

**Part 2A of Form ADV: Firm Brochure**



G R E S H A M   I N V E S T M E N T   M A N A G E M E N T   L L C

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March 29, 2019

This brochure provides information about the qualifications and business practices of Gresham Investment Management LLC (“Gresham”, “firm”, “we”, or “our”). If you have any questions about the contents of this brochure, please contact us at 212-984-1430 or [compliance@greshamllc.com](mailto:compliance@greshamllc.com). The information in this brochure has not been approved or verified by the United States Securities and Exchange Commission or by any state securities authority.

Additional information about Gresham is also available on the SEC’s website at [www.adviserinfo.sec.gov](http://www.adviserinfo.sec.gov). You can search this site by a unique identifying number, known as a CRD number. Our firm’s CRD number is 134392.

We are a registered investment adviser; registration does not imply a certain level of skill or training.

## **Item 2     Material Changes**

Material changes between the last annual update on March 29th, 2018 and this annual update include:

- Item 5, Fees and Compensation:
  - Updates to reflect the updated fee schedule applicable to the Gresham CMS Strategy.
  - Updates to reflect the fee schedule applicable to the new share classes added for the GreshamQuant Managed Futures Strategy.
  - Updates to reflect the fee schedule applicable to the MTAP – High Octane Strategy.
  
- Item 8, Methods of Analysis, Investment Strategies and Risk of Loss:
  - The programs listed under the Mid-Term Active Implementation (MTA) and Term Structure Monetization and the strategy descriptions were updated to include the addition of the MTAP - High Octane Strategy.

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## Item 4 Advisory Business

**History & Ownership:** Gresham Investment Management LLC (“Gresham”) is a registered investment adviser with the U.S. Securities and Exchange Commission (“SEC”) as of April 2005 with its principal place of business located in New York, NY. Gresham is organized as a limited liability company under the laws of Delaware.

The firm's executive officers include Jonathan S. Spencer, President, Chief Investment Officer; Douglas J. Hepworth, Executive Vice President, Chief Operating Officer & Chief Risk Officer; and Adam I. Gehrie, Executive Vice President, General Counsel & Chief Compliance Officer. Nuveen Investments, Inc. is the majority managing member and principal shareholder of Gresham. Nuveen Investments, Inc. is a subsidiary of Nuveen, LLC (“Nuveen”). Nuveen is a subsidiary, and represents the asset management division, of Teachers Insurance and Annuity Association of America (also known as “TIAA”), a leading financial services provider. Refer to Item 10 for further details regarding Gresham’s affiliation with Nuveen and TIAA. Additional information about Gresham’s ownership structure is contained in its Form ADV, Part 1A, available on the SEC’s website at [www.adviserinfo.sec.gov](http://www.adviserinfo.sec.gov).

**Services Offered:** We provide investment advice to separately managed client accounts as well as to certain commingled investment vehicles offering interests on a private placement basis. Our investment advice focuses on the commodities markets and cash equivalent securities collateralizing our commodity portfolio strategies. Accordingly, in addition to our registration with the SEC as an investment adviser, we are registered with the Commodity Futures Trading Commission (“CFTC”) as a Commodity Trading Advisor (“CTA”) and as a Commodity Pool Operator (“CPO”) and we are a member of the National Futures Association (“NFA”). Gresham operates through two separate trading divisions; the Near Term Active division (“Gresham NTA”) and the Term Structure Monetization division (“Gresham TSM”). Specifically, Gresham, through its two trading divisions, offers the following services:

- Discretionary trading authority on behalf of our clients, which includes but is not limited to the following:
  - Domestic and foreign exchange-traded futures contracts and over-the-counter futures and forward contracts;
  - Swaps on certain futures contracts;
  - Exchange-traded options on futures contracts;
  - Treasuries and other types of securities or derivatives;
- Placing orders for execution of any of the above with futures commission merchants or counterparties that we may select or our clients may designate; and
- Discretionary investing of collateral in cash-equivalents, including money market funds, short term U.S. governmental securities and short-term municipal securities.

Our strategies generally consist of portfolios of commodity futures contracts, forward contracts, options on futures contracts, swaps, and other derivative contracts, as well as for collateral classes pertaining to certain strategies, physical commodities. The portfolio compositions may be proprietary (e.g., TAP<sup>®</sup>, our managed futures and risk premia offerings such as GreshamQuant or Gresham CMS, or our multi-asset Risk Dispersing Portfolio<sup>™</sup> strategy), or may reflect published commodity investment benchmarks (such as the Bloomberg Commodity Index or the S&P Goldman Sachs Commodity Index (e.g., A+, G+)). In addition, we offer different implementation methodologies, including: Near-Term Active implementation (e.g., TAP<sup>®</sup>) through Gresham NTA; and Term Structure Monetization (e.g., ETAP) through Gresham TSM. Our strategies and implementation methodologies are more fully described in Item 8 of this Firm Brochure.

When we advise separately managed accounts, the portfolios we construct and manage are consistent with the established investment guidelines of our institutional clients. Such clients may impose reasonable restrictions, including designating that certain commodities and commodity sectors be included in or excluded from their portfolios. The offering documents associated with the commingled investment vehicles we manage describe the portfolio construction and implementation strategies applicable to such investment pools.

Gresham employs the services of sub-advisers to manage the entire portfolio of U.S. Treasury Inflation-Protected Securities as well as the entire portfolio of tax-exempt short-term municipal securities that collateralize the futures contract positions that the firm manages on behalf of certain clients.

Gresham also serves as a sub-adviser, managing commodities futures investments pursuant to its portfolio construction and implementation strategies, of certain accounts and commingled investment vehicles organized by affiliated and unaffiliated investment advisers.

Once a client's portfolio has been established, Gresham NTA or Gresham TSM, as applicable, reviews the portfolio regularly.

As of 12/31/2018, we managed approximately \$6,447,381,303 of regulatory assets under management. Gresham NTA managed approximately \$3,709,553,986 on a discretionary basis, while Gresham TSM managed approximately \$2,737,827,317 on a discretionary basis.

## Item 5 Fees and Compensation

General Information: A basic fee schedule for separately managed accounts and commingled investment vehicles appears below and on the following page. The established minimum initial investment for a separately managed account is \$50 million. The minimum initial and subsequent investment amounts for commingled investment vehicles are set forth in the relevant offering documents. We may negotiate the fees and minimum initial and subsequent investment amounts separately with clients, including investors in the commingled investment vehicles. Employees and other investors affiliated with Gresham may not be charged management or performance fees. See Item 10 below for a further discussion of side letter agreements with respect to the commingled investment vehicles. Gresham also receives fees as a sub-adviser to funds registered under the Investment Company Act.

We generally bill clients with separately managed accounts and commingled investment vehicles either quarterly or monthly (monthly applicable to commingled investment vehicles only) in arrears, on the basis of assets under management at the end of the quarter for management fees. Excess return (“Outperformance” or “Performance Allocations”) (after the subtraction of management fees) above an agreed-upon benchmark or hurdle rate (as set forth in the investment management agreement for separately managed accounts or the offering documents of the relevant commingled investment vehicle, as applicable) may be billed at the end of the quarter or year, as applicable. We do not deduct fees from client assets. Certain commingled investment vehicles may allocate Outperformance or Performance Allocations (if any) to Gresham Asset Management LLC, an affiliate of Gresham.

### **TAP® via Separately Managed Account**

<b>Net Asset Value</b>	<b>Fee</b>
First \$50MM	0.75%
Next \$50MM	0.35%
Next \$50MM	0.25%

### **TAP® via Commingled Fund**

<b>Net Asset Value</b>	<b>Fee</b>
Less than \$5MM	1.00%
\$5MM to \$9MM	0.90%
First \$50MM	0.75%
Next \$50MM	0.35%
Next \$50MM	0.25%

### **TAP® - ATAP Strategy via Commingled Fund**

<b>Net Asset Value</b>	<b>Fee</b>
\$100K+	1.25%

### **TAP® - Agricultural Strategy via Commingled Fund**

<b>Net Asset Value</b>	<b>Fee</b>
\$100K+	1.25%

**ETAP, A+, G+ Strategies via Separately Managed Account**

<b>Net Asset Value</b>	<b>Fee</b>
\$50MM - \$74MM	0.40%+30% of Outperformance over benchmark
\$75MM - \$99MM	0.35%+30% of Outperformance over benchmark
\$100MM - \$149MM	0.30%+30% of Outperformance over benchmark
\$150MM - \$249MM	0.25%+30% of Outperformance over benchmark
\$250MM - \$499MM	0.20%+30% of Outperformance over benchmark
\$500MM+	0.15%+30% of Outperformance over benchmark

**ETAP, A+, G+ Strategies via Commingled Fund**

<b>Net Asset Value</b>	<b>Fee</b>
\$100K - \$499K	0.75%+30% of Outperformance over benchmark
\$500K - \$999K	0.65%+30% of Outperformance over benchmark
\$1MM - \$9MM	0.55%+30% of Outperformance over benchmark
\$10MM - \$49MM	0.45%+30% of Outperformance over benchmark
\$50MM - \$74MM	0.40%+30% of Outperformance over benchmark
\$75MM - \$99MM	0.35%+30% of Outperformance over benchmark
\$100MM - \$149MM	0.30%+30% of Outperformance over benchmark
\$150MM+	0.25%+30% of Outperformance over benchmark

**MTAP via Separately Managed Account**

<b>Net Asset Value</b>	<b>Fee</b>
First \$50MM	0.75%
Next \$50MM	0.50%
Next \$100MM+	0.40%

**MTAP via Commingled Fund**

<b>Net Asset Value</b>	<b>Fee (Class A/C)</b>
First \$50MM	0.75%
Next \$50MM	0.50%
Next \$100MM	0.40%

**DJF via Commingled Fund**

<b>Net Asset Value</b>	<b>Fee (Class A / B)</b>
First \$50MM	0.75% / 0.85%
Next \$50MM	0.50% / 0.60%
Next \$100MM	0.40% / 0.50%

**MTAP - High Octane Strategy via Commingled Fund**

<b>Net Asset Value</b>	<b>Fee (Class B/D)</b>
First \$50MM	0.85%
Next \$50MM	0.60%
Next \$100MM	0.50%

## GreshamQuant Managed Futures via Commingled Fund

Net Asset Value	Fee
\$5MM+	1.5% + 15% of Net Profit during the Performance Period above the Hurdle Rate Amount.  Founder's Class 1: 1% management fee or 30% of Net Profit during the Performance Period above the Hurdle Rate Amount.  Founder's Class 2: .75% + 20% of Net Profit during the Performance Period above the Hurdle Rate Amount.

## Gresham RDP via Commingled Fund

Net Asset Value	Fee
\$5MM	0.60%
\$5MM - \$50MM	0.40%
\$50MM+	0.25%

## Gresham CMS

Net Asset Value	Fee
\$100K+	0.50%

***Termination of the Advisory Relationship:*** Typically, an advisory agreement for a separately managed account may be canceled at any time, by either party, for any reason, upon receipt of 30 days written notice. Interests in commingled investment vehicles are typically redeemable at month-end upon 5 business days' notice. Upon termination of any account, any earned but unbilled fees will be due and calculated on the basis of the number of days that have elapsed between the last billing period date and the termination date.

***No Wrap Fee Arrangements:*** Gresham has no wrap fee arrangements with any broker or futures commission merchant.

***Additional Fees and Expenses:*** In addition to our advisory fees, clients are also responsible for certain fees and expenses charged by the relevant custodians and brokers, including, but not limited to, commissions and exchange fees. Investors should refer to the offering documentation or investment management agreement, as applicable, for further details on fees and expenses.

***ERISA Accounts:*** Gresham is deemed to be a fiduciary to advisory clients that are employee benefit plans pursuant to the Employee Retirement Income and Securities Act ("ERISA"). As such, our firm is subject to specific duties and obligations under ERISA and the Internal Revenue Code that include among other things, restrictions concerning certain forms of compensation.

***No Sale Compensation:*** Neither Gresham nor any of its supervised persons accepts compensation for sale of securities or other investment products.

## **Item 6      Performance-Based Fees and Side-By-Side Management**

Gresham manages both commingled investment vehicles and separately managed accounts consisting of investments in commodities futures contracts, forwards contracts, options on futures contracts, swaps, and other derivative contracts as well as for collateral classes pertaining to certain strategies, physical commodities. Some accounts and funds that we manage pay only a management fee based on a percentage of net asset value. Some accounts and funds that we manage pay both a management fee and outperformance or performance allocation, as detailed in Item 5 of this Brochure. There may be a conflict of interest because of the incentive to favor those accounts and funds on which we earn a performance-based fee over those on which we do not. The conflict is mitigated by the fact that with respect to our long-only trading strategies, Gresham NTA is typically responsible for the day-to-day trading decisions related to accounts and funds that pay a management fee only, and Gresham TSM is typically responsible for the day-to-day trading decisions related to accounts and funds that pay a performance-based fee (in addition to a management fee). With respect to our managed futures and risk premia trading strategies, the conflict is mitigated because trading decisions are generated using a systematic approach that does not consider the trades of other Gresham portfolios and which leaves traders without discretion to favor these accounts.

Gresham offers a variety of different strategies to its clients. Accordingly, the performance in some clients' accounts may be materially different than the performance in other clients' accounts that invest in different strategies.

Additionally, clients should be aware that a performance-based fee arrangement may create an incentive for us to recommend a portfolio with a more active implementation methodology and may entail increased trading expenses, rather than implementation methodologies associated with portfolios that we might recommend under a different fee arrangement. We attempt to ensure that such strategies are consistent with the clients' investment objectives and that they understand and are able to bear the potential risks.

## Item 7    **Types of Clients**

Gresham provides investment advice to private funds and separately managed accounts and also acts as sub-adviser to investment companies. Other types of clients may include, among others:

- Pension and profit sharing plans (other than plan participants);
- Corporations or other businesses;
- State or municipal government entities;
- Other investment advisers;
- Insurance companies;
- University endowments;
- Sovereign wealth funds;
- Collective Trusts; and
- Non-Profit Organizations

We generally require our clients to invest a minimum of \$50 million to open a separately managed account, although we reserve the right to accept accounts of smaller sizes in our sole discretion. The minimum investment requirement in a commingled investment vehicle employing our strategies is negotiable but generally will not be less than \$100,000.

## Item 8 Methods of Analysis, Investment Strategies and Risk of Loss

### Methods of Analysis

Gresham uses the following methods of analysis in formulating our investment advice and/or managing client assets:

**Fundamental Analysis:** We evaluate such factors as global production, global trade and futures liquidity in determining the composition of the portfolio of futures, forwards, options, and exchange traded swaps comprising our strategies.

**Technical Analysis:** We analyze past market movements and apply the results to the current market in an attempt to identify recurring patterns in the prices of futures, forwards, options, and exchange traded swaps and to estimate future price movement.

**Quantitative Analysis:** We use mathematical models and historical back-testing in an attempt to obtain more accurate measurements of quantifiable market data, such as trending and mean-reverting statistics, and evaluate the potential impact on the prices of futures, forwards, options, and exchange traded swaps. A risk in using quantitative analysis is that the models used may be based on assumptions that prove to be incorrect.

**Risks for All Forms of Analysis:** Our methods of analysis rely on the assumption that the pricing data from publicly-available sources of information are accurate. While we endeavor to remain alert to indications that data may be incorrect, there is always a risk that our analysis may be compromised by inaccurate or misleading information. Moreover, our assessments as to future potential price movements may prove to be incorrect, due to unforeseen events or otherwise.

The firm may employ additional methods of analysis to meet client needs. All investments involve the risk of loss of capital. Below is a general summary of certain Gresham investment strategies.

### Investment Strategies

Gresham offers its clients exposure to several different fully-collateralized commodity futures portfolios that we manage according to several different implementation methodologies through two separate trading divisions: Gresham NTA and Gresham TSM. Such portfolios may be in the form of commingled investment vehicles or separately managed accounts.

#### Portfolio Construction

**TAP®:** Gresham's proprietary Tangible Asset Program® ("TAP") consists of a basket of 32 different tangible commodity futures selected and weighted according to the underlying commodity's global production, global trade, and futures liquidity values. For the annual target weights set at the beginning of each year the commodity sector exposures are limited to 35% for any one sector and 60% for any two. No commodity sector can be less than 20% of the group maximum (35%). No individual commodity may represent more than 70% of its sector and no commodity complex can represent more than 80% of a sector. In addition, Gresham employs active factor-based interim rebalancing within the portfolio throughout the course of the year.

**Other:** Gresham also offers programs that reference the commodity futures allocations and weightings of several published commodity investment benchmarks, such as the Bloomberg Commodity Index and S&P GSCI.

## Implementation Options

### **Near Term Active Implementation (NTA) (through Gresham NTA)**

Programs: *TAP, ATAP, Gresham A Commodities*

As the commodity futures contracts near the last trading date or first delivery date, Gresham NTA traders “roll them over” into a new contract. The timing of this process is opportunistic, and is based on the traders’ experienced assessment of liquidity levels and price activity in the market. For certain strategies, Gresham NTA traders may vary commodity exposure over time. Gresham NTA traders can also take positions further out on the futures curve than those taken by near-month commodity benchmarks such as the Bloomberg Commodity Index and S&P Goldman Sachs Commodity Indices.

### **Mid-Term Active Implementation (MTA) and Term Structure Monetization (TSM) (through Gresham TSM)**

Programs: *DJF, MTAP, MTAP - High Octane, ETAP, A+, G+*

Offered through Gresham TSM, the MTA and TSM strategies employ a trader to (i) roll futures contracts opportunistically with the aim of maximizing risk-adjusted returns and extracting value from the term structure of commodity futures contracts; and (ii) if applicable, put on spread trades via futures contracts and options positions. The traders in these programs forecast the attractiveness of longer-dated futures contracts versus those held in the NTA programs, using factors such as seasonality, fungibility, and prevailing interest rates to determine which points on the futures term structure represent the best relative values.

### **Gresham CMS (through Gresham NTA)**

Programs: *CMS*

Gresham CMS is a commodity-only systematic blend of strategies that provides investors access to Gresham’s proprietary premia-focused models. Portfolio construction focuses on dynamic risk allocation across strategies, taking into account liquidity constraints, transaction costs, and market impact. Strategies within Gresham CMS currently fall into several categories: momentum, cross-sectional value, fundamental factors, statistical arbitrage, and volatility.

### **GreshamQuant (through Gresham TSM)**

Programs: *ACAR*

The GreshamQuant ACAR strategy attempts to achieve positive absolute returns during both up and down markets as well as across different economic cycles while controlling portfolio risk. This strategy involves systematic trading that provides changing exposure to a diversified basket of futures and other derivatives.

Programs: NMFS

The GreshamQuant NMFS strategy, offered exclusively within a Nuveen registered fund complex sub-advised by Gresham, employs a proprietary, quantitatively-driven, systematically-executed investment process that seeks to capitalize on the existence of price momentum (or “trend”) within the global equity, fixed income, currency and commodity markets.

### **Gresham RDP (through Gresham NTA)**

Programs: *RDP*

The objectives of the RDP strategy are to provide stable returns with growth over longer time periods and across full economic cycles. Gresham attempts to achieve the strategy’s objectives by investing in exchange-traded U.S. and non-U.S. dollar-denominated futures and forward contracts using the Gresham’s proprietary multi-asset Risk Dispersing Portfolio™ strategy. Underlying asset classes primarily include U.S. and non-U.S. stocks, U.S. and non-U.S. bonds, and real assets (such as futures on physical commodities and gold). A collateral share class of RDP pursues a “cash and carry” strategy which may hold physical commodities.

### **Risk of Loss**

**Absence of Regulatory Oversight:** The commingled investment vehicles that Gresham directly manages are not registered as investment companies under the Investment Company Act, and, accordingly, the provisions of the Investment Company Act (which provide certain regulatory safeguards to investors) are not applicable. Furthermore, pursuant to exemptions available under rules of the CFTC, Gresham is not required to comply with all CPO regulations with respect to the commingled investment vehicles it manages.

**Trading in Commodity Futures, Forward, Options, Swaps and Over-The-Counter Commodity Contracts is Speculative and Volatile:** Prices for commodity futures, forward, options, swaps and over-the-counter commodity contracts are highly volatile. Price movements of commodity interests are influenced by, among other things, changing supply and demand relationships, governmental agricultural and trade programs and policies, climate and national and international political and economic events. Gresham cannot control any of these factors, and therefore we can give no assurances that our strategies will be profitable or will not incur substantial losses. For these reasons and others, clients and investors should consider an investment in Gresham's strategies as long-term and speculative.

**Trading in Commodity Interests is Highly Leveraged; Use of Leverage:** The low margin deposits required in commodity futures and forward trading (typically between 2% and 15% of the value of the contracts traded) allow for a high degree of leverage. For example, if at the time of purchase one deposits 10% of the price of a contract as margin, a 10% decrease in the price of the contract would, if one then closes out the contract, result in a total loss of the margin deposit before any deduction for brokerage commissions. A decrease of more than 10% would result in a loss of more than the total margin deposit. Accordingly, a relatively small price movement in a contract may result in immediate and substantial losses. Similar risks apply to over-the-counter commodity contract trading. Furthermore, the use of leverage is an integral part of certain of Gresham’s strategies and is used primarily as a tool to manage the volatility of the overall portfolio.

**Futures Markets May Be Illiquid:** Certain commodity exchanges limit fluctuations in commodity futures contract prices during a single day by regulations referred to as “daily price fluctuation limits” or “daily limits.” During a single trading day, traders may not execute trades at prices beyond the daily limit. Once the price of a futures contract for a particular commodity has increased or decreased by an amount equal to the daily limit, traders cannot take or liquidate positions in the commodity unless both a buyer and seller are willing to effect trades at or within the limit. In the past, commodity futures prices have moved the daily limit for several consecutive days with little or no trading. Similar occurrences, or regulatory interventions in the commodity markets, could prevent Gresham from promptly liquidating unfavorable positions and adversely affect trading and profitability.

**Trading on Non-U.S. Exchanges:** Gresham engages in trading on non-U.S. exchanges and other markets located outside of the U.S. Neither CFTC regulations nor regulations of any other U.S. governmental agency apply to the execution of transactions on or the regulation of such non-U.S. markets.

**Counterparty Risks:** CFTC regulations require that futures commission merchants maintain a client’s assets in a segregated account. If the futures commission merchant holding a client’s portfolio fails to comply with that legal requirement, the client may be subject to a risk of loss of funds on deposit with the futures commission merchant in the event of the broker’s bankruptcy. In addition, under certain circumstances, such as the inability of another client of the futures commission merchant or the futures commission merchant itself to satisfy substantial deficiencies in such other client’s account, a client may be subject to a risk of loss of those funds on deposit with the futures commission merchant, even if such funds are properly segregated. In the case of any such bankruptcy or client loss, the amount a client might recover, even in respect of property specifically traceable to the client’s portfolio, would represent only a pro rata share of all property available for distribution to all of the futures commission merchant’s clients.

**Swaps Strategy Risks:** Gresham may trade in certain swaps. Unlike futures and options on futures contracts, most swap contracts currently are not traded on or cleared by an exchange or clearinghouse. The CFTC currently requires only a limited class of swap contracts (certain interest rate and credit default swaps) to be executed on an exchange or other organized trading platform and cleared. In accordance with the Dodd-Frank Wall Street Reform and Consumer Protection Act (the “Dodd-Frank Act”), the CFTC has authority to determine which other classes of swap contracts to be required to be cleared and executed on an exchange or other organized trading platform. In general, uncleared transactions present greater counterparty risk than cleared transactions, given the regulated status and risk-mitigating characteristics of clearinghouses.

Because swaps do not generally involve the delivery of underlying assets or principal, the amount payable upon default and early termination is usually calculated by reference to the current market value of the contract. Swap dealers require Gresham’s commingled investment vehicles and other clients to deposit initial margin and variation margin as collateral to support the client’s obligation under the swap but may not themselves provide collateral for the benefit of the client. If the swap dealer or other counterparty to such a swap defaults, the client would be a general unsecured creditor for any termination amounts owed by the counterparty to the client as well as for any collateral deposits in excess of the amounts owed by the client to the counterparty, which would result in losses to the client portfolio.

**Futures on Broad-Based Security Indexes:** Gresham’s strategies may trade futures on broad-based security indexes. Gresham’s use of security index futures exposes client portfolios to potential volatility and losses in excess of direct investments in the contract’s underlying assets. The values of Gresham’s positions in security index futures tend to fluctuate in response to changes in the value of the underlying index, which

exposes client portfolios to the risk that the underlying index will not move in a direction that is favorable to the client portfolios. While the value of a security index futures contract tends to correlate with the value of the underlying index, differences between the futures market and the value of the underlying index may result in an imperfect correlation. Since losses could result from market movement, Gresham may need to sell other investments at disadvantageous times in order to meet daily margin requirements. The futures markets may experience reduced liquidity, which could result in losses to client portfolios and cause Gresham to be unable to settle its futures positions.

**Frequency of Trading:** Unlike equities, futures contracts cannot be held indefinitely. They mature or settle according to futures exchange rules. To maintain a long market position, the owner of a long futures contract will sell it and simultaneously buy a later-dated contract, a process called rolling a position forward. Therefore, even conservative buy and hold commodity futures investment strategies, such as those offered by Gresham, necessitate a much higher degree of turnover than similar equity investment strategies. Increased trading frequency involves higher transaction costs, which could increase the risk of loss.

**U.S. Government and Other Interest Rate Securities:** Gresham may invest a substantial portion of a client's portfolio in debt obligations. Income securities are subject to interest rate, market and credit risk. Interest rate risk relates to changes in a security's value as a result of changes in interest rates generally. Even though such instruments are investments that may promise a stable stream of income, the prices of such securities are inversely affected by changes in interest rates and, therefore are subject to the risk of market price fluctuations. In general, the values of fixed income securities increase when prevailing interest rates fall and decrease when interest rates rise. Market risk relates to the changes in the risk or perceived risk of an issuer, country or region. Credit risk relates to the ability of the issuer to make payments of principal and interest. The values of income securities may be affected by changes in the credit rating or financial condition of the issuing entities.

**CFTC Independent Account Controller Exemption:** Gresham NTA and Gresham TSM operate under an independent account controller exemption pursuant to CFTC Rule 150.4(b)(4) (the "IAC Exemption") and hence are not required to aggregate their respective commodity interest positions for position limit purposes. If the CFTC were to terminate, suspend or withdraw the IAC Exemption or the IAC Exemption became otherwise unavailable, Gresham NTA and Gresham TSM would be required to aggregate their respective commodity interest positions for position limit purposes. In that case, it is possible that certain investment decisions of Gresham NTA or Gresham TSM would be modified and its trading options limited.

**Model Risks, In General:** Strategies may rely upon complex quantitative models. While Gresham utilizes back-testing and other statistical tests to evaluate research results, such tests will not insulate Gresham from all design and conceptual flaws. The complexity of the components of Gresham's strategies, and the interactions among such components, may make it difficult or impossible to detect the source of any weakness or failure in such strategies before material losses are incurred. There is no assurance that prices will move in line with the forecasts generated by the models. Models must be constantly re-evaluated in light of, and, in some cases, adjusted to account for, rapidly changing market conditions. All changes to models (including incremental improvements to current models) expose client portfolios to the possibility of unforeseen losses from a variety of factors, including conceptual failures and implementation failures. The successful operation of the models is also reliant upon the information technology systems used by Gresham and its ability to ensure those systems remains operational and that appropriate disaster recovery procedures are in place.

**Cybersecurity Risks:** Gresham, its clients and their service providers are susceptible to operational and information security and related risks due to potential cybersecurity incidents. In general, cybersecurity

incidents can result from deliberate attacks or unintentional events. Cybersecurity attacks include, but are not limited to, gaining unauthorized access to digital systems (e.g., through “hacking” or malicious software coding) for the purposes of misappropriating assets or sensitive information, corrupting data, or causing operational disruption. Cybersecurity attacks also may be carried out in a manner that does not require gaining unauthorized access, such as distributed denial-of-service attacks on websites (i.e., efforts to make services unavailable to intended users). Cybersecurity incidents affecting Gresham, its clients or service providers such as financial intermediaries have the ability to cause disruptions and impact business operations, potentially resulting in financial losses, including by interfering with the ability to calculate the net asset value of a client’s portfolio; creating impediments to trading for a client’s portfolio; causing the inability of investors to transact business with funds managed by Gresham; triggering violations of applicable privacy, data security, or other laws; and exposing the parties to regulatory fines and penalties, reputational damage, reimbursement or other compensation or remediation costs, legal fees, and/or additional compliance costs. Similar adverse consequences could result from cybersecurity incidents affecting issuers of securities in which a client’s portfolio is invested, counterparties with which Gresham and its clients engage in transactions, governmental and other regulatory authorities, exchange and other financial market operators, banks, brokers, dealers, insurance companies and other financial institutions and parties. While information risk management systems and business continuity plans have been developed which are designed to reduce the risks associated with cybersecurity incidents, there are inherent limitations in any cybersecurity risk management systems or business continuity plans, including the possibility that certain risks cannot be and/or have not been identified.

**Legal and Regulatory Risks:** Future and ongoing legal and regulatory developments and changes in the United States and around the globe could have a material adverse effect on a client’s portfolio. It is impossible to predict the full effect of such changes, which could, among other things, divert Gresham’s time, attention and resources from management activities, increase operating expenses and limit a client portfolio’s ability to make certain investments.

The Dodd-Frank Act required the SEC, the CFTC, and other federal financial regulators to develop an expanded regulatory framework for derivatives. While the CFTC has adopted most of the required regulations for commodity based swaps, the CFTC is still revising these rules, and the SEC has yet to adopt or implement a number of regulations relating to security-based swaps. Thus, the ultimate impact of the SEC’s and CFTC’s rulemakings is still unknown, but has the potential to increase the costs of using derivatives, may limit the availability of some forms of derivatives or Gresham’s or an account’s ability to use derivatives in pursuit of its investment objectives, and may adversely affect the performance of some derivative instruments used. Moreover, parallel regulatory reform efforts taken by governmental authorities outside of the U.S. have resulted in the adoption of similar, but not identical requirements to those adopted in the U.S., and the lack of harmonization or mutual recognition between U.S. and foreign regulatory schemes has the potential to fragment the liquidity for derivatives markets into regional liquidity pools which may increase the cost of derivatives and adversely impact the performance of some instruments.

**Operational Risks; Reliance on Third Party Service Providers:** Gresham’s strategies are highly dependent on information systems and technology. Any failure or deterioration of these systems or technology due to human error, data transmission failures, coding errors or other causes could materially disrupt its operations. A disruption in the infrastructure that supports Gresham’s business, including a disruption involving electronic communications or other services that Gresham, or third parties that it does business with, use or affecting one of the Gresham’s offices or facilities, may affect its ability to continue to operate its business without interruption.

**Trade Errors:** Absent negligence on the part of Gresham (or contrary agreement with a particular client),

trading and other mistakes (including, without limitation, those that result in losses and those that result in gains) may be treated as being for the client portfolio's account (i.e., investors will bear any resulting losses and will benefit from any resulting gains), subject to applicable law.

**Additional Regulatory Risk:** Instability in the financial markets in 2008-2009 led the U.S. government to take a number of unprecedented actions designed to support certain financial institutions and segments of the financial markets that have experienced extreme volatility, and in some cases a lack of liquidity. Most significantly, the U.S. government enacted a broad-reaching new regulatory framework over the financial services industry and consumer credit markets, the potential impact of which on the value of securities or other financial instruments held by an account is unknown. If similar instability returns to the financial markets, federal, state, and other governments, their regulatory agencies, or self-regulatory organizations could take actions that affect the regulation of the instruments in which an account invests, or the issuers of such instruments, in ways that are unforeseeable. Volatile financial markets can expose accounts to greater market and liquidity risk and potential difficulty in valuing portfolio instruments held by accounts. The value of an account's holdings is also generally subject to the risk of future local, national, or global economic disturbances based on unknown weaknesses in the markets in which an account invests. In the event of such a disturbance, issuers of securities held by a portfolio may experience significant declines in the value of their assets and even cease operations, or may receive government assistance accompanied by increased restrictions on their business operations or other government intervention. In addition, it is not certain that the U.S. government will intervene in response to a future market disturbance and the effect of any such future intervention cannot be predicted. It is difficult for issuers to prepare for the impact of future financial downturns, although companies can seek to identify and manage future uncertainties through risk management programs.

Considerable additional regulatory attention has been focused on financial services companies and products. The Dodd-Frank Act regulates markets, market participants and financial instruments that previously were unregulated or only lightly regulated and substantially alters the regulation of many other markets, market participants and financial instruments. While many provisions of the Dodd-Frank Act have been implemented through rulemaking, it remains difficult to assess the impact of the Dodd-Frank Act on a portfolio, and the markets in which a portfolio may invest.

**Global Economic Risk:** Global economies and financial markets are becoming increasingly interconnected, which increases the possibilities that conditions in one country, region or market might adversely impact issuers in a different country, region or market. Changes in legal, political, regulatory, tax and economic conditions may cause fluctuations in markets and securities prices around the world, which could negatively impact the value of securities and commodity interests. For example, in a June 2016 referendum, citizens of the United Kingdom ("UK") voted to leave the European Union ("EU"). It is expected that the UK will formally withdraw from the EU in due course. During this period and beyond, the impact on the UK and European economies and the broader global economy could be significant, resulting in negative impacts, such as increased volatility and illiquidity, potentially lower economic growth and decreased asset valuations. The UK vote to leave the EU may have a destabilizing impact on the EU to the extent other member states similarly seek to withdraw from the union. It may also have a negative impact on the economy and currency of the UK as a result of anticipated or actual changes to the UK's economic and political relations with the EU. Any or all of these challenges may affect the value of a portfolio's investments economically tied to the UK or EU. Similar major economic or political disruptions, particularly in large economies like China's, may have global negative economic or political repercussions. Additionally, geopolitical events, such as war, terrorism, natural and environmental disasters, and market manipulation, may disrupt securities and derivatives markets and adversely affect global economics and markets. Examples of such events include recent hurricanes in the Caribbean Sea and southern United States and heightened concerns regarding North Korea's nuclear weapons and long range ballistic missile programs. Governmental and quasi-governmental

authorities and regulators throughout the world have responded to turmoil with a variety of significant fiscal and monetary policy changes, including but not limited to, direct capital infusions into companies, new monetary programs and dramatically lower interest rates. An unexpected or quick reversal of these policies, or the ineffectiveness of these policies, could increase volatility in securities and derivatives markets.

The foregoing discussion of certain risk factors does not purport to be a complete explanation of all risk factors involved in an investment in an account or an application of an investment strategy. It is critical that all clients and prospective investors review the documents associated with opening an account or an investment in a fund.

## **Item 9     Disciplinary Information**

We are required to disclose any legal or disciplinary events that are material to a client's or prospective client's evaluation of our advisory business or the integrity of our management. Our firm and our management persons have no reportable disciplinary events to disclose.

## Item 10 Other Financial Industry Activities and Affiliations

As noted in Item 4 above regarding our advisory business, in addition to being a SEC registered investment adviser, Gresham is registered with the CFTC as a CPO and a CTA, and is a member of the NFA.

In connection with TIAA's majority ownership of Gresham (through TIAA's ownership of Nuveen), TIAA is deemed a "control person" of Gresham and TIAA's other financial industry entities may be considered affiliates of Gresham under various regulatory regimes including as applicable the Investment Advisers Act of 1940, as amended, the Investment Company Act of 1940, as amended (the "Investment Company Act"), and the Employee Retirement Income Security Act of 1974, as amended ("ERISA").

However, neither TIAA nor its other affiliates manage or exercise control over the day-to-day investment operations of Gresham, including with respect to Gresham's investment determinations on behalf of clients. Gresham exercises its own independent investment discretion in accordance with its investment strategies, fiduciary duties and client guidelines. Additional information about Gresham's ownership structure is contained in its Form ADV, Part 1, available on the SEC's website at [www.adviserinfo.sec.gov](http://www.adviserinfo.sec.gov).

TIAA's subsidiaries includes various financial industry entities, including broker-dealers, investment companies, other investment advisers, commodity pool operators and/or commodity trading advisors, banking or thrift institutions, insurance companies or agencies, sponsors or syndicators of limited partnerships, and sponsors, general partners, or managing members of pooled investment vehicles, among other entities. For further information on these subsidiaries, please see Exhibit A.

Neither TIAA nor its other affiliates will have any material involvement in Gresham's day-to-day investment activities, although certain affiliates of TIAA (together "Affiliated Entities") sub-advise the collateral portion of certain accounts managed by Gresham.

**Other Pooled Investment Vehicles:** Gresham is the managing member (the "Managing Member") or investment manager of several commingled investment vehicles. Each such entity invests in a portfolio of futures, forwards, as well as a collateral component of cash equivalents. These entities are not required to register as investment companies under the Investment Company Act of 1940 due to an exemption available to funds whose securities are not publicly offered.

A list of private funds is disclosed on Schedule D of Form ADV, Part 1 in Item 7.B. Part 1A of our Form ADV can be accessed by following the directions provided on the Cover Page of this Brochure. Prospective investors in the commingled investment vehicles should refer to the relevant offering documents for more information specific to the investment entity.

**Potential Conflicts of Interest:** We and our members, officers and employees devote as much time as we deem necessary and appropriate to manage Gresham's commingled investment vehicles. We and our affiliates are not restricted from forming additional investment funds, entering into other investment advisory relationships or engaging in other business activities (as permitted by the Nuveen Ethics Office), even though such activities may be in competition with these commingled investment vehicles and/or may involve substantial time and resources of our firm and our affiliates. Potentially, one could view such activities as creating a conflict of interest in that our management personnel and employees will not exclusively devote their time and effort to the business of these entities but rather between the business of the entities and other of our business activities and those of our affiliates. A related concern is that our

focus on the management of commingled investment vehicles could distract from managing separate accounts.

From time to time, Affiliated Entities may enter into an advisory or other arrangement with Gresham, or refer business to it. For example, Gresham currently serves as a sub-adviser to certain funds sponsored by Affiliated Entities, including funds under the “Nuveen Funds” brand. Gresham’s relationship with Affiliated Entities creates an inherent potential conflict of interest based on a possible incentive to favor the account affiliated with or referred by an Affiliated Entity over other clients and accounts. Gresham recognizes that it is a fiduciary and as such must act in the best interests of all its clients, whom it must treat fairly, and refrain from favoring the interests of one over another. At times, Gresham may determine, in an exercise of its discretion, to limit or refrain from entering into certain transactions, for some or all clients, in order to seek to avoid a potential conflict of interest, or where the legal, regulatory, administrative or other costs associated with entering into the transaction are deemed by Gresham to outweigh the expected benefits. Further, certain regulatory and legal restrictions or limitations may restrict certain investment or voting activities of Gresham on behalf of its clients. As described in Items 4 and 8 above, Gresham pursues investment implementation strategies in accordance with established guidelines of Gresham’s institutional clients or the offering documents associated with the commingled investment vehicles Gresham manages or sub-advises, as applicable. Further, as detailed in Item 6 above, specific senior traders are typically responsible for the day-to-day trading decisions related to certain funds and accounts (or applicable portfolio components). Because Gresham evaluates each portfolio management group on the basis of the quality of their management of the accounts (or the applicable portfolio components) for which they are responsible, it is in their interest to ensure fair treatment of their portfolios, irrespective of other factors, such as fee and/or other arrangements, or a sub-advisory relationship or client referral arrangement with a related person.

Side Letters: Gresham or the commingled investment vehicles it manages may enter into agreements with certain investors (side letters), that provide for terms of investment that are more favorable to these investors than are the terms described in the relevant offering documents associated with the applicable commingled investment vehicles. Such terms may include:

- The waiver, reduction, different calculation or rebate of management fees, withdrawal fees, liquidation fees, performance allocation, organizational expenses and/or operating expenses;
- Preferential transfer or liquidity rights, including additional withdrawal dates and/or waived or reduced withdrawal notice periods; and
- Undertakings designed to protect an investor from violating any applicable statute or regulation.

A commingled investment vehicle may also agree to provide certain investors with supplemental information and reports that could affect their decision to request withdrawal of their interests in the commingled investment vehicle. Side letters will not generally entitle other investors to the same preferential terms of investment, and Gresham or a commingled investment vehicle may not disclose to other investors the existence or specific terms of any such side letters. Gresham or a commingled investment vehicle will enter into side letters only if such agreements are consistent, and implemented in accordance with, the governing documents of the applicable commingled investment vehicle.

## **Item 11 Code of Ethics, Participation or Interest in Client Transactions and Personal Trading**

### **Code of Ethics**

Gresham's Code of Ethics (together with certain affiliate policies incorporated therein, the "Code"), is designed to address the requirements of Rule 204A-1 of the Advisers Act. The Code requires that we distribute a copy of the Code upon hire and annually to all employees, each of whom is required to submit a Code of Ethics Acknowledgement and Certification.

The Code includes policies and procedures that address the protection of non-public information, employee quarterly transactions reports as well as initial holdings reports and annual holdings reports that must be submitted by all employees. Among other items, the Code also requires employees to obtain Compliance pre-approval with respect to the acquisition of securities in a limited offering (e.g., private placement) or an initial public offering.

In addition, the Code provides for oversight, enforcement and recordkeeping provisions. We have established policies requiring the reporting of Code violations to the Chief Compliance Officer and/or the Nuveen Ethics Office, as appropriate. Any individual who violates any of the above restrictions may be subject to termination. A copy of our Code is available to our advisory clients and prospective clients. You may request a copy by contacting [compliance@greshamllc.com](mailto:compliance@greshamllc.com) or by calling us at 212-984-1430.

### **Participation or Interest in Client Transactions**

Gresham and individuals associated with our firm are prohibited from engaging in principal or agency cross transactions. We may recommend investment in entities of which Gresham may be the Managing Member or investment manager to advisory clients for whom collective investment vehicles may be more suitable than a separate advisory account.

Additionally, certain accounts and commingled investment vehicles may invest in other commingled investment vehicles managed by Gresham. Investors will not be charged any additional management or performance fees with respect to such investments. Employees and other investors affiliated with Gresham may not be charged fees.

## Item 12 Brokerage Practices

**Futures Commission Merchant:** A futures commission merchant (“FCM”) clears all futures trades and holds all client funds deposited as margin in a segregated account. In the case of separately managed accounts, Gresham does not require clients to use a particular FCM, but the selection of the FCM is subject to our acceptance, based on criteria described below. We may recommend an FCM to advisory clients, and, in the case of our commingled investment vehicles, we select the FCM. We base our acceptance or selection of an FCM on the following criteria:

- Size;
- Competitiveness of commissions charged; and
- Efficiency of operations.

**Executing Broker:** Gresham reserves the right to direct all trades to any executing broker it chooses or to an electronic trading platform for execution with instructions to “give up” the transactions to the client’s clearing broker. The clearing broker will then pay floor brokerage and additional administrative or “give up” fees to the executing broker or electronic trading platform from the client’s account. In seeking best execution, the selection of executing brokers and electronic trading platforms and their respective capabilities (e.g., the costs and quality of execution) on behalf of clients shall be evaluated by Gresham. Gresham’s Risk, Operations, and Infrastructure Committee reviews execution quality across portfolios on a semi-annual basis.

**Foreign Exchange Counterparties:** Trading in the foreign exchange market typically involves a bank or brokerage firm acting as a principal in the transaction with another bank or brokerage firm. The bank or brokerage firm usually includes its anticipated profits and costs in the spread between the bid and asked prices it quotes for the transaction.

**No Research and Other Soft Dollar Benefits:** Gresham has no formal or informal arrangements or commitments to utilize research, research-related products or any other services obtained from FCMs, executing brokers, foreign exchange counterparties, or third parties, on a soft dollar commission basis.

**Introducing Broker:** Gresham does not require clients to use an introducing broker, but Gresham may permit a client to select one to introduce trades for its account. However, clients should be aware that instructing Gresham to use an introducing broker may result in higher per-trade commission charges and that Gresham may therefore in these circumstances be unable to obtain the most favorable execution for such transactions.

**Trade Aggregation:** Gresham typically aggregates client orders for accounts pursuing a common implementation strategy whenever possible, consistent with our duty to seek best execution. In such cases, participating accounts will receive an average trade price based on the price achieved for such trades, a pro-rata allocation of the contracts bought or sold, as well as the associated transaction costs. In the event of a partial fill of a batched order, we will allocate the traded contracts pro-rata, at the average price.

## **Item 13    Review of Accounts**

We perform various reviews of client accounts. The Operations Department performs separate trade-by-trade reconciliations as well as daily account position reconciliations. Discrepancies are resolved with the relevant counterparty and then reviewed by the Head of Operations.

Accounting also conducts, on a daily and monthly basis, reconciliations which include but are not limited to reconciliations of cash, portfolio holdings, subscriptions, and redemptions. Discrepancies are resolved with the relevant counterparty and then reviewed by the Funds Controller.

The Chief Investment Officer and relevant members of senior management review the components of the commodity futures portfolios comprising its respective investment strategies at least annually and may add or remove futures contracts or make adjustments to their relative weightings based on such considerations as annual production and global trade values of underlying commodities and the liquidity of associated contracts at any time. In addition, Gresham NTA and Gresham TSM may make more frequent weighting adjustments dictated by changing values of the futures contracts relative to one another or to rebalance a portfolio to bring it in line with an associated commodities index.

**Reports:** Gresham prepares and sends reports to its clients, including performance data and a narrative, as agreed per each separately managed account agreement. In addition, in the case of commingled investment vehicles, the relevant Fund Administrators produce and send monthly capital account statements to investors, summarizing the value of their holdings.

## Item 14 Client Referrals and Other Compensation

Gresham may pay referral fees to independent persons or firms (“Solicitors”) for introducing clients or investors in private funds to us. Whenever we pay a referral fee, we require the Solicitor to provide the prospective client with a copy of this document (our Firm Brochure) and a separate disclosure statement that includes the following information:

- The Solicitor’s name and relationship with our firm;
- The fact that the Solicitor is being paid a referral fee;
- The amount of the fee; and
- Whether the fee paid to us by the client will be increased above our normal fees in order to compensate the Solicitor.

As a matter of firm practice, we do not increase the advisory fees paid to us by clients or investors referred by solicitors as a result of any referral.

It is Gresham’s policy not to accept or allow our related persons to accept any form of compensation, including cash, sales awards or other prizes, from a non-client in conjunction with the advisory services we provide to our clients.

## **Item 15    Custody**

Gresham is deemed to have custody of the assets of some of the commingled investment vehicles that it manages by virtue of its role as Managing Member of the limited liability companies comprising certain of these entities. Qualified custodians hold all the assets of the commingled investment vehicles we manage in accounts in the name of the relevant entities.

The relevant Fund Administrators of the Gresham-managed commingled investment vehicles issue monthly account statements directly to such entities' investors. In addition, an independent accounting firm audits these entities annually and issues audited financial statements prepared in accordance with generally accepted accounting principles to all the entities' investors within 120 days of the end of the Fund's fiscal year.

Investors in Gresham-managed commingled vehicles should carefully review the statements that they receive from the vehicle's administrators, and clients with accounts managed by Gresham should carefully review the statements that they receive from their account's custodian.

## **Item 16 Investment Discretion**

Gresham has discretionary authority to trade on behalf of the commingled investment vehicles, sub-advised funds, and separately managed accounts that it manages. Such authority is, if applicable, set forth in the investment management agreement between Gresham and the relevant entities or account holders. The offering documents associated with the commingled investment vehicles or the investment management agreement between Gresham and the separately managed accountholders may define the composition of the portfolios thereby limiting Gresham's discretionary authority.

In addition, Gresham NTA and Gresham TSM are specifically authorized by Gresham's executive management to independently control trading decisions on behalf of, but without the day-to-day direction of, Gresham's executive management.

## **Item 17    Voting Client Securities**

Although Gresham has discretion over client accounts, our commodities-oriented investment activities do not result in requests to vote proxies on behalf of our clients.

## **Item 18    Financial Information**

Under no circumstances do we require or solicit payment of fees in excess of \$1,200 per client more than six months in advance of services rendered. Therefore, we are not required to include a financial statement.

As we maintain discretionary authority for client accounts and are deemed to have custody of the assets of some of the commingled investment vehicles that we manage by virtue of our role as Managing Member of the limited liability companies comprising certain of these entities, we are required to disclose any financial condition that is reasonably likely to impair our ability to meet our contractual obligations. Gresham has no additional financial circumstances to report.

Gresham has not been the subject of a bankruptcy petition at any time, including but not limited to, during the past ten years.

Exhibit A

TIAA Subsidiaries

Primary Financial Industry Subsidiaries under Nuveen, LLC, the asset management division of TIAA

Entity Name	Primary Financial Industry or Related Affiliation*
AGR Partners, LLC	Registered Investment Adviser
Churchill Asset Management LLC	Registered Investment Adviser
Greenwood Resources Capital Management LLC	Registered Investment Adviser
Gresham Investment Management LLC	Registered Investment Adviser CFTC Registered Commodity Pool Operator CFTC Registered Commodity Trading Advisor
Nuveen Asset Management, LLC	Registered Investment Adviser CFTC Registered Commodity Trading Advisor
Nuveen Fund Advisors, LLC	Registered Investment Adviser CFTC Registered Commodity Pool Operator
NWQ Investment Management Company, LLC	Registered Investment Adviser
Santa Barbara Asset Management, LLC	Registered Investment Adviser
Symphony Asset Management LLC	Registered Investment Adviser
Teachers Advisors, LLC	Registered Investment Adviser
Nuveen Alternatives Advisors, LLC	Registered Investment Adviser
TIAA-CREF Investment Management, LLC	Registered Investment Adviser
Westchester Group Investment Management, Inc.	Real Estate Broker or Dealer
Winslow Capital Management, LLC	Registered Investment Adviser
Nuveen Securities, LLC	Registered Broker Dealer
Teachers Personal Investors Services, Inc.	Registered Broker Dealer
Nuveen Services, LLC	Shared services entity
Nuveen Canada Company	Canadian marketing affiliate
Nuveen Real Estate Management Limited	UK FCA Registered Investment Adviser
Nuveen Management AIFM Limited	UK FCA Registered Investment Adviser
TIAA-CREF Asset Management UK Limited	UK FCA Registered Investment Adviser
Nuveen UK Limited	UK FCA Registered Investment Adviser
Nuveen Hong Kong Limited	HK marketing affiliate
Nuveen Australia Pty Ltd	Australian marketing affiliate
Nuveen Japan Co. Ltd	Japan marketing affiliate

Other Primary Financial Industry Subsidiaries of TIAA

TIAA-CREF Individual & Institutional Services, LLC (aka TIAA-CREF Advice and Planning Services)	Registered Investment Adviser Registered Broker Dealer
TIAA-CREF Tuition Financing, Inc.	Registered Investment Adviser Registered Municipal Advisor
TIAA Endowment and Philanthropic Services, LLC (fka Kaspick & Company, LLC)	Registered Investment Adviser
Teachers Insurance and Annuity Association of America	Insurance Company or Agency
TIAA-CREF Life Insurance Company	Insurance Company or Agency
TIAA-CREF Insurance Agency, LLC	Insurance Company or Agency
TIAA, FSB	Banking or thrift institution
TIAA Advisory, LLC	Registered Investment Adviser

\*The list above refers to TIAA subsidiaries in financial industry affiliation categories referenced in Form ADV, Part 2A, Item 10.C, excluding numerous entities organized primarily to serve as sponsor, general partner, managing member (or equivalent) or syndicator of one or more pooled investment vehicles or limited partnerships (or equivalent). For a list of such entities that have material arrangements with the registrant, please see the registrant's Form ADV, Part 1, Section 7.A. of Schedule D. The list above refers to the primary financial industry

affiliation category and certain TIAA subsidiaries listed above may have additional financial industry affiliations, as further described in its respective disclosure documents (Form ADV, in the case of a registered investment adviser).