W 9046

IOWA GEOLOGICAL SURVEY
In Cooperation with U. S. Geological Survey
RECORD OF WELL

Location:

Town: MESSERVEY (N E) (S W) :County CERRO GORDO E.

NE NW SW sec. 32 T. 94 N., R. 22 W. _____ Twp.

Well name and number _____

Owner MESSERVEY TOWN WELL (1957) Address _____

Tenant _____ Address _____

Contractor THORPE WELL CO. Address DES MOINES

Drillers _____

Drilling dates OCT. 9-31, 1957

Well data:

Altitudes: Drilling curb _____ feet; Land surface _____ feet

Determined by _____

Topographic position _____

Total depth: Reported 573 feet, Measured _____ feet

Drilling method CABLE TOOLS

Hole and casing data 108'7" OF 12" CASING
269'7" OF 10" CASING
LINER SET AT 390

Original depth to water 131' ft. above below _____ Date _____

Source of data _____

Sources of water: Principal DEVONIAN - CEDAR VALLEY

Others _____

Production Data

Date				
Static water level	131			
Measuring point				
Pumping water level	APP. 206' (75' OF DRAWDOWN)			
Yield (g. p. m.)	150			
Duration of pumping				
Specific capacity				

Pump Data

Type pump _____ Column diameter and length _____

Cylinder or bowls diameter and length _____

Suction pipe _____ Airline _____

Power _____ Production _____ g. p. m. for _____ hours per day

Use of water _____

Dissolved constituents and properties (in parts per million except as indicated)

Date sampled				
Sampled by				
Silica (SiO_2)				
Iron (Fe)				
Manganese (Mn)				
Calcium (Ca)				
Magnesium (Mg)				
Potassium (K)				
Sodium (Na)				
Carbonate (CO_3)				
Bicarbonate (HCO_3)				
Sulfate (SO_4)				
Chloride (Cl)				
Fluoride (F)				
Nitrate (NO_3)				
Dissolved solids				
Hardness (as $CaCO_3$)				
Total				
Grains per gallon				
Noncarbonate				
Alkalinity (as $CaCO_3$)				
pH				
Specific conductance (micromhos at 25°C)				
Temperature (°F)				
Analysis No.				

Laboratory Data

Well No. W 9046 Sample range 0-573 No. of samples 109

No. of dupls. and cond. 109 Good Washed range 100-573

Samples prepared by K. Sargent R Valentine G Dorland Date 10/6/57 10/21/57 11/5/57 11/8/57

Logged by NORTHUP Date 11/7/57

Correlations by _____ Date 11/7/57

NA2-11, NA2-12

Form 610

WELL PRODUCTION TEST

Well No. 2, Meservey, Iowa Date Nov 1 '57

Time	Meter Reading Hundreds	GPM	Water Level	Pump Speed rpm	Motor Speed rpm	Temp F	Production	Remarks
								23 sec for 55 gal Drum = 132 gpm
6:23	258164.7		207'			52°		
	Water was at 131' static level before Pumping							130 gpm by meter
6:37	258182.9 / 18.2	130	206'-4"	2000	1400	51°		water slightly cloudy / water clearing but still slightly cloudy
7:00:00	258212.85		206'-0"	2030	1400	51°		
7:03	Pump Shut off							
7:04		150	150					
7:05		141	141					
7:06		139	139					
7:07		138	138					
7:12	Pump on							
7:15		180	180					
7:17		184	184	2250	1450			Pump speeded up
7:19	258224.03	189	189	2250	1450			water cloudy
7:30	237.6	188	188	Pump Shut off				water clearing
7:44	Pump on 258224.03	✓		2250				
7:46		150	170					150 gpm pumping water quite cloudy
7:47			180					
7:48			186					
7:49			192					
7:50			194					
7:51			196					
7:52		135	197					
7:53			198					
7:54			198-6"					water Cloudy
7:59	258 255.9	130	199-6"	2250	1300	51		Water quite cloudy
8:15	276.3	135	198-6"	2250	1300	51		Water quite cloudy
8:30	295.0	130	197-0	2250	1300	51		Water quite cloudy
8:45	313.85	125	197-0	2250	1300			
meter removed @ 8:50 for cleaning								
8:58	329.10	100	190-0					
9:16		140	202	2300	1300			Water quite Cloudy

Contractor Thorpe Well Co

By

Rowat - Murray, Engineers
Belmond, Iowa
By R W Rosene

Distribution: Orig - RME, Belmond; 1 cc: Contractor; 1 cc: RME, Res. Eng.
1 cc: City Engineer; 1 cc: [illegible]

SUMMARY REPORT

2

TEST OF MESERVEY, IOWA WELL NO. 2

A. A pumping test was run by Thorpe Well Company on November 1, 1957 on the new well (No. 2). Bob Rosene and John Dickson representing ROWAT_MURRAY, ENGINEERS were present during the test. The purpose of the test was to obtain data on the quantity and quality of the available water.

B. The test was conducted over a 12 hour period from 6 A.M. to 6 P.M. There were four phases to the test.

First Phase: Surging the well. From 6 A.M. to 1 P.M. the pump was turned off an on at various times and the pump was run at different speeds until the water remained clear.

Second Phase: Pumping at 50 gpm. From 1 P.M. to 2 P.M. the contractor attempted to pump the well at 50 gpm, but had difficulty maintaining a steady rate of flow. The drawdown at this rate was approximately 27 feet.

Third Phase: Pumping at 100 gpm. At 2 P.M. the pump was increased to produce 100 gpm. The well was pumped at this rate until 4 P.M. with an approximate drawdown of 49 feet.

Fourth Phase: Maximum pumping rate: At 4 P.M. the contractor increased the pumping rate to the maximum he was set up for, which was approximately 150 gpm. The pumping was slowed down when it started raining but it was again speeded up after the motor was covered. This rate was continued until the completion of the test at 6 P.M. with an approximate drawdown of 75 feet.

C. A water sample was taken at 5:55 P.M. when the water level was 206', 3" below the surface of the ground. The pump was pumping at a rate of 150 gpm and had been pumping continous since 12:50 P.M.

MUNICIPAL IMPROVEMENTS

SPECIFICATION

FOR

WATERWORKS IMPROVEMENTS

FOR

MESERVEY, IOWA

Project No. 842

Rowat - Murray
ENGINEERS
BELMOND, IOWA

ROWAT - MURRAY, ENGINEERS
Belmond, Iowa

WATERWORKS IMPROVEMENTS
MESERVEY, IOWA

Project No. 842

ADDENDUM NO. 1

August 29, 1957

Attention of the Prospective Bidders on this project is directed to the following Addendum:

A. The Notice of Hearing and Letting is modified as follows:

1. The opening of bids is postponed 20 days to 8:00 p.m., September 30, 1957.

2. The bid security check is changed from 10% to 5% of the amount of the proposal.

B. Deep Well Specification - Section 1-2.1 on well casing is hereby modified to allow the use of either screwed or welded joints.

ROWAT - MURRAY, ENGINEERS
Belmond, Iowa

WATERWORKS IMPROVEMENTS
MESERVEY, IOWA

ADDENDUM NO. 2

Attention of the Prospective Bidders on this project is directed to the following Addendum which is intended to clarify the intent of the Proposal Form:

1. Omit the words "and center" from Item 1 of Section 1 of the Proposal Form.

   It is intended that Item 1 include all concrete, materials and labor required for the four column piers and Item 2 include all concrete, materials and labor required for the valve manhole which also serves as the center pier.

S P E C I F I C A T I O N

FOR

W A T E R W O R K S I M P R O V E M E N T S

MESERVEY, IOWA

Prepared By

ROWAT - MURRAY, ENGINEERS

Belmond, Iowa

1957

I N D E X

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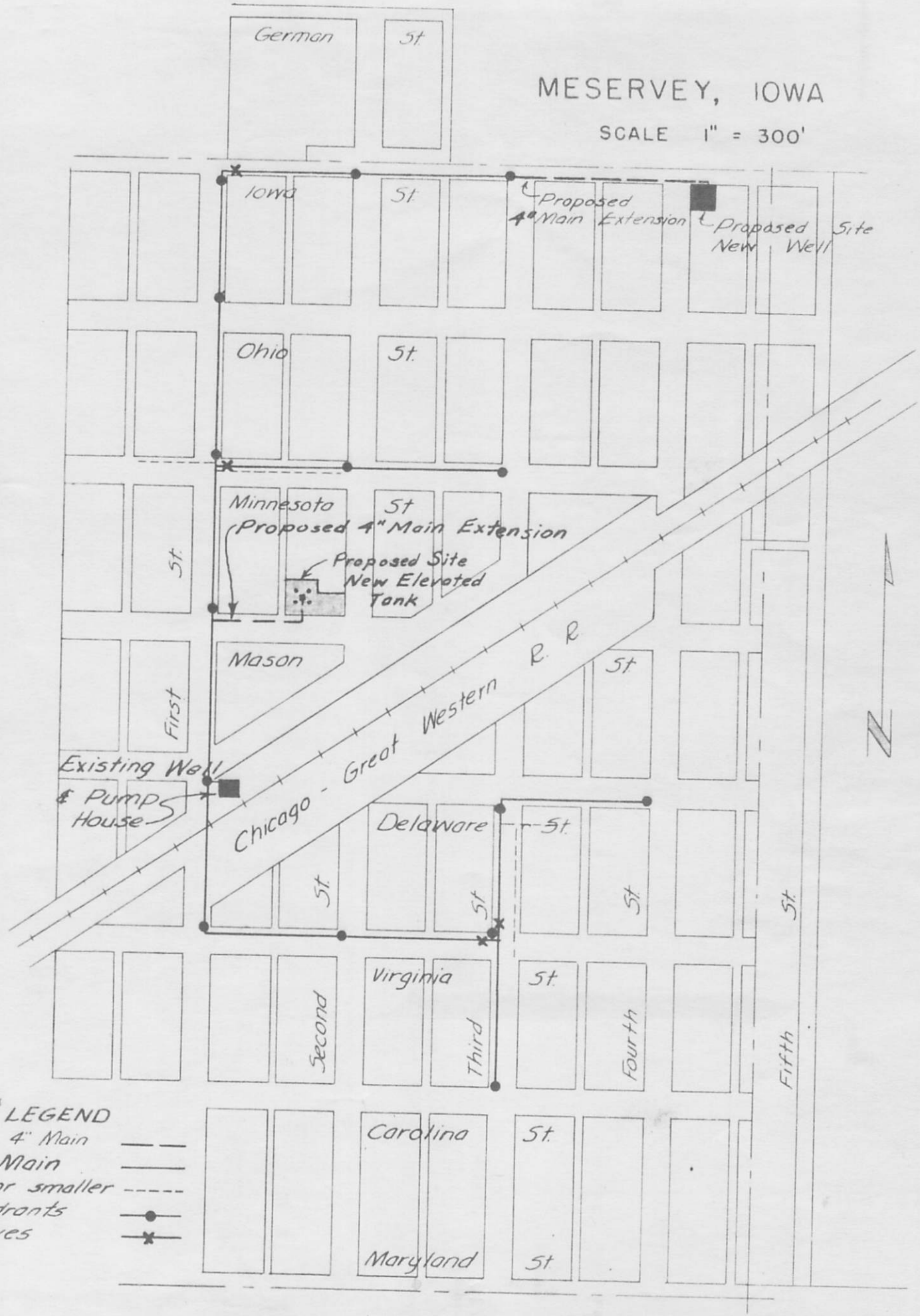
1. Tank Site Boring
2. Foundation Plan
3. Foundation Detail
4. Center Pier and Valve Manhole Detail
5. New Deep Well Profile
6. Belmond & Thornton Well Profiles
7. Distribution System Layout



Project No. 842

NOTICE OF HEARING AND LETTING

Sealed proposals will be received by the Town Clerk of the Town of Meservey, Iowa, at his office in said Town until 8:00 o'clock p.m. on the 10th day of Sept. for the construction of Waterworks Improvements as described in the plans and those specifications now on file in the office of the Town Clerk. Proposals will be acted upon by the Town Council of said Town at a meeting to be held on the day and hour above specified or at such later time as may be filed. At said time and place a hearing will be held on the proposed plans and specifications and proposed form of contract for said improvements, and at said hearing any interested person may appear and file objections thereto or to the cost of said improvements.

The extent of the work to be done is as follows:

1. Furnishing, erecting and painting of a 50,000 gallon capacity elevated water tank on a 100' tower with concrete footings and necessary appurtenances.
2. Construction of a 10 inch well approximately 500 feet deep including all drilling, casing, testing, grouting, lining, disinfection and related items of materials and work.
3. Installation of approximately 650 lineal feet of 4 inch cast iron water main with necessary fittings and appurtenances.

All work is to be done in strict compliance with plans and specifications prepared by Rowat - Murray, Engineers of Belmond, Iowa, unless notified of change by the Engineer in charge. The above mentioned plans and specifications have heretofore been approved by the Town Council, and are now on file for public examination in the office of the Town Clerk and may be examined by bidders.

Each proposal shall be made on a form furnished by the Town or Rowat-Murray, Engineers and must be accompanied by a check, certified by an Iowa bank in an amount equal to or greater than ten per cent (10%) of the amount of the proposal made payable to the Town Treasurer of the above Town and filed in a sealed envelope. This check may be retained by the Town Treasurer as liquidated damages in the event the successful bidder fails to enter into a contract within ten (10) days and post bond satisfactory to the Town insuring the faithful fulfillment of the contract and maintenance of said improvements as required by law.

Payment to the contractor for said improvements will be made in cash derived from the proceeds of the issuance of such bonds as may be legally issued for such purposes or from such other funds of the Town as may be legally used for such purposes. Any combination of the above methods of payment may be used.

The contractor will be paid interest at the rate of 4% from the date of the acceptance of the improvement to the date of payment computed on the unpaid contract price.

By virtue of statutory authority, a preference will be given to products and provisions grown or produced within the State of Iowa, and to Iowa domestic labor.

The successful bidder will be required to furnish a bond in an amount equal to one hundred per cent (100%) of the contract price, said bond to be issued by a responsible surety approved by the Town Council and shall guarantee the faithful performance of the contract and the terms and conditions therein contained and shall guarantee the prompt payment for all materials and labor, protect and save harmless the Town from claims and damages of any kind caused by the operation of the contractor.

Plans and specifications for private use may be obtained from the Engineers or the Town Clerk upon a deposit of $15.00 all of which will be refunded to anyone filing a complete and bona fide bid and to others $10.00 will be refunded, provided in all cases that such plans and specifications are returned in good order within two weeks after the date of receiving bids.

Contract shall be awarded to the lowest responsible bidder. The Town reserves the right to reject any or all proposals, and to waive informalities or irregularities in any bid.

Published on order of the Town Council of Meservey, Iowa.

By Victor Nordman Town Clerk

Proposals

Proposals must be submitted on forms furnished by the owner or the Engineers. They must be filled out in ink or typewriter. If not made in accordance with the Instructions to Bidders, the proposal shall be subject to rejection as irregular, yet the owner reserves the right to waive any irregularity.

It is the intent of the owner to receive separate bids on the various sections listed in the Proposal Form. However, any bidder who so desires may submit a combined bid to include any combination of these sections.

It is expressly agreed that by submitting a proposal, the Bidder acknowledges that he has examined the site of the proposed improvements and the plans and specifications, has satisfied himself of the feasibility and correctness of the same, has informed himself of the conditions relating to the construction of and the labor under which the work will be performed and accepts all the terms and conditions thereof.

Return of Certified Checks

Certified checks of the lowest two or more bidders on each Section may be retained until a contract is awarded or rejection made, which shall not exceed ten (10) days. Other checks will be returned after the canvass and tabulation of the bids is completed.

Failure to Execute Contract

Should the successful bidder fail to execute the contract and to furnish bond or bonds to validate the same within ten (10) days as herein provided, his certified check shall be forfeited to the owner as liquidated damages.

Special Types of Structures

It is not the intent of this Specification to discriminate against tanks of standard manufacture which may be different in shape or detail from the conventional type specified. Any manufacturer wishing to submit a bid covering a tank different from that specified may do so providing he indicates in a supplement to his proposal the deviations from the specifications and includes photographs showing the typical design as well as a list of erected tanks of that design. Such tanks must comply with American Water Works Association design requirements.

Qualifications of Bidders

Each bidder on any Section of the Proposal Form must have a record of previous experience with the type of work required for the contract involved and must furnish evidence to the satisfaction of the Engineer and the owner that he is qualified by experience and ability to perform this contract.

Divisions of Work

The work under this project is divided into four sections. The proposal form is set up to allow bidders to bid on one section or on more than one section as the contractor wishes. It is intended that the plans and specifications clearly show the limits of work for each contract. The divisions are as follows:

Section 1. Tank foundation construction shall include all general construction necessary for the complete installation of the elevated tank foundations. This includes all excavation and backfill, grading, concrete and reinforcing steel. Anchor bolts are to be furnished by the tank manufacturer.

Section 2. Tank and tower construction shall include all steel, fabrication, erection and painting required for the complete installation of the new 50,000 gallon elevated water tank on a 100' tower. This includes anchor bolts but not foundations and center valve pit. Valve and supply line at valve pit is to be furnished and installed by others.

Section 3. Deep well construction shall include all drilling, casing, grouting, testing and related items necessary for the completion of a new 10" diameter by 500 feet deep well to have an expected capacity of 120 gallon per minute. Installation of the pump, pump house and distribution system connection are not included in this contract.

Section 4. Distribution system extensions include installation of the necessary mains to connect the new well and the new elevated tank to the existin water main system. This includes necessary excavation and backfill, 4 inch cast iron main with fittings and valves and connections to the existing main.

P R O P O S A L

Town Council
Meservey, Iowa

Re: Meservey, Iowa Waterworks Improvements

Gentlemen:

The undersigned hereby declares that he has examined the specifications and contract documents prepared by Rowat - Murray, Engineers for the construction of waterworks improvements consisting of a new 50,000 gallon elevated water tank, a new well and extension of the distribution system and having personally examined the site of the work hereby proposes to furnish all labor, tools, material and equipment required for such work in accordance with the following schedule of prices.

SCHEDULE OF BID PRICES

Foundation Piers and Valve Manhole

SECTION I

Item	Description	Quantity	Unit Price	Extension
1.	Column and center pier concrete including excavation, backfill, reinforcing steel and forms, complete in place	27 C.Y.	_____/c.y.	_____
2.	Valve manhole complete in place	1 unit	Lump Sum	_____
	Total items 1 & 2			_____

Water Tank and Tower

SECTION II

1.	Furnishing, erecting and painting one 50,000 gallon elevated water storage tank on a 100' tower including anchor bolts, but not including foundation piers and center piers. Complete in place	1	Lump Sum	_____
	Total Sections I & II			_____

Item	Description	Quantity	Unit Price	Extension
	Well			
	SECTION III			
1.	For setting up and removing equipment, complete		Lump Sum	300.00
2.	For drilling a sufficiently large hole from ground elevation to depth of 20' and furnishing, placing and removing temporary 16" O.D. casing, complete	20 L.F.	10.00/L.F.	
3.	For drilling a sufficiently large hole from 20' to 100' for 12" I.D. temporary casing, complete	80 L.F.	8.00/L.F.	
4.	For drilling a sufficiently large hole from 100' to 240' for 10" I.D. casing	140 L.F.	7.50/L.F.	
5.	For furnishing and placing 10" I.D. 0.365" wall steel casing from 2' above ground surface to 240', complete in place	242 L.F.	6.00/L.F.	
6.	For drilling 10" diameter open hole from 240' to 500' complete	260 L.F.	7.00/L.F.	
7.	For furnishing, setting up and removing of pressure grout cementing unit and grouting shoe, complete		Lump Sum	400.
8.	For furnishing and placing neat cement grout by pressure method (Holland process or equal) in the annular space around the 10" casing from 0 to 240'.	300 sacks	3.25/Sack	
9.	For furnishing, installing and removing test pump as specified, complete		Lump Sum	200.
10.	For operating test pump for testing of yield and drawdown	12 hours	12.00/Hr.	
	Total Base Bid Section III - Items 1 through 10			
	Total Alternate Bid Section III - Items 1 through 6, 9, 10 & 15			

	Quantity	Unit Price	Extension
Alternates			
11. Furnishing and placing 12" I.D. casing from 0 to 100' if required, complete in place		7.00 _____/L.F.	
12. Credit to be given on price quoted in Item 11 if 12" casing may be pulled and salvaged.		5.50 _____/L.F.	
13. For drilling a sufficiently large hole for 8" I.D. casing if required		1.00 _____/L.F.	
14. For furnishing and placing 8" I.D. 0.322 inch wall steel casing if required		4.00 _____/L.F.	
15. For sealing only the top 20' and the bottom 12' of the 10" casing with neat cement grout. (Items 7 & 8 will be omitted if this alternate is accepted.)		Lump Sum 150.00 _____	

Water Main Extensions

SECTION IV

1. Furnishing and placing 4" diameter cast iron water main as specified, complete in place	650 L.F.	_____/L.F.	_____
2. Furnishing and placing 4" valves as specified, complete in place	2 each	_____/Ea.	_____
3. Furnishing and placing fittings (tees, bends, etc.), complete in place	450 lbs.	_____/LB.	_____
Total Section IV			_____

If awarded the contract for Section I we will begin construction within _____ days and will complete construction within _____ calendar days after the acceptance of this proposal.

If awarded the contract for Section II we will begin fabrication as soon as steel is available and complete construction within _____ calendar days after acceptance of this proposal.

If awarded the contract on Section III we will begin construction within _____ days and will complete construction within _____ calendar days after the acceptance of this proposal.

If awarded the contract on Section IV we will begin construction within _____ days and will complete construction within _____ calendar days after the acceptance of this proposal.

As evidence of good faith, we herewith submit a certified check for $_____ being not less than 10% of our base bid. This check shall become the property of the Town of Meservey, Iowa in the event that the undersigned fails to enter into a contract with said Town and to furnish bond or bonds to validate said contract within ten (10) days after date of acceptance of this proposal.

Respectfully submitted,

_____

by_____
Name Title

_____

Project No. 842

C O N T R A C T

THIS CONTRACT made and entered into IN QUADRUPLICATE at _____,

_____, this _____ day of _____, 195_ by and between

the Town of _____ hereinafter called the Town, and _____

_____ hereinafter

called the Contractor.

WITNESSETH:

The Contractor hereby agrees to furnish all labor, tools, and equipment and to furnish and deliver all materials required for the proposed _____

_____

as indicated by the plans and specifications now on file with Town Clerk of the Town of _____.

Said plans and specifications, the Resolution of Necessity, the Resolution Ordering Construction, the published Notice to Contractors, the bid of the Contractor and the bond guaranteeing performance of the contract are hereby specifically made parts of this contract as fully as though set out herein verbatim.

On completion of the said improvement, the Town agrees to pay to the Contractor therefore the prices set out in this bid; said payment to be made as prescribed in the Specifications and Contract Documents.

The Contractor agrees to begin work on or before _____ and to complete the same on or before _____.

IN WITNESS WHEREOF, this contract has been executed IN QUADRUPLICATE on the date first herein written.

_____
Contractor

_____
Mayor

ATTEST:

_____
Town Clerk

Total Contract Bid Amount _____

STANDARD GENERAL SPECIFICATIONS

Section 10 Definition of Terms

Section 20 Proposal Requirements and Conditions

Section 30 Award and Execution of Contract

Section 40 Scope of the Work

Section 50 Control of Materials and Work

Section 60 Legal Relations and Responsibility to the Public

Section 70 Prosecution and Progress

Section 80 Measurement and Payment

STANDARD GENERAL SPECIFICATIONS

SECTION 10. DEFINITION OF TERMS

10.1 CITY., The Party of the First Part in the accompanying contract acting through its authorized representatives.

10.2 COUNCIL., The authorized representatives of the Party of the First Part.

10.3 ENGINEERS., Rowat - Murray, Engineers, or their authorized representatives.

10.4 INSPECTOR., The authorized representative of the Engineers assigned to the detailed inspection of the work, or materials therefore, and to such other duties as may be delegated to him in these specifications.

10.5 CONTRACTOR., The Party of the Second Part in the accompanying contract for the improvement covered by these specifications or his authorized representative.

10.6 SUBCONTRACTOR., Any person, firm or corporation who has, with the approval of the Council, contracted with Contractor to execute and perform in his stead all or any part of the contract.

10.7 BIDDER., Any individual, firm or corporation submitting a proposal for all or a part of the work provided for in these specifications.

10.8 PROPOSAL GUARANTY., The security designated in the Notice to Bidders or Proposal, to be furnished by the bidder as a guaranty of good faith to enter into a contract and furnish an acceptable bond for the work contemplated, if it be awarded to him.

10.9 SURETY., The corporate body bound with and for the Contractor for the acceptable performance of the contract.

10.10 PROPOSAL., The written proposal, submitted by the bidder in the prescribed manner, and on the standard form, for the improvements covered by these specifications.

10.11 SPECIFICATIONS., The documents that set forth the manner in which the proposed work is to be accomplished, which have been prepared by the Engineers and approved by the Council, official copies of which are now on file with the Clerk.

10.12 SPECIAL PROVISIONS., Clauses or memoranda not contained herein, applying to the contract of which these specifications are a part, which change or supplement these specifications.

10.13 CONTRACT., The agreement entered into between the City and the Contractor setting forth the terms under which the work covered by the plans and specifications is to be performed. The contract includes all conditions, definitions, and instructions set forth in the official contract and specifications, the proposal, official plans, and all supplemental agreements entered into by the parties to the contract.

10.14 NOTICE TO BIDDERS., The notice calling attention of bidders to the time and place for receiving bids, containing a brief description of the work and briefly setting forth the requirements and conditions for submission of proposals.

10.15 INSTRUCTIONS TO BIDDERS., The clauses setting forth, in detail, the information relative to the proposed work and requirements for the submission of proposals.

10.16 PLANS., The plans for the improvement covered by the specifications and approved by the Council, official copies of which are on file with the Clerk.

10.17 CONTRACT BOND., The bond executed by the Contractor and his surety in favor of the City guaranteeing the complete execution of the contract in accordance with the plans and specifications, the payment of all debts pertaining to the work and maintenance of the work as provided by law or by the specifications.

10.18 CONTRACT PERIOD., The contract period is the period from the specified date for beginning the work to the specified date of completion, both dates inclusive. The contract period may be extended by the Council, as provided in these specifications in which event the contract period includes the new date of completion.

10.19 OFFICIAL PUBLICATIONS., The official publications are the formal resolutions and notices relative to the proposed improvement that are required by law to be published in a prescribed manner, and that have actually been published in accordance with the statutes relating therto. Attention is directed to the fact that those official publications are by statute vested with all of the force and effect of contract obligations.

SECTION 20. PROPOSAL REQUIREMENTS AND CONDITIONS

20.1 USE OF PROPOSAL FORM., Bidders will be furnished with proposal forms giving the description of the work, the time at which the work must be completed, and the amount of the proposal guaranty which must accompany the proposal, all of which must be in accordance with the official publications relating to the proposed improvement. To insure against accidental errors, the Contractor should read carefully the official publications before preparing his proposal.

20.2 ESTIMATE OF QUANTITIES., For all work let on a unit price basis the Engineers' estimate of quantities shown in the notice to bidders or proposal is understood to be qpproximate only, and will be used only for the purpose of comparing bids. For work let on a lump sum price basis any estimate of quantities provided is furnished for the convenience of bidders and is not guaranteed.

20.3 EXAMINATION OF THE PROPOSED WORK., Bidders are required to examine to their satisfaction, the plans and specifications and to make sure that the requirements are fully understood. They must satisfy themselves by actual examination of the site as to the nature of the work and all conditions affecting the performance of the contract.

20.4 PREPARING THE PROPOSAL., In preparing his proposal, the bidder shall specify the price, written legibly in ink or with the typewriter, at which he proposes to do each item of work. The price shall be stated in figures. In items where unit price is required, the total amount of each item shall be computed at the unit prices bid for the quantities given in the estimate. In case of errors in computing the total amount, the unit price will be assumed to be correct. A price shall be submitted for at least one type of construction and for all miscellaneous items.

20.5 SIGNATURES ON PROPOSALS., If the proposal is made by an individual, his name and post office address must be shown. If made by a firm or partnership, the name and post office address of the firm or partnership must be shown. If made by a corporation, the person signing the proposal must name the state under the law of which the corporation is chartered, and the name, title, and

business address of the executive head of the corporation. Anyone signing a proposal as agent may be required to submit satisfactory evidence of his authority to do so.

20.6 IRREGULAR PROPOSAL PROHIBITED Any changes or alterations made in the official proposal forms, or any additions thereto, may cause the rejection of the bid. No bid will be considered which contains a clause in which the Contractor reserves the right to accept or reject a contract awarded him by the Council. Proposals in which the unit prices are obviously unbalanced may be rejected.

20.7 PROPOSAL GUARANTY Each proposal shall be accompanied by a certified check drawn on a known responsible bank in the State of Iowa for the amount specified in the proposal form and made payable to the Treasurer of the City. Should the bidder receiving the award fail to execute a satisfactory contract and file an acceptable contract bond within ten (10) days after the acceptance of his proposal, this check shall be cashed and the full amount retained by the City as fixed and liquidated damages.

A certified check to be acceptable shall bear on its face the endorsement of a solvent bank as to the amount certified, which endorsement shall be signed by an official authorized to bind the bank by its acts.

20.8 DELIVERY OF PROPOSAL Proposals shall be placed in an envelope and the envelope sealed and marked to indicate its contents, and be accompanied by a certified check in a separate envelope, properly endorsed. If forwarded by mail, the two envelopes shall be placed in a third and mailed to the Clerk at his office before the time specified for closing bids.

20.9 WITHDRAWAL OF PROPOSAL Bidders shall be permitted to withdraw their proposals after the same have been filed with the Clerk, if request is made in writing to the Clerk, before the time specified for closing of bids. No proposal may be withdrawn for a period of thirty days (30) after the date set for the opening of bids.

20.10 OPENING PROPOSALS Bids will be publicly opened at the time and place announced in the official publication, and will be immediately read and recorded. Award will be as soon thereafter as practicable.

20.11 DISQUALIFICATION OF BIDDER No bidder shall submit more than one proposal. Reasonable grounds for believing that any bidder is interested in more than one proposal for the work may cause the rejection of all proposals in which such bidder is interested, or may cause the disapproval of any contract awarded such bidder. The attention of bidders is directed to Chapter 553, Code of Iowa, regarding unlawful combinations in making public contracts.

20.12 COMPETENCY OF BIDDER Bidders must be capable of performing the work bid upon. They may be required to supply a detailed statement covering experience on similar work, list of machinery, plant and other equipment which will be used on the proposed work, and such statements of their financial resources as may be deemed necessary.

SECTION 30. AWARD AND EXECUTION OF CONTRACT

30.1 CONSIDERATION OF BIDS The City reserves the right to waive defects and to reject any or all proposals.

30.2 AWARD OF CONTRACTS Contracts will be awarded at the time and place indicated in the notice to bidders, or if deemed advisable, at a time and place to be fixed by the Council at the time of opening proposals.

30.3 QUALIFICATIONS OF FOREIGN CORPORATIONS., Corporations organized under the laws of any other State shall file with the Clerk a certificate from the Secretary of the State of Iowa showing that they have complied with all the provisions of partnerships of other states and shall file with the Clerk an agreement consenting to the jurisdiction of the Courts of the county in which the project is located as provided in Chapter 616 of the Code of Iowa for all matters arising out of or connected with any contract entered into. Such certificates or agreements shall be on file with the Clerk, before any contract awarded hereunder shall be effective.

30.4 RETURN OF PROPOSAL GUARANTY,, The proposal guaranty of unsuccessful bidders will be returned promptly after the award has been made. In no case will the proposal guaranty be held longer than thirty (30) days without Written permission of the bidder, except that the proposal guaranty of the bidder to whom the contract is awarded will be retained until he has entered into contract and filed an acceptable bond.

30.5 CONTRACT BOND., The bidder to whom the contract is awarded will be required to file a surety bond in a sum equal to the amount the City is obligated to pay upon the completion of the contract, which bond shall be in a form complying with the laws of Iowa relating thereto, and shall be conditioned upon the completion of the contract in accordance with the specifications. When required by law, or by the specification, this bond shall include a clause guaranteeing maintenance of the work for the period stipulated.

30.6 EXECUTION OF CONTRACT., The bidder to whom the contract has been awarded shall enter into contract with the City within ten (10) days after the award has been made. No proposal shall be considered binding upon the City, until the Contract is properly executed by both parties and the contract bond filed with the Clerk, and approved by the Council.

30.7 FAILURE TO EXECUTE CONTRACT., Failure to file bond in the sum specified, or to execute the contract within ten (10) days, from contract awarding shall be just cause for the annulment of the award, or of the contract if executed, and it is understood by the bidder that in the event of the annulment of the award or of the contract, the amount of the proposal guaranty shall be retained by the City, as fixed and liquidated damages sustained by the City, due to the delay and failure of the bidder to enter into contract.

30.8 PREFERENCE FOR IOWA PRODUCTS., By virtue of statutory authority, a preference will be given to products and provisions grown or produced within the State of Iowa and to Iowa domestic labor.

SECTION 40. SCOPE OF THE WORK

40.1 INTENT OF THE PLANS AND SPECIFICATIONS., The true intent of the plans and specifications is to provide for the construction and completion of every detail of the improvement included in the contract, and it is understood that the Contractor for all or any part thereof will furnish all labor, materials, tools, transportation and supplies and to execute the contract in a satisfactory and workmanlike manner and in accordance with the plans, specifications, and terms of the contract.

40.2 INCREASED OR DECREASED QUANTITIES., The right is reserved, without impairing the contract, to order the performance of such work of a class not contemplated in the proposal or to increase or decrease the quantities as may be considered necessary to complete fully and satisfactorily the work included in the contract. However, when the work is completed without change in the plans and the resultant quantities of the various classes of work vary by more than twenty per cent (20%) from the estimated quantities specified in the contract, an adjustment in prices

for such classes of work may be made by agreement between the Engineers and the Contractor subject to the approval of the Council. Either party to the contract may request such an adjustment.

40.3 CLOSING STREETS TO TRAFFIC., The Contractor is hereby given authority to close streets, or parts of streets to vehicle traffic. The streets or parts of streets are to remain closed as long as the construction work or the condition of the finished work requires. The Engineers shall be the judges of how many streets or parts of streets it is necessary for the Contractor to close at any time and may refuse to permit the closing of additional streets until such of the work is finished and opened to traffic, as they may direct.

40.4 FINAL CLEANING UP., The Contractor shall remove all excavated material, rubbish or other surplus material from the site of the work, replace or renew fences, sidewalks, or other property damaged or disturbed by his work, and leave the premises in a condition satisfactory to the Engineers.

SECTION 50. CONTROL OF MATERIALS AND WORK

50.1 SUPERVISION AND INSPECTION., The Engineers shall have supervision of the construction provided for in this contract and shall decide any and all questions which may arise as to the quality and acceptability of materials furnished, work performed, manner of performance, rate of progress on the work and all questions as to the acceptable fulfillment of the terms of the contract. Materials and construction work shall at all times be subject to the inspection of the Engineers or their representatives, and the Contractor to be held strictly to the true intent of these specifications as regards quality of materials, workmanship and the diligent prosecution of the work.

50.2 ALTERATION OR CORRECTION OF THE PLANS., The plans are made up from surveys that are presumably correct, and represent the forseen construction requirements. Any modification of the plans which may be required by the exigencies of the construction, or any corrections made necessary because of errors in the original surveys, will be made by the Engineers. Should corrections or modifications of the plans or specifications require a different quality or class of work than that upon which the unit prices in the proposal are based, or if modifications or corrections are required in parts of the work partially completed and such modifications result in an increased cost to the Contractor, the amount to be paid for work resulting from such changes shall be agreed upon in writing at the time the changes are ordered and before the work is begun by the Contractor. No allowance will be made for anticipated profits on work not performed.

50.3 DEVIATION FROM PLANS., No deviation from plans and specifications will be permitted without the written consent of the Engineers.

50.4 AUTHORITY AND DUTIES OF INSPECTORS., Inspectors may be stationed on the work to report to the Engineers as to the progress of the work, manner in which it is being performed, also to report whenever it appears that materials furnished and work performed by the Contractor fails to fulfill the requirements of the specifications and contract, and to direct the attention of the Contractor to such failure or infringement, but such inspection shall not relieve the Contractor from any obligations to furnish acceptable materials or to provide completed construction that is satisfactory in every particular.

In case of any dispute arising between the Inspector and the Contractor as to material furnished or the manner of performing the work, the inspector shall have the authority to reject materials or suspend the work until the question at issue can be referred to and decided by the Engineers. Inspectors are not authorized to revoke, alter, enlarge, relax or release any requirements of these specifications,

nor to issue instruction contrary to the plans and specifications. The Inspector shall in no case act as foreman or perform other duties for the Contractor, or interfere with management of the work by the latter.

50.5 REMOVAL OF UNAUTHORIZED AND DEFECTIVE WORK., Work done without lines and grade being given, work done beyond lines shown on the plans or as given, except as herein provided, or any extra or additional work done without authority will be considered as unauthorized and at the expense of the Contractor and will not be paid for under the provisions of the Contract. Work so done may be ordered removed and replaced at the Contractor's expense. Any work which fails to meet the requirements of the plans and specifications shall be removed and replaced at the Contractor's expense.

50.6 ENGINEER'S STAKES., The Engineers shall set the necessary line and grade stakes promptly upon notification by the Contractor that stakes are needed. When so requested, the Contractor shall furnish the necessary laborers to assist in setting the stakes. The City will not be responsible for delays due to lack of grade or line stakes unless the Contractor shall have given the Engineers twenty-four (24) hours notice in writing that such stakes are needed.

50.7 MATERIAL SAMPLES., Before a contract is awarded, the bidder may be required to furnish a statement of the origin, composition and manufacture of any or all materials proposed for use in the performance of the Contract, together with samples of the material. These samples will be considered as representative and typical of the material to be obtained from any particular source.

50.8 SPECIFICATIONS REFERRED TO., Specifications referred to on the plans and in these specifications are as much a part of these documents as though set forth herein verbatim and it is the responsibility of the Contractor that he know and understand the specifications referred to in order that the work described shall be fully and completely constructed as intended by the plans and specifications.

SECTION 60. LEGAL RELATIONS AND RESPONSIBILITY TO THE PUBLIC

60.1 LAWS RELATING TO WORK., The Contractor is presumed to be familiar with all laws, ordinances, and regulations which may in any manner affect those engaged or employed upon the work or the materials or equipment used in or upon the work and shall conduct the work so as not to conflict with such laws, ordinances and regulations.

60.2 PROTECTION OF WORK AND ADJOINING PROPERTY., The Contractor for any part of the improvement shall be held responsible for the care of materials and of partially completed and completed work, until final acceptance of the same by the Council. He will be required to make good at his own expense any damage which the work may sustain from any cause prior to the filing of the Engineer's certificate of completion. He shall take all risk from floods and casualties of every description and make no charge for delay due to such cause. He may, however, be allowed a reasonable extension of time on account of such delays, He shall correct or make good at his own expense all damages to adjacent property due to the acts or negligence of his employees or the prosecution of his work and save the City harmless therefrom.

60.3 RESPONSIBILITY FOR ACCIDENTS., The Contractor shall assume full responsibility for all damages sutained by persons or property due to the carrying on of his work, and until final acceptance thereof or until released by the Engineers in writing.

60.4 LIABILITY INSURANCE., The Contractor shall carry liability insurance which

shall save harmless the City and protect the public and any person from injury sustained by the reason of the prosecution of the work or the handling or storing of materials therefor, and said contractor shall also carry liability insurance which shall meet the requirements of the Iowa Workmen's Compensation Law.

Prior to the payment of any estimate earned under a contract awarded under these specifications, the Contractor shall furnish the Clerk with proper affidavit or affidavits executed by representatives of duly qualified insurance companies, evidencing that said insurance company or companies have issued liability insurance policies effective during the life of the contract or for a period of at least ten (10) days following the filing or written notice of cancellation, protecting the public and any person from injuries or damage sustained by reason of carrying on the work involved in the Contract. The affidavit shall specifically evidence the following forms of insurance protection:

(1) Public liability insurance covering all operations performed by persons directly employed by the Contractor.
(2) Public liability insurance covering all operations performed by any subcontractor to whom a portion of the work may have been assigned.
(3) Public liability insurance covering all work upon the project performed by any independent contractor working under the direction of either the principal contractor or a subcontractor.
(4) Motor vehicle bodily injury liability insurance and property damage liability insurance on all motor vehicles employed on the work, whether owned by the Contractor or by other persons, firms, or corporations.

The minimum protection shall be as follows:

Public Liability Insurance - - - - - - - - - - -	$25,000 Per person
	50,000 Per accident
Motor Vehicle Bodily Injury Liability Insurance -	25,000 Per person
	50,000 Per accident
Property Damage - - - - - - - - - - - - - - - - -	10,000 Per accident

60.5 MAINTENANCE OF BARRICADES AND LIGHTS,, The Contractor shall at his own expense and without further or other order provided, erect and maintain at all times during the progress and suspension of the work and until completion and final acceptance thereof, suitable and requisite barriers, signs, and other adequate protection and shall provide, keep, and maintain such red lights, danger signals, or watchmen as may be necessary or as may be ordered by the Engineers to insure the safety of the public as well as those engaged on the work. All barricades and obstructions shall be protected at night by red signal lights which lights shall be burning from sunset to sunrise. Barricades and obstructions shall be of substantial construction and shall preferably be painted white to increase their visibility at night.

60.6 PATENTS., The Contractor shall indemnify and save harmless the property owner and the City against all claims arising from alleged infringements of any patents and the payment of all royalty covering tools, machinery, processes, appliances, devices or materials used in connection with the work, and the Council may retain out of the moneys which may be due, or become due, the Contractor a sum sufficient to cover all such claims, and retain the same until the claims are paid or satisfactorily adjusted by the Contractor or his surety.

60.8 CLAIMS AGAINST CONTRACTOR., The Contractor shall be held for the payment of all just claims against him arising out of the prosecution of this contract, and

his bond will not be released until such claims are paid or dismissed.

60.9 PERSONAL LIABILITY OF PUBLIC OFFICIALS AND/OR ENGINEERS., In carrying out any of the provisions of the contract or in exercising any power or authority granted him thereby, there shall be no liability upon the Engineers or their authorized assistants either personally or as an official of the City, it being understood that in such matters he acts as the agent and representative of the City.

60.10 JURISDICTION., Any action in court against the contractor or sureties on his bond because of damages to property or individuals by said Contractor or his workmen, or because of the violation of any provisions of the specifications, or an account of the failure of said Contractor to fully comply with these provisions, shall be brought in the District Court of the State of Iowa having jurisdiction over the county in which the project is located.

60.11 NO WAIVER OF LEGAL RIGHTS., The City shall not be precluded or estopped by any measurement, estimate, or certificate made either before or after the completion and acceptance of the work and payments therefor, from showing the true amount and character of the work performed and materials furnished by the Contractor, or from showing that any such measurement estimate, or certificate is untrue or incorrectly made, or that the work or materials do not in fact conform to the Contract. The City shall not be precluded or estopped not withstanding any such measurement, estimate or certificate and payment in accordance therewith, from recovering from the Contractor and his surety, such damages as it may sustain by reason of this failure to comply with the terms of the Contract. Neither the acceptance by the City or any of its representatives, nor any payment for or acceptance of the whole or any part of the work, nor any extension of time, nor any possession taken by the City, shall operate as a waiver on any portion of the contract or of any power herein reserved, or any right to damages herein provided. A waiver of any breach of the contract shall not be held to be a waiver of any other or subsequent breach.

SECTION 70. PROSECUTION AND PROGRESS

70.1 ASSIGNMENT OF CONTRACT., The Contractor shall not sell or assign the contract or sublet any portion of the work provided for therein without the written consent of the Council.

70.2 ORDER OF CONSTRUCTION., The Engineers shall have control of the order in which the various parts of the improvement are to be performed. The order of improvement as determined by the Contractor will be followed except where the Engineers determine that such order would not be to the best interests of the general public.

70.3 PROGRESS OF THE WORK., The Contractor shall at all times have a competent superintendent as his agent on the work, who shall receive instructions from the Engineers, and as large a force of workmen as is necessary to prosecute the work with diligence. The progress of the work shall be such that at the expiration of one-fourth of the contract period, one-eighth of the work shall be completed; at the expiration of one-half of the contract period, three-eighths of the work shall be completed; at the expiration of three-fourths of the contract period, the work shall be three-fourths completed; and the whole work shall be completed at the end of the contract period.

If at any time the above schedule is not being maintained, the Council may give written notice to the Contractor, and his sureties that the specifications are not being complied with. Such notice shall state what action on the part of the Contractor is required to bring the work within the requirements of the

specifications. If the Contractor fails within ten (10) days to proceed as directed in the said notice, then the Council shall have authority to annul this contract without process or action at law and take over the prosecution and completion of the work, to use equipment or materials already delivered and to subject or otherwise provide for the completion of the work in the specified manner. Neither the Council nor any member or employee thereof shall be liable or accountable to the Contractor or his surety for the manner in which or the price at which the said work or any portion thereof, may have been or may be done.

All the costs incurred in completing the work or performing anew such work as has been rejected as defective or unsuitable shall be deducted from any moneys due, or becoming due, the Contractor, and in case the expense of completing the work as above provided shall be less than the sum that would have been due the Contractor if he had completed the work himself, he shall be paid the difference and if the expense so incurred is greater than would have been the case under the terms of the contract, the Contractor and his surety shall be liable for the difference.

70.4 WEATHER During stormy or inclement weather, all work shall be suspended except such as can be done in an acceptable manner. Permission to work during freezing, stormy or inclement weather, shall in no wise be construed as a release of the Contractor's responsibility regarding the quality of the finished work at such time.

70.5 SUNDAYS AND LEGAL HOLIDAYS Except for such work as may be required to properly maintain or protect completed or partially completed construction or to maintain lights and barricades, no work will be permitted on Sundays or legal holidays without specific permission of the Engineers.

70.6 CHARACTER OF WORKMEN AND EQUIPMENT The Contractor shall employ competent and efficient workmen for every kind of work. Any person employed on the work, who shall refuse or neglect to obey the directions of the Engineers or Inspector, or who shall be deemed incompetent or disorderly, or who shall commit trespass upon public or private property in the vicinity of the work, shall be dismissed when the Engineers so order, and shall not be reemployed unless express permission be given by the Engineers.

The methods equipment and appliances used on the work and labor employed shall be such as will produce satisfactory quality of work and shall be adequate to complete the contract within the specified time limit.

70.7 TEMPORARY SUSPENSION OF THE WORK The Engineer shall have authority to suspend the work wholly or in part, for such period or periods of time as he may deem necessary, due to unsuitable weather, or such other conditions as are considered unfavorable for the suitable prosecution of the work or for such time as is necessary due to the failure of the Contractor to carry out orders given or to perform any or all provisions of the contract.

70.8 ENGINEERING COSTS AFTER OFFICIAL DATE OF COMPLETION Should the Contractor fail to complete the improvement within the time specified, he shall reimburse the City for any extra Engineering Costs necessitated by the continuance of the work beyond the time specified for completion. The Contractor may require the City to submit vouchers or payrolls in support of claims for such extra compensations.

70.9 LIQUIDATED DAMAGES - CONTRACTS NOT COMPLETED WITHIN CONTRACT PERIOD., Time is an essential element of the contract and it is important that the work be pressed vigorously to completion. The date of commencement and the date of completion of the work included in the contract will be fixed by the Council and set forth in the contract documents, and will be known as the "Contract Period".

For each calendar day that any work shall remain uncompleted after the end of the contract period, the amount per calendar day specified in the proposal form, shall be deducted from any money due the contractor, not as a penalty, but as predetermined and agreed liquidated damages. Due account shall be taken of any adjustment of the contract period subsequent to the letting of the contract for good and sufficient reasons approved by the Council.

The assessment of liquidated damages for failure to complete the work within the contract period shall not constitute a waiver of the City's right to collect additional damages which the City might sustain by failure of the Contractor to carry out the terms of his contract.

70.10 TERMINATION OF RESPONSIBILITY., The contract shall be considered as completed and the Contractor released from further obligations, except as to the requirements of his bond, after the work has been completed and finally accepted and final estimates have been allowed and the final report of the Engineers has been filed with and approved by the Council.

SECTION 80. MEASUREMENT AND PAYMENT

80.1 STANDARDS OF MEASUREMENTS., All work completed under the contract shall be measured by the Engineers according to the United States standard measures.

80.2 SCOPE OF PAYMENT., The Engineer's measurements of quantities shall be the basis for final payment for the work performed under this contract. After the work is completed, the Engineers will make measurements and computations of the number of units of each of the various items of work performed at the rates specified by his proposal. Before final settlement is made, the Council may require the Contractor to submit a list of all persons furnishing labor or materials, with evidence that such persons have been paid in full. Should reasonable doubt arise as to the integrity of any part of the completed work the payment on that portion of the work will be withheld until the cause for such doubt has been removed. Payment shall be made in the manner set forth in the official publications relating thereto.

If the work extends over a period of more than one month, and is to be paid for from other than special assessment funds, the Contractor will be paid monthly estimates based upon the amount of acceptable work completed or materials delivered. Ten per cent (10%) of each estimate shall be deducted and held as suspended payment until final acceptance of the entire contract. Final payment will be made promptly following the expiration of the statutory time for filing claims or following adjudication or release of claims.

The time and method of payment for work to be paid for from special assessment funds will be set forth in the special provisions.

80.3 CITY WATER The Contractor will be allowed to use City water, but before any water is used, he shall make application to the Engineers who will provide and install suitable meters and supply the Contractor's representative with suitable hydrant wrenches when the use of hydrants is necessary. The Contractor shall designate one of his employees who shall be responsible for operating the hydrants used by the Contractor. The employee so designated shall be under the direct supervision of the Engineers and no other employee may operate any hydrant or valve without the written permission of the Engineers. The meters shall not be moved by the Contractor, but will be moved by City employees as directed by the Contractor. The water used will be charged to the Contractor at the rate of _____ per 1,000 gallons.

80.4 EXTRA WORK Such extra work as may be ordered by the Engineers shall be done by the Contractor, and he shall be compensated as provided herein. If work is to be done or materials are to be furnished by the Contractor, which cannot properly be classified under unit prices included in the proposal, the Contractor shall be paid therefor the actual reasonable cost of the labor and materials entering permanently in such work plus fifteen per cent (15%) of the cost thereof. In computing the labor cost on such extra work the following items shall be included.

(a) Actual pay roll expenditures for labor at the current rate therefor and cost of materials.

(b) Pay of foreman and timekeepers for actual time required on the extra work.

(c) Liability insurance prorated for the extra work.

Labor cost items on extra work shall be furnished in duplicate by the Contractor to the Inspector daily. The Inspector shall check the items and if he finds them to be correct, he shall so certify on the statement of cost returning one copy to the Contractor and filing one copy with the Engineers.

The Engineers shall determine the cost of materials entering into the extra work, from the materials and receipted freight bills for the same.

For any special machine power, tools, or equipment including fuel and lubricants but not including small hand tools, which may be deemed necessary or desirable to use, the Contractor shall be allowed a reasonable rental thereon to be agreed upon in writing by the Engineers before the work is begun and to which sum no percentage is to be added.

The item of cost shall not include repairs or replacement of equipment or overhead expenses of any character. The fifteen per cent (15%) allowed is considered to cover the use of hand tools and all overhead expenses except liability insurance.

In no case will a claim for extra compensation be allowed unless the work upon which the claim is based has been ordered in writing, except as provided hereinafter.

80.5 CLAIMS FOR EXTRA COMPENSATION If the Contractor deems that extra compensation is due him for work or material that he considers is not clearly covered in the items for which he submitted unit prices in his bid, and that were not ordered in writing by the Engineers as an extra as heretofore provided, the Contractor shall notify the Engineers in writing of his intention to make claim for extra compensation for work before he begins the work. If such written notification is not given, or the Engineer is not afforded proper facilities by the Contractor for keeping strict account of actual cost as defined herein, then the Contractor hereby agrees to waive the claim for extra compensation. Such notice to the Engineers, and the fact that the Engineers have kept account of cost as aforesaid, shall not in any way be construed as proving the validity of the claim, which must be passed upon by the Council. In case the Council finds the claim to be just, it shall be allowed and paid for as extra work as provided herein.

80.6 IOWA SALES TAX - FILING OF FORM Before final payment is made on contracts awarded by the City, the Principal Contractors and Sub-Contractors shall file on forms supplied by the City the amounts of Iowa Sales Tax and Use Tax paid on materials and supplies actually used upon or incorporated into projects let by the City.

These forms shall be submitted in five copies to the Engineer in charge of the project upon completion of the contract.

STANDARD SPECIFICATION FOR TANK FOUNDATIONS

SECTION I GENERAL

1.01 General

The foundations shall consist of column piers and a riser pier or valve pit as shown on the typical foundation drawing. The piers shall be of sufficient weight to resist the uplift due to wind forces and large enough to provide a safe bearing on the soil.

1.02 Basis of Bid

The contractor shall prepare his bid on the construction of the typical foundation and valve pit shown in the appendix. The bid shall be on a unit price per cubic yard of concrete in place and shall include the furnishing of all labor, materials, excavation, backfill, and grading required to complete the piers and valve pit. Anchor bolts shall be furnished by the tank contractor.

SECTION II EXCAVATION AND BACKFILL

2.01 Excavation

Excavation for foundations shall be carried to the depth shown on the plans. In event unstable material is encountered at that depth, it shall immediately be brought to the attention of the Engineer who will investigate and give further directions to the contractor. If the excavation is carried below the grade shown on the plans without approval of the Engineer, the extra depth shall be filled with concrete at the contractor's expense.

2.02 Backfill

The contractor shall backfill around piers and valve pit as soon as the forms have been stripped. The backfill shall be compacted to prevent undue future settlement and graded to provide a uniform slope away from the piers and center valve pit. Rocks, debris or excess dirt from the excavation shall be removed from the site and disposed of in a manner satisfactory to the engineer.

SECTION III CONCRETE WORK

3.01 Concrete and Reinforcing Steel

All concrete and reinforcing steel used on this project shall be provided and placed in accordance with the Standard Specifications for concrete and the Special Provisions included in this specification.

3.02 Forms

All forms shall be constructed of sound lumber free from defects which might impair the surface of the concrete. Forms shall be tightly constructed, well braced, and shall be placed true to line and grade. All exposed corners shall have a 2" bevel face. Before placing of concrete, all forms shall be thoroughly wet down. Anchor bolts and tank construction anchors shall be firmly embedded

in the concrete. They shall be held in place by suitable templates erected before concreting begins. Under no circumstances shall these bolts be placed in concrete that has previously been poured.

3.03 Finishing

The top of the valve pit box shall be given a wood float finish and shall be provided with a slight crown to shed water. After the forms are removed, all exposed surfaces of the piers and valve pit shall immediately be given a rubbed finish. If honeycomb is present, it shall be patched by chipping out to a depth of at least 1" at the edges and applying a patching mixture of coarse sand and cement mixed to match the rest of the concrete.

SECTION IV BASIS OF PAYMENT

The foundation contractor shall build the piers and valve pit in accordance with detailed plans provided by the tank contractor and will be paid at the unit bid price for the amount of concrete required to build the piers and valve pit in accordance with the tank contractor's plans.

I N D E X

STANDARD SPECIFICATIONS FOR CONCRETE

SECTION A. DESCRIPTION

SECTION B. MATERIALS

1. PORTLAND CEMENT
2. WATER FOR CONCRETE
3. FINE AGGREGATE
4. COARSE AGGREGATE
   (1) General Requirements
   (2) Sieve Analysis
   (3) Minimum Permissible Amounts of Injurious Substance
   (4) Screened Gravel Aggregate for Concrete
   (5) Crushed Limestone Aggregate for Concrete
   (6) Soundness
5. STORAGE OF CONCRETE AGGREGATES

SECTION C. PROPORTIONING

1. MEASURING MATERIALS
2. DESIGN OF CONCRETE MIXES
3. TESTS ON CONCRETE

SECTION D. MIXING

1. CONCRETE MIXER
2. MIXING CONCRETE
3. READY MIXED CONCRETE
4. RETEMPERING OR REMIXING

SECTION E. PLACING CONCRETE

SECTION F. CURING

SECTION G. STEEL REINFORCEMENT

SECTION H. BAR REINFORCEMENT

SECTION I. WIRE MESH REINFORCEMENT

STANDARD SPECIFICATIONS FOR CONCRETE

SECTION A. DESCRIPTION

Concrete shall be composed of a standard brand of Portland Cement, fine and coarse aggregate, and water mixed in the proportions hereinafter specified.

SECTION B. MATERIALS

1. PORTLAND CEMENT: Portland Cement shall comply with one of the following requirements. The type of portland cement to be used shall be set forth in the Special Provisions of these specifications.

(a) Normal Portland Cement shall conform to Standard Specifications for Portland Cement, Type I, ASTM Designation C 150-52.

(b) High Early-Strength Cement shall conform to Standard Specifications for Portland Cement, Type III ASTM Designation C 150-52.

(c) Air-Entraining Portland Cement shall conform to tentative specification for Air-Entraining Portland Cement, Type IA, ASTM Designation C 175-51T.

1.1 ADMIXTURES: Air-Entraining admixture shall be Darex as made by Dewey-Almy Chemical Company or Neutralized Vinsol Resin as made by Hercules Powder Company, or other air-entraining agents approved by the Engineers.

Other admixtures may be used if approved by the Engineers.

TESTING: Cement may be tested either at the mill or at destination. Approval can ordinarily be given within thirty-six (36) hours after sampling if the cement passes the specification requirements for fineness, soundness, and the time of setting; but if so ordered the cement shall be tested for the seven (7) day or twenty-eight (28) day tests. Cement which has been stored more than sixty (60) days shall be retested before being used. Any cement which has developed lumps from storage shall be thoroughly retested and approved before being used. Testing of Portland Cement shall comply with the latest revision of the following ASTM designations:

C 109 "Method of Test for Compressive Strength of Hydraulic-Cement Mortars."
C 114 "Methods of Chemical Analysis of Portland Cement."
C 115 "Method of Test for Fineness of Portland Cement by the Turbidimeter."
C 151 "Method of Test for Autoclave Expansion of Portland Cement."
C 183 "Methods of Sampling Hydraulic Cement."
C 185 "Method of Test for Air Content of Air Entraining Portland Cement Mortar." (Tentative)

C 190 "Method of Test for Tensile Strength of Hydraulic Cement Mortars."

C 191 "Method of Test for Time of Setting of Hydraulic Cement by the Vicat or Gillmore Needles."

2. WATER FOR CONCRETE. Water used in concrete shall be clean and free from injurious amounts of oil, acid, alkali, or vegetable matter. Before installing his water supply equipment, the Contractor shall secure the Engineers' approval of the source of water supply which he proposes to use. If at any time the water from this source shall become unsatisfactory in quality, or of insufficient quantity, the Engineers may require the Contractor to provide water from some other source.

3. FINE AGGREGATE. Fine aggregate shall consist of sand having durable grains, free from injurious amounts of silt, shale, coal, organic matter, or other unjurious substances. The maximum amount of injurious substances permitted shall not exceed the following:

Shale and coal particles retained on #14 sieve, not more than 1.5% by weight of total sample.

Inorganic Silt and Clay not more than 1.5% by weight of total sample.

Organic Impurities other than coal, not more than that indicated by Figure 2 when tested in accordance with the AASHO Method of Test for Organic Impurities in Sands for Concrete, Method T-21.

The size of the particles shall conform to the following limits:

Passing 3/8 inch sieve		100%
Passing No. 4 sieve	95% to	100%
Passing No. 8 sieve	75% to	95%
Passing No. 30 sieve	20% to	40%
Passing No. 100 sieve	0% to	5%

When fine aggregate is sieved through the following numbered sieves: 4, 8, 16, 30, 50, and 100, not more than 40 per cent shall pass one sieve and be retained on the sieve with the next higher number.

The mortar strength of fine aggregate shall be determined in the manner prescribed in ASTM Method C-109, except that the fine aggregate being tested shall be substituted for the standard sand prescribed. The strength of such mortar, tested at the age of seven (7) days, shall not be less than 100 per cent of the strength of the mortar made from the same cement when tested in accordance with ASTM Method C-109. Fine aggregate from any source from which samples have shown satisfactory mortar strength, may be accepted without further mortar strength tests so long as its fineness modulus is not less than that of the fine aggregate from that source which showed a satisfactory mortar strength minus 0.30.

4. COARSE AGGREGATE

(1) General Requirements: Coarse aggregate shall consist of gravel or crushed stone clean and free from dust covering, frozen lumps, clay lumps, sticks, coal and vegetable or other deleterious matter and shall be durable and sound.

(2) Sieve Analysis: Coarse aggregate for concrete when tested by means of laboratory sieves, shall conform to the following requirements:

Passing a sieve with 1½" openings	100%
Passing a sieve with 3/4" openings	30% to 70%
Passing a sieve with 3/8" openings	10% to 30%
Passing a No. 4 sieve	0% to 5%

(3) Permissible Amounts of Injurious Substance: The coarse aggregate shall not contain in excess of the following specified amounts of injurious materials.

Clay lumps	0.5% by weight
Total shale and coal combined	0.8% by weight
Coal	0.5% by weight
Wood (Wet Weight)	0.1% by weight
Organic matter (other than coal and wood)	0.0% by weight
Inorganic silt and finely divided clay	1.5% by weight
Iron Oxide particles	1.5% by weight

The total amount of shale, unsound chert, and other kinds of materials whose disintegration is accompanied by an increase in volume which may cause the spalling of the concrete or mortar in which they are contained shall not exceed 2.0% by weight.

Coarse aggregate shall not contain a combined total of more than 5% by weight of the objectionable substances listed above, including chert, plus any unsound particles not listed above.

(4) Screened Gravel Aggregate for Concrete: Screened gravel aggregate shall consist of washed and screened gravel or pebbles. It may contain a quantity of material obtained from crushing the oversize stone found in the deposit. Gravel aggregate shall not have a percentage of wear in excess of thirty-five (35) when tested in accordance with the AASHO "Method of Test for Abrasion of Coarse Aggregates", Method T96, Grading A or B.

(5) Crushed Limestone Aggregate for Concrete: Crushed limestone shall not contain an excess of flat elongated, or laminated pieces. Limestone shall not have a percentage of wear in excess of forty-five (45) when tested in accordance with AASHO, "Method for Test for Abrasion of Coarse Aggregates", Method T96, Grading A or B.

(6) Soundness: All coarse aggregates for concrete when subjected to the I.S.H. C., 1956 series, paragraph 4101.02C, 16 cycle water-alcohol, freezing and thawing test shall not show a loss of more than 6%.

5. STORAGE OF CONCRETE AGGREGATES. Suitable means shall be provided by the Contractor for keeping the fine and coarse aggregates for concrete separated and free from dust, dirt, or other foreign materials. In extremely warm or dry weather the contractor may be required to keep the storage pile of fine and coarse aggregate wet for such a period of time as the Engineer may direct.

SECTION C. PROPORTIONING

1. MEASURING MATERIALS. Measurement of cement and aggregate shall be by direct weight upon approved weighing scales, capable of weighing accurately to the nearest two (2) pounds at any load. Cement in unopened bags as packed by the manufacturer may be considered to weight ninety-four (94) pounds per bag. The Contractor shall provide with each installation of weighing equipment sufficient standard 50-pound test weights to check and calibrate the scales. The device for measuring water shall be capable of measurement to the nearest one-fourth ($\frac{1}{4}$) gallon. It shall be provided with an auxiliary tank from which the water shall be drawn into the measuring tank and shall be readily adjustable for different volumes, and so arranged that the quantity of water which can be used in any batch is within the sole control of the Inspector. The operating mechanism must be such that leakage will not occur when the valves are closed.

2. DESIGN OF CONCRETE MIXES: Concrete shall be composed of Portland Cement, fine aggregates, coarse aggregates and water. The proportioning of these materials shall be by weight.

Air Entrained Concrete, if required by the Special Provisions, can be accomolished by using Air-Entraining Portland Cement complying with Section B paragraph 1 (c) or by adding an Air-Entraining Agent complying to Section B. paragraph 1.1. They shall be accurately proportioned and added in the required amount by an approved measuring device.

Not less than two weeks before the start of concrete operation, the contractor, at his expense, shall have an approved independent testing laboratory check the aggregate for specification compliance and design the concrete mixture using the aggregates from the proposed source of supply for this project. All concrete furnished shall meet the following requirement:

MAXIMUM WATER-CEMENT RATIO: 5.5 Gals. / Sack Cement
MINIMUM COMPRESSIVE STRENGTH at 28 DAYS: 3500 lbs. / sq. in.
MINIMUM CEMENT CONTENT: 6.0 Sack / cu. yd.
MAXIMUM SLUMP, Hand Placed: 3"
MAXIMUM SLUMP, Vibrated: 2"
ENTRAINED AIR (if required): $4\frac{1}{2}\% \pm 1\frac{1}{2}\%$

In no case will the maximum water-cement ratio or the compressive strength be waived.

3. TESTS ON CONCRETE. Tests of the concrete shall be made by an approved independent testing laboratory at the expense of the Contractor. One pair, consisting of two 6" x 12" cylinders shall be taken by the Engineers for each day's pour or for each 200 cubic yards of concrete, if more than 200 cubic yards are poured in any one day. Specimens shall be made and cured in accordance with current ASTM Specifications C-39 and C-31 Standard Method of Making Concrete Compression and Flexural test Specimens in the Field, and with the specimens cured in accordance with par. 7 (b) of C-31. Slump tests shall be made on each batch tested in accordance with current ASTM Designation C-143. For air-entrained concrete determination of the air content of the concrete shall be made at the same time that specimens for strength tests are made. The air content of the concrete shall be determined by direct measurement by means of an apparatus in which the concrete, as mixed, is subjected to pressure and the change in volume with pressure is determined or by ASTM Designation C138-44.

The standard age of test shall be 28 days, but 7-day tests may be used provided the relation between the 7- and 28-day strengths of the concrete is established by tests for the materials and proportions used.

If the average strength of the laboratory control cylinders for any portion of the structure falls below the compressive strength specified, the Engineer shall have the right to order a change in the proportions or the water content of the concrete in order to improve the quality of the concrete.

In addition, where there is a question as to the quality of the concrete in the structure or slab, the Engineer may require tests in accordance with the "Standard Methods of Securing, Preparing and Testing Specimens of Hardened Concrete for Compressive or Flexural Strengths" (ASTM Designation C-42) on any portions where questionable concrete has been placed. The expense of securing and testing will be born by the contractor. Where defective concrete is located, it shall be replaced at the expense of the contractor, or an adjustment made in the contract price to cover the decrease in useful life of the structure or slab. The replacement or adjustment shall be at the option of the owner.

SECTION D. MIXING

1. CONCRETE MIXER. Concrete shall be mixed in a batch mixer. No mixer shall be used which requires a fraction of a sack of cement to form a batch.

2. MIXING CONCRETE. None of the materials for a batch of concrete shall be placed in the drum of the mixer until all the previous batch has been discharged. Water shall be added at the time the other materials are being run into the mixer.

The mixing shall continue for a minimum of one (1) minute after all the ingredients are in the drum, during which time the drum shall revolve at the speed for which it was designed, but shall not make less than fourteen (14) nor more than twenty (20) revolutions per minute.

The size of the batch shall not exceed the rated capacity of the mixer.

3. READY-MIXED CONCRETE. Ready-mixed concrete may be used in lieu of concrete mixed at the site of the work. The term "ready-mixed concrete" shall be construed to mean either central plant mixed concrete or central plant proportioned, truck mixed concrete. Measurement and proportioning of aggregates and cement shall be in accordance with Section C hereof.

Transporting vehicles shall be so constructed as to insure rapid delivery without loss of ingredients. The compartment in which concrete is transported shall be thoroughly cleaned and flushed with water before receiving each batch.

The size of the batch in any transit mixer shall not exceed the manufacturers rating.

When the concrete is mixed during transportation of the batch to the site of the work, means shall be provided so that the mixing time and quantity of water added can be readily verified.

The transporting vehicle shall provide for positive mechanical agitation of the concrete during transit unless other methods of transportation are approved by the Engineers.

Additional water shall not be added at the site unless cement is added at the rate of one 94 lb. bag for each 5.5 gallons of water added. The concrete shall be thoroughly mixed after the addition of cement and water.

4. RETEMPERING OR REMIXING. Retempering or remixing of mortar or concrete which has partially hardened will not be permitted.

SECTION E. PLACING CONCRETE

The concrete shall be placed in the forms immediately after mixing and in such manner as to avoid the separation or segregation of the aggregate. Care shall be taken in depositing the concrete in the forms to work the coarser aggregate away from the face of the forms and to force the concrete under and around the reinforcement. All concrete shall be vibrated with an internal vibrator which shall produce not less than 3500 vibrations per minute.

No concrete shall be placed in water without specific approval of the Engineers. No concrete shall be placed without specific permission of the Engineers when the air temperature is at or below 40° F. If permission is granted, the methods used for heating materials and for protecting the concrete after placing shall be subject to the approval of the Engineers. The method of protection shall be capable of maintaining the temperature of the concrete at not less than 50° F. for at least 72 hours.

SECTION F. CURING

Provision shall be made for maintaining concrete in a moist condition for a period of at least seven (7) days after placement except that where high early strength cement is used, moist curing shall be provided for at least two days.

SECTION G. STEEL REINFORCEMENT

At the time it is placed in the concrete, all steel for reinforcement shall be clean; free from oil, paint, or other coating which would tend to reduce bond. Scaly rust, loose mill scale and dirt shall be completely removed. Reinforcement which has become pitted by rust shall not be used.

Reinforcement shall be placed in the exact positions as shown on the plans and shall be held securely in place during the placing and setting of the concrete. Metal chairs meeting the approval of the Engineers shall be used to support all horizontal bar reinforcement in slabs, floor and structural members.

Splicing of tensile reinforcement at points of maximum stress shall be avoided. All splices in bar reinforcement shall have a minimum length equal to fifty (50) times the normal diameter of the bar. Splices in mesh reinforcement shall have a minimum lap equal to the mesh spacing in the direction of the lap.

SECTION H. BAR REINFORCEMENT

All bars used for reinforcement of pavement slab shall be either rail steel conforming to the requirements of the ASTM, "Specifications for Rail Steel Concrete Reinforcement Bars", Designation A16-50T, or conforming to the requirements for hard grade bars of the ASTM, "Specifications for Billet Steel Concrete Reinforcement Bars", Designation A15 - 50T.

All bars used for reinforcement of concrete in structures or wherever bent bars are specified shall be of structural grade, conforming to ASTM "Specifications for Billet Steel Concrete Reinforcement Bars", Designation A15 - 50T. Unless otherwise specified, all bars shall be deformed round bars of the size and shape as shown on the plans. All bar reinforcement shall be bent cold and shall be carefully and accurately bent to the shapes and dimensions shown on the plans.

SECTION I. WIRE MESH REINFORCEMENT

Wire mesh used as reinforcement for concrete shall be electrically welded rectangular mesh. The size and spacing of wires and weight per one hundred (100) square feet shall conform to the requirements shown on the plans. The material used in manufacture of wire mesh shall conform to the requirements of the ASTM "Standard Specifications for Cold Drawn Steel Wire for Concrete Reinforcement", Designation A82-34.

STANDARD SPECIFICATIONS FOR ELEVATED WATER TANKS

SECTION I GENERAL

1.01 Scope of the Work

The work to be included under this contract includes the furnishing of all labor, material, tools, and equipment necessary for the complete fabrication, erection, testing, painting and disinfecting of the proposed elevated water storage tank. The size and type of tank, and height of tower are specified in the special provisions of this specification. Specifically excepted from the tank contract is the construction of the foundation piers and the center pier or valve pit. However, the tank contractor at his option may submit a bid on the foundation work as well as the tank erection.

1.02 Permits, Laws and Ordinances

The contractor shall, at his own expense, procure all permits, certificates or licenses required by law for the execution of his work. He shall comply with all federal, state and local laws, ordinances or regulations relating to the performance of his work.

1.03 Location

The location of the tower and tank is to be generally as shown on the plat plan. The exact location shall be as shown by an authorized representative of the owner at the time of construction.

1.04 Items To Be Furnished By the Contractor

The tank contractor shall furnish detailed foundation plans, all anchor bolts, all materials except for foundations and all labor necessary to complete the structure including accessories hereinafter specified.

1.05 Items To Be Furnished by the Owner

The owner shall furnish the site upon which the tank is to be constructed together with sufficient surrounding space for the storage of materials and to permit the contractor to use the customary erection methods. The owner will provide a suitable right-of-way from the nearest public road to the tank site.

The owner will furnish concrete foundations and center pier with valve pit in accordance with the tank contractors drawings. All backfilling and rough grading shall be completed ready for the tank contractor to erect his steel work.

The owner will furnish and install the piping necessary to connect the water system to the inlet pipe at the point hereinafter specified.

The owner will furnish and provide means of disposal of all water required for testing and sterilization purposes.

1.06 Competent Workmen

The contractor shall employ only competent workmen for the execution of his work and all such work shall be performed under the direct supervision of an experienced steel worker foreman satisfactory to the Engineers.

1.07 Guarantee

The contractor shall guarantee the structure against any defective material or workmanship including paint and painting for a period of one year after the date of final completion. If any materials or workmanship prove to be defective within the year, they shall be replaced or repaired by the contractor at no expense to the owner.

SECTION II DESIGN REQUIREMENTS

2.01 General

All materials, general design, allowable stresses and shop fabrication shall be in accordance with the latest revision of Bulletin D 100-52 "Standard Specifications for Steel Tanks, Stand pipes, Reservoirs, and Elevated Tanks for Water Storage" of the American Water Works Association. Specific exceptions to the standard specification, if required, may be found in the special provisions of this specification and shall take precedence over the standard specification. Accessories shall be as hereinafter specified.

2.02 Plans

The Contractor shall provide, with his proposal, design drawings in duplicate showing all principal dimensions, the type and size of all supporting members, the thickness of all bottom, shell and roof plates, typical connection and fabrication details, and all other information needed to show clearly the construction of the tank and tower upon which his bid is based. Also included shall be typical details of the foundation and center pier or valve pit based on a soil bearing value of 4,000 pounds per square foot.

SECTION III ACCESSORIES

3.01 Tower Ladder

A steel tower ladder with sides not less than 2" x 5/16" and rungs not less than 5/8" round or square shall be furnished extending from a point 8 ft. above the ground up to and connecting with the horizontal balcony girder. The ladder may be vertical but shall not in any place have a backward slope.

3.02 Outside Tank Ladder

A steel ladder shall be provided on the outside of the tank shell and shall extend from the balcony to the roof hatch. The construction shall be the same as the tower ladder. The tank ladder may connect to the roof swivel ladder.

3.03 Roof Swivel Ladder

A steel ladder shall be provided extending from the outside tank ladder to the apex of the roof. It shall be designed to rotate completely around the roof.

3.04 Roof Hatch

A door or hatch shall be provided immediately above the high water level and within reach of the outside tank ladder. It shall have a minimum opening dimension or diameter of 24" and be provided with a curb of not less than 4" high. The hatch cover shall be designed to overlap the curb not less than 2 inches on all sides and shall be equipped with suitable hinges and a hasp to permit locking.

3.05 Roof Finial

The peak of the roof shall be finished with a suitable ornamental finial. The finial may be designed to serve as the roof vent if desired by the contractor.

3.06 Roof Vent

A suitable vent shall be furnished above the maximum water level. It shall be designed to pass sufficient air so that at the maximum possible rate of water either entering or leaving the tank, dangerous pressures will not be developed. The overflow pipe shall not be considered to be a tank vent. The vent shall be designed to prevent the entrance of birds or animals.

3.07 Balcony

Provide a balcony with hand rail at the juncture of the tank bottom and the cylindrical side wall.

3.08 Riser Pipe

A suitable steel riser pipe of the type specified in the Special Provisions shall be installed.

If a large diameter riser pipe is specified, it shall be of sufficient size to prevent freezing. It shall be furnished with a safety grating at the top of the riser to be used during construction and a manhole not less than 12" x 16" in size approximately three feet from the base. The manhole opening is to be so designed that all stresses around the opening are provided for. The riser shall be complete with pipe connection, base elbow and connecting section of pipe, as shown in the Special Provisions or on the layout drawings. Design of the tank and riser shall allow for expansion and contraction in the riser pipe.

If a small diameter riser pipe is specified, it shall be equipped with a base elbow, expansion joint and connection section of pipe. The riser shall be enclosed in an insulated metal frost casing with sufficient insulation to protect the pipe from freezing. The casing shall have suitable expansion joints and shall be sealed to protect the insulation from condensation.

3.09 Overflow Pipe

A steel pipe overflow of suitable size shall be furnished and installed. It shall extend from an elbow through the tank at the overflow point vertically downward on the outside of the face of the tank to a point just below the balcony floor.

SECTION IV ERECTION

4.01 General

The contractor shall furnish labor, liability and compensation insurance, tools, false work, scaffolding and other equipment necessary to erect the tank complete and ready for use. He shall furnish the owner with certificates of insurance coverage in duplicate.

4.02 Riveting and Welding

All riveting and welding shall be in accordance with the recommended practice outlined in the American Water Works Association Bulletin D 100-52 "Standard Specifications for Steel Tanks, Stand pipes, Reservcirs and Elevated Tanks, for Water Storage."

Surfaces to be welded shall be free from loose scale, heavy rust, grease, paint or other foreign material. A fine film of rust adhering on cut or sheared edges need not be removed.

Welding shall not be done when the surfaces are wet from rain, snow or ice; when rain or snow are falling, nor during periods of high winds unless the welder and the work are properly protected from the elements. Welding shall not be done when the base metal temperature is below 0° F. At all times when welding is in progress, the metal shall be properly preheated for the air temperature and material involved in order that a sound weld may be obtained.

4.03 Workmanship

Only experienced workmen qualified to do the task which they are performing shall be used. All welders shall be certified by a recognized welding certification agency in accordance with standards of the American Welding Society. Proof of certification shall be provided in duplicate to the owner by the contractor for each welder used during the erection process.

Standard safety precautions shall be taken during the erection procedure to protect the workmen on the site, the tank materials, and structures and/or people on adjacent property.

4.04 Cleaning Up

Upon completion of the erection, the contractor shall remove or dispose of all rubbish and other unsightly material caused by his operations and shall leave the premises in as good a condition as he found them.

SECTION V PAINTING

5.01 Surface Cleaning

Before the application of the prime coat of paint, the surface of all metal shall be thoroughly cleaned by grit blasting or pickling to remove all rust and mill scale.

5.02 Interior Surfaces

The inside of the tank (and riser if a steel plate riser is used) shall be painted a prime coat and two finish coats of American Water Works Association Specification Red Lead Phenolic Resin Varnish or equal. Successive finish coats shall be tinted slightly to help indicate coverage.

5.03 Exterior Surfaces

The outside of the tank, tower, and riser (if a steel riser or frost casing is used) shall be painted a prime coat of American Water Works Association Specification Red Lead Phenolic Resin Varnish or equal and two field coats of aluminum paint. Mixing varnish for the aluminum paint shall comply with Federal Specification TT - V - 81b, Type II, Class B; and aluminum-pigment powder and paste for aluminum paint shall comply with Federal Specification TT - A - 468a, Type II paste, Class B. To one gallon of mixing varnish should be mixed 2 lbs of aluminum paste. The paint should be mixed the same day it is used. Ready mixed paint may be used provided it is equal to the above and also provided that the paint is consumed within six months after manufacture. Successive finish coats shall be tinted slightly to help indicate proper coverage.

5.04 Surface Cleaning for Field Painting

Before the application of the finish coats of paint in the field, all surfaces inside and out shall be thoroughly cleaned of rust, dirt, grease, or other foreign matter by wire brushing, grit blasting or other approved methods. All surfaces shall be clean and dry and all exposed metal surfaces shall be reprimed before the finish coats of paint are applied. In the event that the tank and tower are used before the finish coats of paint are applied, the interior of the tank shall be grit blasted and reprimed where necessary for a satisfactory painting job.

5.05 Materials

All ingredients used in these paints shall comply with the Federal Specifications mentioned above. All paints and materials shall be delivered to the tank site in sealed containers which have not been previously opened. Each container shall be clearly labeled by the manufacturer with his name and the type of paint it contains. The contractor shall provide affidavits in duplicate from the paint manufacturer certifying specification compliance. All paint shall be applied strictly in accordance with the instructions of the manufacturer.

5.06 Workmanship

All painting shall be done by experienced painters in a neat and workmanlike manner. If the paint is applied by pneumatic spray, it shall be brushed out where necessary and worked into all corners and crevices to assure a finish job equal to first class brush work. All painting shall be free of runs, cracks, blisters, crazing or other defects. Any area showing such defects shall be cleaned and repainted. The contractor shall allow sufficient time for each coat to dry thoroughly before the following coat is applied. Paint shall be applied only when the air and surface temperatures are at or above 40° F. No paint shall be applied during wet or foggy weather or upon damp frosty surfaces. In addition no paint shall be applied whenever the surface is either too hot or too cold for the securing of a first class job with the particular paint being used.

SECTION VI TESTING AND STERILIZATION

6.01 General

After the tank has been completed, it shall be filled with water furnished at the tank site by the owner at proper pressure to fill the tank to the maximum working water level. Any leaks disclosed in this test shall be repaired by the contractor. No repair work shall be done on any joint unless the water in the tank is at least 2 feet below the point being repaired. The test shall be repeated after repairs are made until the structure passes the test.

6.02 Sterilization

After the tank has been completely tested and found ready for service, the tank shall be filled slowly with potable water up to the overflow line by the owner. The tank contractor shall introduce sufficient chlorine to provide a concentration of 50 parts per million of free chlorine in the full tank.

The contact period for chlorine in the tank shall be 24 hours wherever possible. In no instance shall it be less than six hours. After the holding period, the highly chlorinated water shall be drained to waste and the tank refilled from the regular supply. After refilling, samples of water shall be taken and tested to demonstrate and record the sanitary condition of the tank before it is placed into regular service. Sterilization and testing procedures shall be in accordance with requirements of the Iowa Department of Health.

6.03 Disposal of Waste Water

The owner shall provide a means of disposing of test water and sterilization water from the tank inlet or drain pipe.

SECTION VII METHOD OF PAYMENT

Payments under this contract shall be made on the basis of monthly estimates submitted in triplicate by the contractor for work performed on the job site and for material delivered and stored on the job site. Monthly payments shall be made for 85% of the amount claimed by the contractor less the aggregate of previous payments. The balance of 15% shall become due and payable 30 days after final completion of the contract.

STANDARD SPECIFICATIONS FOR DEEP WELLS

Section 1-1--General

Section 1-1.1--Scope of Work

The work to be done hereunder includes the furnishing of all labor, material, transportation, tools, supplies, plant, equipment and appurtenances, unless hereinafter specifically excepted, necessary for the complete satisfactory construction, disinfection and testing of the proposed water supply well described under Section 1-1.7.

Section 1-1.2--Permits, Certificates, Laws and Ordinances

The contractor shall, at his own expense, procure all permits, certificates and licenses required of him by law for the execution of his work. He shall comply with all federal, state or local laws, ordinances or rules and regulations relating to the performance of the work.

Section 1-1.3--Location

The well to be constructed hereunder is to be located as shown by the attached plans.

Section 1-1.4--Local Conditions

Information regarding test wells, existing nearby wells, availability of power, unusual conditions affecting work, etc., is attached hereto or in the Plans. This information regarding sub-surface conditions is intended to assist the contractor in preparing the contractor's bid. However, the city does not guarantee its accuracy, nor that it is necessarily indicative of conditions to be encountered in sinking the well to be constructed hereunder, and the contractor shall satisfy himself regarding all local conditions affecting his work by personal investigation and neither the information contained in this section nor that derived from maps or plans, or from the city or the city's agents or employees shall act to relieve the contractor from any responsibility hereunder or from fulfilling any and all of the terms and requirements of the contract.

Section 1-1.5--Boundaries of Work

The city shall provide land or right-of-way for the work specified in this contract and make suitable provisions for ingress and egress, and the contractor shall not enter on or occupy with men, tools, equipment or material, any ground outside the property of the city without

the written consent of the owner of such ground. Other contractors and employees or agents of the city may for all necessary purposes enter upon the work and premises used by the contractor, and the contractor shall conduct his work so as not to impede unnecessarily any work being done by others on or adjacent to the site.

Section 1-1.6--Protection of Site

Excepting as otherwise provided herein, the contractor shall protect all structures, walks, pipelines, trees, shrubbery, lawns, etc., during the progress of his work; shall remove from the site all cuttings, drillings, debris and unused materials; and shall, upon completion of the work, restore the site as nearly as possible to its original condition, including the replacement, at the contractor's sole expense, of any facility or landscaping which has been damaged beyond restoration to its original condition or destroyed. Water pumped from the well shall be conducted to a place where it will be possible to dispose of the water without damage to property or the creation of a nuisance. Points of disposal for water are shown in these specifications or on the attached plans.

Section 1-1.7--General Description of Well

The completed well is to consist of the principal items specified in the Special Provisions.

Section 1-1.8--Facilities or Material to Be Furnished By City

The city shall furnish to the contractor at the site of the work free of cost the items indicated in the Special Provisions.

Section 1-1.9--Competent Workmen

The contractor shall employ only competent workmen for the execution of his work and all such work shall be performed under the direct supervision of an experienced well driller satisfactory to the engineers.

Section 1-2--Casings and Well Screens

Section 1-2.1--Casings

Casings to be used hereunder as a part of the permanent well shall be of new material having minimum weights and dimensions as reflected by the Special Provisions. Casing shall be provided with drive shoes of approved type. Casings shall have screwed joints.

Section 1-2.2--Well Screens

Well screens will be used in unconsolidated formations only. The minimum nominal diameter and minimum length of screen, the type of metal,

the type of screen, the screen openings and the number in area of openings, the strength of the screen and fittings shall be as prescribed in the attached Special Provisions.

Section 1-3--Description of Work

See Special Provisions for this information and instruction.

Section 1-4--Testing for Yield and Drawdown

Section 1-4.1--Time of Test

After the well has been completely constructed and cleaned out and the depth of the well accurately measured, the contractor shall notify the engineer to that effect and shall make the necessary arrangements for conducting a final pumping test. Besides this final test the engineer may order the contractor to make such additional pumping tests during and after construction as he deems necessary. All tests shall be run with similar equipment and in a like manner to that hereinafter described.

Section 1-4.2--Test Pump

The contractor shall furnish and install necessary pumping equipment capable of pumping to the required point of discharge a maximum gallons per minute at a pumping level below ground but with satisfactory throttling devices so that the discharge may be reduced all as specified in the attached Special Provisions.

The pumping unit shall be complete with prime mover of ample power, controls and appurtenances and shall be capable of operating without interruption for a period of hours as specified in the Special Provisions.

Section 1-4.3--Auxiliary Equipment

The contractor shall furnish all necessary discharge piping for the pumping unit, which shall be of sufficient size and length to conduct the water being pumped to the discharge point as shown by the attached plat or plans. The contractor shall also furnish, install and maintain equipment of approved size and type for measuring the flow of water; such equipment to be a weir box, orifice or water meter. To measure the elevation of the water level in the well, an air line complete with gage, hand pump and check valve shall be provided. Unless otherwise permitted, the air line shall be securely fastened to the pumping unit and shall terminate approximately at the maximum desired pumping level stated in the Special Provisions but shall in no case be nearer than 2 feet to the end of the suction pipe.

Section 1-4.4--Duration of Test

Except as otherwise provided, the contractor shall furnish all labor, motive power, lubricating oil and other necessary materials, equipment, labor and supplies required and shall operate the pumping unit at such rates of discharge and for such periods of time as directed, excepting that the final test shall be run for the period specified in the Special Provisions. Accidental interruptions may, if so agreed upon between the contractor and the engineer, be compensated for by correspondingly extending the time of the completion of the test run. After the completion of the final test, the contractor shall remove by bailing, sand pumping or other methods any sand, stones or other foreign material that may have become deposited in the well. Time stated for the duration of the final test is a minimum only and the engineer reserves the right to require the contractor to extend such period of test, or to make additional tests.

Section 1-5--Grouting and Sealing

Section 1-5.1--Grouting Material

The annular space between the inner or protective casing and the outer casing or hole shall be filled with cement grout. Grout shall be proportioned of cement and the minimum quantity of water (not over 6 gal. per cu. ft. of cement) required to give a mixture of such consistency that it can be forced through out the grout pipes. The mixture, method of mixing and consistency of grout shall be approved by the engineer.

Section 1-5.2--Placement of Grout

Before proceeding with the placing of grout the contractor shall secure the engineer's approval of the method he proposes to use. No method will be approved that does not specify the forcing of grout from the bottom of the space to be grouted towards the surface. A suitable cement retainer, packer or plug shall be provided at the bottom of the inner casing so that the grout will not leak through into the bottom of the well. The grouting shall be done continuously and in such a manner as will insure the entire filling of the annular space in one operation. No drilling operations or other work in the well will be permitted within 72 hours after the grouting of casings. If quick-setting cement is used this period may be reduced to 24 hours.

Section 1-5.3--Grouting Liners

Where required by the engineer, liners may be grouted. The method to be used shall be detailed by the contractor for the approval of the engineers.

Section 1-6--Testing for Plumbness and Alignment

Section 1-6.1--Requirement to Test

All holes shall be constructed and all casings and liners set round, plumb and true to line as defined herein. To demonstrate the compliance of his work with this requirement the contractor shall furnish all labor, tools, and equipment and shall make the tests described herein in the manner prescribed by, and to the satisfaction of, the engineer. Tests for plumbness and alignment must be made after the complete construction of the well and before its acceptance. Additional tests, however, may be made by the contractor during the performance of the work. No specific payments shall be made by the city for making these tests.

Section 1-6.2--Description of Test

Plumbness and alignment shall be tested by lowering into the well to a depth equal to the lowest anticipated pump setting a section of pipe 40 feet, long or a dummy of the same length. The outer diameter of the plumb shall not be more than $\frac{1}{2}$ inch smaller than the diameter of that part of the casing or hole being tested. If a dummy is used it shall consist of a rigid spindle with three rings, each ring being 12 inches wide. The rings shall be truly cylindrical and shall be spaced one at each end of the dummy and one ring in the center thereof. The central member of the dummy shall be rigid so that it will maintain the alignment of the axes of the rings.

Section 1-6.3--Requirements for Plumbness and Alignment

Should the dummy fail to move freely throughout the length of the casing or hole to a depth equivalent to the lowest anticipated pump setting or should the well vary from the vertical in excess of two-thirds the smallest inside diameter of that part of the well being tested per 100 feet of depth, or beyond limitations of this test, the plumbness and alignment of the well shall be corrected by the contractor at his own expense [illegible] shall he fail to correct such faulty alignment or plumbness, the engineer may refuse to accept the well. The engineer may waive the requirements of this paragraph for plumbness if, in his judgment, (a) the contractor has exercised all possible care in constructing the well and the defect is due to circumstances beyond his control; (b) the utility of the completed well will not be materially affected; (c) the cost of necessary remedial measures will be excessive. In no event will the provisions of this paragraph with respect to alignment be waived.

Section 1-7--Disinfection

Section 1-7.1--Time of Disinfection

After the well has been completely constructed, it shall be throughly cleaned of all foreign substances, including tools, timbers, rope, debris of any kind, cement, oil, grease, joint dope and scum. The casing pipe shall be thoroughly swabbed, using alkalis if necessary, to remove oil, grease,or joint dope. The well shall then be disinfected with a chlorine solution.

Section 1-7.2--Chlorine Solution

The chlorine solution used for disinfecting the well shall be of such volume and strength and shall be so applied that a concentration of at least 50 ppm. of chlorine shall be obtained in all parts of the well. Chlorine solution shall be prepared and applied in accordance with the directions of, and to the satisfaction of, the engineer, and shall remain in the well for a period of at least two hours.

Section 1-7.3--Requirements for Disinfection of Test Pump

In the event that the test pump is installed after the well has been disinfected, all exterior parts of the test pump coming in contact with the water shall be dusted with a chlorine compound as directed by the engineer.

Section 1-8--Samples and Records

Section 1-8.1--Samples of Formations

The contractor shall keep an accurate redord of the location of the top and bottom of each stratum penetrated and shall save and deliver to the engineer and to the Iowa Geological Survey, Geology Annex, Iowa City, Iowa, samples of the material taken from each 5 ~~(10)~~ ~~(20)~~ feet of drilling and at every change of formation.

Section 1-8.2--Record of Casing Pipe

The contractor shall keep an accurate record as assembled of the order, number, size and lengths of the individual pieces of pipe installed in the well.

Section 1-8.3--Liquidated Damages

Failure on the part of the contractor to obtain, preserve and deliver such samples or records to the engineer and to the Iowa Geological Survey shall be considered an actual damage to the city and

shall authorize the city to retain from moneys due or to become due the contract the sum of _____ dollars as liquidated damages for each sample that the contractor shall fail to obtain, preserve and deliver, or for each length of pipe not properly measured and recorded in the order in which it was placed in the well. In the event that, in the opinion of the engineer, the failure of the contractor to take and preserve the samples may affect the proper design of the screen, the contractor may be required to perform such work as the engineer deems necessary to remedy such failure. (The last sentence relates to unconsolidated formations only.)

Section 1-8.4--Daily Reports

The contractor shall also submit a daily report describing the nature of material encountered, the work done during each day, including the items of work accomplished, such as depth drilled, casing set, etc., the water level in the well at the beginning and end of each shift and such other pertinent data as he is requested to make a record of by the engineer. A sample form of the daily report is a part of the specifications.

Section 1-9--Protection of Quality of Water

Section 1-9.1--Precautions to be Taken

The contractor shall take such precautions as are necessary or as may be required permanently to prevent contaminated water or water having undesirable physical or chemical characteristics from entering, through the opening made by the contractor in drilling the well, stratum from which the well is to draw its supply. He shall also take all necessary precautions during the construction period to prevent contaminated water, gasoline, etc., from entering the well either through the opening or by seepage through the ground surface.

Section 1-9.2--Corrective Work

In the event that the well becomes contaminated or that water having undesirable physical or chemical characteristics does enter the well due to the neglect of the contractor, he shall, at his own expense, perform such work or supply such casings, seals, sterilizing agents or other material as may be necessary to eliminate the contamination or shut off the undesirable water.

Section 1-9.3--Freedom From Sand and Turbidity

The contractor shall exercise extreme care in the performance of his work in order to prevent the breakdown or caving in of strata overlying that from which the water is to be drawn. He shall develop,

pump or bail the well by such methods as may be approved by the engineer until the water pumped from the well shall be substantially free from sand and until the turbidity is less than 5 on the silica scale described in Standard Methods of Water Analysis.

Section 1-10--Temporary Capping

At all times during the progress of the work, the contractor shall protect the well in such manner as will effectively prevent either tampering with the well or the entrance of foreign matter into it, and, upon its completion, he will provide and set a substantial screwed, flanged or welded cap satisfactory to the engineer.

Section 1-11--Abandonment of Well

In the event that the contractor shall fail to sink the well to the depth specified or to such lesser depth as ordered by the engineer, or should he abandon the well because of loss of tools or for any other cause, he shall, if requested and as directed by the engineer, fill the abandoned hole with clay or clay and concrete and remove the casing. Salvaged material furnished by the contractor shall remain his property.

Section 1-12--Measurement and Compensation

The contractor is referred to the Standard General Specifications and to the Special Provisions and to the other allied papers concerning measurement and compensation.

CONTRACTOR'S DAILY REPORT
(To be made out in three copies) Form No. 320

Contractor _____

Project _____ Date _____

	First Shift	Second Shift
Well depth - beginning	_____ ft.	_____ ft.
- end	_____ ft.	_____ ft.
Well diameter	_____ in.	_____ in.
Casing placed - diameter	_____ in.	_____ in.
- length	_____ ft.	_____ ft.
- type	_____	_____
Type of material being drilled	_____	_____
	_____	_____
Static water level	_____ ft.	_____ ft.
Cutting samples taken	No._____	No._____
	No._____	No._____
Grouting operation	_____	_____
No. of hours of drilling	_____	_____
Working hours	_____ m. to _____ m.	_____ m. to _____ m.

_____ Signature of driller

_____ Signature of driller

Comments: In the space provided below any special situations arising should be explained in detail. (Notations pertaining to tests conducted; notations on change of well or casing diameter; accidents of construction nature; accidents of liability nature; and any other additional information having a bearing upon the work, persons concerned with the work, time of occurrence, etc.)

_____

_____

_____

_____

_____

_____

_____

Daily Distribution: Original to Engineer, Rowat - Murray, Belmond
1 copy to Contractor
1 copy to IGS, Iowa City, Iowa

SPECIFICATIONS
FOR
CAST IRON WATER DISTRIBUTION SYSTEM

SECTION A. GENERAL

1. Description - This work shall consist of the construction of a water distribution system including furnishing all materials, equipment, tools and labor including excavation, laying of pipe, placing fittings and valves, setting fire hydrants, and any other incidental work in accordance with the detail plans and these specifications.

2. Laws and Ordinances - It shall be the contractor's duty to comply with all local and state rules or laws pertaining to the work described herein.

SECTION B. MATERIALS

1. Pipe - Cast iron pipe shall comply with the requirements of the American Water Works Association Standard Specifications for Cast Iron Pipe A21.2-1953 (AWWA C102-53). Unless otherwise specified all pipe shall comply with the requirement of Class 150 of the above specifications.

2. Fittings and Jointing Materials

A. Joints - The joints shall be mechanical joints complying with American Standard Specifications for a Mechanical Joint for Cast Iron Pressure Pipe and Fittings - A21.11 (AWWA C111) or bell and spigot pipe with lead joints complying with Section 9a of American Water Works Association Tentative Standard Specifications for Installation of Cast Iron Water Mains (AWWA C600-54T) or rubber gasket type joint, Tyton or equal, subject to the approval of the engineer

B. Bends, Tees, Reducers, Adapters, etc. - All bends, crosses, tees, reducers, sleeves, etc., shall have ends complying with Section B 2A above, and with Standard Specification for Cast Iron Pressure Fittings (AWWA C100-52T).

3. Valves and Valve Boxes - Valves shall be iron bodied, bronze mounted, double disc, parallel seat type, with a non-rising stem and "O" ring seals conforming to AWWA Specification C 500-52T. Valves placed underground shall be provided with two inch square operating nuts which shall open to the left and with valve boxes and extensions so that they may be operated from the ground surface. Valve boxes shall be made of good quality cast iron and shall be enlarged at the bottom to permit proper operation of the valve. The covers shall be marked with the word "water" cast integrally.

4. Concrete - All concrete used for reaction backing or anchor blocks shall have a minimum of five bags of cement per cubic yard of concrete and not more than $7\frac{1}{2}$ gallons of water per sack of cement. Clean durable aggregates shall be used. Samples of the proposed aggregates and the design shall be submitted to the Engineer for approval not less than two weeks before starting field construction work.

SECTION C. CONSTRUCTION METHODS

1. Installation of Water Pipe

A. Handling of Material - Each pipe section should be kept under control at all times to reduce the possibility of damage. If an accident results in damage to a pipe section, it shall be marked plainly and set aside. Repairs can be made later on, so long as any damage is noted at the time. Pipe and accessories too heavy to be loaded or unloaded by hand shall be moved by lifting with hoists or skidding so as to avoid shock or damage. Under no circumstances shall such materials be dropped. Pipe handled on skidways shall not be skidded or rolled against pipe already on the ground.

Pipe should be lined up as near the trench as possible to avoid excess handling. The small and medium size couplings should be stored at a central point to keep them away from dirt, oil, grease, etc.

B. Excavation and Preparation of Trench - Trenching shall be in open cut except with the written permission of the Engineer. Permission for tunnel work may be given for crossing under cross walks and house drives or under service pipes. The length of trench to be opened at any one time may be limited when, in the opinion of the Engineer, such limitation is necessary.

The contractor shall protect all existing concrete paving, sidewalk, driveways and curb and gutter from damage and if the same are disturbed or destroyed the contractor shall, at his own expense, replace such improvement. See Special Provisions for concrete mix design. All asphalt paving and drives shall be replaced by the Owner.

The trench shall be only of sufficient width to provide free working space of approximately 6 inches on each side of the pipe at a level even with the top of the pipe. Minimum trench width shall be 18 inches.

In soils where caving is experienced, trenches shall be sheeted and braced and such sheeting shall not be removed until backfilling has progressed to such a stage that no damage to the pipe will result from its removal.

C. Preparation of Trench for Pipe Laying - When excavation is in stable, firm soil and the trench bottom is of a material that can be cut true and straight, pipe can be installed using the trench bottom for support. When using the leveled trench bottom for support, it must contact the pipe barrel continuously at every joint from one joint to the other. The trench bottom should be hand shaped to proper grade and alignment with joint holes deep enough to provide for proper jointing procedure as specified in American Water Works Association Tentative Standard Specifications for Installation of Cast Iron Water Mains (AWWA C600-54T).

In case unsuitable material is encountered in the trench bottom the Engineer shall be promptly notified and additional excavation and/or backfill may be authorized. Payment and authorization for same shall be in accordance with Par. 80.4 of the General Specifications. If the trench bottom is extremely hard or is in rock where there is the possibility of pipe being subjected to "point" contacts, the trench should be excavated at least 8" below grade and then backfilled to grade with selected, tamped soil. In unstable soils, it will be necessary to excavate deeper than grade and refill with selected materials to the satisfaction of the Engineer.

D. Pipe Laying - Proper implements, tools, and facilities satisfactory to the Engineer shall be provided and used by the contractor for the safe and convenient prosecution of the work. All pipe, fittings, valves and hydrants shall be carefully lowered into the trench piece by piece with a derrick, ropes, skids, or other suitable tools or equipment, in such a manner as to prevent damage to the materials. Under no circumstances shall materials be dropped into the trench.

All dirt shall be removed from the inside of the pipe before it is laid. All open ends of the pipe shall be securely plugged when work is left temporarily or over night.

Concrete backing or suitable metal tie rods or clamps of sufficient size and type to prevent movement shall be installed at all fitings, valves and hydrants. Their size and type depends on pressure, pipe size, kind of soil and the type of fitting and shall be placed in accordance with the manufacturer's recommendation.

E. Jointing - All jointing shall be done in compliance with American Water Works Association Tentative Standard Specifications for Installation of Cast Iron Water Mains (AWWA C600-54T).

F. Installing Valves, and Accessories - Valves shall be set so that the stem rises vertically from the axis of the pipe. Over each valve stem shall be placed a valve box with riser set true and plumb, which shall have the dirt tamped around it securely and shall be left flush with the surface of the ground. Valves shall not be placed under sidewalks or on traveled ways when it can be avoided. An anchor block shall be placed under all valves 8" and larger in size.

G. Backfilling - Backfill shall be suitable earth free from boulders, large roots, sod, or other vegetation or frozen material. The initial backfill shall be shoveled by hand, evenly along both sides of the pipe making a layer of not more than 4 inches thick. Two different hand tampers shall be used; one with a narrow head or blade to tamp under the pipe or joint, and the other with a flat head to compact soil at the sides and over the pipe. Backfilling and tamping shall continue in lifts not to exceed four inches loose thickness until the pipe has at least a six inch cover. Where the pipe is placed beneath a roadway or driveway, or within three feet of the edge of an existing or proposed pavement the tamping shall be continued in six inch lifts to the surface with a mechanical tamper as approved by the Engineer.

Consolidation by water settling will not be permitted in clay or loam soils. If written permission of the Engineer is given, it may be done in sand or gravel soils.

2. Testing Methods - Before testing, all parts of the pipe line shall be backfilled and braced sufficiently to prevent movement under pressure. This will include backfilling at any deflection in the line to prevent outward movement on curves and upward movement at the crest of hills and also the bracing of the test ends. Temporary bracing shall not be placed at thrust blocks, for the thrust blocks shall also be subjected to the test pressure. The line shall be filled from any available low pressure source at least 24 hours before leakage tests shall be made.

A. Pressure Test - Before any joint, except those necessary to prevent movement is covered, the pipe line shall be subjected to a static pressure of 150 p.s.i. for at least thirty minutes or longer if necessary, to examine all the joints. All joints and pipe must be perfectly tight under this test and shall be made in the presence of the Engineers.

B. Leakage Test - After all work is completed and covered, the contractor may be required to conduct a leakage test on any or all sections of the new line. Tests for leakage shall be made after the line has been subjected to a working pressure of from three to five days. At this time, the section of pipe under test shall be subjected to a 125 pound pressure for at least two hours. At this pressure, the line shall not show leakage exceeding one-fourth gallon each 24 hours per inch diameter per joint. Should leakage occur over this tolerance the contractor shall repair the joints.

All testing equipment and service of skilled workmen shall be provided by the contractor.

3. Sterilization of Completed Line - Before being placed in service, the entire line shall be chlorinated in accordance with the requirements of the Iowa State Department of Health. The chlorinating agent shall be applied at the beginning of the section and may be injected through corporation stop, hydrant or other connection insuring treatment of the entire line.

Water shall be fed slowly into the new line with chlorine applied in amounts to produce a dosage of 40 to 50 parts per million. During the chlorination process, all valves, hydrants, and other accessories shall be operated at least three times in order to insure that each is properly sterilized.

The chlorine solution shall be retained in the line for a period of eight hours or more after which time it may be drawn off. A residual of not less than 5 ppm shall be found in all parts of the line.

After chlorination, the water shall be flushed from the line until the replacement water tests are the same as those of the permanent water source. The town will provide all water used in the sterilization of the lines at no cost to the contractor.

4. Utilities Encountered and Disturbed - The contractor shall, at his own expense, repair, relay and otherwise put back into immediate and proper service any house sewer, water line, storm line, telephone cable or any other utility which he destroys or disrupts in the course of his work. The contractor shall be limited in such responsibility to all utilities lying above an elevation of 0.2 feet above the top of the proposed improvement. Any utility disrupted by the contractor in his operations lying below the elevation of 0.2 feet above the top of the proposed improvement shall be the responsibility of the owner of such utility and its repair shall not be the responsibility of the contractor. In situations described in the latter instance, the contractor will be expected to accommodate the owner of such utility in any reasonable way which makes it easier or more convenient for the owner to repair or relay his utility.

5. Clean Up - After the completion of the work, the contractor shall thoroughly clean and smooth the disturbed area and remove all excess dirt, rock, construction materials and equipment.

SPECIAL PROVISIONS

SECTION 1 - Elevated Tank Foundations

Description of the Work

The work covered by this section includes the complete installation of elevated tank foundations and center pier with valve manhole.

Concrete in piers above the spread footings and any other concrete which will be subjected to freezing shall be air entrained concrete with 4½% ± 1½% of entrained air. Air entrainment may be obtained by using either an admixture or air entrained cement. All aggregate used in this concrete shall conform to the requirements of the concrete specification.

Concrete in the buried spread footings need not be air entrained. Coarse aggregate for the spread footings shall conform to the requirements of the concrete specification except that the allowable loss in the specified freeze-thaw soundness test may be increased from 6% to 10% and maximum size of the aggregate may be increased from 1½" to 2".

The concrete mix design requirements for all concrete under this contract shall be modified to the following:

Min. compressive strength at 28 days	3000 psi
Maximum water - cement ratio	6 gal/sack cement
Min. cement content for pad footings	5.5 sack/ c.y.
Min. cement content for piers	6.0 sack/ c.y.

SECTION 2 - Elevated Water Tank Specification

Description of the Work

The work covered by this specification includes the furnishing and erecting of one 50,000 gallon elevated steel water tank. The tank may be of the conical top and hemispherical bottom type or double ellipsoidal type. The tower shall elevate the tank 100' from the top of the foundation piers to the low water level.

By other contract, the Town will provide the valve and tee required within the valve manhole and will install same after contractor has provided the stub of 4" diam. pipe from the base elbow of the riser.

Modifications to Tank Specification

Section II Design Requirements - The tower footings and center pier are to be based on a soil bearing value of not over 4,000 lb. per sq. ft. Bids on footings are to be based on the drawings in this specification. After contracts are let the successful tank contractor shall submit for approval his standard footing designs for this bearing value.

SECTION III Accessories - Riser - Either a large diameter steel plate riser or a small diameter riser pipe with frost casing shall be furnished with this tank. It shall have a 4" diameter cast iron outlet pipe, base elbow and 1' of pipe to extend into the valve manhole.

Overflow Pipe - The overflow pipe shall be 4" standard pipe and shall be extended to a point just below the balcony.

Section IV - Erection - All joints and connections necessary in the fabrication of this tank shall normally be made by welding. Riveted joints may be allowed for certain locations upon special request.

SECTION 3 - Deep Well Specification

Description of the Work

As reflected on the form of proposal submitted herewith, drilling will be started with 16 inch O.D. temporary steel casing to be set to an estimated depth of 20 feet. Drilling will then be continued inside of the 16 inch casing with a hole of sufficient size to accommodate a 12 inch I.D. temporary casing to an estimated depth of 100 feet. From this point a hole of sufficient size to accommodate a 10 inch I.D. permanent casing will be drilled to an estimated depth of 240 feet. The 12 inch temporary casing will not be set unless caving formations are encountered which make it necessary. A 10 inch permanent steel casing with minimum wall thickness of 0.365 inch will be set from 2 feet above ground surface to an estimated depth of 240 feet, regardless of whether the 12 inch temporary casing is set or not. The bottom end of this 10 inch casing will be equipped with a cementing type float shoe and the 10 inch steel casing will be pressure cemented in place as herein specified and the 12 inch and 16 inch temporary casing will be removed. When the neat cement grout has completely set, drilling operations will be continued inside of the 10 inch casing and a 10 inch open hole drilled to an estimated depth of 500 feet. If caving formations are encluntered which make it necessary to place casing after the installation of the 10 inch casing, 8 inch I.D. steel casing with a minimum wall thickness of 0.322 inch will be set and drilling will be continued with 8 inch diameter open hole. If the 8 inch casing is used it will be equipped with a forged steel entering shoe on the top end and with a forged steel drive shoe on the bottom and will be surrounded with a neat cement grout as herein specified.

Well Casings

All permanent casings used shall comply with American Water Works Association Standard Specifications for Deep Wells (AWWA A-100-52).

Water Samples

The contractor shall take representative water samples each time a new acquifer is penetrated. The method of sampling shall be in accordance with recommendations of the Iowa Geological Society. Containers will be furnished to the contractor and he shall record the pertinent data on each sample and send the sample to the Iowa Geological Society, Iowa City, Iowa without delay.

Testing for Yield and Drawdown

A final test to ascertain the well's capacity and to secure information so that permanent pumping equipment may be intelligently selected shall be accomplished as herein specified. It is anticipated that this well will develop one hundred and twenty gallons per minute from an economical pumping level.

Alternates

The proposal form includes several alternates covering additional casing and an alternate method of grouting the 10" casing. The contractor's method of grouting under the alternate shall be subject to the approval of the Engineer and shall be such as to provide a sound water tight seal for a minimum of 20' at the top and 12' at the bottom of the 10" casing.

Miscellaneous

The Town will arrange for disposal of the water and waste produced in the drilling and testing of the well and will furnish water required in the drilling operation.

The anticipated log of the well is indicated on the Contract Plan. This information is the best available on the logs and geological conditions near Meservey. The Town believes that it will be possible to drill the size holes to the depths specified. However, the Town does not in any way warrant the information on the geological conditions and no contractor is to rely on the above stated geological information for any part of his bid on said well.

At the contractor's discretion and with the approval of the Town work on this project may be carried on 24 hours per day excluding Sundays and holidays.

It is mutually understood that items not covered in these contract documents and plans and allied papers will be handled as specified by the American Water Works Association Standard Specifications for Deep Wells (AWWA A-100-52) and at prices mutually agreed upon in change orders by the Town and by the contractor.

SECTION 4 - Water Main Specifications

Description of the Work

The work covered by this section includes the complete installation of the 4" cast iron water main with fittings, valves and accessories necessary to connect the new well and elevated water tank to the present distribution system.

Minimum depth from natural ground level to the top of the water main will be five feet.

The contractor will be required to do such clearing and grubbing as can ordinarily be done with hand tools. This will include brush and small trees up to and including 8" in diameter. Cost for this is to be included in bid items for pipe laying.

The excavation is expected to be in normal earth. However, the Contractor will be required to remove occasional fragmentary rock not over 24" in any dimension or other small obstructions in the path of the water main without additional compensation. Should trees over 8", large quantities of rock, or obstructions of a major nature be encountered, the contractor shall promptly notify the Engineer. If possible, the main will be relocated to miss the obstruction. In event this is not feasible, extra work may be authorized. Payment and authorization for same shall be in accordance with Paragraph 80.4 of the General Specifications.

It is intended that anchor and thrust blocks be in accordance with Section B Par. 6 of the Specifications for Cast Iron Water Distribution System. Concrete for replacement of sidewalks, curbs, slabs or other concrete exposed to the weather shall conform to the Standard Specification for Concrete.

Because of the small amount of concrete used on this project, it will not be necessary to have a mix design prepared by a laboratory. However, samples of the aggregate, the source of materials and proposed mix design shall be submitted to the Engineers for approval prior to the use of any concrete. All other requirements of the concrete specification shall be as specified. Air entrained concrete shall be used for concrete exposed to weathering and may be used throughout.

PROPERTY OF

BY SNS DATE July 21-37 **ROWAT - MURRAY, ENGINEERS** SHEET NO. ..... OF .....

BELMOND, IOWA

CHKD. BY RWR DATE July 22-37 SUBJECT Meservey Elevated JOB NO. 842

Water Tank Foundation Boring Field Book #83

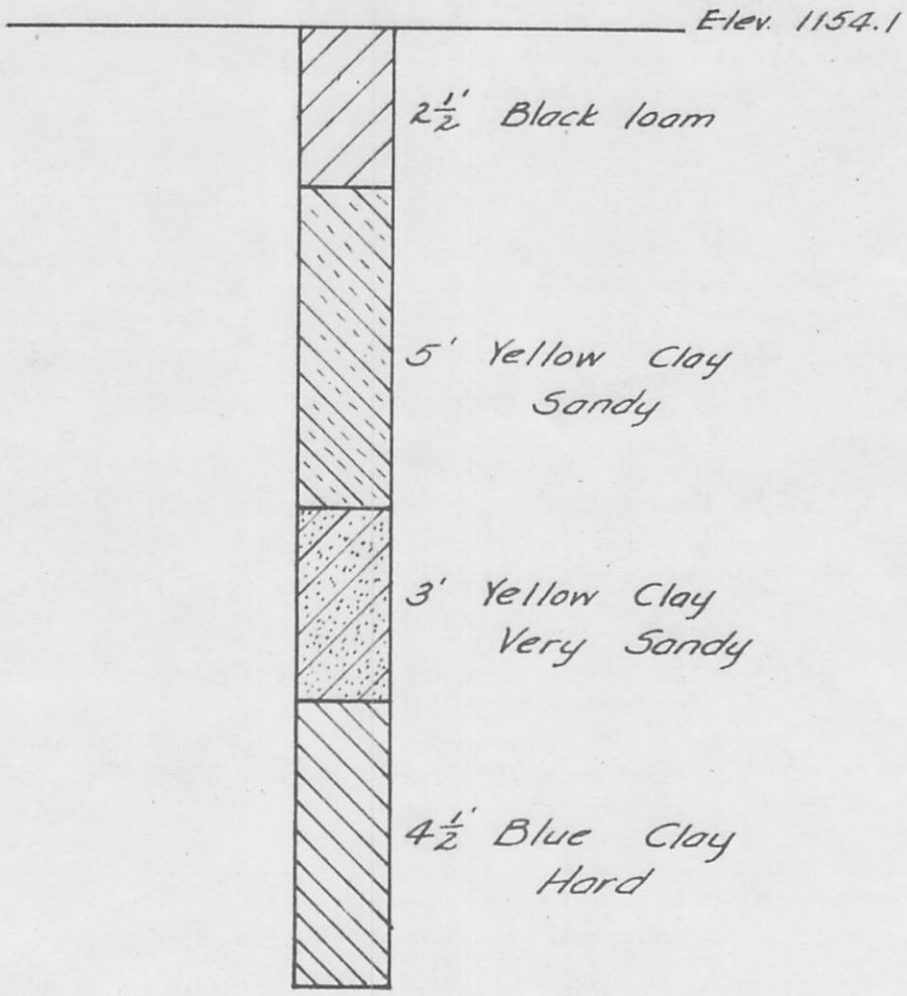


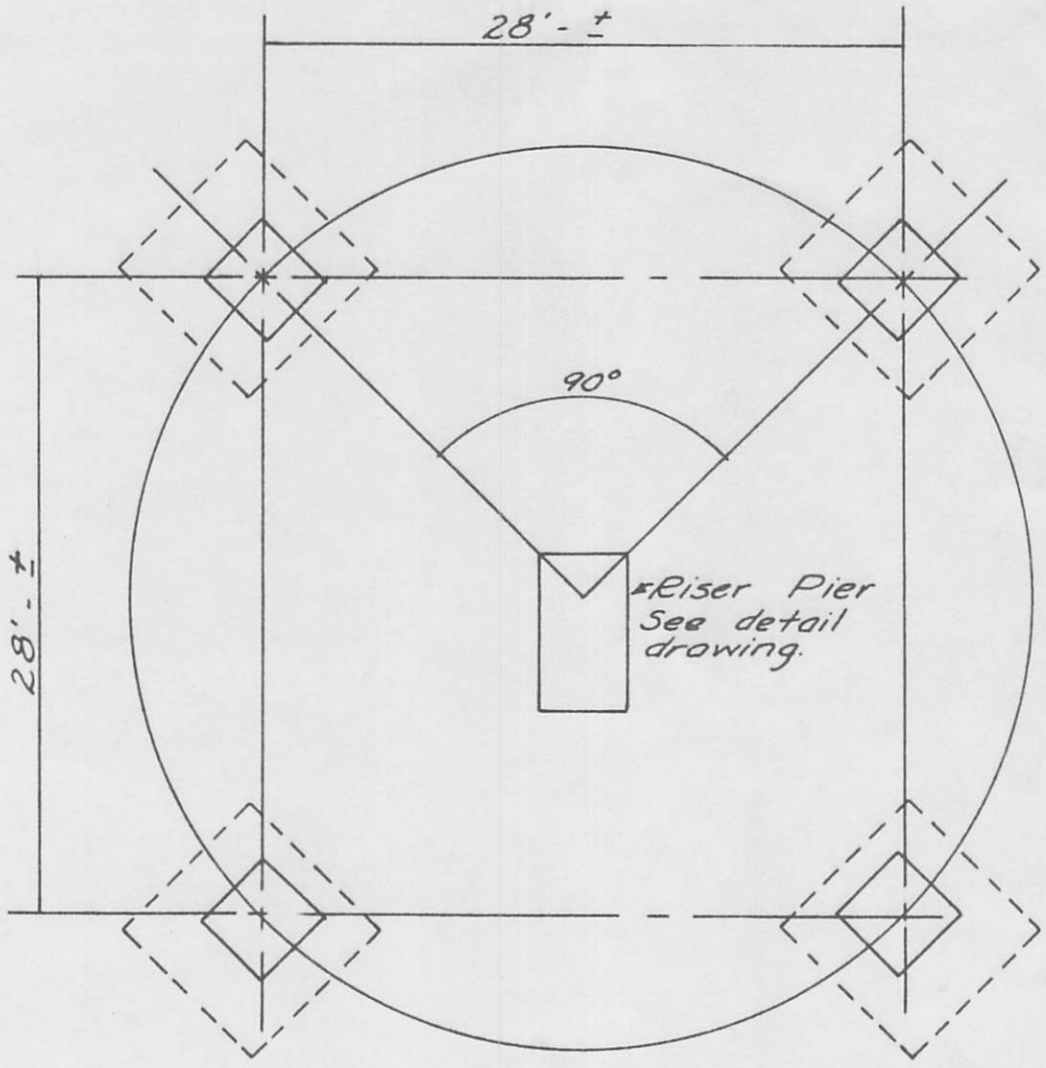
FIG 1

PROPERTY OF

BY SKW DATE 8-16-57 **ROWAT - MURRAY, ENGINEERS** SHEET NO. ..... OF .....

BELMOND, IOWA

CHKD. BY EWR DATE 8-16-57 SUBJECT Elevated Water Tank JOB NO. 842



FOUNDATION PLAN

50,000 Gal. Tank
100 Foot Tower

Note: Exact dimensions to be in accordance with tank manufacturer's shop drawings.

FIG 2

PROPERTY OF

BY H.E.J. DATE 8/10/57

ROWAT - MURRAY, ENGINEERS

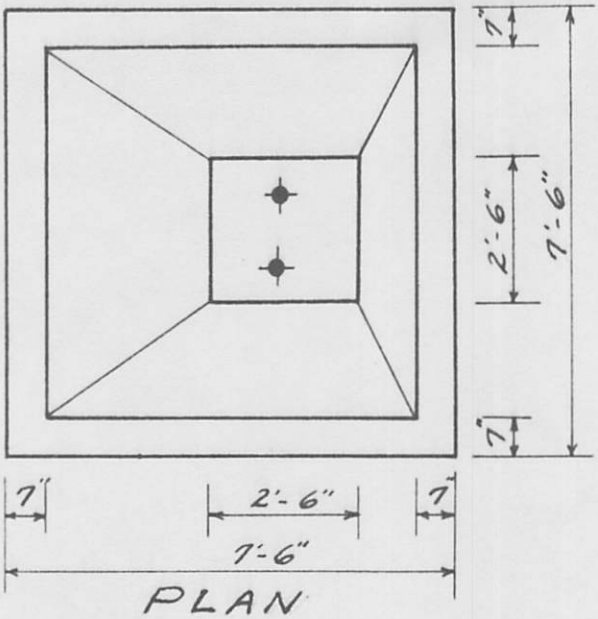
BELMOND, IOWA

SHEET NO. ..... OF .....

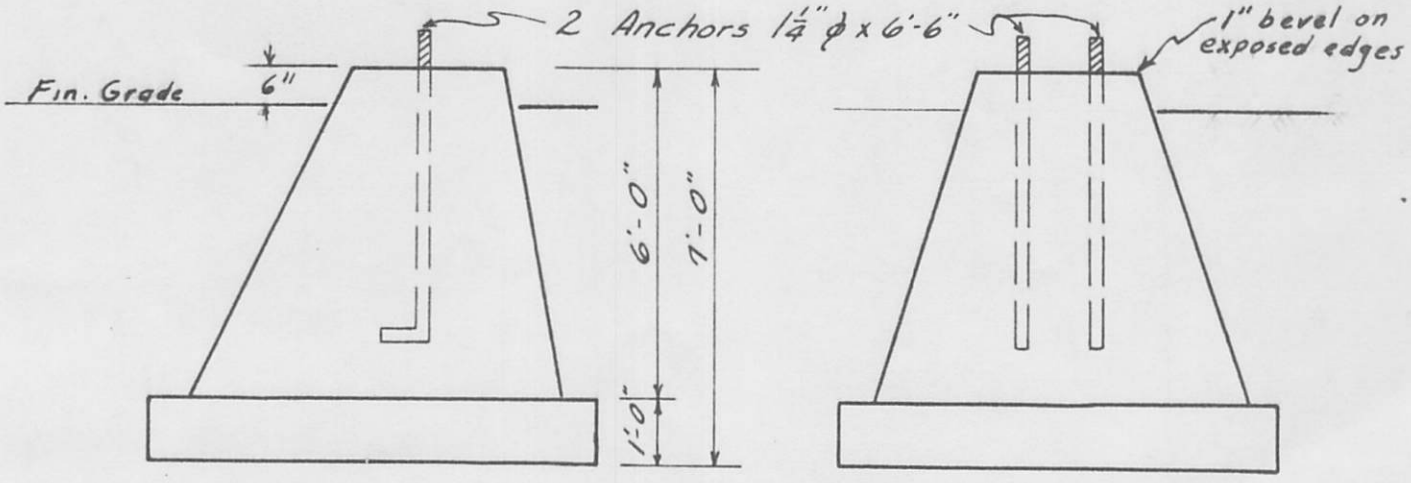
CHKD. BY RWR DATE 8/15/57

SUBJECT ELEVATED TANK FOUNDATION PIERS

JOB NO. .....



PLAN



ELEVATIONS

Soil Bearing Value Not to Exceed 4000 Pounds/Sq. Foot
4 Columns - Spread between piers 28' ±

Note: Anchor bolts and detail Pier drawings to be Furnished by tank contractor

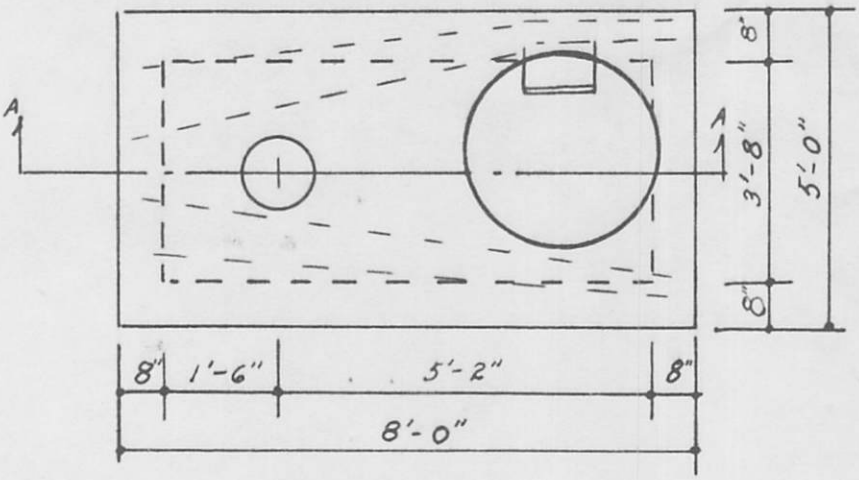
Fig. 7

PROPERTY OF

BY RWR DATE 8/10/57 **ROWAT - MURRAY, ENGINEERS** SHEET NO. ... OF ...

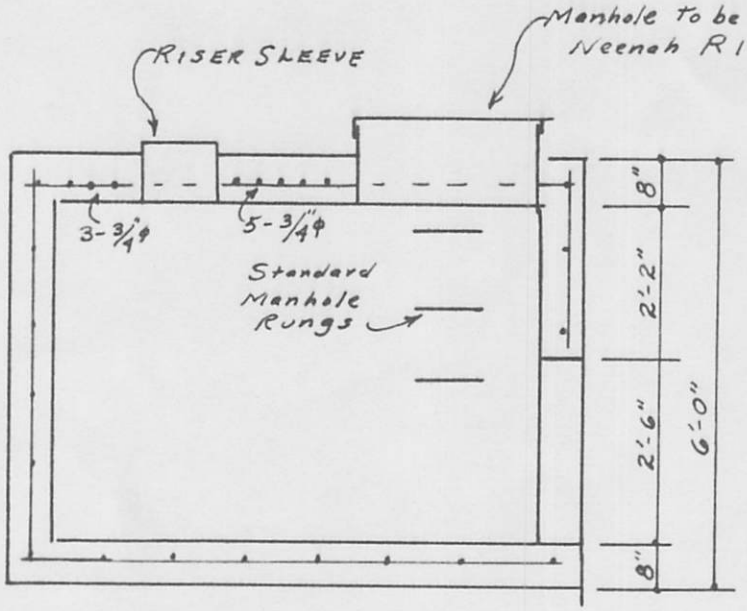
BELMOND, IOWA

CHKD. BY ... DATE ... SUBJECT ELEVATED WATER TANK JOB NO. 842

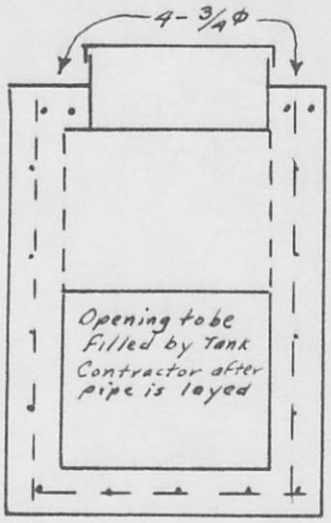


PLAN VIEW

Reinforcing:
½"ϕ @ 12" oc each way for walls and floor slab
¾ϕ bars as shown for top slab



℄ SECTION A-A



END VIEW

TYPICAL
CENTER PIER ℄ VALVE PIT

FIG. 4

PROPERTY OF

BY HEJ DATE 8-3-57 **ROWAT - MURRAY, ENGINEERS** SHEET NO. 1 OF 1

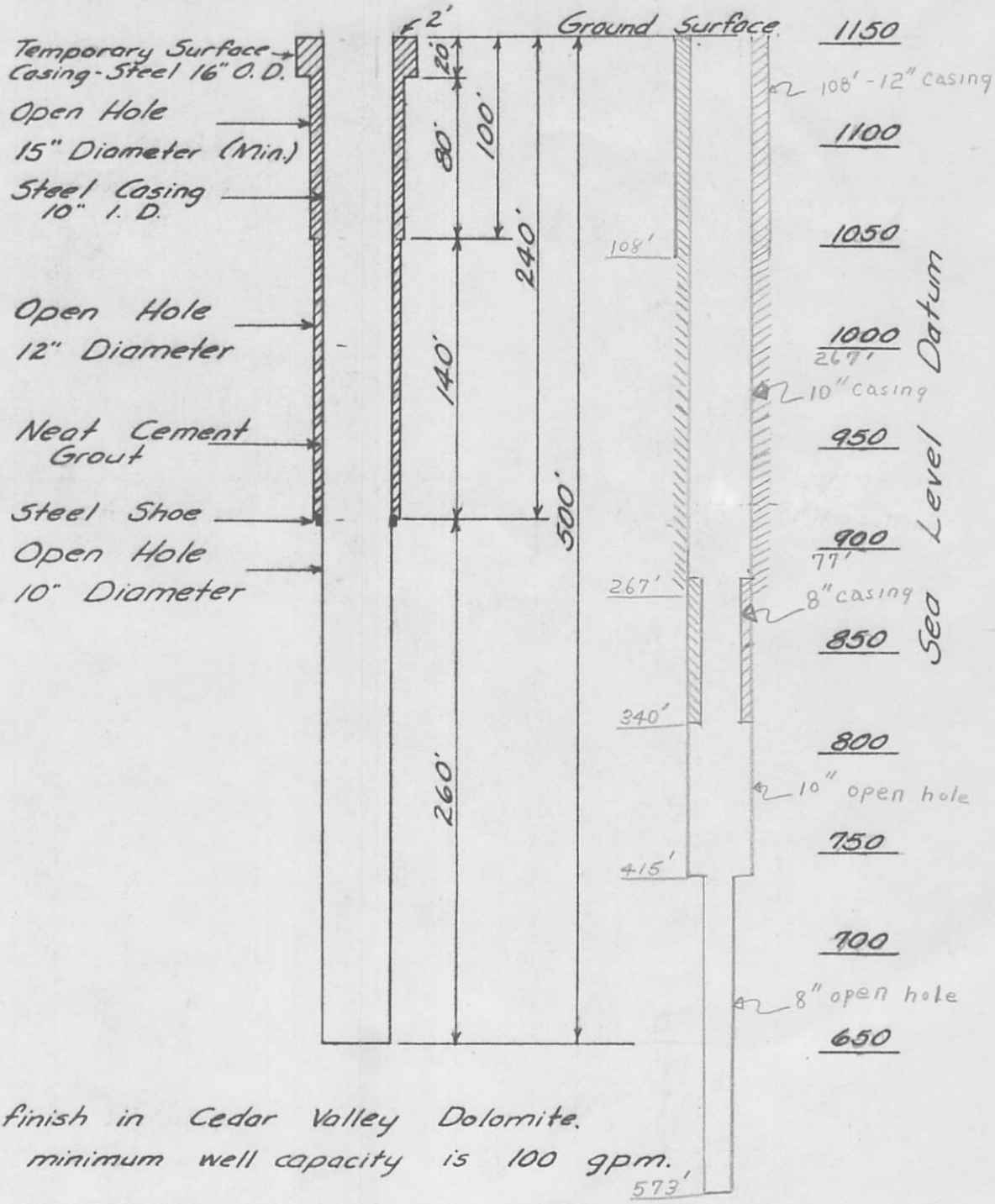
BELMOND, IOWA

CHKD. BY ..... DATE ..... SUBJECT Meservey, Iowa JOB NO. 842

Waterworks Improvements Figure 5

Proposed Well

"As Built" Well Profile



Well to finish in Cedar Valley Dolomite.
Expected minimum well capacity is 100 gpm.

FIG. 5

PROPERTY OF

ROWAT - MURRAY, ENGINEERS

BELMOND, IOWA

BY_____ DATE_____ SHEET NO. 1 OF 1

CHKD. BY_____ DATE_____ JOB NO. 842

SUBJECT Meservey, Iowa

Waterworks Improvements Figure 6

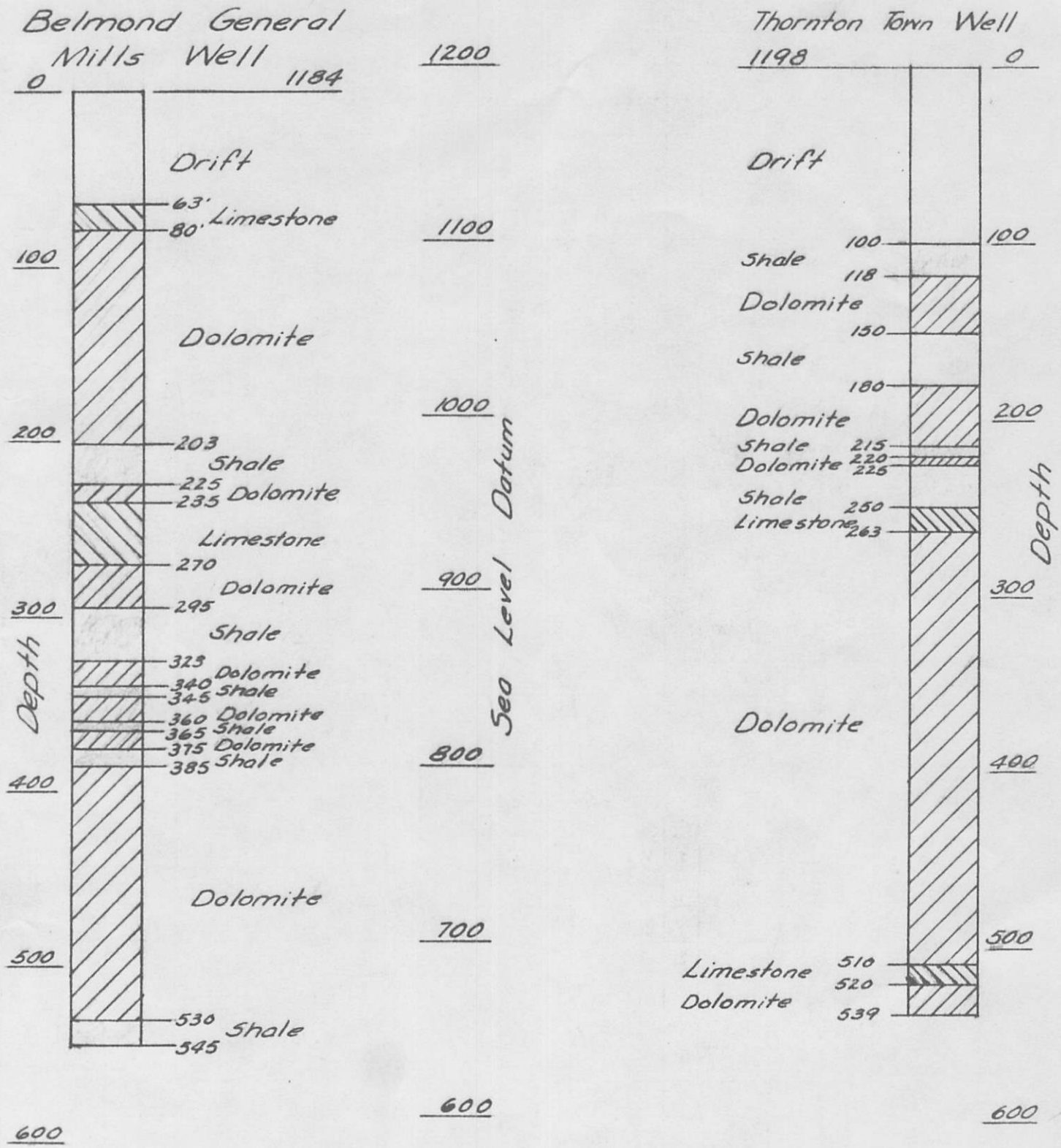
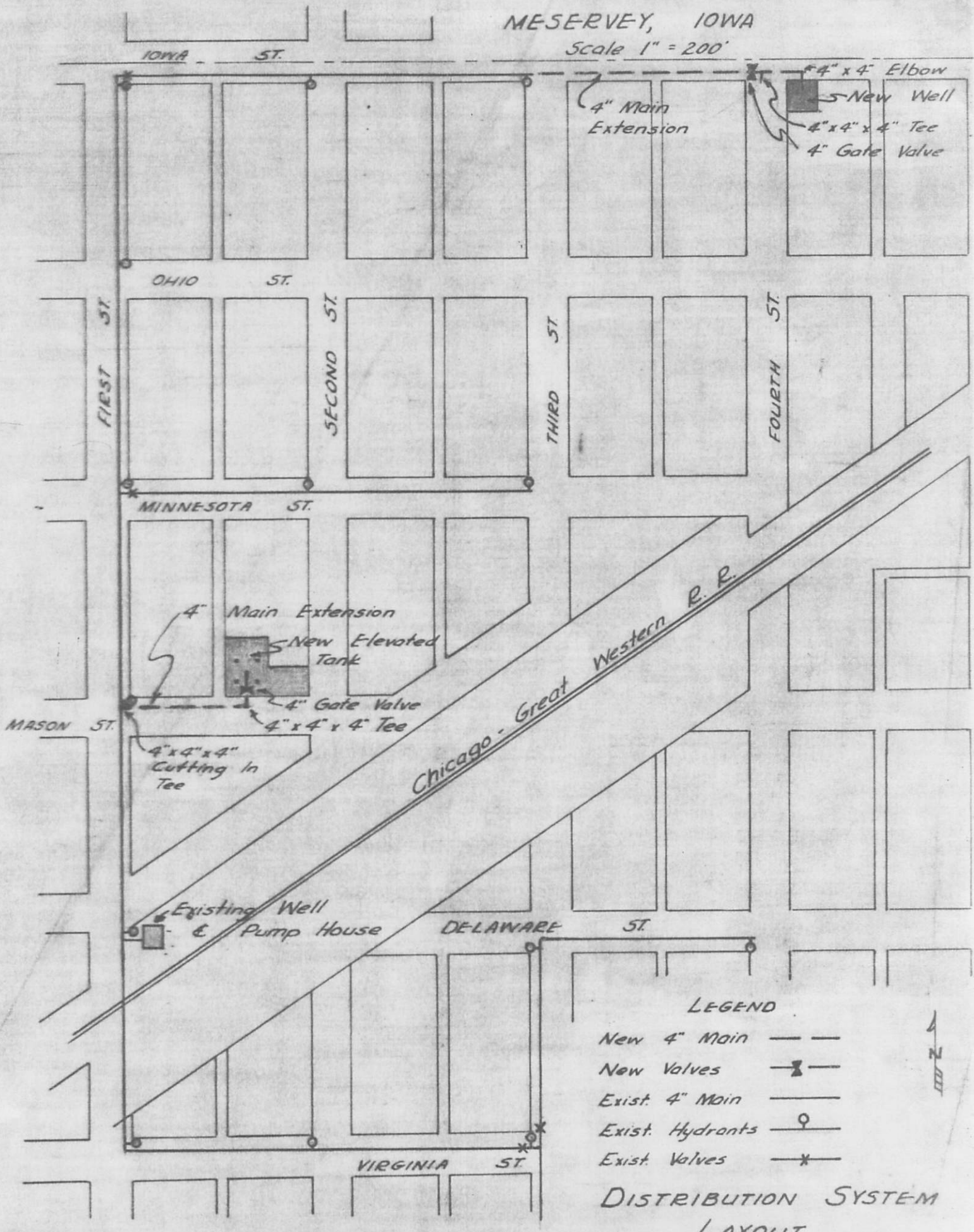


FIG. 6



Proj. 842

FIG. 7