COUNTY OF CARROLL

Water System Improvements Study

REQUEST FOR PROPOSALS

June 10, 2021

Submitted by:

UNDERWOOD engineers

99 North State Street

Concord, New Hampshire

N2911

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REQUEST FOR PROPOSALS
WATER SYSTEM IMPROVEMENTS STUDY

COUNTY OF CARROLL, NEW HAMPSHIRE

Our continuing commitment to sustainability
Underwood Engineers has undertaken an effort to improve the sustainability of our corporate endeavors, in our community and beyond. This binder is made from recycled materials carrying the Forest Stewardship Council approval and is printed using soy-based inks. It is, itself fully recyclable. The metal parts may be unscrewed and recycled separately from the paper parts.

civil &
environmental
engineering

UNDERWOOD
engineers

N2911

June 10, 2021

Carroll County, Office of the Commissioners
Mellisa Seamans
Attn: Water System Improvements Study
95 Water Village Road
Ossipee, NH 03864

Re: Request For Proposals
Water System Improvements Study
County of Carroll, New Hampshire

Dear County Commissioners:

Underwood Engineers is extremely pleased to have the opportunity to submit a Proposal Package for engineering services related to a Water System Improvements Study for the County of Carroll. We are confident that upon review of our attached Proposal and subsequent interview discussions, you will find that Underwood Engineers is the right engineer for your project and the right fit for the County.

Underwood Engineers is a local New Hampshire firm serving primarily New Hampshire municipal clients. We have been serving the New Hampshire water and wastewater communities for 38 years from our two offices in Portsmouth and Concord, NH. Our staff is made up primarily of licensed professional engineering personnel who are committed to client service and quality solutions above all else. When you hire Underwood, the people you meet in the interview are the people who will perform your project and be your key contacts throughout the life of the project.

Water system studies are staple items of Underwood's workload. Collectively, the Project Team identified for the Carroll County project have participated in the generation of dozens of Water System Master Plans and Water System Studies which were the basis for subsequent water system improvements.

We look forward to receiving an interview request to share with you further our approach and vision for your project. We are confident that we can deliver a product that exceeds your expectations within a reasonable budget.

Very truly yours,

UNDERWOOD ENGINEERS, INC.

Michael B. Metcalf, P.E.
Senior Project Manager

Keith A. Pratt, P.E.
President

ph 603.230.9898
fx 603.230.9899
99 North State Street
Concord, NH 03301
underwoodengineers.com

section one
firm information

INTRODUCTION TO UNDERWOOD ENGINEERS

Underwood Engineers (UE) is a full-service civil and environmental engineering firm that has been providing professional engineering services for nearly four decades. Founder Frank G. Underwood, P.E., started the company in 1982. In 2006, the company ownership expanded to include Keith Pratt, P.E., W. Steven Clifton, P.E., and Colleen A. Morrow and in 2011, Keith Pratt and Steve Clifton assumed the President and Vice President roles, respectively. Areas of the firm's expertise include infrastructure systems, wastewater engineering, funding, water engineering, user rate studies, roads and drainage, municipal planning, site planning and engineering, construction services, and solid waste.

SERVING NEW ENGLAND COMMUNITIES

UE is a full-service, multi-disciplined firm serving municipal clients throughout Northern New England.

As a dedicated and highly professional organization, we have maintained long-term relationships with numerous New England municipalities. From our offices in Portsmouth and Concord, New Hampshire, we serve clients throughout New Hampshire, Maine, Massachusetts and Vermont. Approximately ninety-five percent (95%) of our workload is for municipalities and municipal districts/commissions. Most of our staff are registered Professional Engineers and many of our staff engineers are members of municipal boards in their home communities. Our experience and community service provides us with excellent hands-on understanding of the concerns of area citizens.

PROJECT DELIVERY PHILOSOPHY

As our client, you always have direct access to principals in the company.

Our President and Vice President are responsible for and set continuous goals of quality assurance and client satisfaction. Mr. Pratt and Mr. Clifton oversee all projects and maintain constant communication with Project Managers.

We are firmly committed to a project management system ensuring our goals for quality assurance and client satisfaction are met. A Project Manager with a Professional Engineer license is assigned to each project and has the overall responsibility for project delivery (*i.e. schedule, budget, technical coordination, and communication*). The Project Manager remains as your primary contact from project initiation through construction and to satisfactory completion.

The Project Engineer is designated as the secondary client contact to assure that assistance will always be available when requested.

section one
firm information

PROFESSIONAL STANDARDS

Underwood Engineers' staff maintains memberships to several industry specific professional organizations which advocate high standards and ethics for Professional Engineers. As Members, we recognize our obligation to protect the environment and community's population through the conscientious application of the best design techniques available. Many of our employees are also active in the state and regional associations such as NHWWA, NEWWA, MEWEA, NHWPCA, MWWPF, NEWEA and NEWWA. Underwood Engineers remains on the NHDES list of pre-qualified engineering firms.

RECOGNITION FOR YANKEE INGENUITY

Our engineers are recognized as innovative problem solvers. With inherent Yankee ingenuity, we have constantly achieved long term, affordable solutions for the complex problems that municipalities face. By proven expertise in obtaining funding, State & Federal grant procedures, negotiation, permitting procedures, design solutions, project delivery, value engineering, budgets and cost sharing, we have demonstrated our reputation for excellence and service.

THE UNDERWOOD TEAM

Currently, Underwood Engineers has 63 full-time employees:

Licensed Professional Engineers	25*
Professional Support Staff	28
Technical Support	4
Administrative	6
Total Staff	**63**

* *Licenses cover NH, VT, ME, MA*

Our professional staff include 9 individuals with Master's Degrees.

UE also maintains a team of 9 field staff providing construction services.

VALUES, VISION AND MISSION

Underwood Engineers completed a companywide strategic plan to articulate our core vision, mission and values. The following represents our beliefs.

Values

- Exceptional Client Service
- Quality Solutions
- Professional Integrity

Vision

Underwood Engineers' vision is to be the civil and environmental firm of choice in New England recognized for technical expertise, exceptional client service, and collegial teamwork. We take pride in cultivating client relationships based on exceeding expectations and mutual trust.

Mission

Underwood Engineers' mission is to solve our clients' civil and environmental engineering challenges with a commitment to outstanding value, exceptional service, and quality results.

PROFESSIONAL SERVICE PROFILE

Wastewater Collection and Treatment

- Sewer System Evaluation Studies and I/I Evaluation
- Regulation compliance assistance
- Funding option analysis and assistance
- Industrial pretreatment programs & facilities
- Treatment plant analysis, permitting, design and operations assistance
- Collection system analysis and computer modeling
- Rate structure analysis
- Toxicity reduction evaluation studies
- Septage treatability studies
- National Pollution Discharge Elimination System (NPDES) permits
- Outfall/Diffuser design

Funding and Financing

- Grant Applications
- Environmental Assessment
- Public information meetings
- Warrant Article preparation
- Accounting coordination

Construction Services

- Bidding services
- Contract administration
- Resident project representative (Resident Inspector)
- Record drawing information
- Project start up
- Project close out

Environmental Permitting

- Wetlands
- ACOE Dredge & Fill
- NPDES
- Site Specific
- Solid Waste
- Local development permits
- Technical assistance to Planning Boards

Water Distribution and Treatment

- Water supply and management analysis
- Distribution system analysis, computer modeling, permitting and design
- Water treatment facilities design and permitting
- Regulation compliance assistance
- Rate structure analysis
- Well and storage facility design
- Fire suppression system design

Stormwater Management

- Drainage analysis
- Computer modeling and master planning
- Permitting and regulatory compliance
- Stormwater Treatment, LID and remediation
- Structural analysis and evaluation of highway culverts
- Culvert rehabilitation
- MS4 compliance

Site Engineering

- Surveying
- Planning
- Site layout and design
- Permitting and regulatory compliance

Solid Waste

- Solid waste management planning
- Waste characterization study
- Hydrogeological studies
- Landfill design and permitting
- Solid waste facilities permitting and design

Municipal Roadways

- Road surface management systems
- Repair and rehabilitation strategies
- Roadway design
- Drainage facilities
- Technical Assistance to Planning Board

section one
firm information

CORPORATE INFORMATION

NAME:	Underwood Engineers, Inc.
FOUNDED:	1982
LOCATIONS:	Portsmouth, NH (headquarters) and Concord, NH
PRESIDENT:	Keith A. Pratt, P.E. - kpratt@underwoodengineers.com[1, 2]
SR. VICE PRESIDENT:	W. Steven Clifton, P.E. - wsclifton@underwoodengineers.com [1, 2]
VICE PRESIDENT:	David J. Mercier, P.E. – dmercier@underwoodengineeers.com[2]
TREASURER:	Colleen Morrow - cmorrow@underwoodengineers.com[2]
FOUNDER:	Frank G. Underwood, P.E. - fgu@underwoodengineers.com
LICENSES:	NH, ME, MA and VT
SERVICES:	Water, Wastewater, Civil/Environmental Engineering and Infrastructure Underwood Engineers is also qualified for all disciplines on the NHDES Roster of Prequalified Consulting Engineers.
SERVICE AREA:	New England
WEBSITE:	www.underwoodengineers.com
CONTACT:	Headquarters 25 Vaughan Mall Portsmouth, NH 03801 603-436-6192 603-431-4733 (fax)
	Branch 99 North State Street Concord, NH 03301 (603) 230-9898 (603) 230-9899 (fax)

1 Stockholders who can obligate the Company
2 Members of the Board of Directors

UE maintains necessary insurance including the following limits for professional liability:
$5M – Aggregate
$2M – Per Claim

section two
project understanding

PROJECT UNDERSTANDING

The Carroll County Farm complex and approximately 40 homes in Ossipee Village are served by the Carroll County Water System. The sources of supply include two deep bedrock wells and three dug wells, which are also referred to as springs. The artesian output of two of the dug wells/springs flows by gravity to the third dug well/spring from which water is pumped through a metering and treatment building, where chlorine is fed, and then into an in-ground 200,000-gallon concrete reservoir. The discharge from each bedrock well also flows through the metering and treatment building, receives chlorine and flows to the reservoir. Water flows by gravity from the reservoir through a 10-inch D.I. main to the County Farm, and then onto the village via County Farm Road, Route 28 and Route 171 where the size is reduced to 8-inch in the village center and several smaller diameter mains serve other streets.

A 1999 engineering study of the Carroll County Water System identified a supply deficiency and bedrock well #2 was added subsequent to that report and prior to 2001. However, no water supply improvements have been made since that time and demands have increased over the last 20 years due to the addition of new facilities at the County Farm (new jail in 2003 and a new nursing home in 2010) and addition of several residential connections. Additionally, a rehabilitation center with 28 beds was under consideration for an existing office building in the village that is connected to the water system. While this proposal did not go forward, the potential for increased water demand in the Village exists and must be understood.

The last measurement of the capacity of the wells/springs supplying the water system was in 1999 prior to installation of bedrock #2. Both the current supply capacity of these wells and the water levels are unknown. It is noted that level measurement infrastructure was included in design documents from 2001 but it is not clear if any of this was actually installed. It is further noted that recent source metering data indicates that 99% of the water flowing to the reservoir is coming from bedrock well #2. Additionally, in a recent water quality sampling effort, there was air in the discharge from bedrock well #1 indicating a possible low water level.

The 10-inch and 8-inch D.I. water mains noted above were installed in 2001/2002. However, the rest of the distribution system consists of 4-inch and smaller cast iron and PVC mains which are older. In some locations, fire hydrants are connected to 4-inch mains which does not meet current design standards.

Carroll County requires an engineering evaluation and study to determine the following:

- Supply capacity of existing sources of supply
- Projected demands and ability of supplies to meet them
- Fire flow capability throughout water system
- Recommendations on
    - Rehabilitating or improving existing supply sources

- Adding a supply source or sources to meet demands
- Distribution system improvements to ensure adequate fire flow
- Rate adjustments to help support recommended improvements

Underwood Engineers proposes to conduct the following scope of work to meet the needs of the Carroll County Water System as noted above.

section three
project approach and scope of work

PROJECT APPROACH

Underwood Engineers uses a Project Team approach to successfully complete projects. Carroll County, including the Water Superintendent and the County Commission will be an important part of that team. We communicate frequently to ensure that project progress is meeting expectations and the goals of the project. While the Project Manager will be the primary point of contact, all members of the UE project team are available to answer questions or concerns of the County in the event that the Project Manager is unavailable.

SCOPE OF WORK

The initial effort will be primarily a desktop analysis aided by field work to evaluate sources and equipment and conduct fire flow tests and/or supply flow measurements. If it is determined that pump tests of the existing wells, or evaluation of the wells requiring the efforts of a licensed water well contractor are necessary, this work will be carried out in a subsequent phase.

The scope of the engineering evaluation shall include the following tasks:

- Initiate the project with a kick-off meeting to discuss the project scope of work and goals to ensure that all parties are on the same page, as well as to either collect, or identify information needed to complete the evaluation.
- Inspect the existing water supply and storage infrastructure (without dewatering) to determine the general condition and note any required upgrades. This inspection shall be coordinated to occur on the same day as the kick-off meeting
- Review existing reports, studies, plans and available information on the Carroll County water system
- Determine, or make the best possible estimate of the current sustainable capacity of each of the existing supply sources
- Determine status of designed well water level infrastructure from 2001 and if this exists, what is necessary to make it functional
- Evaluation of source water quality and any required treatment changes
- Project demand for water in the County Farm and Ossipee Village for a 20-year planning period, including potential development in Ossipee Village or any planned facilities on the County Farm
- Analyze required or needed fire flow at the County Farm and in Ossipee Village
- Perform field fire flow tests at selected locations in the distribution system, to better understand existing system-wide fire flow capability
- Develop a computerized water model of the County Farm water system for use in evaluating both current available fire flow at any location and recommended water main improvements

to achieve the needed fire flow. The results of the field fire flow tests will be used to calibrate the model to ensure it is accurately representing the system.

- Evaluate current County rate structure and compare to similar size systems in the State. Determine proportional use by the County and the Ossipee Village users and use this to help develop an equitable rate structure that supports operational and capital costs.
- Work with the County to identify possible funding sources to assist with implementation of any water system improvement recommendations. This shall include at a minimum, the Drinking Water State Revolving Fund (DWSRF), Drinking Water Groundwater Trust Fund (DWGTF) and Community Development Block Grants (CDBG).
- Produce an engineering report to document the existing system, supply capacity, projected demand, condition of existing supply and storage infrastructure, and fire flow capability throughout the system. The report will include recommendations on:
    - Need, or not, for additional supply sources
    - Additional required investigations such as pump tests, inspection of pumping equipment or new source investigations
    - Required upgrades to existing supply, treatment, and storage infrastructure
    - Distribution system improvements to both modernize the system as well as provide needed fire flows
    - Changes in the rate structure
    - Possible funding sources that the County can tap to proceed with any proposed upgrades
- Provide a draft copy of the report to the County and attend a County Commissioners meeting to discuss/present the report and seek comment
- Provide a final copy of the report based on input from the County

section four
relevant project experience

Underwood Engineers has a great deal of experience in all aspects of water system engineering; from initial planning documents to comprehensive studies to design, construction, and start-up of source, treatment, storage and distribution system projects. The following experience table details a variety of water system projects completed by UE. Contact information is provided for the clients for whom these projects were completed. It is noted that we have also provided references in ***Section 7*** of this proposal. We urge you to contact our references as they can provide the best information on the services provided by UE.

WATER STORAGE, DISTRIBUTION AND TREATMENT

Town of Bristol, NH Waterworks Improvements **Contact:** ***Jeff Chartier*** Water & WW Superintendent (603) 744-8411		**Engineering Services:** Preliminary Engineering, Design, Construction, Funding Assistance (NHDES DWSRF-ARRA) **Team Members:** Metcalf, Pitsas, Rees	**Major Components:** ■ Comprehensive water system evaluation and storage analysis ■ Water system modeling ■ Development of distribution system capital improvements plan ■ Booster pumping station and relocation of PRVs ■ Upgrade of well pumping station ■ Locating 0.5 MG water storage tank
Conway Village Fire District, Conway, NH Water Storage Tank **Contact:** ***Stephen Bamsey*** (603) 447-5470		**Engineering Services:** Preliminary Engineering, Design, Construction **Team Members:** Pratt, Metcalf, Mercier, Pitsas	**Major Components:** ■ Preliminary evaluation of aging, leaking steel tank ■ Cost effective evaluation of storage tank options ■ Water storage tank replacement with new 0.265 MG prestressed concrete tank ■ 9,800 LF of new and replacement water main

section four
relevant project experience

Coos County Complex **West Stewartstown, NH** Water Supply & Storage Improvements **Contact:** ***Jennifer Fish, County Administrator*** (603) 246-3321		**Engineering Services:** Study, Design, Construction **Team Members:** Metcalf, Carney, Rees	**Major Components:** ■ Water Supply Alternatives Evaluation ■ Coordination among several state agencies and the West Stewartstown Water Precinct (WSWP) ■ 1,700 LF of watermain along a busy Rail Trail.to connect to WSWP system. Work timed to avoid summer ATV and winter snowmobile use. ■ Meter vault for both fire and domestic flow ■ Demolition of old water storage facility
City of Dover, NH Pudding Hill Aquifer Improvements **Contact:** ***Bill Boulanger*** Deputy Director of Community Services (603) 516-6450 ***Dave White, P.E.*** City Engineer (603) 516-6462		**Engineering Services:** Preliminary Engineering, Design, Construction, Funding Assistance **Team Members:** Pratt, Sundean	**Major Components:** ■ Connection of two new wells to distribution system ■ 2,100 LF raw and finished water main ■ Coordination with electrical utility ■ MtBE Remediation Bureau funding assistance
City of Dover, NH PFAS/1,4 – Dioxane/MtBE and Fe/Mn Water Treatment Plant **Contact:** ***Bill Boulanger*** Deputy Director of Community Services (603) 516-6450 ***Dave White, P.E.*** City Engineer (603) 516-6462		**Engineering Services:** Preliminary Design, Pilot Testing, Final Design **Team Members:** Pratt, Page, S. Clifton, Alegria, Cannella	**Major Components:** ■ Pilot testing of alternatives ■ GAC or ion exchange resin for PFAS removal ■ Advanced oxidation for 1,4-dioxane removal ■ Greensand Plus filtration for Fe/Mn ■ Integration of multiple treatment processes in a new facility ■ Aquifer recharge and groundwater management

section four
relevant project experience

City of Dover, NH Fe/Mn Water Treatment Facility **Contact:** ***Bill Boulanger*** Deputy Director of Community Services (603) 516-6450 ***Dave White, P.E.*** City Engineer (603) 516-6462		**Engineering Services:** Preliminary Engineering, Design, Construction, Funding Assistance **Team Members:** Pratt, Page, S. Clifton	**Major Components:** ■ New iron and manganese treatment facility 1,200 gpm using GreenSand Plus ■ Modified existing clearwell for continued use ■ Backwash reclaim system to minimize water to waste ■ Upgrades to two well pumping stations ■ New well chemical treatment facility ■ SRF funding assistance
City of Dover, NH North End Pressure Zone **Contact:** ***Bill Boulanger*** Deputy Director of Community Services (603) 516-6450 ***Dave White, P.E.*** City Engineer (603) 516-6454		**Engineering Services:** Preliminary Engineering, Design, Construction, Funding Assistance **Team Members:** Pratt, Metcalf	**Major Components:** ■ 760,000 Gal. Prestressed Concrete Water Stand Pipe ■ Hydraulic verification study ■ Evaluation of modeling software and conversion to WaterCAD ■ Water modeling - pressure, fire flow, water age ■ 10,000 LF new DI Water main ■ Directional drill HDPE water main ■ New Booster Pumping Station ■ SCADA ■ Emergency Power

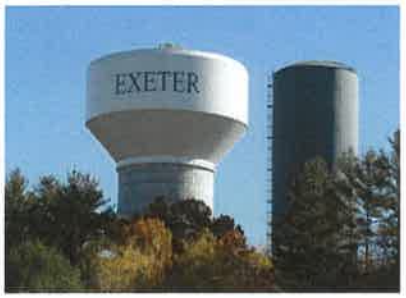
section four
relevant project experience

City of Dover, NH Water Facility Improvements, Phase I **Contact:** ***Bill Boulanger*** Deputy Director of Community Services (603) 516-6450 ***Dave White, P.E.*** City Engineer (603) 516-6462		**Engineering Services:** Preliminary Engineering, Design, Construction, Funding Assistance **Team Members:** Pratt, Page, J. Clifton, Sundean	**Major Components:** ■ New iron and manganese treatment facility 1,200 gpm using GreenSand Plus ■ Modified existing clearwell for continued use ■ Backwash reclaim system to minimize water to waste ■ Upgrades to two well pumping stations ■ New well chemical treatment facility ■ SRF funding assistance
City of Dover, NH Water Facility Improvements, Phase II **Contact:** ***Bill Boulanger*** Deputy Director of Community Services (603) 516-6450 ***Dave White, P.E.*** City Engineer (603) 516-6462	 Smith Cummings Well Conceptual View	**Engineering Services:** Preliminary Engineering, Design, Construction, Funding Assistance **Team Members:** Pratt, J. Clifton, Sundean	**Major Components:** ■ Upgrades to two well pumping stations ■ Connection of two new wells to distribution system ■ 7,300 LF raw water main ■ Emergency interconnection with Somersworth ■ Upgrades to aquifer recharge pumping stations ■ SRF funding assistance and DWGTF grant ■ Road reconstruction and traffic control
Town of Durham, NH Madbury Road Booster Pump Station **Contact:** ***April Talon, P.E.*** Town Engineer (603) 868-5578		**Engineering Services:** Evaluation of low pressure problem in one residential area of the system, Study, Design, Construction, and Start-Up Technical Service **Team Members:** Pratt, Metcalf	**Major Components:** ■ Hydraulic modeling ■ Creation of new pressure zone ■ New below ground booster pump station to fit in residential area ■ Hydropneumatic storage to maintain pressure in boosted zone ■ Water main and valving to isolate new zone from the rest of the system ■ Check valves to accommodate fire flow

section four
relevant project experience

Town of Durham, NH Foss Farm & Beech Hill Storage Tanks **Contact:** ***April Talon, P.E.*** Town Engineer (603) 868-5578		**Engineering Services:** Preliminary Engineering, Design, Construction **Team Members:** Metcalf, Rees	**Major Components:** ■ Recoating of Existing 3.0 MG Foss Farm Tank and 0.6 MGD Beech Hill Tank. ■ Preliminary evaluation and inspection by 3rd party tank specialist including ROW inspection of interior(s)
Town of Durham Spruce Hole Groundwater Supply & Artificial Recharge Facility **Contact:** ***Todd Selig*** Town Administrator (603) 868-5571		**Engineering Services:** Preliminary Engineering, Design, Construction **Team Members:** Metcalf, Pitsas	**Major Components:** ■ Installation, testing and permitting for new 130 foot deep 12" x 18" gravel-packed well, 725 GPM ■ Reuse of existing infrastructure ■ New infrastructure included: Connecting water main, three phase electrical power, control and meter building, and artificial recharge basins

section four
relevant project experience

Town of Exeter Water Distribution System Improvements Program **Contact:** ***Jennifer Perry, P.E.*** Public Works Director (603) 773-6157		**Engineering Services:** Hydraulic Verification Study, Design, Construction, Start-Up Technical Assistance, Funding Assistance **Team Members:** Pratt, Page	**Major Components:** ■ Increased hydraulic gradeline (HGL) of Main Zone 30 ft. ■ Hydraulic verification study ■ Hydraulic modeling ■ New water storage tank – 1.5 MG composite elevated, winner "Concrete Structure of the Year" (Northern New England Concrete Promotion Association) ■ 2 new booster pumping stations, one with high service (fire) pump ■ New control valves to manage tank levels ■ WTP finished water pump modifications ■ 5,200 LF of DI water main to improve hydraulic connection between tank and system ■ 5,200 LF of roadway reconstruction including new curb and sidewalk ■ SCADA improvements to incorporate new tank and booster pumping stations
Town of Greenville Barrett Hill Water Tank & Distribution System Improvements **Contact:** ***Tara Sousa*** Town Administrator (603) 878-2084		**Engineering Services:** Preliminary Engineering, Design, Construction, Funding Assistance **Team Members:** Pratt, Page	**Major Components:** ■ Comprehensive water system evaluation ■ New water storage tank – 600,000 gal. welded steel ■ Eliminated pressure zones and increased HGL. ■ Tank access road and site improvements ■ SCADA improvements to incorporate new tank ■ 27,000+ LF of DI water main, services, & appurtenances ■ Roadway, sidewalk and drainage improvements ■ 3 PRV structures

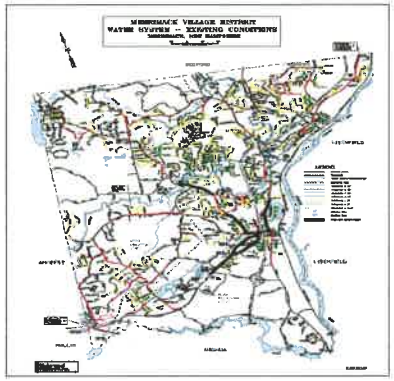
section four
relevant project experience

Greenville Estates Village District Water System Improvements **Contact:** ***Tara Sousa*** Town Administrator (603) 878-0439		**Engineering Services:** Preliminary Engineering, Design, Construction, Funding Assistance **Team Members:** Pratt, Rochette	**Major Components:** ■ Alternatives evaluation ■ 10,300 LF of 12" DI water main ■ Directional drill 8" HDPE water main under brook ■ 3,400 LF of 6" PVC C900 water main ■ Master meter station with PRVs ■ NHDOT permitting ■ Intermunicipal Agreement between Town and District
Town of Hinsdale North Hinsdale Water Storage Tank **Contact:** ***Jill Collins*** Town Administrator 603-336-5710, Ext. 11		**Engineering Services:** Preliminary Engineering, Design, Construction, Funding Assistance **Team Members:** Pratt, Page	**Major Components:** ■ New 0.4 MG prestressed concrete tank ■ Tank access road and site improvements ■ Tank mixing design
Town of Hinsdale, NH Well #2 Replacement **Contact:** ***Dennis Nadeau*** Water and Sewer Superintendent (603) 336-5715		**Engineering Services:** Preliminary Engineering, Design, Construction, Funding Assistance **Team Members:** Metcalf, Page	**Major Components:** ■ Permit, design and construct 360 gpm replacement well ■ Pump test run into system-eliminated discharge line ■ Upgrade existing vault and add flow meter ■ New VFD and electrical in existing station ■ Decommission old well

section four
relevant project experience

City of Keene, NH Low Pressure Zone Solutions Study **Contact:** ***Donald Lussier, P.E.*** City Engineer (603) 352-6550 ***Donna Hanscom*** Assistant Director of Public Works (603) 352-6550		**Engineering Services:** Planning, Water Modeling **Team Members:** Pratt, Metcalf	**Major Components:** ■ Identification of distribution system deficiencies ■ Update and calibrate water model ■ Flow testing ■ Water modeling - pressure, fire flow, water age ■ Alternative evaluation of low-pressure solutions ■ Water infrastructure plan review and update CIP ■ Develop uni-directional flushing program
Merrimack Village District, NH Premium Outlet Turnpike Crossing **Contact:** ***Ronald Miner*** Superintendent (603) 424-9241		**Engineering Services:** Preliminary Engineering, Design, Construction, Funding Assistance **Team Members:** Pratt, Page	**Major Components:** ■ 6,400 LF of 16" DI main ■ 4,000 LF of 10" DI fire protection line ■ Sleeved solid ledge directional bore under FE Everett Turnpike ■ 300 LF of 16" HDPE main
Merrimack Village District Hutchinson Tank Recoating **Contact:** ***Ronald Miner*** Superintendent (603) 424-9241		**Engineering Services:** Design, Construction **Team Members:** Pratt, Metcalf, Page, Noble	**Major Components:** ■ Recoating of 1M Gal steel water storage tank ■ Maintain antennas in operation during work ■ Field inspection by 3rd party specialist

section four
relevant project experience

Merrimack Village District Wells 7 & 8 Iron and Manganese Treatment **Contact:** ***Ronald Miner*** Superintendent (603) 424-9241		**Engineering Services:** Preliminary Engineering, Design, Funding Assistance **Team Members:** Pratt, Metcalf, Page	**Major Components:** ■ 1.8 MGD Iron & Manganese removal WTP ■ Expandability to treat potential new source ■ Backwash reclaim system to minimize waste wash water ■ Infiltrating lagoons to recharge aquifer with water not recycled ■ Emergency generator ■ SCADA
Merrimack Village District Turkey Hill Bridge Crossing **Contact:** ***Ronald Miner*** Superintendent (603) 424-9241		**Engineering Services:** Preliminary Engineering, Design, Construction **Team Members:** Page, Clifton, Pratt	**Major Components:** ■ NHDOT design coordination and permitting ■ 1,100 LF of 16-inch ductile iron water main ■ Twin pipe crossings for high and low-pressure zones ■ Pre-insulated pipe with HDPE jacket ■ Pipe support and thrust restraint design ■ Cost savings through combining water work with Town bridge project.
Merrimack Village District Hydraulic Evaluation & Continental Boulevard Water Main **Contact:** ***Ronald Miner*** Superintendent (603) 424-9241		**Engineering Services:** Preliminary Engineering, Design, Funding Assistance **Team Members:** Pratt, Metcalf, Page	**Major Components:** ■ Distribution system hydraulic evaluation ■ Hydraulic modeling ■ 17,000 LF of 16-inch water main to improve hydraulic connection between supplies, area of highest demand, and high-pressure zone ■ Coordination with Bureau of Turnpikes

section four
relevant project experience

City of Portsmouth Madbury Wells #2, #3, #4 & #5 Infrastructure Improvements **Contact:** ***Al Pratt, P.E.*** Water Resources Manager (603) 427-1530		**Engineering Services:** Preliminary Engineering, Design **Team Members:** Pratt, Metcalf, Page	**Major Components:** ■ Infrastructure evaluation ■ Basis of Design Memorandum ■ Final Design Document Prepared ■ Bidding Services
Town of Raymond Wells #1 and #4 Infrastructure Improvements **Contact:** ***Steve Brewer*** Public Works Director (603) 895-7035		**Engineering Services:** Preliminary Engineering, Design, Funding Assistance **Team Members:** Pratt, Metcalf	**Major Components:** ■ Replacement of Well 1R including well pumps and pitless adaptor ■ Installation of Well 4 including new pump station building ■ 3,300 LF connecting water main ■ Associated site work
Town of Raymond, NH Mottolo Water Main Extension **Contact:** ***Drew Hoffman, NHDES*** (603) 271-6778		**Engineering Services:** Preliminary Engineering, Design, Construction, Funding Assistance **Team Members:** Metcalf, Pitsas	**Major Components:** ■ 1,800 LF sleeved 12" and 8" water main crossing NHDOT Route 102. ■ 10,400 LF 12" DI water main ■ 1,700 LF 8" DI water main ■ River crossing ■ 25 homes with internal plumbing modifications ■ Roadway repairs

section four
relevant project experience

City of Rochester, NH Water Supply Evaluation **Contact:** ***Peter Nourse, P.E.*** Director of Public Works (603) 332-4096		**Engineering Services:** Preliminary Engineering, Funding Assistance **Team Members:** Pratt, Metcalf	**Major Components:** ■ Water supply, pumping and storage evaluation ■ Distribution System Inventory and Assessment ■ Groundwater Capacity Evaluation ■ Recommendations and CIP developed
Town of Salem, NH Manor Parkway Pressure Zone Feasibility Study **Contact:** ***Daniel Hudson*** Director of Engineering (603) 890-2033		**Engineering Services:** Hydraulic Verification, Preliminary Engineering, Funding Assistance **Team Members:** Pratt, Metcalf	**Major Components:** ■ Evaluate existing high-pressure zone pumping station ■ Evaluate alternatives to improve fire flows, including pump improvements and new water storage tank ■ Hydraulic modeling ■ Hydrant flow testing ■ Evaluate options to expand high pressure zone
Town of Salem, NH Exit 2 Area Water System Improvements **Contact:** ***Daniel Hudson*** Director of Engineering (603) 890-2033		**Engineering Services:** Preliminary Engineering, Design, Construction, Funding Assistance **Team Members:** Pratt, J. Clifton	**Major Components:** ■ Upgrades to existing municipal fire/booster pumping station ■ New municipal fire pumping station ■ (2) x 1,750 gpm fire pumps ■ 800 gpm quad-plex packaged municipal booster pump skid ■ Building and ancillary systems (electrical, HVAC, etc.) ■ Coordination between water and fire departments ■ SCADA ■ DWSRF funding assistance

section five
project team

Underwood Engineers has assigned the following personnel to the Carroll County Project:

President and Principal in Charge:	Keith A. Pratt, P.E.
Project Manager:	Lynnette E. Carney, P.E.
Project Engineer:	Allison M. Rees, P.E.
Technical Resource and QA/QC:	Michael B. Metcalf, P.E.
Subconsultant - Future:	Emery & Garrett Groundwater Investigations (EGGI) *(No hydrogeologic work is included in this phase but if work on the wells or further source investigations are recommended, UE has completed many successful projects with EGGI, a division of GZA, as our hydrogeological subconsultant.)*

Our proposed project team has a collective total of **123 years** of water system engineering experience. This team has been working together for the past 12 years analyzing New Hampshire water systems and engineering solutions to solve issues and modernize systems.

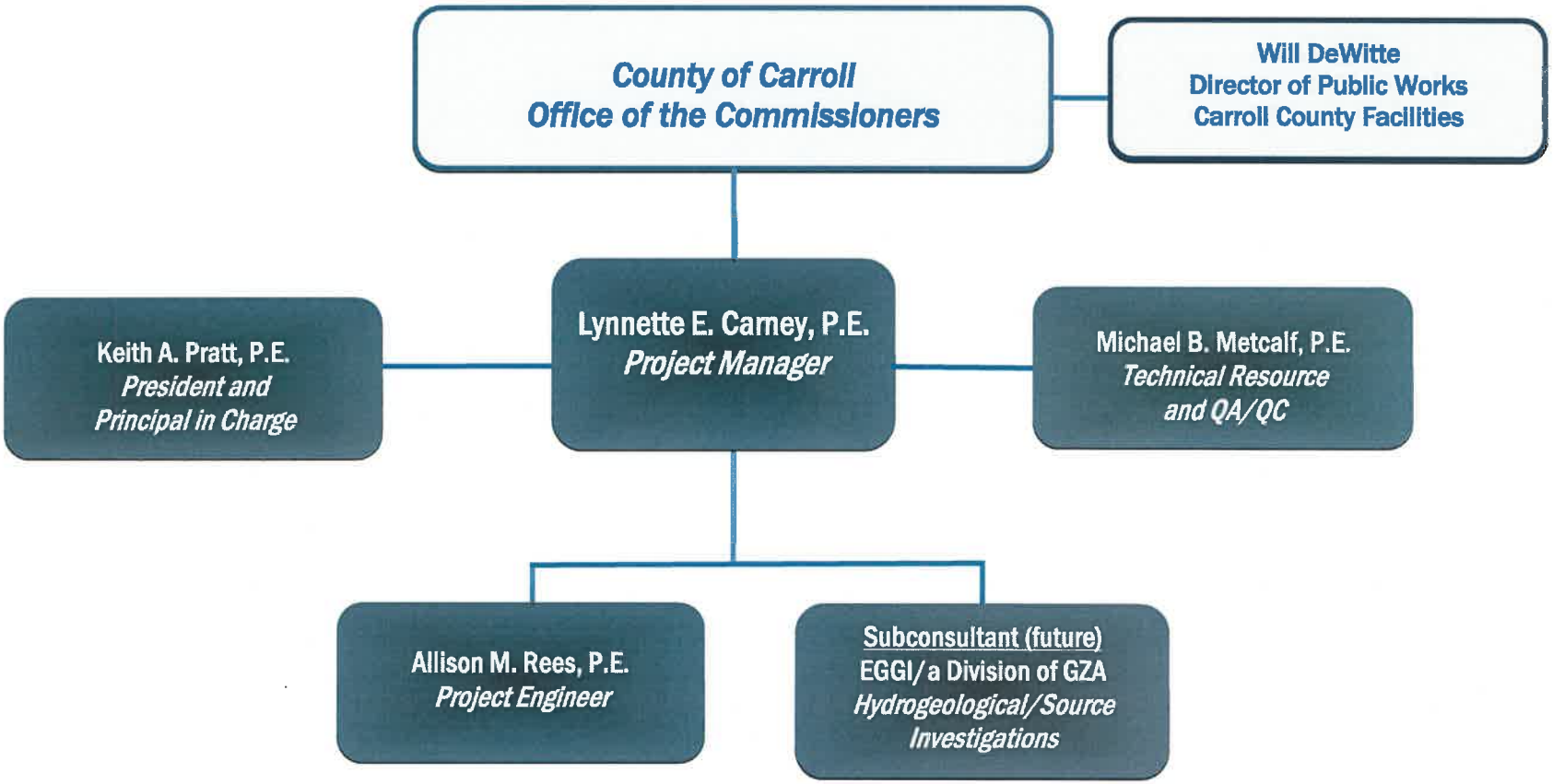
Lynnette Carney, P.E. and **Allison Rees, P.E.** were, respectively, the **Project Manager** and **Project Engineer** for the Coos County Water Improvements which were recently completed. **Michael Metcalf, P.E.** served as a **Technical Resource and** in a **QA/QC** role. Their roles were similar to their proposed roles for the Carroll County project.

Should hyrdrogeological services be recommended or required, we would utilize Emery & Garrett Groundwater Investigations (a division of GZA), with whom UE has teamed on numerous successful groundwater projects in New Hampshire.

Resumes for the proposed UE team are attached.

When we work with other consultants on a project team, it is Underwood Engineers' policy to pass on Subconsultant costs to the County with *no mark-up.*

section five
project team



KEITH A. PRATT, P.E.
PRESIDENT

kpratt@underwoodengineers.com

EDUCATION

MS/1995
Civil and Environmental Engineering
University of New Hampshire

BS/1988
Civil Engineering
University of Maine

PROFESSIONAL REGISTRATIONS

Professional Engineer:
New Hampshire
Massachusetts
Maine

Subsurface Disposal System Designer:
New Hampshire

TECHNICAL EXPERTISE

- Water Treatment
- Sewer Collection and I/I
- Master planning and CIP budgeting
- Water and wastewater project funding
- Design/construction administration
- Intermunicipal Agreements
- Public relations/project presentation to Town Selectmen
- Negotiation with State and Federal Regulators

YEARS OF EXPERIENCE

Underwood Engineers: 25
Other firms: 5

PROFESSIONAL PROFILE

Mr. Pratt has proven success managing municipal civil, water and wastewater projects. His experience includes designing and managing multi-million dollar and multi-year construction projects for New England communities. His work to keep the public, managers and regulators involved in all stages of the project develops a strong foundation from which a project will move forward.

Keith's combination of a strong technical background and knowledge of funding for projects is a unique benefit for communities. Keith works to secure funding for projects early on so that user rate and tax impacts can be determined. Keith is very familiar with the requirements for funding of water and wastewater projects through NHDES (SRF and SAG), DW&GW Trust Fund, Rural Development, and the Office of State Planning (CDBG).

As President of Underwood Engineers, Keith uses these skills to manage the firm and the project teams. He is actively involved in most of the projects being completed at Underwood.

Keith has also been active in his community of Barrington, NH as a Selectman for four years, 2009-2013.

RELEVANT PROJECT EXPERIENCE

MUNICIPAL WATER/WASTEWATER

Merrimack Village District, Merrimack, NH

Principle in Charge for all projects in the District including transmission mains, blending, Fe/Mn water treatment plant piloting, design and construction. The $4.7 Million Fe/Mn water treatment plant went on line in 2016. Current/recent work at MVD includes storage tank improvements, booster pumping station replacement, and three (3) water treatment plants for PFAS for all the Districts wells.

Southern NH Regional Water System, Derry and Plaistow, NH

Principle in Charge for all the water projects in Plaistow and Derry relating to the Southern NH Regional Water project. This project, funded by MtBE and the Trust Funds, includes new transmission mains, storage tanks, pumping stations, and meter/PRV vaults. In addition to the engineering design work, UE has been involved with coordinating efforts with other communities to facilitate the delivery of Manchester Water Works supply to Plaistow and all the communities in between.

MtBE and NHDW&GW Trust Funds, Various, NH

Principle in Charge for all the current UE projects funded by either the MtBE Settlement Funds or the NHDW&GW Trust Funds. This includes projects in Durham/Lee (water main extension), Epsom (water main extension), Dover (system interconnects and artificial recharge), as well as Portsmouth (Breakfast Hill Area Water Main Extension), to name a few.

Water Facility Improvements, Dover, NH

Principal in Charge for the Water Facility Improvements program which began with a Facility Plan in 2015. Work includes significant transmission main improvements as part of the multi-year, multi-million dollar program. Funding for the work comes in part form NDHES SRF, MtBE Settlement Funds and NH DW&GW Trust Funds. Recently completed projects include Fe/Mn Treatment at Lowell Avenue. Current work includes the design of a new Water Treatment Plat at Pudding Hill for Fe/Mn, PFAS, MtBE, and 1,4-Dioxane. Additional work includes design improvements to the City's French Cross Road Fe/Mn Water Treatment Plant.

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Sewer System Extension and Pumping Station Improvements, Eliot, ME

Principal in charge for a sewer extension along Route 236. Phased work includes improvements to two municipal pumping stations. Work also included negotiations of a new intermunicipal agreement with the Town of Kittery, ME. Current work includes the design and construction phase of the replacement of the two primary wastewater pumping stations. The $1.7 M SRF project was completed in the Fall of 2018. Current work includes preliminary design phase for the $18M sewer and water extension to Route 236.

Water and Wastewater Improvements, Swanzey, NH

Project Manager for a $5.6 Million project which includes comprehensive improvements to water, sewer, drainage, and roads for North Swanzey. Unique to this project was the efforts to combine the construction projects of both the town and the Precinct into one construction contract. Work also included negotiations of a new intermunicipal agreement with the City of Keene. Keith is coordinating the joint funding from Rural Development, CDBG, and SRF funds.

Water System and Road Improvements, Exeter, NH

Project Manager for an $8 Million project which includes comprehensive water system improvements to the water system, drainage, roads, and sidewalks along Epping Road and Main Street. Unique to this project was a new 1.5 MG composite elevated water storage tank to replace the existing 1 MG standpipe. The project also raises the hydraulic grade line by 13 psi throughout Town.

Water and Wastewater Improvements, Boscawen, NH

Project Manager for a $3.3 Million sewer, water, and drainage improvements program being completed for the Town of Boscawen and the Penacook-Boscawen Water Precinct. Keith developed an agreement between the Precinct and Town to complete the joint project with one construction contract. This project also included negotiations with the City of Concord for a new intermunicipal agreement.

CSO and I/I Abatement Program, Portsmouth, NH

Project Manager for a 15-year, $30 Million plus CSO abatement / sewer separation program for the City's downtown area. The project includes comprehensive utility (water, sewer, and drain) and road improvements including sidewalk and curbing, negotiations and approvals from the NH Cultural / Historical Resources Division, NHDES Wastewater Engineering Bureau, and US EPA Region 1 officials. The ongoing design and construction phases being with an intensive preliminary design effort. The program established a reasonable sequence and schedules to complete the work in the densely populated historic area of Portsmouth.

Infrastructure Improvements (2008 to 2016), Keene, NH

Project Manager and principal in charge for the $15 Million plus multi-year Infrastructure Improvement Projects. Work included water transmission, sewer, and drain system replacement. Keith was responsible for overall schedule, budget and contract. His responsibilities also included client contact and presentations to the City Council. UE completed hydraulic modeling and a disinfection evaluation for the northern section of the distribution system.

Groundwater System Evaluations, Rochester, NH

Principle in Charge for engineering evaluation of groundwater supplies in Rochester, NH. Work includes coordinating with the hydrogeologist and developing costs for putting groundwater supplies online. Important aspects of the work included identifying the most cost effective supplies and preparing a CIP for the City.

Wastewater System Improvements, Wolfeboro, NH

Principal in charge for improvements to Wolfeboro's wastewater system including collection system, pumping stations, treatment plants and effluent Designed and provided construction administration for a new well water and new wastewater system for the 40-unit condominium complex. Keith also applied for and received a 45% grant from Rural Development on behalf of the District. The new water system came online in February 2004.

Wastewater Treatment System Improvements, Carroll County, NH

Project Manager responsible for process improvements to the Carroll County wastewater disposal system. The project was funded through the NHDES SRF program.

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Water System Improvements, Greenville, NH
Project Manager for a $5.7 million water system improvements project which included a new conventional water treatment plant, a 600,000 gallon water storage tank, and 25,000 feet of water pipe. Several state and local roads which were affected by the project were rebuilt. Keith coordinated the funding and financing of the project. His efforts resulted in the Town receiving grants for approximately 88% of the project costs. Funding included NHDES, Rural Development, NHDOT, and the Office of State Planning.

Corrosion Control Study, Durham, NH
This study evaluated corrosion control alternatives for lead and copper reduction for the University of New Hampshire water treatment plant in Durham, New Hampshire. Increasing finished water pH and review of sampling sites was sufficient to bring the system into compliance.

Sludge Reduction Services, Durham, NH
Keith was Project Manager for the full-scale pilot testing at the Arthur Rollins water treatment plant in Durham, New Hampshire. The goal of the study was to investigate the use of alternative coagulants that would lead to the reduction of residual sludge.

Highlands Village District, Northfield, NH
Designed and provided construction administration for a new well water and new wastewater system for the 40-unit condominium complex. Keith also applied for and received a 45% grant from Rural Development on behalf of the District. The new water system came online in February 2004.

Wastewater System Improvements, Greenville, NH
This two phase project included improvements to the recycle and waste activated sludge pumps as well as the installation of a selector in the aeration tank. The improvements to the 0.3 MGD facility were in response to an Administrative Order by Consent.

Water Supply Study, Dalton, NH
This study developed alternative water supplies for the Town of Dalton, NH. Options included development of a groundwater supply and connection to the adjacent Town of Gilman, VT.

Comprehensive Water System Improvements Master Plan, Hinsdale, NH
Project Manager for a series of studies including water supply, treatment, storage, and distribution, sewer system infiltration and inflow, road and sidewalk improvements. A comprehensive and cost effective plan for implementing the recommended improvements was developed. Follow-up work included design and construction of a 600,000 gallon prestressed concrete tank and the recoating of two, 250,000 gallon steel tanks.

Silver Lake Area Wastewater Improvements, Belmont, NH
Keith was the Project Manager for this $1.3 Million sewer collection system located around Silver Lake. The project included 2 pumping stations.

Municipal Improvements, Greenfield, NH
Project Manager for a 4-year $2 Million program. The work included a new municipal wastewater system and downtown sidewalk and drainage improvements. The wastewater disposal site was a former industrial building that was cleaned up using the Brownfield's program. The projects were funded using over six (6) state and federal programs.

Route 140 Water Line Extension Study, Belmont, NH
A study evaluating the financial impact for a 2 mile water line extension on Route 140 in Belmont, NH.

Route 3 Water Line Improvements, Belmont, NH
This project included providing design drawings for new water lines to be incorporated into NHDOT's Route 3 improvements project.

Keith A. Pratt, PE
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Water System Improvements, Peterborough, NH

Project Manager for the design and construction of a $465,000 / 300,000 gallon water storage tank and booster pumping station project. Work included an engineering evaluation to redesign the storage tank elevations / and creation of a new high pressure zone, to allow appropriate water turnover and improve water quality in the storage tank. Keith applied for and coordinated the funding applications which resulted in a 45% grant from Rural Development.

Epping Road Water and Sewer Improvements, Exeter, NH

Responsible for the design of 4,000 feet of sewer, 2,000 feet of water line and a water booster pumping station. The $1.2 Million project received 20% State Aid Grant reimbursement from the NHDES.

Portsmouth Avenue Sewer Line Improvements, Exeter, NH

Designed 2,000 feet of sewer line replacement and 1,000 feet of drainage pipe on Portsmouth Avenue in Exeter. The project includes redesign of all the curbing and sidewalks for the entire length of road.

High Street Area Wastewater Improvements, Exeter, NH

Design and construction services for the replacement of 1,000 feet of sewer line on this busy Town roads servicing the hospital.

Mill Street Water Main Replacement, Greenville, NH

Project manager for a $300,000 twelve (12) inch water main project. The project was funded 100% by a Community Development Block Grant.

Beebe River Village District, Campton, NH

Project manager for the final design of the water and wastewater system improvements. The $700,000 project included development of a new water source, storage facilities, and treatment. The project was funded 100% by a Community Development Block Grant.

SEWER COLLECTION SYSTEMS AND INFILTRATION AND INFLOW (I/I)

Phase III Infiltration and Inflow Evaluation, Exeter, NH

Keith was the Principal in Charge for the 2013 3-year study that included a comprehensive review of Exeter's I/I issues. The work included developing cost-effective solutions to mitigate I/I and CSO's in the collection system. The I/I work is ongoing and is part of an administrative order issued to the Town. As a result of the work, UE is implementing many of the projects that were identified in the CIP as a result of the work.

Sewer System Master Plan Update, Salem, NH

Principal in Charge for a Sewer System Master Plan Update in Salem, NH. The work includes I/I evaluations, pumping station evaluation, sewer modeling, and development of a CIP. As a result of the work, UE completed design and construction phase engineering services for the $10 Million sewer interceptor replacement project on South Broadway. Additionally, we are involved with pumping station improvements and I/I mitigation projects.

Infiltration and Inflow Study, Portsmouth, NH

Principal in Charge for an I/I report in the City of Portsmouth. The work includes flow isolation, metering, and CCTV. A significant part of the work was to develop pubic information materials relating to private I/I.

Infiltration and Inflow Study, New Castle, NH

Principal in Charge for an I/I report in the New Castle to develop a CIP for the future. The work included metering, flow isolation and manhole inspection to identify sources of I/I. Additionally, the Eight (8) wastewater pumping stations in Town were evaluated. A CIP was developed.

Infiltration and Inflow Study, Hampton, NH

Principal in Charge for an I/I report in the Hampton Beach area of Town. The work includes flow isolation and manhole inspection to identify sources of I/I. Tidal influences were evaluated as well.

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Infiltration and Inflow Investigations, Eliot, ME
Keith is the Principal in Charge for ongoing I/I projects in Eliot, ME. The work includes investigations in the municipal sewer lines as well as private sources.

Infiltration and Inflow Investigation, Laconia, NH
Keith is the Principal in Charge for the recently completed I/I evaluation in Laconia, NH. The work includes investigations in the municipal sewer lines as well as private sources to develop a Capital Improvements Plan.

Infiltration and Inflow Investigation, Wolfeboro, NH
Keith is the Principal in Charge for the ongoing I/I projects in Wolfeboro, NH. The work includes investigations in the municipal sewer lines as well as private sources.

Infiltration and Inflow Evaluations, Belmont, NH
Keith was the Project Manager and Principal in Charge for the I/I studies in Belmont, NH. The work included establishing a volume of I/I to benchmark flows before discharging into the Winnipesaukee River Basin System.

Infiltration and Inflow Evaluations, Boscawen, NH
Principal in Charge for I/I studies in Boscawen, NH. The work included continuous flow monitoring, inspections, flow isolation to develop strategies and a CIP for reducing I/I.

Infiltration and Inflow Investigation, Hinsdale, NH
Keith was the Principal in Charge for the I/I evaluation completed in Hinsdale, NH.

MUNICIPAL WATER STORAGE

0.40 Million Gallon Tank, Plaistow, NH
Principle in Charge for a new 400,000 gallon water storage tank in Plaistow, NH as part of the Southern NH Regional Water System. This tank will be part of Plaistow's new potable water system.

0.76 Million Gallon Concrete Wire Wound Tank, Dover, NH
Principle in Charge for the new 760,000 gallon water storage tank in Dover, NH. The concrete tank was installed as part of a larger project to raise the hydraulic grade line in the north end of Town.

1.5 Million Pedestal Water Storage Tank, Exeter, NH
Principle in Charge for the 1,500,000 gallon elevated water storage tank in Exeter, NH. The concrete pedestal supports a steel tank and replaces an older steel standpipe. The new tank raises the hydraulic grade line in Town by 13 psi. Work included transmission main improvements as well as booster station improvements.

Retrofit Highland Avenue Steel Tanks, Hinsdale, NH
Principle in Charge for retrofitting two 250,000 gallon steel water storage tanks. One tank was welded (1965) and the other was riveted (1938). Structural improvements were also made to the steel. Lead removal and abatement was included as part of the work.

0.15 Million Gallon Welded Steel, Greenville, NH
Project Manager for a 150,000 gallon water storage tank in Greenville, NH. The tank was installed as part of a larger project to improve the water system in Town. The tank was located on the opposite end of the existing tank to balance the system.

0.30 Million Gallon Glass Lined Bolted Tank, Peterborough, NH
Project Manager for a 300,000 gallon water storage tank in Peterborough, NH. The tank was installed to improve pressure problems in the west end of Town. A booster pumping station was also installed to raise the hydraulic grade line.

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MUNICIPAL WATER / WASTEWATER PUMPING STATIONS

Water Booster Pumping Station, Dover, NH

Principle in Charge for the comprehensive water system improvements in Dover, NH, including new water storage tank, transmission main and booster pumping station. The North End Pressure Zone Project including raising the hydraulic grade line for the north end of the City to better provide water serviced and fire flows. A new water booster pumping station was installed to pump to the new water storage tank and higher hydraulic grade line.

Water Booster Pumping Station, Merrimack, NH

Principle in Charge for the replacement booster pumping station at Turkey Hill Road. This station provides the water necessary for the High Pressure Zone in Merrimack. The project is funded by a NH DW&GW Trust Fund loan.

Water Booster Pumping Stations, Salem, NH

Principle in Charge for the improvements to one booster pumping station and the installation of a new booster pumping station located in the Industrial Park area of Town. The project was to correct issues with limited and reliable pressures and fire flows in the area.

Wastewater Pumping Station Improvements, Eliot, ME

Principal in charge for the design and reconstruction of 2 wastewater pumping stations in Elio, ME. This $1.7 Million project was funded by a Maine DEP SRF loan.

Wastewater Pumping Station Improvements, Belmont, NH

Principal in charge for the design and reconstruction of 6 wastewater pumping stations in Belmont, NH. Much of the work was funded by a NHDES SRF loan.

Wastewater Pumping Station Evaluations, New Castle, NH

Principal in charge for the evaluation of 8 wastewater pumping stations located in Newcastle, NH. The evaluation identifying deficiencies and recommended improvements.

Varney Road Wastewater Pumping Station Improvements, Gilford, NH

Principal in charge for improvements to two end-suction centrifugal pumping stations in Gilford, NH. The rehabilitation projects were identified in a preliminary engineering study to determine the most cost-effective solution.

Belmonte and Front Street Wastewater Pumping Station Improvements, Exeter, NH

Project Manager for capital improvements to two end-suction centrifugal pumping stations in Exeter, NH. The rehabilitation projects were identified in a preliminary engineering study to determine the most cost-effective solution.

INTERMUNICIPAL AGREEMENTS

Keith has been Project Manager for the following projects involving the preparation or modification of intermunicipal agreements:

Town of Swanzey, NH (Keene, NH)
Greenville Village District (Greenville, NH)
Town of Boscawen, NH (Concord, NH)
Town of Lebanon, NH (Hanover, NH and Enfield, NH)
Conway Village Fire District, NH (North Conway Water Precinct)
Eliot ME (Kittery, ME)
Plaistow, NH (Regional)
Dover (Somersworth, NH)

Keith A. Pratt, PE
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RATE STUDIES

Keith has been Project Manager for the following user rate studies:

- Hinsdale, NH (water)
- Merrimack Village Water District, NH (water)
- Lebanon, NH (water)
- Raymond, NH (water)
- Wolfeboro, NH (water and sewer)
- Belmont, NH (sewer)
- Swanzey, NH (sewer)
- Eliot, ME (sewer)
- Boscawen, NH (sewer)
- Laconia, NH (sewer)

PROFESSIONAL AFFILIATIONS / CIVIC ACTIVITIES

- American Water Works Association
- New England Water Works Association
- American Council of Engineering Companies (ACEC-NH)
- National Society of Professional Engineers
- Water Environment Federation
- University of New Hampshire Civil Engineering Advisory Board (current)
- Barrington, NH Board of Selectmen (2009 to 2013)

PRESENTATIONS AND PAPERS

Mr. Pratt has presented or co-authored the following:

"Tackling PFAS - Impacts on Municipal Infrastructure, The Merrimack Village District Experience", Presentation, September 22, 2019. New Hampshire Municipal Association Technical Meeting, Concord, NH.

"Implementing Low Impact Developing and Getting Your Planning Board on 'Board'", Presentation, November 2014 New Hampshire Local Government Center (NHMA) Annual Conference, Manchester, NH.

"Finding and Removing the Private Side of Inflow & Infiltration", Presentation, December 11, 2014, Maine Rural Water Association Meeting, Bangor, ME.

"Planning for an Emergency in Water and Sewer Rate Design", Presentation, September 10, 2013, Granite State Rural Water Meeting, Sunapee, NH.

"The Value of Public Drinking Water and Establishing Equitable Rates", Presentation, October 31, 2012, New Hampshire Water Works Exposition, Concord, NH.

"Considerations in Water Rate Setting—Part II", October 12, 2011, New Hampshire Water Works Association, 2007 Drinking Water Exposition, Concord, NH. This presentation discussed concepts the concept of funding aging infrastructure through creative rate setting practices.

"Considerations in Water Rate Setting", October 31, 2007 – NHWWA and NHDES Drinking Water Exposition and Trade Show, Manchester, NH. This topic discussed balancing rates and rate increases with expenditures. The spreadsheet model showed the impact of various rate increases to different user classes.

"Dig the Hole Once – Benefits (and Pitfalls) of Combined Infrastructure Projects", November 2, 2005, New Hampshire Water Works Association, 2005 Drinking Water Exposition, Manchester, NH. This presentation discussed the benefits of combining infrastructure projects. Recent cost increases and the cost-effectiveness of combining projects was discussed.

"A Case Study of Working Together in New Hampshire", this topic was presented at the NH Water Exposition on November 10, 2004 (Manchester, NH) and the NH Water Works Association Meeting, September 8, 2005 (Boscawen, NH). The presentation discussed the recent combined projects in Swanzey and Boscawen. Both projects included joint efforts between the Water District (distribution improvements) and Town (sewer improvements).

"Alternative Bidding – Creative Ways to Reduce Costs", April 17, 2003 – NHWWA Meeting, Hampton Beach, NH. This topic discussed alternative bidding techniques for a water storage tank and booster pumping station that led to significant costs savings for the Town of Peterborough, NH.

"Selecting, Siting and Funding Water Storage Tanks, Large and Small", January 15, 2003 Manchester, NH. This paper discussed considerations on materials and siting of water storage tanks. Funding and cost-effectiveness was also discussed.

"Tools You Can Use – Financial Considerations When Selecting a Water Storage Tank", Journal of the New Hampshire Water Works Association, Summer 2003.

MICHAEL B. METCALF, P.E.

SENIOR PROJECT MANAGER

mmetcalf@underwoodengineers.com

EDUCATION

MS/1992/Hydrology
University of New Hampshire

BS/1979/Civil Engineering
University of Connecticut

PROFESSIONAL REGISTRATIONS

Professional Engineer:
New Hampshire
Maine

TECHNICAL EXPERTISE

- Water system master planning , CIP budgeting, and asset management
- Water supply development, treatment and water resource management
- Water system design and construction administration
- Public speaking and presentations to municipal boards
- Negotiation with State and Federal Regulators

YEARS OF EXPERIENCE

Underwood Engineers: 15
Other firms: 25

PROFESSIONAL PROFILE

Mr. Metcalf has over 40 years of municipal water system experience. His background includes all aspects of planning, design and construction of water supply development, surface and groundwater treatment, distribution, and storage facilities. He has authored numerous reports and planning studies including comprehensive water system evaluations, rate studies, water resource management plans, pump test reports, water treatment facility evaluations, instream flow studies, and basis of design reports.

RELEVANT PROJECT EXPERIENCE

WATER SYSTEM PLANNING AND ANALYSIS

Water Supply & Storage Improvements, Coos County Complex, West Stewartstown, NH

Project Manager for a water supply alternatives evaluation for the Coos County Complex driven by poor water quality and an antiquated storage facility that led to a significant deficiency determination by NHDES. Alternatives were evaluated and based on cost, practicality and feasibility, a connection to the West Stewartstown Water Precinct System was recommended using a rail trail to avoid a problematic bridge crossing. Funding sources were evaluated and UE helped secure a DWSRF loan for the project which included 1,700 L.F. of connecting main, a meter and backflow prevention vault and demolition of the old storage facility. During the design and construction phase, served as a technical resource and provided QA/QC.

Comprehensive Water Study, Hancock, NH

Project manager for preparation of comprehensive Water Study. Responsibilities included hydraulic analyses, study of alternatives, cost estimation, study of fiscal implementation, and report preparation.

Water Supply Study, Lancaster, NH

Project manager responsible for water supply study including hydrogeologic evaluation of Lancaster area, safe yield analysis of existing surface water supply, evaluation of groundwater supply options and surface water treatment alternatives, and report preparation.

Water Supply and Distribution Study, Durham, NH

Project manager responsible for preparation of Water Supply and Distribution Basis of Design which included preliminary design of an upgrade to the existing water treatment facility, a hydrogeologic evaluation of the Durham area, and a computer analysis of the water distribution system.

Water Supply Alternative Study, New London-Springfield, NH

Project manager responsible for preparation of a comprehensive Water Supply Alternative Study for the New London-Springfield Water System Precinct including a hydrogeologic evaluation of the entire Precinct, safe yield analysis of the existing surface water supply, extensive water use and system growth potential evaluation, groundwater supply options, analysis of available treatment schemes for the surface supply and recommendations on the most feasible cost-effective option.

Utility Master Plan, University of NH, Durham, NH

Project manager responsible for the water treatment, storage and distribution portion of a utility Master Plan conducted for UNH.

Michael B. Metcalf, P.E.
senior project manager
mmetcalf@underwoodengineers.com

Water Master Plan, Hartford, VT
Project engineer responsible for preparation of a comprehensive 10-year Master Plan for the Hartford water system. This included analysis of water systems in Quechee and White River Junction, including an iron removal facility, three well pumping stations, six storage facilities, and five booster pump stations. A capital improvements program was developed identifying prioritized spending needs over a ten-year period.

New Water System, Dresden Mills and Oquossoc, ME
Project manager responsible for planning design and construction of complete new water systems in these small communities where petroleum hydrocarbon contamination had impacted a number of residential and business wells. Projects were funded and managed by the Maine Department of Environmental Protection. Each system included bedrock wells, a control/pumping station with an integral clear well, transmission main, distribution mains and service connections. The Dresden Mills system also included a radon treatment unit.

Wiswall Dam Removal Study – Water Supply Implications, Durham, NH
Project manager and author of a study of the water supply implications of removing Wiswall Dam on the Lamprey River. The Durham/UNH water system has an intake for a raw water pump station in the impoundment created by the dam. Dam removal was being considered as one alternative to improve upstream migration of anadromous fish.

MUNICIPAL WATER / SURFACE WATER TREATMENT

Iron and Manganese Treatment Facility, Merrimack Village District, NH
Project Manager responsible for design and construction of a new 1.8 MGD iron and manganese water treatment facility to treat Wells #7 and #8.

Well Pumping Stations, City of Portsmouth, NH
Project Manager responsible for evaluation, design and construction of upgrades to three existing well pumping stations and one new well pumping station near the Portsmouth WTP in Madbury, NH.

Kimball Tank Booster Pumping Station, Contoocook Village Precinct, Contoocook, NH
Project Manager for evaluation, design and construction of a new booster pumping station and improvements to a cast-in-place buried concrete tank which allowed regular use of the tank which had been rendered obsolete when a new tank was constructed at a higher elevation.

Manor Parkway Pressure Zone Improvements, Salem, NH
Project Manager for design and construction of an upgrade to an existing booster pumping station (domestic and fire service) as well as a new fire pump station to correct pressure problems in the zone and provide sufficient fire protection for the boosted zone which serves primarily industrial and commercial users.

Water Treatment Facility Upgrade, Newmarket, NH
Process design manager for upgrade to existing water treatment facility on limited site utilizing three different surface water supplies. Project included conversion of existing sedimentation basin into dry space to house new
adsorption clarifiers and chemical storage/feed facilities, complete replacement of pumps, piping, mechanical and electrical equipment, complete
rehabilitation of existing rapid sand filters, addition of powdered activated carbon and chlorine dioxide feed system, addition of plant backwash recycle system, and a new intake into the Lamprey River.

North End Pressure Zone and Water Storage Tank, Dover, NH
Project Manager responsible for design and construction of water distribution system high pressure zone, including 767,000 gallon pre-stressed, wire-wound concrete water storage tank, 32' x 28' booster pumping station, 10,000 LF of 12-inch ductile iron water main, zone isolation valves and PRV vault, and SCADA. along Route 145 to create a major system loop. The project included directional drilling (i.e. 3,500 feet) for main installation in order to limit disturbance to wetlands. The pump station included chlorination and NaOH treatment. Mike assisted with funding applications and administration of a $4 million SRF loan with 15% ($600,000) forgiveness.

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Rapid Sand Filters Upgrade, Concord, NH
Project manager responsible for evaluation of dual media rapid sand filters, design, and construction administration of air scour system to be added to the existing filters. Project included media and underdrain replacement.

Water Treatment Facility Modified Design/Build, Goffstown, NH
Project manager for modified design-build project for a 400 gpm water treatment facility using ceramic media pressure filtration process which does not require coagulation chemicals.

Water Treatment Facility Evaluation, University of NH, Durham, NH
Project manager responsible for conducting an evaluation of an existing conventional treatment facility including future demand projections for the Town and University, analysis of the existing status of the treatment facility, and determining the merits of upgrading the existing plant versus construction of a new facility.

Instream Flow Rule Evaluation, University of NH, Durham, NH
Project manager responsible for studying the Draft Instream Flow Rule proposed as part of the New Hampshire Rivers Management and Protection Program and determining its impact on the existing operation of pumping from the Lamprey River to augment flow in the Oyster River from which raw water is taken for the UNH water treatment facility.

Benchmarking Study of Water and Wastewater Treatment Facilities, Rochester, NH
Project manager responsible for a peer review and benchmark study of the Rochester Water and Wastewater Treatment Facilities to determine the efficiency and adequacy of operations at each facility, as well as any potential advantage in Contract Operations of the plants. The analysis involved a detailed comparison of operation of Rochester's plants to operations at three New England facilities (both for water and wastewater respectively) of similar size and complexity.

Slow Sand Filtration Facility, Sunapee, NH
Project manager responsible for design of a new slow sand filtration facility to bring the Town of Sunapee into compliance with the Surface Water Treatment Rule. The project also included renovations to a raw water pumping station located in a historically significant building and a new raw water transmission main to the slow sand filter site. The filtration facility was designed to blend into the residential neighborhood adjacent to the site.

WATER SECURITY

Water System Vulnerability Assessment and Revised Emergency Response Plan, Concord, NH
Project manager responsible for preparation of a vulnerability assessment (VA) and emergency response plan (ERP) for the City of Concord, NH water supply, storage and distribution system, in accordance with the Public Health Security and Bioterrorism Preparedness and Response Act of 2002. The Concord water system serves over 40,000 people and includes a 10-mgd surface water treatment plant supplied by water from Penacook Lake and the Contoocook River, a wellfield capable of 1 mgd, 5 pump stations, 5 water storage facilities, and about 170 miles of water transmission and distribution mains.

WATER RESOURCE MANAGEMENT

Water Resource Management Plan, University of New Hampshire/Town of Durham, NH
Project manager responsible for project evaluation to better utilize and manage existing water resources as well as to prepare for implementation of the Instream Flow Rule which impacts one of the Town and University supply sources, the Lamprey River. Project included preparation of a Water Resources Management Plan, preliminary and final design of (1) a new water main to carry Lamprey River water directly to the UNH water treatment plant (instead of discharging it into the Oyster River over a mile upstream of the plant), and (2) modifications to the raw water pump station and water treatment plant to accomplish the new transfer infrastructure.

Water Supply Augmentation Study, Rochester, NH
Project manager responsible for conducting a number of evaluations to (1) determine the safe yield of the existing Rochester, NH surface supply, (2) determine necessary improvements for existing water supply dams and potential improvements to increase storage and safe yield, (3) determine the feasibility and cost of interconnections with the Somersworth and Farmington water systems, (4) determine the feasibility and cost of a second water treatment facility on a different surface water supply, (5) determine the availability of groundwater supplies and the cost to develop and connect them to the water system.

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WATER REGULATORY COMPLIANCE

Avoidance of Filtration Waiver Request, Hancock, NH

Project manager for preparation of a waiver request for avoidance of filtration under the Surface Water Treatment Rule which included analysis of disinfection alternatives and transmission main improvements to meet avoidance waiver criteria. After approval of the request by the State, acted as Project Manager for design and construction administration of a new disinfection facility and oversized transmission main to allow sufficient contact time.

Surface Water Treatment Rule Compliance Project, Jaffrey, NH

Project manager responsible for the following projects made necessary by the requirement to filter or abandon two existing surface water supplies: (1) Preparation of study analyzing water use, population projections, future water needs and water supply alternatives to meet those needs, (2) Design and construction administration for renovations to two well pumping stations, a new booster pump station, a 0.75 MG precast concrete water storage tank, a 0.5 MG completely buried precast concrete storage facility on Monadnock Mountain, 8000 feet of transmission main replacement, and a new radio telemetry instrumentation and control (SCADA) system

GROUNDWATER TREATMENT & SYSTEM DESIGN

New Groundwater Supply Planning and Preliminary Design, Durham, NH

Project Manager responsible for planning and preliminary design of a new groundwater supply for the Durham/UNH water system in the Spruce Hole Aquifer. The project included an analysis of water main materials and routes to connect the new supply to the system and preliminary design of the pumping station and facilities for artificial recharge of the aquifer using water pumped from the Lamprey River.

Study and Pilot Testing of Blending as an Alternative to Treatment, Merrimack Village District, Merrimack,NH

Project Manager responsible for a study and full scale pilot testing of blending several groundwater supplies to dilute iron, manganese, sodium and chloride to avoid much more expensive treatment facilities.

Iron, Manganese and Radon Treatment Facility, Raymond, NH

Project manager responsible for planning, design and construction of a new 0.6 mgd treatment facility to remove iron, manganese and radon from 3 gravel packed wells in Raymond. For cost and space savings, project utilized single tank with 4 cells containing manganese greensand and an integral packed tower aeration unit on top. Also responsible for coordinating with hydrogeologic subcontractor to locate, design and install the new third well.

New Groundwater System Design and Construction Administration, Georges Mills, NH

Project manager responsible for design of a new groundwater supply system to replace an unfiltered surface water supply. The project included two new bedrock wells, a pumping station with radon removal equipment and space for fluoride removal equipment, new transmission main to connect this pump station to the existing system, and a new cast-in-place concrete, in-ground, two-cell 0.25 mg water storage facility.

Groundwater Supply Design and Construction Administration, New London-Springfield, NH

Project manager for design and construction administration of a new groundwater supply consisting of six gravel packed wells with low head submersible pumps which convey water to a pump station with a wet well and high head pumps. Project also included a 1.0 MG precast concrete storage reservoir, 4,800 feet of connecting water main, and a solar powered radio telemetry system tied into an instrumentation and control system at the pump station.

Trihalomethanes (THM) Reduction Study, Ashland, MA

Project engineer responsible for piloting a mixed oxidants (MIOX) pretreatment system for reduction of THMs being experienced in the distribution system due to chlorination of groundwater high in Total Organic Carbon (TOC). The project included analyses of the cost and ramifications of disinfection with chloramines as an alternative to use of MIOX.

Manganese Removal Facility Upgrade, Hartford, VT

Project manager responsible for design and construction of an upgrade consisting of addition of two 8-foot-diameter manganese greensand filtration tanks, along with upgrading the mechanical and electrical systems of the 29-year-old facility. This project included piloting of the continuous regeneration (CR) and catalytic oxidation (CO) processes to select one to replace the intermittent regeneration (IR) process which led to media expansion and frequent maintenance. Also included in the project were 300 feet of 48-inch-diameter main to provide sufficient chlorine contact time to meet state regulations.

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Corrosion Control Study, Milford, NH
Project manager responsible for corrosion control study for compliance with the Lead and Copper Rule. Also responsible for design of chlorination and sequestering chemical feed facilities at the groundwater supply points.

Corrosion Control Facility Design and Construction Administration, Bristol, NH
Project manager responsible for corrosion control study for compliance with the Lead and Copper Rule and design and construction administration of new corrosion control facilities.

HYDROGEOLOGIC STUDIES

Hydrogeologic and Water Quality Evaluation, Merrimack, NH
Project manager for hydrogeologic and water quality evaluations of a Merrimack Village District Well which had been shut down due to volatile organic contamination. Responsible for preparation of a basis of design report comparing cost estimating, and recommending treatment systems to meet drinking water quality standards.

Hydrogeologic Analysis and Report, Hinsdale, NH
Project manager responsible for hydrogeologic analysis of a new well site and preparation of pump test report.

Hydrogeologic Evaluation, Milton, NH
Project manager for a hydrogeologic evaluation and test well investigation to locate a second source of groundwater supply for the Milton Water District. After a viable site was found, a five-day pumping test was arranged and coordinated.

Preliminary Well Siting Report, Peterborough, NH
Project hydrogeologist responsible for the hydrogeologic evaluation of a potential new gravel-packed well site and preparation of the hydrogeologic portion of the Preliminary Report in compliance with State of New Hampshire Env-Ws 379.

Groundwater Supply Development, Raymond, NH
Project manager responsible for a town-wide investigation to find a new source of groundwater supply for the town. Responsibilities included supervision of hydrogeologic subcontractor and coordination with town and state agencies.

Gravel-Packed Wells and Pump Station, Hinsdale, NH
Project manager responsible for planning, design, and construction administration of two gravel-packed wells and single pump station to handle both wells.

Wellfield and Pump Station, Lunenburg, MA
Project manager for design and construction administration of tubular wellfield, suction priming system and pump station.

Test Well Investigation, North Raynham, MA
Project engineer for test well investigation program to find a new groundwater source of supply.

WATER DISTRIBUTION SYSTEMS

Computer Modeling, Barre, VT
Project engineer for preparation of a computerized simulation of the water distribution system. This was a large complex model consisting of high and low pressure water mains and a number of pressure reducing valves.

Booster Pump Station Design and Construction Admin, Durham, NH
Project manager for a preliminary study design and construction administration of a booster pump station to raise pressures in one area of town.

Computer Modeling, Hooksett, NH
Project manager for preparation of a computerized simulation of the Hooksett Village Precinct Water distribution system.

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Transmission Main Design and Construction Admin, Durham, NH
Project manager for design and construction administration of 3,000 feet of transmission main to allow better use of an existing groundwater supply.

Water Main Design Review, Construction Administration and Inspection, Fair Haven, VT
Construction project manager and chief resident engineer for 22,000 feet of transmission and distribution water main.

Water Meter Installation Design and Construction Administration, Hillsborough and Sunapee, NH
Project manager for design of a water meter installation program for each of these water systems which were previously totally unmetered.

Water Main Extension, Raymond, NH
Project Manager responsible for design and construction administration of a 12,000 foot 12" DI water main extension to connect 25 homes impacted by groundwater contamination from the Mottolo Pig Farm Superfund site. Project included a directional drill underneath the Exeter River and several other directional drills to avoid wetland impacts.

Raw Water Main, Durham, NH
Project Manager responsible for design and construction administration of 8,000 feet of new 12" PVC water main to connect an existing pump station on the Lamprey River directly to the UNH WTP. Project included automatic air release valves and a pressure reducing valve to reduce the pressure as water enters the WTP.

WATER STORAGE

Water Storage Facility Rehabilitation Project, Newmarket, NH
Project manager for design and construction administration of complete interior and exterior paint removal and recoating of the Great Hill Water Storage Facility.

Water Storage Facility Design Review, Construction Administration and Inspection, Fair Haven, VT
Construction project management and chief resident engineer for 0.5 MG storage reservoir, access road, and connecting water main and altitude valve vault.

Water Storage Facility Design and Construction Administration, Gloucester, MA
Project engineer for design and construction administration of a 1.0 MG welded steel standpipe, altitude valve vault and connecting water main.

Reservoir Rehabilitation, Maynard, MA
Project manager for design and construction administration of rehabilitation of an abandoned 1.5 MG rubble masonry open reservoir. Project consisted of a new concrete floor, shotcrete walls, new concrete ringwall foundation and precast concrete dome roof.

Water Storage Facility Design and Construction Admin, Orange, MA
Project engineer for design and chief resident engineer for construction of two 1.0 MG precast concrete water storage facilities, altitude valve vault, and 2,000 feet of water main.

Water System Storage Facility Evaluation, Milford, NH
Project engineer for preparation of an analysis of existing water system storage facilities including recommendations on sizing, location, and materials of construction for a new storage facility.

Water Storage Facility Recoating Project, Durham, NH
Project manager for design and construction administration of interior and exterior recoating of 3.0 MG steel standpipe.

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PRESENTATIONS / PUBLICATIONS / AWARDS

Artificial Recharge—Another Water Supply Option for New Hampshire, Case Study: Spruce Hole Groundwater Supply & Artificial Recharge Facility, UNH/Durham Water System (UDWS), Durham, New Hampshire. NHWWA Journal (Volume II 2018)

Spruce Hole Groundwater Supply & Artificial Recharge Facility, UNH/Durham Water System—Improving Drought Resiliency. Presented at NEWWA Water Resource Symposium (October 2017)

Phosphate Treatment for Corrosion Control or Corrosion Control After Flint. Presented at NHWWA Operator Training (March 2017)

Blending Water Supplies to Reduce Treatment Needs. Presented at NH Water Exposition & Trade Show, Manchester, NH (Oct, 2007).

Water Resource Management in a Seacoast New Hampshire Community. Presented at NH Water Exposition & Trade Show, Manchester, NH (Oct, 2006).

Raymond, NH Groundwater Treatment Facility. Presented at NEWWA Annual Conf., Newport, RI (Sep, 2004).

Iron, Manganese and Radon Removal in Raymond, NH. Presented at NEWWA, NHWWA & GMWEA Joint Meeting, West Lebanon, NH (Jan, 2004).

New Horizons in Drinking Water Disinfection. Presented at NH Water Exposition & Trade Show, Manchester, NH (Oct, 2003).

How to measure the water uses & the timing of their impact on a stressed stream (Lamprey River). Presented at Environmental Expo, Boston, MA (May, 2003) and NEWWA Water Resources Symposium, Boxboro, MA (Oct, 2003).

Impacts of the proposed Instream Flow Rules on Water Suppliers. Presented at NH Water Expo & Trade Show, Manchester, NH (Nov, 2001).

Impacts of Instream Flow Rules & Federal Wild Scenic Designation on use of the Lamprey River as a supplemental supply for the Town of Durham and the University of New Hampshire. Presented at NEWWA Annual Conf., Bretton Woods, NH (Sep, 2001)

Metcalf, M.B. (2000). *Pressure filtration for iron and manganese removal.* J. New England Water Works Assoc. V.114 (3): 187-199.

Winner-NEWWA Dexter Bracket Award for Most Meritorious Paper in J. New England Water Works Assoc. in 2000

Winner-NHWWA Outstanding Achievement Award, 2010

PROFESSIONAL AFFILIATIONS / CIVIC ACTIVITIES

- American Water Works Association
- New England Water Works Association, Water Resources Committee Co-Chair
- New Hampshire Water Works Association, Past President
- Geologic Society New Hampshire
- Rotary Club of Hopkinton, NH

LYNNETTE E. CARNEY, P.E.

SENIOR PROJECT ENGINEER

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EDUCATION

MS/1991/Civil Engineering;
Clarkson University, NY

BS/1989/Civil Engineering;
Clarkson University, NY

PROFESSIONAL REGISTRATIONS

Professional Engineer:
New Hampshire

TECHNICAL EXPERTISE

- Water and wastewater treatment facility system planning, design, and construction
- Water distribution system design
- Sewer collection system design
- Pumping station design

YEARS OF EXPERIENCE

Underwood Engineers: 12
Other firms: 18

PROFESSIONAL PROFILE

Lynnette has 30 years of experience in water and wastewater treatment facility system planning, design, and construction. Her experience includes design of water sources, treatment, pumping, and distribution and sewer collection systems, pumping, and instrumentation and control.

RELEVANT PROJECT EXPERIENCE

WATER

Coos County Complex, Coos County, West Stewartstown, NH

Project Manager & Senior Project Engineer. Designed and provided construction administration services for infrastructure to connect the CCC to the West Stewartstown Water Precinct. This included 1,700 LF of 8-inch ductile iron water main along a rail-trail, including a steel sleeve beneath a DOT bridge, and a meter and backflow vault at the CCC. Phase 2 of the project included decommissioning the CCC's existing wells and storage tank, and installation of new sprinkler and domestic service entrances for the facility.

Glencliff Home, State of New Hampshire, Benton, NH

Water Conservation Plan – Senior Project Engineer. Prepared a water conservation plan for the Industrial/Commercial/Institutional (ICI) facility. Evaluated historic water records and metering in the existing system, which consisted of both potable and non-potable water systems for domestic and fire protection.

Water System Improvements Phase I - Well #3 – Senior Project Engineer. Evaluating alternatives to connect the new well, which is approximately 2,500 ft away, to the facility, and provide necessary storage and pressure for domestic use. Evaluated piping changes to separate the existing cistern water source from the domestic system and retain it for fire protection. Evaluated permitting and other impacts as the new water main will cross land of the Benton State Forest, managed by DNCR, a stream, and the Appalachian Trail. Developed phasing of the project due to budgetary limitations. Prepared plans and specifications for a 2,500 lf 4-inch HDPE transmission main between Well #3 and the facility, including a control building at Well #3 and a booster pump station with provisions for future disinfection, pH adjustment and corrosion control. Developed a radio control system between the two facilities.

Water System Improvements, Phase II – Well #6 - Project Manager & Senior Project Engineer. Designed and provided construction administration services for a new Well #6 and connecting water main beyond Well #3. This included approximately 700 LF of 2-inch HDPE water main, electrical conduits, pitless adapter, pump and motor. Two new 20,000-gallon FRP storage tanks were added near the booster pump station to provide storage for the system, to allow separation of the facility's main buildings, and back-up emergency connections between the domestic and fire protection systems provided. Chlorination facilities and a third booster pump were added at the booster pump station.

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Merrimack Village District, Merrimack, NH

PFC Evaluation – Senior Project Engineer. Prepared evaluation of temporary and treatment measures for two well sites, involving four wells where PFOA was a concern. Prepared preliminary designs including carbon filtration units for the two sites. Evaluated other emerging technologies for treatment. Prepared cost opinions and prepared a report.

Tank Evaluation – Senior Project Engineer. Reviewed condition assessment reports for a 1 MG steel tank and a 4 MG concrete tank, recommended upgrades, mixers and prepared cost opinions and an evaluation report for the work.

Wells #4/5 PFAS WTP - Senior Project Engineer. Designed and provided construction administration services for an 870 gpm WTP to remove PFAS from drinking water. Evaluated GAC and resin technologies for treatment, conducted RSSCTs, pH and arsenic testing to evaluate various GACs. The project included new pitless adapters, well pumps and motors, and an infiltration basin for backwash disposal. The new WTP building included two 12 ft diameter, 26 ft tall GAC vessels, calcium hypochlorite tablets for disinfection, sodium hydroxide for pH adjustment and a blended phosphate for corrosion control.

Wells #7/8 PFAS WTP Addition - Senior Project Engineer. Designed and provided construction administration services for the addition of a PFAS removal system to a 1,250 gpm existing Greensand WTP. Conducted RSSCTs, pH and arsenic testing to evaluate various GACs. The project included new VT well pumps and motors, and an additional infiltration basin for backwash disposal. A building addition was constructed to house two 15 ft diameter, 26 ft tall GAC vessels, and associated piping. A new caustic feed system was installed at Well #7 for pH adjustment.

Well #2/9 PFAS WTP - Senior Project Engineer. Designed and provided construction administration services for a 2,000 gpm WTP to remove PFAS from drinking water. Conducted RSSCTs, pH and arsenic testing to evaluate various GACs. The project included a new VT pump and motor for Well #2 and a pitless adapter, submersible pump, motor, and transmission main to a new Well #9. An infiltration basin was used for backwash disposal. The new WTP building included two trains of 12 ft diameter, 26 ft tall GAC vessels (4 vessels), sodium hypochlorite feed for disinfection, sodium hydroxide for pH adjustment and a blended phosphate for corrosion control.

Lakes Region Facility, State of New Hampshire, Laconia, NH

Senior Project Engineer. Designed 700 lf of new 8-inch ductile iron water main from the City main to two remaining buildings on the facility campus, including a directionally drilled, sleeved, crossing of State Route 106. Prepared plans and technical specifications for bidding.

Slope N Shore Club, New London, NH

Senior Project Engineer. Connected a new bedrock well to the small community water system servicing approximately 70 homes and designed improvements to the main pump/treatment building. Designed a new booster pump station which served approximately half the system, and prepared a Water Conservation Plan. Prepared bid documents for the owner-purchased pre-fabricated booster pump station, evaluated bids and worked with the Owner to sign the purchase agreement. Prepared plans and specifications for installation of the booster pump station and improvements to the main pump/treatment building and connection of the new well.

Well #1R and New Well #4 Town of Raymond, NH

Well #1Replacement – Senior Project Engineer. Designed new pump, pitless adapter, approximately 80 feet of water main and site work to connect the replacement gravel packed Well #1R to the existing system. Coordinated with others for the installation, pump testing of the well, and electrical design. Prepared plans and specifications and bid the project, which was funded by a SRF loan. Performed construction administration for the project, which included Davis-Bacon compliance and AIS requirements. Prepared cost estimates and monitored the project budget.

Well #4 Improvements – Senior Project Engineer. Designed improvements to connect a new 250 gpm bedrock well to the existing distribution system. The design included a new pump, pitless adapter, 3,300 feet of water main, a new 1,000-ft paved access drive, site work, a new pump station which included metering, tablet chlorination and the addition of polyorthophosphate, new electrical and telephone service to the new pump station. Prepared cost estimates and schedules for the project. Prepared plans and specifications for the project; coordinated with electrical and mechanical designers. Well #4 was installed on the grounds of the high school, so coordination with the school, SAU and school schedule was required.

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Madbury Wells, City of Portsmouth, NH
Senior Project Engineer for project consisting of upgrading the Madbury Well #2 and #3 pump stations, and a new pump station for replacement Well #4R and a new Well #5. Designed upgrades for Wells #2 and #3 pump stations with new vertical line shaft well pumps, a new generator, and new piping; coordinated with electrical and mechanical design upgrades. Prepared a preliminary evaluation for the integration and construction of replacement Well #4R and Well #5 which included the evaluation of new buildings, yard piping, a new access road and culvert. Coordinated the design of a new pump station building for Well #4R and #5, site piping, 1,000 ft of new water main and electrical conduit, design of an upgraded gravel access road and culvert for a wetland crossing. Designed a temporary emergency connection for Well #5 when drought impacted the City's normal water supplies.

Bela Brook Water Corporation, Bow, NH
New Replacement Well Permitting and Construction Oversight – As Senior Project Engineer, prepared preliminary and final groundwater permits for a 10 gpm replacement bedrock well. Prepared contract documents, bid, and provide construction administration services for construction of the new well. Subcontracted with a well drilling company for drilling, hydrofracking and pump test. Designed and oversaw construction of the permanent connection of the well to the system.

Pump Station Upgrade Design and Construction Administration – As Senior Project Engineer, prepared preliminary basis of design report for approval by NHDES. Designed upgrades to the existing pump station, including new booster pumps, metering, a new filtration system (Greensand Plus) for iron, manganese and arsenic removal, backwash, integration of a new well, and new monitoring and controls. Coordinated design with structural and electrical design upgrades. Developed plans and specifications, and bid project. Performed construction administration and RPR tasks. Reviewed certified payrolls for Davis-Bacon compliance and performed labor interviews. for the project, which was SRF funded. Tracked overall project budget. Prepared O&M manual and record drawings.

Water Conservation Plan – As Senior Project Engineer, prepared a water conservation plan for the unmetered system, which included night-time flow monitoring for leak detection.

Crotched Mountain Rehabilitation Center (CMRC), Greenfield, NH
Water Conservation Plan – Senior Project Engineer. Prepared a water conservation plan for the Industrial/Commercial/Institutional (ICI) facility.

Well #17 – Senior Project Engineer. Prepared conceptual design for removing iron and manganese from the new 10 gpm bedrock well, using an MTM filtration system. Prepared schematic plans and aided the Owner in obtaining bids for construction of the treatment system in a building constructed by the Owner.

Corrosion Control Study, Town of Sunapee, NH
Senior Project Engineer. Evaluated test results from various locations in the system, evaluated the use and cost of silicates and poly orthophosphates and prepared a report summarizing the findings.

Water Balance, Raymond, NH
Performed a water audit for the Town using the AWWA Free Water Audit Software v.5. Reviewed operational practices and large meter sizing.

System and Source Evaluation, Raymond High School (SAU 33), Raymond, NH
Senior Project Engineer. Evaluated the existing school water system and the potential to connect the school to the municipal water system. The existing system included a well, softener, storage, domestic water system and fire protection system. Developed a conceptual plan to retain the existing fire protection system and connect the domestic water system to the municipal system with a booster pump system.

Water Meter & AMR Upgrade, Wolfeboro, NH
As Project Engineer, worked with the Town to develop quantities needed for the system upgrade. Evaluated meters and AMR systems available from various vendors and prepared a technical memorandum to the Town. Evaluated large meters in the system and based on metered use records, identified meters for further evaluation. Evaluated the existing system of seasonal meters in the system, made recommendations for improvements, and identified lockboxes for use with the seasonal meters. Evaluated meter and radio read technologies for the Town and prepared an engineering evaluation. Assisted the Town with owner-purchase of radios, meters and reading equipment. Prepared final SRF bid documents for a new AMR system for approximately 2,200 customers, and approximately 200 meter replacements using a Neptune system. Worked with the billing department to identify necessary upgrades

to the billing system and coordinate a billing system upgrade with the meter/AMR project. Provided bidding and construction administration serviced during the AMR and meter installations. Coordinated with the Town billing department, water department and installation contractor to manage data transfer, monthly reading of the meters and payments to the Contractor and Vendor.

Water Meter and AMR system Installation, Newmarket, NH

As Project Engineer, prepared bid documents for furnishing and installing approximately 1,100 meter replacements and radio installations using a Badger system . The Town had begun installation of radios and meter replacements in the water system which consisted of about 2,500 accounts, and completed the project using a contractor and funding provided under the ARRA program. UE bid the project and provided construction administration services to complete the AMR installation and meter replacements started by the Town. Prepared specifications and bid documents for the replacement of approximately 900 meters and radios. Provided construction administration services to the Town.

Water Meter and AMR System Installation, Pillsbury Lake District, Webster, NH

Evaluated meters and reading systems (touch-read and radio-read) for the unmetered system. Prepared bid documents for the installation of new meters and reading equipment. Provided bidding construction administration services for the system wide installation of new meters (cut-ins) and meter reading equipment. Sensus meters and MXU radio-read system was installed.

Well #6 Pump Station Rehabilitation &Well 7/8 Blending, Merrimack Village District, Merrimack, NH

As project engineer, provided final design for the rehabilitation of the Well #6 station, which had been off-line for nearly two decades. The upgrade included a new well pump, piping, chlorine and pH analyzers and rehabilitation of the lime feed system, tablet chlorinator and other building improvements. Provided final design for minor upgrades at the pump stations for Wells 7 and 8, including new chemical feed systems and minor building upgrades.

Water Supply Evaluation, Rochester, NH

Senior Project Engineer. Prepared a Water Supply Evaluation for the City's water supplies (a surface water source, one permitted well, and one conditionally permitted well), which included identifying water supply needs and available a supply, evaluating improvements needed to existing sources, evaluating additional sources of supply, comparing costs of potential new sources. UE also developed a Preliminary Well Management Plan which included evaluating past use of Well #1, drawdown, water quality changes over time, pumping restrictions due to river level and provided recommendations for future operation of Well #1 and recommended water treatment.

Spruce Hole Artificial Recharge, Town of Durham, NH

Senior Project Engineer. Prepared final design plans and specifications for the pump station associated with a new well, which included provisions for artificial recharge to the aquifer.

Storm Center Well Pump Station and Hillside Booster Pump Station Upgrade, Bristol, NH

Prepared O&M manual for the operation of a new booster pump station and a rehabilitation of the Storm Center well station.

Water Meter and AMR Upgrade, Belmont, NH

Evaluated the system needs to provide the Town with a radio read system and prepared a preliminary engineering report. Prepared contract documents for the project, bid the project and facilitated owner-purchasing of meters and radios for the project. Provided construction administration for the SRF funded project which included replacement of approximately 225 residential meters, 25 large meters, and installation of about 500 radios using a Sensus system.

Preliminary Water System Evaluation, Franconia Village Water System, Franconia, NH

As Project Manager, evaluated the existing water system including supply, storage, treatment and distribution. Evaluated existing flows and population, and projected future design flows. Also prioritized improvements including a new storage tank, meters, and distribution system improvements. Prepared cost estimates for capital improvements and prepared a final report for the Water Department.

Community Well System Evaluation, Derry, NH

As Project Manager, evaluated three community well systems owned by the Town of Derry and made recommendations for improvements including treatment. Prepared cost estimates and a final report for the Water and Wastewater Department.

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Individual Well Feasibility Study, Pittsburg, NH
As Project Manager, evaluated the feasibility of abandoning the existing municipal water system in lieu of individual wells. The project included mapping, preliminary siting of approximately 70 wells, review of governing regulations, potential contaminant sources, anticipated water quality and cost opinions.

Slow Sand Filtration Plant Design, Sunapee, NH
As Project Engineer, provided final design of the 0.375-MGD slow sand filtration plant, raw water pump station upgrade, and new raw water main. Coordinated other disciplines, and prepared drawings and specification.

Water System Studies, United States Air Force Bases, Worldwide
As Project Engineer, evaluated water systems at various Air Force bases. Evaluation included coliform violation, water quality modeling, source, and desalinization treatment.

Water Storage Tank Repainting, Town of Newmarket, NH
As Project Engineer, prepared specifications for the repainting of a 0.75-MG water storage tank.

Water Supply Update Study, Town of Jaffrey, NH
As Project Engineer, reviewed past source water work, identifying potential sources and evaluating improvements necessary to implement various new water sources.

Water System Improvements, Guilderland, NY
As Project Engineer, provided final design and prepared contract documents of a 3-phase multiple prime contract project. The project consisted of rehabilitation of the raw water pump station, a new interconneect pump station, chemical feed systems, 6-MGD water treatment plant, finished water storage tank and high lift pump station.

Water Treatment Plant Improvements, Cohoes, NY
As Project Engineer, provided conceptual design and prepared specifications for the instrumentation of a 10-MGD water treatment plant. The project also included the design of a zebra mussel control system for the water intake using potassium permanganate.

Slow Sand Filtration Plant, Albany, NH
As Project Engineer, designed a 1,200-gpd slow sand filter and finished water storage tank for a summer camp.

Watershed Protection Project, Providence, RI
As Project Engineer, prepared a Water Quality Protection Plan for the Scituate Reservoir System.

Water System Studies, Rye Water District, Rye, NH
As Project Engineer, evaluated and provided cost estimate for a new water main. The project included evaluation of existing well capacities and usage projection, review of available storage for compliance with current design standards, evaluation of lead and copper sampling data and source water quality data, and recommendation measures to bring the system into compliance with Lead and Copper Regulations.

Water System Evaluation, Barnstead Elementary School, Barnstead, NH
As Project Engineer, evaluated the existing water system and prepared a report outlining recommendations to bring the system into compliance with state and federal regulations.

Water System Hydraulic Analysis, Clifton Park, NY
As Project Engineer, performed hydraulic analysis of a 1,200-pipe model to consolidate five independent water systems.

Water System Hydraulic Analysis, Hudson Falls, NY
As Project Engineer, performed hydraulic analysis for village water system, evaluating new tank locations, recommending improvements, and preparing engineer's report.

Lynnette E. Carney, P.E.
senior project engineer
lcarney@underwoodengineers.com

Water Quality Study, CellTech Biologics, Portsmouth, NH
As Project Engineer, evaluated a coliform occurrence problem at the Pease International Tradeport Water System.

Distribution System Modeling, North Conway Water Precinct, NH
As Project Engineer, developed basic KYPIPE model for major transmission mains and pump stations to perform preliminary hydraulic analyses to aid in the design of a new pump station.

Distribution System Modeling, Tilton and Northfield Water District (previously, Tilton-Northfield Aqueduct Co., Inc.), NH
As Project Engineer, developed a WaterCAD hydraulic model for the distribution system, including calibration and evaluation of future improvements.

OTHER TRAINING / CERTIFICATIONS
OSHA, 40-hour Hazwoper

CONFERENCES / PUBLICATIONS / AWARDS
- 2006 WEFTEC, Dallas, TX – "A Small Community Tackles a WWTF Upgrade"
- 2006 NEWEA Annual Conference, Boston, MA – "Derry, New Hampshire Effluent Pump Station and Force Main Overview"

PROFESSIONAL ASSOCIATIONS
- New Hampshire Water Works Association
- New Hampshire Water Works Pollution Control Association
- NHWWA Operator Training, Portsmouth, NH - 2016 - "When is the Right Time to Upgrade Meters?"
- NHWWA Spring Meeting, Wolfeboro, NH - 2016 - "Are You Ready for a Meter/Reading System Upgrade?"

ALLISON M. REES, P.E.

SENIOR PROJECT ENGINEER / PROJECT MANAGER

arees@underwoodengineers.com

EDUCATION

BS/Civil Engineering, 1998
University of New Hampshire
Durham, NH

PROFESSIONAL REGISTRATIONS

Professional Engineer:
Civil Engineer
New Hampshire

CERTIFICATIONS

NHDOT LPA Certification

TECHNICAL EXPERTISE

- Water and wastewater engineering studies, design
- Civil engineering design and construction administration
- Planning Board reviews
- Environmental permitting
- Federal compliance

YEARS OF EXPERIENCE

Underwood Engineers: 14
Other Firms: 9

PROFESSIONAL PROFILE

Ms. Rees provides project engineering evaluations and design for water, wastewater, and site development projects. She has worked with roadway reconstruction, commercial site design, infrastructure improvements, new and replacement utilities, and water treatment and distribution. Ms. Rees also has experience in Planning Board reviews, federal compliance, and environmental permitting.

RELEVANT PROJECT EXPERIENCE

WATER SUPPLY, TREATMENT, AND DISTRIBUTION

PFAS Removal Treatment Plant, Merrimack Village District (MVD), NH

Engineered final design of a new water treatment plant for removal of PFAS from municipal Wells 4 & 5 in the MVD water system. Chemical feed treatment design for pH adjustment, corrosion control, and chlorination.

Coos County Complex, West Stewartstown, NH

Design and construction administration for interconnection of the Coos County Complex water system with the West Stewartstown Water Precinct system, consisting of a new meter vault and 1,700 LF water main along a Rail Trail, demolition of an existing water storage tank, and internal plumbing connections. Obtained environmental permits, administered federal compliance, and handled coordination with the Trails Bureau of DNCR.

Glencliff Home Well #3 Infrastructure, Benton, NH

Connection of existing water system with new well, including a new control building and booster station. Obtained wetlands permitting for installation of the new water main underneath a perennial stream.

Mottolo Water Main Extension, Raymond, NH

Project Engineer for the design of a 12,000-foot water main extension on Town and State roads, which was needed to serve residents in an area where the groundwater became contaminated. The project was funded through the EPA Super Fund division. Because residents were being transferred from a private well supply to a municipal supply, new service lines had to be run into each home and interior plumbing modifications were required.

Well Upgrade and New Booster Pump Station Design, Bristol, NH

Project Engineer for the upgrade of the Storm Center Well which consisted of constructing an addition to the building that houses the chemical feed equipment. The upgrade also included installing a new well pump and all new process, mechanical, and electrical/PLC-based instrumentation equipment. A new booster pump station was also designed and constructed, which allows water to be pumped from the Village System to the Lake System and allows water to flow from the from the Lake System to the Village System via three pressure reducing valves.

Production Well Pump Station & Water Main Extension, Colebrook, NH

Project Engineer for the design of a 0.3 mgd well pump station and a 6,600-foot water main extension as part of a project to place a new groundwater supply online. Water main improvements included extending the distribution system 4,000 feet along Route 3, 1,400 feet through a wetland field, and installing 1,400 feet under a brook, railroad tracks, and wetlands area and along Route 145 to create a major system loop. The project included directional drilling (i.e. 3,500 feet) for main installation in order to limit disturbance to wetlands. The pump station included chlorination and NaOH treatment.

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Well 6, 7, & 8 Blending Project, Merrimack, NH

Project Engineer for the upgrade of three well water pump stations. The upgrades included rehabilitation of a lime feed system, installing all new process piping, replacement pumps and analyzers, and electrical and instrumentation equipment. The upgraded pump stations will allow the blending of several groundwater supplies to dilute iron, manganese, sodium and chloride to avoid much more expensive treatment facilities.

Water Storage Tank Improvements, Durham, NH

Project Engineer for the rehabilitation of two existing steel water storage tanks. One tank is a 3,000,000-gallon welded steel standpipe and the other is a 600,000-gallon welded steel ground tank. The project included structural repairs, miscellaneous improvements, and recoating of interior and exterior surfaces.

ROADWAY RECONSTRUCTION PROJECTS

Roadway, Sidewalk, and Drainage Reconstruction Design, Keene, NH

2010 Infrastructure Project: Project Engineer for the design of 6,500 feet of roadway and sidewalks reconstruction along residential and commercial streets (Washington Street neighborhood). The project included a new closed drainage system throughout the entire project and relocation of power poles.

Sidewalk Design, Antrim, NH

Project Engineer for the design and construction of a 2,500-foot sidewalk project along Route 202 and Elm Street. This project is an extension of an earlier project and includes replacement of an open drainage swale with closed drainage and extension of the decorative lighting system. Major funding was through the NHDOT TE & CMAQ program.

Roadway and Drainage Reconstruction, Antrim, NH

Project Engineer for the design and reconstruction of a Town road (i.e. Gregg Lake Road and Holt Hill Road) to address drainage issues in the area. This project included replacement of an outlet into Gregg Lake.

Mansion Hill, Lincoln, NH

Project Engineer for the complete reconstruction of several heavily populated roads in the Mansion Hill area of town, including water, sewer, and drainage systems. Obtained all necessary environmental permits.

Exeter River Mobile Home Park, Exeter, NH

Design for reconstruction of several thousand feet of roadway including water, sewer, and stormwater systems.

WASTEWATER COLLECTION & TREATMENT

Bog Sewer Improvements, Claremont, NH

Design of approximately 2,100 lf of sewer main cross-country through wetland areas and steep terrain. An aerial crossing and several stream crossings were included. Approximately 900 lf of sewer main cured-in-place lining and structure rehabilitation was also part of the project.

Route 28 Water and Sewer Improvements, Derry, NH

Project Engineer for the design of approximately 6,000 lf of water main and 8,500 lf of sewer main along heavily traveled roadways. Involved roadway reconstruction in areas and directionally drilled highway crossings.

Force Main Replacement, St. Paul's School, Concord, NH

Designer for replacement of the force main along Dunbarton Road from the campus to the City sewer system.

Coit Dormitory Kitchen Waste Separation, St. Paul's School, Concord, NH

Designed new grease trap and new interior and exterior sewer lines in order to separate kitchen waste from residential waste, minimizing the amount of grease getting into the sewer mains on campus.

Allison M. Rees, P.E.
senior project engineer
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Leachfield Conversion, Kearsarge High School, Sunapee, NH

Design and permitting for the conversion of a sand filter bed to a subsurface leachfield in order to comply with groundwater discharge permit requirements.

Gravity Sewer Interconnection, Granliden Resort, Sunapee, NH

Project Engineer for the environmental permitting associated with a new gravity sewer main interconnection with the municipal sewer system.

Creighton Street Pumping Station Upgrade, Newmarket, NH

Assisted in the upgrade of a 2.74-mgd headworks facility, including site design, piping layout, and equipment selection.

Fats, Oils, and Grease Study, Portsmouth, NH

Inspected all food service facilities in the City to document efforts by establishments to minimize grease entering the City sewer system. Reported on existing conditions of all facilities and recommended maintenance schedules and improvements to cut down on fats, oils, and grease in the sewer pipes and structures.

LAND PLANNING

Subdivision and Commercial Site Plan Design Reviews, Various Municipalities, New Hampshire

Performed plan reviews for conformance with applicable regulations and good engineering practices and attended Technical Review Committee (TRC) meetings. Reviews included subdivisions and commercial site plans, roads, drainage, grading, erosion control, water, sewer and fire cisterns. Design review performed for the following municipalities within the last year:

- Exeter
- Newmarket
- Epping (water and sewer only)
- Greenville
- Pembroke (sewer only)

Field Representative, Various Municipalities, NH

Acted as agent between the Towns and Owners, Developers, and Contractors of private site development projects. Coordinated between departments and conduct limited field observation to ensure conformance with approved plans and conditions set by the Planning Board. This service was provided for the following municipalities within the last year:

- Exeter
- Newmarket
- Epping (water and sewer only)
- Pembroke (sewer only)
- Boscawen

Gravel Pit Compliance Reports, Boscawen, NH

Coordinated annual site inspections and wrote reports regarding compliance with the conditions imposed in excavation permits for multiple gravel pits for the Town of Boscawen Planning Board.

PERMITTING

Water Facility Improvements, Dover, New Hampshire

Prepared three wetlands and two shoreland application permits for groundwater recharge, water supply, and water distribution projects for the City of Dover. Sites were located along the Bellamy River, Isinglass River, and Willand Pond. Obtained permits for sites containing threatened and endangered species and sensitive communities. Prepared wetland application packages for projects that spanned multiple properties and crossed town lines into Rochester and Somersworth.

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Wetlands and Shoreland Permits, Various Municipalities, New Hampshire

Prepared wetlands and shoreland application permits for many projects of various types and sizes. Obtained permits for sites containing Prime wetlands, threatened and endangered species, and sensitive communities. Prepared application packages for projects that spanned multiple properties, were partially within the NHDOT ROW, and crossed town lines. Obtained permits for projects with coastal impacts, including salt marsh and tidal buffer zone.

NHDOT and DNCR Permits, Various Municipalities, New Hampshire

Prepared and obtained NHDOT Long-Form Excavation Permits for projects all over New Hampshire of various types and sizes. Performed the environmental reviews necessary for the permits. Coordinated with the NHDOT and DNCR to obtain Use and Occupancy permits for multiple projects with impacts to Rail Trails and infrastructure within the NHDOT right-of-way.

Various Annual Groundwater Permit Reports

Wrote annual groundwater reports for several municipalities, including landfills in Raymond and Antrim.

OTHER RELATED PROJECTS

Loon Estates Cooperative Infrastructure Evaluation, Northwood, NH

Evaluation of existing water system, including pumphouse/treatment and distribution system, and subsurface septic systems. Assistance with obtaining funding sources for future water and subsurface system replacement projects. This project is currently in the funding phase before final design.

Resident Project Representative, Forest Lane Roadway & Drainage Improvements, Boscawen, NH

Resident Project Representative for a drainage and roadway improvements project in Boscawen, NH. The improvements included closed and open drainage and pavement operations including reclaim.

Various Feasibility Studies and Capital Improvement Plans

Evaluated infrastructure of manufactured housing parks throughout New Hampshire, reporting on the condition of drainage, wastewater and water systems, pavement, lighting, and safety issues. Prepared capital improvement plans and feasibility studies for suggested short and long-term improvements.

Various Residential Subdivisions

Project Engineer for the design and development of subdivisions ranging in size from 5 lots to 80 lots, including NHDES and NHDOT permitting and municipal approvals.

PROFESSIONAL AFFILIATIONS

New Hampshire Society of Professional Engineers
New Hampshire Public Works Association

CERTIFICATIONS

NHDOT LPA Certification

FEE

Underwood Engineers proposes to complete the scope of work presented herein for the lump sum of $15,000.

PROJECT SCHEDULE

The RFP noted that the schedule would be determined after award. Assuming award occurs in July 2021, UE proposes the following Schedule for the project.

Award Engineering Contract	July 2021
Conduct Field Investigations/Site Visits & Develop Computer Model	July - August 2021
Perform Evaluations and Write Report	September - October
Draft Report – Present at County Commission Meeting	November 2021
Final Report	December 2021

section seven
references

WATER SYSTEM REFERENCES			
MUNICIPALITY	**CONTACT(S)**	**EMAIL**	**TEL**
CONWAY VILLAGE FIRE DISTRICT **128 West Main Street** **Conway, NH 03818**	*Steve Bamsey, Commissioner* *Bruno Vallieres, Superintendent*	sbamsey@cvillagefd.com bvallieres@cvillagefd.com	(603) 447-5470
COOS COUNTY **P.O. Box 10** **West Stewartstown, NH 03597**	*Jennifer Fish, County Administrator*	jennifer.fish@cooscountynh.us	(603) 246-3321
CITY OF DOVER **Department of Public Works** **271 Mast Road** **Dover, NH 03820**	*John Storer, P.E., Director of Community Services* *Bill Boulanger, Deputy Director of Community Services*	j.storer@dover.nh.gov b.boulanger@dover.nh.gov	(603) 516-6450
TOWN OF DURHAM **100 Stone Quarry Drive** **Durham, NH 03824**	*April Talon, P.E., Town Engineer*	atalon@ci.durham.nh.us	(603) 868-5578
MERRIMACK VILLAGE DISTRICT **Two Greens Pond Road** **Merrimack, NH 03054**	*Ron Miner, Superintendent* *Jill Lavoie, Business Manager*	ron.miner@mvdwater.org jill.lavoie@mvdwater.org	(603) 424-9241
TOWN OF EXETER **13 Newfields Road** **Exeter, NH 03833**	*Jennifer Perry, P.E. Public Works Director*	jperry@exeternh.org	(603) 773-6157