

ROYAL BANK OF CANADA
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December 01, 2017

November 2017
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Registration Statement No. 333-208507
PRICING SUPPLEMENT
Dated November 30, 2017
Filed Pursuant to Rule 424(b)(2)

STRUCTURED INVESTMENTS

Opportunities in U.S. Equities

\$9,394,960 Dual Directional Trigger Jump Securities Based on the Performance of the S&P 500[®] Index, due December 5, 2022

Principal at Risk Securities

The Dual Directional Trigger Jump Securities (the “securities”) are senior unsecured obligations of Royal Bank of Canada, do not pay interest, do not guarantee any return of principal at maturity and have the terms described in the accompanying prospectus supplement and prospectus, as supplemented or modified by this document. At maturity, if the level of the underlying index has not decreased, investors will receive the stated principal amount of their investment plus a positive return equal to the greater of (1) the digital return and (2) the underlying index return. If the level of the underlying index has decreased, but not by more than 20%, investors will receive the stated principal amount plus an unleveraged positive return equal to the absolute value of the percentage decrease, which will effectively be limited to a positive return of 20%. However, if the level of the underlying index has decreased by more than 20%, investors will lose 1% of the stated principal amount for every 1% decrease in the final index level from the initial index level. These securities are for investors who seek an equity index-based return and who are willing to risk their principal and forgo current income in exchange for the potential benefit of the digital return and the unleveraged absolute return feature, which applies to a limited range of negative performance of the underlying index. Investors may lose their entire initial investment in the securities. The securities are senior notes issued as part of Royal Bank of Canada’s Global Medium-Term Notes, Series G program. All payments on the securities are subject to the credit risk of Royal Bank of Canada.

SUMMARY TERMS

Issuer:	Royal Bank of Canada
Underlying index:	S&P 500 [®] Index
Aggregate principal amount:	\$9,394,960
Stated principal amount:	\$10 per security
Issue price:	\$10 per security (see “Commissions and issue price” below)
Pricing date:	November 30, 2017
Issue date:	December 5, 2017
Maturity date:	December 5, 2022
Payment at maturity:	<ul style="list-style-type: none"> · If the final index level is greater than or equal to the initial index level, \$10 + the product of (a) \$10 and (b) the greater of (1) the digital return and (2) the underlying index return · If the final index level is less than the initial index level but is greater than or equal to the trigger level, \$10 + (\$10 × absolute index return)

In this scenario, you will receive a 1% positive return on the securities for each 1% decrease in the level of the underlying index. In no event will this amount exceed the stated principal amount plus \$2.00.

· If the final index level is less than the trigger level,
 $\$10 + (\$10 \times \text{underlying index return})$

Under these circumstances, the payment at maturity will be less than \$8.00. You will lose at least 20% and possibly all of the stated principal amount if the final index level is less than the trigger level.

Digital return:	25.75%		
Underlying index return:	$(\text{final index level} - \text{initial index level}) / \text{initial index level}$		
Absolute index return:	The absolute value of the underlying index return. For example, a -5% underlying index return will result in a +5% absolute index return		
Trigger level:	2,118.06, which is 80% of the initial index level, rounded to two decimal places		
Initial index level:	2,647.58, which was the closing level of the underlying index on the pricing date		
Final index level:	The closing level of the underlying index on the valuation date		
Valuation date:	November 30, 2022, subject to adjustment for non-trading days and certain market disruption events		
CUSIP / ISIN:	78013F578 / US78013F5787		
Listing:	The securities will not be listed on any securities exchange.		
Agent:	RBC Capital Markets, LLC (“RBCCM”). See “Supplemental Information Regarding Plan of Distribution; Conflicts of Interest.”		
Commissions and issue price:	Price to public	Agent’s commissions	Proceeds to issuer
Per security	\$10.00	\$0.30 ⁽¹⁾	
		\$0.05 ⁽²⁾	\$9.65
Total	\$9,394,960.00	\$281,848.80 \$46,974.80	\$9,066,136.40

RBCCM, acting as agent for Royal Bank of Canada, will receive a fee of \$0.35 per \$10 stated principal amount and ⁽¹⁾will pay to Morgan Stanley Wealth Management (“MSWM”) a fixed sales commission of \$0.30 for each security that MSWM sells. See “Supplemental Information Regarding Plan of Distribution; Conflicts of Interest.”

⁽²⁾Of the amount per \$10 stated principal amount received by RBCCM, acting as agent for Royal Bank of Canada, RBCCM will pay MSWM a structuring fee of \$0.05 for each security.

The initial estimated value of the securities as of the pricing date is \$9.5112 per \$10.00 security, which is less than the price to public. The market value of the securities at any time will reflect many factors, cannot be predicted with accuracy, and may be less than this amount.

An investment in the securities involves certain risks. See “Risk Factors” beginning on page 6 of this document, page S-1 of the accompanying prospectus supplement and page 1 of the prospectus.

You should read this document together with the related prospectus supplement and prospectus, each of which can be accessed via the hyperlinks below, before you decide to invest.

Please also see “Additional Terms of the Securities” in this document.

Prospectus Supplement dated January 8, 2016

Prospectus dated January 8, 2016

None of the Securities and Exchange Commission, any state securities commission or any other regulatory body has approved or disapproved of the securities or passed upon the adequacy or accuracy of this document. Any representation to the contrary is a criminal offense. The securities will not constitute deposits insured by the Canada Deposit Insurance Corporation, the U.S. Federal Deposit Insurance Corporation or any other Canadian or U.S. government agency or instrumentality.

Dual Directional Trigger Jump Securities Based on the Performance of the S&P 500[®] Index, due December 5, 2022
Principal at Risk Securities

Investment Summary

Dual Directional Trigger Jump Securities

Principal at Risk Securities

The Dual Directional Trigger Jump Securities Based on the Performance of the S&P 500[®] Index, due December 5, 2022 (the “securities”) can be used:

As an alternative to direct exposure to the underlying index that provides a minimum positive return of 25.75% if the § underlying index has not decreased from the pricing date to the valuation date, and offers an uncapped 1-to-1 participation in any increase in the level of the underlying index if its level has increased by more than 25.75%.

§ To obtain an unleveraged positive return for a limited range of negative performance of the underlying index.

§ To enhance returns and potentially outperform the underlying index in a moderately bullish or moderately bearish § scenario.

The securities are exposed on a 1:1 basis to the full negative performance of the underlying index if the final index level is less than the trigger level.

Maturity: Approximately five years

Digital return: 25.75%

Trigger level: 80% of the initial index level

Minimum payment at maturity: None. Investors may lose their entire initial investment in the securities.

Coupon: None

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Key Investment Rationale

The securities offer the potential for a positive return equal to the greater of (1) the digital return and (2) the underlying index return if the level of the underlying index does not decrease, and an unleveraged positive return equal to the absolute value of a limited range of negative performance of the underlying index. At maturity, if the level of the underlying index has not decreased, investors will receive the stated principal amount plus a positive return equal to the greater of (1) the digital return and (2) the underlying index return. If the level of the underlying index has decreased, but by no more than 20%, investors will receive the stated principal amount plus an unleveraged positive return equal to the absolute value of the percentage decrease, which will effectively be limited to a positive return of 20%. However, if the level of the underlying index has decreased by more than 20%, investors will lose 1% of the principal amount for every 1% decrease in the final index level from the initial index level. Investors may lose their entire initial investment in the securities.

Upside

Scenario Above the Digital Return
The final index level is greater than the initial index level by more than 25.75%. In this case, the securities offer 1-to-1 uncapped participation in the increase in the level of the underlying index.

Scenario Digital Return
The final index level is equal to the initial index level or is greater than the initial index level by up to 25.75%. In this case, the securities offer the digital return of 25.75%.

Scenario Absolute Return
The final index level is less than the initial index level but is greater than or equal to the trigger level, which is 80% of the initial index level. In this case, you receive a 1% positive return on the securities for each 1% decrease in the level of the underlying index. For example, if the final index level is 10% less than the initial index level, the securities will provide a total positive return of 10% at maturity. The maximum return you may receive in this scenario is a positive 20% return at maturity.

Scenario Downside
The final index level is less than the trigger level, and, at maturity, we will pay less than the stated principal amount by an amount that is proportionate to the percentage decrease in the level of the underlying index from the initial index level. Under these circumstances, the payment at maturity will be less than \$8.00 per security. For example, if the final index level is 70% less than the initial index level, you will lose 70% of the principal amount and receive only \$3.00 per security at maturity. There is no minimum payment at maturity on the securities, and you could lose your entire investment.

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Additional Information

You should read this document together with the prospectus dated January 8, 2016, as supplemented by the prospectus supplement dated January 8, 2016, relating to our Senior Global Medium-Term Notes, Series G, of which the securities are a part. This document, together with these documents, contains the terms of the securities and supersedes all other prior or contemporaneous oral statements as well as any other written materials, including preliminary or indicative pricing terms, correspondence, trade ideas, structures for implementation, sample structures, brochures or other educational materials of ours.

You should rely only on the information provided or incorporated by reference in this document, the prospectus and the prospectus supplement. We have not authorized anyone else to provide you with different information, and we take no responsibility for any other information that others may give you. We and Morgan Stanley Wealth Management are offering to sell the securities and seeking offers to buy the securities only in jurisdictions where it is lawful to do so. The information contained in this document and the accompanying prospectus supplement and prospectus is current only as of their respective dates.

If the information in this document differs from the information contained in the prospectus supplement or the prospectus, you should rely on the information in this document.

You should carefully consider, among other things, the matters set forth in “Risk Factors” in this document and the accompanying prospectus supplement, as the securities involve risks not associated with conventional debt securities. We urge you to consult your investment, legal, tax, accounting and other advisers before you invest in the securities. You may access these documents on the SEC website at www.sec.gov as follows (or if such address has changed, by reviewing our filings for the relevant date on the SEC website):

·Prospectus dated January 8, 2016:

<http://www.sec.gov/Archives/edgar/data/1000275/000121465916008810/j18160424b3.htm>

·Prospectus Supplement dated January 8, 2016:

<http://www.sec.gov/Archives/edgar/data/1000275/000121465916008811/p14150424b3.htm>

Our Central Index Key, or CIK, on the SEC website is 1000275.

Please see the section “Documents Incorporated by Reference” on page i of the above prospectus for a description of our filings with the SEC that are incorporated by reference therein.

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How the Dual Directional Trigger Jump Securities Work

Payoff Diagram

The payoff diagram below illustrates the payment at maturity on the securities for a range of hypothetical percentage changes in the closing level of the underlying index. The graph is based on the following terms:

Stated principal amount:	\$10 per security
Digital return:	25.75%
Trigger level:	80% of the initial index level
Minimum payment at maturity:	None

Dual Directional Trigger Jump Securities Payoff Diagram

How it works

Upside Scenario. If the final index level is greater than or equal to the initial index level, then investors would receive the \$10 stated principal amount plus a return equal to the greater of (1) the digital return and (2) the underlying index return.

§ For example, if the level of the underlying index increases by 3%, the investor would receive a 25.75% return, or § \$12.575 per security.

§ For example, if the level of the underlying index increases by 40%, the investor would receive a 40% return, or § \$14.00 per security.

Absolute Return Scenario. If the final index level is less than the initial index level but is greater than or equal to the trigger level of 80% of the initial index level, the investor would receive a 1% positive return on the securities for each 1% decrease in the level of the underlying index.

§ For example, if the level of the underlying index decreases by 10%, the investor would receive a 10% return, or § \$11.00 per security. The maximum return you may receive in this scenario is a positive 20% return at maturity.

Downside Scenario. If the final index level is less than the trigger level, the investor would receive an amount less than the \$10 stated principal amount, based on a 1% loss of principal for each 1% decrease in the level of the § underlying index. Under these circumstances, the payment at maturity will be less than \$8.00 per security. There is no minimum payment at maturity on the securities.

§ For example, if the level of the underlying index decreases by 70%, the investor would lose 70% of the principal amount and receive only \$3.00 per security at maturity, or 30% of the stated principal amount.

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Risk Factors

An investment in the securities is subject to the risks described below, as well as the risks described under “Risk Factors” in the accompanying prospectus supplement and prospectus. Investors in the securities are also exposed to further risks related to the issuer of the securities, Royal Bank of Canada, which are described in Royal Bank of Canada’s annual report on Form 40-F for its most recently completed fiscal year, filed with the SEC and incorporated by reference herein. See the categories of risks, identified and disclosed in the management’s discussion and analysis of financial condition and results of operations included in the annual report on Form 40-F. This section (and the management’s discussion and analysis section of the annual report on Form 40-F) describes the most significant risks relating to the securities. You should carefully consider whether the securities are suited to your particular circumstances.

The securities do not pay interest or guarantee return of any principal. The terms of the securities differ from those of ordinary debt securities in that the securities do not pay interest or guarantee the payment of any principal amount at maturity. If the final index level is less than the trigger level (which is 80% of the initial index level), the absolute return feature will not apply and the payout at maturity will be an amount in cash that is at least 20% less than the \$10 stated principal amount of each security. In this case, you will lose a significant portion of your principal amount equal to the full percentage decrease in the level of the underlying index from the initial index level to the final index level. There is no minimum payment at maturity on the securities, and, accordingly, you could lose your entire initial investment in the securities.

The market price of the securities will be influenced by many unpredictable factors. Several factors will influence the value of the securities in the secondary market and the price at which RBCCM may be willing to purchase or sell the securities in the secondary market, including:

- § the trading price and volatility (frequency and magnitude of changes in value) of the securities represented by the underlying index;
- § dividend yields on the securities represented by the underlying index;
- § market interest rates;
- § our creditworthiness, as represented by our credit ratings or as otherwise perceived in the market;
- § time remaining to maturity; and
- § geopolitical conditions and economic, financial, political, regulatory or judicial events that affect the underlying index.

Generally, the longer the time remaining to maturity, the more the market price of the securities will be affected by the other factors described above. The level of the underlying index may be volatile, and you should not take the historical levels of the underlying index as an indication of future performance. See “Information About the Underlying Index” below. You may receive less, and possibly significantly less, than the stated principal amount per security if you sell your securities prior to maturity.

The securities are subject to the credit risk of Royal Bank of Canada, and any actual or anticipated changes to its credit ratings or credit spreads may adversely affect the market value of the securities. You are dependent on Royal Bank of Canada’s ability to pay all amounts due on the securities at maturity and therefore you are subject to the credit risk of Royal Bank of Canada. If Royal Bank of Canada defaults on its obligations under the securities, your investment would be at risk and you could lose some or all of your investment. As a result, the market value of the securities prior to maturity will be affected by changes in the market’s view of Royal Bank of Canada’s creditworthiness. Any actual or anticipated decline in Royal Bank of Canada’s credit ratings or increase in the credit spreads charged by the market for taking Royal Bank of Canada credit risk is likely to adversely affect the market value of the securities.

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The amount payable on the securities is not linked to the level of the underlying index at any time other than the valuation date. The final index level will be based on the closing level of the underlying index on the valuation date, subject to adjustment for non-trading days and certain market disruption events. Even if the level of the underlying index increases prior to the valuation date but then decreases by the valuation date to a level that is less than the trigger level, the payment at maturity will be significantly less than it would have been had the payment at maturity been linked to the level of the underlying index prior to that decrease. Although the actual level of the underlying index on the maturity date or at other times during the term of the securities may be higher than the final index level, the payment at maturity will be based solely on the closing level of the underlying index on the valuation date. Investing in the securities is not equivalent to investing in the underlying index. Investing in the securities is not equivalent to investing in the underlying index or its component stocks. Investors in the securities will not have voting rights or rights to receive dividends or other distributions or any other rights with respect to stocks that constitute the underlying index.

The initial estimated value of the securities is less than the price to the public. The initial estimated value that is set forth on the cover page of this document, does not represent a minimum price at which we, RBCCM or any of our affiliates would be willing to purchase the securities in any secondary market (if any exists) at any time. If you attempt to sell the securities prior to maturity, their market value may be lower than the price you paid for them and the initial estimated value. This is due to, among other things, changes in the level of the underlying index, the borrowing rate we pay to issue securities of this kind, and the inclusion in the price to the public of the agent's commissions and the estimated costs relating to our hedging of the securities. These factors, together with various credit, market and economic factors over the term of the securities, are expected to reduce the price at which you may be able to sell the securities in any secondary market and will affect the value of the securities in complex and unpredictable ways. Assuming no change in market conditions or any other relevant factors, the price, if any, at which you may be able to sell your securities prior to maturity may be less than your original purchase price, as any such sale price would not be expected to include the agent's commissions and the hedging costs relating to the securities. In addition to bid-ask spreads, the value of the securities determined for any secondary market price is expected to be based on the secondary rate rather than the internal funding rate used to price the securities and determine the initial estimated value. As a result, the secondary price will be less than if the internal funding rate was used. The securities are not designed to be short-term trading instruments. Accordingly, you should be able and willing to hold your securities to maturity.

Our initial estimated value of the securities is an estimate only, calculated as of the pricing date. The initial estimated value of the securities is based on the value of our obligation to make the payments on the securities, together with the mid-market value of the derivative embedded in the terms of the securities. See "Structuring the Securities" below. Our estimate is based on a variety of assumptions, including our credit spreads, expectations as to dividends, interest rates and volatility, and the expected term of the securities. These assumptions are based on certain forecasts about future events, which may prove to be incorrect. Other entities may value the securities or similar securities at a price that is significantly different than we do.

The value of the securities at any time after the pricing date will vary based on many factors, including changes in market conditions, and cannot be predicted with accuracy. As a result, the actual value you would receive if you sold the securities in any secondary market, if any, should be expected to differ materially from the initial estimated value of your securities.

Adjustments to the underlying index could adversely affect the value of the securities. The sponsor of the underlying index (the "index sponsor") may add, delete or substitute the stocks constituting the underlying index, or make other methodological changes. Further, the index sponsor may discontinue or suspend calculation or publication of the underlying index at any time. Any of these actions could affect the value of and the return on the securities. We have no affiliation with the index sponsor and will not be responsible for any actions taken by the index sponsor. The index sponsor is not an affiliate of ours and will not be involved in the offering of the securities in any

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way. Consequently, we have no control over the actions of the index sponsor, including any actions of the type that would require the calculation agent to adjust the payment to you at maturity. The index sponsor has no obligation of any sort with respect to the securities. Thus, the index sponsor has no obligation to take your interests into consideration for any reason, including in taking any actions that might affect the value of the securities. None of our proceeds from the issuance of the securities will be delivered to the index sponsor.

The securities will not be listed on any securities exchange and secondary trading may be limited. The securities will not be listed on any securities exchange. Therefore, there may be little or no secondary market for the securities. RBCCM may, but is not obligated to, make a market in the securities, and, if it chooses to do so at any time, it may cease doing so. When it does make a market, it will generally do so for transactions of routine secondary market size at prices based on its estimated of the current value of the securities, taking into account its bid/offer spread, our credit spreads, market volatility, the notional size of the proposed sale, the cost of unwinding any related § hedging positions, the time remaining to maturity and the likelihood that it will be able to resell the securities. Even if there is a secondary market, it may not provide enough liquidity to allow you to trade or sell the securities easily. Because we do not expect that other broker-dealers will participate significantly in the secondary market for the securities, the price at which you may be able to trade your securities is likely to depend on the price, if any, at which RBCCM is willing to transact. If, at any time, RBCCM were not to make a market in the securities, it is likely that there would be no secondary market for the securities. Accordingly, you should be willing to hold your securities to maturity.

Historical levels of the underlying index should not be taken as an indication of its future levels during the term of the securities. The trading prices of the equity securities comprising the underlying index will determine the level of § the underlying index at any given time. As a result, it is impossible to predict whether the level of the underlying index will rise or fall. Trading prices of the equity securities comprising the underlying index will be influenced by complex and interrelated political, economic, financial and other factors.

Hedging and trading activity by us and our subsidiaries could potentially adversely affect the value of the securities. One or more of our subsidiaries and or third party dealers expect to carry out hedging activities related to the securities (and possibly to other instruments linked to the underlying index or the securities it represents), including trading in those securities as well as in other related instruments. Some of our subsidiaries also may conduct trading activities relating to the underlying index on a regular basis as part of their general broker-dealer and other § businesses. Any of these hedging or trading activities on or prior to the pricing date could have affected the initial index level and, therefore, have increased the level above which the underlying index must close on the valuation date so that investors do not suffer a significant loss on their initial investment in the securities. Additionally, such hedging or trading activities during the term of the securities, including on the valuation date, could adversely affect the closing level of the underlying index on the valuation date and, accordingly, the amount of cash an investor will receive at maturity, if any.

Our business activities may create conflicts of interest. We and our affiliates may engage in trading activities related to the underlying index or the securities represented by the underlying index that are not for the account of holders of § the securities or on their behalf. These trading activities may present a conflict between the holders' interest in the securities and the interests we and our affiliates will have in proprietary accounts, in facilitating transactions, including options and other derivatives transactions, for our customers and in accounts under our management.

These trading activities could be adverse to the interests of the holders of the securities.

We and our affiliates may presently or from time to time engage in business with one or more of the issuers of the securities represented by the underlying index. This business may include extending loans to, or making equity investments in, such companies or providing advisory services to such companies, including merger and acquisition advisory services. In the course of business, we and our affiliates may acquire non-public information relating to these companies, which we have no obligation to disclose to you, and, in addition, one or more of our affiliates may publish research reports about these companies. Neither we nor the agent have made any independent investigation regarding any matters whatsoever relating to the issuers of the securities represented by the underlying index.

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Moreover, we and our affiliates may have published, and in the future expect to publish, research reports with respect to the underlying index or the securities which it represents. This research is modified from time to time without notice and may express opinions or provide recommendations that are inconsistent with purchasing or holding the securities. Any of these activities by us or one or more of our affiliates may affect the level of the underlying index and, therefore, the market value of the securities.

§ The calculation agent, which is a subsidiary of the issuer, will make determinations with respect to the securities, which may create a conflict of interest. Our wholly owned subsidiary, RBCCM, will serve as the calculation agent. As calculation agent, RBCCM determined the initial index level and will determine the final index level, the underlying index return, and the amount of cash, if any, you will receive at maturity. Moreover, certain determinations made by RBCCM, in its capacity as calculation agent, may require it to exercise discretion and make subjective judgments, such as with respect to the occurrence or non-occurrence of market disruption events and the selection of a successor index or the calculation of the final index level in the event of a market disruption event or discontinuance of the underlying index. These potentially subjective determinations may adversely affect the payout to you at maturity, if any. For further information regarding these types of determinations, see “Additional Terms of the Securities” below.

§ Significant aspects of the tax treatment of the securities are uncertain. The tax treatment of an investment in the securities is uncertain. We do not plan to request a ruling from the Internal Revenue Service (the “IRS”) or from the Canada Revenue Agency regarding the tax treatment of an investment in the securities, and the IRS, the Canada Revenue Agency or a court may not agree with the tax treatment described in this document.

The IRS has issued a notice indicating that it and the U.S. Treasury Department are actively considering whether, among other issues, a holder should be required to accrue interest over the term of an instrument such as the securities even though that holder will not receive any payments with respect to the securities until maturity and whether all or part of the gain a holder may recognize upon sale, exchange or maturity of an instrument such as the securities should be treated as ordinary income. The outcome of this process is uncertain and could apply on a retroactive basis. Please read carefully the sections entitled “Canadian Federal Income Tax Consequences” and “Supplemental Discussion of U.S. Federal Income Tax Consequences” in this document, the section entitled “Tax Consequences” in the accompanying prospectus and the section entitled “Certain Income Tax Consequences” in the accompanying prospectus supplement. You should consult your tax advisor about your own tax situation.

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Additional Terms of the Securities

Please read this information in conjunction with the summary terms on the front cover of this document.

Additional Provisions

Postponement of the valuation date: If the valuation date occurs on a day that is not a trading day or on a day on which the calculation agent has determined that a market disruption event (as defined below) has occurred or is continuing, then the valuation date will be postponed until the next succeeding trading day on which the calculation agent determines that a market disruption event does not occur or is not continuing; provided that in no event will the valuation date be postponed by more than five trading days. If the valuation date is postponed by five trading days, and a market disruption event occurs or is continuing on that fifth trading day, then the calculation agent may determine, in its good faith and reasonable judgment, what the closing level of the underlying index would have been in the absence of the market disruption event. If the valuation date is postponed, then the maturity date will be postponed by an equal number of business days. No interest shall accrue or be payable as a result of such postponement. With respect to the underlying index and any relevant successor index, a “market disruption event” means:

- a suspension, absence or material limitation of trading of equity securities then constituting 20% or more of the level of the underlying index (or the relevant successor index) on the relevant exchanges (as defined below) for such securities for more than two hours of trading during, or during the one hour period preceding the close of, the principal trading session on such relevant exchange; or
- a breakdown or failure in the price and trade reporting systems of any relevant exchange as a result of which the reported trading prices for equity securities then constituting 20% or more of the level of the underlying index (or the relevant successor index) during the one hour preceding the close of the principal trading session on such relevant exchange are materially inaccurate; or
- a suspension, absence or material limitation of trading on the primary exchange or market for trading in futures or options contracts related to the underlying index (or the relevant successor index) for more than two hours of trading during, or during the one hour period preceding the close of, the principal trading session on such exchange or market; or
- a decision to permanently discontinue trading in the relevant futures or options contracts; in each case as determined by the calculation agent in its sole discretion; and
- a determination by the calculation agent in its sole discretion that the event described above materially interfered with our ability or the ability of any of our affiliates to adjust or unwind all or a material portion of any hedge with respect to the securities.

Market disruption events:

For purposes of determining whether a market disruption event with respect to the underlying index (or the relevant successor index) exists at any time, if trading in a security included in the underlying index (or the relevant successor index) is materially suspended or materially limited at that time, then the relevant percentage contribution of that security to the level of the underlying index (or the relevant successor index) will be based on a comparison of (a) the portion of the level of the underlying index (or the relevant successor index) attributable to that security relative to (b) the overall level of the underlying index (or the relevant successor index), in each case immediately before that suspension or limitation.

For purposes of determining whether a market disruption event with respect to the

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underlying index (or the relevant successor index) has occurred:

- a limitation on the hours or number of days of trading will not constitute a market disruption event if it results from an announced change in the regular business hours of the relevant exchange, or the primary exchange or market for trading in futures or options contracts related to the underlying index (or the relevant successor index);
- limitations pursuant to the rules of any relevant exchange similar to NYSE Rule 80B (or any applicable rule or regulation enacted or promulgated by any other self-regulatory organization or any government agency of scope similar to NYSE Rule 80B as determined by the calculation agent) on trading during significant market fluctuations will constitute a suspension, absence or material limitation of trading;
- a suspension of trading in futures or options contracts on the underlying index (or the relevant successor index) by the primary exchange or market trading in such contracts by reason of:
 - a price change exceeding limits set by such exchange or market,
 - an imbalance of orders relating to such contracts, or
 - a disparity in bid and ask quotes relating to such contracts,will, in each such case, constitute a suspension, absence or material limitation of trading in futures or options contracts related to the underlying index (or the relevant successor index); and
- a “suspension, absence or material limitation of trading” on any relevant exchange or on the primary exchange or market on which futures or options contracts related to the underlying index (or the relevant successor index) are traded will not include any time when such exchange or market is itself closed for trading under ordinary circumstances.

“Relevant exchange” means the primary exchange or market of trading for any security (or any combination thereof) then included in the underlying index or such successor index, as applicable. If the index sponsor discontinues publication of the underlying index and the index sponsor or another entity publishes a successor or substitute index that the calculation agent determines, in its sole discretion, to be comparable to the discontinued index (such index being referred to herein as a “successor index”), then the closing level of the underlying index on the valuation date will be determined by reference to the level of such successor index at the close of trading on the relevant exchange for the successor index on such day.

Upon any selection by the calculation agent of a successor index, the calculation agent will cause written notice to be promptly furnished to the trustee, to us and to the holders of the securities.

If the index sponsor discontinues publication of the underlying index prior to, and that discontinuation is continuing on the valuation date, and the calculation agent determines, in its sole discretion, that no successor index is available at that time or the calculation agent has previously selected a successor index and publication of that successor index is discontinued prior to, and that discontinuation is continuing on, the valuation date, then the calculation agent will determine the closing level of the underlying index for that date. The closing level of the underlying index will be computed by the calculation agent in accordance with the formula for and method of calculating the underlying index or successor index, as applicable, last in effect prior to the discontinuation, using the closing price (or, if trading in the relevant securities has been materially suspended or materially limited, the calculation agent’s good faith estimate of the closing price that would have prevailed but for the suspension or limitation) at the close of the principal trading session on that date of each security most recently included in the underlying index or successor index, as applicable. If at any time the method of calculating the underlying index or a successor index, or the level thereof, is changed in a material respect, or if the underlying index or a successor index is in any other way modified so that the underlying index or successor index does

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not, in the opinion of the calculation agent, fairly represent the level of the underlying index or successor index had those changes or modifications not been made, then the calculation agent will, at the close of business in New York City on the date on which the closing level of the underlying index is to be determined, make any calculations and adjustments as, in the good faith judgment of the calculation agent, may be necessary in order to arrive at a level of a stock index comparable to the underlying index or successor index, as the case may be, as if those changes or modifications had not been made, and calculate the closing level of the underlying index with reference to the underlying index or such successor index, as adjusted. Accordingly, if the method of calculating the underlying index or a successor index is modified so that the level of the underlying index or such successor index is a fraction of what it would have been if there had been no such modification (e.g., due to a split in the underlying index), then the calculation agent will adjust its calculation of the underlying index or such successor index in order to arrive at a level of the underlying index or such successor index as if there had been no such modification (e.g., as if such split had not occurred).

Notwithstanding these alternative arrangements, discontinuation the publication of or modification of the underlying index or successor index, as applicable, may adversely affect the value of the securities. A business day means a Monday, Tuesday, Wednesday, Thursday or Friday that is not a day on which

Business day: banking institutions in The City of New York generally are authorized or obligated by law, regulation or executive order to close.

A trading day means a day, as determined by the calculation agent, on which trading is generally conducted on (i) the relevant exchanges for securities comprising the underlying index or the successor index and (ii) the exchanges on which futures or options contracts related to the underlying index or the successor index are traded, other than a day on which trading on such relevant exchange or exchange on which such futures or options contracts are traded is scheduled to close prior to its regular weekday closing time.

Trading day:

In the event we fail to make a payment on the maturity date, any overdue payment in respect of such payment on the securities will bear interest until the date upon which all sums due are received by or on behalf of the relevant holder, at a rate per annum which is the rate for deposits in U.S. dollars for a period of six months which appears on the Reuters Screen LIBOR page as of 11:00 a.m. (London time) on the first business day following such failure to pay. Such rate shall be determined by the calculation agent. If interest is required to be calculated for a period of less than one year, it will be calculated on the basis of a 360-day year consisting of the actual number of days in the period.

Default interest upon acceleration:

If the maturity of the securities is accelerated upon an event of default under the Indenture, the amount payable upon acceleration will be determined by the calculation agent. Such amount will be the payment at maturity, calculated as if the date of declaration of acceleration were the valuation date.

Events of default and acceleration:

Minimum ticketing size: \$1,000 / 100 securities

Additional amounts:

We will pay any amounts to be paid by us on the securities without deduction or withholding for, or on account of, any and all present or future income, stamp and other taxes, levies, imposts, duties, charges, fees, deductions or withholdings (“taxes”) now or hereafter imposed, levied, collected, withheld or assessed by or on behalf of Canada or any Canadian political subdivision or authority that has the power to tax, unless the deduction or withholding is required by law or by the interpretation or administration thereof by the relevant governmental authority. At any time a Canadian taxing jurisdiction requires us to deduct or withhold for or on account of taxes from any payment made under or in respect of the securities, we will pay such additional amounts (“Additional Amounts”) as may be necessary so that the net amounts received by each holder (including Additional Amounts), after such deduction or withholding, shall not be less than the amount the holder would have received had no such deduction or withholding been required.

However, no Additional Amounts will be payable with respect to a payment made to a holder of a security or of a right to receive payments in respect thereto (a “Payment Recipient”), which we refer to

as an "Excluded Holder," in respect of any taxes imposed because the

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beneficial owner or Payment Recipient:

(i)