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Town of Nags Head

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NORTH CAROLINA
DARE COUNTY

SERVICE CONTRACT
PURCHASE ORDER # 2010/060

**THIS CONTRACT IS NOT VALID WITHOUT THE REQUIRED ACCOMPANYING/
CORRESPONDING PURCHASE ORDER**

JJP
(CONTRACTOR initials)

THIS CONTRACT is made and entered into this the 11th day of August 2010, by and between the TOWN OF NAGS HEAD, a public body corporate of the State of North Carolina, (hereinafter referred to as "the TOWN") party of the first part and DIEHL & PHILLIPS, P.A. 219 E. CHATHAM STREET, CARY, NC 27511, (hereinafter referred to as "CONTRACTOR"), party of the second part.

1. SERVICES TO BE PROVIDED AND AGREED CHARGES

The services and/or material to be furnished under this contract (hereinafter referred to collectively as "SERVICES") and agreed charges are as follows:

DISINFECTION BY-PRODUCTS

In the amount, not to exceed, \$7,000.00 (Seven Thousand dollars and no cents), in accordance with CONTRACTOR'S Engineering Services Proposal (Disinfection By-Products) submitted on November 9 2009 (copy attached).

FIRE PROTECTION

In the amount, not to exceed, \$3,000.00 (Three Thousand dollars and no cents), in accordance with CONTRACTOR'S Engineering Services Proposal (Fire Protection) submitted on November 9 2009 (copy attached).

SYSTEM UPGRADES

In the amount, not to exceed, \$2,000.00 (Two Thousand dollars and no cents), in accordance with CONTRACTOR'S Engineering Services Proposal (Fire Protection) submitted on November 9 2009 (copy attached).

Total contract price shall be \$12,000

It is mutually agreed by and between the TOWN and CONTRACTOR that work under this contract will commence no later than AUGUST 16, 2010. The contract completion date shall be JUNE 30, 2011 with time being of the essence. If CONTRACTOR fails to complete work under this contract by JUNE 30,2011, the TOWN will be damaged thereby, and because the amount of

the TOWN's damages, inclusive of expenses for inspection, superintendence and necessary traveling expenses is difficult if not impossible to definitely ascertain and prove, it is hereby agreed that the amount of such damages shall be \$100.00 as liquidated damages for every day's delay in finishing the work in excess of the completion date prescribed; and the CONTRACTOR hereby agrees that said sum shall be deducted from monies due the CONTRACTOR under the contract or, if no money is due the CONTRACTOR hereby agrees to pay to the TOWN as liquidated damages, and not by way of penalty, such total sum as shall be due for such delay computed aforesaid.

2. DESCRIPTION OF PROJECT

DISINFECTION BY-PRODUCTS

The Town will provide monthly "special-non compliance" monitoring at the Gull Street and 8th Street entry points to verify T-THM levels, and additional water quality monitoring for total hardness (CaCO₃), Coliform, Total Organic Carbon (or UV-254 as a surrogate), conductivity, chlorides, and free and total chlorine.

In addition, special samples for the same analytical parameters should be collected quarterly from (a) the outlet of each of the Town's ground storage tanks and (b) at least four locations within the distribution system (MRT & TCR sites) to determine changes in water quality that may occur at the tank sites versus those within the distribution system.

Sample results can be forwarded to D&P / JFH electronically for compilation, review and discussion.

To assist NHPWD staff Contractor will:

- Review records of chlorine addition at booster stations and review DBP distribution records. The purpose of these reviews would be to make comments/recommendations regarding optimal chlorine feed dosages.
- Calculate residence time & prepare tank turnover spreadsheets from NH provided data including SCADA reports, then review the data to make recommendations as to system modifications that could help lower DBP's.

FIRE PROTECTION

Upon completion of the water system modeling, the results will be reviewed to determine areas of the water system that may have inadequate fire flows. Additional flow testing and additional model runs may be needed to obtain baseline data, and Nags Head PWD may want information on system upgrades, with cost estimates as a part of this fire protection analysis; there also may be meetings involving the fire department. It is suggested that this work be performed on a unit price (hourly) basis.

SYSTEM UPGRADES

Upon completion of the water system modeling, the results will be reviewed to determine areas of the water system that may have inadequate line sizes. Due to the fact that the results of the hydraulic modeling will determine how many areas may need upgrades, it is suggested that this work be performed on a unit price (hourly) basis

3. TERM OF CONTRACT

The term of this CONTRACT for SERVICES is from AUGUST 11, 2010 to JUNE 30, 2011. Either party may nonetheless cancel this contract on thirty (30) days written notice to the other party by certified mail or personal delivery. This contract is subject to the availability of funds to purchase the specified SERVICES and may be terminated at any time if such funds become unavailable.

4. PAYMENT TO CONTRACTOR

The TOWN agrees to pay at the rates specified for SERVICES satisfactorily performed in accordance with this contract. Unless otherwise specified, the CONTRACTOR shall submit an itemized invoice to the TOWN by the end of the month during which SERVICES are performed. Payment will be processed promptly upon receipt and approval by the TOWN of the invoice.

5. INDEPENDENT CONTRACTOR

Both the TOWN and the CONTRACTOR agree that the CONTRACTOR shall act as an independent contractor and shall not represent itself as an agent or employee of the TOWN for any purpose in the performance of the CONTRACTOR'S duties under this contract. Accordingly, the CONTRACTOR shall be responsible for payment of all Federal, State and local taxes arising out of the CONTRACTOR'S activities in accordance with this contract, including by way of illustration but not limitation, Federal and State income tax, Social Security tax, Unemployment Insurance taxes, and any other taxes or business license fees as required.

In performing the SERVICES, the CONTRACTOR is acting as an independent contractor and shall perform SERVICES in accordance with currently approved methods and practice in the CONTRACTOR'S professional capacity and in accordance with the standards of applicable professional organizations and licensing agencies.

6. INSURANCE AND INDEMNITY

The CONTRACTOR shall indemnify and save harmless the TOWN, its agents and employees from and against all actions, liability, claims, suits, damages, cost or expenses of any kind which may be brought or made against the TOWN or which the TOWN must pay and incur by reason of or in any manner resulting from injury, loss or damage to persons or property resulting from negligent performance of or failure to perform any of its obligations under the terms of this CONTRACT.

The CONTRACTOR shall be fully responsible to the TOWN for the acts and omissions of its sub-contractors and of persons either directly or indirectly employed by it, as the CONTRACTOR is for the acts and omissions of persons directly employed by it.

In addition, the CONTRACTOR shall comply with the North Carolina Worker's Compensation Act and shall provide for the payment of workers' compensation to its employees in the manner and to the extent required by such Act. In the event the CONTRACTOR is excluded from the requirements of such Act and does not voluntarily carry workers'

compensation coverage, the CONTRACTOR shall carry or cause its employees to carry adequate medical/accident insurance to cover any injuries sustained by its employees or agents during the performance of SERVICES.

The CONTRACTOR agrees to furnish the TOWN proof of compliance with said Act or adequate medical/accident insurance coverage upon request.

The CONTRACTOR upon request by the TOWN shall furnish a Certificate of Insurance from an insurance company, licensed to do business in the State of North Carolina and acceptable to the TOWN verifying the existence of any insurance coverage required by the TOWN. The Certificate will provide for sixty (60) days advance notice in the event of termination or cancellation of coverage.

7. HEALTH AND SAFETY

The CONTRACTOR shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the work. The CONTRACTOR shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to all employees from the work and other persons who may be affected thereby.

8. NON-DISCRIMINATION IN EMPLOYMENT

The CONTRACTOR shall not discriminate against any employee or applicant for employment because of age, sex, race, creed, or national origin. The CONTRACTOR shall take affirmative action to ensure that applicants are employed and that employees are treated during employment without regard to their age, sex, race, creed, or national origin. In the event the CONTRACTOR is determined by the final order of an appropriate agency or court to be in violation of any non-discrimination provision of federal, state or local law or this provision, this Contract may be cancelled, terminated or suspended in whole or in part by the TOWN, and the CONTRACTOR may be declared ineligible for further contracts.

9. GOVERNING LAW

This contract shall be governed by and in accordance with the laws of the State of North Carolina. All actions relating in any way to this contract shall be brought in the General Court of Justice of the State of North Carolina or in the Federal District Court for the Eastern District of North Carolina.

10. OTHER PROVISIONS

This Contract is subject to such additional provisions as are set forth in any addendum executed separately by each party and attached hereto.

11. CONTRACT DOCUMENTS/AMENDMENTS

This document together with the purchase order and any attached exhibits constitutes the entire Contract between the said two parties and may only be modified by a written mutual agreement signed by the parties and attached hereto. In the event of any conflict between this contract and any attached documents, the contract language will prevail.

12. SIGNATURES

Both the TOWN and the CONTRACTOR agree to the above contract.

Witnessed or Attested By:

Michelle W. [Signature]



TOWN OF NAGS HEAD

By: [Signature]

Title: Town Manager

Date: 8-18-10

Jeffrey R. Beecher

Corporate Seal:

CONTRACTOR

By: John F. Phillips

Printed Name: JOHN F. PHILLIPS

Title: SEC. TREAS

Date: 8/12/10

"This instrument has been preaudited in the manner required by the Local Government Budget and Fiscal Control Act."

[Signature]
Finance Officer

APPROVED AS TO FORM AND LEGAL SUFFICIENCY.

[Signature]
TOWN ATTORNEY

DIEHL & PHILLIPS, P.A.

CONSULTING ENGINEERS

219 East Chatham Street

Cary, North Carolina 27511

Telephone (919) 467-9972 – Fax (919) 467-5327

WILLIAM C. DIEHL, P.E.

JOHN F. PHILLIPS, P.E.

ALAN R. KEITH, P.E.

November 9, 2009

Dave Clark, P.E.
Public Works Director
Town of Nags Head
2200 S. Lark Avenue
P.O. Box 99
Nags Head, NC 27959-0099

Re: Engineering Services Proposal
Town of Nags Head Public Works Department
Town Water System Master Plan Update

Dear Mr. Clark:

Fred Hill and I are pleased that you and your staff have selected us to provide an engineering services proposal for the referenced project. Fred and I have put together a proposal based on our conversation with you and your staff that we believe will fit the needs the Town of Nags Head Public Works Department.

I am aware that budgets are tight, and I have tried to scope our services with your budget constraints in mind. The hydraulic modeling portion of our proposal has been priced as a lump sum amount because the scope of work can be readily defined. I know the fee is more than you may have budgeted, but it does include a significant amount of my time performing calibration testing in the field. As you know, model calibration is critical, but it is also time consuming. I have suggested that the other work items including disinfection by-products, fire protection, and system upgrades be performed on an hourly basis. I have provided budget estimates for these work items, but these costs would be updated as the level of effort for these work items becomes clearer. Fred and I will be glad to meet with you to discuss the fee proposal, and we are certainly willing to modify the proposal to work with your budget.

If the proposal is acceptable, I will be the project engineer/manager; this should be construed to mean that I will be performing the majority of the effort from Diehl & Phillips, with Diehl & Phillips staff support as needed. Fred Hill will be assisting us with the water quality aspects of the project.

SCOPE OF SERVICES DISINFECTION BY-PRODUCTS

Systems that purchase water, such as Nags Head PWD, are dependent on their supplier to produce a high quality product and maintain that quality through the interconnection. This requires a joint effort and diligence from all parties.

To reinforce this focus, we urge routine contact between all parties (Nags Head, Manteo, Kill Devil Hills and Dare County Water) in the Dare County Regional water system, including full disclosure of treatment efficiencies and process alterations as well as water quality data from routine and compliance sampling within the respective distribution systems. As we approach EPA's Stage 2 DBP regulations we must maintain open communication. We suggest the respective Public Works and Distribution and Water department managers meet early in 2010 to establish mutual water quality goals and discuss how these can be maintained. If possible, we prefer the first meeting be hosted in Nag's Head, perhaps at Town Hall or the Fire Department. Subsequent meetings may be rotated among the parties on a semi-annual basis.

Purchasing systems must be aware of water quality entering the system and manage DBP formation within the distribution network. Nags Head PWD staff currently address this by frequently flushing low flow areas within the system and have installed blow-off devices to reduce residence time at dead ends.

Nags Head has not experienced problems with excessive HAA(5) in their distribution system, but T-THM's have been of concern. We suggest monthly "special-non compliance" monitoring at the Gull Street and 8th Street entry points to verify T-THM levels, and further suggest additional water quality monitoring for total hardness (CaCO₃), Coliform, Total Organic Carbon (or UV-254 as a surrogate), conductivity, chlorides, and free and total chlorine. Most can be performed in the Town's WTP lab at little expense. This information will provide documentation about incoming water quality and should be helpful for further system evaluation.

In addition, special samples for the same analytical parameters should be collected quarterly from (a) the outlet of each of the Town's ground storage tanks and (b) at least four locations within the distribution system (MRT & TCR sites) to determine changes in water quality that may occur at the tank sites versus those within the distribution system.

Sample results can be forwarded to D&P / JFH electronically for compilation, review and discussion.

Because water that is delivered to NHPWD is chlorinated at the supplier's treatment facilities, DBPs may already be present - and could be increased when further chlorine is added at the pumping stations.

To assist NHPWD staff in this determination;

- We will review records of chlorine addition at booster stations and review DBP distribution records. The purpose of these reviews would be to make comments/recommendations regarding optimal chlorine feed dosages.
- We will calculate residence time & prepare tank turnover spreadsheets from NH provided data including SCADA reports, then review the data to make recommendations as to system modifications that could help lower DBP's.

Because the exact level of involvement in the DBP is difficult to determine exactly, it is suggested that the above work be performed on an hourly basis; we believe Nags Head PWD will save money with this hourly approach. For budget estimating purposes, it is anticipated that this hourly approach will cost about \$7000.00 for 12 months of assistance as described above.

SCOPE OF SERVICES HYDRAULIC MODELING

The engineer will computer model major pipes (6" and larger) in the distribution system utilizing Micro Hardy Cross. Micro Hardy Cross is a modeling program that is fairly simple to use, and I have used it for probably 20 years or so on literally hundreds of models, from large municipal water systems, county-wide water systems, sewage pump stations, etc. I have obtained excellent results from the model, with good correlation with actual system operating conditions. You can get more information about this modeling software by doing a web search for Micro Hardy Cross.

The modeling will consist of a number of "snapshots" of the system under a number of steady-state operating conditions. At this point, it is anticipated that the base piping network will be based on the existing model, as far as pipe lengths and diameters; these lengths and diameters will be spot checked against existing record drawings for major mains, especially the 12" and 8" mains that contribute most to water transmission between the pumps and tanks. Major pipes that have been added since the last model will be included in the new model. C factors (roughness coefficients) will be field checked for major mains as described hereinafter. System demands, and where to locate these demands in the model will require significant input by town staff; water billing information will need to be compiled for significant water users, and estimates of peak demands by these users will need to be a joint effort by town staff and the engineer. After the model is running, it will be calibrated by datalogging pressures at various locations in the system, as selected in a joint effort by town staff and the engineer.

The hydraulic modeling will include running the model with the following operational conditions:

- Average daily flow (ADF) with no pumps running
- ADF with all combinations of pumps running
- Max day flow (MDF) with no pumps running
- MDF with all combinations of pumps running
- Estimated Max hour flow (MHF) with no pumps running
- MHF with all combinations of pumps running
- The above 3 scenarios that have pumps running will be modeled with the altitude valve open and closed.

A complete printout showing flows in all modeled pipes, c factors used for modeled pipes, headloss in all modeled pipes, pressures at all nodes, modeled demands at all nodes will be provided for all the above operating scenarios.

A setup drawing that shows all pipes, pipe numbers, nodes, tanks, and pumps, etc. will be provided.

A digital copy of the model with all the above model simulations will be provided, including a copy of Micro Hardy Cross registered in the name of the Town of Nags Head, as well as a users manual for the program. The engineer will provide 8 hours of training to town staff in how to use the program, and the training will include some basic hydraulic analysis training. This 8 hours of training can be broken down into two four hour sessions a month or so apart if desired by Nags Head; this will help town staff by answering questions that arise after working with the model and program.

The actual operating conditions of the existing pumps will be field evaluated, so the model can be properly calibrated. The operating conditions of the pumps will be compared to the manufacturers pump curve, and the engineer will make a written observation as to the pump's performance.

During the study period, the engineer will make field trips to perform c factor testing on selected portions of the distribution system. It is anticipated that most of this c factor testing will take place during the normally scheduled system flushing that the town performs in the winter. The engineer will need assistance from the town staff with hydrant flowing and residual pressure gauge reading during this c factor testing. The owner should expect some system disturbance during this testing, as hydrants will be opened to full flow; similarly, there may be some soil disturbance near some hydrants that the owner may need to repair after the hydrant flowing is completed. The engineer will focus this c factor testing on major lines that are used to transfer large volumes of water to the tanks, as these are the critical pipes as far as the model is concerned.

A written report will be provided that includes a summary of the hydraulic modeling as well as a copy of the model setup map and copies of the data output for the various scenarios that were modeled. The engineer will make recommendations as to operating modifications that will improve the hydraulic performance of the distribution system.

Engineering Fee for Hydraulic Modeling as described above: \$22,000.00



08/16/2010 09:21
costellk

TOWN OF NAGS HEAD

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poinquiry

PURCHASE ORDER

20110160-00 FY 2011

BILL TO

VENDOR

DIEHL & PHILLIPS P.A
219 EAST CHATHAM STREET
CARY, NC 27511

SHIP TO

NANCY CARAWAN
NAGS HEAD WATER PLANT
2200 LARK AVE
NAGS HEAD, NC
27959

Tel# 919-467-9972
Fax# 919-467-5327

Requisition
161

DATE ORDERED	VENDOR NUMBER	DATE REQUIRED	FREIGHT METHOD/TERMS	DEPARTMENT/LOCATION
08/12/10	009426	08/03/10		Water Operations

LN	DESCRIPTION	QTY	UOM	UNIT PRICE	NET PRICE
001	\$7000 for D/DBP study for co compliance in 2014 \$3000 for study for sytem fire protection \$2,000 for recommended system upgrades	1.0	Each	12000.000	12,000.00

PO TOTAL 12,000.00

** END OF REPORT - Generated by Karen Costello

