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The State of New Hampshire
Department of Environmental Services

Robert R. Scott, Commissioner

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November 2, 2020

His Excellency, Governor Christopher T. Sununu
and the Honorable Council
State House
Concord, New Hampshire 03301

REQUESTED ACTION

Authorize the Department of Environmental Services (NHDES) to enter into a **SOLE SOURCE** agreement with Research Triangle Institute (RTI), (VC# 171105-B001), Research Triangle Park, NC in the amount of $198,908 for the modernization of the RiverTrak® Forecast System used to track water flows, effective upon Governor and Council approval through December 31, 2022. 100% Capital (General) Funds.

Funding is available in the account as follows:

	FY 2021
03-44-442030-12670000-034-500161	$198,908

Dept. Environmental Services, 19-146:1-VI:A Dam Repair & Reconstruction, Capital Projects

EXPLANATION

Under RSA 483-D:1, NHDES was directed to develop a computer model to assist in managing flows in the Winnipesaukee River Basin. To fulfill this requirement, in 2001, NHDES procured the services of Riverside Technology Incorporated (now doing business as Research Triangle Institute), a qualified engineering consultant, in accordance with the procedures specified in RSA 21-I:22, to provide and support the RiverTrak® Forecast System. This agreement to modernize the RiverTrak® Forecast System is **SOLE SOURCE** because the forecasting and reservoir operations modeling systems produced by RTI are custom applications of software modules that can only upgraded by RTI. A complete ground-up redevelopment of the underlying hydrologic models and information, developed in the original contract with RTI, by another vendor would not be cost effective and would unnecessarily risk interruption and/or degradation of modeling and publicly available data functions of the existing models. The Department of Information Technology (DoIT) has provided a letter of approval for this **SOLE SOURCE** agreement, which is attached to this request.

Since the original development of the RiverTrak® Forecast System, NHDES has contracted with RTI to model additional New Hampshire watershed basins to expand the utility of the RiverTrak® Forecast System, and uses it daily to inform dam operations on many of the State's most important water resources and provide public access to valuable information, including lake levels and stream flows. The software and database systems collectively known as the RiverTrak® Forecast System includes the following capabilities:

- Provides real-time access to hydrometeorological data
- Stores and manages the real-time data

www.des.nh.gov
29 Hazen Drive • PO Box 95 • Concord, NH 03302-0095
(603) 271-3503 • Fax: 271-2867 • TDD Access: Relay NH 1-800-735-2964

- Forecasting of lake levels and stream flows in watersheds using real-time data from NHDES gauging stations as well as other available sources
- Provides real-time decision support for reservoir operations
- Evaluates alternative reservoir operations and structural measures
- Disseminates information to the public through NHDES' webpage on current conditions and hydrometerological data, such as lake levels, river levels, stream flows, precipitation, and air temperature

The underlying software framework for the RiverTrak® Forecast System is now more than 20 years old. As a result, the software framework is no longer compatible with many of the latest security protocols, software, and operating systems employed by the State of New Hampshire. The RiverTrak® Forecast System is not compatible with the latest versions of SQL Server relational database software, and compatibility with future versions of Microsoft Windows is unknown and not guaranteed by RTI. DoIT has been keeping an older server in service specifically to run an older version of SQL Server database software that is compatible with the RiverTrak® Forecast System, and multiple workarounds were necessary to allow the software executable to run on a newer desktop running the Windows 10 operating system. The Real-Time Data webpage developed by RTI for disseminating data to the public may not be supported by Microsoft in future releases of Microsoft Servers.

In addition, over time some other webpages and data sources have improved their security protocols and are no longer compatible with the RiverTrak® Forecast System. Most nobably, the transition to HTTPS secure-encryption webpages using TLS/SSL protocols has subsequently prevented the RiverTrak® Forecast System from downloading and using forecasted temperature data from the National Digital Forecast Database and hydrometereological data from the Hydrometeorological Automated Data System website. There have also been many advances in the available forecasting data from outside sources that the RiverTrak® Forecast System has not been capable of utilizing, including expanded forecast data from the Northeast River Forecast Center (NERFC) that are now regularly available for 72-hours into the future with occasional 96-hour forecasts issued for major storms and hurricanes. All of these issues and more would be addressed in the proposed agreement with RTI to modernize the RiverTrak® Forecast System software framework.

This contract has been approved by the Office of Information Technology, attached to this request.

This contract has been approved by the Department of Justice as to form, substance and execution.

We respectfully request your approval.

Robert R. Scott, Commissioner

Notice: This agreement and all of its attachments shall become public upon submission to Governor and Executive Council for approval. Any information that is private, confidential or proprietary must be clearly identified to the agency and agreed to in writing prior to signing the contract.

AGREEMENT

The State of New Hampshire and the Contractor hereby mutually agree as follows:

GENERAL PROVISIONS

1. IDENTIFICATION.

1.1 State Agency Name New Hampshire Department of Environmental Services		1.2 State Agency Address 29 Hazen Drive – PO Box 95 Concord, NH 03302-0095	
1.3 Contractor Name Research Triangle Institute (d/b/a RTI International)		1.4 Contractor Address 3040 Cornwallis Rd PO Box 12194 Research Triangle Park NC 27709-2194 USA	
1.5 Contractor Phone Number (919) 541-6634	1.6 Account Number 03-44-44-442030-12670000-034-500161	1.7 Completion Date 12/31/2022	1.8 Price Limitation $198,908
1.9 Contracting Officer for State Agency James W. Gallagher, Jr., P.E.		1.10 State Agency Telephone Number Office: (603) 271-1961 Cell: (603) 419-9206	
1.11 Contractor Signature Date: 29/09/2020		1.12 Name and Title of Contractor Signatory Don K. Enichen, Manager of Contracts Research Triangle Institute	
1.13 State Agency Signature Date: 11/2/20		1.14 Name and Title of State Agency Signatory Robert R. Scott, Commissioner	
1.15 Approval by the N.H. Department of Administration, Division of Personnel *(if applicable)* By:		Director, On:	
1.16 Approval by the Attorney General (Form, Substance and Execution) *(if applicable)* By:		On: 11/4/2020	
1.17 Approval by the Governor and Executive Council *(if applicable)* G&C Item number:		G&C Meeting Date:	

Contractor Initials DE
Date 9-29-20

2. SERVICES TO BE PERFORMED. The State of New Hampshire, acting through the agency identified in block 1.1 ("State"), engages contractor identified in block .1.3 ("Contractor") to perform, and the Contractor shall perform, the work or sale of goods, or both, identified and more particularly described in the attached EXHIBIT B which is incorporated herein by reference ("Services").

3. EFFECTIVE DATE/COMPLETION OF SERVICES.

3.1 Notwithstanding any provision of this Agreement to the contrary, and subject to the approval of the Governor and Executive Council of the State of New Hampshire, if applicable, this Agreement, and all obligations of the parties hereunder, shall become effective on the date the Governor and Executive Council approve this Agreement as indicated in block 1.17, unless no such approval is required, in which case the Agreement shall become effective on the date the Agreement is signed by the State Agency as shown in block 1.13 ("Effective Date").

3.2 If the Contractor commences the Services prior to the Effective Date, all Services performed by the Contractor prior to the Effective Date shall be performed at the sole risk of the Contractor, and in the event that this Agreement does not become effective, the State shall have no liability to the Contractor, including without limitation, any obligation to pay the Contractor for any costs incurred or Services performed. Contractor must complete all Services by the Completion Date specified in block 1.7.

4. CONDITIONAL NATURE OF AGREEMENT.

Notwithstanding any provision of this Agreement to the contrary, all obligations of the State hereunder, including, without limitation, the continuance of payments hereunder, are contingent upon the availability and continued appropriation of funds affected by any state or federal legislative or executive action that reduces, eliminates or otherwise modifies the appropriation or availability of funding for this Agreement and the Scope for Services provided in EXHIBIT B, in whole or in part. In no event shall the State be liable for any payments hereunder in excess of such available appropriated funds. In the event of a reduction or termination of appropriated funds, the State shall have the right to withhold payment until such funds become available, if ever, and shall have the right to reduce or terminate the Services under this Agreement immediately upon giving the Contractor notice of such reduction or termination. The State shall not be required to transfer funds from any other account or source to the Account identified in block 1.6 in the event funds in that Account are reduced or unavailable.

5. CONTRACT PRICE/PRICE LIMITATION/ PAYMENT.

5.1 The contract price, method of payment, and terms of payment are identified and more particularly described in EXHIBIT C which is incorporated herein by reference.

5.2 The payment by the State of the contract price shall be the only and the complete reimbursement to the Contractor for all expenses, of whatever nature incurred by the Contractor in the performance hereof, and shall be the only and the complete compensation to the Contractor for the Services. The State shall have no liability to the Contractor other than the contract price.

5.3 The State reserves the right to offset from any amounts otherwise payable to the Contractor under this Agreement those liquidated amounts required or permitted by N.H. RSA 80:7 through RSA 80:7-c or any other provision of law.

5.4 Notwithstanding any provision in this Agreement to the contrary, and notwithstanding unexpected circumstances, in no event shall the total of all payments authorized, or actually made hereunder, exceed the Price Limitation set forth in block 1.8.

6. COMPLIANCE BY CONTRACTOR WITH LAWS AND REGULATIONS/ EQUAL EMPLOYMENT OPPORTUNITY.

6.1 In connection with the performance of the Services, the Contractor shall comply with all applicable statutes, laws, regulations, and orders of federal, state, county or municipal authorities which impose any obligation or duty upon the Contractor, including, but not limited to, civil rights and equal employment opportunity laws. In addition, if this Agreement is funded in any part by monies of the United States, the Contractor shall comply with all federal executive orders, rules, regulations and statutes, and with any rules, regulations and guidelines as the State or the United States issue to implement these regulations. The Contractor shall also comply with all applicable intellectual property laws.

6.2 During the term of this Agreement, the Contractor shall not discriminate against employees or applicants for employment because of race, color, religion, creed, age, sex, handicap, sexual orientation, or national origin and will take affirmative action to prevent such discrimination.

6.3. The Contractor agrees to permit the State or United States access to any of the Contractor's books, records and accounts for the purpose of ascertaining compliance with all rules, regulations and orders, and the covenants, terms and conditions of this Agreement.

7. PERSONNEL.

7.1 The Contractor shall at its own expense provide all personnel necessary to perform the Services. The Contractor warrants that all personnel engaged in the Services shall be qualified to perform the Services, and shall be properly licensed and otherwise authorized to do so under all applicable laws.

7.2 Unless otherwise authorized in writing, during the term of this Agreement, and for a period of six (6) months after the Completion Date in block 1.7, the Contractor shall not hire, and shall not permit any subcontractor or other person, firm or corporation with whom it is engaged in a combined effort to perform the Services to hire, any person who is a State employee or official, who is materially involved in the procurement, administration or performance of this Agreement. This provision shall survive termination of this Agreement.

7.3 The Contracting Officer specified in block 1.9, or his or her successor, shall be the State's representative. In the event of any dispute concerning the interpretation of this Agreement, the Contracting Officer's decision shall be final for the State.

Contractor Initials JE
Date 9/29/20

8. EVENT OF DEFAULT/REMEDIES.

8.1 Any one or more of the following acts or omissions of the Contractor shall constitute an event of default hereunder ("Event of Default"):

8.1.1 failure to perform the Services satisfactorily or on schedule;

8.1.2 failure to submit any report required hereunder; and/or

8.1.3 failure to perform any other covenant, term or condition of this Agreement.

8.2 Upon the occurrence of any Event of Default, the State may take any one, or more, or all, of the following actions:

8.2.1 give the Contractor a written notice specifying the Event of Default and requiring it to be remedied within, in the absence of a greater or lesser specification of time, thirty (30) days from the date of the notice; and if the Event of Default is not timely cured, terminate this Agreement, effective two (2) days after giving the Contractor notice of termination;

8.2.2 give the Contractor a written notice specifying the Event of Default and suspending all payments to be made under this Agreement and ordering that the portion of the contract price which would otherwise accrue to the Contractor during the period from the date of such notice until such time as the State determines that the Contractor has cured the Event of Default shall never be paid to the Contractor;

8.2.3 give the Contractor a written notice specifying the Event of Default and set off against any other obligations the State may owe to the Contractor any damages the State suffers by reason of any Event of Default; and/or

8.2.4 give the Contractor a written notice specifying the Event of Default, treat the Agreement as breached, terminate the Agreement and pursue any of its remedies at law or in equity, or both.

8.3. No failure by the State to enforce any provisions hereof after any Event of Default shall be deemed a waiver of its rights with regard to that Event of Default, or any subsequent Event of Default. No express failure to enforce any Event of Default shall be deemed a waiver of the right of the State to enforce each and all of the provisions hereof upon any further or other Event of Default on the part of the Contractor.

9. TERMINATION.

9.1 Notwithstanding paragraph 8, the State may, at its sole discretion, terminate the Agreement for any reason, in whole or in part, by thirty (30) days written notice to the Contractor that the State is exercising its option to terminate the Agreement.

9.2 In the event of an early termination of this Agreement for any reason other than the completion of the Services, the Contractor shall, at the State's discretion, deliver to the Contracting Officer, not later than fifteen (15) days after the date of termination, a report ("Termination Report") describing in detail all Services performed, and the contract price earned, to and including the date of termination. The form, subject matter, content, and number of copies of the Termination Report shall be identical to those of any Final Report described in the attached EXHIBIT B. In addition, at the State's discretion, the Contractor shall, within 15 days of notice of early termination, develop and submit to the State a Transition Plan for services under the Agreement.

10. DATA/ACCESS/CONFIDENTIALITY/ PRESERVATION.

10.1 As used in this Agreement, the word "data" shall mean all information and things developed or obtained during the performance of, or acquired or developed by reason of, this Agreement, including, but not limited to, all studies, reports, files, formulae, surveys, maps, charts, sound recordings, video recordings, pictorial reproductions, drawings, analyses, graphic representations, computer programs, computer printouts, notes, letters, memoranda, papers, and documents, all whether finished or unfinished.

10.2 All data and any property which has been received from the State or purchased with funds provided for that purpose under this Agreement, shall be the property of the State, and shall be returned to the State upon demand or upon termination of this Agreement for any reason.

10.3 Confidentiality of data shall be governed by N.H. RSA chapter 91-A or other existing law. Disclosure of data requires prior written approval of the State.

11. CONTRACTOR'S RELATION TO THE STATE. In the performance of this Agreement the Contractor is in all respects an independent contractor, and is neither an agent nor an employee of the State. Neither the Contractor nor any of its officers, employees, agents or members shall have authority to bind the State or receive any benefits, workers' compensation or other emoluments provided by the State to its employees.

12. ASSIGNMENT/DELEGATION/SUBCONTRACTS.

12.1 The Contractor shall not assign, or otherwise transfer any interest in this Agreement without the prior written notice, which shall be provided to the State at least fifteen (15) days prior to the assignment, and a written consent of the State. For purposes of this paragraph, a Change of Control shall constitute assignment. "Change of Control" means (a) merger, consolidation, or a transaction or series of related transactions in which a third party, together with its affiliates, becomes the direct or indirect owner of fifty percent (50%) or more of the voting shares or similar equity interests, or combined voting power of the Contractor, or (b) the sale of all or substantially all of the assets of the Contractor.

12.2 None of the Services shall be subcontracted by the Contractor without prior written notice and consent of the State. The State is entitled to copies of all subcontracts and assignment agreements and shall not be bound by any provisions contained in a subcontract or an assignment agreement to which it is not a party.

13. INDEMNIFICATION. Unless otherwise exempted by law, the Contractor shall indemnify and hold harmless the State, its officers and employees, from and against any and all claims, liabilities and costs for any personal injury or property damages, patent or copyright infringement, or other claims asserted against the State, its officers or employees, which arise out of (or which may be claimed to arise out of) the acts or omission of the

Contractor Initials _____

Date 9/29/20

Contractor, or subcontractors, including but not limited to the negligence, reckless or intentional conduct. The State shall not be liable for any costs incurred by the Contractor arising under this paragraph 13. Notwithstanding the foregoing, nothing herein contained shall be deemed to constitute a waiver of the sovereign immunity of the State, which immunity is hereby reserved to the State. This covenant in paragraph 13 shall survive the termination of this Agreement.

14. INSURANCE.

14.1 The Contractor shall, at its sole expense, obtain and continuously maintain in force, and shall require any subcontractor or assignee to obtain and maintain in force, the following insurance:

14.1.1 commercial general liability insurance against all claims of bodily injury, death or property damage, in amounts of not less than $1,000,000 per occurrence and $2,000,000 aggregate or excess; and

14.1.2 special cause of loss coverage form covering all property subject to subparagraph 10.2 herein, in an amount not less than 80% of the whole replacement value of the property.

14.2 The policies described in subparagraph 14.1 herein shall be on policy forms and endorsements approved for use in the State of New Hampshire by the N.H. Department of Insurance, and issued by insurers licensed in the State of New Hampshire.

14.3 The Contractor shall furnish to the Contracting Officer identified in block 1.9, or his or her successor, a certificate(s) of insurance for all insurance required under this Agreement. Contractor shall also furnish to the Contracting Officer identified in block 1.9, or his or her successor, certificate(s) of insurance for all renewal(s) of insurance required under this Agreement no later than ten (10) days prior to the expiration date of each insurance policy. The certificate(s) of insurance and any renewals thereof shall be attached and are incorporated herein by reference.

15. WORKERS' COMPENSATION.

15.1 By signing this agreement, the Contractor agrees, certifies and warrants that the Contractor is in compliance with or exempt from, the requirements of N.H. RSA chapter 281-A *("Workers' Compensation")*.

15.2 To the extent the Contractor is subject to the requirements of N.H. RSA chapter 281-A, Contractor shall maintain, and require any subcontractor or assignee to secure and maintain, payment of Workers' Compensation in connection with activities which the person proposes to undertake pursuant to this Agreement. The Contractor shall furnish the Contracting Officer identified in block 1.9, or his or her successor, proof of Workers' Compensation in the manner described in N.H. RSA chapter 281-A and any applicable renewal(s) thereof, which shall be attached and are incorporated herein by reference. The State shall not be responsible for payment of any Workers' Compensation premiums or for any other claim or benefit for Contractor, or any subcontractor or employee of Contractor, which might arise under applicable State of New Hampshire Workers' Compensation laws in connection with the performance of the Services under this Agreement.

16. NOTICE. Any notice by a party hereto to the other party shall be deemed to have been duly delivered or given at the time of mailing by certified mail, postage prepaid, in a United States Post Office addressed to the parties at the addresses given in blocks 1.2 and 1.4, herein.

17. AMENDMENT. This Agreement may be amended, waived or discharged only by an instrument in writing signed by the parties hereto and only after approval of such amendment, waiver or discharge by the Governor and Executive Council of the State of New Hampshire unless no such approval is required under the circumstances pursuant to State law, rule or policy.

18. CHOICE OF LAW AND FORUM. This Agreement shall be governed, interpreted and construed in accordance with the laws of the State of New Hampshire, and is binding upon and inures to the benefit of the parties and their respective successors and assigns. The wording used in this Agreement is the wording chosen by the parties to express their mutual intent, and no rule of construction shall be applied against or in favor of any party. Any actions arising out of this Agreement shall be brought and maintained in New Hampshire Superior Court which shall have exclusive jurisdiction thereof.

19. CONFLICTING TERMS. In the event of a conflict between the terms of this P-37 form (as modified in EXHIBIT A) and/or attachments and amendment thereof, the terms of the P-37 (as modified in EXHIBIT A) shall control.

20. THIRD PARTIES. The parties hereto do not intend to benefit any third parties and this Agreement shall not be construed to confer any such benefit.

21. HEADINGS. The headings throughout the Agreement are for reference purposes only, and the words contained therein shall in no way be held to explain, modify, amplify or aid in the interpretation, construction or meaning of the provisions of this Agreement.

22. SPECIAL PROVISIONS. Additional or modifying provisions set forth in the attached EXHIBIT A are incorporated herein by reference.

23. SEVERABILITY. In the event any of the provisions of this Agreement are held by a court of competent jurisdiction to be contrary to any state or federal law, the remaining provisions of this Agreement will remain in full force and effect.

24. ENTIRE AGREEMENT. This Agreement, which may be executed in a number of counterparts, each of which shall be deemed an original, constitutes the entire agreement and understanding between the parties, and supersedes all prior agreements and understandings with respect to the subject matter hereof.

Contractor Initials KE
Date 9/29/20

EXHIBIT A
Special Provisions

There are no Special Provisions.

Contractor Initials: dE
Date: 9/29/20

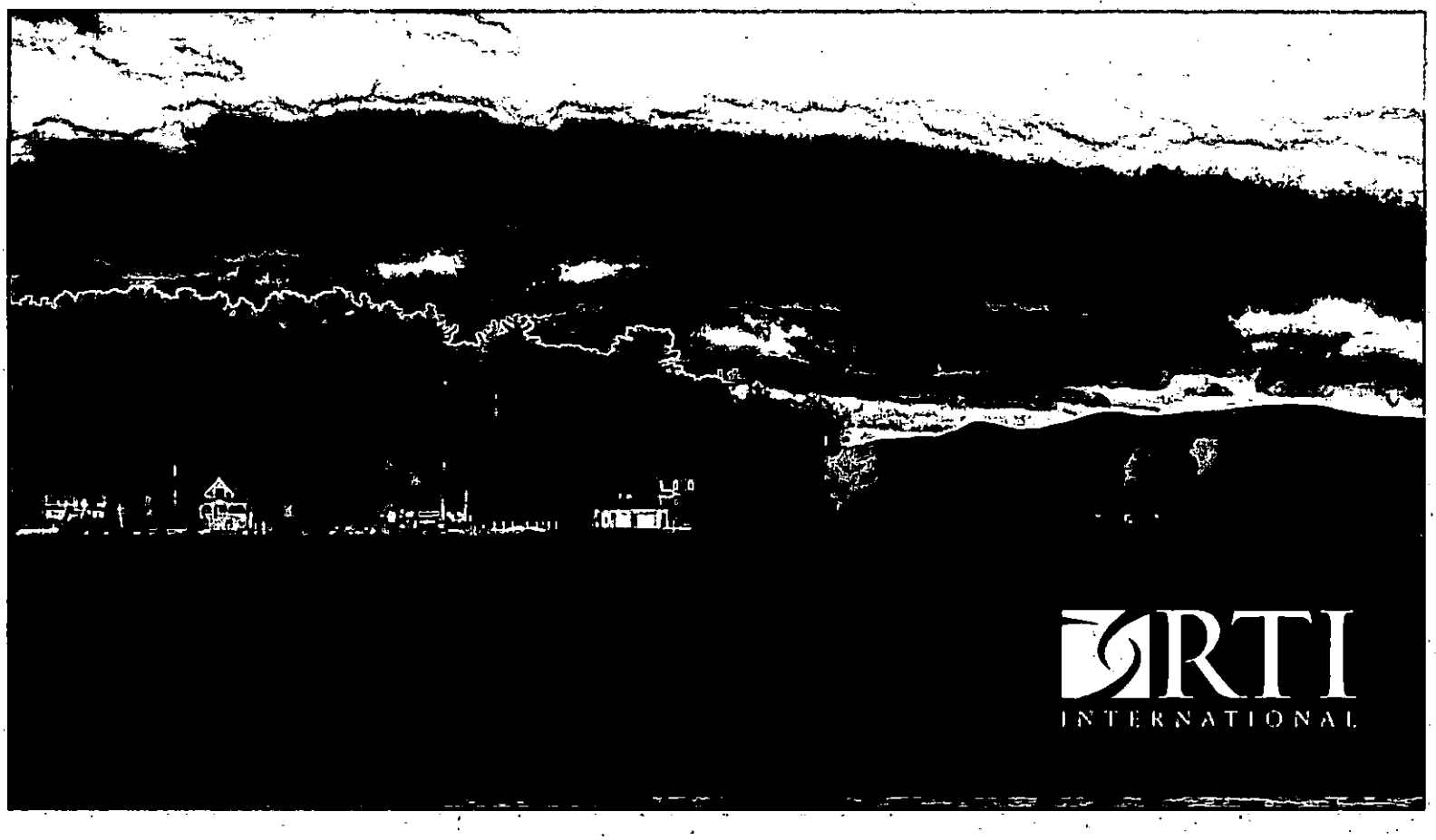
EXHIBIT B
Scope of Services

Research Triangle Institute, d/b/a RTI International ("RTI") shall perform the tasks as described in the attached detailed proposal titled:

"Modernization of Dam Bureau RiverTrak® Forecast System",
submitted by RTI International, dated July 10, 2020.

Contractor Initials: CJC
Date: 9/29/20

RTI INTERNATIONAL



Modernization of the Dam Bureau RiverTrak® Forecast System

Prepared for:

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

July 10 2020

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RTI INTERNATIONAL

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Technical and Cost Proposal

July 10 2020

Modernization of the Dam Bureau RiverTrak® Forecast System

Submitted To:

Jacob Ruiter
Dam Computer Systems Technician
NHDES - Dam Bureau
29 Hazen Dr. Concord, NH 03301
Office: 603-271-3617
Cell: 603-419-0136
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Submitted by:

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RTI INTERNATIONAL

Technical and Cost Proposal

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RTI INTERNATIONAL

Background

The New Hampshire Department of Environmental Services (NHDES) Dam Bureau has since the early 2000s operated the RTI RiverTrak® forecast system to help operate 48 reservoirs, lakes, and flood control structures in New Hampshire. Changes in computer technology as well as with data security standards make it increasingly harder to properly maintain RiverTrak® under full functionality. NHDES is there for considering replacing RiverTrak® with more modern technology.

This proposal presents the replacement of RiverTrak® with modern technology, while keeping mostly the same functionality. In addition, it proposes optional additional system expansion and support type work requested by NHDES.

1 RTI Amanzi™

We propose building the RiverTrak® replacement system using RTI's Amanzi™ framework.

This data and modeling management framework uses modern web-enabled technologies (such as docker[1] and CSIP[2]) to allow robust and parallelizable data processing and model execution. Amanzi™ utilizes standard no-cost databases (such as PostgreSQL[3]) and web interfaces as additional key components.

This technology approach differs significantly from RiverTrak®'s monolithic architecture which made it difficult to adapt to new data transmission and security standards. Contrary to this, Amanzi™ is built to be modular and to allow specific components, IT technologies or data protocols to be switched out or changed. As such, Amanzi™ is futureproof.

Contrary to RiverTrak®, which allows one user at a time, Amanzi™ is built for concurrent use. This enables one user to, for example, review and create forecasts, whereas another user can simultaneously look at previously created forecasts or current observations (the current NHDES Dam Bureau internal RiverTrak® website tried to alleviate this constraint in the past). Depending on the deployment, Amanzi™ also allows concurrent data processing and modelling. This means that the many of the data import functions currently executed in-series by RiverTrak® can be configured to execute in parallel, e.g., USGS gage observations can be downloaded at the same time as data acquired by NHDES's XConnect system). Likewise, models for independent sub-basins (such as Mascoma and the 5-Basins) can be run concurrently, resulting in shorter times to complete forecast runs.

[1] See https://www.docker.com/ for more details
[2] See https://alm.engr.colostate.edu/cb/project/csip for more detail
[3] See https://www.postgresql.org/ for more detail

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2 Implementation

We propose a phased implementation, that reproduces the most critical functionalities of the current RiverTrak® system first, and then extends this functionality to additional areas and objectives, as described in the subsequent sections.

2.1 Phase 1

2.1.1 Overview

In Phase 1 RTI will implement (with a few alterations as mentioned in Table 2-2) the RiverTrak® functionalities to perform deterministic short-term forecasts for all currently implemented forecast locations. As part of this phase RTI will also investigate and correct with some specific model configurations in the current RiverTrak® system.

It is envisioned that the initial deployment and testing of the new Amanzi™ system will occur in parallel to the ongoing use of RiverTrak®. This will allow for testing under operational conditions without disrupting the operational forecasting at the NHDES Dam Bureau.

For the time being, RiverTrak® would also provide the data for the external website.

2.1.2 Implemented Functionality

Specifically, the functionalities listed in Table 2-1 will be implemented essentially as they are in the current RiverTrak® system. Table 2-2 lists slightly modified approaches to a subset of RiverTrak® processing steps, primarily related to using readily available gridded data products for precipitation and temperature observations and forecasts instead of the current, mostly gage based approach. In additional, the currently used MS Access database for model states adjustments and the MS Excel spreadsheets to enter dam operations will be replaced by built in Amanzi™ functionality.

Table 2-1. RiverTrak® functionalities reproduced in Amanzi™ in Phase 1

Functionality	Current Label(s) in RiverTrak®
Data Import	
From XConnect (SHEF format) **~ 220 time series**	DECODE SHEFFILES (NORTH), DECODE SHEFFILES (SOUTH), DECODE SHEFFILES (WEST)
From USGS NWIS **~105 time series**	FROM USGS NWIS (VIA RT SENTRY)
From NWS HADS **~93 time series**	OBSERVATIONS FROM HADS (NORTH), OBSERVATIONS FROM HADS (SOUTH)
Data Processing	
Convert data from various intervals to hourly or daily intervals **~400 time series**	CHANGEINT

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Functionality	Current Label(s) in RiverTrak®
Convert stage observations to discharge or vice versa ~59 time series	STAGEDISCHARGERATING
Convert precipitation accumulation to precipitation increments ~63 time series	CHANGEDATATYPE
Fill observed (past) data to the end of the forecast period ~220 time series	FILLREPEAT
Combine observed and forecasted data into model input time series ~170 time series	FUTURE_MAP, FUTURE_MAT
Data Export	
Export data as comma delimited file	COMMA_DELIMITED
Modelling	
Model snow accumulation, snow melt, and rainfall-runoff processes for 59 sub-basins	SNOWPACK, SACSMA
Model routing for 6 reaches	LAGK
Model 46 reservoirs (incl. routing between reservoirs as needed)	RESERVOIR, RES-J
Forecasting	
Create 3-day forecasts for all sub-basins (2 scenarios per forecast)	ZERO_QPF, QPF1
Interface	
Display observed and forecast hydrographs for 103 forecast location on an internal web-interface	'AutoUpdateProduct'

7/25/20

RTI INTERNATIONAL

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Table 2-2. RiverTrak® functionalities replaced by alternative options

Existing Functionality	Current label(s) in RiverTrak®	Replacement Functionality
Data Import		
Import QPE XMRG files from the North East River Forecast Center (NERFC)	QPE FROM NERFC (FROM SENTRY)	Import gridded precipitation and temperature estimates from MRMS[4]
Import QPF XMRG files from the North East River Forecast Center (NERFC)	QPF FROM NERFC (FROM SENTRY)	• Import gridded precipitation and temperature estimates from HRRR[5] • Import gridded precipitation and temperature estimates from GEFS[6]
Data Processing		
Convert gage-based precipitation observations to Mean Areal Precipitation (MAP)	MAP	Compute areal averages from MRMS
Convert gage-based precipitation observations to Mean Areal Temperature (MAT)	MAT	Compute areal averages from MRMS
Convert NERFC QPE XMRG data to Mean Areal Radar Precipitation (MAPX)	MAPX	Compute areal averages from MRMS, which is a blend of radar and gage observations
Create a shapefile from NERFC QPE data	SHAPEFILE	No longer needed – the Amanzi™ web interface displays gridded data
Create summary forecast information	FILLFLOODMONITOR	No longer needed – this can be defined in the Amanzi™ web interface
Convert gridded NERFC QPF XMRG to mean areal QPF	GRIDDEDQPF	Compute areal averages from HRRR and GEFS
Data Export		
Export data graphs as png	GRAPH	No longer needed – the web-interface can directly graph data
Export data as a html table	TABLE_REPORT	No longer needed – the web-interface can directly tabulate data
Export dam control data for use in the control settings spreadsheets	SHEF_A	No longer needed – data can be entered in the web-interface, no external spreadsheet is required
Forecasting		
Create 365-day ensemble forecasts for the Winnipesaukee basin		Use GEFS rather than historical precipitation
Interface		

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Existing Functionality	Current label(s) in RiverTrak®	Replacement Functionality
Model states adjustment database		Model states can be adjusted in the internal web-interface
Dam control settings spreadsheets		Dam control settings can be entered in the internal web-interface

2.1.3 Tasks

As part of Phase 1 RTI-CWR will perform the following tasks:

Task 1. Reproduce the Deterministic Forecasting Functionality of RiverTrak® in Amanzi™

Configure and deploy Amanzi™ with the functionalities described in Table 2-1 and Table 2-2 above. The system will operate on Windows 10, use modern database connectivity services, supports the latest security protocols[7] and avoids hardcoding for URLs, etc.

The system will be deployed on NHDES infrastructure with evolving functionalities including an internal web-interface (see Table 4-1 for details). RTI will provide 1 day of on-site training will be provided once the system is deployed on NHDES infrastructure.

Task 2. Investigate Problems with Quantitative Precipitation Forecasts (QPF)

The new system will no longer utilize the NERFC 48-hour QPF. Rather, the QPF from HRRR and GEFS will be used. Under this task configure the models to always use 72-hours (3 days) of QPF data.

Task 3. Investigate and correct problems with the Sunapee (SUNNH) model parameterization

Perform long term runs with the SUNNH models and adjust model parameters to reduce the 'flashiness' of the model results.

Task 4. Investigate and Correct Problems with MAP Ingestion for Highland & Island Pond (ILPNH) models

Perform long term runs with the ILPNH models and adjust the model configuration and/or parameters to produce realistic responses.

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[4] See https://www.nssl.noaa.gov/projects/mrms/ for details
[5] See https://rapidrefresh.noaa.gov/hrrr/ for details
[6] See https://www.ncdc.noaa.gov/data-access/model-data/model-datasets/global-ensemble-forecast-system-gefs for details
[7] As of January 2020

2.2 Phase 2

2.2.1 Overview

Under Phase 2 RTI will expand the functionality of new Amanzi™ system to include long-term probabilistic forecasting for the Winnipesaukee watershed, add National Water Model forecasts as alternative inflow option to the system, and break up the Baker River watershed into smaller components to explicitly model the local flood control impoundments. Phase 2 also includes the development of a new external website and would end in the complete switch from RiverTrak® to Amanzi™.

2.2.2 Implemented Functionality

Specifically, RTI will implement the additional functionalities listed in Table 2-3.

Table 2-3. RiverTrak® functionalities reproduced in Amanzi™ in Phase 2

Functionality	Current Label(s) in RiverTrak®
Forecasting	
Create 365-day ensemble forecasts for the Winnipesaukee basin	-- using GEFS rather than historical precipitation
Interface	
Display observed hydrographs on an external web-interface	

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2.2.3 Tasks

As part of Phase 2 RTI-CWR will perform the following tasks:

Task 5. Add probabilistic forecasting for the Winnipesaukee Watershed

Configure and deploy Amanzi™ with the functionalities described in Table 2-3.

Task 6. Create sub-basin models for Baker River Watershed

Subdivide the existing Baker River sub-basin into 8 sub-basins to model the 8 Baker River flood control dams, configure the snow and rainfall runoff models (using the existing model parameters) and configure a RES-J model to simulate routing and dam operations. Update all related system data process steps and the web-interface.

Task 7. Add National Water Model (NWM) forecasts

Configure the system to 1) import and combine short-term National Water Model results to create forecasts at all system forecast locations (including the additional ones from Task 5). Update the internal web-interfaces to show these additional forecasts.

Task 8. Add Import, Processing and Display of SNODAS SWE

Implement processes to download SNODAS datasets, process them to sub-basin average snow water equivalent (SWE), and display the results on the forecast graphs on the internal web interface.

Task 9. Develop and Deploy a New External Website

Using branding guidelines provided by the NHDES replace all functionality of the current RiverTrak® website with modern interactive technologies. This includes an interactive map showing observation locations, observed data graphs, and an option to download historic data.

Task 10. Provide on-call support as needed

Provide 50 hours of remote support over a one-year period following the completion of the previous tasks.

OE 9/29/20

2.3 Phase 3

2.3.1 Overview

NHDES is interested in supported operational decision-making using optimization approaches with the ensemble inflow forecasts. This Phase is focused on creating an application to process the inflow forecast traces for the Lake Winnipesaukee basins, as implemented under Phase 2 – Task 5, and provide both release (operational) decisions at Lakeport Dam, Avery Dam, and Lochmere Dam, and resulting water levels at Lake Winnipesaukee, Opeechee Bay, Lake Winnisquam, and Silver Lake. In particular:

- The main objective of optimization is on seasonal water level and flow management, whereas hydropower is secondarily optimized within reasonable constraints of flow and water level management.
- Dam releases will be optimized separately for each inflow trace (which will include upstream releases at Opeechee Bay and Lake Winnisquam), resulting in 'spaghetti plots' of potential futures for these releases and the associated water levels.
- Short-term operations based on forecasts may be handled using approaches similar to those currently employed using operator system knowledge, rather than focusing on an explicit short-term optimization model.

As a result of this task, a system will be developed to optimize inflow traces with a series of objectives and constraints to support operational decisions. The system will be integrated into the Amanzi framework for streamlined optimization and review of results.

2.3.2 Implemented Functionality

RTI will implement the additional functionalities listed in Table 2-4.

Table 2-4. Optimization functionalities developed in Amanzi™ in Phase 3

Functionality	Description
Ingest Forecast Ensembles	Read and format ensemble forecasts for the Winnipesaukee system for optimization model use
Optimization	Process each forecast trace resulting in a 'spaghetti' plot of optimal decision traces
Output Decisions	Create output files for processing in Amanzi and visualization via the internal web-interface

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2.3.3 Tasks

As part of Phase 3 RTI-CWR will perform the following tasks:

Task 11. Data Collection and Review

Base data on system operations and dam components from Lakeport dam downstream to Silver Lake will be collected and organized to help guide the long-term optimization model development. Focus will be on outlining and summarizing critical flow levels, critical stage levels, locations of concern affected by operations, and other relevant details.

Task 12. Objective and Constraint Elicitation

Using the collated base data, explicit definition of objectives and constraints will be developed. This documentation will be presented to NHDES to understand the algorithm and receive feedback on setup. Once approved, this will be integrated into the optimization algorithm.

Task 13. Long-term Optimization Model Development

Develop a multi-state long-term optimization model using dynamic programing for the main reach of the Winnipesaukee River. The optimization algorithm will be discretized into (day / week / monthly) timesteps to help support reservoir positioning and planning. It will run and optimize each trace from the ensemble independently.

Task 14. Long-term Model Testing and Verification

With the developed model, testing will be conducted for a range of extreme conditions to find outlier behavior. The results will also be thoroughly checked for correctness in system response. Results will be shared with NHDES for review and concurrence on model performance before ingesting the system within the Amanzi framework.

Task 15. Integration into the forecast system

The system will be integrated through a managed workflow into the Amanzi forecast system. This will again be tested to cover a range of scenarios and extremes. The integration includes the visualization of optimization results on the internal web-interface.

Task 16. Documentation, Reporting, Presentation Training

Prepare a user's manual and supporting documentation around the process, algorithm, and testing results. This can be used to support training of the application in addition to supporting future modifications or adjustments, if required.

3 Assumptions

The following technical assumptions are made with respect to the tasks above:

a. NHDES provides an application server (either on-site or in the cloud) to host the Amanzi™ system
b. The application server has access to the data written by NHDES's Connect system
c. The application server has access to the internet
d. NHDES provides a database server to host the Amanzi™ database (PostgreSQL)
e. NHDES provides connectivity between the application and database servers
f. NHDES provides location and parametric information for the 8 Baker River flood control dams
g. NHDES provides branding guidelines for the external website

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h. Optimization will be done using an *implicit stochastic* approach, which means each forecast trace will be an independent optimization run – operators will use judgement for final operational decision.
i. Training for optimization will be conducted remotely using video conferencing tools.

4 Deliverables and Schedule

The deliverables and the schedule for this project is provided in Table 4-1 and Table 4-2.

Table 4-1. Phase 1 Deliverables and Schedule

Task	Deliverable Number	Deliverable	Due Date
		PHASE 1	
Task 1	1.1	Amanzi™ based forecast system implemented on NHDES infrastructure ingesting all data products listed in Table 2-1	3 months from start of Phase 1
Task 1	1.2	Amanzi™ based forecast system implemented on NHDES infrastructure for data processing and 3-day deterministic forecasting (as listed in Table 2-1 and Table 2-2)	5 months from start of Phase 1
Task 1	1.3	Fully functional internal web-interface deployed and tested on NHDES infrastructure	6 months from start of Phase 1
Task 1	1.4	On-site training on the operation of the Amanzi™ based forecast system provided	7 months from start of Phase 1
Task 2	2	Processes and models configured to allow the use of 72-hour QPF and tested for proper functionality	5 months from start of Phase 1
Task 3	3	Sunapee (SUNNH) models configured and parameterized to produce less flashy results; models deployed in the current RiverTrak® system for testing	2 months from start of Phase 1
Task 4	4	Highland & Island Pond (ILPNH) models configured and parameterized to realistically respond to MAP and MAT inputs; models deployed in the current RiverTrak® system for testing	3 months from start of Phase 1

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[redacted]

Table 4-2. Phase 2 Deliverables and Schedule

Task	Deliverable Number	Deliverable	Due Date
PHASE 2 (starts after completion of Phase 1)			
Task 5	5	Amanzi™ based forecast system including 365-day probabilistic forecasting for the Winnipesaukee watershed deployed and tested on NHDES infrastructure	2 months from start of Phase 2
Task 6	6	Baker River watershed models and Amanzi™ system reconfigured to include 8 flood control dams and tested for proper functioning	3 months from start of Phase 2
Task 7	7	National Water Model (NWM) forecast download and processing added to all forecast locations; internal web interface configured to display NWM forecasts	4 months from start of Phase 2
Task 8	8	SNODAS data processed and integrated in internal web-interface	4 months from start of Phase 2
Task 9	9	Fully functional external web-interface deployed and tested on NHDES infrastructure	5 months from start of Phase 2
Task 10	10	50 hours of on-call support provided	12 months after Task 8 deliverable

JE 5/25/22

[redacted]

Table 4-3. Phase 3 Deliverables and Schedule

Task	Deliverable Number	Deliverable	Due Date
PHASE 3 (starts after completion of Phase 1)			
Task 11	11	Memorandum on collected and reviewed data required for the development of the optimization scheme	1 month from start of Phase 3
Task 12	12	Memorandum on the definition of the optimization objectives, constraints, and algorithm	2 months from start of Phase 3
Task 13	13	Draft stand-alone optimization model for the Winnipesaukee River as described in Section 2.3.1 and 2.3.2	5 months from start of Phase 3
Task 14	14	Fully tested stand-alone optimization model for the Winnipesaukee River as described in Section 2.3.1 and 2.3.2	6 months from start of Phase 3
Task 15	15	Optimization model integrated into the Amanzi Forecast System	7 months from start of Phase 3
Task 16	16	User's manual and supporting documentation; Presentation	7 months from start of Phase 3

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5 Costs and Invoicing Schedule

Table 5-1 and Table 5-2 provide costs for the deliverables listed above.

Table 5-1. Phase 1 Costs

Deliverable Number	Deliverable	Costs
	PHASE 1	
1.1	Amanzi™ based forecast system implemented on NHDES infrastructure ingesting all data products listed in Table 2-1	$ 25,084
1.2	Amanzi™ based forecast system implemented on NHDES infrastructure for data processing and 3-day deterministic forecasting (as listed in Table 2-1 and Table 2-2)	$ 33,044
1.3	Fully functional internal web-interface deployed and tested on NHDES infrastructure	$ 16,574
1.4	On-site training on the operation of the Amanzi™ based forecast system provided	$ 10,209
2	Processes and models configured to allow the use of 72-hour QPF and tested for proper functionality	$ 2,680
3	Sunapee (SUNNH) models configured and parameterized to produce less flashy results; models deployed in the current RiverTrak® system for testing	$ 4,544
4	Highland & Island Pond (ILPNH) models configured and parameterized to realistically respond to MAP and MAT inputs; models deployed in the current RiverTrak® system for testing	$ 3,216
	PHASE 1 TOTAL	**$ 95,351**

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[redacted]

Table 5-2. Phase 2 Costs

Deliverable Number	Deliverable	Costs
	PHASE 2	
5	Amanzi™ based forecast system including 365-day probabilistic forecasting for the Winnipesaukee watershed deployed and tested on NHDES infrastructure	$ 24,477
6	Baker River watershed models and Amanzi™ system reconfigured to include 8 flood control dams and tested for proper functioning	$ 9,016
7	National Water Model (NWM) forecast download and processing added to all forecast locations; internal web interface configured to display NWM forecasts	$ 11,851
8	SNODAS data processed and integrated in internal web-interface	$ 5,943
9	Fully functional external web-interface deployed and tested on NHDES infrastructure	$ 10,947
10	50 hours of on-call support provided	$ 10,243
	PHASE 2 TOTAL	**$ 72,477**
	PHASE 3	
11	Memorandum on collected and reviewed data required for the development of the optimization scheme	$ 1,269
12	Memorandum on the definition of the optimization objectives, constraints, and algorithm	$ 2,645
13	Draft stand-alone optimization model for the Winnipesaukee River as described in Section 2.3.1 and 2.3.2	$ 11,661
14	Fully tested stand-alone optimization model for the Winnipesaukee River as described in Section 2.3.1 and 2.3.2	$ 5,750
15	Optimization model integrated into the Amanzi Forecast System	$ 3,037
16	User's manual and supporting documentation; Presentation	$ 6,718
	PHASE 3 TOTAL	**$ 31,080**
	Project Total	$198,908

We propose invoicing for the individual tasks monthly for the percentage of the deliverable completed in the previous month.

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EXHIBIT C
Price and Payments

All services shall be performed to the satisfaction of NHDES before payment is made. All payments shall be made upon receipt and approval of stated outputs and upon receipt of an associated invoice. The billing is to be done on a monthly basis as a percentage completion of tasks as per the work program detailed in Exhibit B.

The total cost of the contract shall not exceed $198,908. NHDES agrees to pay the invoices as submitted by the Contractor. Invoices are subject to the approval of the Contract Officer before payment is processed.

1. DELIVERABLE PAYMENT SCHEDULE.

   All charges by Research Triangle Institute (RTI International), under this Contract shall be at a fixed price in accordance with the schedules set forth in Table 1 below.

2. FIXED PRICE PAYMENT SCHEDULE

   Table C-1: Payment Schedule:

Contractor Initials: JE
Date: 9/29/20

Table C-1

PHASE 1			
Deliverable	**Percentage**	**Due Date**	**Payment Amount**
Amanzi™ based forecast system implemented on NHDES infrastructure ingesting all data products listed in Table 2-1	13%	3 months from start of Phase 1	$ 25,084
Amanzi™ based forecast system implemented on NHDES infrastructure for data processing and 3-day deterministic forecasting (as listed in Table 2-1 and Table 2-2 of project proposal)	17%	5 months from start of Phase 1	$ 33,044
Fully functional internal web-interface deployed and tested on NHDES infrastructure	8%	6 months from start of Phase 1	$ 16,574
On-site training on the operation of the Amanzi™ based forecast system provided	5%	7 months from start of Phase 1	$ 10,209
Processes and models configured to allow the use of 72-hour QPF and tested for proper functionality	1%	5 months from start of Phase 1	$ 2,680
Sunapee (SUNNH) models configured and parameterized to produce less flashy results; models deployed in the current RiverTrak® system for testing	2%	2 months from start of Phase 1	$ 4,544
Highland & Island Pond (ILPNH) models configured and parameterized to realistically respond to MAP and MAT inputs; models deployed in the current RiverTrak® system for testing	2%	3 months from start of Phase 1	$ 3,216
Phase 1 Total:	**48%**		**$ 95,351**

Contractor Initials: JE
Date: 9/29/20

PHASE 2 (starts after completion of Phase 1)			
Deliverable	**Percentage**	**Due Date**	**Payment Amount**
Amanzi™ based forecast system including 365-day probabilistic forecasting for the Winnipesaukee watershed deployed and tested on NHDES infrastructure	12%	2 months from start of Phase 2	$ 24,477
Baker River watershed models and Amanzi™ system reconfigured to include 8 flood control dams and tested for proper functioning	5%	3 months from start of Phase 2	$ 9,016
National Water Model (NWM) forecast download and processing added to all forecast locations; internal web interface configured to display NWM forecasts	6%	4 months from start of Phase 2	$ 11,851
SNODAS data processed and integrated in internal web-interface	3%	4 months from start of Phase 2	$ 5,943
Fully functional external web-interface deployed and tested on NHDES infrastructure	5%	5 months from start of Phase 2	$ 10,947
50 hours of on-call support provided	5%	12 months after Task 8 deliverable	$ 10,243
Phase 2 Total:	**36%**		**$ 72,477**

Contractor Initials: JE
Date: 9/29/20

PHASE 3 (starts after completion of Phase 1)			
Deliverable	**Percentage**	**Due Date**	**Payment Amount**
Memorandum on collected and reviewed data required for the development of the optimization scheme	1%	1 month from start of Phase 3	$ 1,269
Memorandum on the definition of the optimization objectives, constraints, and algorithm	1%	2 months from start of Phase 3	$ 2,645
Draft stand-alone optimization model for the Winnipesaukee River as described in Section 2.3.1 and 2.3.2 of project proposal	6%	5 months from start of Phase 3	$ 11,661
Fully tested stand-alone optimization model for the Winnipesaukee River as described in Section 2.3.1 and 2.3.2 of project proposal	3%	6 months from start of Phase 3	$ 5,750
Optimization model integrated into the Amanzi Forecast System	2%	7 months from start of Phase 3	$ 3,037
User's manual and supporting documentation; Presentation	3%	7 months from start of Phase 3	$ 6,718
Phase 3 Total:	**16%**		**$ 31,080**
Project Total:	**100%**		**$198,908**

Notwithstanding any other provision of this Contract, in no event shall the total payment made by the State exceed $198,908.

3. PAYMENTS

The State shall pay RTI International within thirty (30) calendar days of the State's receipt of a correct and undisputed invoice.

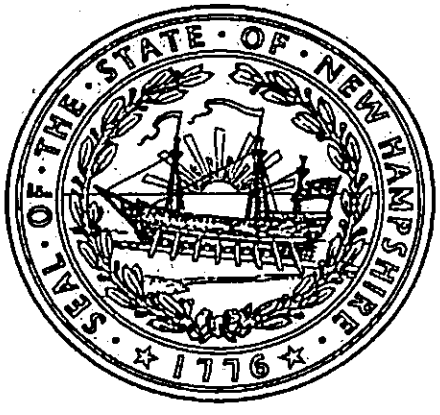
Contractor Initials: _____
Date: 9/29/20

State of New Hampshire
Department of State

CERTIFICATE

I, William M. Gardner, Secretary of State of the State of New Hampshire, do hereby certify that RESEARCH TRIANGLE INSTITUTE is a North Carolina Nonprofit Corporation registered to transact business in New Hampshire on April 05, 2000. I further certify that all fees and documents required by the Secretary of State's office have been received and is in good standing as far as this office is concerned.

Business ID: **338837**
Certificate Number: **0004963406**



IN TESTIMONY WHEREOF,
I hereto set my hand and cause to be affixed the Seal of the State of New Hampshire, this 22nd day of July A.D. 2020.

William M. Gardner
Secretary of State

RTI INTERNATIONAL

3040 E. Cornwallis Road • PO Box 12194 • Research Triangle Park, NC 27709-2194 • USA
Telephone +1.919.541.6000 • Fax +1.919.541.5985 • www.rti.org

September 29, 2020

Jacob Ruiter
Dam Computer Systems Technician
NHDES - Dam Bureau
29 Hazen Dr. Concord, NH 03301

Via Email: Jacob.Ruiter@des.nh.gov

Reference: Delegation of Signature Authority Warrant

Dear Mr. Ruiter:

Please accept this letter as confirmation that Don Enichen's Delegation of Authority Warrant, dated September 19, 2011 is currently valid. RTI's practice is to issue the warrants for the contract managers when there is any change in delegation. Don's delegation of authority was increased to $50,000,000 on September 19, 2011 and has not changed since that date.

Thank you for the opportunity to provide this clarification. Please let me know if there are any additional concerns.

Sincerely,

Stacey Passwaters

Stacey Passwaters
Director, Contracts & Subcontracts

[RTI# 02812000.465]

RTI INTERNATIONAL

Delegation of Signatory Authority Warrant

Don K. Enichen

In accordance with my delegation from the President and CEO, whose authority is authorized by resolution of the Board of Governors, and within the responsibilities of your position, you are hereby delegated the authority to execute all such documents, affidavits, certifications, contracts and other agreements related to Contracts that evidence a commitment on the part of RTI International and are undertaken in the ordinary course of business. The limitations of your delegated signatory authority are set forth below. This delegation remains in effect until it is amended. All signature authority is deemed null and void once employment with RTI ends.

Limits of Signatory Authority
$50,000,000

Lisa J. Gilliland

Lisa J. Gilliland
Vice President
Office of Contracts
RTI International

9/19/11
Date

RTI International is a trade name of Research Triangle Institute

CERTIFICATE OF LIABILITY INSURANCE

DATE(MM/DD/YYYY): 05/30/2020

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER	CONTACT NAME:	
Aon Risk Services South, Inc. Charlotte NC Office 1111 Metropolitan Avenue, Suite 400 Charlotte NC 28204 USA	PHONE (A/C. No. Ext): (866) 283-7122	FAX (A/C. No.): (800) 363-0105
	E-MAIL ADDRESS:	

INSURED	INSURER(S) AFFORDING COVERAGE	NAIC #
RTI International 3040 Cornwallis Rd PO Box 12194 Research Triangle Park NC 27709-2194 USA	INSURER A: Continental Casualty Company	20443
	INSURER B: National Fire Ins. Co. of Hartford	20478
	INSURER C: AIU Insurance Company	19399
	INSURER D: American Home Assurance Co.	19380
	INSURER E: New Hampshire Insurance Company	23841
	INSURER F:	

COVERAGES **CERTIFICATE NUMBER:** 570081955883 **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS. Limits shown are as requested

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	X COMMERCIAL GENERAL LIABILITY CLAIMS-MADE [X] OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: POLICY [ ] PRO-JECT [X] LOC OTHER:			4034978327	06/01/2020	06/01/2021	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG	$1,000,000 $1,000,000 $15,000 $1,000,000 $2,000,000 $2,000,000
B	AUTOMOBILE LIABILITY X ANY AUTO OWNED AUTOS ONLY HIRED AUTOS ONLY SCHEDULED AUTOS NON-OWNED AUTOS ONLY X $1,000 Coll Ded X $1,000 Comp Ded			4034978456	06/01/2020	06/01/2021	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident)	$1,000,000
	[ ] UMBRELLA LIAB [ ] OCCUR [ ] EXCESS LIAB [ ] CLAIMS-MADE [ ] DED [ ] RETENTION						EACH OCCURRENCE AGGREGATE	
C	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR / PARTNER / EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) Y/N [N] N/A If yes, describe under DESCRIPTION OF OPERATIONS below			WC045886610 AOS	06/01/2020	06/01/2021	X PER STATUTE [ ] OTH-ER	
C				WC045886611 FL	06/01/2020	06/01/2021	E.L. EACH ACCIDENT E.L. DISEASE-EA EMPLOYEE E.L. DISEASE-POLICY LIMIT	$1,000,000 $1,000,000 $1,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

Evidence of Insurance.

CERTIFICATE HOLDER

RTI International
3040 Cornwallis Rd.
PO Box 12194
Research Triangle Park NC 27709-2194 USA

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

Aon Risk Services South Inc.

Holder Identifier :

Certificate No : 570081955883

STATE OF NEW HAMPSHIRE
DEPARTMENT OF INFORMATION TECHNOLOGY
27 Hazen Dr., Concord, NH 03301
Fax: 603-271-1516 TDD Access: 1-800-735-2964
www.nh.gov/doit

Denis Goulet
Commissioner

November 4, 2020

Robert R. Scott, Commissioner
State of New Hampshire
Department of Environmental Services
29 Hazen Drive
Concord, NH 03301

Dear Commissioner Scott:

This letter represents formal notification that the Department of Information Technology (DoIT) has approved your agency's request to enter into a sole source contract with Research Triangle Institute (dba RTI International "RTI"), of Research Triangle Park, NC, as described below and referenced as DoIT No. 2021-024.

> The purpose of this contract is to provide technical and administrative services for the modernization of the RiverTrak Forecast System, which is used to inform dam operations on many of the State's most important water resources and provides public access to valuable information, including lake levels and stream flows. This effort will include ensuring that the system has the latest security protocols, software, and operating systems employed by the State of New Hampshire.
>
> The funding amount for this contract is not to exceed $198,908.00, and shall become effective upon Governor and Council approval through December 31, 2022.

A copy of this letter should accompany the Department of Environmental Services' submission to the Governor and Executive Council for approval.

Sincerely,

Denis Goulet

DG/kaf
DoIT 2021-024
cc: Heather Pike, DoIT