

ROYAL BANK OF CANADA
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Product Prospectus Supplement ERN-ETF-1 to the Prospectus dated September 7, 2018 and
the Prospectus Supplement dated September 7, 2018

Royal Bank of Canada

Senior Global Medium-Term Notes, Series H

Enhanced Return Notes Linked to One or More Exchange Traded Funds

GENERAL TERMS

Royal Bank of Canada may offer and sell enhanced return notes (the “notes”) from time to time of any maturity. The prospectus dated September 7, 2018, the prospectus supplement dated September 7, 2018 and this product prospectus supplement describe terms that will apply generally to the notes, including any notes you purchase. A separate pricing supplement will describe the terms that apply specifically to your notes, including any changes to the terms specified below. If the terms described in the relevant pricing supplement are inconsistent with those described in this document or in the accompanying prospectus supplement or prospectus, the terms described in the relevant pricing supplement will control.

The notes are unsecured non-principal-protected notes linked to the performance of one or more exchange traded funds (each, a “Reference Asset”) specified in the relevant pricing supplement. If the Reference Asset of your notes consists of more than one exchange traded fund, we may refer to the Reference Asset as a “Basket” and each applicable component of the Reference Asset as a “Basket Component.” The payment at maturity on your notes will be based on the performance of the Reference Asset during the term of your notes. The notes are designed for investors who are seeking exposure to the Reference Asset and who anticipate that the level of the Reference Asset will increase (or, in the case of bearish notes, decrease) from its Initial Level to the Final Level on the applicable valuation date or dates. Investors must be willing to forego interest payments on the notes and be willing to accept a return that may be negative, in which case you will receive at maturity less, and possibly significantly less, than your principal.

THE NOTES DO NOT GUARANTEE ANY RETURN OF PRINCIPAL AT MATURITY. YOU ARE SUBJECT TO A RISK TO ALL OR A PORTION OF YOUR INVESTMENT IN THE NOTES, AS DESCRIBED IN MORE DETAIL BELOW.

The notes will not be listed on any securities exchange.

Your investment in the notes involves certain risks. See “Additional Risk Factors Specific to the Notes” beginning on page PS-5 to read about investment risks relating to the notes. Unless otherwise specified in the relevant pricing supplement, the principal of the notes is not protected and you could lose some or all of your investment.

The price at which you purchase the notes includes hedging costs and profits that Royal Bank of Canada or its affiliates expect to incur or realize. These costs and profits will reduce the secondary market price, if any secondary market develops, for the notes. As a result, you will experience an immediate and substantial decline in the value of your notes on the issue date.

None of the Securities and Exchange Commission (the “SEC”), any state securities commission or any other regulatory body has approved or disapproved of the notes or passed upon the accuracy of this product prospectus supplement or the accompanying prospectus and prospectus supplement. Any representation to the contrary is a criminal offense.

We may use this product prospectus supplement in the initial sale of a note. In addition, RBC Capital Markets, LLC or one of our other affiliates may use this product prospectus supplement in a market-making transaction in a note after its initial sale. Unless we or our agent informs the purchaser otherwise in the confirmation of sale, this product prospectus supplement is being used in a market-making transaction.

The notes 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. governmental agency or instrumentality.

RBC Capital Markets, LLC

Product Prospectus Supplement dated September 11, 2018

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In this product prospectus supplement, references to the “accompanying prospectus” mean the accompanying prospectus, dated September 7, 2018, as supplemented by the accompanying prospectus supplement, dated September 7, 2018, of Royal Bank of Canada. References to the “relevant pricing supplement” mean the pricing supplement that describes the specific terms of your notes.

SUMMARY

The information in this “Summary” section is qualified by the more detailed information set forth in this product prospectus supplement, the prospectus supplement and the prospectus, as well as the relevant pricing supplement.

- Issuer: Royal Bank of Canada (“Royal Bank”).
- Underwriter: RBC Capital Markets, LLC.
- Issue: Senior Global Medium-Term Notes, Series H.
- Reference Asset: The exchange traded fund or exchange traded funds (each, an “ETF”) specified in the relevant pricing supplement.
- Minimum Investment: As specified in the relevant pricing supplement.
- Denominations: Unless otherwise specified in the relevant pricing supplement, the notes will be issued in denominations of \$1,000 and integral multiples in excess of \$1,000.
- Interest Payable: None.
- Payment at Maturity: The payment at maturity will be based on the performance of the Reference Asset, and will be calculated as follows:
- Payment at Maturity in Excess of Principal
- If the Final Level is greater than or equal to (or, in the case of bearish notes, less than or equal to) the Initial Level, then, at maturity, you will receive an amount equal to:
- Principal Amount + (Principal Amount × Percentage Change)
- (a) If the relevant pricing supplement specifies that a “Leverage Factor” is applicable to your notes, then the payment at maturity will be calculated as follows:
- Principal Amount + (Principal Amount × Percentage Change × Leverage Factor)
- (b) If the relevant pricing supplement specifies that a “Booster Coupon” is applicable to your notes:
1. If the Percentage Change is greater than the Booster Percentage, then the payment at maturity will equal:
Principal Amount + (Principal Amount × Percentage Change)
 2. If the Percentage Change is greater than or equal to 0% but less than or equal to the Booster Percentage, then the payment at maturity will equal:
Principal Amount + (Principal Amount × Booster Percentage)

(c) If the relevant pricing supplement specifies that a cap is applicable to your notes, then the payment at maturity will not exceed the Maximum Redemption Amount set forth in the relevant pricing supplement.

(d) If the relevant pricing supplement specifies that a “Digital Coupon” is applicable to your notes, then the payment at maturity will equal:

Principal Amount + (Principal Amount x Digital Coupon)

Payment at Maturity Less Than or Equal to Principal

If the Final Level is less than (or, in the case of bearish notes, greater than) the Initial Level, then, at maturity, you will receive less than the principal amount of your notes. In such a case, the payment at maturity will equal:

Principal Amount + (Principal Amount x Percentage Change)

(a) If the relevant pricing supplement specifies that a “Downside Multiplier” is applicable to your notes, then the payment at maturity will be calculated as follows:

Principal Amount + (Principal Amount x Percentage Change x Downside Multiplier)

(b) If the relevant pricing supplement specifies that a “Buffer” is applicable to your notes:

1. If the Final Level is greater than or equal to (or, in the case of bearish notes, less than or equal to) the Buffer Level, then the payment at maturity will equal the principal amount of your notes.

2. If the Final Level is less than (or, in the case of bearish notes, greater than) the Buffer Level, then the payment at maturity will equal:

Principal Amount + [Principal Amount x (Percentage Change + Buffer Percentage)]

(c) If the relevant pricing supplement specifies that a “Barrier” is applicable to your notes:

1. If no Barrier Event has occurred, then the payment at maturity will equal the principal amount of your notes.

2. If a Barrier Event has occurred, then the payment at maturity will equal:

Principal Amount + (Principal Amount x Percentage Change)

Percentage
Change:

The Percentage Change, expressed as a percentage, is calculated as follows:

$$\frac{\text{Final Level} - \text{Initial Level}}{\text{Initial Level}}$$

If your notes are bearish notes, the Percentage Change will be calculated as follows:

Initial Level – Final Level

Initial Level

Maximum

Redemption Amount: As specified in the relevant pricing supplement, if applicable.

Amount:

Leverage Factor: As specified in the relevant pricing supplement, if applicable.

Downside

Multiplier: As specified in the relevant pricing supplement, if applicable.

Booster Percentage: A specified percentage increase (or, in the case of bearish notes, decrease) in the level of the Reference Asset. The Booster Percentage will be set forth in the relevant pricing supplement, if applicable.

Digital Coupon: A percentage that will be specified in the applicable pricing supplement.

Buffer Level: A specified level of the Reference Asset that is less than (or, in the case of bearish notes, greater than) the Initial Level. The Buffer Level will be a percentage of the Initial Level and set forth in the relevant pricing supplement, if applicable.

Buffer Percentage: A specified percentage that will be set forth in the relevant pricing supplement, if applicable. For example, if the Buffer Level is 90% of the Initial Level, the Buffer Percentage will be 10%.

Barrier Level: A specified level of the Reference Asset that is less than (or, in the case of bearish notes, greater than) the Initial Level. The Barrier Level will be a percentage of the Initial Level and set forth in the relevant pricing supplement, if applicable.

Barrier Event: Depending upon the terms set forth in the relevant pricing supplement, a Barrier Event will occur if:

- (i) the Final Level is less than (or, in the case of bearish notes, greater than) the Initial Level, and
- (ii) (a) for notes subject to Intra-Day Monitoring, at any time during the Monitoring Period, the level of the Reference Asset is less than (or, in the case of bearish notes, greater than) the Barrier Level, or
- (b) for notes subject to Close of Trading Day Monitoring, on any trading day during the Monitoring Period, the closing level of the Reference Asset is less than (or, in the case of bearish notes, greater than) the Barrier Level, or
- (c) for notes subject to Final Valuation Date Monitoring, the Final Level is less than (or, in the case of bearish notes, greater than) the Barrier Level.

Monitoring Period:

As specified in the relevant pricing supplement, if applicable.

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Initial Level: As specified in the relevant pricing supplement.
The closing level of the Reference Asset on the valuation date (if there is one valuation date applicable to the notes) or the arithmetic average of the closing levels of the Reference Asset on each of the

Final Level: valuation dates (if there is more than one valuation date applicable to the notes), or any other dates specified in the relevant pricing supplement.

Issue Date: As specified in the relevant pricing supplement.

Valuation Date(s): Unless otherwise specified in the relevant pricing supplement, the valuation date, or if there is more than one valuation date, the final valuation date, will be the third trading day prior to the maturity date, subject to extension for up to ten trading days for market disruption events.

Maturity Date: As specified in the relevant pricing supplement.

CUSIP: As specified in the relevant pricing supplement.

Clearance and Settlement: DTC global (including through its indirect participants Euroclear and Clearstream, Luxembourg, as described under “Description of Debt Securities—Ownership and Book-Entry Issuance” in the accompanying prospectus).

Listing: The notes will not be listed on any securities exchange or quotation system.

Calculation Agent: RBC Capital Markets, LLC.

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ADDITIONAL RISK FACTORS SPECIFIC TO THE NOTES

An investment in your notes is subject to the risks described below, as well as the risks described under “Risk Factors” in the prospectus and the prospectus supplement. Your notes are not secured debt and are riskier than ordinary unsecured debt securities. Also, investing in your notes is not equivalent to investing directly in the applicable Reference Asset. You should carefully consider whether the notes are suited to your particular circumstances. This product prospectus supplement should be read together with the prospectus, the prospectus supplement and the relevant pricing supplement. The information in the prospectus and prospectus supplement is supplemented by, and to the extent inconsistent therewith replaced and superseded by, the information in this product prospectus supplement and the relevant pricing supplement. This section describes the most significant risks relating to the terms of the notes. We urge you to read the following information about these risks, together with the other information in this product prospectus supplement and the prospectus, the prospectus supplement and the relevant pricing supplement, before investing in the notes.

General Risks Relating to the Notes

Your Investment in the Notes May Result in a Loss.

The notes do not guarantee any return of principal unless otherwise specified in the relevant pricing supplement. We will not repay you a fixed amount of principal on the maturity date. The amount payable on the notes at maturity will depend primarily on the Percentage Change in the level of the Reference Asset from the Initial Level to the Final Level. Because the level of the Reference Asset will be subject to market fluctuations, the return on your notes at maturity may be less, and possibly significantly less, than the principal amount per note. If the Final Level is less than (or, in the case of bearish notes, greater than) the Initial Level (and, in the case of notes with a buffer, less than (or, in the case of bearish notes with a buffer, greater than) the Buffer Level) or a Barrier Event has occurred (as applicable), the return on your notes will be less than the principal amount per note. This will be the case even if the level of the Reference Asset is greater than (or, in the case of bearish notes, less than) the Initial Level at certain periods during the term of the notes. In the case of notes with a Downside Multiplier greater than 100%, your notes will participate in the downside performance (or, in the case of bearish notes, upside performance) of the Reference Asset on a leveraged basis. Depending on the Downside Multiplier, you may lose all or a substantial portion of the amount that you invested to purchase the notes.

The Buffer Level and Barrier Level Provide Only Limited Principal Protection.

You will receive the principal amount of your notes at maturity only if (i) in the case of notes with a buffer, the Final Level is greater than or equal to (or, in the case of bearish notes with a buffer, less than or equal to) the Buffer Level and (ii) in the case of notes with a barrier, a Barrier Event has not occurred. If the Final Level is less than (or, in the case of bearish notes, greater than) the Buffer Level or a Barrier Event has occurred, as applicable, you will lose some or all of your principal amount.

The Notes Do Not Pay Interest and Your Return May Be Lower than the Return on a Conventional Debt Security of Comparable Maturity.

There will be no periodic interest payments on the notes as there would be on a conventional fixed-rate or floating-rate debt security having the same maturity. The return that you will receive on your notes, which could be negative, may be less than the return you could earn on other investments. Even if your return is positive, your return may be less than the return you would earn if you bought a conventional senior interest bearing debt security of Royal Bank with the same maturity date or if you invested directly in the Reference Asset. Your investment may not reflect the full opportunity cost to you when you take into account factors that affect the time value of money.

Your Potential Payment at Maturity May Be Limited.

If your notes are subject to a cap or a Digital Coupon, they will provide less opportunity to participate in the appreciation (or, in the case of bearish notes, depreciation) of the Reference Asset than an investment in a security linked to the Reference Asset providing full participation in the appreciation (or, in the case of bearish

notes, depreciation), because the payment at maturity will not exceed the Maximum Redemption Amount or the Digital Coupon, as applicable. Accordingly, your return on the notes may be less than your return would be if you made an investment in a security directly linked to the positive (or, in the case of bearish notes, negative) performance of the Reference Asset.

Owning the Notes Is Not the Same as Owning the Reference Asset or its Components or a Security Directly Linked to the Performance of the Reference Asset or its Components.

The return on your notes will not reflect the return you would realize if you actually owned the Reference Asset or its components or a security directly linked to the performance of the Reference Asset or its underlying components and held that investment for a similar period because, for example, your notes may be subject to a cap or Digital Coupon, in which case the payment at maturity will not exceed the maximum return set forth in the relevant pricing supplement.

Your notes may trade quite differently from the Reference Asset. Changes in the level of the Reference Asset may not result in comparable changes in the market value of your notes. Even if the level of the Reference Asset increases (or, in the case of bearish notes, decreases) from the Initial Level during the term of the notes, the market value of the notes prior to maturity may not increase to the same extent. It is also possible for the market value of the notes prior to maturity to decrease while the level of the Reference Asset increases (or, in the case of bearish notes, decreases).

There May Not Be an Active Trading Market for the Notes—Sales in the Secondary Market May Result in Significant Losses.

There may be little or no secondary market for the notes. The notes will not be listed on any securities exchange. RBC Capital Markets, LLC and other affiliates of Royal Bank may make a market for the notes; however, they are not required to do so. RBC Capital Markets, LLC or any other affiliate of Royal Bank may stop any market-making activities at any time. Even if a secondary market for the notes develops, it may not provide significant liquidity or trade at prices advantageous to you. We expect that transaction costs in any secondary market would be high. As a result, the difference between bid and asked prices for your notes in any secondary market could be substantial. If you sell your notes before maturity, you may have to do so at a substantial discount from the issue price, and as a result, you may suffer substantial losses.

The Market Value of Your Notes May Be Influenced by Many Unpredictable Factors.

The following factors, which are beyond our control, may influence the market value of your notes:

- the level of the Reference Asset, including, in the case of notes that have a buffer, whether the level of the Reference Asset trades or closes at a level below the Buffer Level or, in the case of notes that have a Barrier, whether a Barrier Event has occurred;
- if your notes are subject to a cap or a Digital Coupon, your potential return on the notes will be limited;
- the volatility (i.e., the frequency and magnitude of changes) of the price or level of the Reference Asset;
- if the Reference Asset includes one or more exchange traded funds, the dividend rate on the applicable component stocks;
- economic, financial, political, military, regulatory, legal and other events that affect the applicable securities or commodities markets generally and the U.S. markets in particular, and which may affect the level of the Reference Asset;

if the Reference Asset includes one or more indices, commodities or other assets that have returns that are calculated based upon currencies other than the U.S. dollar or prices in one or more non-U.S. markets (a “non-U.S. Reference Asset”), changes in, and the volatility of, the exchange rates between the U.S. dollar and the relevant non-U.S. currency or currencies could have a negative impact on the payments due on your notes and their market value; interest and yield rates in the market; and the time remaining to maturity of the notes.

These factors may influence the market value of your notes if you sell your notes before maturity. Our creditworthiness, as represented by our credit ratings or as otherwise perceived in the market will also affect the market value of your notes. If you sell your notes prior to maturity, you may receive less than the principal amount of your notes.

Payments on the Notes Are Subject to Our Credit Risk, and Changes in Our Credit Ratings Are Expected to Affect the Market Value of the Notes.

The notes are Royal Bank’s senior unsecured debt securities. As a result, your receipt of the amount due on the maturity date is dependent upon Royal Bank’s ability to repay its obligations at that time. This will be the case even if the level of the Reference Asset increases (or, in the case of bearish notes, decreases) after the pricing date. No assurance can be given as to what our financial condition will be at the maturity of the notes.

If Your Notes Are Linked to a Basket, Changes in the Level of One or More Basket Components May Be Offset by Changes in the Level of One or More Other Basket Components.

Your notes may be linked to a Basket. In such a case, a change in the levels of one or more Basket Components may not correlate with changes in the levels of one or more other Basket Components. The level of one or more Basket Components may increase, while the level of one or more other Basket Components may not increase as much, or may even decrease. The opposite changes may occur in the case of bearish notes. Therefore, in determining the level of the Basket as of any time, increases (or, in the case of bearish notes, decreases) in the level of one Basket Component may be moderated, or wholly offset, by lesser increases or decreases (or, in the case of bearish notes, lesser decreases and increases) in the level of one or more other Basket Components. If the weightings of the applicable Basket Components are not equal, changes in the level of the Basket Components which are more heavily weighted could have a disproportionately adverse impact upon your notes.

The Amount to Be Paid at Maturity Will Not Be Affected by All Developments Relating to the Reference Asset.

Changes in the level of the Reference Asset during the term of the notes before the relevant valuation date or valuation dates will not be reflected in the calculation of the payment at maturity, unless the level of the Reference Asset trades or closes below (or, in the case of bearish notes, above) the Barrier Level, as applicable. The calculation agent will calculate this amount by comparing only the Final Level to the Initial Level (or the Buffer Level, as applicable) and, in the case of notes that have a barrier, by comparing the trading level or closing level of the Reference Asset during the Monitoring Period or on the valuation date(s), as applicable, to the Barrier Level. No other levels of the Reference Asset will be taken into account. As a result, you may receive less than the principal amount of your notes, even if the level of the Reference Asset has increased (or, in the case of bear notes, decreased) at certain times during the term of the notes before decreasing to a level below (or, in the case of bearish notes, increasing to a level above) the Initial Level (or Buffer Level, as applicable) and, if applicable, below (or, in the case of bearish notes, above) the Barrier Level as of the relevant dates.

We Will Not Hold Any Asset Comprising the Reference Asset for Your Benefit.

The indenture and the terms governing your notes do not contain any restriction on our ability or the ability of any of our affiliates to sell, pledge or otherwise convey all or any portion of the securities that may comprise the

Reference Asset that we or they may acquire. Neither we nor our affiliates will pledge or otherwise hold any assets for your benefit, including any Reference Asset or its components. Consequently, in the event of our bankruptcy, insolvency or liquidation, any of those assets that we own will be subject to the claims of our creditors generally and will not be available for your benefit specifically.

The Market Value of Your Notes Will Likely Decline at an Accelerated Rate as the Level of the Reference Asset Approaches and Drops Below (or, in the Case of Bearish Notes, Rises Above) the Barrier Level.

If your notes have a barrier, when the trading level or closing level, as applicable, of the Reference Asset on any trading day declines (or, in the case of bearish notes, rises) from the Initial Level to a level near the Barrier Level for the first time, the market value of the notes will likely decline at a greater rate than the decrease (or, in the case of bearish notes, increase) in the level of the Reference Asset. If the level of the Reference Asset is near or below (or, in the case of bearish notes, above) the Barrier Level, we expect the market value of the notes to decline to reflect the fact that investors may receive less than their principal amount at maturity.

You Must Rely on Your Own Evaluation of the Merits of an Investment Linked to the Reference Asset.

In the ordinary course of their business, our affiliates may have expressed views on expected movements in any Reference Asset or its components, and may do so in the future. These views or reports may be communicated to our clients and clients of our affiliates. However, these views are subject to change from time to time. Moreover, other professionals who transact business in markets relating to any Reference Asset or its components may at any time have significantly different views from those of our affiliates. For these reasons, you are encouraged to derive information concerning the applicable Reference Asset or its components from multiple sources, and you should not rely solely on views expressed by our affiliates.

Changes that Affect an Index Included in the Reference Asset Will Affect the Market Value of the Notes and the Amount You Will Receive at Maturity.

The policies of a sponsor of any index (the "Index Sponsor") that is the underlying index for an ETF that is a Reference Asset concerning the calculation of that index, additions, deletions or substitutions of the components of that index and the manner in which changes affecting those components, such as stock dividends, reorganizations or mergers, may be reflected in the index and, therefore, could affect the amount payable on the notes at maturity, and the market value of the notes prior to maturity. The amount payable on the notes and their market value could also be affected if the Index Sponsor changes these policies, for example, by changing the manner in which it calculates the index.

Trading and Other Transactions by Royal Bank or its Affiliates in the Reference Asset or Its Components, Futures, Options, Exchange-Traded Funds or Other Derivative Products May Adversely Affect the Market Value of the Notes. As described below under "Use of Proceeds and Hedging," we or one or more affiliates may hedge our obligations under the notes by purchasing or selling the Reference Asset or its components, futures or options on the Reference Asset or its components, or exchange-traded funds or other derivative instruments with returns linked or related to changes in the performance of the Reference Asset or its components. We or our affiliates may adjust these hedges by, among other things, purchasing or selling those assets at any time. Although they are not expected to, any of these hedging activities may adversely affect the level of the Reference Asset or its components, and, therefore, the market value of the notes. It is possible that we or one or more of our affiliates could receive substantial returns from these hedging activities while the market value of the notes decreases.

We or one or more of our affiliates may also engage in trading in the Reference Asset or its components and other investments relating to those assets on a regular basis as part of our general broker-dealer and other businesses, for proprietary accounts, for other accounts under management or to facilitate transactions for customers, including block transactions. Any of these activities could adversely affect the level of the Reference Asset or its components and, therefore, the market value of the notes. We or one or more of our affiliates may also issue or underwrite other securities or financial or derivative instruments with returns linked or related to changes in the

performance of the Reference Asset or its components. By introducing competing products into the marketplace in this manner, we or one or more of our affiliates could adversely affect the market value of the notes.

The Inclusion in the Purchase Price of the Notes of a Selling Concession and of Our Cost of Hedging Our Market Risk under the Notes is Likely to Adversely Affect the Market Value of the Notes.

The price at which you purchase the notes includes a selling concession (including a broker's commission), as well as the costs that we (or one of our affiliates) expect to incur in the hedging of our market risk under the notes. The hedging costs include the expected cost of undertaking this hedge, as well as the profit that we (or our affiliates) expect to realize in consideration for assuming the risks inherent in providing the hedge. As a result, assuming no change in market conditions or any other relevant factors, the price, if any, at which you may be able to sell your notes prior to maturity will likely be less than your original purchase price. We expect that this effect will be greater if it occurs earlier in the term of the notes than if it occurs later in the term of the notes.

We Have No Affiliation with Any Index Sponsor and Will Not Be Responsible for Any Actions Taken by an Index Sponsor.

Unless otherwise specified in the relevant pricing supplement, no Index Sponsor is an affiliate of ours or will be involved in any offerings of the notes in any way. Consequently, we have no control of the actions of any Index Sponsor, including any actions of the type that would require the calculation agent to adjust the payment to you at maturity. No Index Sponsor has any obligation of any sort with respect to the notes. Thus, no Index Sponsor has any obligation to take your interests into consideration for any reason, including in taking any actions that might affect the value of the notes. None of our proceeds from any issuance of the notes will be delivered to any Index Sponsor.

The Business Activities of Royal Bank or its Affiliates May Create Conflicts of Interest.

As noted above, we and our affiliates expect to engage in trading activities related to the Reference Asset or its components that are not for the account of holders of the notes or on their behalf. These trading activities may present a conflict between the holders' interests in the notes and the interests we and our affiliates will have in their proprietary accounts, in facilitating transactions, including options and other derivatives transactions, for their customers and in accounts under their management. These trading activities, if they influence the level of the Reference Asset or its components, could be adverse to the interests of the holders of the notes. We and one or more of our affiliates may, at present or in the future, engage in business with the issuers of the equity securities included in a Reference Asset or the component stocks of any exchange traded fund that is included in a Reference Asset, including making loans to or providing advisory services to those companies. These services could include investment banking and merger and acquisition advisory services. These activities may present a conflict between our or one or more of our affiliates' obligations and your interests as a holder of the notes. Moreover, we and our affiliates may have published, and in the future expect to publish, research reports with respect to the Reference Asset or its components. 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 notes. Any of these activities by us or one or more of our affiliates may affect the level of the Reference Asset or its components and, therefore, the market value of the notes.

The Calculation Agent Can Postpone the Determination of the Final Level if a Market Disruption Event Occurs.

The determination of the Final Level may be postponed if the calculation agent determines that a market disruption event has occurred or is continuing on any valuation date with respect to the Reference Asset. If such a postponement occurs, the calculation agent will use the closing level of the Reference Asset on the first subsequent business day on which no market disruption event occurs or is continuing. In no event, however, will any valuation date be postponed by more than ten trading days. As a result, if a market disruption event occurs or is continuing on a valuation date, the maturity date for the notes could also be postponed, although not by more than ten trading days.

If the determination of the level of the Reference Asset for any valuation date is postponed to the last possible day, but a market disruption event occurs or is continuing on that day, that day will nevertheless be the date on which the level of the Reference Asset will be determined by the calculation agent. In such an event, the calculation agent will make a good faith estimate in its sole discretion of the level that would have prevailed in the absence of the market disruption event. See “General Terms of the Notes—Market Disruption Events.”

There Are Potential Conflicts of Interest Between You and the Calculation Agent.

The calculation agent will, among other things, determine the amount of your payment at maturity on the notes. Our wholly-owned subsidiary, RBC Capital Markets, LLC, will serve as the calculation agent. We may change the calculation agent after the original issue date without notice to you. The calculation agent will exercise its judgment when performing its functions. For example, the calculation agent may have to determine whether a market disruption event affecting the Reference Asset has occurred. This determination may, in turn, depend on the calculation agent’s judgment whether the event has materially interfered with our ability or the ability of one of our affiliates to unwind our hedge positions. Since this determination by the calculation agent will affect the payment at maturity on the notes, the calculation agent may have a conflict of interest if it needs to make a determination of this kind.

The Historical Performance of the Reference Asset or its Components Should Not Be Taken as an Indication of Their Future Performance.

The level of the Reference Asset will determine the amount to be paid on the notes at maturity. The historical performance of the Reference Asset or its components does not necessarily give an indication of their future performance. As a result, it is impossible to predict whether the level of the Reference Asset will rise or fall during the term of the notes. The level of the Reference Asset and its components will be influenced by complex and interrelated political, economic, financial and other factors.

Significant Aspects of the Tax Treatment of an Investment in the Notes Are Uncertain.

The tax treatment of an investment in the notes is uncertain. We do not plan to request a ruling from the Internal Revenue Service or the Canada Revenue Agency regarding the tax treatment of an investment in the notes, and the Internal Revenue Service, the Canada Revenue Agency or a court may not agree with the tax treatment described in this product prospectus supplement.

Since each of the Reference Assets is an ETF, while the matter is not entirely clear, unless otherwise specified in the applicable pricing supplement, there exists a substantial risk that an investment in a note is, in whole or in part, a “constructive ownership transaction” to which Section 1260 of the Internal Revenue Code applies. If Section 1260 of the Internal Revenue Code applies, all or a portion of any long-term capital gain recognized by a U.S. Holder in respect of a note will be recharacterized as ordinary income and certain interest charges may apply. See the section entitled “Supplemental Discussion of U.S. Federal Income Tax Consequences—Supplemental U.S. Tax Considerations—Possible Application of Section 1260 of the Internal Revenue Code.”

The Internal Revenue Service 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 notes even though that holder will not receive any payments with respect to the notes until maturity and whether all or part of the gain a holder may recognize upon sale or maturity of an instrument such as the notes 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 “Supplemental Discussion of U.S. Federal Income Tax Consequences” in this product prospectus supplement, the section “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.

For a more complete discussion of the Canadian federal income tax consequences of investing in the notes, please see “Tax Consequences—Canadian Taxation” in the accompanying prospectus. If you are not a Non-resident Holder (as that term is defined in “Tax Consequences—Canadian Taxation” in the accompanying prospectus) or if you acquire the notes in the secondary market, you should consult your tax advisor as to the consequences of acquiring, holding and disposing of the notes and receiving the payments that might be due under the notes.

Non-U.S. Investors May Be Subject to Certain Additional Risks.

The notes will be denominated in U.S. dollars. If you are a non-U.S. investor who purchases the notes with a currency other than U.S. dollars, changes in rates of exchange may have an adverse effect on the value, price or returns of your investment.

This product prospectus supplement contains a general description of certain U.S. tax considerations relating to the notes. If you are a non-U.S. investor, you should consult your tax advisor as to the consequences, under the tax laws of the country where you are resident for tax purposes, of acquiring, holding and disposing of the notes and receiving the payments that might be due under the notes.

This product prospectus supplement also contains a general description of certain Canadian tax considerations relating to the notes. If you are not a Non-resident Holder (as that term is defined in “Tax Consequences—Canadian Taxation” in the accompanying prospectus) or if you acquire the notes in the secondary market, you should consult your tax advisor as to the consequences of acquiring, holding and disposing of the notes and receiving the payments that might be due under the notes.

Certain Considerations for Insurance Companies and Employee Benefit Plans.

Any insurance company or fiduciary of a pension plan or other employee benefit plan that is subject to the prohibited transaction rules of the Employee Retirement Income Security Act of 1974, as amended, which we call “ERISA,” or the Internal Revenue Code of 1986, as amended, including an IRA or a Keogh plan (or a governmental plan to which similar prohibitions apply), and that is considering purchasing the notes with the assets of the insurance company or the assets of such a plan, should consult with its counsel regarding whether the purchase or holding of the notes could become a “prohibited transaction” under ERISA, the Internal Revenue Code or any substantially similar prohibition in light of the representations a purchaser or holder in any of the above categories is deemed to make by purchasing and holding the notes. For additional information, please see the discussion under “Employee Retirement Income Security Act” below.

Risks Relating to the Applicable Reference Asset

There Are Liquidity and Management Risks Associated with the Reference Asset.

Although shares of the Reference Asset will be listed for trading on a securities exchange and a number of similar products have been traded on various exchanges for varying periods of time, there is no assurance that an active trading market will continue for the shares of the Reference Asset or that there will be liquidity in that trading market. The Reference Asset is subject to management risk, which is the risk that the investment adviser’s investment strategy, the implementation of which is subject to a number of constraints, may not produce the intended results.

We Cannot Control Actions by the Investment Adviser which May Adjust the Reference Asset in a Way that Could Adversely Affect the Payments on the Notes and Their Market Value, and the Investment Adviser Has No Obligation to Consider Your Interests.

The policies of the investment adviser concerning the calculation of the Reference Asset’s net asset value, additions, deletions or substitutions of securities or other investments held by the Reference Asset and the manner in which changes affecting the underlying index are reflected in the Reference Asset could affect the market price per

share of the Reference Asset and, therefore, the amounts payable on the notes and their market value. The amounts payable on the notes and their market value could also be affected if the investment adviser changes these policies, for example, by changing the manner in which it calculates the Reference Asset's net asset value, or if the investment adviser discontinues or suspends calculation or publication of the Reference Asset's net asset value, in which case it may become difficult to determine the value of your notes. If events such as these occur or if the closing price per share of the Reference Asset is not available on a valuation date, the calculation agent may determine the closing price per share of the Reference Asset on that valuation date; as a result, the calculation agent would determine the level of the Reference Asset in a manner it considers appropriate, in its sole discretion.

The Performance of the Reference Asset and the Performance of the Underlying Asset May Vary.

The performance of the Reference Asset and that of its underlying asset generally will vary due to transaction costs, certain corporate actions and timing variances. If the Reference Asset maintains a "representative sampling" strategy as to an underlying asset, the performance of the Reference Asset will differ to some degree from that of the relevant asset.

In addition, because the shares of the Reference Asset are traded on a securities exchange and are subject to market supply and investor demand, the market value of one share of the Reference Asset may differ from its net asset value per share; shares of the Reference Asset may trade at, above, or below their net asset value per share.

For the foregoing reasons, the performance of the Reference Asset may not match the performance of its underlying asset over the same period. Because of this variance, the return on the notes to the extent dependent on the return of the Reference Asset may not be the same as an investment directly in the securities or other investments included in the underlying asset or the same as a debt security with a payment at maturity linked to the performance of the underlying asset.

Time Zone Differences Between the Cities Where the Underlying Asset and the Reference Asset Trade May Create Discrepancies in Trading Levels.

As a result of the time zone difference, if applicable, between the cities where the securities or commodities comprising the underlying asset trade and where the shares of the Reference Asset trade, there may be discrepancies between the values of the underlying asset and the market value of the notes. In addition, there may be periods when the foreign securities or commodities markets are closed for trading (for example, during holidays in a country other than the United States) that may result in the values of the underlying asset remaining unchanged for multiple trading days in the city where the shares of the Reference Asset trade. Conversely, there may be periods in which the applicable foreign securities or commodities markets are open, but the securities market on which the Reference Asset trades is closed.

Risks Relating to Equity-Based reference Assets

The risk factors in this section will be applicable to your notes if one or more of the ETFs that are included in the Reference Asset invest in one or more equity securities or equity indices.

You Will Not Have Any Shareholder Rights and Will Have No Right to Receive any Shares of the Reference Asset at Maturity.

Investing in your notes will not make you a holder of the Reference Asset or any of the constituent stocks of the Reference Asset. Neither you nor any other holder or owner of the notes will have any voting rights, any right to receive dividends or other distributions or any other rights with respect to any of these securities.

An Investment in the Notes May Be Subject to Risks Associated with Non-U.S. Securities Markets.

The Reference Asset may include one or more equity securities that have been issued by non-U.S. companies. An investment in securities linked to the value of non-U.S. equity securities involves particular risks. Non-U.S. securities markets may be more volatile than U.S. securities markets, and market developments may affect

non-U.S. securities markets differently from the U.S. securities markets. Direct or indirect government intervention to stabilize these non-U.S. securities markets, as well as cross shareholdings among non-U.S. companies, may affect trading prices and volumes in those markets. Also, there is generally less publicly available information in the U.S. about non-U.S. companies than about those U.S. companies that are subject to the reporting requirements of the SEC, and non-U.S. companies are subject to accounting, disclosure, auditing and financial reporting standards and requirements that differ from those applicable to U.S. reporting companies.

Securities prices in non-U.S. countries are subject to political, economic, financial and social factors that may be unique to the particular country. These factors, which could negatively affect the non-U.S. securities markets, include the possibility of recent or future changes in the economic and fiscal policies of non-U.S. governments, the possible imposition of, or changes in, currency exchange laws or other non-U.S. laws or restrictions applicable to non-U.S. companies or investments in non-U.S. equity securities, the possibility of fluctuations in the rate of exchange between currencies, the possibility of outbreaks of hostility and political instability and the possibility of natural disaster or adverse public health developments in the region. Moreover, the economies of certain foreign countries may differ favorably or unfavorably from the U.S. economy in important respects, such as growth of gross national product, rate of inflation, trade surpluses or deficits, capital reinvestment, resources and self-sufficiency.

The Return on the Notes Will Be Exposed to Fluctuations in Exchange Rates that Might Affect the Level of the Reference Asset and the Payment at Maturity.

Because the securities included in the Reference Asset may be traded in currencies other than U.S. dollars, and the notes are denominated in U.S. dollars, the amount payable on the notes at maturity may be exposed to fluctuations in the exchange rate between the U.S. dollar and each of the currencies in which those securities are denominated. These changes in exchange rates may reflect changes in various non-U.S. economies that in turn may affect the payment on the notes at maturity. An investor's net exposure will depend on the extent to which the currencies in which the relevant securities are denominated either strengthen or weaken against the U.S. dollar and the relative weight of each security. If, taking into account such weighting, the U.S. dollar strengthens (or, in the case of bearish notes, weakens) against the currencies in which the relevant securities are denominated, the value of those securities may be adversely affected and the level of the Reference Asset may be adversely affected as well. In turn, the payment at maturity may be adversely affected.

We Do Not Control Any Company Included in an Equity-Based Reference Asset and Are Not Responsible for Any Disclosure Made by Any Other Company.

Neither we nor any of our affiliates have the ability to control the actions of any of the companies included in a Reference Asset, nor do we assume any responsibility for the adequacy or accuracy of any publicly available information about any of these companies, unless (and only to the extent that) our securities or the securities of our affiliates are represented by that Reference Asset. You should make your own investigation into the companies represented by the applicable Reference Asset.

You Will Have Limited Anti-Dilution Protection.

The calculation agent will adjust the Initial Level, the Buffer Level and the Barrier Level, if applicable, of the Reference Asset for stock splits, reverse stock splits, stock dividends, extraordinary dividends and other events that affect the applicable issuer's capital structure, but only in the situations we describe in "General Terms of the Notes—Anti-Dilution Adjustments" below. The calculation agent will not be required to make an adjustment for every corporate event that may affect the relevant security. For example, the calculation agent will not make any adjustments for events such as an offering by the relevant issuer of equity securities, a tender or exchange offer for the issuer's shares at a premium to its then-current market price by that issuer or a tender or exchange offer for less than all outstanding shares of that issuer by a third party. Those events or other actions by the applicable issuer or a third party may nevertheless adversely affect the level of the Reference Asset, and adversely affect the value of your notes.

Risks Relating to Commodity-Based Reference Assets

The risk factors in this section will be applicable to your notes if one or more of the ETFs that are included in the Reference Asset invest in one or more commodities.

You Will Not Own the Underlying Commodities.

Investing in the notes is not the same as owning the applicable commodities or futures contracts relating to those commodities. You will not have a right to receive delivery of any of the applicable commodities or futures contracts relating to those commodities. We will not invest in any of the applicable commodities or futures contracts relating to those commodities on behalf or for the benefit of holders of the notes.

Commodities Prices Are Highly Volatile Due to Unpredictable Factors that Affect Supply and Demand.

Several factors, many of which are beyond our control, may influence the market value of the notes. Factors that may affect supply and demand of the underlying commodities or futures contracts of the Reference Asset and, thus, the market value of the notes include (but are not limited to):

- political events;
- weather;
- agriculture;
- disease;
- labor activity;
- technological developments;
- direct government activity (such as embargoes); and
- other supply disruptions in major producing or consuming regions of the applicable commodity.

These factors may adversely affect the performance of the Reference Asset or underlying commodities or futures contracts of the Reference Asset and the market value of the notes. The market value of the notes will also be affected by, among other things:

- the trading prices of the applicable commodities;
- the trading prices of the applicable commodities futures; and
- the volatility of the applicable commodities and commodities futures (including the frequency and magnitude of price increases and decreases in those commodities or commodities futures).

Suspension or Disruptions of Market Trading in the Commodity and Related Futures Markets May Adversely Affect the Value of Your Notes.

The commodity markets are subject to temporary distortions or other disruptions due to various factors, including the lack of liquidity in the markets, the participation of speculators and government regulation and intervention.

Certain exchanges have regulations which limit the amount of fluctuations in futures contracts that may occur during a single trading day. These limits are generally referred to as “daily price fluctuation limits,” and the

maximum or minimum price of a futures contract on any given day as a result of these limits is referred to as a “limit price.” Once the limit price has been reached in a particular futures contract, no trades may be made at a different price. Limit prices may have the effect of precluding trading in a particular futures contract or forcing the liquidation of futures contracts at disadvantageous times or prices. These circumstances could affect the level of the Reference Asset or the underlying commodities of the Reference Asset and could therefore adversely affect the market value of the notes.

Underlying Commodities that Trade on Foreign Exchanges, and Baskets Containing Such Commodities and Indices Based in Part on Such Commodities May Be Subject to Additional Market Risks.

The regulations of the U.S. Commodity Futures Trading Commission (the “CFTC”) do not apply to trading on foreign exchanges, and trading on foreign exchanges may involve different and greater risks than trading on U.S. exchanges. Certain foreign markets may be more susceptible to disruption than U.S. exchanges due to the lack of a government-regulated clearinghouse system. Trading on foreign exchanges also involves certain other risks that are not applicable to trading on U.S. exchanges. Those risks include (but are not limited to):

- varying exchange rates;
 - varying quoting conventions or contract specifications on different exchanges;
- exchange controls;
- expropriation;
- burdensome or confiscatory taxation;
- moratoriums; and
- political or diplomatic events.

It may also be more costly and difficult for participants in those markets to enforce the laws or regulations of a foreign country or exchange, and it is possible that the foreign country or exchange may not have laws or regulations which adequately protect the rights and interests of investors in the applicable commodities.

The Notes Will Not Be Regulated by the Commodity Futures Trading Commission.

Unlike a direct investment in futures contracts related to the applicable commodities, your investment in the notes does not afford you the benefits of the regulatory protections of the CFTC. Although RBC Capital Markets, LLC is registered with the CFTC as a futures merchant, you will not benefit from the CFTC’s or any other non-U.S. regulators’ regulatory protections that are afforded to persons who trade in futures contracts through a registered futures merchant or operator.

Unlike an investment in notes linked to the performance of an ETF that invests in one or more commodities, an investment in a collective investment vehicle that invests in futures contracts on behalf of its participants may be regulated as a commodity pool and its operator may be required to be registered with and regulated by the CFTC as a “commodity pool operator” (a “CPO”). Because the notes will not be interests in a commodity pool, they will not be regulated by the CFTC as a commodity pool, we will not be registered with the CFTC as a CPO and you will not benefit from the CFTC’s or any non-U.S. regulatory authority’s regulatory protections afforded to persons who trade in futures contracts or who invest in regulated commodity pools.

An Investment in the Notes May Be Subject to Risks Associated with the London Bullion Market Association (the “LBMA”).

The closing prices of some commodities, such as gold and silver, may be determined by reference to fixing prices reported by the LBMA. The LBMA is a self-regulatory association of bullion market participants. Although

all market-making members of the LBMA are supervised by the Bank of England and are required to satisfy a capital adequacy test, the LBMA itself is not a regulated entity. If the LBMA ceases operations, or if bullion trading becomes subject to a value-added tax or other tax or any other form of regulation currently not in place, the role of the LBMA price fixings as a global benchmark for the value of the relevant commodities may be adversely affected. The LBMA is a principals' market which operates in a manner more closely analogous to an over-the-counter physical commodity market than regulated futures markets, and certain features of U.S. futures contracts are not present in the context of LBMA trading. For example, there are no daily price limits on the LBMA which would otherwise restrict fluctuations in the prices of LBMA contracts. In a declining market, it is possible that prices would continue to decline without limitation within a trading day or over a period of trading days.

An Investment in the Notes May Be Subject to Risks Associated with the Trading of Commodities on the London Metals Exchange (the "LME").

The market prices of some commodities may be determined by reference to the settlement prices of contracts traded on the LME. The LME is a principals' market which operates in a manner more closely analogous to the over-the-counter physical commodity markets than the futures markets, and certain features of U.S. futures markets are not present in the context of LME trading. For example, there are no daily price limits on the LME, which would otherwise restrict the extent of daily fluctuations in the prices of LME contracts. In a declining market, therefore, it is possible that prices would continue to decline without limitation within a trading day or over a period of trading days. In addition, a contract may be entered into on the LME calling for delivery on any day from one day to three months following the date of such contract and for monthly delivery in any of the next 16 to 24 months (depending on the commodity) following such third month, in contrast to trading on futures exchanges, which call for delivery in stated delivery months. As a result, there may be a greater risk of a concentration of positions in LME contracts on particular delivery dates, which in turn could cause temporary aberrations in the prices of LME contracts for certain delivery dates. If such aberrations are occurring on a valuation date, the prices of the contracts used to determine the level of the price of the underlying commodities of the Reference Asset could be affected in a manner that adversely affects the payment at maturity.

Other Risk Factors Relating to the Applicable Reference Asset

The relevant pricing supplement may set forth additional risk factors as to the Reference Asset that you should review prior to purchasing the notes.

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GENERAL TERMS OF THE NOTES

Please note that in this section entitled “General Terms of the Notes,” references to “holders” mean those who own notes registered in their own names, on the books that we or the trustee maintain for this purpose, and not those who own beneficial interests in notes registered in street name or in notes issued in book-entry form through The Depository Trust Company (“DTC”) or another depository. Owners of beneficial interests in the notes should read the section entitled “Description of the Notes We May Offer—Legal Ownership” in the prospectus supplement and “Description of Debt Securities—Ownership and Book-Entry Issuance” in the prospectus.

In addition to the terms described in the “Summary” section above, the following general terms will apply to the notes, including your notes:

Specified Currency

Unless otherwise specified in the relevant pricing supplement, all payments, if any, on the notes will be made in U.S. dollars (“\$”).

Form and Denomination

The notes will be issued only in global form through DTC. Unless otherwise specified in the relevant pricing supplement, the notes will be issued in minimum denominations of \$1,000 and integral multiples of \$1,000.

No Listing

Your notes will not be listed or displayed on any securities exchange or included in any interdealer market quotation system.

Defeasance, Default Amount, Other Terms

Neither full defeasance nor covenant defeasance will apply to your notes. The following will apply to your notes:

the default amount will be payable on any acceleration of the maturity of your notes as described under “—Default Amount on Acceleration” below;

a business day for your notes will have the meaning described under “—Special Calculation Provisions—Business Day” below; and

a trading day for your notes will have the meaning described under “—Special Calculation Provisions—Trading Day” below.

Please note that the information about the issuance, issue date, issue price discounts or commissions and net proceeds to Royal Bank in the relevant pricing supplement relates only to the initial issuance and sale of your notes. If you have purchased your notes in a market-making transaction after the initial issuance and sale, any such relevant information about the sale to you will be provided in a separate confirmation of sale.

Payment at Maturity

At maturity, subject to our credit risk as issuer of the notes, you will receive a cash payment that is based on the performance of the Reference Asset. The payment at maturity will be calculated as follows:

Payment at Maturity in Excess of Principal

If the Final Level is greater than or equal to (or, in the case of bearish notes, less than or equal to) the Initial Level, then, at maturity, you will receive an amount equal to:

Principal Amount + (Principal Amount × Percentage Change)

The Percentage Change is the difference between the Final Level and the Initial Level and is expressed as a percentage of the Initial Level. The Percentage Change may be positive or negative and will be calculated as follows:

$\frac{\text{Final Level} - \text{Initial Level}}{\text{Initial Level}}$

Initial Level

If your notes are bearish notes, the Percentage Change will be calculated as follows:

$\frac{\text{Initial Level} - \text{Final Level}}{\text{Initial Level}}$

Initial Level

(a) Leverage Factor. If the relevant pricing supplement specifies that a Leverage Factor is applicable to your notes, then the payment at maturity will be calculated as follows:

Principal Amount + (Principal Amount × Percentage Change × Leverage Factor)

The Leverage Factor represents the extent to your notes will participate in the upside performance (or, in the case of bearish notes, downside performance) of the Reference Asset. The Leverage Factor may be less than, equal to, or greater than 100%. If the Leverage Factor is less than 100%, your notes will participate in less than the full upside performance (or, in the case of bearish notes, downside performance) of the Reference Asset. If the Leverage Factor is greater than 100%, your notes will participate in the upside performance (or, in the case of bearish notes, downside performance) on a leveraged basis. The Leverage Factor will be specified in the relevant pricing supplement, if applicable.

(b) Booster Coupon. If the relevant pricing supplement specifies that a Booster Coupon is applicable to your notes:

1. If the Percentage Change is greater than the Booster Percentage, then the payment at maturity will equal:

Principal Amount + (Principal Amount × Percentage Change)

2. If the Percentage Change is greater than or equal to 0% but less than or equal to the Booster Percentage, then the payment at maturity will equal:

Principal Amount + (Principal Amount × Booster Percentage)

The Booster Percentage is a specified increase (or, in the case of bearish notes, decrease) in the level of the Reference Asset, and will be set forth in the relevant pricing supplement, if applicable.

(c) Cap. If the relevant pricing supplement specifies that a cap is applicable to your notes, then the payment at maturity will not exceed the Maximum Redemption Amount set forth in the relevant pricing supplement.

(d) Digital Coupon. If the relevant pricing supplement specifies that a Digital Coupon is applicable to your notes, then the payment at maturity will equal:

Principal Amount + (Principal Amount × Digital Coupon)

The Digital Coupon will be a percentage specified in the applicable pricing supplement.

Payment at Maturity Less than or Equal to Principal

If the Final Level is less than (or, in the case of bearish notes, greater than) the Initial Level, then, at maturity, you will receive less than the principal amount of your notes. In such a case, the payment at maturity will equal:

Principal Amount + (Principal Amount × Percentage Change)

(a) Downside Multiplier. If the relevant pricing supplement specifies that a Downside Multiplier is applicable to your notes, then the payment at maturity will be calculated as follows:

Principal Amount + (Principal Amount × Percentage Change × Downside Multiplier)

The Downside Multiplier represents the extent to which your notes will participate in the downside performance (or, in the case of bearish notes, upside performance) of the Reference Asset. The Downside Multiplier may be less than, equal to, or greater than 100%. If the Downside Multiplier is less than 100%, your notes will participate in less than the full downside performance (or, in the case of bearish notes, upside performance) of the Reference Asset. If the Downside Multiplier is greater than 100%, your notes will participate in the downside performance (or, in the case of bearish notes, upside performance) on a leveraged basis. The Downside Multiplier will be specified in the relevant pricing supplement, if applicable. Depending on the Downside Multiplier, you may lose all or a substantial portion of the amount that you invested to purchase the notes; however, in no event will you lose more than your initial investment.

(b) Buffer. If the relevant pricing supplement specifies that a Buffer is applicable to your notes:

1. If the Final Level is greater than or equal to (or, in the case of bearish notes, less than or equal to) the Buffer Level, then the payment at maturity will equal the principal amount of your notes.

2. If the Final Level is less than (or in the case of bearish notes, greater than) the Buffer Level, then the payment at maturity will equal:

Principal Amount + [(Principal Amount × (Percentage Change + Buffer Percentage))]

The Buffer Level is a specified level of the Reference Asset that is less than (or, in the case of bearish notes, greater than) the Initial Level. The Buffer Level will be a percentage of the Initial Level and set forth in the relevant pricing supplement, if applicable. The Buffer Percentage is a specified percentage that will be set forth in the relevant pricing supplement, if applicable. For example, if the Buffer Level is 90% of the Initial Level, the Buffer Percentage will be 10%.

(c) Barrier. If the relevant pricing supplement specifies that a Barrier is applicable to your notes:

1. If no Barrier Event has occurred, then the payment at maturity will equal the principal amount of your notes.

2. If a Barrier Event has occurred, then the payment at maturity will equal:

Principal Amount + (Principal Amount × Percentage Change)

Unless otherwise specified in the relevant pricing supplement, a Barrier Event will occur if:

(i) the Final Level is less than (or, in the case of bearish notes, greater than) the Initial Level; and

- (ii) (a) for notes subject to Intra-Day Monitoring, at any time during the Monitoring Period, the level of the Reference Asset is less than (or, in the case of bearish notes, greater than) the Barrier Level, or
- (b) for notes subject to Close of Trading Day Monitoring, on any trading day during the Monitoring Period, the closing level of the Reference Asset is less than (or, in the case of bearish notes, greater than) the Barrier Level, or
- (c) for notes subject to Final Valuation Date Monitoring, the Final Level is less than (or, in the case of bearish notes, greater than) the Barrier Level.

The relevant pricing supplement will specify which of these three Monitoring Methods is applicable to your notes as well as the applicable Monitoring Period. If your notes are monitored by a different method, that method will be specified in the relevant pricing supplement, as well as any other provisions relating to the determination of the amount payable on your notes at maturity.

The Barrier Level is a specified level of the Reference Asset that is less than (or, in the case of bearish notes, greater than) the Initial Level. The Barrier Level will be a percentage of the Initial Level and set forth in the relevant pricing supplement, if applicable.

Determining the Level of the Reference Asset

Initial Level. The relevant pricing supplement will set forth the Initial Level of the Reference Asset. Unless otherwise specified in the relevant pricing supplement, the Initial Level of an exchange-traded fund will be its closing price on the pricing date.

Final Level. Unless otherwise specified in the relevant pricing supplement, the level of an exchange-traded fund on any valuation date will be its closing price on that date.

Valuation Date

Unless otherwise specified in the relevant pricing supplement, the valuation date (if there is only one valuation date applicable to the notes) or the final valuation date (if there is more than one valuation date applicable to the notes) will be the third trading day before the maturity date specified in the relevant pricing supplement. If the calculation agent determines that a market disruption event occurs or is continuing on any valuation date applicable to the notes, the Final Level will be determined according to the calculation in “—Market Disruption Events” below.

Maturity Date

Unless otherwise specified in the relevant pricing supplement, the maturity date will be the third scheduled business day following the valuation date or the final valuation date, as applicable, unless that date is not a business day, in which case the maturity date will be the next following business day. The maturity date will be postponed by the same number of trading days as the valuation date or the final valuation date, as applicable, if a market disruption event occurs or is continuing as described above. No interest will accrue past the maturity date specified in the relevant pricing supplement.

Unavailability of the Level of the Reference Asset on a Valuation Date

With respect to Reference Assets consisting of one or more ETFs, if a security’s listing is withdrawn from the principal national securities exchange on which that security is listed for trading and that security is not listed on any national exchange, or trading on that security is terminated on or prior to any valuation date, then the closing price for that security on that date will be determined by the calculation agent. In determining the closing price for that security on that date, the calculation agent may consider any relevant information, including, without limitation, information consisting of relevant market data in the relevant market supplied by one or more third parties or

internal sources including, without limitation, relevant rates, prices, yields, yield curves, volatilities, spreads, correlations or other relevant market data in the relevant market.

Adjustments Relating to Notes Linked to a Basket

If the calculation agent substitutes a successor ETF, or otherwise affects or modifies a Basket Component, then the calculation agent will make those calculations and adjustments as, in judgment of the calculation agent, may be necessary in order to arrive at a basket comparable to the original Basket (including without limitation changing the percentage weights of the Basket Components), as if those changes or modifications had not been made, and will calculate the payment at maturity with reference to that basket or the successor basket (as described below), as adjusted.

In this event, the calculation agent will provide written notice to the trustee of these calculations and adjustments, and the trustee will furnish written notice thereof, to the extent the trustee is required to under the senior debt indenture, to each noteholder, or in the case of global notes, the depositary, as holder of the global notes.

In the event of the adjustment described above, the newly composed basket is referred to in this section as the “successor basket” and will be used as a substitute for the original Basket for all purposes.

If the calculation agent determines that the available successor basket or basket components as described above do not fairly represent the value of the original Basket or Basket Components, as the case may be, then the calculation agent will determine the level of the applicable Basket Components or the Basket level for any valuation date as described under “—Unavailability of the Level of the Reference Asset on a Valuation Date—Reference Assets Consisting of One or More ETFs.”

Notwithstanding these alternative arrangements, discontinuance of trading on the applicable exchanges or markets in any Basket Component may adversely affect the market value of the notes.

Market Disruption Events

If the Final Level will be determined on a single valuation date and a market disruption event occurs or is continuing on that date, the Final Level will equal the closing price or closing level, as applicable, of the Reference Asset on the first trading day following the valuation date on which the calculation agent determines that a market disruption event is not continuing. If a market disruption event occurs or is continuing on each trading day to and including the tenth trading day following the valuation date, the Final Level will be determined (or, if not determinable, estimated by the calculation agent in a manner which is considered commercially reasonable under the circumstances) by the calculation agent on that tenth trading day, regardless of the occurrence or continuation of a market disruption event on that day. In such an event, the calculation agent will make a good faith estimate in its sole discretion of the Final Level that would have prevailed in the absence of the market disruption event.

If the Final Level will be determined over more than one valuation date and a market disruption event occurs or is continuing on any scheduled valuation date other than the final valuation date, the level of the Reference Asset for that valuation date will equal the closing price of the Reference Asset on the next scheduled valuation date. For example, if a market disruption event occurs or is continuing on the first and second scheduled valuation dates, but not on the third scheduled valuation date, then the closing price of the Reference Asset on the third scheduled valuation date will also be deemed to be the closing price of the Reference Asset on the first and second scheduled valuation dates. If no further scheduled valuation dates occur after a valuation date on which a market disruption event occurs or is continuing or if a market disruption event occurs or is continuing on the final valuation date, then the closing price of the Reference Asset for that valuation date will be determined (or, if not determinable, estimated by the calculation agent in a manner which is considered to be commercially reasonable under the circumstances) by the calculation agent on that final valuation date, regardless of the occurrence or continuation of a market disruption event on that day. In such an event, the calculation agent will make a good faith estimate in its sole discretion of the closing price of the Reference Asset that would have prevailed in the absence of the market disruption event.

A market disruption event means any event, circumstance or cause which Royal Bank determines, and the calculation agent confirms, has or will have a material adverse effect on the ability of Royal Bank to perform its obligations under the notes or to hedge its position in respect of its obligations to make payment of amounts owing thereunder and more specifically includes the following events to the extent that they have such effect with respect to any ETF that forms a part of the Reference Asset:

- a suspension, absence or limitation of trading in (i) that security in its primary market, as determined by the calculation agent, or (ii) futures or options contracts relating to that security in the primary market for those contracts, as determined by the calculation agent;
- any event that disrupts or impairs, as determined by the calculation agent, the ability of market participants to (i) effect transactions in, or obtain market values for, the security in its primary market, or (ii) effect transactions in, or obtain market values for, futures or options contracts relating the security in its primary market;
- the closure on any day of the primary market for that security on a scheduled trading day prior to the scheduled weekday closing time of that market (without regard to after hours or any other trading outside of the regular trading session hours) unless such earlier closing time is announced by the primary market at least one hour prior to the earlier of (i) the actual closing time for the regular trading session on such primary market on such scheduled trading day for such primary market and (ii) the submission deadline for orders to be entered into the relevant exchange system for execution at the close of trading on such scheduled trading day for such primary market;
- any scheduled trading day on which (i) the primary market for that security or (ii) the exchanges or quotation systems, if any, on which futures or options contracts on that security are traded, fails to open for trading during its regular trading session; or
- any other event, if the calculation agent determines that the event interferes with our ability or the ability of any of our affiliates to unwind all or a portion of a hedge with respect to the notes that we or our affiliates have effected or may effect as described below under “Use of Proceeds and Hedging” in this product prospectus supplement.

Anti-Dilution Adjustments Relating to a Reference Asset that Is an Exchange Traded Fund

The Initial Level, Buffer Level and Barrier Level will be specified in the relevant pricing supplement. The calculation agent will adjust the Initial Level, Buffer Level and Barrier Level if any of the dilution events described below occurs with respect to the Reference Asset.

The calculation agent will adjust the Initial Level, Buffer Level and Barrier Level as described below, but only if an event below under this section occurs with respect to the Reference Asset and only if the relevant event occurs during the period described under the applicable subsection. The Initial Level, Buffer Level and Barrier Level will be subject to the adjustments described below, independently and separately, with respect to the dilution events that affect the Reference Asset.

If more than one anti-dilution event requiring adjustment occurs with respect to the Initial Level, Buffer Level and Barrier Level, the calculation agent will adjust that Initial Level, Buffer Level and Barrier Level for each event, sequentially, in the order in which the events occur, and on a cumulative basis. Therefore, having adjusted the Initial Level, Buffer Level and Barrier Level for the first event, the calculation agent will adjust the Initial Level, Buffer Level and Barrier Level for the second event, applying the required adjustment to the Initial Level, Buffer Level and Barrier Level as already adjusted for the first event, and so on for each event. If an event requiring an anti-dilution adjustment occurs, the calculation agent will make the adjustment with a view to offsetting, to the extent practical, any change in the economic position of the holder and us, relative to your note, that results solely from that event. The calculation agent may, in its sole discretion, modify the anti-dilution adjustments as necessary to ensure an equitable result.

Stock Splits and Stock Dividends

A stock split is an increase in the number of a corporation's outstanding shares of stock without any change in its stockholders' equity. When a corporation pays a stock dividend, it issues additional shares of its stock to all holders of its outstanding stock in proportion to the shares they own. Each outstanding share will be worth less as a result of a stock split or stock dividend.

If the Reference Asset is subject to a stock split or receives a stock dividend, then the calculation agent will adjust the Initial Level, Buffer Level and Barrier Level by dividing the prior Initial Level, Buffer Level and Barrier Level—that is, the Initial Level, Buffer Level and Barrier Level before the stock split or stock dividend—by the number equal to: (1) the number of shares of the Reference Asset outstanding immediately after the stock split or stock dividend becomes effective; divided by (2) the number of shares of the Reference Asset outstanding immediately before the stock split or stock dividend becomes effective. The Initial Level, Buffer Level and Barrier Level will not be adjusted, however, unless:

- in the case of a stock split, the first day on which the Reference Asset trades without the right to receive the stock split occurs after the pricing date and on or before the applicable valuation date; or
- in the case of a stock dividend, the ex-dividend date occurs after the pricing date and on or before the applicable valuation date.

The ex-dividend date for any dividend or other distribution with respect to the Reference Asset is the first day on which the Reference Asset trades without the right to receive that dividend or other distribution.

Reverse Stock Splits

A reverse stock split is a decrease in the number of a corporation's outstanding shares of stock without any change in its stockholders' equity. Each outstanding share will be worth more as a result of a reverse stock split.

If the Reference Asset is subject to a reverse stock split, then the calculation agent will adjust the Initial Level, Buffer Level and Barrier Level by multiplying the prior Initial Level, Buffer Level and Barrier Level by a number equal to: (1) the number of shares of the Reference Asset outstanding immediately before the reverse stock split becomes effective; divided by (2) the number of shares of the Reference Asset outstanding immediately after the reverse stock split becomes effective. The Initial Level, Buffer Level and Barrier Level will not be adjusted, however, unless the reverse stock split becomes effective after the pricing date and on or before the applicable valuation date.

Extraordinary Dividends

Any distribution or dividend on the Reference Asset determined by the calculation agent to be a distribution or dividend that is not in the ordinary course of the issuer's historical dividend practices will be deemed to be an extraordinary dividend. The calculation agent will determine if the dividend is an extraordinary dividend and, if so, the amount of the extraordinary dividend. Each outstanding share will be worth less as a result of an extraordinary dividend.

If any extraordinary dividend occurs with respect to the Reference Asset, the calculation agent will adjust the Initial Level, Buffer Level and Barrier Level to equal the product of: (1) the prior Initial Level, Buffer Level and Barrier Level, times (2) a fraction, the numerator of which is the amount by which the closing price of the Reference Asset on the business day before the ex-dividend date exceeds the extraordinary dividend amount and the denominator of which is the closing price of the Reference Asset on the business day before the ex-dividend date. The Initial Level, Buffer Level and Barrier Level will not be adjusted, however, unless the ex-dividend date occurs after the pricing date and on or before the applicable valuation date.

The extraordinary dividend amount with respect to an extraordinary dividend for the Reference Asset equals:

for an extraordinary dividend that is paid in lieu of a regular quarterly dividend, the amount of the extraordinary dividend per share of the Reference Asset minus the amount per share of the immediately preceding dividend, if any, that was not an extraordinary dividend for the Reference Asset; or

for an extraordinary dividend that is not paid in lieu of a regular quarterly dividend, the amount per share of the extraordinary dividend.

To the extent an extraordinary dividend is not paid in cash, the value of the non-cash component will be determined by the calculation agent. A distribution on the Reference Asset that is a stock dividend, an issuance of transferable rights or warrants or a spin-off event and also an extraordinary dividend will result in an adjustment to the Initial Level, Buffer Level and Barrier Level only as described under “—Stock Splits and Stock Dividends” above, “—Transferable Rights and Warrants” below or “—Reorganization Events” below, as the case may be, and not as described here.

Transferable Rights and Warrants

If the issuer of the Reference Asset issues transferable rights or warrants to all holders of the Reference Asset to subscribe for or purchase the Reference Asset at an exercise price per share that is less than the closing price of the Reference Asset on the business day before the ex-dividend date for the issuance, then the Initial Level, Buffer Level and Barrier Level will be adjusted by multiplying the prior Initial Level, Buffer Level and Barrier Level by the following fraction:

the numerator will be the number of shares of the Reference Asset outstanding at the close of business on the day before that ex-dividend date plus the number of additional shares of the Reference Asset that the aggregate offering price of the total number of shares of the Reference Asset so offered for subscription or purchase pursuant to the transferable rights or warrants could purchase at the closing price on the business day before the ex-dividend date, with that number of additional shares being determined by multiplying the total number of shares so offered by the exercise price of those transferable rights or warrants and dividing the resulting product by the closing price on the business day before that ex-dividend date.

the denominator will be the number of shares of the Reference Asset outstanding at the close of business on the day before that ex-dividend date plus the number of additional shares of the Reference Asset offered for subscription or purchase under those transferable rights or warrants.

The Initial Level, Buffer Level and Barrier Level will not be adjusted, however, unless the ex-dividend date described above occurs after the pricing date and on or before the applicable valuation date.

Reorganization Events

If the issuer of the Reference Asset undergoes a reorganization event in which property other than the Reference Asset — e.g., cash and securities of another issuer — is distributed in respect of the Reference Asset, then, for purposes of calculating the level of the Reference Asset, the calculation agent will determine the closing price of the Reference Asset on the applicable valuation date to equal the value of the cash, securities and other property distributed in respect of one share of the Reference Asset.

If the calculation agent determines that, by valuing such cash, securities and other property, a commercially reasonable result is not achieved, then the calculation agent will, in its sole discretion, substitute another stock for that Reference Asset.

Each of the following is a reorganization event with respect to the Reference Asset:

the Reference Asset is reclassified or changed;

the issuer of the Reference Asset has been subject to a merger, consolidation or other combination and either is not the surviving entity or is the surviving entity but all the outstanding stock is exchanged for or converted into other property;

a statutory share exchange involving the outstanding stock and the securities of another entity occurs, other than as part of an event described in the two bullet points above;

the issuer of the Reference Asset sells or otherwise transfers its property and assets as an entirety or substantially as an entirety to another entity;

the issuer of the Reference Asset effects a spin-off—that is, issues to all holders of the Reference Asset equity securities of another issuer, other than as part of an event described in the four bullet points above;

the issuer of the Reference Asset is liquidated, dissolved or wound up or is subject to a proceeding under any applicable bankruptcy, insolvency or other similar law; or

another entity completes a tender or exchange offer for all of the outstanding stock of the issuer of the Reference Asset.

Valuation of Distribution Property

If a reorganization event occurs with respect to the Reference Asset, and the calculation agent does not substitute another stock for the Reference Asset as described in “—Substitution” below, then the calculation agent will determine the applicable closing price on each valuation date so as to equal the value of the property—whether it be cash, securities or other property—distributed in the reorganization event in respect of one share of the Reference Asset, as the Reference Asset existed before the date of the reorganization. We refer to the property distributed in a reorganization event as distribution property, a term we describe in more detail below. The calculation agent will not make any determination for a reorganization event, however, unless the event becomes effective (or, if the event is a spin-off, unless the ex-dividend date for the spin-off occurs) after the pricing date and on or before the applicable valuation date.

For the purpose of making a determination required by a reorganization event, the calculation agent will determine the value of each type of distribution property, in its sole discretion. For any distribution property consisting of a security, the calculation agent will use the closing price for the security on the relevant date. The calculation agent may value other types of property in any manner it determines, in its sole discretion, to be appropriate. If a holder of the Reference Asset may elect to receive different types or combinations of types of distribution property in the reorganization event, the distribution property will consist of the types and amounts of each type distributed to a holder that makes no election, as determined by the calculation agent in its sole discretion.

If a reorganization event occurs and the calculation agent adjusts the closing price of the Reference Asset on a valuation date to equal the value of the distribution property distributed in the event, as described above, the calculation agent will make further determinations for later events that affect the distribution property considered in determining the closing price. The calculation agent will do so to the same extent that it would make determinations if the Reference Asset were outstanding and were affected by the same kinds of events.

For example, if the issuer of the Reference Asset merges into another company and each share of the Reference Asset is converted into the right to receive two common shares of the surviving company and a specified amount of cash, then on each valuation date the closing price of a share of the Reference Asset will be determined to equal the value of the two common shares of the surviving company plus the specified amount of cash. The calculation agent will further determine the common share component of such closing price to reflect any later stock split or other event, including any later reorganization event, that affects the common shares of the surviving company, to the extent described in “—Anti-Dilution Adjustments Relating to a Reference Asset that is an Equity Security or an Exchange-Traded Fund” or as described above in this “—Reorganization Events” section as if the

common shares were the Reference Asset. In that event, the cash component will not be redetermined but will continue to be a component of the closing price.

When we refer to distribution property, we mean the cash, securities and other property distributed in a reorganization event in respect of the Reference Asset or in respect of whatever securities whose value determines the closing price on a valuation date if any adjustment resulting from a reorganization event has been made in respect of a prior event. In the case of a spin-off, the distribution property also includes the Reference Asset in respect of which the distribution is made.

If a reorganization event occurs, the distribution property distributed in the event will be substituted for the Reference Asset as described above. Consequently, in this product prospectus supplement, when we refer to the Reference Asset, we mean any distribution property that is distributed in a reorganization event in respect of the Reference Asset. Similarly, when we refer to the issuer of the Reference Asset, we mean any successor entity in a reorganization event.

Substitution

If the calculation agent determines that a commercially reasonable result is not achieved by valuing distribution property with respect to the Reference Asset upon becoming subject to a reorganization event, then the calculation agent will, in its sole discretion, substitute another stock for the Reference Asset. In such case, the adjustments described above in “—Valuation of Distribution Property” will not apply.

If the calculation agent so determines, it may choose, in its sole discretion, the stock of a different company listed on a national securities exchange or quotation system as a substitute for the Reference Asset. For all purposes, the substitute stock will be deemed to be a stock for purposes hereof.

The calculation agent will determine, in its sole discretion, the Initial Level, Buffer Level, Barrier Level and/or the manner of valuation of the substitute stock. The calculation agent will have the right to make such adjustments to the calculation of the individual stock performance as it determines in its sole discretion are necessary to preserve as nearly as possible our and your relative economic position prior to the reorganization event.

Other Events

The calculation agent is empowered to make such adjustments to the terms of the notes for other events not described above in its sole discretion.

Payment of Additional Amounts

We will pay any amounts to be paid by us on the notes 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 notes, 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 note or of a right to receive payments in respect thereto (a “Payment Recipient”), which we refer to as an “Excluded Holder,” in respect of a beneficial owner or Payment Recipient:

- (i) with whom we do not deal at arm’s length (within the meaning of the Income Tax Act (Canada)) at the time of making such payment;

who is subject to such taxes by reason of its being connected presently or formerly with Canada or any province or (ii) territory thereof otherwise than by reason of the holder's activity in connection with purchasing the notes, the holding of notes or the receipt of payments thereunder;

who is, or who does not deal at arm's length with a person who is, a "specified shareholder" (within the meaning of subsection 18(5) of the Income Tax Act (Canada)) of Royal Bank of Canada (generally a person will be a (iii) "specified shareholder" for this purpose if that person, either alone or together with persons with whom the person does not deal at arm's length, owns 25% or more of (a) our voting shares, or (b) the fair market value of all of our issued and outstanding shares);

who presents such note for payment (where presentation is required) more than 30 days after the relevant date (except to the extent that the holder thereof would have been entitled to such Additional Amounts on presenting a (iv) note for payment on the last day of such 30 day period); for this purpose, the "relevant date" in relation to any payments on any note means:

(a) the due date for payment thereof, or

if the full amount of the monies payable on such date has not been received by the Trustee on or prior to such due (b) date, the date on which the full amount of such monies has been received and notice to that effect is given to holders of the notes in accordance with the Indenture;

who could lawfully avoid (but has not so avoided) such withholding or deduction by complying, or procuring that (v) any third party comply, with any statutory requirements necessary to establish qualification for an exemption from withholding or by making, or procuring that any third party make, a declaration of non-residence or other similar claim for exemption to any relevant tax authority; or

who is subject to deduction or withholding on account of any tax, assessment, or other governmental charge that is imposed or withheld by reason of the application of Section 1471 through 1474 of the United States Internal (vi) Revenue Code of 1986, as amended (the "Code") (or any successor provisions), any regulation, pronouncement, or agreement thereunder, official interpretations thereof, or any law implementing an intergovernmental approach thereto, whether currently in effect or as published and amended from time to time.

For the avoidance of doubt, we will not have any obligation to pay any holders Additional Amounts on any tax which is payable otherwise than by deduction or withholding from payments made under or in respect of the notes at maturity.

We will also make such withholding or deduction and remit the full amount deducted or withheld to the relevant authority in accordance with applicable law. We will furnish to the trustee, within 30 days after the date the payment of any taxes is due pursuant to applicable law, certified copies of tax receipts evidencing that such payment has been made or other evidence of such payment satisfactory to the trustee. We will indemnify and hold harmless each holder of notes (other than an Excluded Holder) and upon written request reimburse each such holder for the amount of (x) any taxes so levied or imposed and paid by such holder as a result of payments made under or with respect to the notes, and (y) any taxes levied or imposed and paid by such holder with respect to any reimbursement under (x) above, but excluding any such taxes on such holder's net income or capital.

For additional information, see the section entitled "Supplemental Discussion of Canadian Tax Consequences."

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Default Amount on Acceleration

Unless otherwise specified in the relevant pricing supplement, in case an event of default with respect to the notes shall have occurred and be continuing, the amount declared due and payable on the notes upon any acceleration of the notes will be determined by the calculation agent and will be an amount in cash equal to the amount payable as described under the caption “—Payment at Maturity,” calculated as if the date of acceleration were the final valuation date. If the maturity of the notes is accelerated because of an event of default, we will, or will cause the calculation agent to, provide written notice to the trustee at its New York office, on which notice the trustee may conclusively rely, and to the depository, of the cash amount due with respect to the notes as promptly as possible and in no event later than two business days after the date of acceleration.

Manner of Payment and Delivery

Any payment on the notes at maturity will be made to accounts designated by you and approved by us, or at the office of the trustee in New York City. The payment at maturity will only be made when the notes are surrendered to the trustee at that office. We also may make any payment or delivery in accordance with the applicable procedures of the depository.

Modified Business Day

As described in the accompanying prospectus, any payment on your note that would otherwise be due on a day that is not a business day may instead be paid on the next day that is a business day, with the same effect as if paid on the original due date. For your note, however, the term business day may have a different meaning than it does for other Series H medium-term notes. We discuss this term under “—Special Calculation Provisions” below.

Role of Calculation Agent

The calculation agent will make all determinations regarding the level of the Reference Asset, modified business days, market disruption events, the default amount, and the amount payable on your notes. Absent manifest error, all determinations of the calculation agent will be final and binding on you and us, without any liability on the part of the calculation agent. You will not be entitled to any compensation from us for any loss suffered as a result of any of the above determinations or confirmations by the calculation agent.

Our subsidiary, RBC Capital Markets, LLC is currently serving as the calculation agent for the notes. We may change the calculation agent for your notes at any time without notice and the calculation agent may resign as calculation agent at any time upon 60 days’ written notice to Royal Bank.

Special Calculation Provisions

Business Day

When we refer to a business day with respect to your notes, we mean a day that is a business day of the kind described in the accompanying prospectus supplement, unless otherwise specified in the relevant pricing supplement. If the relevant pricing supplement specifies a different meaning for the term business day, we will use that modified definition in determining each applicable payment date as well as the maturity date for your notes, all as described in this product prospectus supplement.

Trading Day

When we refer to a trading day with respect to your notes, we mean a day on which the principal trading market for the Reference Asset is open for trading, unless otherwise specified in the relevant pricing supplement.

HYPOTHETICAL RETURNS ON YOUR NOTES

The relevant pricing supplement may include a table or chart showing hypothetical amounts that could be delivered for your notes at maturity, based on a range of hypothetical levels of the Reference Asset and on various key assumptions shown in the relevant pricing supplement.

Any table or chart showing hypothetical amounts will be provided for purposes of illustration only. It should not be viewed as an indication or prediction of future investment results. Rather, it is intended merely to illustrate the impact that various hypothetical levels of the Reference Asset on any valuation date, as calculated in the manner described in the relevant pricing supplement and assuming all other variables remained constant. The hypothetical amounts listed in the relevant pricing supplement will be entirely hypothetical. They will be based on levels of the Reference Asset that may not be achieved on the relevant valuation date and on assumptions that may prove to be erroneous.

As calculated in the relevant pricing supplement, the hypothetical amounts payable on your notes at maturity may bear little or no relationship to the actual market value of your notes on that date or at any other time, including any time you might wish to sell your notes. In addition, you should not view the hypothetical amounts as an indication of the possible financial return on an investment in your notes, since the financial return will be affected by various factors, including taxes, that the hypothetical information does not take into account. Moreover, whatever the financial return on your notes might be, it may bear little relation to — and may be much less than — the financial return that you might achieve were you to invest directly in the Reference Asset.

We describe various risk factors that may affect the market value of your notes, and the unpredictable nature of that market value, under “Additional Risk Factors Specific to the Notes” above.

We cannot predict the levels of the Reference Asset or, therefore, the payment at maturity. Moreover, the assumptions we make in connection with any hypothetical information in the relevant pricing supplement may not reflect actual events. Consequently, that information may give little or no indication of the amount that will be paid in respect of your notes at maturity, nor should it be viewed as an indication of the financial return on your notes or of how that return might compare to the financial return on an investment directly in the Reference Asset.

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USE OF PROCEEDS AND HEDGING

We will use the net proceeds we receive from the sale of the notes for the purposes we describe in the attached prospectus supplement under “Use of Proceeds.” We or our affiliates may also use those proceeds in transactions intended to hedge our obligations under the notes as described below.

In anticipation of the sale of the notes, we or our affiliates expect to enter into hedging transactions involving purchases of securities, commodities, indices or other assets included in or linked to the Reference Asset and/or listed and/or over-the-counter derivative instruments linked to the Reference Asset prior to or on the pricing date. From time to time, we or our affiliates may enter into additional hedging transactions or unwind those we have entered into.

In this regard, we or our affiliates may:

- acquire or dispose of the Reference Asset or its components;
- acquire or dispose of long or short positions in listed or over-the-counter derivative instruments based on the level of the Reference Asset or its components; or
- any combination of the above two.

We or our affiliates may acquire a long or short position in securities similar to the notes from time to time and may, in our or their sole discretion, hold or resell those similar securities.

We or our affiliates may close out our or their hedge on or before the final valuation date. That step may involve sales or purchases of the Reference Asset or its components or over-the-counter derivative instruments linked to those assets.

The hedging activity discussed above may adversely affect the market value of the notes from time to time. See “Additional Risk Factors Specific to the Notes—Trading and Other Transactions by Royal Bank or its Affiliates in the Reference Asset or Its Components, Futures, Options, Exchange-Traded Funds or Other Derivative Products May Adversely Affect the Market Value of the Notes” and “—The Business Activities of Royal Bank or its Affiliates May Create Conflicts of Interest” in this product prospectus supplement for a discussion of these adverse effects.

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HISTORICAL REFERENCE ASSET LEVEL INFORMATION

We may provide historical level information on the Reference Asset or applicable Basket Components in the relevant pricing supplement. You should not take any of those historical levels as an indication of the future performance. We cannot give you any assurance that the level of the Reference Asset or Basket Components will not decrease (or, in the case of bearish notes, increase), thus causing you to receive an amount that is less than the principal amount of your notes at maturity.

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SUPPLEMENTAL DISCUSSION OF CANADIAN TAX CONSEQUENCES

An investor should read carefully the description of material Canadian federal income tax considerations relevant to a Non-resident Holder owning debt securities under “Tax Consequences—Canadian Taxation” in the accompanying prospectus.

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SUPPLEMENTAL DISCUSSION OF U.S. FEDERAL INCOME TAX CONSEQUENCES

The following is a general description of the material U.S. tax considerations relating to the notes. It does not purport to be a complete analysis of all tax considerations relating to the notes. Prospective purchasers of the notes should consult their tax advisors as to the consequences under the tax laws of the country of which they are resident for tax purposes and the tax laws of Canada and the U.S. of acquiring, holding and disposing of the notes and receiving payments under the notes. This summary is based upon the law as in effect on the date of this product prospectus supplement and is subject to any change in law that may take effect after such date.

Supplemental U.S. Tax Considerations

The following disclosure—including the opinion of Morrison & Foerster LLP—has been prepared without regard to any particular note that you may purchase in the future and, therefore, is provided solely as a matter of general information. You should not rely upon the following disclosure (including the opinion of Morrison & Foerster LLP), or the disclosure under “Tax Consequences—United States Taxation” in the prospectus or “Certain Income Tax Consequences—United States Taxation” in the prospectus supplement, with regard to an investment in any particular note because this disclosure (including the opinion of Morrison & Foerster LLP) does not take into account the terms of any particular note or the tax consequences of investing in or holding any particular note unless the pricing supplement applicable to your notes expressly indicates that you may rely on the following disclosure and expressly states that you may rely on the opinion of Morrison & Foerster LLP. Any note that you purchase may have terms that would result in a tax treatment that is significantly different from the treatment described below. For example, the discussion below assumes that an investor in the notes will be subject to a significant risk that it will lose a significant amount of its investment in the notes. If an investor in the notes is not subject to a significant risk that it will lose a significant amount of its investment in the notes, the tax treatment of that note may differ substantially from that described in the discussion below. There may be other features or terms of your notes that will cause this tax section to be inapplicable to your notes. Further, this discussion does not address the tax consequences applicable to any holders under Section 451(b) of the Code.

Consequently, any tax disclosure relevant to any note you may purchase will be set forth only in the pricing supplement relating to your note, and, unless the pricing supplement indicates otherwise, you should not rely on the tax disclosure below or in the prospectus supplement or prospectus in deciding whether to invest in any note. Moreover, in all cases, you should consult with your own tax advisor concerning the consequences of investing in and holding any particular note you propose to purchase.

The following section supplements the discussion of U.S. federal income taxation in the accompanying prospectus and prospectus supplement. It applies only to those initial holders who are not excluded from the discussion of U.S. federal income taxation in the accompanying prospectus.

NO STATUTORY, JUDICIAL OR ADMINISTRATIVE AUTHORITY DIRECTLY DISCUSSES HOW THE NOTES SHOULD BE TREATED FOR U.S. FEDERAL INCOME TAX PURPOSES. AS A RESULT, THE U.S. FEDERAL INCOME TAX CONSEQUENCES OF AN INVESTMENT IN THE NOTES ARE UNCERTAIN. BECAUSE OF THE UNCERTAINTY, YOU SHOULD CONSULT YOUR TAX ADVISOR IN DETERMINING THE U.S. FEDERAL INCOME TAX AND OTHER TAX CONSEQUENCES OF YOUR INVESTMENT IN THE NOTES, INCLUDING THE APPLICATION OF STATE, LOCAL OR OTHER TAX LAWS AND THE POSSIBLE EFFECTS OF CHANGES IN FEDERAL OR OTHER TAX LAWS.

We will not attempt to ascertain whether any Reference Asset or any components of any of the Reference Assets would be treated as a “passive foreign investment company” within the meaning of Section 1297 of the Code or a “U.S. real property holding corporation” within the meaning of Section 897 of the Code. If any such Reference Asset or any components of any of the Reference Assets were so treated, certain adverse U.S. federal income tax consequences could possibly apply. You should refer to any available information filed with the SEC and other authorities by the issuers of the Reference Assets and the issuers of the components of the Reference Assets and consult your tax advisor regarding the possible consequences to you in this regard.

In the opinion of our counsel, Morrison & Foerster LLP, it would generally be reasonable to treat a note with terms described in this product prospectus supplement as a pre-paid cash-settled derivative contract in respect

of the Reference Asset or Basket for U.S. federal income tax purposes, and the terms of the notes require a holder and us (in the absence of a change in law or an administrative or judicial ruling to the contrary) to treat the notes for all tax purposes in accordance with such characterization. If the notes are so treated, subject to the discussion below concerning the potential application of the “constructive ownership” rules under Section 1260 of the Code, a U.S. holder should generally recognize capital gain or loss upon the sale or maturity of the notes in an amount equal to the difference between the amount a holder receives at such time and the holder’s tax basis in the notes. In general, a U.S. holder’s tax basis in the notes will be equal to the price the holder paid for the notes. Capital gain recognized by an individual U.S. holder is generally taxed at preferential rates where the property is held for more than one year and is generally taxed at ordinary income rates where the property is held for one year or less. The deductibility of capital losses is subject to limitations. The holding period for notes of a U.S. holder who acquires the notes upon issuance will generally begin on the date after the issue date (i.e., the settlement date) of the notes. If the notes are held by the same U.S. holder until maturity, that holder’s holding period will generally include the maturity date. It is possible that the Internal Revenue Service could assert that a U.S. holder’s holding period in respect of the notes should end on the date on which the amount the holder is entitled to receive upon the maturity of the notes is determined, even though the holder will not receive any amounts from us in respect of the notes prior to the maturity of the notes. In such case, if that date is not in excess of one year from the issue date, a U.S. holder may be treated as having a holding period in respect of the notes that is one year or less even if the holder receives cash upon maturity of the notes at a time that is more than one year after the beginning of its holding period.

Potential Application of Section 1260 of the Internal Revenue Code. Since each of the Reference Assets is the type of financial asset described under Section 1260 of the Code (including, among others, any equity interest in pass-thru entities such as ETFs, regulated investment companies, real estate investment trusts, partnerships, and passive foreign investment companies, each a “Section 1260 Financial Asset”), while the matter is not entirely clear, unless otherwise specified in the applicable pricing supplement, there exists a substantial risk that an investment in a note is, in whole or in part, a “constructive ownership transaction” to which Section 1260 of the Code applies. If Section 1260 of the Code applies, all or a portion of any long-term capital gain recognized by a U.S. holder in respect of a note will be recharacterized as ordinary income (the “Excess Gain”). In addition, an interest charge will also apply to any deemed underpayment of tax in respect of any Excess Gain to the extent such gain would have resulted in gross income inclusion for the U.S. holder in taxable years prior to the taxable year of the sale or maturity (assuming such income accrued at a constant rate equal to the applicable federal rate as of the date of sale or maturity).

If an investment in a note is treated as a constructive ownership transaction, it is not clear to what extent any long-term capital gain of a U.S. holder in respect of the note will be recharacterized as ordinary income. It is possible, for example, that the amount of the Excess Gain (if any) that would be recharacterized as ordinary income in respect of the note will equal the excess of (i) any long-term capital gain recognized by the U.S. holder in respect of the note and attributable to Section 1260 Financial Assets, over (ii) the “net underlying long-term capital gain” (as defined in Section 1260 of the Code) such U.S. holder would have had if such U.S. holder had acquired an amount of the corresponding Section 1260 Financial Assets at fair market value on the original issue date for an amount equal to the portion of the issue price of the note attributable to the corresponding Section 1260 Financial Assets and sold such amount of Section 1260 Financial Assets upon the date of sale or maturity of the note at fair market value (and appropriately taking into account any leveraged upside exposure). To the extent any gain is treated as long-term capital gain after application of the recharacterization rules of Section 1260 of the Code, such gain would be subject to U.S. federal income tax at the rates that would have been applicable to the net underlying long-term capital gain. However, unless otherwise established by clear and convincing evidence, the net underlying long-term capital gain is treated as zero. U.S. holders should consult their tax advisors regarding the potential application of Section 1260 of the Code to an investment in the note.

Alternative Treatments. Alternative tax treatments of the notes are also possible and the Internal Revenue Service might assert that a treatment other than that described above is more appropriate. For example, it is possible to treat the notes, and the Internal Revenue Service might assert that the notes should be treated, as a single debt instrument. If the notes have a term that exceeds one year, such a debt instrument would be subject to the special tax rules governing contingent payment debt instruments. If the notes are so treated, a holder would generally be required to accrue interest currently over the term of the notes even though that holder will not receive any payments from us prior to maturity. In addition, any gain a holder might recognize upon the sale or maturity of the notes would

generally be ordinary income and any loss recognized by a holder at such time would be ordinary loss to the

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extent of interest that same holder included in income in the current or previous taxable years in respect of the notes, and thereafter, would be capital loss. If the notes are treated as a single debt instrument that has a term of no more than one year, the notes would be treated as a single contingent short-term debt instrument, which would also result in tax consequences that are different from those described above.

If the Reference Asset, or a Basket Component, periodically rebalances, it is possible that the notes could be treated as a series of derivative contracts, each of which matures on the next rebalancing date. If the notes were properly characterized in such a manner, a holder would be treated as disposing of the notes on each rebalancing date in return for new derivative contracts that mature on the next rebalancing date, and a holder would accordingly likely recognize capital gain or loss on each rebalancing date equal to the difference between the holder's basis in the notes (which would be adjusted to take into account any prior recognition of gain or loss) and the fair market value of the notes on such date.

Because of the absence of authority regarding the appropriate tax characterization of the notes, it is also possible that the Internal Revenue Service could seek to characterize the notes in a manner that results in other tax consequences that are different from those described above. For example, the Internal Revenue Service could possibly assert that any gain or loss that a holder may recognize upon the sale or maturity of the notes should be treated as ordinary gain or loss.

The Internal Revenue Service has released a notice that may affect the taxation of holders of the notes. According to the notice, the Internal Revenue Service and the U.S. Treasury Department are actively considering whether the holder of an instrument similar to the notes should be required to accrue ordinary income on a current basis. It is not possible to determine what guidance they will ultimately issue, if any. It is possible, however, that under such guidance, holders of the notes will ultimately be required to accrue income currently and this could be applied on a retroactive basis. The Internal Revenue Service and the U.S. Treasury Department are also considering other relevant issues, including whether additional gain or loss from such instruments should be treated as ordinary or capital and whether the special "constructive ownership rules" of Section 1260 of the Code, which generally operate to recharacterize certain long-term capital gains as ordinary income and impose an interest charge, might be applied to such instruments. Holders are urged to consult their tax advisors concerning the significance, and the potential impact, of the above considerations. Unless stated otherwise in the relevant pricing supplement, we intend to treat the notes for U.S. federal income tax purposes in accordance with the treatment described in this product prospectus supplement unless and until such time as the U.S. Treasury Department and Internal Revenue Service determine that some other treatment is more appropriate.

Backup Withholding and Information Reporting. Payments made with respect to the notes and proceeds from the sale or maturity of the notes may be subject to a backup withholding tax unless, in general, the holder complies with certain procedures or is an exempt recipient. Any amounts so withheld generally will be refunded by the Internal Revenue Service or allowed as a credit against the holder's U.S. federal income tax liability, provided the holder makes a timely filing of an appropriate tax return or refund claim to the Internal Revenue Service.

Reports will be made to the Internal Revenue Service and to holders that are not exempted from the reporting requirements.

Non-U.S. Holders. The following discussion applies to non-U.S. holders of the notes. A non-U.S. holder is a beneficial owner of a note that, for U.S. federal income tax purposes, is a non-resident alien individual, a foreign corporation, or a foreign estate or trust.

Except as discussed below, a non-U.S. holder will generally not be subject to U.S. federal income or withholding tax for amounts paid in respect of the notes, provided that (i) the holder complies with any applicable certification requirements, (ii) the payment is not effectively connected with the conduct by the holder of a U.S. trade or business, and (iii) if the holder is a non-resident alien individual, such holder is not present in the U.S. for 183 days or more during the taxable year of the sale or maturity of the notes. In the case of (ii) above, the holder generally would be subject to U.S. federal income tax with respect to any income or gain in the same manner as if the holder were a U.S. holder and, in the case of a holder that is a corporation, the holder may also be subject to a branch profits tax equal to 30% (or such lower rate provided by an applicable U.S. income tax treaty) of a portion of its earnings and profits for the taxable year that are effectively connected with its conduct of a trade or business in

the U.S., subject to certain adjustments. Payments made to a non-U.S. holder may be subject to information reporting and to backup withholding unless the holder complies with applicable certifi