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KENTUCKY AVENUE WELLFIELD SITE
REMEDIAL INVESTIGATION AND FEASIBILITY STUDY
TOWN OF HORSEHEADS, NEW YORK

Contract
Drilling Services

New York State
Department of
Environmental Conservation

50 Wolf Road, Albany, New York 12233
Henry G. Williams, *Commissioner*

Division of Solid and Hazardous Waste
Norman H. Nosenchuck, P.E., *Director*

CONTRACT
FOR PROFESSIONAL SERVICES

Article No. 1 - PARTIES TO AGREEMENT

This Agreement is made on the 25th day of July in the year 1985 between Dames & Moore (hereinafter "Engineer") and James L. Ward Geotechnical Drilling Services, Inc. and Rochester Drilling Co., Inc. (hereinafter "Contractor").

Article No. 2 - SCOPE OF WORK

(1) Project Description

The study area of this investigation is the Kentucky Avenue Well Field and vicinity, encompassing approximately eight square miles. The area is located north of Elmira, NY, at the intersection of two major valleys within the Chemung River Basin. The aquifer of concern is the Newtown Creek Aquifer, which was found to be contaminated with high levels (>50 ppb) of trichloroethylene (TCE). In addition, several private residence wells have been found to be contaminated (April and May 1984) with TCE and benzene. Information from the EPA and the NYSDEC has identified twenty sites in the area as potential sources of aquifer contamination.

The subsurface of the study area consists mainly of layered deposits of alluvial and outwash sands and gravel, lake silts and clays, and till. All of these unconsolidated deposits are underlain by shale bedrock at depths over 100 feet. Within the river basin there are numerous sand and gravel aquifers.

The investigation will entail the installation of two-inch monitoring wells within the study area in two phases. The first phase, as planned, consists of the installation of up to five two-well clusters. At least one well in each cluster may extend to bedrock. The second phase, as planned, consists of the installation of up to seven two-well clusters, installed in a similar manner as Phase I.

In addition, an optional phase of well installations may be performed, consisting of up to five clusters of two to three wells each. All wells will be two inches in diameter and constructed of stainless steel. The Contractor should be prepared to drill to depths up to 150 feet.

Definitions

A) Owner - The New York State Department of Environmental Conservation.

B) Work or Works - The word "work" shall mean and include equipment, apparatus, machinery, and/or material supplied together with all of the various classes of work to be executed, whether temporary or permanent, under this Contract. It shall also mean the place of working, where the context so indicates.

C) Site - Land and other places on which the Works are to be carried out and any other lands or places as may be specifically designated in the Contract as forming part of the site.

(2) Scope of Work

The scope of work covered is as follows:

A) Perform exploratory soil/rock borings and collect soil/rock samples from these borings.

B) Install wells in selected boreholes and fully develop these wells.

(3) Drilling

In making borings in overburden, casing not less than 6 inches inside diameter or other specifically approved method for keeping the holes open shall be used. Wash boring, rotary drilling, or other approved method may be used for loosening and removing material from the boring. Borings shall not be started until the contractor's equipment has been examined and approved by the Engineer.

Typically, the soil will be sampled by using a "Standard" Split Spoon, unless specifically requested by the Engineer's field representative. In each boring, samples shall be obtained by driving a 2-inch O.D. split-barrel sample spoon of conventional design into material which has not been disturbed by the boring operation. At least one sample shall be taken from each distinct soil stratum which is penetrated. In no case shall the interval between samples exceed five (5) feet. At locations requested by the Engineer's field representative, samples shall be taken with a 3.25-inch split-barrel sampler provided by the Engineer. Drilling and split spoon sampling shall conform to ASTM D-1586 Guidelines. Overburden samples shall be stored and marked in glass jars with lids provided by the Contractor.

The Contractor should be prepared to use common alternatives to advance the borehole or obtain samples, at the request of the Engineer. These alternatives could include, but are not limited

to, mud rotary drilling and "undisturbed" sampling, respectively. Where possible, a head of potable water shall be maintained in the borehole so as to provide a confining pressure to the undisturbed soil at the base of the drill stem. In drill holes not intended for well installation, approved drilling mud may be used. In drill holes intended for the installation of wells, degradable drilling mud, approved by the Engineer, may be used.

It may be necessary to obtain core samples of bedrock. If the Contractor and Engineer agree that bedrock has been reached in a particular borehole, the Contractor shall core a minimum of 50 feet of said rock and retrieve the core for the Engineer's inspection. Core size shall be NX unless otherwise directed by the Engineer. A double-tube core barrel and wireline apparatus may be used.

The casing (or augers) shall be firmly seated into the bedrock and the hole cleaned out prior to introduction of the core barrel.

The diamond core bit shall then be started in the hole, and the rock shall be drilled until the required depth is reached. When the core is broken off, it shall be withdrawn, labeled, and stored before the drilling is continued.

Cores shall be carefully handled to insure their proper identification and placing in the order in which they are removed from the hole, and care shall be taken to recover as large a percentage of core as possible. The Contractor shall regulate the speed of the drill, the rate of feed, and the pressure on the bit and shall remove the core as often as necessary to insure the maximum percent recovery. Rock cores shall be placed in suitable wooden core boxes so partitioned that the recovered rock core from each boring shall be kept separate. Wood spacer blocks shall be inserted and properly labeled wherever there is core loss. The rock cores shall be suitably labeled and arranged in the boxes in the sequence in which the material is removed from the hole. Adjacent runs shall be separated by means of wood blocks, on which the elevation of the top and bottom of the run shall be clearly, accurately, and permanently marked.

Core obtained from detached sections of rock or from boulders in the overburden shall be suitably preserved and delivered to the Engineer with the soil samples.

Core boxes shall be constructed of dressed lumber, about 5 feet in length, and with a capacity for about 20 feet of core in each box. Each core box shall have a hinged and screwed-on cover, be completely equipped with all necessary partitions, spacer blocks, covers, hinges, and screws, and shall be substantially made to withstand normal abuse in shipment.

(4) Monitoring Well Installation

A typical well installation for this project is depicted in Figure 2. The wells shall be constructed of stainless steel riser from a point 3 feet above the ground surface to the top of the well screen. Johnson stainless steel casing and Johnson wire wound stainless steel screens or equivalent approved by the Engineer, shall be used. The screened intervals and slot sizes for each well shall be selected on site by the Engineer's field representative based on inspection of site soils. All screens shall have attached a well sump constructed of 2-inch stainless steel riser (typically 2 feet) with an end cap, and shall be installed in the borehole with a centering device.

The annular space between the borehole and the well screens shall be completely filled with a sand pack in such a manner as not to expose the well screen to the formation during sand packing. The sand pack shall be of a size gradation specified by the Engineer's field representative, and shall be approved by the Engineer field representative prior to placement. The sand pack will be placed using a tremie, and shall extend at least 2 feet above the top of the well screens.

A primary bentonite seal 2 feet thick shall be placed with a tremie above the sand pack. Unless directed otherwise by the Engineer's field representative, a cement-bentonite grout will be used to backfill the annular space above the bentonite seal. The grout will be emplaced using a tremie. The largest grain size should not be greater than one-third the size of the available annular space.

Additional bentonite seals may be emplaced within the annular space at the request of the Engineer's field representative to prevent hydraulic connection between separate aquifers.

There may be situations, determined by the Engineer's field representative, where natural material or clean backfill from an offsite source may be used to backfill the annular space in lieu of the cement-bentonite grout.

A 10-foot length of 8-inch protective casing (minimum ASA SCH-10) shall be installed at the surface around the 2-inch stainless steel riser. The final stick-up will be specified in the field by the Engineer's field representative. A drain hole shall be cut in the protective casing near the ground surface to prevent accumulation of water in the annular space between casings. A pelletized bentonite seal shall be provided at the bottom of the section of protective casing to prevent grout seepage into the formation. Cement-bentonite grout shall fill the annular space between the 8-inch and the 2-inch casings and outside the 8-inch casing up to the ground surface.

At all times during the progress of the Work, the Contractor shall protect the wells in such a manner as to effectively

prevent either tampering with the well or the entrance of foreign matter into it.

(5) Well Development

The water wells shall be developed by such means as shall effectively extract from the water-bearing formation a maximum practical quantity of sand, drilling mud and other fine material in order to bring the well to maximum yield per foot of drawdown and to a sand and silt-free condition, as determined by the Engineer field representative. The Contractor shall be capable of developing the wells by means of surge plunger, high velocity jetting equipment, pumping or air lift. The method(s) of development for each well shall be at the discretion of the Engineer's field representative. The development work must be done in such a manner that does not cause undue settlement and disturbance of the strata above the water-bearing formation.

(6) Testing for Plumbness and Alignment

All wells shall be constructed and all casing set round, plumb, and true-to-line, as defined herein. To demonstrate the compliance with this requirement, the Contractor shall furnish all labor, tools, and equipment and shall make tests for plumbness and alignment to the satisfaction of the Engineer. These tests will be made after the well has been cased and screened and before its acceptance. Additional tests, however, may be made by the Contractor during the performance of the work. No payment shall be made by the Engineer for making additional tests.

Plumbness shall be tested by lowering a well survey cage provided by the Engineer, or similar device approved by the Engineer, down to the well bottom suspended on a thin cable. Deflection measurements will be made at the surface. The well shall not deviate from plumb by more than 3 percent of depth or the well shall be rejected.

Alignment shall be tested by lowering into the well, to a depth within 3 feet above the screen section, a dummy pipe 10 feet long, to be supplied by the Contractor. The outer diameter of the dummy shall not be more than 1/2-inch smaller than the diameter of the part of the casing or hole being tested. If the dummy fails to descend to within 3 feet of the screened section, the well will have failed the alignment test.

Should the well be rejected after failing either or both of the above tests, the well will be redrilled and reinstalled at the Contractor's expense.

(7) Well Completion

The annular space between the boring and the 8-inch protective surface casing shall be grouted with a bentonite-cement grout at the surface. The protective casing will be painted a color

approved by the Engineer and the well identification number shall be inscribed on a brass plate and attached to the protective casing with bolts or rivets. Information shall be provided on the plate to identify the well as belonging to the NYSDEC. The stainless steel well casing shall be capped with a cap. The 8-inch steel protective casing shall be equipped with a locking steel cap of a design approved by the Engineer.

Article No. 3 - LOCATION, NUMBER AND DEPTH OF BORING

Borings shall be made at the approximate locations shown on Figure 1. Exact locations will be staked out or otherwise indicated in the field by the Engineer.

Approximately 24 planned wells and eight optional wells may be installed at the Kentucky Avenue Wellfield site. It is estimated that there will be twelve 2-well clusters, two optional 3-well clusters, and two optional single-well installations. Additional borings may be made without the installation of a monitoring well. The wells shall be drilled to an average depth of 70 feet. In some cases, wells may be drilled to a depth of more than 100 feet.

Article No. 4 - SITE CONSIDERATION

The study area of this investigation is the Kentucky Avenue Well Field and vicinity, located in Elmira Heights, New York, just north of Elmira, New York. The study area encompasses an area of approximately eight square miles.

Final boring locations will be determined by the Engineer field representative.

Access to some borings may be limited due to soft or wet ground in which case it may be necessary to use an off-road drill rig. Some of the borings are located in urban environments where utilities must be considered.

Acquisition and Transportation of water to the specific boring location will be the Contractor's responsibility.

Drilling is expected to be performed using hollow-stemmed augers. If rotary wash method is required, no cost compensation for materials or labor shall be made.

At the completion of drilling borings not receiving wells, the Contractor shall seal all boreholes using a portland cement or bentonite (or both) grout, except those requested by the Engineer to be left open.

Article No. 5 - DRAWINGS BY ENGINEER

The attached contract drawings which accompany and form part of these Requirements bear the general titles:

Figure 2 - Typical Well Installation

Figure 3 - Typical Point Sampler Installation

The Engineer reserves the right to revise the drawing and to furnish any additional drawings for the proper execution of the work as he may deem necessary. The Contractor shall execute the work in accordance with the latest drawing revisions.

Article No. 6 - TECHNICAL APPROACH

The technical site direction provided by the Engineer as the Owner's representative, shall supplement the conditions and requirements of this document. The Engineer will have sole authorization to make changes in specified procedures and work quantities.

Information on accessibility of boring locations, nature of terrain, availability and terms for obtaining water, and all other conditions affecting the work shall be obtained by the Contractor. Right of entry to each required boring location will be obtained by the Owner.

Article No. 7 - TIME OF COMPLETION

The work outlined under this contract will be performed in two phases. The first phase of the work shall be completed 1-1/2 months from the time of authorization for commencement. The second phase shall be completed 2 months after authorization of the second phase. One to 2 months may be expected between phases. The Owner and Engineer reserve the right to include an optional phase of well installations to be performed during the interim period between the first and second phases. Liquidated damages for time schedule overruns will be a part of the contract.

Article No. 8 - TIME FOR WORK

The Contractor shall be prepared to begin work within ten (10) calendar days after receipt of the notice of authorization for each phase of work. The Phase I work shall be completed within 45 calendar days after beginning work. The Phase II work shall be completed within 60 calendar days after beginning the Phase II work. The completion date and the acceptance date are considered to be the same date.

Article No. 9 - WORK SCHEDULE

The work for each phase shall commence by the tenth day after authorization to proceed and shall commence with drilling and testing activities and shall be conducted with all reasonable speed and diligence so as to result in a timely completion. Completion dates for all phases of work are indicated in Article 7. If, in the Engineer's opinion, the work is not progressing towards the planned completion date, the Contractor shall supply to the project additional manpower and equipment as required by the Engineer in order to expedite the work.

Article No. 1Ø - PROSECUTION OF WORK BY CONTRACTOR

The Contractor shall do all work and furnish all labor, tools, equipment and transportation required for performing and completing the work in accordance with this document and under the supervision of the Engineer.

All work shall be prosecuted with diligence and shall be done in a good, substantial and workmanlike manner.

The Contractor shall employ only experienced persons in the performance of the work herein.

All work shall be done to the satisfaction of the Engineer and in conformance with the Engineer's Quality Assurance procedures. The amount, quality, acceptability, and fitness of the work and materials furnished hereunder shall be decided by the Engineer, which shall have full power to reject any materials furnished and work performed which, in the opinion of the Engineer, do not fully conform to the terms of the Specification applicable to the work.

These specifications shall not be changed or modified unless such change or modification is in writing and signed by the Engineer and Contractor.

All personnel assigned to the project by the Contractor shall be required to be cooperative with the personnel assigned to the project by the Engineer, and in the event the Contractor's personnel fail to so cooperate, the Contractor shall relieve them of their duties on the project when requested by the Engineer.

The Contractor shall provide at least two workers for a drill rig, at least one of whom shall be experienced in soil sampling and monitoring well installation, maintenance, and operation of the boring unit. The workers shall be able to communicate in English with the Engineer, as a safety requirement.

Article No. 11 - FIELD ENGINEERING

The Engineer shall be represented at each drilling site by a field representative who shall determine the various drilling locations and inspect drilling and sampling operations to be performed by the Drilling Contractor.

(1) The Contractor is directly responsible to the Engineer for the acceptability of their work and the Engineer has full technical direction over the Contractor's work.

(2) The Drilling Superintendent and the Engineer's field representative will jointly prepare and sign the Engineer's daily Quantity Verification sheets. All payments of quantities to the Contractor will be based on these reports. (Also see Articles 21 and 22.)

(3) All quantities that are stated or implied in these Requirements are not firm or guaranteed. The Engineer shall verify the actual quantities of work performed as the work progresses. The final Contract payment shall be determined by actual quantities.

Article No. 12 - CORRECTION OF WORK

Work performed by the Contractor but not in accordance with the specifications of the Contract shall be corrected to conform to said specifications at the Contractor's expense.

The stated work period (Article 8) will not be altered due to time lost by the Contractor in correcting work not conforming to these documents, nor due to delays caused by Contractor owned equipment malfunction or deficiencies.

Article No. 13 - MAINTENANCE AND CLEANING UP OPERATION AREAS

(1) All operation and storage areas utilized by the Contractor will be uncovered and unguarded. The Contractor will be responsible for procuring storage areas for all supplies and equipment.

At all times during the progress of the Work, the Contractor shall protect the wells in such a manner as to effectively prevent either tampering with the well or the entrance of foreign matter into it.

(2) No temporary facilities will be provided by the Engineer. Any temporary facilities erected or located by the Contractor shall be previously approved by the Engineer, and removed upon completion of the project.

(3) The Contractor shall at all times keep the premises free from accumulations of waste material or rubbish caused by his employees or work. The Contractor shall remove from the site and from all public and private property, at his own expense, all rubbish and waste material resulting from his operation.

In addition, at the completion of the work, and prior to final inspection, the Contractor shall remove all temporary structures, and all rubbish and waste from and about the work area; and all his tools, scaffolding, and surplus materials; and shall leave his work area "CLEAN", ready for immediate use. Contractor shall restore or relandscape all lawns, roadways, and sidewalks to their original condition. The Contractor shall be responsible for the cost of all such restoration.

No burning of rubbish and/or waste materials shall be permitted on the project site.

Article No. 14 - COMPLIANCE WITH LAWS

Contractor shall perform the work so as to insure compliance with all applicable federal, state, and local laws, codes, ordinances, and regulations in effect at the time of execution of this contract. Contractor agrees to indemnify and reimburse Dames & Moore for all costs, fines, penalties, expenses incurred as a result of failure to comply with, or violation by the Contractor of, the provisions contained in this clause.

Article No. 15 - FINAL ACCEPTANCE AND PROJECT CLOSEOUT

Upon completion of the work, the Contractor shall so notify the Engineer in writing. Upon receipt of written notice, the Contractor and the Engineer shall conduct a final inspection which will result in either a written final acceptance or a written correction list.

If the final inspection results in a written correction list, the Contractor shall perform all necessary corrective work, which when work is completed, will require another final inspection.

Article No. 16 - MATERIAL AND EQUIPMENT REQUIREMENTS

The materials and equipment to be provided by the Contractor on this project shall include, but not be limited to, Items A through X, which, in the opinion of the Engineer, is the minimum required for the effective conduct of the drilling operation.

(A) Hydraulic feed rotary rig(s) capable of drilling to a depth of 150 feet.

(B) 150 feet each of 6-inch and 3-3/4-inch hollow-stem augers or casing.

(C) 150 feet straight drill rods (minimum size AW).

(D) Auger plug with appropriate short drill rod per rig in the event running sands are encountered.

(E) Two 2-inch (nominal diameter) split spoons per rig.

(F) A 140-pound hammer with drive head for both drill rods and casing per rig.

(G) A 300-pound hammer with drive head for both drill rods and casing per rig.

(H) A pump or pumps capable of pumping water, drilling mud and grout at a rate of no less than 25 gpm.

(I) A minimum of 1,000 pounds of each of the following sizes of sand for the sand packs:

(2-Q Rok)
(4-Q Rok)

Sand pack gradation curves are available from the Engineer.

(J) A minimum of the following slot sizes of 2-inch nominal diameter stainless steel wire wound screen:

Slot Number	Slot Size (inches)	Length Required (feet)
10	0.010	30
20	0.020	30
40	0.040	30

(K) A minimum of 150 feet of 2-inch nominal diameter stainless steel solid riser pipe.

(L) Five standard bags approved degradable drilling mud; five 5-gallon pails of 1/4-inch diameter coated pelletized bentonite and 250 pounds powdered bentonite.

(M) "Clean" backfill material as approved by the Engineer.

(N) Equipment to transport water to each rig.

(O) Ten boxes standard (2-inch nominal diameter) glass soil sample jars with lids, one dozen teflon lid liners.

(P) Two dozen 1-quart glass sample (minimum 3-inch diameter mouth) jars with lids per rig.

(Q) Three new wooden core boxes, size NX.

(R) Materials and tools necessary for use in assuring an aligned, centered, and plumb well and screen installation.

(S) New 8-inch nominal diameter protective surface casings for each well.

(T) At least one pickup truck for equipment and materials movement.

(U) Twelve bags portland cement, per rig.

(V) One 80-pound bag blacktop cold patch.

(W) One steam generator, for cleaning purposes.

(X) All other equipment and tools necessary to support the drilling operations.

The above listed material and equipment requirements shall be maintained at all times throughout the duration of the work, unless otherwise specified by the Engineer.

Article No. 17 - SUBSTITUTION OF EQUIPMENT AND MATERIALS

The Contractor shall not substitute agreed upon equipment and materials without prior written consent from the Engineer.

Article No. 18 - CONTRACTOR NOT TO ASSIGN OR SUBLET

The Contractor shall not assign to another party any work awarded to it by power of attorney or otherwise, not sublet the work, nor any part thereof, without first obtaining the written consent of the Engineer.

In the event the Engineer shall give its written consent for any assignment or subletting of the work awarded to the Contractor, such assignment of subletting shall not, in any event, release the Contractor of any of its obligations hereunder.

Article No. 19 - LABOR IN HARMONY WITH TRADES

The Contractor shall employ labor only in harmony with trades.

Article No. 20 - QUALITY ASSURANCE

All work shall be performed with full knowledge and in conformance with Dames & Moore procedures for Quality Assurance. Dames & Moore's Quality Assurance criteria for drilling activities include, but are not limited to, the following procedures:

(1) Decontamination by steam-cleaning and/or high pressure detergent wash of equipment prior to mobilization and demobilization. This must be certified by Contractor in writing.

(2) Thorough steam-cleaning of all downhole drilling equipment between borings (i.e., auger flights, bits, sampling apparatus, bailers) and under any other circumstances during which steam-cleaning is deemed necessary by the Engineer's representative.

(3) Decontamination of miscellaneous downhole equipment (i.e., steel tapes, hoses, tremie) by washing with hexane and methanol followed by a distilled water rinse. All wash waste will be retained in appropriate receptacles supplied by the Engineer.

(4) Decontamination by steam-cleaning and/or high pressure detergent wash of well casing and screen prior to installation.

(5) Wrapping of all male-threaded solid riser pipe joints with teflon tape to be supplied by the Contractor before standpipe assembly.

(6) All maintenance, repairs and replacement of fluids such as gasoline, hydraulic fluid, antifreeze-coolant, oil and grease on the drilling equipment shall be performed away from the drilling locations to a site designated by the Owner or Engineer. Drill rigs leaking hydraulic or any other fluid shall be removed from the site and repaired or replaced so as not to adversely contaminate the drilling site.

Article No. 21 - QUANTITY VERIFICATION

Dames & Moore Services and Materials Received Record forms will be completed by the Engineer on a daily basis and shall be signed by the drilling superintendent. These forms will be the basis for payment to the Contractor. Any conflict between the Contractor and Engineer regarding quantities will be resolved prior to the continuation of the work by the respective.

Article No. 22 - METHOD OF PAYMENT

Unit prices as quoted in Table 1 of this Contract shall be used to determine equitable adjustment of the Contract Price in connection with approved additional work, work omitted, or reduced by the Engineer. Any additional work that is required during the course of the job shall be approved by the Engineer and agreed upon in writing by the Engineer and the Contractor before the work is started and before any payment can be made.

Pay items (for extra work) not contained in the Contract will be negotiated with the Contractor. The Contractor's proposed terms shall be received by the Engineer in writing prior to performing the work. In some cases, to expedite the work, verbal authorization for out-of-scope work will be given by the Engineer to the Contractor at the discretion of the Engineer.

The Contractor may submit invoices for work on a monthly basis, or at the completion of the work and the acceptance thereof, at his discretion. Payment requests will be submitted by the Engineer to the State of New York for approval and payment. The Engineer will pay the contractor only after approval and payment by the State.

The Contractor must submit, as documentation for payment, signed copies of the Dames & Moore Services and Material Received Record forms with his request for payment. No payment will be made for items not accounted for on the Dames & Moore Services and Material Received Record forms.

Article No. 23 - LIQUIDATED DAMAGES

Liquidated damages in the form of non-payment will be assessed against the Contractor for all work performed beyond the acceptance date of each phase. All work required for acceptance beyond the acceptance date will be performed at the Contractor's own expense. Payment will be made only for work completed up to and including the acceptance date. Footage and quantity ceiling limits for each phase work period will be set and agreed upon by the Engineer and the Contractor prior to signing of the Contract.

Article No. 24 - EXTRA WORK

No extra work shall be done except when ordered by the Engineer in writing. When so ordered, the Contractor shall perform such work and shall be paid therefore, at a flat price as shall be agreed upon in advance by the Engineer and the Contractor. Payments, therefore, shall be made by the Engineer on the basis set forth in Article 22 herein.

Article No. 25 - STAND-BY TIME

Stand-by time is defined as time during which the Contractor drill rig cannot or is requested not to work. Stand-by time shall be paid only for the following reasons:

(A) Downhole geophysical logging of the borehole or well by the Engineer.

(B) Time waiting for grout to set up (only if no other task can be performed during this period).

(C) Time when the drill rig is standing by either in response to a request by the Engineer or while waiting for the Engineer.

(D) The first hour of working time lost due to poor weather conditions. All time lost in excess of one hour per day is not subject to payment.

No payment will be made for stand-by time due to equipment malfunction or breakdown. In addition, no payment will be made for stand-by time resulting from the lack of working equipment by the Contractor or his subcontractors on site, including time for procurement or additional time required for alternate procedures.

Article No. 26 - COMMUNITY RELATIONS

The Contractor and all of his employees shall at all times, while under contract to the Engineer, conduct themselves in a manner which causes no unnecessary stress or bad feelings with the local community.

Article No. 27 - APPLICATION OF EQUAL EMPLOYMENT OPPORTUNITY CLAUSE

The Equal Employment Opportunity Clause in Section 202 of Executive Order #11246, as amended, relative to equal employment opportunity and the implementing rules and regulations of the Office of Federal Contract Compliance are incorporated herein by specific reference. The Contractor shall advise all subcontractors and vendors working on this project of the said federal provisions and provide the Engineer, prior to commencement of any work on the project, with documentation as to Contractor's communication of said provisions to all subcontractors and vendors on this project.

Article No. 28 - SAFETY

The Contractor agrees to comply with all applicable requirements of the Occupational Safety and Health Act of 1970 (P.L. 91-596).

The Contractor further agrees to indemnify and hold harmless the Engineer from all liability, civil and criminal, resulting from violations of the said Act related to the Contractor's work.

The work site will be subject to Health and Safety inspection by representatives of New York State. The Contractor will be responsible for providing Health and Safety Equipment and instruction for employees of the Contractor and/or subcontractors working under contract with the Contractor. The Contractor agrees to abide by the requirements of the Engineer's Health and Safety Plan.

Article No. 29 - TERMINATION OF CONTRACT

The Engineer reserves the right to terminate the Contract without prior notice if, in the Engineer's opinion, the Contractor is not abiding by this document, is not pursuing the work in true faith, or is acting negligently in any way.

In addition, in the event of termination for any reason prior to completion of all reports contemplated by this Agreement, the Engineer reserves the right to complete such analyses and records as are necessary to place their files in order and, where considered by them necessary to protect their professional reputation, to complete a report on the services performed to date. A termination charge to cover the cost thereof for an amount not to exceed thirty percent of all charges incurred up to the date of termination may, at the option of Dames & Moore, be made.

Article No. 30 - BURIED UTILITIES

Location of underground utilities, as provided by the various cities and municipalities, will be reviewed by the Engineer and the Contractor prior to any drilling. Should the Contractor drill in other than the exact locations specified by the Engineer and agreed upon by the Contractor, the Contractor agrees to indemnify the Engineer for all loss, damage, suit, cost, expense including attorney's fee (including loss of consequential use) resulting from damage to underground utilities.

Article No. 31 - OWNERSHIP AND MAINTENANCE OF DOCUMENTS

All materials resulting from Contractor's efforts on this project, including documents, calculations, maps, photographs, drawings, computer printouts, notes/samples, specimens and any other pertinent data, are instruments of Dames & Moore unless otherwise specified. In any event, Contractor shall have the right to retain copies of all said instruments excepting samples and specimens.

All reports and other materials resulting from Contractor's efforts on this project are not intended or represented to be suitable for reuse by Contractor or others on this project or any other project. Reuse of said reports or materials by Contractor without written permission or adaptation by the Engineer shall be at the user's sole risk, without liability on the Engineer's part, and the Contractor agrees to indemnify and hold harmless the Engineer from all claims, damages, and expenses including attorney's fees arising out of such unauthorized reuse. Any reuse or adaptation of the instruments of service occurring with the Engineer's written permission shall entitle the Engineer to compensation in amounts to be agreed up with the Contractor.

Article No. 32 - CONFIDENTIALITY

Contractor shall hold confidential all business and technical information obtained from the Engineer or its affiliates or generated in the performance of services under this contract. Contractor shall not disclose such information without the Engineer's written consent except to the extent required for:

(1) Performance of services under this Agreement;

(2) Compliance with professional standards of conduct for preservation of the public safety, health, and welfare;

(3) Compliance with any court order or other governmental directive; and/or

(4) Protection of Contractor against claims or liabilities arising from performance of services under this Agreement.

Article No. 33 - LITIGATION

In the event of litigation or arbitration between the two parties to this Agreement, all reasonable costs and attorney's fees to enforce this Agreement incurred by the prevailing party shall be reimbursed by the non-prevailing party.

Article No. 34 - INDEPENDENT CONTRACTOR STATUS

Nothing in this contract shall construe the Contractor or any of their employees or agents to be the Engineer's employees, agents or representatives.

Article No. 35 - WARRANTY

The Contractor warrants their work will be performed with the usual thoroughness and competence of the hazardous waste and geotechnical drilling profession.

Article No. 36 - INDEMNIFICATION

The Contractor agrees to indemnify and save harmless Dames & Moore, its partners and employees, from and against loss, damage, cost, suit, charge or expense, including attorney's fees, caused by error, omission or the negligent act(s) of Contractor, his employees or agents, resulting in bodily injury, including death, of any person or persons, and damage to any property, as a result of the work performed under this contract.

Article No. 37 - INSURANCE

Prior to commencement of work, the Contractor shall furnish to the Engineer certificates of insurance, satisfactory to the Engineer and not subject to cancellation or material change without thirty (30) days prior written notice, evidencing insurance coverage as follows:

(1) Workers' Compensation, including Occupational Disease benefits, in accordance with applicable laws and statutes and including Employers Liability coverage for a limit of $100,000.

(2) Comprehensive General Liability, including coverage for Premises and Operations, Contractual Liability, Independent Contractors, Completed Operations, Broad Form Property Damage, and including coverage for XCU exclusions for limits of $500,000 per occurrence and $1,000,000 aggregate for Bodily Injury and $500,000 per occurrence and $1,000,000 aggregate for Property Damage; or $1,000,000 Combined Single Limit Bodily Injury and Property Damage.

(3) Automobile Liability for the same limits as stipulated under Comprehensive General Liability.

(4) Professional Liability Insurance for the same limits as stipulated under Comprehensive General Liability.

All insurance stipulated above must remain in full force and effect with no lapse in coverage from commencement of work performed under this contract and for a period of not less than two (2) years after acceptance of the completed work.

The Comprehensive General Liability and Professional Liability policies and certificates of insurance shall be specifically endorsed to cover the Contractor's Contractual Liability to Dames & Moore under the provisions stipulated in Article 36 - Indemnification.

All policies and certificates of insurance required under this section shall be endorsed to include Dames & Moore as an additional insured as respects work performed by the Contractor.

In the event any work under this contract is sublet by the Contractor, with the consent of the Engineer, these same insurance and indemnity provisions shall apply to all said subcontractors and proof of insurance will be furnished to the Engineer prior to commencement of work by any such subcontractor.

Article No. 38 - LAWS GOVERNING THIS AGREEMENT

This Agreement shall be governed by the laws of the State of New York of the United States of America.

IN WITNESS WHEREOF, the parties hereby execute this agreement and make this contract:

CONTRACTOR

JAMES L. WARD GEOTECHNICAL DRILLING SERVICES, INC.

43 Steel St.
Address

Rochester, New York
Signed By

James L. Ward
Title

President
Date

July 30, 1985

ROCHESTER DRILLING CO., INC.

45 Steel Street
Address

Rochester, N.Y., 14606
Signed By

[signature] V.P.
Title

7/29/85
Date

ENGINEER

DAMES & MOORE

2596 Belgium Rd. Baldwinsville NY. 13027
Address

[signature]
Signed By

Associate
Title

July 5, 1985
Date

TABLE 1

UNIT PRICES

ITEM	UNIT	UNIT PRICE
1. Initial Mobilization shall consist of transporting to the site all personnel, materials, tools, and equipment required for the completion of the work and removal of same on completion of the drilling program. All equipment shall be certified steam-cleaned prior to mobilization.	L.S.	$2,800.00
2. All subsequent mobilization, if required. All equipment shall be steam-cleaned prior to mobilization.	L.S.	$2,500.00
3. Drilling and continuous sampling of soils with a 2 or 3.5 inch OD split spoon sampler. (3.5 inch OD sampler to be provided by Engineer). Glass sample jars and lids shall be provided by the Contractor.		
3a. 6-inch I.D. Hollow stem augers.	L.F.	$ 18.00
3b. 3 3/4 inch I.D. Hollow stem augers.	L.F.	$ 16.00
4. Drilling and standard sampling of soils every 5 feet with a 2 or 3.5 inch OD split spoon sampler. (3-inch OD sampler to be provided by Engineer). Glass sample jars and lids shall be provided by the Contractor.		
4a. 6-inch I.D Hollow stem augers.	L.F.	$ 16.00
4b. 3 3/4 inch I.D. Hollow stem augers.	L.F.	$ 14.00

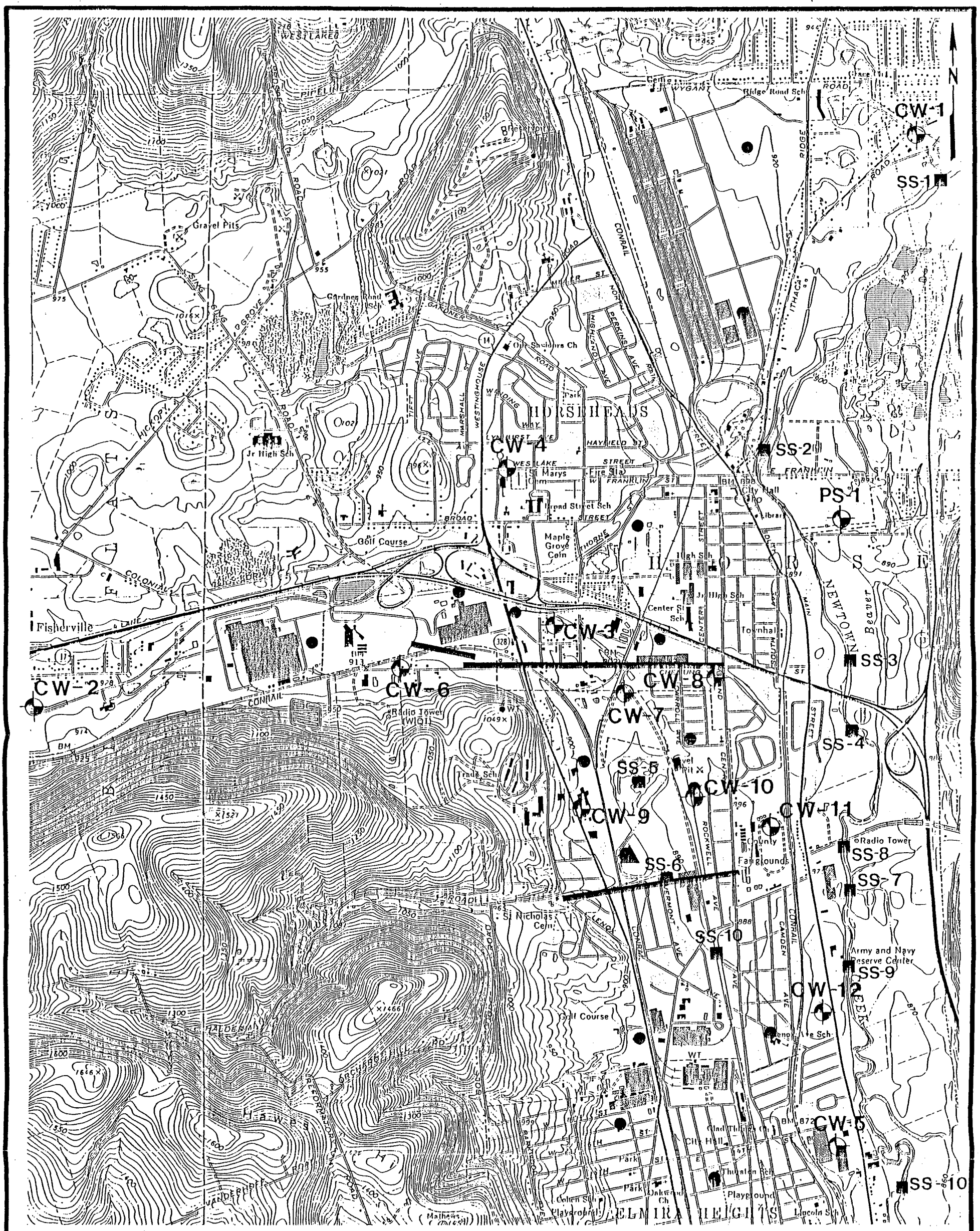
5.	Undisturbed sampling with Shelby Tube.	Ea.	$ 75.00
6.	Drilling at least a 8 inch diameter boring in the overburden without samples.	L.F.	$ 12.00
7.	Coring in bedrock with NX size coring equipment (double tube) wire line.	L.F.	$ 27.50
8.	Supply and install 2" ID Johnson Stainless Steel standpipe. Price is to include costs of supplying all material necessary to install standpipe as well as bentonite pellets and cement grout to seal boring at depths specified by the Engineer.	L.F.	$ 16.50
9.	Supply and install 2" ID Johnson Stainless Steel screen including 2-inch stainless steel well pump. Price is to include costs of supplying all material necessary to install screen.	L.F.	$ 32.00
10.	Supply, Install and Grout 10 foot sections of 8-inch (ASA SCH 10 minimum) protective casing and locking cap. Includes painting and brass ID plate.	PER WELL	$ 300.00
11.	Developing of wells using surging block, water jetting or water flushing, (as described in Section 4.29) including cost of containment and removal of discharge water, if required.	PER WELL	$ 750.00
11a	Development beyond 6 hours per well.	PER HOUR	$ 125.00

12. Standby time to include only the following:

    a) downhole geophysical logging by the Engineer.

    b) time when drill rig is standing by while waiting for Engineer.

	c) time waiting for grout to set up		
	d) the first hour of time lost due to poor weather conditions. All time lost in excess of one hour per day is not subject to payment.	PER HOUR	$ 100.00
13.	Install necessary well materials, and sampling devices (supplied by the Engineer) for the installation of point sampling devices.	PER HOUR	$ 125.00
14.	Install bentonite seals by means of tremie pipe or bentonite placement device above and beyond the first 1/2 hour.	PER HOUR	$ 125.00



EXPLANATION:

- KENTUCKY AVENUE WELL
- CLUSTER WELL
  - CW-1 - CW-5 PROPOSED REGIONAL WELLS
  - CW-6 - CW-12 POSSIBLE LOCATION FOR POTENTIAL SOURCE SITE WELLS
- SURFACE WATER AND SEDIMENT SAMPLING LOCATIONS
- GEOPHYSICAL SOUNDING/PROFILE LOCATIONS
- GEOPHYSICAL LINE

SCALE

0 1000 2000 3000 4000 FEET

STUDY AREA

SHOWING PROPOSED WELL AND SAMPLING LOCATIONS AND PROPOSED GEOPHYSICAL LINE LOCATION

Reference: Base map taken from U.S.G.S. 7.5' Topographic Map, Horsehead, N.Y. Quadrangle, 1978

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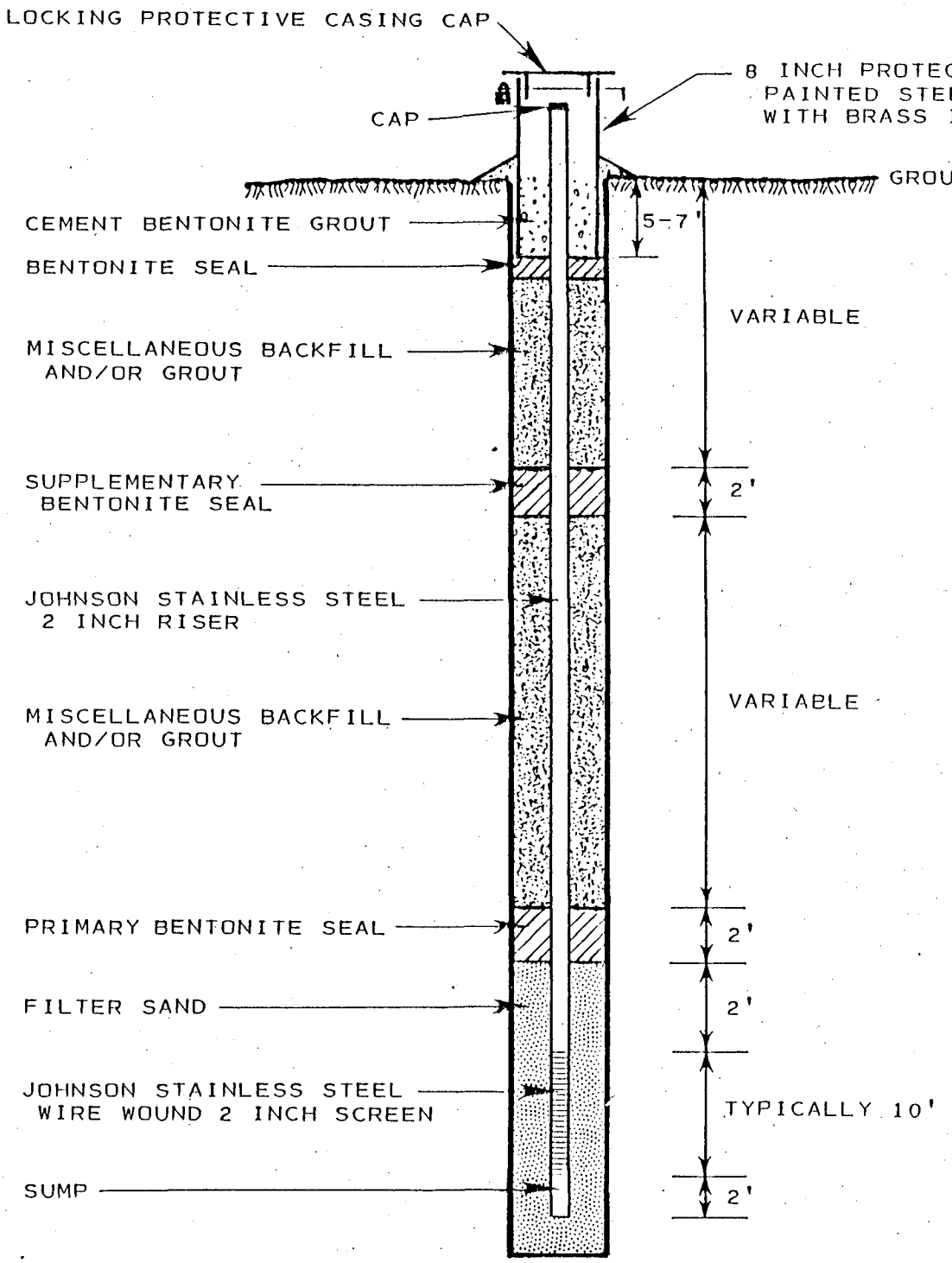
FIGURE 1



TYPICAL WELL INSTALLATION

(NOT TO SCALE)

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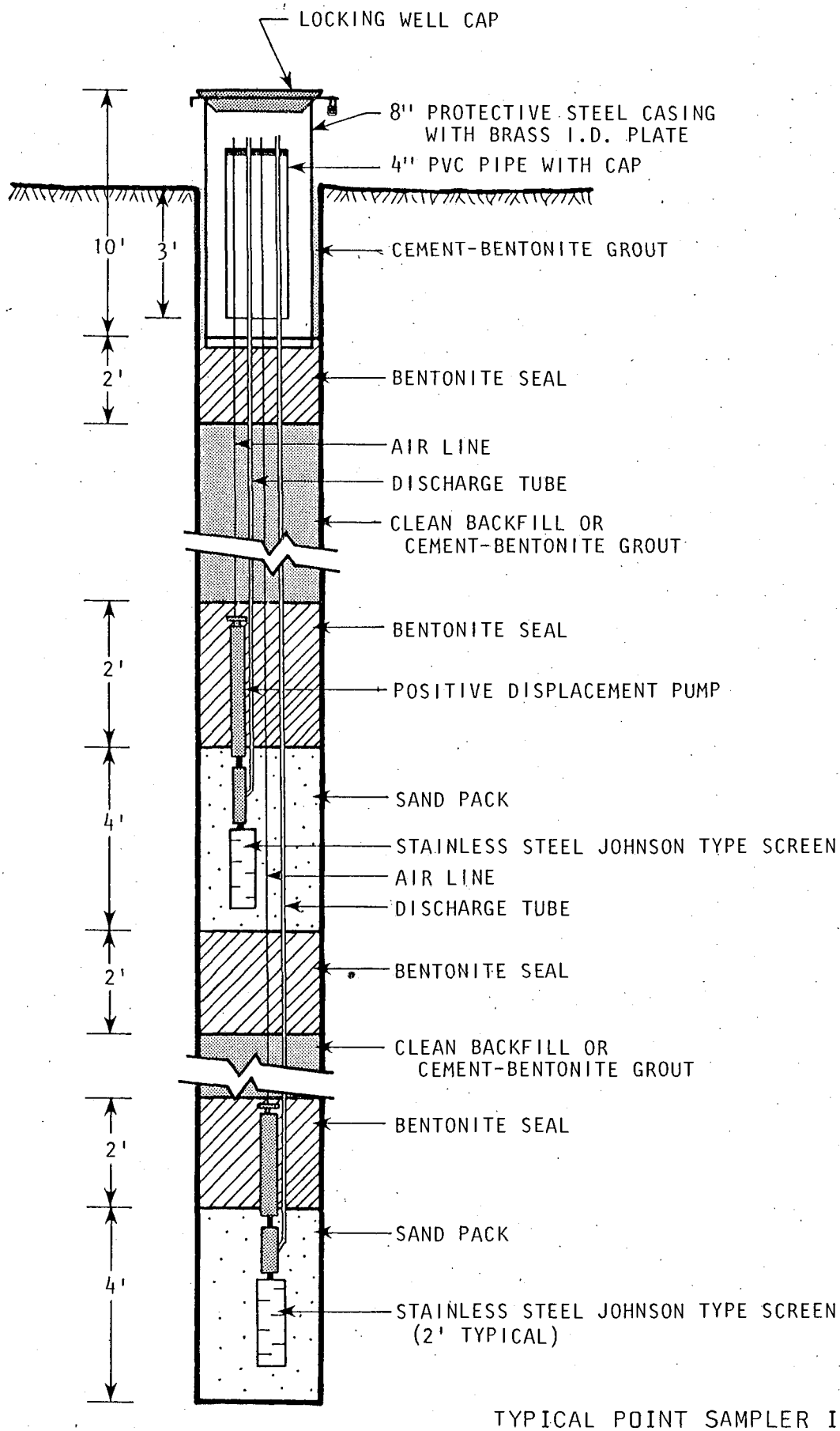
FIGURE 2



TYPICAL POINT SAMPLER INSTALLATION
(NOT TO SCALE)

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FIGURE 3