent participation requirements, which are publicly available and form part of their Operating Rules and Procedures. The CCPs have also issued formal guidance to assist applicants' and participants' understanding of the participation requirements. This includes guidance on: the admission process and criteria; notification obligations; offshoring and outsourcing arrangements; business continuity requirements; and, in the case of ASX Clear, liquidity management arrangements and capital requirements.

The CCPs have an internal policy and supporting standards that summarise the financial and operational requirements placed on participants under the Operating Rules and Procedures (see CCP Standard 17.2), and document the responsibilities of the CS Boards, CRO and relevant functions for ensuring these requirements are met and periodically reviewed. The Operating Rules and Procedures provide for an appeals process should an application for participation be rejected or a participant's access be terminated.

Under the Code of Practice, ASX has committed to providing transparent and non-discriminatory terms of access to ASX Clear's cash equity clearing services, including to participants and AMOs.

At the end of June 2018, ASX Clear had 34 participants (excluding inactive participants) – 12 of these were participants that offer or can offer clearing services to related entities or third parties. ASX Clear (Futures) had 20 participants, predominantly large domestic and foreign banks and their subsidiaries. Eight of ASX Clear (Futures)' participants were OTC derivatives clearing participants, of which four cleared OTC derivatives only. One futures participant was clearing remotely from the United Kingdom under a pilot scheme (see CCP Standard 17.2).

17.2 A central counterparty's participation requirements should be justified in terms of the safety of the central counterparty and the markets it serves, be tailored to and commensurate with the central counterparty's specific risks, and be publicly disclosed. Subject to maintaining acceptable risk control standards, a central counterparty should endeavour to set requirements that have the least restrictive impact on access that circumstances permit.

The ASX CCPs' participation requirements are designed to promote the safety and integrity of the CCPs. They cover: minimum capital and financial obligations; requirements related to legal structure,

governance and regulatory status; business and managerial requirements; operational resources and capabilities; business continuity arrangements; and risk and liquidity management arrangements.

Under the Operating Rules and Procedures, a potential participant must satisfy the ASX CCPs that it has (or will have) the resources and processes in place to comply with its obligations as a participant. For these purposes, 'resources' include financial, technological and human resources, and 'processes' include management supervision, training, compliance, risk management, business continuity and disaster recovery processes. A participant must also demonstrate that it has the capacity to make an immediate transfer of funds, on demand, should this be required to meet its obligations.

CCP-specific participation requirements are described below.

ASX Clear

Participants are required to comply with a risk-based capital regime under which participants must hold 'liquid capital' in excess of a 'total risk requirement'.⁴¹ Calculation of the total risk requirement considers counterparty risk, large-exposure risk, position risk, non-standard risk and operational risk. ASX management has discretion to increase the risk requirement associated with operational risk imposed on a participant, in the form of a 'secondary requirement'. Brokers that have insufficient capital, or that do not wish to undertake their own clearing, may use the services of a General Participant. A General Participant is a participant that may offer clearing services to trading participants.

In addition to meeting the capital requirement, participants are required to hold minimum levels of 'core capital'.⁴² Direct Participants, who do not clear for other brokers, must maintain a minimum of \$5 million in core capital. General Participants are subject to tiered core capital requirements, under which a General Participant must hold \$5 million in core capital for each trading participant for which it clears, up to a maximum of \$20 million. That is, a General Participant:

- that clears only for itself or for up to one other trading participant is required to hold \$5 million in core capital
- that clears for itself and one other participant, or on behalf of two third-party trading participants, is required to hold \$10 million in core capital
- is required to hold an additional \$5 million in core capital for each additional trading participant that it clears for, to a maximum of \$20 million.

In December 2017, ASX Clear introduced rule changes to implement enhancements to minimum core capital requirements, which aim to better account for the complexity of each participant's business model. The enhancements introduced add-ons to a participant's existing base capital requirement that reflect its activities in own-account business, non-ASX client activity, and client written ETO activity. Subject to a minimum level of materiality, ASX applies an additional capital requirement of \$2.5 million or \$5 million for each of these activities, depending on the level of materiality. Under the new requirements, the minimum core capital requirement ranges from \$5 million to \$35 million, up from the current range of \$5 million to \$20 million.

41 'Liquid capital' is defined by ASX to comprise total tangible shareholders' funds held in liquid assets, net of the maximum liability of certain guarantees and indemnities given by the participant.

42 'Core capital' is defined by ASX to be the sum of: all paid-up ordinary share capital; all non-cumulative preference shares; all reserves, excluding revaluation reserves, other than financial asset and liability revaluation reserves; and opening retained profits/losses, adjusted for current year movements.

Participants have been granted an initial transitional period until 1 January 2019 to meet any increased core capital requirements. Subsequently, ASX will review the capital requirements on a quarterly basis, and allow a transitional period of at least six months for participants to meet any subsequent increases.

Bank participants may elect to be covered under another capital regime which recognises compliance with the requirements of a prudential supervisor. This is intended to encourage ADIs to become active participants for the full range of products cleared by ASX Clear. At the end of the assessment period, two participants were subject to this capital regime.

ASX Clear also has in place requirements in respect of participants' liquidity risk management frameworks. Under these standards, participants are required to establish a formal liquidity risk management framework and prepare an annual liquidity plan, which should consider both normal and stressed market conditions. Participants that are ADIs regulated by APRA or non-bank subsidiaries of ADIs (if certain conditions are met) are exempted from the enhanced requirements.

ASX Clear (Futures)

Participants that clear futures only are subject to a minimum NTA requirement of \$5 million. ASX management has discretion to impose a higher requirement.

Participation requirements for participants that clear OTC derivatives are set out in the publicly available OTC Rules and OTC Handbook. The capital requirement of \$50 million for these participants is significantly higher than that for futures-only participants to reflect the increased complexity of OTC derivatives markets, and the potential for a default event to require the liquidation of less liquid products than those in the futures market. In particular, OTC derivatives participants would be called upon to contribute to the close-out process, including by bidding in an auction of a defaulted participant's positions.

Since April 2015, ASX Clear (Futures) has been conducting a pilot scheme for the admission of participants that are incorporated and base their operations offshore. Such participants must demonstrate the capacity to meet all of the financial and operational requirements described above and that no conflicts of law would arise as a result of their participation. ASX will assess the outcomes from the pilot scheme (initially involving a single UK-based participant) prior to allowing such arrangements more broadly.

17.3 A central counterparty should monitor compliance with its participation requirements on an ongoing basis and have clearly defined and publicly disclosed procedures for facilitating the suspension and orderly exit of a participant that breaches, or no longer meets, the participation requirements.

The Validation and Oversight team, which covers both CCPs and reports to the CRO, is responsible for the risk management of exposures to clearing participants. The Validation and Oversight team monitors day-to-day developments regarding, among other things, financial requirements, risk profiles, open positions and settlement obligations to the CCPs.

The CRA team is responsible for monitoring, assessing and investigating matters relating to financial requirements, including monitoring participants' monthly financial statements for any matters of concern. CRA also carries out a range of participant monitoring spot checks and other initiatives designed to validate the accuracy of the financial and operational information that participants submit to the ASX CCPs. Participants are required to inform ASX if at any stage their capital falls below the minimum requirement. CRA, working with CRPM, is also responsible for determining and reviewing participants' ICRs, drawing in part on information provided by participants in their regular

financial returns to ASX, and coordinating a watch list of participants deemed to warrant more intensive monitoring (see CCP Standard 4.1).

In addition, Operations and ASX Compliance perform regular and ad hoc compliance monitoring activities.

The ASX CCPs' arrangements for monitoring and enforcing participants' compliance with their Operating Rules are published on the ASX public website. Under these arrangements, ASX Clear and ASX Clear (Futures) have wide-ranging powers to sanction their participants in order to preserve the integrity of the CCPs. ASX Clear and ASX Clear (Futures) may restrict, suspend or terminate a participant's authority to clear some or all market transactions in the event of a default, or in the event of a breach of the Operating Rules and Procedures that may have an adverse effect on the CCPs. The action taken will depend on a number of factors, including the materiality of the incident, the participant's financial and operational capacity, as well as the participant's history of compliance. Where a breach has been identified and the participant has taken appropriate steps to rectify it, the CCPs will typically continue to monitor the participant closely for a period of time. Significant breaches are also referred to ASIC and, depending on the nature of the breach, may be investigated by ASX Compliance to determine whether formal disciplinary action is required.

Standard 18: Tiered participation arrangements

A central counterparty should identify, monitor and manage the material risks to the central counterparty arising from tiered participation arrangements.

ASX Clear	ASX Clear (Futures)
Observed	Observed

18.1 A central counterparty should ensure that its rules, procedures and agreements allow it to gather basic information about indirect participation in order to identify, monitor and manage any material risks to the central counterparty arising from such tiered participation arrangements.

ASX Clear and ASX Clear (Futures) apply a risk-based approach to the monitoring of tiered participation arrangements. These arrangements are described in further detail below.

ASX Clear

ASX Clear operates an individually segregated account structure for equity derivatives products (see CCP Standard 13.2). While ASX Clear does not have access to data on indirect participants' overall financial position, this account structure means that ASX Clear collects data on their positions in these products, and associated margin requirements and collateral assigned to the account by the participant. During the assessment period, clients of ASX Clear's participants represented 79 per cent of the initial margin held by the CCP to cover its derivatives-related credit exposures to both participants and (indirectly) their clients.

There are, however, practical limitations in the analysis of indirect participation in cash equities clearing. Due to the commingled house/client account structure (see CCP Standard 13.2), ASX is unable to separately identify client positions at either an aggregate or an individual account level. ASX Clear is able to view initial margin and position data of participants, including third-party clearers, which allows it to determine the materiality of third-party clearers' activity in relation to the overall market. In addition, ASX Clear is able to monitor significant changes to indirect participation

arrangements in both cash and derivatives markets through its regular discussions with participants, including third-party clearers. Business Development, Participants Compliance, Post Trade Operations and CRPM are each involved in the discussion of changes to participants' exchange-facing business models, including those that relate to tiered participation arrangements.

ASX Clear (Futures)

ASX Clear (Futures) gathers basic information on indirect participation in the form of a Daily Beneficial Ownership Report (DBOR) from participants for futures positions. This report provides details of client positions. These data are aggregated and reviewed using a risk-based approach to identify positions that may be unusual, result in a concentration of risk, or breach position limits set by ASX Clear (Futures) for the expiry period. There are, however, practical limitations to the use of these data for the analysis of tiering; in particular, the account reference of a client or related clients trading through multiple participants may vary from participant to participant. During the assessment period, clients of ASX Clear (Futures)' participants represented 79 per cent of initial margin held by ASX Clear (Futures) to cover its credit exposures to both participants and (indirectly) their clients.

ASX Clear (Futures) offers the option of individually segregated client accounts for both OTC and exchange-traded derivatives (see CCP Standard 13.2). If participants and their clients were to make use of the individually segregated accounts, ASX would be able to gather better information on client positions to support its monitoring of tiered participation risks (see Standard 18.4).

Both CCPs

If required, the ASX CCPs may request more detailed information from participants on any client positions. This information may include further details about the indirect participant's profile or activities, including its intentions regarding future trading activity or proposed action during the expiry period. ASX Clear and ASX Clear (Futures) also have an ongoing program of risk-based thematic participant reviews, covering risk topics of interest or concern. If warranted, these could potentially examine tiering risks if the ASX CCPs were to perceive an increased risk from indirect relationships. ASX Clear currently considers the risks from concentration of indirect participants to be low; ASX Clear (Futures) considers the residual risks from concentration of indirect participants to be very low for OTC products and medium for futures products.

18.2 A central counterparty should identify material dependencies between direct and indirect participants that might affect the central counterparty.

As noted under CCP Standard 18.1, ASX Clear and ASX Clear (Futures) monitor dependencies arising from tiered participation indirectly through a variety of means. These include discussions with participants on developments in their business and risk management activities, participants' own risk assessments, discussions with new participants as part of the induction process, monitoring of delivery risk (e.g. deliverable futures options expiries at ASX Clear (Futures)), and the CCPs' broader array of risk management data collection (including the DBOR at ASX Clear (Futures)) and monitoring activities (including the weekly risk-based monitoring of client-level data on derivatives-related exposures at ASX Clear). Based on this information, ASX Clear and ASX Clear (Futures) have not identified any material dependencies between direct and indirect participants that are of concern.

As discussed under CCP Standard 18.4, the use of individually segregated accounts allows ASX Clear to monitor the proportion of a participant's derivatives business attributable to a particular client and set triggers for further action based on the proportion of initial margin attributable to that client. This is also the case for individually segregated accounts in ASX Clear (Futures), although use of these accounts is limited.

18.3 A central counterparty should identify indirect participants responsible for a significant proportion of transactions processed by the central counterparty and indirect participants whose transaction volumes or values are large relative to the capacity of the direct participants through which they access the central counterparty in order to manage the risks arising from these transactions.

An important potential source of tiered participation risks in ASX Clear arises in the context of the third-party clearing market. There are a small number of participants offering third-party clearing services in the derivatives and cash markets. While there is a greater dispersion of third-party clearing activity for derivatives than cash equities, the largest third-party clearer in the cash market represented a relatively small proportion of total positions held at ASX Clear during the assessment period.

The ASX CCPs encourage participants to develop appropriate risk control measures in managing their relationships with indirect participants. ASX does not set thresholds, either formal or informal, at which it would encourage direct participation by an indirect participant. ASX's general approach to managing risks associated with participants' business activities is based on a framework that can flexibly detect and respond to new risks as they arise, rather than setting firm *ex ante* activity limits.

18.4 A central counterparty should regularly review risks arising from tiered participation arrangements and should take mitigating action when appropriate.

ASX maintains a formal Concentration Risk Standard, which sets out a risk-based approach to monitoring concentration risks in a number of areas (see CCP Standard 4.2), including tiered participation.

ASX Clear

On the basis of the relatively low exposures generated by cash market transactions, ASX has concluded that the residual risks to ASX Clear from tiered participation arrangements in the cash market are low. ASX Clear therefore monitors tiering risks for the cash market as part of its ongoing monitoring of participant credit exposures, investigating whether identified issues are due to client positions (see CCP Standard 4.2).

ASX has, however, identified two main sources of tiering risk in the clearing of derivatives products in ASX Clear:

- For low strike price options, the potential for large mark-to-market margin requirements following exercise may be a particular issue where there is a concentration of positions in individual client accounts
- For ETOs more generally, clients of participants may execute strategies, such as selling deep out-of-the-money put options for premium income, that have the potential to trigger significant margin obligations in the event of large price movements.

ASX Clear therefore monitors indirect participation in the derivatives market on a weekly basis, using concentration indicators based on initial margin. If a client's ETO initial margin accounts for over 25 per cent of its clearing participant's total ETO initial margin, further investigation is triggered. The Concentration Risk Standard notes that a number of factors will be considered when determining the appropriate response to any breaches of triggers, including the materiality of the breach and the credit standing and activity profile of the participant involved.

ASX Clear (Futures)

Exposures arising from OTC derivatives clearing remain low relative to exchange-traded derivatives exposures, and there has not been any use of client clearing arrangements for OTC derivatives to date. Accordingly, ASX Clear (Futures) has focused on the residual risks from tiered participation arrangements in its exchange-traded derivatives clearing activities.

ASX Clear (Futures) reviews risks arising from tiered participation in exchange-traded derivatives on a periodic basis using the DBOR client-level data. A number of predefined triggers are applied to these data to identify positions that may be unusual, result in a concentration of risk, or breach position limits set by the facility for the expiry period. The triggers are defined at the contract level, taking into account factors such as the nature of the contract, the market liquidity, whether the contract has position limits for expiry, and whether it is deliverable. Monitoring of the DBOR data, including the DBOR triggers, is conducted by ASX Participants Compliance.

If client use of individually segregated client accounts reaches a material level (see CCP Standard 13), ASX Clear (Futures) would consider whether enhancements to its monitoring of indirect participation in the exchange-traded derivatives market are required. In particular, on a daily basis, ASX Clear (Futures) monitors concentration indicators based on initial margin. If a client's initial margin accounts for over 25 per cent of its clearing participant's total initial margin, further investigation would be triggered. The Concentration Risk Standard notes that a number of factors will be considered when determining the appropriate response to any breaches of triggers, including the materiality of the breach and the credit standing and activity profile of the relevant participant. Clients that continue to clear via an omnibus client account will continue to be monitored using the DBOR data.

Standard 19: FMI links

A central counterparty that establishes a link with one or more FMIs should identify, monitor and manage link-related risks.

ASX Clear	ASX Clear (Futures)
Observed	Observed

19.1 Before entering into a link arrangement, and on an ongoing basis once the link is established, a central counterparty should identify, monitor and manage all potential sources of risk arising from the link arrangement. Link arrangements should be designed such that the central counterparty is able to comply with these CCP Standards.

Identifying link-related risks

A link for the purposes of this standard is any connection that is made to another FMI according to a set of contractual and operational arrangements, irrespective of the complexity of the link and whether it is made directly with the FMI or through an intermediary.⁴³

ASX Clear maintains links with two other FMIs, both of which are in the ASX Group:

- *Austraclear*. This link supports AUD funds transfers other than the settlement of securities-related payments, such as margin payments. Cash transfers are entered into

43 Links to payment systems are addressed in CCP Standard 9.

Austraclear by ASX Clear, and then matched in Austraclear against the respective clearing participants' cash settlement instructions. Regular margin collections and intraday margin calls, which make up the majority of cash transfers, are submitted automatically to Austraclear by ASX Clear's margin and collateral systems.

- *ASX Settlement.* This link supports the settlement of securities transactions, including DvP settlement of novated securities trades and the lodgement of non-cash collateral. Instructions for these transactions are entered into CHESSE, which supports the functioning of both ASX Clear and ASX Settlement.

ASX Clear (Futures) maintains links with three other FMIs:

- *Austraclear.* This link supports AUD funds transfers, lodgement of AUD-denominated non-cash collateral, and settlement of 90-day bank bill futures. Cash transfers are entered into Austraclear by ASX Clear (Futures), and then matched in Austraclear against the respective clearing participants' cash settlement instructions. Regular margin collections and intraday margin calls, which make up the majority of cash transfers, are submitted automatically to Austraclear by ASX Clear (Futures)' margin and collateral systems. AUD-denominated non-cash collateral is lodged via a collateral lodgement form, and cannot be applied to margin requirements until the day following lodgement of this form. Once ASX Clear (Futures) has received the form, the relevant securities are transferred to ASX Clear (Futures) via a 'free of payment' trade in Austraclear. Settlement of 90-day bank bill futures takes place in Austraclear according to procedures set out in ASX 24's Operating Rules and Procedures. Sellers and buyers who are not full participants of Austraclear must appoint a full participant to act as their settlement agent.
- *NZClear.* This link supports the settlement of NZD payments. ASX Clear (Futures) maintains an account in NZClear to initiate and receive NZD margin payments, with settlement in central bank money made in ESAS via ASXCC's Exchange Settlement Account with the RBNZ (see CCP Standard 9.1).
- *DTCC.* This link was established for the reporting of OTC IRD trades, and supports ASX Clear (Futures)' OTC trade reporting obligations to ASIC. The link also facilitates the reporting of OTC IRD trades involving US persons, which is a condition of ASX Clear (Futures)' August 2015 exemption from the requirement to register as a DCO in the US, as amended in January 2016.

Managing operational risk

The links to ASX Settlement and Austraclear are subject to the same operational risk management framework that applies to all of the ASX CS facilities (see CCP Standard 16). This addresses operational risks associated with software, infrastructure or network failures and manual processing errors. An incident report is required for any significant technical or operational incident, including an assessment of mitigating actions to reduce the risk of reoccurrence. In addition, six-monthly risk profile assessments are prepared and presented to the Audit and Risk Committee, and an independent system-controls audit is conducted annually. Austraclear operations are also covered by the Austraclear System Business Operations Plan, which includes a 'Step-in and Service' agreement with the Bank (see Appendix C.2, SSF Standard 14).

The potential impact of risks associated with ASX Clear (Futures)' link to NZClear is limited by the small value of NZD margin in comparison with total margin held by ASX Clear (Futures). NZClear is owned, operated and overseen by the RBNZ. Any operational issues that arise in NZClear are notified to all members, including ASX Clear (Futures), via email notification. NZClear has the ability to perform transactions on behalf of a member in the event of an operational disruption to ASX Clear (Futures)'

link arrangements; in this case, ASX would advise NZClear to perform payment instructions via written instructions signed by ASX's authorised signatories. ASX Clear (Futures) has contingency arrangements that allow for late payment of initial margin on New Zealand futures products via Austraclear in AUD, with ASX Clear (Futures) applying a haircut to the NZD margin equivalent.

Managing financial risk

ASX Clear and ASX Clear (Futures) do not assume any direct financial risks from its links to other FMIs.

19.2 A link should have a well-founded legal basis, in all relevant jurisdictions, that supports its design and provides adequate protection to the central counterparty and other FMIs involved in the link.

ASX Clear's links to Austraclear and ASX Settlement and ASX Clear (Futures)' link to Austraclear have their legal basis in the Regulations, Operating Rules and Procedures of the facilities. The finality of settlements in the systems is supported, respectively, by approvals of Austraclear under Part 2 of the PSNA, and ASX Settlement under Part 3 of the PSNA (see CCP Standard 8.2).

The finality of settlement in NZClear is enshrined in the system rules of NZClear and supported by NZClear's designation under Part 5C of the *Reserve Bank of New Zealand Act 1989* (NZ) (see CCP Standard 8.1).

A CCP link to a trade repository for trade reporting purposes does not give rise to legal risks associated with the clearing and settlement of transactions or the recording of title to assets. Nevertheless, the legal basis of ASX Clear (Futures)' link to DTCC is supported by contractual arrangements between the two FMIs.

19.3 Where relevant to its operations in Australia, a central counterparty should consult with the Reserve Bank prior to entering into a link arrangement with another FMI.

ASX Clear and ASX Clear (Futures) have discussed their link arrangements with the Bank. ASX Clear and ASX Clear (Futures) did not enter into any new link arrangements during the assessment period.

19.4 Before entering into a link with another central counterparty, a central counterparty should identify and manage the potential spillover effects from the default of the linked central counterparty. If a link has three or more central counterparties, a central counterparty should identify, assess and manage the risks of the collective link arrangement.

ASX Clear and ASX Clear (Futures) have no links with other CCPs.

19.5 A central counterparty in a central counterparty link arrangement should be able to cover, at least on a daily basis, its current and potential future exposures to the linked central counterparty and its participants, if any, fully with a high degree of confidence without reducing the central counterparty's ability to fulfil its obligations to its own participants at any time.

ASX Clear and ASX Clear (Futures) have no links with other CCPs.

Standard 20: Disclosure of rules, key policies and procedures, and market data

A central counterparty should have clear and comprehensive rules, policies and procedures and should provide sufficient information and data to enable participants to have an accurate

understanding of the risks they incur by participating in the central counterparty. All relevant rules and key policies and procedures should be publicly disclosed.

ASX Clear	ASX Clear (Futures)
Observed	Observed

20.1 A central counterparty should adopt clear and comprehensive rules, policies and procedures that are fully disclosed to participants. Relevant rules and key policies and procedures should also be publicly disclosed (including specific requirements relating to CCP Standards 1.4, 2.2, 12.3, 13.4, 15.4, 17.2 and 17.3).

ASX Clear's and ASX Clear (Futures)' Operating Rules and Procedures form the basis of all material aspects of the CCPs' service to participants. The Operating Rules and Procedures, ASX guidance notes, and the OTC Rules and OTC Handbook, are disclosed on the ASX public website.⁴⁴ The Operating Rules and Procedures are also made available on the Customer Portal, ASX's participant website. The Customer Portal also supports the dissemination of non-public information to participants.

To assist participants in their understanding of the risks of participating in ASX Clear and ASX Clear (Futures), and for the information of other interested stakeholders, ASX publishes a range of additional material on its public website; this includes information required to be disclosed under the FSS. Information specific to ASX Clear and ASX Clear (Futures) includes information about risk management, default management, margin and CBPLs, and business continuity arrangements. More general information includes: the ASX Group's regulatory framework; requirements of the FSS; requirements of the Corporations Act for provision of services in a 'fair and effective' way; the ASX Group's other obligations under the Corporations Act; and the ASX Group's observance of the Principles. ASX provides a centralised list of links on its website to information related to its clearing risk management arrangements. ASX also operates a dedicated website that discloses information relevant to the clearing and settlement of cash equities, to support its disclosure commitments under the Code of Practice.

Specific disclosure requirements are dealt with under CCP Standards 1.4, 2.2, 12.3, 13.4, 15.4, 17.2 and 17.3.

20.2 A central counterparty's rules, policies and procedures should clearly identify the nature and scope of the risk exposure assumed by the central counterparty, such as by novation, open offer or other similar legal devices. A central counterparty's rules, policies and procedures should clearly identify the point in the clearing process at which the central counterparty assumes the risk exposure.

ASX maintains on its public website an overview of how the CCPs would manage a clearing participant default; this includes information about the purpose of novation, the point at which novation occurs, and the scope of contractual arrangements. Section 12 of ASX Clear's Operating Rules and Part 3 of the ASX Clear (Futures) Operating Rules set out the arrangements for registration of market contracts, including the point at which a contract is considered to be registered and at which each ASX CCP assumes the risk exposure of a trade. These arrangements apply to transactions of ASX-quoted securities on the ASX and Chi-X markets and OTC equity options (see CCP Standard 1.5). The

⁴⁴ Available at <<http://www.asx.com.au/regulation/rules/asx-clear-operating-rules.htm>> for ASX Clear, and at <<http://www.asx.com.au/regulation/rules/asx-clear-futures-operating-rules.htm>> for ASX Clear (Futures).

conditions and timing for the novation of an OTC derivatives trade are outlined in the OTC Rules and the OTC Handbook.

20.3 A central counterparty should disclose clear descriptions of the system’s design and operations, as well as the central counterparty’s and participants’ rights and obligations, so that participants can assess the risks they would incur by participating in the central counterparty (see CCP Standards 2.8 and 9.5).

General descriptions of ASX Clear’s and ASX Clear (Futures)’ system design and operations are available on the ASX public website, including as part of ASX’s response to the CPMI-IOSCO Disclosure Framework (see CCP Standard 20.5). ASX’s disclosure framework document describes the ASX group structure, provides a general description of the ASX CS facilities and their roles, system design and operations, outlines the legal and regulatory framework for clearing and settlement, and provides a description of steps taken by ASX to implement the Principles and the corresponding FSS. The ASX public website provides additional information on system design and operations, including descriptions of ASX Clear’s cash market clearing and settlement process, and margining approaches for both securities and derivatives products, and ASX Clear (Futures)’ exchange-traded and OTC derivatives clearing processes and margining approaches.

The rights and obligations of ASX Clear, ASX Clear (Futures) and their participants are defined in the ASX Clear and ASX Clear (Futures) Operating Rules and Procedures, and ASX Clear (Futures) OTC Rules and OTC Handbook, which are published on the ASX public website and the Customer Portal. There is a transparent process for changing ASX Clear’s and ASX Clear (Futures)’ Operating Rules and Procedures, with any changes notified to participants via the ASX website (see CCP Standard 1.3). These documents are supplemented with guidance notes to support participants’ understanding of the risks they face by participating in the system. During the assessment period, ASX Clear (Futures) updated its guidance note on notification obligations for participants.

The CCPs provide disclosures to assist participants in understanding their contingent exposure to the use of the ASX CCPs’ expanded suite of recovery tools, including tools to address uncovered credit losses and liquidity shortfalls.

20.4 A central counterparty should provide all necessary and appropriate documentation and training to facilitate participants’ understanding of the central counterparty’s rules, policies and procedures and the risks they face from participating in the central counterparty.

All applicants for participation in ASX Clear and ASX Clear (Futures) are provided with an application pack, which includes information regarding key requirements of the facilities. Applicants have access to the Operating Rules, Procedures and guidance notes via the ASX website, as well as other publicly available information about the facilities, services and participation requirements. When ASX Clear or ASX Clear (Futures) has completed an initial assessment of an application, the applicant is also invited to attend formal ‘on boarding’ meetings with staff from ASX Compliance, CRPM and Operations functions to discuss key areas of importance for participants.

If either ASX Clear or ASX Clear (Futures) became aware or suspected that a participant lacked a satisfactory understanding of the Operating Rules and Procedures or the risks of participation, it would generally work collaboratively with the participant to educate them on their obligations. The CCPs may become aware of issues through their routine risk monitoring activities or through their regular discussions with participants.

20.5 A central counterparty should complete regularly and disclose publicly responses to the CPSS-IOSCO *Disclosure Framework for Financial Market Infrastructures*.⁴⁵ A central counterparty also should, at a minimum, disclose basic risk and activity data, as directed by the Reserve Bank from time to time.

ASX has published its response to the CPMI-IOSCO Disclosure Framework, including information describing how its CS facilities observe the applicable Principles.⁴⁶ This document was updated during the assessment period. ASX plans to continue updating this document periodically and to further enhance its disclosure as necessary from time to time.

ASX publicly reports basic risk and activity data for the ASX CS facilities via a monthly activity report, as well as through additional data published on both its main website and a dedicated website on clearing and settlement of cash equities. ASX Clear and ASX Clear (Futures) also publish a set of quantitative risk and activity data in accordance with the CPMI-IOSCO *Public quantitative disclosure standards for central counterparties*, which are intended to complement the descriptive disclosures under the Disclosure Framework; these data are updated on a quarterly basis.⁴⁷

Standard 21: Regulatory reporting

A central counterparty should inform the Reserve Bank in a timely manner of any events or changes to its operations or circumstances that may materially impact its management of risks or ability to continue operations. A central counterparty should also regularly provide information to the Reserve Bank regarding its financial position and risk controls on a timely basis.

ASX Clear	ASX Clear (Futures)
Observed	Observed

21.1 A central counterparty should inform the Reserve Bank as soon as reasonably practicable if:

- (a) it breaches, or has reason to believe that it will breach:**
 - (i) a CCP Standard; or**
 - (ii) its broader legislative obligation to do, to the extent that it is reasonably practicable to do so, all things necessary to reduce systemic risk;**
- (b) it becomes subject to external administration, or has reasonable grounds for suspecting that it will become subject to external administration;**
- (c) a related body to the central counterparty becomes subject to external administration, or if the central counterparty has reasonable grounds for suspecting that a related body will become subject to external administration;**

⁴⁵ The CPSS was renamed the CPMI in October 2014.

⁴⁶ Available at <<http://www.asx.com.au/documents/asx-compliance/pfmi-disclosure-framework.pdf>>.

⁴⁷ The quantitative disclosures for ASX Clear are available at <<http://www.asx.com.au/regulation/regulatory-compliance/asx-clear.htm>>. The quantitative disclosures for ASX Clear (Futures) are available at <<http://www.asx.com.au/regulation/regulatory-compliance/asx-clear-futures.htm>>.

- (d) a participant becomes subject to external administration, or if the central counterparty has reasonable grounds for suspecting that a participant will become subject to external administration;**
- (e) a participant fails to meet its obligations under the central counterparty's risk control requirements or has its participation suspended or cancelled because of a failure to meet the central counterparty's risk control requirements;**
- (f) it fails to enforce any of its own risk control requirements;**
- (g) it plans to make significant changes to its risk control requirements or its rules, policies and procedures;**
- (h) it or a service it relies on from a third party or outsourced provider experiences a significant operational disruption, including providing the conclusions of its post-incident review;**
- (i) any internal audits or independent external expert reviews are undertaken of its operations, risk management processes or internal control mechanisms, including providing the conclusions of such audits or reviews;**
- (j) its operations or risk controls are affected, or are likely to be affected, by distress in financial markets;**
- (k) it has critical dependencies on utilities or service providers, including providing a description of the dependency and an update if the nature of this relationship changes;**
- (l) it proposes to grant a security interest over its assets (other than a lien, right of retention or statutory charge that arises in the ordinary course of business);**
- (m) it proposes to incur or permit to subsist any loans from participants or members unless such loans are subordinated to the claims of all other creditors of the central counterparty; or**
- (n) any other matter arises which has or is likely to have a significant impact on its risk control arrangements (see also CCP Standards 1.6, 16.10 and 19.3).**

ASX and the Bank have formalised existing cooperation arrangements through cooperation letters with each of ASX Clear and ASX Clear (Futures). The letters set out the arrangements between the CCPs and the Bank relating to the CCPs' performance of their assistance and notification obligations.

In addition to immediately notifying the Bank of significant developments (a requirement that is specified in many of ASX's key internal risk management policies), ASX and the Bank hold scheduled periodic meetings that include:

- annual meetings with the Board and, separately, the Chair of the Board to discuss strategic issues and compliance with the FSS
- semi-annual high-level review meetings to discuss strategy and relevant market developments, involving the Chief Executive Officer and other relevant executives
- quarterly meetings to discuss developments relevant to compliance with the FSS
- quarterly risk management meetings, involving managers responsible for clearing risk policy and the implementation of risk management arrangements

- quarterly technology and operations meetings, involving the Chief Operating Officer and other members of the management team responsible for implementation of operational strategy, management of operational risk and business continuity planning.

These meetings provide a forum for the discussion of material developments, such as issues regarding participant compliance, changes to risk management controls, and the results of internal and external reviews. Matters discussed in the formal scheduled meetings are followed up, as appropriate, in more focused targeted sessions. The Bank and ASX also hold ad hoc meetings to discuss relevant matters as required. Representatives of ASIC may attend both regular and ad hoc meetings where matters of common interest are being discussed.

21.2 A central counterparty should also provide to the Reserve Bank, on a timely basis:

- (a) audited annual accounts;**
- (b) management accounts on a regular basis, and at least quarterly;**
- (c) risk management reports, including detailed information on margining and stress testing, on a regular basis, and at least quarterly;**
- (d) periodic activity, risk and operational data, as agreed with the Reserve Bank; and**
- (e) any other information as specified by the Reserve Bank from time to time.**

Audited annual reports are published on the ASX public website. Under the Code of Practice, ASX Clear also publishes annual management accounts for its cash equity clearing and settlement services. ASX also provides the Bank with quarterly statements of balance sheet and collateral held for each CS facility.

ASX provides the Bank with a monthly risk management report, as well as detailed activity, risk and operational data on a quarterly basis. The risk management report includes information on stress test results, adequacy of financial resources, and developments in risk management policy. Data provided quarterly to the Bank include changes to participants' ICRs, daily margin collections (including intraday margin calls), stress test results, collateral holdings, and any late payments. The quarterly risk management, and technology and operations meetings between the Bank and ASX provide a forum for discussion of developments observed in the data.

From time to time, the Bank requests additional information from ASX Clear and ASX Clear (Futures) on topics of interest, particularly regarding any operational incidents or the status of projects with significant risk implications.