

Part II: Activities of the Broker-Dealer Operator and its Affiliates

Item 1: Broker-Dealer Operator Trading Activities on the ATS

- a. Are business units of the Broker-Dealer Operator permitted to enter or direct the entry of orders and trading interest (e.g., quotes, conditional orders, or indications of interest) into the NMS Stock ATS?

Yes ☒ No ☐

If yes, name and describe each type of business unit of the Broker-Dealer Operator that enters or directs the entry of orders and trading interest into the ATS (e.g., NMS Stock ATS, type of trading desks, market maker, sales or client desk) and, for each business unit, provide the applicable MPID and list the capacity of its orders and trading interest (e.g., principal, agency, riskless principal).

The JPMS equities business units listed below are able, on an agency, riskless principal, or principal basis, to enter or direct the entry of firm orders into JPMS algorithmic trading strategies, ~~which in turn are~~ and JPMS' smart order routing technology (the "SOR," or, collectively with the JPMS algorithmic trading strategies, the "algorithms/SOR"). As described in Part III, Item 5, the algorithms/SOR is able to enter or direct the entry of firm orders and trading interest in the form of conditional orders (collectively, "Firm/Conditional Orders") into JPB-X (using the "JPMS" MPID) via JPMS' smart order routing technology (the "SOR," or, collectively with the JPMS algorithmic trading strategies, the "algorithms/SOR"), as described in Part III, Item 5, based on the algorithmic trading strategies' algorithms/SOR's own routing determinations or, with respect to the initial conditional order only, the routing determinations of the JPMS business units.

The JPMS business units with such access to JPB-X are as follows:

1. Over-the-Counter ("OTC") Listed International Sales and Trading, which (i) facilitates client trading on an agency, riskless principal, or principal basis, including electronic and portfolio trading, and hedges the resulting risk and (ii) acts as a market maker or block positioner in U.S. and non-U.S. equities, equity listed options, OTC options, equity swaps, exchange-traded funds, preferred stocks, credit products, and equity structured products, including the following trading desks:
 - (i) Americas Execution Services, which primarily conducts and facilitates customer trading on both an agency and a principal basis in U.S. exchange-listed, OTCBB, and pink sheet securities and acts as a market maker or block positioner in certain U.S. exchange-listed securities;
 - (ii) Automated Liquidity Provider, which is an electronic market making desk that places two-sided orders in equities and ETFs via exchanges and other venues;
 - (iii) Americas Credit Indices, which trades high grade credit derivatives and associated hedges;

- (iv) **Block Liquidity Management, which books block transactions with clients;**
- (v) **Boston Sales and Trading, which primarily receives and handles domestic (mainly block and program) equity orders (with executions done via coordination with JPMS' block trading desk, proprietary direct market access connectivity, and/or other market access tools) and provides market commentary, as well as access to JPM corporate marketing and corporate access events;**
- (vi) **Central Liquidity Book, which manages and hedges client facilitation positions;**
- (vii) **Corporate Trading, which trades equities, futures, equity listed options, equity OTC options, equity swaps, and equity structured products and facilitates open market activities for corporate clients;**
- (viii) **Electronic Client Trading, which primarily coordinates customer access to, and the monitoring and support of, JPMS' direct-to-market, algorithmic, and agency-only trading product;**
- (ix) **Emerging Markets Global Credit, which hedges Emerging Markets Credit Risk positions with ETFs;**
- (x) **Equity Finance Collateral Management, which handles collateral management for the equity finance business;**
- (xi) **Equity Finance Trading, which finances client and counterparty equity positions through swap transactions;**
- (xii) **Exchange Traded Fund ("ETF") Flow, which conducts and facilitates customer trading on both an agency and a principal basis in U.S. exchange-listed ETF securities, acts as a block positioner in certain U.S. exchange-listed ETF securities, and engages in domestic and international creation/redemptions of ETFs, basket swaps, passive index arbitrage, term swaps, and put/call combos;**
- (xiii) **Exotic, which trades equities, futures, equity listed options, exotic equity options, equity swaps, and equity structured products;**
- (xiv) **Flow Index, which trades equities, equity indices, futures, equity listed options, equity vanilla OTC options, swaps, and equity structured products;**
- (xv) **Franchise, which primarily conducts and facilitates customer trading, on both an agency and a principal basis, in U.S. exchange-listed, OTCBB, and pink sheet securities and also acts as a market maker or block positioner in certain U.S. exchange-listed, OTCBB, and pink sheet securities;**

- (xvi) **Equity Index Structuring**, which is responsible for creating investible indices based on equities or on a cross-asset basis;
 - (xvii) **Index Swaps**, which provides financing solutions to clients, makes markets in Exchange for Physicals on any Americas index, single stock, or ETF, sources inventory through derivative trades to lend to prime brokerage clients, makes markets and provides liquidity in dividends, and provides customized basket solutions to clients;
 - (xviii) **International Trade**, which primarily conducts and facilitates customer trading on both an agency and a principal basis in international securities (both ADRs and “locals”) and acts as a market maker or block positioner in certain ADRs;
 - (xix) **North America Delta One Swap**, which engages in financing client and counterparty swap transactions related to custom baskets and ETFs, facing institutional clients on swaps, and hedging the client swaps by executing in the market and with counterparties;
 - (xx) **North America Credit Markets Preferred ADM**, which facilitates client flow in fixed income products, including preferred equities, and hedges the resulting risk;
 - (xxi) **Program Trading**, which trades baskets on an agency basis and handles G-VWAP baskets, shortened settlement, and blind risk bid orders for clients, following client instructions such as in-line-with-the-market, market-on-close, market-on-open, VWAP, and TWAP orders;
 - (xxii) **Securitized Product Group**, which takes positions in securitized product ETFs via ETF create/redeems to hedge fixed income client-facing positions;
 - (xxiii) **Single Stock Flow Volatility**, which trades equities, equity indices, futures, equity listed options, equity vanilla OTC options, swaps, and equity structured products; and
 - (xxiv) **Syndicate**, which engages in underwriting activities that range from initial public offerings, follow-on equity issues, convertible issues, and private placements;
2. **American Depositary Receipt (“ADR”) Cross Trading**, which primarily conducts dealer swaps between ADRs and U.S. stocks;
 3. **Convertible Bond Sales and Trading**, which enters into convertible bond transactions with clients and hedges the resulting risk;
 4. **Fixed Income Sales and Trading**, which provides liquidity to high-yield and distressed credit clients and hedges the resulting risk, including the following trading desks:

- (i) **High Yield Trading, which trades high yield debt and associated hedges;**
 - (ii) **High Yield Loan Trading Distressed, which trades high yield distressed loans; and**
 - (iii) **North America Credit Markets Preferred Stock, which trades preferred stocks;**
- 5. Commodities Trading, which provides liquidity to commodities clients and hedges the resulting risk;**
 - 6. Equity Finance, which may buy or sell stocks in connection with its facilitation of stock borrows and loans; and**
 - 7. WMIS Capital Markets, which handles order flow derived from Wealth Management business lines on an agency basis and is able to source liquidity from other units of the JPMS equities business that in turn are able to access JPB-X via the algorithms/SOR as described above.**

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Item 6: Activities of Service Providers

- a. Does any employee of the Broker-Dealer Operator or its Affiliate that services both the operations of the NMS Stock ATS and any other business unit or any Affiliate of the Broker-Dealer Operator (“shared employee”) have access to confidential trading information on the NMS Stock ATS?

Yes ☒ No ☐

If yes, identify the business unit, Affiliate, or both that the shared employee services, and provide a summary of the role and responsibilities of the shared employee at the ATS and the business unit, Affiliate, or both that the shared employee services.

Confidential trading information consists of data regarding open or partially open Firm/Conditional Orders in JPB-X (“real-time data”) and data regarding fully or partially completed Firm/Conditional Orders in JPB-X, including executions and cancellations (“historical data”). Confidential trading information, however, does not include post-execution reporting under applicable reporting rules or regulations. Confidential trading information also does not include aggregated data resulting from the combination of the JPB-X historical data associated with a Subscriber’s Firm/Conditional Order with data regarding other Firm/Conditional Orders of the Subscriber or other JPMS clients, whether or not such Firm/Conditional Orders were routed to JPB-X (“Aggregated Data”). Aggregated Data is created by ECS Liquidity Product Specialists, who can aggregate any JPB-X historical data, or trading personnel in a business unit identified in response to Part II, Item 1(a), who can aggregate only JPB-X historical data regarding that unit’s or a subset of that unit’s Firm/Conditional Orders. Aggregated Data includes JPB-X historical data from only the prior trading day or earlier. Aggregated Data sourced only from JPB-X historical data does not provide

Subscriber-specific or symbol-specific information. Aggregated Data can be used (i) by JPMS to provide market color or trend analyses externally and/or to internal principal or agency trading desks (e.g., JPMS has included in marketing materials aggregate statistics regarding JPB-X such as ~~the average size of block-sized fills~~ executed volume); (ii) by JPMS to advertise, report on, or enhance the quality of its execution or other services offered to clients (e.g., JPMS has included in marketing materials aggregate VWAP slippage statistics that incorporate execution data from JPB-X and other venues to which Subscribers' VWAP orders were routed); and (iii) by third parties so they can provide JPMS with analytics (regarding, e.g., its market share or other performance metrics on a client-by-client basis). Such data sets are sufficiently aggregated and/or anonymized that they protect the confidentiality of Subscribers' trading strategies and are not themselves confidential trading information. Moreover, the use of such data sets, depending on the context, may be subject to confidentiality restrictions under agreements with recipients of the data sets and/or JPMC policies and procedures.

No employee or contingent worker ("workforce member") of JPMS or its affiliates is dedicated solely to servicing the operations of JPB-X. Shared workforce members with some level of access to confidential trading information on JPB-X include those described below to the extent they have a need to know such information to perform their respective responsibilities in connection with the operations of JPB-X (#1-5) or JPMS' compliance with applicable law in operating JPB-X (#6). Persons authorized to access confidential trading information are prohibited from using confidential trading information for purposes other than those described below.

(1) Electronic Client Solutions ("ECS") Liquidity Product Specialists (workforce members of JPMS) responsible for the development and day-to-day operation of the SOR and JPMS' alternative trading systems, including JPB-X, who can access real-time data and historical data so they can monitor the performance of JPB-X, prepare aggregated data sets as described above, detect any Subscriber behavior resulting in a materially negative impact to the operation of JPB-X or to other Subscribers or indicating a need to change a Subscriber's order flow type or tier assignment, work to resolve issues related to the foregoing that may arise, develop further product initiatives, and respond to client inquiries and regulatory requests;

(2) the ECS Client Coverage, ECS Connectivity Product, and ECS Sales groups (workforce members of JPMS), which provide client services to ECS clients, including JPB-X Subscribers, and can access real-time data, only at a summary level (e.g., aggregated order quantities by client or symbol), and historical data so they can field inquiries from clients regarding orders routed to JPB-X by or on behalf of the clients;

(3) ECS supervisors and senior management (workforce members of JPMS) responsible for the ECS business, including the JPB-X offering and its operation, who can access real-time data, only at a summary level (e.g., aggregated order quantities by client or symbol), and historical data so they can appropriately supervise and manage the JPMS workforce members described in (1) and (2) above;

(4) Middle Office personnel (workforce members of JPMS affiliates worldwide) responsible for processing transactions effected by JPMS and its

affiliates, including trades in JPB-X, who can access historical data so they can monitor the post-trade processing of transactions executed in JPB-X, including with respect to the clearance, settlement, and allocation of such transactions, and work to resolve any processing issues that may arise;

(5) Personnel in technology groups (workforce members of JPMS) responsible for providing technical support and developing and maintaining electronic trading applications and infrastructure across JPMS, including the applications and infrastructure on which JPB-X relies, who can access real-time and historical data when necessary in the course of their work to provide technical support and develop and maintain the applications and infrastructure;

(6) Personnel in technology groups, Compliance, and Regulatory Management (workforce members of JPMS affiliates worldwide) responsible for facilitating JPMS' and its affiliates' compliance with applicable law, including with respect to the operation of JPB-X, who can access historical data so they can maintain JPMS' and its affiliates' compliance with laws applicable to the operation of JPB-X, including through surveillance and the preparation of regulatory reports and responses to regulatory requests; and

(7) Business unit trading personnel who route firm orders to the algorithms/SOR for execution (workforce members of JPMS), who can access JPB-X data regarding only that unit's or a subset of that unit's Firm/Conditional Orders so they can monitor such Firm/Conditional Orders.

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Part III: Manner of Operations

Item 4: Hours of Operations

- a. Provide the days and hours of operation of the NMS Stock ATS, including the times when orders or trading interest can be entered on the ATS, and any hours of operation outside of regular trading hours.

JPB-X operates during the regular trading hours set by the primary markets for NMS stocks; the hours for such a primary market typically are from 9:30 a.m. to 4:00 p.m. (New York time), Monday-Friday, except on holidays observed by the primary market. JPB-X can accept conditional orders from the algorithms/SOR starting at 6:30 a.m. JPB-X does not match or execute Firm/Conditional Orders in an NMS stock until after the NMS stock has opened on its primary market.

JPB-X accepts conditional orders designated for Close Price Match (see Part III, Item 7), and amendments and cancellations of such conditional orders, from the algorithms/SOR during the regular trading hours set by the primary exchange for the NMS stock being traded until the Close Price Match matching time. The Close Price Match matching time for NMS stocks for which the New York Stock Exchange is the primary exchange is 3:56:30 p.m. (New York time). The Close Price Match matching time for NMS stocks for which another exchange is the primary exchange is two minutes before that exchange's market-on-close cut-off time. JPB-X executes orders designated for Close Price

Match after the primary exchange for the NMS stock being traded publishes an official closing price as determined by the closing auction.

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Item 5: Means of Entry

- c. Are there any other means for entering orders and trading interest into the NMS Stock ATS (e.g., smart order router, algorithm, order management system, sales desk)?

Yes ☒ No ☐

If yes, identify and explain the other means for entering orders and trading interest, indicate whether the means are provided through the Broker-Dealer Operator, either by itself or through a third-party contracting with the Broker-Dealer Operator, or through an Affiliate of the Broker-Dealer Operator, and list and provide a summary of the terms and conditions for entering orders or trading interest into the ATS through these means.

Subscribers can enter firm orders into JPMS' algorithmic trading strategies, which can direct the SOR to enter child Firm/Conditional Orders into JPB-X based on the algorithmic trading strategies' own routing determinations or, with respect to the initial conditional order only, the routing determinations of Subscribers. Subscribers also can enter firm orders into the SOR, which can enter child Firm/Conditional Orders designated for Close Price Match into JPB-X based on the SOR's own routing determinations or, with respect to the initial conditional order only, the routing determinations of Subscribers. The SOR accesses JPB-X through a proprietary FIX messaging protocol. Subscribers can enter firm orders into JPMS algorithmic trading strategies and the SOR via a client gateway (JPMS' JISU technology or an order management system selected by the Subscriber). Subscribers can opt out of having the algorithms/SOR route Firm/Conditional Orders to JPB-X. Subscribers that access the algorithms/SOR are subject to any applicable contractual agreements with JPMS, such as any Electronic Access and Trading Agreements, the terms of which (regarding, e.g., intellectual property rights, warranties, indemnification obligations, and limitations of liability) are sometimes negotiated and generally do not contain specific terms and conditions for accessing JPB-X through the algorithms/SOR. There is no means by which to access JPB-X through the algorithms/SOR that is available to JPMS business units or JPMS affiliates but not to Subscribers. Unless otherwise noted, the description above applies to both Firm/Conditional Orders designated for VWAP Price Match and Firm/Conditional Orders designated for Close Price Match (see Part III, Item 7).

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Item 7: Order Types and Attributes

- a. Identify and explain each order type offered by the NMS Stock ATS. In your explanation, include the following:
- priority, including the order type's priority upon order entry and any

- subsequent change to priority (if applicable); whether and when the order type can receive a new time stamp; the order type's priority vis-à-vis other orders on the book due to changes in the NBBO or other reference price; and any instance in which the order type could lose execution priority to a later arriving order at the same price;
- ii. conditions, including any price conditions (*e.g.*, how price conditions affect the rank and price at which it can be executed; conditions on the display or non- display of an order; or conditions on executability and routability);
 - iii. order types designed not to remove liquidity (*e.g.*, post-only orders), including what occurs when such order is marketable against trading interest on the NMS Stock ATS when received;
 - iv. order types that adjust their price as changes to the order book occur (*e.g.*, price sliding orders or pegged orders) or have a discretionary range, including an order's rank and price upon order entry and whether such prices or rank may change based on the NBBO or other market conditions when using such order type; when the order type is executable and at what price the execution would occur; whether the price at which the order type can be executed ever changes; and if the order type can operate in different ways, the default operation of the order type;
 - v. whether an order type is eligible for routing to other Trading Centers;
 - vi. the time-in-force instructions that can be used or not used with each order type;
 - vii. the circumstances under which order types may be combined with another order type, modified, replaced, canceled, rejected, or removed from the NMS Stock ATS; and
 - viii. the availability of order types across all forms of connectivity to the NMS Stock ATS and differences, if any, in the availability of an order type across those forms of connectivity.

Conditional and Firm Orders. The algorithms/SOR can route to JPB-X (i) conditional orders and (ii) if any of the conditional orders match with other conditional orders in JPB-X, firm orders routed in response to firm-up invitations received from JPB-X (in the case of the SOR with respect to orders designated for Close Price Match) or from JPB-X via the SOR (in the case of JPMS algorithmic trading strategies).

Matching Types. JPB-X accepts Firm/Conditional Orders designated for the following two matching types:

- Volume-Weighted Average Price Match (“VWAP Price Match”), which matches orders, using the conditional order process described in Part III, Item 9, and crosses them at a VWAP price determined by JPB-X over the course of a pre-determined match period; and
- Close Price Match, which matches orders, using the conditional order process described in Part III, Item 9, and crosses them at the security's official closing price as determined by the closing auction at the primary exchange for the security.

Firm/Conditional Orders designated for each matching type are maintained in separate order books within JPB-X and do not interact with each other.

Firm/Conditional Order Types. JPB-X accepts (1) limit and market Firm/Conditional Orders for the VWAP Price Match matching type and (2)

market-on-close Firm/Conditional Orders for the Close Price Match matching type. A limit Firm/Conditional Order is a Firm/Conditional Order to buy or sell stock at a specific price or better. A market Firm/Conditional Order is a Firm/Conditional Order to buy or sell stock at the best available price. A market-on-close Firm/Conditional Order is a Firm/Conditional Order to buy or sell stock at its closing price as determined by the primary exchange for the stock. JPB-X does not offer post-only Firm/Conditional Order types, and none of the above Firm/Conditional Order types is eligible for routing to other Trading Centers. The above Firm/Conditional Order types cannot be combined (*i.e.*, a Firm/Conditional Order cannot be more than one Firm/Conditional Order type).

Time-In-Force Instructions. For both VWAP Price Match and Close Price Match matching types, JPB-X only accepts a “day” time-in-force instruction. A day Firm/Conditional Order is a Firm/Conditional Order intended to rest in an order book maintained by JPB-X until the Firm/Conditional Order is executed or cancelled at the end of the trading day or earlier.

Modifications, Replacements, and Cancellations. The algorithms/SOR can modify, replace, or cancel day Firm/Conditional Orders routed to JPB-X, whether designated for VWAP Price Match or Close Price Match, as described below. The modification or replacement of a day conditional order results in the entry of a replacement conditional order with a new time stamp and lower priority in time than the original conditional order, unless the modification is a reduction in the quantity of the conditional order, in which case the replacement conditional order has a new time stamp but the same priority in time that the original conditional order had prior to its replacement. Note, however, that conditional orders designated for Close Price Match cannot be modified, replaced, or cancelled once the Close Price Match matching time is reached. The algorithms/SOR can cancel or reduce the quantity of a firm-up order prior to its execution.

Rejections. JPB-X rejects (i) short sale exempt Firm/Conditional Orders, (2) short sale Firm/Conditional Orders designated for Close Price Match, (3) Firm/Conditional Orders priced at or above \$1.00 per share if priced in a sub-penny increment, (4) Firm/Conditional Orders priced below \$1.00 per share if priced in an increment of less than \$.0001, and (5) Firm/Conditional Orders that exceed limits imposed by JPMS pursuant to its obligations under SEC Rule 15c3-5.

Eligibility for Matching and Execution. A Firm/Conditional Order is ineligible for matching in JPB-X unless the price, minimum quantity, and counterparty preference instructions associated with the Firm/Conditional Order, if any, are satisfied. Conditional orders, but not firm orders, can have minimum match size requirements. As described in response to Part III, Item 9, when JPB-X sends a firm-up invitation, JPB-X cancels the corresponding conditional order, irrespective of the conditional order’s minimum quantity instruction. As also described in response to Part III, Item 9, a firm-up order is ineligible for execution in JPB-X during the order’s applicable firm-up period.

Matching of VWAP Price Match Orders. As described in response to Part III, Item 11, once JPB-X matches firm-up orders designated for VWAP Price Match and the match period has elapsed, the firm-up orders are crossed, based on equal split / time priority (*i.e.*, all orders on the same side are given equal allocations with any remaining quantity allocated equally to earlier-in-time orders), at the

VWAP determined by JPB-X. Changes to an associated parent order, price limitations, the triggering of a Rule 201 price test, production issues, or the closing of the stock at its primary exchange may result in termination of the match period, in which case the quantity of a matched order's fill will be proportional to the duration of the match period and the price of the fill will be the VWAP over the duration of the match period (or, if a Rule 201 price test is in effect, at a price that is allowed by the rule). In addition, JPB-X does not execute a cross in any NMS stock that is subject to a regulatory or trading halt (a "Halt"), although, as described in response to Part III, Item 20, JPB-X will continue to accept Firm/Conditional Orders in such an NMS stock and instructions to modify, cancel, or replace Firm/Conditional Orders in that NMS stock using the priority logic described in response to Part III, Item 11(c). Firm-up orders that were matched but for which the match period has not elapsed will be cancelled by JPB-X immediately after the Halt goes into effect. If a Halt in an NMS stock occurs during regular trading hours while a firm-up period for one or more conditional orders in that security is underway, JPB-X rejects any firm-up order received during the firm-up period while the halt is in place.

Matching of Close Price Match Orders. As described in response to Part III, Item 11, once JPB-X matches firm-up orders designated for Close Price Match in a NMS stock, they are crossed, based on time priority, at the closing price as determined by the closing auction and published by the primary exchange for the NMS stock after the exchange closes. As described in response to Part III, Item 20, when a Halt is in effect for an NMS stock, JPB-X will continue to accept and match conditional orders designated for Close Price Match and to accept instructions to modify, cancel, or replace conditional orders in that NMS stock using the priority logic described in response to Part III, Item 11(c) but will not execute orders if the primary exchange does not publish a close price as determined by the closing auction for the stock, in which case JPB-X will cancel the unexecuted orders immediately after JPMS determines that the primary exchange has not published a close price as determined by the closing auction for the stock and has been delayed in doing so as a result of the Halt. Firm-up orders that were matched but have not yet been executed will be cancelled by JPB-X immediately after the Halt goes into effect.

Changes in NBBO. Although a change in the NBBO would not affect the relative priority of matched firm-up orders that remain eligible for execution after the change, the change could affect whether a firm-up order designated for VWAP Price Match with a price instruction associated with it is eligible for execution and the execution price at which orders that remain eligible for execution are crossed.

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Item 9: Conditional Orders and Indications of Interest

- a. Does the NMS Stock ATS send or receive any messages indicating trading interest (e.g., IOIs, actionable IOIs, or conditional orders)?

Yes ☒ No ☐

If yes, identify and explain the use of the messages, including information contained in messages (e.g., price or size minimums), how the message is transmitted (e.g., order

management system, smart order router, FIX), when the message is transmitted (e.g., automatically by the ATS, or upon the sender's request), the type of Persons that receive the message (e.g., Subscribers, Trading Centers), responses to conditional orders or IOIs (e.g., submission to firm-up conditional orders), and the conditions under which the message might result in an execution in the ATS (e.g., response time parameters, interaction, and matching).

JPB-X receives conditional orders routed to it by the SOR or by JPMS trading algorithms via the SOR. A conditional order describes the price, size, side, symbol, and minimum match size of the trading interest. Conditional orders can take the form of the Firm/Conditional Order types described in response to Part III, Item 7. JPB-X matches conditional orders designated for the VWAP Price Match and Close Price Match as described in response to Part III, Item 11. If two or more conditional orders match, JPB-X sends a firm-up invitation to (i) the SOR, if it had routed one of the matched conditional orders without instruction to do so from a JPMS algorithmic trading strategy, and/or (ii) any JPMS algorithmic trading strategy that instructed the SOR to route one of the matched conditional orders (with multiple firm-up invitations being sent to (i) any JPMS algorithmic trading strategy that routed more than one of the matched conditional orders or (ii) the SOR if it had routed more than one of the matched conditional orders without instruction to do so from a JPMS algorithmic trading strategy). The firm-up invitation includes the symbol, quantity, and price of the associated same-side conditional order that prompted the firm-up invitation and the size of contra-side trading interest.

When JPB-X sends a firm-up invitation, JPB-X cancels the corresponding conditional order, and the recipient of the firm-up invitation (i.e., the SOR or a JPMS algorithmic trading strategy) has the duration of the firm-up period to determine whether to send a firm-up order in response to the firm-up invitation. The price and size attributes reflected in a Subscriber's firm-up order may differ from the corresponding attributes reflected in the Subscriber's earlier conditional order. The firm-up period is the shorter of (i) the time it takes for JPB-X to receive firm-up orders corresponding to all of the matched conditional orders and (ii) the default firm-up period, which is currently two seconds. JPB-X does not match any firm-up orders until the firm-up period elapses. When the firm-up period elapses, JPB-X matches the firm-up orders designated for the VWAP Price Match and Close Price Match as described in response to Part III, Item 11.

By default, the algorithms/SOR can route conditional orders to JPB-X. Subscribers can opt out of the routing of conditional orders on their behalf. Subscribers can opt out in whole or in part (with respect to a subset of conditional orders or all conditional orders) by contacting their JPMS sales representatives. JPMS implements such restrictions as soon as reasonably practicable. In addition, JPMS reserves the right to limit or prohibit the use of conditional orders for Subscribers at JPMS' discretion if, as described in response to Part III, Item 3, ECS Liquidity Product Specialists responsible for the operation of JPB-X detect systematic behavior resulting in a materially negative impact to the operation of JPB-X or to other Subscribers as evidenced by, e.g., a high cancellation rate or, with respect to orders designated for VWAP Price Match, high VWAP slippage of the Subscriber's algorithmic orders.

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Item 11: Trading Services, Facilities and Rules

- c. Explain the established, non-discretionary rules and procedures of the NMS Stock ATS, including order interaction rules for the priority, pricing methodologies, allocation, matching, and execution of orders and trading interest, and other procedures governing trading, such as price improvement functionality, price protection mechanisms, short sales, locked-crossed markets, the handling of execution errors, and the time-stamping of orders and executions.

JPB-X rejects (i) short sale exempt Firm/Conditional Orders, (2) short sale Firm/Conditional Orders designated for Close Price Match, (3) Firm/Conditional Orders priced at or above \$1.00 per share if priced in a sub-penny increment, (4) Firm/Conditional Orders priced below \$1.00 per share if priced in an increment of less than \$.0001, and (5) Firm/Conditional Orders that exceed limits imposed by JPMS pursuant to its obligations under SEC Rule 15c3-5.

A Firm/Conditional Order is ineligible for matching in JPB-X unless the price, minimum quantity, and counterparty preference instructions (see Part III, Items 13-14) associated with the Firm/Conditional Order, if any, are satisfied. Conditional orders, but not firm orders, can have minimum match size requirements. As described in response to Part III, Item 9, a firm-up order is ineligible for execution in JPB-X during the order's applicable firm-up period.

VWAP Price Match Rules and Procedures:

When two or more conditional orders designated for VWAP Price Match on opposite sides are eligible for matching in JPB-X, JPB-X matches them and sends firm-up invitations to the algorithms/SOR (as described in response to Part III, Item 9). Short sale conditional orders are not eligible for matching when a price test under Rule 201 of Regulation SHO is in effect.

Once the firm-up period described in Part III, Item 9 has elapsed, JPB-X matches the firm-up orders it received during the firm-up period (subject to the eligibility criteria for the firm-up orders discussed above and the firm-up orders' participation instructions) based on equal split / time priority (*i.e.*, all orders on the same side are given equal allocations with any remaining quantity allocated equally to earlier-in-time orders). A pre-determined default match period commences upon the earlier of (i) JPB-X's receipt of firm-up orders corresponding to all firm-up invitations sent by JPB-X or (ii) the expiration of the firm-up period. The default match period is currently five minutes for all firm-up orders.

During the match period, JPB-X monitors market data reported via the SIP (see Part III, Item 23) and any changes to parent order attributes. Once the match period elapses, JPB-X crosses the matched firm-up orders at the VWAP (if one exists and it is within the matched orders' price limits, if any), determined by JPB-X based on executed trades reported via the SIP during the match period. Changes to an associated parent order, changes in published quotations that render a firm-up order unmarketable, the triggering of a Rule 201 price test, production issues, or the closing of the stock at its primary exchange may result in early termination of the match period, in which case the quantity of a matched

order's fill will be proportional to the duration of the match period and the price of the fill will be the VWAP over the duration of the match period (or, if a Rule 201 price test is in effect, at a price that is allowed by the rule).

JPB-X does not execute a cross in any NMS stock that is subject to a Halt (although, as described in response to Part III, Item 20, JPB-X will continue to accept Firm/Conditional Orders in such an NMS stock and instructions to modify, cancel, or replace Firm/Conditional Orders in that NMS stock using the priority logic described in this response). Firm-up orders that were matched but for which the match period has not elapsed are cancelled by JPB-X immediately after the Halt goes into effect. If a Halt in an NMS stock occurs during regular trading hours while a firm-up period for one or more conditional orders in that security is underway, JPB-X rejects any firm-up order received during the firm-up period while the halt is in place.

Close Price Match Rules and Procedures:

Following the Close Price Match matching time (see response to Part III, Item 4), JPB-X (i) matches conditional orders designated for Close Price Match on opposite sides that are eligible for matching in JPB-X based on time priority and (ii) sends firm-up invitations to the algorithms/SOR (as described in response to Part III, Item 9).

Once the firm-up period described in Part III, Item 9 has elapsed, JPB-X matches the firm-up orders designated for Close Price match received during the firm-up period (subject to the eligibility criteria for the firm-up orders discussed above and the firm-up orders' participation instructions) based on the time priority previously afforded the corresponding same-side conditional orders that preceded the firm-up orders, respectively. Unmatched firm-up orders are cancelled back to the SOR. Once the official closing price as determined by the closing auction is published by the primary exchange for the NMS stock, JPB-X crosses the matched firm-up orders at that closing price as reported by the SIP (see Part III, Item 23). As described in response to Part III, Item 20, when a Halt is in effect for an NMS stock, JPB-X will continue to accept and match conditional orders designated for Close Price Match and to accept instructions to modify, cancel, or replace conditional orders in that NMS stock using the priority logic described in this response but will not execute orders if the primary exchange does not publish a close price as determined by the closing auction for the stock, in which case JPB-X will cancel the unexecuted orders immediately after JPMS determines that the primary exchange has not published a close price as determined by the closing auction for the stock and has been delayed in doing so as a result of the Halt. Firm-up orders that were matched but have not yet been executed will be cancelled by JPB-X immediately after the Halt goes into effect.

Additional Rules and Procedures for JPB-X Generally:

JPMS, at the request of a Subscriber or on JPMS' own initiative, may determine to review any transaction in JPB-X to assess whether it was adversely affected by a technical issue or "clearly erroneous" as defined by relevant regulators (e.g., under FINRA Rule 11891, "the terms of a transaction are 'clearly erroneous' when there is an obvious error in any term, such as price, number of shares, or other unit of trading, or identification of the security"). If JPMS determines that a transaction was adversely affected by a technical issue or clearly erroneous,

whether or not as a result of JPMS or Subscriber error, JPMS, depending on the facts and circumstances, may work with the affected Subscriber(s) to resolve the error and may cancel (bust) the transaction or assume responsibility for one side of the transaction and work to cover the resulting position as soon as is practicable. JPB-X also may suspend matching in the event of volatile market conditions (e.g., wide bid/offer spreads).

JPB-X time stamps orders upon receipt and executions at the time they occur and reports them in milliseconds in accordance with applicable FINRA Order Audit Trail System and trade reporting rules. JPB-X determines queue positions based on new order receipt times with microsecond precision, except in the case of a reduction in the quantity of an order, in which case, the replacement order assumes the queue position of the original order.

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Item 15: Display

- b. Are Subscriber orders and trading interest bound for or resting in the NMS Stock ATS displayed or made known to any Person (not including those employees of the NMS Stock ATS who are operating the system)?

Yes ☒ No ☐

If yes, explain the display procedures, including how and when Subscriber orders and trading interest are displayed, how long orders and trading interest are displayed, what information about orders and trading interest is displayed, and the functionality of the Broker-Dealer Operator and types of market participants that receive the displayed information.

Firm/Conditional Orders are made known to the SOR when they are routed through it. As described in response to Part III, Item 9, when the algorithms/SOR routes conditional orders to JPB-X, JPB-X may send firm-up invitations back to the algorithms/SOR. Accordingly, when JPMS algorithmic trading strategies route conditional orders to JPB-X via the SOR, any resulting firm-up invitations are sent by JPB-X to a JPMS algorithmic trading strategy via the SOR. A firm-up invitation includes the symbol, quantity, and price of the associated same-side conditional order that prompted the firm-up invitation and the size of contra-side trading interest. The SOR does not retain information about Firm/Conditional Orders resident in the respective order books for VWAP Price Match orders and Close Price Match orders other than Firm/Conditional Orders that the SOR routed to JPB-X without instruction to do so from a JPMS algorithmic trading strategy.

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Item 20: Suspension of Trading

- a. Explain any procedures for suspending or stopping trading on the NMS Stock ATS, including the suspension of trading in individual NMS stocks.

JPMS can, in its sole discretion, elect to suspend operation of JPB-X at any

time, including the suspension of trading in individual NMS stocks for, among other reasons, approaching Regulation ATS Fair Access and Regulation SCI volume thresholds. JPMS also may suspend trading in an NMS stock if, e.g., (i) JPMS is unable to report trades in that stock as described in response to Part III, Item 21 or (ii) the market data received by JPB-X for the stock from the Securities Information Processors (discussed in response to Part III, Item 23) is unavailable, unstable, experiencing unacceptable latencies, or detected to be providing quotes that appear to have quality issues.

In the event of a technical system outage at JPB-X, the JPMS Electronic Trading Technology Production Management team can in its discretion:

- Disable routing from the algorithms/SOR to JPB-X;
- Disable the acceptance of orders in JPB-X; and
- Cease the matching process in JPB-X by cancelling any open Firm/Conditional Orders.

If an NMS stock is subject to a Halt, JPB-X will handle Firm/Conditional Orders as follows, depending on the order type:

- **VWAP Price Match:** When a Halt is in effect for an NMS stock, JPB-X will continue to accept Firm/Conditional Orders in that NMS stock designated for VWAP Price Match and instructions to modify, cancel, or replace Firm/Conditional Orders in that NMS stock using the priority logic described in response to Part III, Item 11(c), but JPB-X will not match or execute Firm/Conditional Orders in that NMS stock. JPB-X will reject a firm-up order if a Halt occurred during the firm-up period for that order. Firm-up orders that were matched but for which the match period has not elapsed will be cancelled by JPB-X immediately after the Halt goes into effect.
- **Close Price Match:** When a Halt is in effect for an NMS stock, JPB-X will continue to accept and match conditional orders designated for Close Price Match and to accept instructions to modify, cancel, or replace conditional orders in that NMS stock using the priority logic described in response to Part III, Item 11(c) but will not execute orders if the primary exchange does not publish a close price as determined by the closing auction for the stock, in which case JPB-X will cancel the unexecuted orders immediately after JPMS determines that the primary exchange has not published a close price as determined by the closing auction for the stock and has been delayed in doing so as a result of the Halt. Firm-up orders that were matched but have not yet been executed will be cancelled by JPB-X immediately after the Halt goes into effect.

In the event of a halt in an NMS stock imposed by JPB-X, it will not accept, match, or execute Firm/Conditional Orders in that NMS stock and will not accept instructions to modify, cancel, or replace Firm/Conditional Orders in that NMS stock.

Moreover, as noted in response to Part III, Item 3(a), JPMS reserves the right (i) to disable any JPB-X functionality, in whole or in part, if such functionality experiences technical issues or could otherwise pose a detrimental risk to Subscribers, JPB-X, or the capital markets and (ii) to restrict the entry of a Subscriber's Firm/Conditional Orders into JPB-X if certain thresholds are exceeded (e.g., risk limits imposed by JPMS pursuant to its obligations under

SEC Rule 15c3-5).

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Item 23: Market Data

- a. Identify the sources of market data used by the NMS Stock ATS (e.g., proprietary feed from a national securities exchange, feed from the securities information processor (“SIP”)), and how the ATS uses market data from these sources to provide the services that it offers, including how the ATS uses market data to determine the NBBO and protected quotes, and display, price, prioritize, execute, and remove orders and trading interest on the ATS.

JPMS determines the NBBO, protected quotes, and execution prices for Firm/Conditional Orders in JPB-X, including VWAP Price Match orders executed at the VWAP over the course of a match period and Close Price Match orders executed at the closing price as determined by the closing auction and published by the primary exchange, based on market data received from the Securities Information Processors (the “SIP”). The market data feeds consumed by JPB-X are provided by Redline, a third-party market data provider. As described in response to Part III, Item 20, JPMS may suspend trading in an NMS stock if the market data received by JPB-X for the stock from the SIP is unavailable, unstable, experiencing unacceptable latencies, or detected to be providing quotes that appear to have quality issues.

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