

**RETURN BIDS TO:
RETOURNER LES SOUMISSIONS À:**

Health Canada / Santé Canada

Attn: Sami Nouh
Email: sami.nouh@canada.ca

**REQUEST FOR PROPOSAL
DEMANDE DE PROPOSITION**

Proposal To: Health Canada

We hereby offer to sell to Her Majesty the Queen in right of Canada, in accordance with the terms and conditions set out herein, referred to herein or attached hereto, the goods, services, and construction listed herein and on any attached sheets at the price(s) set out thereof.

Proposition à: Santé Canada

Nous offrons par la présente de vendre à Sa Majesté la Reine du chef du Canada, aux conditions énoncées ou incluses par référence dans la présente et aux annexes ci-jointes, les biens, services et construction énumérés ici sur toute feuille ci-annexées, au(x) prix indiqué(s).

**Instructions : See Herein
Instructions: Voir aux présentes**

Issuing Office – Bureau de distribution

Health Canada / Santé Canada
200, Eglantine Driveway
Tunney's Pasture
Ottawa Ontario K1A 0K9

Title – Sujet Route Study	
Solicitation No. – N° de l'invitation 1000213457	Date August 22, 2019
Solicitation Closes at – L'invitation prend fin à 2 :00 PM on / le – September 6, 2019	Time Zone Fuseau horaire EDT
F.O.B. - F.A.B. Plant-Usine: <input type="checkbox"/> Destination: <input type="checkbox"/> Other-Autre: <input type="checkbox"/>	
Address Enquiries to: - Adresser toutes questions à : Name: Sami Nouh Email: sami.nouh@canada.ca Telephone : 613-941-2102	
Destination – of Goods, Services, and Construction: Destination – des biens, services et construction : See Herein – Voir ici	
Delivery required - Livraison exigée See Herein – Voir ici	
Vendor/firm Name and address Raison sociale et adresse du fournisseur/de l'entrepreneur	
Facsimile No. – N° de télécopieur : Telephone No. – N° de téléphone :	
Name and title of person authorized to sign on behalf of Vendor/firm Nom et titre de la personne autorisée à signer au nom du fournisseur/de l'entrepreneur	
<hr/> (type or print)/ (taper ou écrire en caractères d'imprimerie)	
<hr/> Signature	<hr/> Date

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PART 1 - GENERAL INFORMATION

1.1 Security Requirements

There is no security requirement

1.2 Statement of Work

The Work to be performed is detailed under Article A of the resulting contract clauses

1.3 Debriefings

Bidders may request a debriefing on the results of the bid solicitation process. Bidders should make the request to the Contracting Authority within 15 working days from receipt of the results of the bid solicitation process. The debriefing may be in writing, by telephone or in person.

PART 2 - BIDDER INSTRUCTIONS

2.1 Standard Instructions, Clauses and Conditions

All instructions, clauses and conditions identified in the bid solicitation by number, date and title are set out in the [Standard Acquisition Clauses and Conditions Manual](https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual) (https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual) issued by Public Works and Government Services Canada.

Bidders who submit a bid agree to be bound by the instructions, clauses and conditions of the bid solicitation and accept the clauses and conditions of the resulting contract.

The 2003 (2019-03-04) Standard Instructions - Goods or Services - Competitive Requirements, are incorporated by reference into and form part of the bid solicitation.

2.2 Submission of Bids

Bids must be submitted only to the contracting officer by the date, time and email address indicated on page 1 of the bid solicitation. Due to the nature of the bid solicitation, bids transmitted by facsimile will not be accepted.

2.3 Former Public Servant

Contracts awarded to former public servants (FPS) in receipt of a pension or of a lump sum payment must bear the closest public scrutiny, and reflect fairness in the spending of public funds. In order to comply with Treasury Board policies and directives on contracts awarded to FPSs, bidders must provide the information required below before contract award. If the answer to the questions and, as applicable the information required have not been received by the time the evaluation of bids is completed, Canada will inform the Bidder of a time frame within which to provide the information. Failure to comply with Canada's request and meet the requirement within the prescribed time frame will render the bid non-responsive.

Definitions

For the purposes of this clause, "*former public servant*" is any former member of a department as defined in the [Financial Administration Act](#), R.S., 1985, c. F-11, a former member of the Canadian Armed Forces or a former member of the Royal Canadian Mounted Police. A former public servant may be:

- a. an individual;
- b. an individual who has incorporated;
- c. a partnership made of former public servants; or
- d. a sole proprietorship or entity where the affected individual has a controlling or major interest in the entity.

"*lump sum payment period*" means the period measured in weeks of salary, for which payment has been made to facilitate the transition to retirement or to other employment as a result of the implementation of various programs to reduce the size of the Public Service. The lump sum payment period does not include the period of severance pay, which is measured in a like manner.

"*pension*" means a pension or annual allowance paid under the [Public Service Superannuation Act](#) (PSSA), R.S., 1985, c.P-36, and any increases paid pursuant to the [Supplementary Retirement Benefits Act](#), R.S., 1985, c. S-24 as it affects the PSSA. It does not include pensions payable pursuant to the [Canadian Forces Superannuation Act](#), R.S., 1985, c. C-17, the [Defence Services Pension Continuation Act](#), 1970, c. D-3, the [Royal Canadian Mounted Police Pension Continuation Act](#), 1970, c. R-10, and the [Royal Canadian Mounted Police Superannuation Act](#), R.S., 1985, c. R-11, the [Members of Parliament Retiring Allowances Act](#), R.S. 1985, c. M-5, and that portion of pension payable to the [Canada Pension Plan Act](#), R.S., 1985, c. C-8.

Former Public Servant in Receipt of a Pension

As per the above definitions, is the Bidder a FPS in receipt of a pension? **Yes** () **No** ()

If so, the Bidder must provide the following information, for all FPSs in receipt of a pension, as applicable:

- a. name of former public servant;
- b. date of termination of employment or retirement from the Public Service.

By providing this information, Bidders agree that the successful Bidder's status, with respect to being a former public servant in receipt of a pension, will be reported on departmental websites as part of the published proactive disclosure reports in accordance with [Contracting Policy Notice: 2012-2](#) and the [Guidelines on the Proactive Disclosure of Contracts](#).

Work Force Adjustment Directive

Is the Bidder a FPS who received a lump sum payment pursuant to the terms of the Work Force Adjustment Directive? **Yes** () **No** ()

If so, the Bidder must provide the following information:

- a. name of former public servant;
- b. conditions of the lump sum payment incentive;
- c. date of termination of employment;
- d. amount of lump sum payment;
- e. rate of pay on which lump sum payment is based;
- f. period of lump sum payment including start date, end date and number of weeks;
- g. number and amount (professional fees) of other contracts subject to the restrictions of a work force adjustment program.

For all contracts awarded during the lump sum payment period, the total amount of fees that may be paid to a FPS who received a lump sum payment is \$5,000, including Applicable Taxes.

2.4 Enquiries - Bid Solicitation

All enquiries must be submitted in writing to the Contracting Authority no later than three (3) calendar days before the bid closing date. Enquiries received after that time may not be answered.

Bidders should reference as accurately as possible the numbered item of the bid solicitation to which the enquiry relates. Care should be taken by Bidders to explain each question in sufficient detail in order to enable Canada to provide an accurate answer. Technical enquiries that are of a proprietary nature must be clearly marked "proprietary" at each relevant item. Items identified as "proprietary" will be treated as such except where Canada determines that the enquiry is not of a proprietary nature. Canada may edit the question(s) or may request that the Bidder do so, so that the proprietary nature of the question(s) is eliminated, and the enquiry can be answered to all Bidders. Enquiries not submitted in a form that can be distributed to all Bidders may not be answered by Canada.

2.5 Applicable Laws

Any resulting contract must be interpreted and governed, and the relations between the parties determined, by the laws in force in Ontario. Bidders may, at their discretion, substitute the applicable laws of a Canadian province or territory of their choice without affecting the validity of their bid, by deleting the name of the Canadian province or territory specified and inserting the name of the Canadian province or territory of their choice. If no change is made, it acknowledges that the applicable laws specified are acceptable to the Bidders.

PART 3 - BID PREPARATION INSTRUCTIONS

3.1 Bid Preparation Instructions

- If the Bidder chooses to submit its bid electronically, Canada requests that the Bidder submits its bid in accordance with section 08 of the 2003 standard instructions. Bidders must provide their bid in a single transmission.
- The bid must be gathered per section and separated as follows:

Section I: Technical Bid File
Section II: Financial Bid File
Section III: Certifications File

Section I: Technical Bid

In their technical bid, Bidders should explain and demonstrate how they propose to meet the requirements and how they will carry out the Work.

Section II: Financial Bid

Bidders must submit their financial bid in accordance with the Basis of Payment.

Section III: Certifications

Bidders must submit the certifications and additional information required under Part 5.

PART 4 - EVALUATION PROCEDURES AND BASIS OF SELECTION

4.1 Evaluation Procedures

- (a) Bids will be assessed in accordance with the entire requirement of the bid solicitation including the technical and financial evaluation criteria.
- (b) An evaluation team composed of representatives of Canada will evaluate the bids.

4.1.1 Technical Evaluation

4.1.1.1 Mandatory Technical Criteria

The bid must meet the mandatory technical criteria specified below. The Bidder must provide the necessary documentation to support compliance with this requirement.

Bids which fail to meet the mandatory technical criteria will be declared non-responsive. Each mandatory technical criterion should be addressed separately.

Instruction to bidders:

Write beside each of the criterion the relevant page number(s) from your bid that addresses the requirement identified for that criterion.

	Requirements	Met (Y/N)	Comments / Reference in Proposal
M1	The Bidder must demonstrate, by providing a certificate or an official letter, that they have access to and have the permission to use the Ontario Population Health and Environment Cohort (ONPHEC) which contains the entire adult population in the province of Ontario with detailed individual-level information on air pollution exposure, incident cases of major chronic diseases such as diabetes, cardiovascular disease, pulmonary disease, and disease progression, and cause-specific mortality between 1996 and 2014 or later.		
M2	The Bidder must demonstrate, by providing a link or printable pdf document of one (1) published science paper in a peer-reviewed journal, that they have completed the validation of the ONPHEC cohort identified from M1.		
M3	The Bidder must demonstrate, by providing links or printable pdf document of two (2) published science papers in peer-reviewed journals, that they have at least 3 years of experience in assisting with optimizing algorithms for the ascertainment of chronic disease outcomes using large-scale health administrative databases in Ontario.		
M4	The Bidder must demonstrate their subject-matter expertise in data linkage, and data analysis using the ONPHEC and air pollution and/or other environmental data, by providing two (2) project summaries conducted in the past 5 years. Project Descriptions must include: 1. Name of the organization; 2. Period of the work (start and end dates); 3. Objectives of the research; 4. Methodology of the research and tasks;		

	<p>5. Contact information (name, telephone, email address) for the project authority.</p> <p>Canada reserves the right to contact client references to validate experience.</p>		
M5	The Bidder must demonstrate, by providing links or printable pdf document of two (2) peer-reviewed scientific papers, their ability to conduct spatial random-effect survival analysis with air pollution exposure data		
M6	The Bidder must demonstrate, by providing links or printable pdf document of two (2) peer-reviewed scientific papers, that they are subject-matter experts in developing concentration-response curves for the impact of air pollution on chronic health outcomes using Shape Constrained Health Impact Function and other advanced statistical methodologies.		
M7	The Bidder must demonstrate, by providing a project plan, that they can begin the analysis in September 2019 and provide deliverables as per scheduled deliverable date outlined in the Activities and Timelines table of the SOW.		
M8	<p>The Bidder must demonstrate, by providing a copy with their bid, that the lead resource has a;</p> <ul style="list-style-type: none"> • PhD in epidemiology or biostatistics <p>Or</p> <ul style="list-style-type: none"> • MD (Medical Doctor) with a Master's in epidemiology or biostatistics. 		

4.2 Basis of Selection - Mandatory Technical Criteria

A bid must comply with the requirements of the bid solicitation and meet all mandatory technical evaluation criteria to be declared responsive. The responsive bid with the lowest evaluated price will be recommended for award of a contract.

PART 5 – CERTIFICATIONS AND ADDITIONAL INFORMATION

Bidders must provide the required certifications and additional information to be awarded a contract.

The certifications provided by Bidders to Canada are subject to verification by Canada at all times. Unless specified otherwise, Canada will declare a bid non-responsive, or will declare a contractor in default if any certification made by the Bidder is found to be untrue whether made knowingly or unknowingly, during the bid evaluation period or during the contract period.

The Contracting Authority will have the right to ask for additional information to verify the Bidder's certifications. Failure to comply and to cooperate with any request or requirement imposed by the Contracting Authority will render the bid non-responsive or constitute a default under the Contract.

5.1 Certifications Required with the Bid

Bidders must submit the following duly completed certifications as part of their bid.

5.1.1 Integrity Provisions - Declaration of Convicted Offences

In accordance with the Integrity Provisions of the Standard Instructions, all bidders must provide with their bid, **if applicable**, the declaration form available on the [Forms for the Integrity Regime](http://www.tpsgc-pwgsc.gc.ca/ci-if/declaration-eng.html) website (<http://www.tpsgc-pwgsc.gc.ca/ci-if/declaration-eng.html>), to be given further consideration in the procurement process.

5.2 Certifications Precedent to Contract Award and Additional Information

The certifications and additional information listed below should be submitted with the bid, but may be submitted afterwards. If any of these required certifications or additional information is not completed and submitted as requested, the Contracting Authority will inform the Bidder of a time frame within which to provide the information. Failure to provide the certifications or the additional information listed below within the time frame provided will render the bid non-responsive.

5.2.1 Integrity Provisions – Required Documentation

In accordance with the section titled Information to be provided when bidding, contracting or entering into a real property agreement of the [Ineligibility and Suspension Policy](http://www.tpsgc-pwgsc.gc.ca/ci-if/politique-policy-eng.html) (<http://www.tpsgc-pwgsc.gc.ca/ci-if/politique-policy-eng.html>), the Bidder must provide the required documentation, as applicable, to be given further consideration in the procurement process.

5.2.2 Federal Contractors Program for Employment Equity - Bid Certification

By submitting a bid, the Bidder certifies that the Bidder, and any of the Bidder's members if the Bidder is a Joint Venture, is not named on the Federal Contractors Program (FCP) for employment equity "FCP Limited Eligibility to Bid" list available at the bottom of the page of the [Employment and Social Development Canada \(ESDC\) - Labour's](https://www.canada.ca/en/employment-social-development/programs/employment-equity/federal-contractor-program.html#) website (<https://www.canada.ca/en/employment-social-development/programs/employment-equity/federal-contractor-program.html#>). Canada will have the right to declare a bid non-responsive if the Bidder, or any member of the Bidder if the Bidder is a Joint Venture, appears on the "FCP Limited Eligibility to Bid" list at the time of contract award.

5.2.3 Additional Certifications Precedent to Contract Award

5.2.3.1 Status and Availability of Resources

SACC Manual clause [A3005T](#) (2010-08-16) Status and Availability of Resources

5.2.3.2 Certifications - Contract

SACC Manual clause [A3015C](#) (2014-06-26) Certifications - Contract

5.2.3.3 Education and Experience

SACC Manual clause [A3010T](#) (2010-08-16) Education and Experience

PART 6 - RESULTING CONTRACT CLAUSES

The following clauses and conditions apply to and form part of any contract resulting from the bid solicitation.

6.1 Security Requirements

6.1.1 There is no security requirement applicable to the Contract.

6.2 Statement of Work

The Contractor must perform the Work in accordance with the Statement of Work at Annex "A".

6.3 Standard Clauses and Conditions

All clauses and conditions identified in the Contract by number, date and title are set out in the [Standard Acquisition Clauses and Conditions Manual](https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual) (https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual) issued by Public Works and Government Services Canada.

6.3.1 General Conditions

[2010B](#) (2018-06-21), General Conditions - Professional Services (Medium Complexity) apply to and form part of the Contract.

6.3.2 Supplemental General Conditions

[4006](#) (2010-08-16) - Contractor to Own Intellectual Property Rights in Foreground Information, apply to and form part of the Contract.

6.4 Term of Contract

6.4.1 Period of the Contract

The Work is to be performed during the period of contract award to March 31, 2020

6.4.2 Option to Extend the Contract

The Contractor grants to Canada the irrevocable option to extend the term of the Contract by up to three (3) additional one (1) year periods, under the same conditions. The Contractor agrees that, during the extended period of the Contract, it will be paid in accordance with the applicable provisions as set out in the Basis of Payment.

Canada may exercise this option at any time by sending a written notice to the Contractor before the expiry date of the Contract. The option may only be exercised by the Contracting Authority, and will be evidenced for administrative purposes only, through a contract amendment.

6.5 Authorities

6.5.1 Contracting Authority

The Contracting Authority for the Contract is:

Name: Sami Nouh
Title: Senior Procurement and Contracting Officer
Health Canada - Public Health Agency of Canada
Chief Financial Officer Branch
Telephone: 613-941-2102
E-mail address: sami.nouh@canada.ca

The Contracting Authority is responsible for the management of the Contract and any changes to the Contract must be authorized in writing by the Contracting Authority. The Contractor must not perform work in excess of or outside the scope of the Contract based on verbal or written requests or instructions from anybody other than the Contracting Authority.

6.5.2 Project Authority

The Project Authority for the Contract is:

Name: _____

Title: _____

Organization: _____

Address: _____

Telephone: _____

Facsimile: _____

E-mail address: _____

The Project Authority is the representative of the department or agency for whom the Work is being carried out under the Contract and is responsible for all matters concerning the technical content of the Work under the Contract. Technical matters may be discussed with the Project Authority, however the Project Authority has no authority to authorize changes to the scope of the Work. Changes to the scope of the Work can only be made through a contract amendment issued by the Contracting Authority.

6.5.3 Contractor's Representative

Insert at contract award

6.6 Proactive Disclosure of Contracts with Former Public Servants

By providing information on its status, with respect to being a former public servant in receipt of a Public Service Superannuation Act (PSSA) pension, the Contractor has agreed that this information will be reported on departmental websites as part of the published proactive disclosure reports, in accordance with Contracting Policy Notice: 2012-2 of the Treasury Board Secretariat of Canada.

6.7 Payment

6.7.1 Basis of Payment - Firm Price

In consideration of the Contractor satisfactorily completing all of its obligations under the Contract, the Contractor will be paid a firm lot price, as specified in Annex B for a cost of \$ _____ insert the amount at contract award). Customs duties are included and Applicable Taxes are extra.

Canada will not pay the Contractor for any design changes, modifications or interpretations of the Work, unless they have been approved, in writing, by the Contracting Authority before their incorporation into the Work.

6.7.2 Milestone Payments - Not subject to holdback

SACC Manual clause [H3010C](#) (2016-01-28) Milestone Payments - Not subject to holdback

Schedule of Milestones

#	Deliverable	Level of effort (hours)	Due Date
1	Submission of documents required for project initiation (including PIA and 3 DCPs) and Report 1	292	October 30, 2019
2	Conduct of Statistical Analysis and Submission of Report 2	250	December 30, 2019
3	Conduct of Statistical Analysis and Submission of Report 3	250	February 28, 2020

Option Year One (From March 17, 2020 to March 16, 2021)

#	Deliverable	Level of effort (hours)	Due Date	Cost
1	Conduct of Statistical Analysis and Submission of Report 4	250	August 30, 2020	\$
2	Conduct of Statistical Analysis and Submission of Report 5	250	December 30, 2020	\$
3	Conduct of Statistical Analysis and Submission of Report 6	264	February 28, 2021	\$
Total Firm Price (All-inclusive Taxes Extra) =				

Option Year Two (From March 17, 2021 to March 16, 2022)

#	Milestone	Level of effort (hours)	Due Date	Cost
1	Conduct of Statistical Analysis and Submission of Report 7	250	August 30, 2021	\$
2	Conduct of Statistical Analysis and Submission of Report 8	250	December 30, 2021	\$
3	Conduct of Statistical Analysis and Submission of Report 9	251	February 28, 2022	\$
Total Firm Price (All-inclusive Taxes Extra) =				\$

Option Year Three (From March 17, 2022 to March 16, 2023)

#	Deliverable	Level of effort (hours)	Due Date	Cost
1	Conduct of Statistical Analysis and Literature Review and Submission of Report 10	223	August 30, 2022	\$
2	Conduct of Statistical Analysis and Submission of Report 11	250	December 30, 2022	\$
3	Conduct of Statistical Analysis and Submission of Report 12	250	February 28, 2023	\$

6.7.3 Electronic Payment of Invoices – Contract

The Contractor accepts to be paid using any of the following Electronic Payment Instrument(s):

- a. Visa Acquisition Card;
- b. MasterCard Acquisition Card;
- c. Direct Deposit (Domestic and International);
- d. Electronic Data Interchange (EDI);
- e. Wire Transfer (International Only);
- f. Large Value Transfer System (LVTS) (Over \$25M)

6.8 Invoicing Instructions

1. The Contractor must submit a claim for payment using form [PWGSC-TPSGC 1111](#), Claim for Progress Payment.

Each claim must show:

- a) all information required on form [PWGSC-TPSGC 1111](#);
- b) all applicable information detailed under the section entitled "Invoice Submission" of the general conditions;
- c) the description and value of the milestone claimed as detailed in the Contract.

2. Applicable Taxes, must be calculated on the total amount of the claim before the holdback is applied. At the time the holdback is claimed, there will be no Applicable Taxes payable as it was claimed and payable under the previous claims for progress payments.

3. The Contractor must prepare and certify one original and two (2) copies of the claim on form [PWGSC-TPSGC 1111](#), and forward it to hc.p2p.east.invoices-factures.est.sc@canada.ca

. The Contractor must not submit claims until all work identified in the claim is completed.

6.9 Certifications and Additional Information

6.9.1 Compliance

Unless specified otherwise, the continuous compliance with the certifications provided by the Contractor in its bid or precedent to contract award, and the ongoing cooperation in providing additional information are conditions of the Contract and failure to comply will constitute the Contractor in default. Certifications are subject to verification by Canada during the entire period of the Contract.

6.10 Applicable Laws

The Contract must be interpreted and governed, and the relations between the parties determined, by the laws in force in Ontario.

6.11 Priority of Documents

If there is a discrepancy between the wording of any documents that appear on the list, the wording of the document that first appears on the list has priority over the wording of any document that subsequently appears on the list.

- (a) the Articles of Agreement;
- (b) the supplemental general conditions [4006](#) (2010-08-16) - Contractor to Own Intellectual Property Rights in Foreground Information;

- (c) the general conditions 2010B (2018-06-21), General Conditions - Professional Services (Medium Complexity);
- (d) Annex A, Statement of Work;
- (e) Annex B, Basis of Payment;
- (f) Annex C, Electronic Payment Instruments; and
- (g) the Contractor's bid dated _____

ANNEX "A"
STATEMENT OF WORK

Analysis of air pollution and disease trajectory and intervention using Ontario healthcare administrative data

1. SCOPE

1.1. Introduction

High levels of ambient air pollution are known to be harmful to human health. There is also clear evidence that exposure to lower levels of air pollution continues to affect human health. Over the past two decades, epidemiological studies conducted at diverse locations including Canada have repeatedly demonstrated increased premature deaths from cardiorespiratory causes as a result of chronic exposure to low levels of air pollutants. Despite mounting evidence linking air pollution to survival, important questions remain. The precise mechanism and pathways, whereby the accumulation of exposures elicits premature death, requires more precise elucidation. To date, little is known about how air pollution influences the transition from clinical manifestation of disease states, to their progression through various stages of severity and complication, and eventually to premature death. This information is crucial for supporting health guidance and preventive interventions, as well as for estimating the burden of air pollution. Chronic disease and air pollution: disease trajectory and intervention (ROUTE) Study, a study funded by Health Canada, is designed to investigate the role of chronic exposure to air pollution in shaping individuals' health trajectories. By identifying key pathways of public health significance, ROUTE study aims to provide guidance for decision making in the development of effective mitigation strategies of air pollution.

Another objective of ROUTE study is to evaluate the effectiveness of some widely-implemented or potential individual- and policy-level interventions in reducing air health effects. Air pollution has major public health and economic consequences, but considerable uncertainty exists concerning which actions can be taken to reduce its effects. Despite mounting interest in understanding the effectiveness of past interventions and whether other possible measures are needed, only a small number of epidemiological studies have been conducted to evaluate past air quality regulatory actions. ROUTE study will further evaluate how air pollution burden can be changed by intervening at both the individual and the population levels, thus filling important gaps in air health research and policy formation. Advances in our understanding of specific strategies is of crucial importance for developing and strengthening evidence-based actions to mitigate the health effects of air pollution.

ROUTE Study will provide powerful guidance for decision making and for the development of policy-level interventions. Important information generated by this study will enable air quality managers to construct effect strategies to improve air quality that benefit the most citizens with respect to their health as outlined by Health Canada's Air Program. . The outcomes from this contract will cross-cut multiple themes of the Health Canada's Air Program. The refined understanding how air pollution may influence transitions between health states will inform the Canadian Ambient Air Quality Standards (CAAQS). This contract will also address several Health Canada's Air Program priorities (e.g., accountability and intervention studies, mechanistic approaches, and research to support health guidance). Furthermore, there is mounting interest among research community and decision makers in utilizing causal inference in air health research. ROUTE Study responds directly to this research need. Collectively, this study will enable policy decision and public actions on air pollution in Canada and elsewhere.

1.2. Objectives of the Requirement

The main objectives of this project are:

1. To determine how air pollution influences the transition of health states from incidence of major chronic diseases, to their progression, and finally to premature death; and
2. To evaluate the effectiveness of some widely-implemented or potential individual-level and population-level strategies in reducing the harmful effects of air pollution on health in Canada

1.3. Background and Specific Scope of the Requirement

There is unequivocal evidence that long-term exposure to air pollution, even at the relatively low levels observed in Canada, is responsible for increased incidence and mortality from major chronic diseases. While different health outcomes have been extensively investigated in previous studies, the segregation

of air pollution research by individual outcome is artificial. Little is known about the impact of air pollution on shaping individuals' physiological transformations (various disease states, frailty, and death). Even less is known about the effectiveness of past interventions of air pollution and whether other possible measures are needed. Advances in our understanding of specific strategies are of crucial importance for developing and strengthening evidence-based actions to mitigate the health effects of air pollution in Canada. To fill these major gaps in knowledge and policy formation, this research contract will compile the entire adult population in Ontario through data linkage across multiple health administrative databases (e.g., chronic disease databases), health survey data (e.g., Ontario portion of the Canadian Community Health Surveys [CCHS]), and environmental exposure data (e.g., air pollution, noise, greenness). These population-based administrative databases were linked and held at ICES, Toronto, Ontario.

This contract will entail three complementary analyses using the Ontario adult population: 1) a study to quantify path-specific effects involving causally ordered mediators (*i.e.*, incidence of selected major diseases and their readmissions) covering a wide array of scenarios of disease trajectories; 2) a study to examine whether use of common cardiovascular medications may moderate the negative effect of air pollution on cardiovascular morbidity and mortality across Ontario; and 3) a study to examine the extent to which a hypothetical policy to enforce low emission zones in the city of Toronto would yield health benefits.

To quantify the role of air pollution exposure on different scenarios of disease trajectories, the research team will conduct a series of mediation analyses in consultation with the scientific team at Health Canada. For air pollutants, the Contractor will use satellite-based surface concentrations of fine particulate matter (PM_{2.5}), land-use regression model-derived nitrogen dioxide (NO₂) concentrations, and fusion-based ozone (O₃) concentrations. For covariates, the Contractor will gather information on age, sex, marital status, education, occupation, body mass index (BMI), smoking, alcohol use, consumption of fruits and vegetables, physical activity from CCHS data, comorbidities from provincial health administrative databases, and various neighborhood-level factors (e.g., percentages of immigrants) from Census data. The proportions of the effect of air pollution on mortality that are mediated through the development of the major diseases and their progression will be estimated. Multiple subgroup analysis and sensitivity analyses will also be conducted to test the key assumptions of mediation analysis.

To examine whether cardiovascular medications moderate cardiovascular morbidity and mortality in association with air pollution, the Contractor will conduct a nested case-control study. The outcomes of interest are death and hospitalization from any cardiovascular cause, as well as death and hospitalization from coronary heart disease and stroke (more specific outcomes). The Contractor will use conditional logistic regression models to estimate the impact of air pollution on cardiovascular morbidity and mortality for each air pollutant-cardiovascular outcome combination. Given that medication use may fall in the causal pathways between air pollution and cardiovascular outcomes (thus act as mediators), the Contractor will also apply advanced causal mediation methods following the strategy developed by a member of the scientific team at Health Canada (Dr. Jay Kaufman, McGill University).

To examine what would be the potential health benefits of implementing hypothetical low emission zones (LEZ) in Toronto, the Contractor will conduct a simulation analysis. This simulation will include three stages that have recently been developed by a member of the scientific team at Health Canada (Dr. Tarik Benmarnia, University of California, San Diego). Realistic estimates from observed changes in air pollution due to a LEZ as described in the literature will be used. As a complementary approach, hypothetical reduction from a no policy scenario, expanding up to an intervention-specific reduction in PM_{2.5} and NO₂ of 10%, will be considered.

2. REQUIREMENTS

2.1. Tasks, Activities, Deliverables and Milestones

Up to twelve reports will be submitted as deliverables:

1. Describing the characteristics of study populations, ascertainment of outcomes, and descriptive statistics of air pollution exposures
2. Characterizing how air pollution influences the transition of health states from incidence of diabetes to premature death

3. Characterizing how air pollution influences the transition of health states from incidence of stroke or heart failure (HF) to premature death
4. Characterizing how air pollution influences the transition of health states from incidence of diabetes, to related readmission, and finally to premature death
5. Characterizing how air pollution influences the transition of health states from incidence of stroke or HF, to related readmissions, and finally to premature death
6. Examining whether use of common cardiovascular medications may moderate the negative effect of air pollution on cardiovascular morbidity and mortality
7. Characterizing how air pollution influences the transition of health states from two causally ordered incident diseases (diabetes to myocardial infarction [MI], diabetes to stroke, diabetes to HF), and finally to premature death
8. Examining whether use of common cardiovascular medications may be mediators in the negative effect of air pollution on death and hospitalization from any coronary heart disease
9. Examining whether use of common cardiovascular medications may be mediators in the negative effect of air pollution on death and hospitalization from stroke
10. Describing detailed results of studies that evaluated the potential benefits of a common intervention
11. Examining the extent to which a hypothetical policy would yield health benefits with incident MI and stroke
12. Examining the extent to which a hypothetical policy would yield health benefits with deaths from non-accidental, cardiovascular, and respiratory causes

2.2. Specifications and Standards

Each progress is to be delivered electronically by emails.

2.3. Method and Source of Acceptance

At the time of submission of each deliverable, Health Canada's Technical Authority will indicate acceptance (or, not); in the affirmative, this would constitute a milestone for payment.

2.4. Project Management Control Procedures

Health Canada's Technical Authority shall communicate with the primary contact for the Provider of Service as needed to clarify any issue and deal with any barriers as needed. The Technical Authority will review the progress reports provided to ensure it contains all the information requested.

3. ADDITIONAL INFORMATION

3.1. Canada's Obligations

- ensure availability of staff with whom the supplier may need to consult;
- schedule teleconferences, if required;
- schedule meetings, if required;
- provide comments on draft reports within ten (10 working days) from receipt of report

3.2. Contractor's Obligations

- meet all tasks, deliverables and milestones as identified in Section 2.1;
- ensure availability of staff with whom the Provider of Service may need to consult;
- submit all written reports to Health Canada in electronic Microsoft Office Word format;
- participate in teleconferences, if required;
- attend meeting at government sites, if required.

3.3. Location of Work, Work site and Delivery Point

All work will be conducted at the contractor's facility. Due to the workload and the tight deadlines, all personnel assigned to any agreement resulting from this contract must be ready to work in close contact with the Health Canada Authority and other departmental personnel.

3.4. Language of Work

All communication on this project will be in English.

4. PROJECT SCHEDULE

4.1. Schedule and Estimated Level of Effort (Work Breakdown Structure)

The Level of Effort (Work Breakdown Structure) is shown in the table below:

Item no.	Deliverables and Milestone	Estimated Level of effort
Original contract period from the date of contract being awarded to March 16, 2020		
1	Submission of documents required for project initiation (including PIA and 3 DCPs) and Report 1	292 hours
2	Conduct of Statistical Analysis and Submission of Report 2	250 hours
3	Conduct of Statistical Analysis and Submission of Report 3	250 hours
Option years 1 (March 17, 2020 to March 12, 2021)		
4	Conduct of Statistical Analysis and Submission of Report 4	250 hours
5	Conduct of Statistical Analysis and Submission of Report 5	250 hours
6	Conduct of Statistical Analysis and Submission of Report 6	264 hours
Option year 2 (March 13, 2021 to March 11, 2022)		
7	Conduct of Statistical Analysis and Submission of Report 7	250 hours
8	Conduct of Statistical Analysis and Submission of Report 8	250 hours
9	Conduct of Statistical Analysis and Submission of Report 9	251 hours
Option year 3 (March 12, 2022 to March 10, 2023)		
10	Conduct of Statistical Analysis and Literature Review and Submission of Report 10	223 hours
11	Conduct of Statistical Analysis and Submission of Report 11	250 hours
12	Conduct of Statistical Analysis and Submission of Report 12	250 hours

ANNEX "B"
BASIS OF PAYMENT

A- Contract Period

During the period of the Contract, for Work performed in accordance with the Contract, the Contractor will be paid as specified below.

Note: Insert additional lines if needed

B- 1 Initial Contract Period (From the date of contract being awarded to March 16, 2020)

#	Deliverable	Level of effort (hours)	Due Date	Cost
1	Submission of documents required for project initiation (including PIA and 3 DCPs) and Report 1	292	October 30, 2019	\$
2	Conduct of Statistical Analysis and Submission of Report 2	250	December 30, 2019	\$
3	Conduct of Statistical Analysis and Submission of Report 3	250	February 28, 2020	\$
Total Firm Price (All-inclusive Taxes Extra) =				

B- 2 Option to Extend the Term of the Contract

This section is only applicable if the option to extend the Contract is exercised by Canada. During the extended period of the Contract specified below, the Contractor will be paid as specified below to perform all the Work in relation to the Contract extension.

Extended Contract Period (From March 17, 2020 to March 16, 2021)

#	Deliverable	Level of effort (hours)	Due Date	Cost
1	Conduct of Statistical Analysis and Submission of Report 4	250	August 30, 2020	\$
2	Conduct of Statistical Analysis and Submission of Report 5	250	December 30, 2020	\$
3	Conduct of Statistical Analysis and Submission of Report 6	264	February 28, 2021	\$
Total Firm Price (All-inclusive Taxes Extra) =				

B- 3 Option to Extend the Term of the Contract

This section is only applicable if the option to extend the Contract is exercised by Canada.

During the extended period of the Contract specified below, the Contractor will be paid as specified below to perform all the Work in relation to the Contract extension.

Extended Contract Period (From March 17, 2021 to March 16, 2022)

#	Milestone	Level of effort (hours)	Due Date	Cost
1	Conduct of Statistical Analysis and Submission of Report 7	250	August 30, 2021	\$
2	Conduct of Statistical Analysis and Submission of Report 8	250	December 30, 2021	\$
3	Conduct of Statistical Analysis and Submission of Report 9	251	February 28, 2022	\$
Total Firm Price (All-inclusive Taxes Extra) =				\$

B- 4 Option to Extend the Term of the Contract

This section is only applicable if the option to extend the Contract is exercised by Canada.

During the extended period of the Contract specified below, the Contractor will be paid as specified below to perform all the Work in relation to the Contract extension.

Extended Contract Period (From March 17, 2022 to March 16, 2023)

#	Deliverable	Level of effort (hours)	Due Date	Cost
1	Conduct of Statistical Analysis and Literature Review and Submission of Report 10	223	August 30, 2022	\$
2	Conduct of Statistical Analysis and Submission of Report 11	250	December 30, 2022	\$
3	Conduct of Statistical Analysis and Submission of Report 12	250	February 28, 2023	\$
Total Firm Price (All-inclusive Taxes Extra) =				

Financial Score

Contract Period	Aggregate Firm Price Rate
B-1 Initial Contract Period	
B-2 Option Period #1	
B-3 Option Period #2	
B-4 Option Period #3	
Aggregate Firm Price Total =	

ANNEX "C" to PART 3 OF THE BID SOLICITATION

ELECTRONIC PAYMENT INSTRUMENTS

The Bidder accepts any of the following Electronic Payment Instrument(s):

- VISA Acquisition Card;
- MasterCard Acquisition Card;
- Direct Deposit (Domestic and International);
- Electronic Data Interchange (EDI);
- Wire Transfer (International Only);
- Large Value Transfer System (LVTS) (Over \$25M)