ADDITIONAL INFORMATION CONCERNING DAILY MID-MARKET MARKS

Pursuant to regulations issued by the Commodity Futures Trading Commission, we have provided you with a daily “mid-market mark” (the “Mark”) for one or more uncleared swap transactions (each a “swap”) between you and The Bank of Nova Scotia (“we” or the “Scotiabank Swap Dealer”). Following is additional information concerning the methodology and assumptions used to prepare the Mark.

The Mark was calculated by the Scotiabank Swap Dealer as of the close of business in New York City on the date specified (the “Calculation Date”). If the Mark is presented without parenthesis, it is in favor of the Scotiabank Swap Dealer favor. If the Mark is presented within parenthesis, it is in your favor.

The Mark is intended as the Scotiabank Swap Dealer’s good faith estimate of a “mid-market” price for the swap as of the close of business on the date indicated. The mid-market price of a swap is not readily observable in the market since an actual or active market for the swap may not exist and even if such a market does exist, swap transactions are quoted and executed by swap dealers at prices that include amounts to cover costs and risks of transacting and to provide a return to the swap dealer. In an illiquid market there will likely be a significant spread between the Mark and the level at which we or any other market participant may be willing to enter into, replace or terminate the swap. Determination of a mid-market price is therefore necessarily subjective and hypothetical and the Scotiabank Swap Dealer’s opinions may differ from those of other dealers or market participants. The Mark (a) does not include amounts for profit, credit reserve, hedging, funding, liquidity or any other costs or adjustments, (b) may not necessarily be a price at which either you or we would agree to replace or terminate the swap, (c) may not necessarily be the value of the swap that is marked on the Scotiabank Swap Dealer’s books and (d) may not reflect the price at which you could execute the swap with any other swap dealer or counterparty. Calls for margin under the swap or related master agreement may be based on considerations other than the Mark.

The Mark is based on a theoretical calculation of the net present value of known and assumed future payments under the swap. For certain non-standard or bespoke swaps, the Mark may be estimated based on the trader’s view of the prevailing market for the swap. To the extent practicable, the trader’s judgment will take into account observable market factors, such as bid and offer quotes (if available), trading inquiries and execution prices for similar transactions, market liquidity for the relevant swap and macroeconomic events affecting the market, with appropriate adjustments to reflect changes in the market since the time of such quotes or transactions, differences in size or terms between the proposed swap and the swaps reflected in such pricing inputs and other factors deemed relevant by the trader. The trader may also consider the output of pricing models used for comparable products.

In most cases, the Mark is calculated by using a proprietary pricing model. The pricing model or models used to calculate the Mark for a particular swap depend on the type and terms of the swap. Such pricing models generally fall within one of the following categories:

- *Market-based models.* These models estimate the present value of a swap based on market inputs reflecting bid and offer prices available in the market for similar transactions.

- *Cash flow-based models*. These models estimate the present value of a swap by projecting future cash flows under the legs of the swap using one or more proprietary forward curves and then discounting those future cash flows to present value using a proprietary discounting curve. Forward curves are generally constructed by using market inputs for available tenors and currencies, using internal marks based on our traders' judgment for tenors or currencies for which there is insufficient market data and then applying a proprietary interpolation methodology to obtain a continuous curve.

- *Probability-based models*. These models estimate the present value of a swap by simulating various sources of uncertainty that could affect its value. This generally involves projecting potential future cash flows under various uncertain scenarios and then calculating the average present value of those future cash flows based on the estimated probability of occurrence of the scenarios under a risk-neutral measure. These models may be implemented by methods including mathematical approximation, Monte Carlo simulation or pricing based on a replicating hedging portfolio. Exhibit H contains additional information about certain terms and concepts relevant to probability-based models.

The pricing models generally discount projected future cash flows or project future values to present value using a proprietary discount curve. The discount curve is constructed using published market data for available tenors and currencies, using internal marks based on our traders' judgments for tenors or currencies for which there is insufficient market data and applying a proprietary interpolation methodology to obtain a continuous curve.

Like other mathematical models, the pricing models generate results from data that is input to the model. Inputs to the pricing models include (i) market data, such as spot and forward currency rates, forward swap and deposit rates and prices of underlying and replicating instruments; (ii) our traders' views on the value of certain illiquid instruments for which observable market data is not available; and (iii) the output of other pricing models, including models used to construct forward curves, survival curves, discount curves and volatility surfaces, and, for certain swaps, other probability-based models. Market inputs to the pricing models are derived from observable sources that we believe to be reliable but we may not have independently verified such information and it may not be current.

The pricing models also rely on certain assumptions intended to simulate future market conditions for computational purposes. Market-based models generally assume continuous liquid markets in which values can realized at quoted bid and offer prices. Cash flow-based models generally assume that future market movements are determined by the relevant forward curves, which be based on assumptions including the shape of portions of the curve for which market data is not available. Probability-based models are generally based on statistical assumptions such as arbitrage-free and risk-neutral measurement and often require additional assumptions with respect to matters such as distribution, correlation and dependence of inputs, future price movements of an underlying and future volatility and changes in volatility. Probability-based models may assume a constant value for certain inputs and may assume that certain inputs can be estimated using a replicating portfolio of liquid instruments for which market prices are available. The assumptions and theoretical analyses underlying the pricing models may not be appropriate for all possible outcomes and the parameters and inputs used in the pricing models may not be representative of all possible market conditions. The methodology and assumptions used to produce the daily mark of a swap may change from time to time as our models are updated.

Development and ongoing maintenance of the pricing models represents a significant investment of resources. The methodology used by the pricing models is confidential and proprietary information which we are not required to share with you. Certain inputs and assumptions that go into the pricing models are also confidential and proprietary, since disclosure of such inputs and assumptions would reveal confidential and proprietary information concerning the design and operation of the relevant pricing model. The information that we may provide to you concerning the pricing models is therefore necessarily limited and incomplete.

The following exhibits are intended to help you understand how we may use pricing models to calculate the Mark by providing general information concerning models currently used to calculate the Mark for certain standard or frequently traded swaps. These examples are for purposes of illustration only and are not intended to provide a complete description of the methodology and assumptions underlying the relevant pricing models, due to the confidential and proprietary nature of such information. The pricing models include additional confidential and proprietary features, inputs and assumptions that are not described in the example. The omitted information may be material to the operation of the pricing models and may cause the Mark generated by a pricing model to vary from the marks that would be estimated by other swap dealers and to fail to reflect actual market conditions.

To the extent permitted by law, we expressly disclaim any responsibility for or liability (including, without limitation liability for any direct, punitive, incidental or consequential loss or damage, negligence or breach of representation or warranty) relating to (i) the accuracy of any models, market data input into such models or estimates used to prepare the Mark, (ii) any errors or omissions in computing or disseminating the Mark, (iii) any changes in market factors or conditions or other circumstances beyond our control and (iv) any uses to which the Mark is put. The Mark is not intended as a valuation or appraisal of the swap and we do not assert that it is an appropriate basis for valuing the swap in your financial statements, for tax reporting purposes or otherwise. You should consult with your own auditors and other advisors before relying on or making use of the Mark for any purpose. We are not acting as your advisor, agent or fiduciary in providing the Mark.

The Mark has been prepared for your use only and you should treat it as proprietary and confidential information. This information may not be shared or reproduced in whole or in part under any circumstances.

Exhibit A
Equity-based swaps

Type of Swap	Model Information
Total Return Swap	We use a model based on simple no-arbitrage considerations to project all future payment streams e.g. forward asset values and dividend in the asset leg, and forward Libor values in the floating leg. A forwards-based approach is used for the asset leg valuation while the floating leg is valued as a floating rate bond. Forward quantities are then discounted to the settlement date based on a discount curve.
Variance Swap	We price the variance swap based on static replication. It is assumed that vanilla options and the underlying can be traded and that the underlying follows a continuous stochastic process. The value of a variance swap can be expressed by the cost of its replicating portfolio of cash, underlying stock and vanilla options. Further adjustments are made to incorporate the impact of discrete cash dividends.
Yield Seeker	Yield Seeker option contracts on Equity assets, single currency and quanto, regular and forward started, are valued under a local volatility model using Monte-Carlo simulation. Each asset price is modeled with a geometric Brownian motion. A constant correlation is assumed for each pair of the geometric Brownian motions. We also assume vanilla options of each asset are liquidly traded and a local volatility surface can be fitted from these vanilla options.
Accelerated Share Repurchase	An Accelerated Share Repurchase contract has a payoff depending on the average asset price over a certain time period. Its value can be represented by partial differential equations (PDEs) derived through arbitrage theory. The PDEs are solved by a proprietary numerical method. We assume the asset price follows the dynamics of a geometric Brownian motion. The volatility parameters are implied from vanilla options of the asset and we assume vanilla options are liquidly traded.
Himalayan Option	The Himalayan option is a European-style call or put option on the Himalayan basket. The Himalayan option may have floors and caps applied to the performances for each time period. The price of each asset in the basket is modeled by a geometric Brownian motion with a constant correlation among each asset price pair. The volatility parameters are implied from vanilla options of the assets and we assume these options are liquidly traded. The Himalayan option is valued as the risk-neutral expectation of its discounted payoff using Monte-Carlo simulation.
Asian Option	We use analytic approximation for single-asset Asian option and multi-factor analytic approximation for Asian option on a basket. The Asian analytic approximation operates under the standard log-normality assumptions. We assume an implied volatility surface can be built for each asset from its vanilla options. For Asian option on a basket, the covariance matrix is calculated by assuming a constant instantaneous correlation for each asset price pair.
American Option	We assume the asset price follows a geometric Brownian motion with volatility parameters implied from vanilla options. The value of an American option on the asset price can be represented as a PDE which can be solved by a proprietary numerical method. Discrete dividends are incorporated in the PDE and the numerical method as well.

Exhibit B
Credit-based swaps

Type of Swap	Model Information
Default Swaps	The model calculates the net present value of known payments and contingent payments as adjusted for the probability of a credit event occurring (the "survival curve"). Known payments include the periodic premium payments from the protection buyer specified in the swap. Contingent payments include payments due from the protection seller in case of a credit event. In the case that the underlying is an interest rate swap, the model assumes that the interest rate dynamics are not correlated with the default intensity. The recovery rate can be fixed or market based.
Index CDO Tranches Bespoke CDO Tranches	The model assumes that default times are correlated according to the Gaussian Copula using a single correlation value across the portfolio. The model uses the base correlation calibration approach to determine the correlation parameter. First, we imply the base correlation skew in both term and subordination from market index tranche prices. Second, for index CDO tranches, we use the correlation skew directly for valuation. For Bespoke tranches, we further map the base correlation skew to a new bespoke correlation skew such that certain invariant risk measure of the bespoke tranches matches with the one of the index tranches. We assume the bespoke portfolio and index portfolio have similar aspects in risk and diversification. We also assume the index tranches are liquidly traded.
Index CDS Option	The Black model is adopted for pricing a European option on a CDS index. The model assumes that credit spreads are log-normally distributed. The risk-free rates and index CDS hazard rates are assumed to be independent.

Exhibit C
Interest rate-based swaps

Type of Swap	Model Information
Single currency swaps: - Fixed/floating - Floating/floating - OIS - Basis - Forward rate agreement - FX forwards	This model takes as an input a set of observable market benchmark rates and provides a consistent set of discount factors and forwards under different collateral currency assumptions. It ensures all input benchmarks are fitted while keeping the interpolated forwards smooth. Index curves are distinguished by index type (e.g. LIBOR or OIS) and by index tenor with each having its own set of associated benchmarks. The model assumes that there are sufficiently liquid benchmark instruments (Libor and OIS derivatives) from which to build projection and discounting curves.
Cross currency swaps: - Fixed/floating - Floating/floating - Fixed/fixed coupon swaps	The notional of the cross-currency swaps can be either with or without FX reset. FX resetting notional basis float leg is the floating foreign currency leg in a resettable cross currency swap with notional exchanges where foreign notionals are determined at the start of each coupon period so as to ensure that the value of the foreign notional in domestic currency matches that of the domestic notional for the same coupon period. Non-deliverable forward feature is also available.
Cap/floor	This model is used for pricing vanilla products under the market standard Black framework with given volatility inputs are used to price a caplet/floorlet. The model assumes that the market is complete, arbitrage free and frictionless and that suitable implied volatility is available.
European swaption	This model is used for pricing vanilla products under the market standard Black framework with given volatility inputs are used to price a payer/receiver swaption.
Bermudan option	This model uses HJM based trinomial tree to price Bermudan swaptions. The model is calibrated to market prices of the relevant European swaptions.
Inflation Swap	This model constructs the market implied consumer price indices (CPI) and the forward reference indices by fitting the zero coupon inflation swap rates, taking into account seasonality, and historical inflation data. Market implied CPIs for future months are assumed to be implied by zero coupon inflation swap rates. Periodic seasonality is assumed for the market implied CPIs.
Inflation zero coupon option	This model is used for pricing vanilla products under the market standard Black framework with given volatility inputs are used to price a payer/receiver swaption.

EXHIBIT D

Energy-based swaps

Type of Swap	Model Information
Commodity Swap Power Swap	The discount rate used to calculate the present value is derived from a proprietary interest rate discount curve constructed by BNS as of the close of business on the Calculation Date by (1) obtaining interest rates published for specified future periods by financial information providers, implied forward interest rates derived from the daily published settlement prices of futures or other exchange-traded instruments or the mean of bid and offer quotes for interest rate swap available in the market for available maturities for the relevant currency and (2) applying an interpolation methodology to obtain a continuous discount curve.
Commodity European Option Commodity American Option Commodity Asian Option Commodity Swaption Commodity Calendar Spread Option	The pricing model has the following inputs and makes the following key assumptions: · The discount rate used to calculate the present value of each payment is derived from a proprietary interest rate discount curve constructed by BNS as of the close of business on the Calculation by (1) obtaining interest rates published for specified future periods by financial information providers, implied forward interest rates derived from the daily published settlement prices of futures or other exchange-traded instruments or the mean of bid and offer quotes for interest rate swaps available in the market for available maturities for the relevant currency and (2) applying an interpolation methodology to obtain a continuous discount curve. · The volatilities used are implied volatilities derived from a proprietary volatility curve constructed by BNS for the relevant underlier as of the close of business on the Calculation Date · Where applicable, the correlations (intra-curve, FX Rate vs. Commodity Curve) used are implied correlations derived from a proprietary correlation curve constructed by BNS for the relevant underliers as of the close of business on the Calculation Date · The floating price used is derived from a proprietary curve for the relevant underlier constructed by BNS as of the close of business on the Calculation day by (1) by obtaining prices published for specified future periods by financial information providers, implied forward prices derived from the daily published settlement prices of futures or other exchange-traded instruments or the mean of bid and offer quotes for the relevant underlier available in the market for available maturities for the relevant underlier and (2) applying an interpolation methodology to obtain a continuous price curve.

EXHIBIT E
Base Metals - based swaps

Type of Swap	Model Information
Swap Outright Average	The average side is priced using the average exchange futures prices for the period. Price fixings are obtained from the exchanges. The physical side of the outright average is also taken from the futures price on that date. The cash/physical flows are discounted using a proprietary LIBOR discount curve derived from a combination of cash, futures and swap rates.
OTC European Option Exchange European Option	The European options use Black's model. Metals prices and volatilities are obtained from the LME. The cash/physical flows are discounted using a proprietary LIBOR discount curve derived from a combination of cash, futures and swap rates.
LME Client Futures	Forward metal prices are taken from the futures curve. The cash/physical flows are discounted using a proprietary LIBOR discount curve derived from a combination of cash, futures and swap rates.

EXHIBIT F
FX-based swaps

Type of Swap	Model Information
Forward Swap	The MtM is a combination of spot prices plus forward points. Both are obtained from Reuters. The cash flow is discounted using a proprietary LIBOR discount curve derived from a combination of cash, futures and swap rates.
Noon Average Rate Contract	The average side is fixed daily. Spot prices and forward points are obtained from Reuters. The LIBOR discount curve is derived from a combination of cash, futures and swap rates.
FX European Option FX American Option FX Asian Option FX Barrier Option	Spot prices and forward points are obtained from Reuters. Volatilities are obtained from Bloomberg (OVDV FX). The European Option is marked using Black-Scholes. The American option uses the "Odd Even Cox-Ross model", the Asian option use a "Log Normal model" and the Barrier option uses a semi-analytical model to derive mark-to-model. The LIBOR discount curve is derived from a combination of cash, futures and swap rates.

EXHIBIT G

Precious Metals-based swaps

Type of Swap	**Model Information**
Swaps Forwards	Forward metal prices are taken from proprietary metals curves. The cash/physical flows are discounted using a proprietary LIBOR discount curve derived from a combination of cash, futures and swap rates.
European Options American Options	A Black-Scholes model is used for MtM purposes. Forward metal prices are obtained from proprietary metals curves and lease rates. Proprietary volatility surfaces are used as inputs. A proprietary LIBOR discount curve derived from a combination of cash, futures and swap rates is used.

EXHIBIT H
Certain Terms

Black-Scholes model: a type of dynamic replication model that seeks to determine the value of an option on an underlying by estimating the risk-neutral probability of the option expiring in the money based on the spot price of the underlying. The basic model assumes frictionless markets (i.e. without transaction costs) with no arbitrage opportunities; forward and discount curves are deterministic; a continuous liquid market exists for purchase and sale (including short sales) of the underlying; and the spot price of the underlying has a log-normal distribution and follows a geometric Brownian motion (i.e. a form of random movement along a vector) with constant drift (i.e. rate of increase over time) and constant volatility.

Black model: the Black model is a variant of the Black–Scholes option pricing model. Its primary applications are for pricing bond options, interest rate caps / floors, and swaptions. It was first presented in a paper written by Fischer Black in 1976. The Black formula is similar to the Black–Scholes formula for valuing stock options except that the spot price of the underlying is replaced by a discounted futures price F.

continuous: a function for which small changes in input (for example, change in time *t*) result in small changes in output (by contrast a discontinuous function is one for which a change in input may not result in any change in output).

covariance matrix: a rectangular array of numbers arranged in rows and columns that describes the tendency of random variables to change together.

implied volatility surface: a measure of implied volatility that uses a three dimensional curved surface to plot implied volatility as a function of both strike price and time to maturity.

local volatility model: a model that seeks to account for changes in volatility over time based on the assumption that the volatility of the underlying is a unique deterministic function of time and spot prices such that vanilla option prices at all times and strikes simultaneously reproduce the prices specified by the implied volatility surface.

log-normal distribution: a continuous probability distribution of a random variable (such as a geometric Brownian motion process) that has only positive values and whose logarithm is normally distributed.

normal (or Gaussian) distribution: a continuous distribution of a random variable for which the mean, median and mode are equal and the probability density function is given by the formula exp[-(x-μ)2/(2σ2)]/σ√(2π), where μ is the mean and σ2 the variance.

probability density function: a function that describes the relative likelihood that one or more random variables will have a given value.

replication model: a model that attempts to decompose a contract payoff into a portfolio of liquid instruments with the same properties. A static replication model attempts to identify a static portfolio with the same expected aggregate future cash flows as the original contract. A dynamic replication model attempts to identify a portfolio that is continuously rebalanced to have the same sensitivity to changes in market conditions as the original contract.

risk-neutral measure: a theoretical measure of probability derived from the assumption that the current value of a financial asset is equal to its expected future payoff discounted at the risk-free rate.

stochastic process: a collection of random variables that represents the evolution of a state or process over time as a probability distribution of potential outcomes (by contrast, a deterministic process is dependent on its inputs and can evolve in only one way).

tree or lattice: a grid with each node representing a possible price of the underlying at a given point in time (such as used in the binomial option pricing model)

partial differential equation (PDE): a partial differential equation (PDE) is a differential equation that contains unknown multivariable functions and their partial derivatives. PDEs are equations that involve rates of change with respect to continuous variables and are used to formulate problems involving functions of several variables.