



PROJECT NO. 17104

**CONTRACT SPECIFICATIONS
FOR**

**WELL NOS. 1 AND 3 ABANDONMENT
AND RESERVOIR DEMOLITION**

FOR

OAK CREEK WATER AND SEWER UTILITY

May 25, 2017

**170 W. Drexel Avenue
Oak Creek, WI 53154**

**Telephone: (414) 570 - 8200
www.water.oak-creek.wi.us**

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CONTRACT SPECIFICATIONS
FOR WATER MAIN AND APPURTENANCES

FOR

WELL NOS. 1 AND 3 ABANDONMENT
AND RESERVOIR DEMOLITION

OAK CREEK WATER & SEWER UTILITY

May 25, 2017



Utility Engineer (OWNER)
Ron J. Pritzlaff, P.E.
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NOTICE TO BIDDERS

OWNER The Oak Creek Water & Sewer Utility hereby gives notice that sealed proposals will be received in the Utility's office at 170 W. Drexel Avenue, Oak Creek, Wisconsin, 53154.

PROJECT The work, officially known as Project No. 17104, WELL NOS. 1 AND 3 ABANDONMENT AND RESERVOIR DEMOLITION, consists of abandonment of Well Nos. 1 and 3, demolition of Well Houses 1 and 3, demolition of 500,000-gallon ground level reservoir, utility abandonment, water main installation, and site grading and restoration with the following approximate quantities:

ITEM DESCRIPTION	QUANTITY	UNITS
Well Nos. 1 and 3 Abandonment and Reservoir Demolition	1	Lump Sum

TIME Proposals must be received by the office of the Utility, 170 W. Drexel Avenue, no later than 9:00 a.m., Thursday, June 8, 2017, at which time and place the proposals will be publicly opened and read aloud.

CONTRACT DOCUMENTS Bid documents may be obtained at the Utility's website: www.water.oak-creek.wi.us under the public contracts section on May 25, 2017.

STATUTORY PROVISIONS The Contract letting shall be subject to the provisions of Section 62.15, 66.0901, 66.0903, and 779.16 Wisconsin Statutes.

BID GUARANTEE A certified check or bank draft payable to the Oak Creek Water & Sewer Utility, or a satisfactory bid bond, in an amount not less than 5% of the bid shall accompany each bid as a guarantee that if the bid is accepted, the bidder will execute and file the proposed contract and bond within 10 days after the award of the contract. In case the bidder fails to file such contract and bond within the time set by the Utility, the check or bid bond shall be forfeited to the Utility as liquidated damages pursuant to SS.62.15(3).

EQUAL OPPORTUNITY The Oak Creek Water & Sewer Utility hereby notifies all bidders that it will affirmatively insure that in any contract entered into pursuant to this advertisement, minority business enterprises will be afforded full opportunity to submit bids in response to this invitation and will not be discriminated against on the ground of race, color, sex, or national origin in consideration for an award.

BID REJECTION	The Oak Creek Water & Sewer Utility Commission reserves the right to reject any and all bids, waive any informalities in bidding, or to accept the bid or bids, which best serves the interest of the Utility.
BID WITHDRAWAL	No bid shall be withdrawn for a period of 30 days after the scheduled opening of the bids without the consent of the Oak Creek Water & Sewer Utility Commission.

INSTRUCTIONS TO BIDDERS

1. Proposal Forms

No bid will be considered which is not submitted on forms furnished by the Utility Engineer.

2. Quantities

The estimated quantities of the work are the result of careful calculations but are considered approximate. The quantity shown will be used as a basis for determining the lowest bidder. After the contract is awarded, the quantity of work listed under any item, or all items, may be increased or decreased according to the specifications at the discretion of the Utility Engineer, without invalidating the bid price.

The general description of bid items is provided to give bidders a brief description of the work covered under this contract, but is not meant to be all inclusive of the work and materials required to complete each item. All miscellaneous items required by the plans and specifications, although not expressly listed on the bid form, are assumed to be included on the unit prices of each general bid item. Bids will be compared on the basis of the quantities listed in the Bidding Schedule. Payment on the contract will be based on the actual, field-measured units installed.

3. Prior Examination of Contract Documents and Worksite

Bidders shall inform themselves of the conditions under which work is to be performed by examining the contract documents, site, ground conditions and obstacles to be encountered in the field, and by such other means necessary. Contractor shall contact the Utility to set up a site visit. After proposal submittal, the Utility will not accept a claim that there was any misunderstanding as to the quantities, conditions, nature of the work, or extra compensation for items the Contractor failed to inform himself of prior to bidding.

4. Inadequacies and Omissions

Any verbal information obtained from or statement made by representatives of the Utility at the time of the examination of the contract documents or the site for the purpose of bidding, which apparently corrects or in any way amends the contract documents shall be invalid. The Oak Creek Water and Sewer Utility will not be responsible for such verbal information or statements.

Bidders shall bring any inadequacies, omissions, or conflicts to the Utility Engineer's attention at least seven days before the due date of bids. Prompt clarification will be immediately supplied to all bidders by addenda, and each addendum shall be acknowledged on the proposal form. Failure to so request

clarification of any inadequacy, omission or conflict will not relieve the contractor of responsibility. The signing of the contract will be considered as implicitly denoting that the contractor has a thorough comprehension of the full intent and scope of the specifications and drawings.

5. Subcontractors

Bidders shall be required to submit a list of subcontractors with their proposal in accordance with Section 66.0901(7), Wisconsin Statutes.

This list of subcontractors shall not be added to nor altered without the written consent of the Utility Engineer. The Utility Engineer may reject proposals if the list of subcontractors and the class of work to be performed is omitted. The omission shall be considered inadvertent or a representation that the bidder will perform the work himself. If such an omission is inadvertent, the bidder shall provide the list of subcontractors within two working days from the date and time of the bid opening.

6. Time of Performance

When not otherwise specified, the bidder must state in the proposal the least number of calendar days (including Saturdays, Sundays and holidays) after the date to commence work given in the Notice to Proceed, in which he will start construction and the number of calendar days (including Saturdays, Sundays and holidays) after date to commence work given in the Notice to Proceed in which he will fully complete the work as specified.

In stating time, the bidder should make due allowance for all probable difficulties which may be encountered.

In the event of failure to complete the work within the time stated or otherwise specified, liquidated damages will be assessed as provided in the specifications.

The bidder may not begin work on the project until permits are received for WDNR Water System Construction & Operation.

7. Proposal Guaranty

The Oak Creek Water and Sewer Utility requires either a bid bond or a certified check of at least 5% of the bid.

8. Requirements for Signing Proposals

- A. The full name and business address of each bidder must be entered on the proposal submitted. The proposal shall be signed in the space provided by written signature of the person or persons properly authorized to sign it.

- B. A proposal submitted by an individual shall be signed by the bidder or by an authorized agent.
- C. A proposal submitted by a firm or partnership shall be signed by a member or by an authorized agent; if by joint adventurers, the proposal shall be signed by each of their authorized agent(s).
- D. Proposals which are signed by an attorney-in-fact for individuals, firms, partnerships or joint adventurers shall have attached a power-of-attorney evidencing authority to sign the bid.
- E. A proposal submitted by a corporation shall be signed by an authorized officer or agent of such corporation. Such corporation must be licensed to do business in the State of Wisconsin before a proposal to do the work can be received. If a foreign corporation, the state under which it is incorporated must be named.

9. Submission of Proposal

The proposal and the proposal guaranty shall be placed in an envelope or in separate envelopes and shall be sealed. On the envelope or envelopes shall be plainly written the PROJECT NUMBER, DATE OF OPENING BIDS, NAME OF BIDDER, AND THE TYPE AND LOCATION OF THE WORK. Such envelope(s) shall be addressed and delivered to the office of the Utility before the time specified in the Notice to Bidders for opening bids.

10. Withdrawal of Proposal

A bidder may withdraw a proposal, provided the Utility Engineer receives a written request prior to the deadline for accepting proposals. The proposal will be returned to the bidder unopened.

11. Bid Prices

Bidders must submit a bid price, in accordance with the specifications, for each item of the job or branch, in compliance with the bidding units specified for the quantities listed in the proposal. Bid prices must be written out in words and also entered in figures. In case of variation, the written prices will prevail.

12. Double Bidding

Two proposals under different names will not be accepted from one firm or association.

13. Disqualifying of Bid Proposal

A bid proposal will be disqualified because of gross errors in computation which cannot be resolved by mathematical correction without resorting to information not contained in the bid.

Errors in extension may be corrected providing that the unit cost is legible and can be definitely identified as complying with item specifications. The total bid shall be adjusted in accordance with approved extension corrections. An extension may not be divided by number of units specified to determine a unit cost if such is omitted by the bidder. It is the responsibility of the bidder to submit a neat, accurate and complete proposal if his bid is to be accepted.

14. Right to Accept or Reject Bids

The Utility reserves the unqualified right to reject any or all bids at its sole and absolute discretion, or to reject any or all bids where the Utility Engineer has determined that the contractor or bidder has unbalanced his bid and unit prices. The Utility further reserves the unqualified right to waive any irregularities in any bid, or to accept any bid which will best serve the interests of the Utility. The Utility also reserves the unrestricted privilege to reject any unit prices for additions to or deductions from the scheduled amount of work as given in the bid, if the same are considered excessive or unreasonable, or to accept any or all such unit prices which may be considered fair and reasonable.

The bid openings are open to the public, and no awards will be made immediately upon opening bids nor until the bids opened can be compared, scheduled, and reviewed by the Utility Commission. The contract shall be awarded by Utility Commission action and the bidder to whom the award is made will be notified at the earliest possible date.

15. Award of Contract

If the Contract is awarded, it will be awarded to the responsive and responsible Bidder with the lowest Bid whose evaluation by Utility indicates to Utility that the award will be in the best interest of the Project.

16. Performance Guaranty

The performance of the contract must be assured by a surety bond executed by the successful bidder in the full amount of the contract. Such bond must also be executed by a surety company.

17. Contract Execution

Within ten days from the date of receipt of the contract forms from the Utility

Attorney, the successful bidder shall sign four copies of the contract form, attach the performance guarantee of the approved licensed surety, and deliver to the office of the Utility. The contract, when signed by the Utility, and approved as to form and execution by the City Attorney, shall be a part of the contract documents. When all parties have signed the contract, the Utility will refund the proposal deposit to the successful bidder.

In case of failure to have delivered such properly executed copies of the contract within ten days, or such extension as the Utility Commission only may deem reasonable, bidder will be considered as having abandoned his proposal. Bidder will be considered in default to the Utility to the full amount of the bid deposit. It will be understood and agreed by the party submitting the proposal that such bid deposit represents the damages to which the Utility will be subjected by reason of the bidder's default in acceptance of contract, or failure to either properly execute the contract forms or deliver within the specified time of such extension.

18. Starting Work Before Notification

No work shall be performed under the contract and no materials or equipment shall be delivered to the site of the work prior to the date in the Utility Engineer's written Notice to Proceed.

19. Refund of Bid Deposit to Unsuccessful Bidders

The bid deposit of all except the two lowest bidders will be refunded after the Utility Commission has determined the lowest responsible bidder. The remaining bid deposit will be refunded upon execution of the contract.

June 8, 2017

To: The Oak Creek Water & Sewer Utility Commission

Re: Bid Proposal

In conformity with the notice to bidders, the undersigned bidder, having examined the site of the work and the contract, submits the following proposal for furnishing the material, equipment, labor and everything necessary for the completion of the work listed hereunder, and agrees to execute the proposed contract and furnish the required bond for the completion of said work, at the locations and for the prices set forth in the attached Schedule One.

The undersigned bidder deposits herewith a certified check payable to the order of the Oak Creek Water and Sewer Utility, or an approved bid bond, in the sum designated in said notice, and hereby agrees that in the event the undersigned bidder shall fail to execute the contract with surety bond thereto and return the same to the Utility within ten calendar days after transmittal by the Utility, then said certified check shall be retained by and become the property of the Oak Creek Water & Sewer Utility as fixed and liquidated damages or the penalty as provided by said bond shall be recovered as liquidated damages.

It is further understood that construction on this contract shall commence and be completed as specified in the Detail Specifications.

This proposal submitted by:

Bidder

Address

Phone

City, State, Zip Code

Operating as: Sole Trader Partnership Corporation _____

Under the laws of the State of _____

By: _____ (Signature)

_____ (Title)

ADDENDUM RECEIPT: We acknowledge the receipt of Addenda _____ inclusive.

SWORN STATEMENT OF BIDDER

PURSUANT TO SECTION 66.0901 (7) WISCONSIN STATUTES

I, being duly sworn at _____(City),
_____ (State), on oath, do hereby state on behalf of said bidder that
I have examined and carefully prepared this proposal from the plans, specifications, the work site
including surface and underground conditions, and other contract documents and have checked the
same in detail before submitting this proposal; and that this sworn statement is hereby made an
integral part of this proposal.

By: _____
(Signature)

(Title)

Subscribed and sworn to before me this _____ day of _____, 2017.

Notary Public, _____ County

State of _____

My commission expires: _____

Affix corporate seal below.

|

INFORMATION ON SURETY *(please fill out completely)*

Firm _____

Address, City, State, Zip Code _____

Attorney-in-fact _____

Address, City, State, Zip Code _____

INFORMATION ON SUBCONTRACTORS

The undersigned bidder will employ, subject to the approval of the said owner, the following subcontractors. This list shall not be added to nor altered without the written consent of the owner. A bid shall not be invalid if the list of subcontractors and the class of work to be performed has been omitted. The omission shall be considered inadvertent or a representation that the bidder will perform the work himself. If such an omission is inadvertent, the bidder shall provide the list of subcontractors within two working days from the date and time of the bid opening.

<u>NAME</u>	<u>ADDRESS</u>	<u>CLASS OF WORK</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Schedule One

List of Drawings

File	Description
17104-1C-2342	Title Sheet
17104-2C-2343	Standard Notes
17104-3C-2344	Erosion Control Notes and Details
17104-4C-2345	Details
17104-5C-2346	Demolition Plan
17104-6C-2347	Site Plan
17104-7C-2348	Demolition Details

Plan Sheets located at the end of specifications.

Schedule Two

LUMP SUM BID:

<hr/>	
(Words)	Dollars \$ <hr/>
	(Numbers)

DETAILED SPECIFICATIONS

I. GENERAL

A. INTRODUCTION

These specifications govern the construction of water main, in the City of Oak Creek in the locations as shown on the plans.

All work performed and all materials supplied under this contract shall conform to the Contract Documents and to all specifications, codes, and ordinances either referred to or established by law.

B. APPLICABLE SPECIFICATIONS

The following specifications shall be applicable to all construction under this project:

1. General Specifications of the Department of Engineering, City of Oak Creek, hereinafter referred to as the General Specifications in these Detailed Specifications.
2. Standard Specifications for Sewer and Water Construction in Wisconsin, current Edition, with addendums hereinafter referred to as the Standard Specifications in these Detailed Specifications.
3. Highway and Structure Construction - Std. Specs. Dept. of Trans., Division of Highways, State of Wis., current edition and supplemental specifications hereinafter referred to as the State Specifications in these Detailed Specifications.
4. These Detailed Specifications.
5. The Construction Plans.
6. Manual on Uniform Traffic Control Devices, current edition.
7. City of Oak Creek Engineering Design Manual, current edition.

Copies of the aforementioned General, Standard and State Specifications are on file at the Engineering Department of the City of Oak Creek for use and reference on the premises by prospective bidders and by the Contractor.

The Detail Specifications and the construction plans cover items, corrections, deletions or additions to the applicable contract specifications and take precedence over those other parts of these specifications that may be in conflict herewith.

Any conflict between the various specifications and the construction plans shall be brought to the attention of the Utility Engineer by the bidders and/or the Contractor. Where such conflict may exist, the Utility Engineer shall have the sole authority to exercise a decision as to the meaning of the bidding and contract documents.

Reference shall also be made to the Instructions to Bidders of the bid and contract documents.

C. CONTROL OF CONSTRUCTION OPERATIONS

1. Scheduling Work

The Contractor will not be permitted to start new phases of the project until previously started phases are fully completed or continuous work, in the opinion of the Utility Engineer, is being done to fully complete the previously started phases. However, the Contractor may with the approval of the Utility Engineer, start a second crew with a second foreman on other portions of the project. (Refer also to Sections 1.2.2 and 1.3.21 (Pages 1-10 and 1-21, respectively) of the Standard Specifications).

At any time during the execution of the contract that the Contractor either suspends or returns to work, he must notify the Utility Engineer of his intentions at least three working days in advance of said suspension or return to work.

2. Maintenance of Public Safety and Convenience

The Contractor shall provide for the placing of necessary detour signs, barricades, warning lights, and warning and informational signs to provide for the safety and convenience of the public prior to starting of any of the work per the State Manual on Uniform Traffic Control Devices. Adjustment to the traffic control devices shall be included and performed by the contractor as called for by the progression of work. Necessary traffic control adjustments shall be in place prior to proceeding with work that could impact the safety of the general public as determined by the Utility Engineer.

All such devices shall comply with the Federal Manual on Uniform Traffic Control Devices.

3. Access to Properties

The Contractor shall provide for access to the properties abutting the work site area in accordance with Section 1.7.7 (Page 1-33) of the Standard Specifications. South Knights Place shall be open to through traffic. In addition, the operations shall be conducted in such a manner that all abutting properties shall be provided with vehicular access overnight, on weekends and on holidays.

The Contractor shall inform residents at least 24 hours prior to a temporary closure of their driveway.

4. Haul Roads and Storage Areas

The Contractor shall be required to submit a plan indicating his intended location of haul roads and storage areas for equipment and materials. Such plan shall be presented at the pre-construction meeting and shall be subject to the approval of the Utility Engineer. Any subsequent proposed changes to the approved plan shall be submitted to the Utility Engineer for approval prior to implementation of the change. Construction traffic shall be permitted on pre-approved areas. All areas used for haul roads and storage shall be subject to restoration by the Contractor to the condition prior to the start of work under this contract.

5. Supervision and Superintendence

Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction. Contractor shall not be responsible for the negligence of Owner or Engineer in the design or specification of a specific means, method technique, sequence, or procedure of construction which is shown or indicated in and expressly required by the Contract Documents.

At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

6. Safety and Protection

Contractor shall be solely responsible for initiation, maintaining, and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:

- a. all persons on the Site or who may be affected by the Work;
- b. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and
- c. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.

Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property

from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify owners of adjacent property and the Underground Facilities and other utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property.

Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply which at the Site.

All damage, injury, or loss to any property caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).

Contractor's duties and responsibilities for safety and for protection of the Work shall continue until such time as all the Work is completed.

Contractor shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

7. Hazard Communication Programs

Contractor shall be responsible for coordinating and exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws and Regulations.

II. NOTICES AND PERMITS

A. GENERAL UTILITY NOTIFICATION

Please note: Section 66.0831 of Wisconsin Statutes makes it mandatory that:

"66.0831 Interference with public service structure. A contractor with a contract for work upon, over, along or under a public street or highway may not interfere with, destroy or disturb the structures of a public utility, including a telecommunications carrier as defined in s. 196.01 (8m), encountered in the performance of the work in a manner that interrupts, impairs or affects the public service for which the structures may be used, without first obtaining written authority from the commissioner of public works or other appropriate authority. A public utility, if given reasonable

notice by the contractor of the need for temporary protection of, or a temporary change in, the utility's structures, determined by the commissioner of public works or other appropriate authority to be reasonably necessary to enable the work, shall temporarily protect or change its structures located upon, over, along or under the surface of a public street or highway. The contractor shall pay or assure to the public utility the reasonable cost of the temporary structure or change, unless the public utility is otherwise liable. If work is done by or for the state or by or for any county, city, village, town sanitary district, metropolitan sewerage district created under ss. 200.01 to 200.15 or 200.21 to 200.65 or town, the cost of the temporary protection or temporary change shall be borne by the public utility."

The Contractor shall refer to Chapter 1.2.0 (Pages 1-9) of the Standard Specifications, in regard to necessary notices and permits required. These provisions shall be strictly adhered to at the start of any part of the project. In particular, the following requirements shall apply.

B. NOTIFICATION TO WE ENERGIES (Electric and Gas Utility)

In accordance with the provisions of the Wisconsin State Statutes, with regard to the maintenance of a certain clearance from energized conductors and with regard to notification where work might affect public utility facilities, it is the requirement herein that the Contractor shall be responsible for and duty-bound to notify the We Energies in writing in advance of work to be done near electric or gas facilities. Such notice shall be directed to:

We Energies – Electric Operations
4800 W. Rawson Avenue
Franklin, Wisconsin 53132
Phone: (414) 423-6112

Emergency or additional notification, if any is required during construction, shall be done by contacting their office at 221-3700.

We Energies - Gas Operations
4800 West Rawson Avenue
Franklin, WI 53132
Phone: (414) 423-5062

C. NOTIFICATION TO AT&T

The Contractor shall notify the communication utilities that have facilities located within the project limits of his construction schedule as it affects said each company as prescribed by the Wisconsin State Statutes.

Such notice shall be directed to the following Utilities:

AT&T
Cable Location Plant

435 S. 95th Street
Milwaukee, WI 53214
Phone: (262) 896-7434

D. NOTIFICATION TO TIME WARNER CABLE

The Contractor shall notify Time Warner Cable of his construction schedule as it affects said cable communications company as prescribed by the Wisconsin State Statutes. Notice shall be directed to:

Time Warner Cable
5475 West Abbott Avenue
Greenfield, WI 53220

Additional notification, if any is required during construction, shall be done by contacting their office by phone at 414/277-4280.

E. NOTIFICATION TO CITY'S STREET, FIRE, & POLICE DEPARTMENTS, & OAK CREEK WATER & SEWER UTILITY

Prior to starting construction within any street, three days' written notice shall be given to the following departments:

1. Street Division, 800 W. Puetz Road, (414) 768-6553
2. Fire Department, 7000 S. 6th Street, (414) 570-5630
3. Police Department, 301 W Ryan Road, (414) 768-8200
4. Oak Creek Public Schools, 7630 South Tenth Street (414) 768-5880
5. Oak Creek Water & Sewer Utility, 170 W. Drexel Avenue, (414) 570-8210

F. OAK CREEK WATER & SEWER UTILITY WATER USE PERMIT

The Contractor will be permitted to use the Utility water supply where available for incidental uses providing a permit is first obtained from the Oak Creek Water and Sewer Utility, 170 West Drexel Avenue, Oak Creek, Wisconsin. There will be no charge for this water use unless the amount is determined to be excessive as defined by the Utility Engineer. The included water will include water needed for filling, testing, and flushing of new water mains. If an invoice is issued and said bill is not paid by completion of the project, the amount of said bill will be deducted from the final contract payment.

G. WORK IN EASEMENTS

The work will be performed in an easement or by right-of-entry upon private lands. The requirements of Sections 1.7.13 and 1.7.14 (Pages 1-35 and 1-36) of the Standard Specifications and these detailed specifications, if any, shall be adhered to.

The requirements of Section 1.7.14 of such Standard Specifications shall also apply to the public right-of-way between the pavement and the property line where the installation is in the public right-of-way or in an easement abutting public right-of-way.

III. CONTRACTOR'S INSURANCE

A. GENERAL

The Contractor shall not commence work under this contract until he has obtained all insurance required under this paragraph and such insurance has been approved by the Utility and insurance certificates have been filed with the Utility, nor shall the Contractor allow any Subcontractor to commence work on his subcontract until all similar insurance required of the Subcontractor has been so obtained and approved in accordance with Section 1.8.4 of the Standard Specifications and these Detailed Specification provisions.

B. COMPENSATION INSURANCE

The Contractor shall take out and maintain during the life of this contract, Worker's Compensation Insurance for all of his employees at the site of the project and in case any work is sublet, the Contractor shall require the Subcontractor similarly to provide Worker's Compensation Insurance for all of the latter's employees, unless such employees are covered by the protection afforded by the Contractor. In case any class of employees engaged in hazardous work under this contract at the site of the project is not protected under the Worker's Compensation Statute, the Contractor shall provide and shall cause each Subcontractor to provide adequate insurance coverage for the protection of his employees not otherwise protected.

C. PUBLIC LIABILITY, PROPERTY DAMAGE, AND CONTRACTUAL LIABILITY INSURANCE

The Contractor shall take out and maintain during the life of this contract, public liability, property damage, and contractual liability insurance in the following minimum amounts:

Bodily Injury	\$1,000,000 per occurrence
	\$1,000,000 aggregate
Property Damage	\$500,000 per occurrence
	\$500,000 aggregate

These policies shall protect the Contractor and any Subcontractor performing work covered by this contract from the claims and damages for personal injury, including accidental death, as well as claims for property damage, which may arise from the performance of the work or under the hold-harmless and indemnifying clauses which are a part of this contract. The said policies are to cover not only the Contractor or Subcontractor but also any other directly or indirectly employed by either of them.

D. ADDITIONAL INSURED ENDORSEMENTS

Contractor shall purchase and maintain liability insurance, as described above, specifically naming as additional insureds OWNER and ENGINEER as well as other individuals or entities so identified, using Additional Insurance Endorsement Form CG 20 26 07 04, CG 81 11 05 06, CG 20 10 07 04, or equivalent form. General liability policies shall also be endorsed with Form CG 20 37 07 04 to include the “products completed operations coverage.”

Endorsements or General Liability policy shall not exclude supervisory or inspection services.

Contractor shall also provide Additional Insured Endorsement for the automobile policy. Endorsement form shall be CA 20 48, or equal.

E. INSURANCE AGAINST THE FOLLOWING SPECIAL HAZARDS

The following respective amounts shall be procured by the Contractor or Subcontractor before the commencement of any operation by the Contractor, or the happening of any circumstance creating or tending to create the particular special hazard:

<u>Kind</u>	<u>Amount</u>
Operating of elevators or hoists.....	\$25,000.00
Use and operation of automobiles and truck.....	\$25,000.00
Structural alterations or demolitions	\$25,000.00
Undermining adjacent structures.....	\$10,000.00
Blasting operations	\$10,000.00
Operation of excavating machinery in streets and highways.....	\$10,000.00
Operation within other public or private right-of-way (including railroad right-of-way)	As Required

IV. PERFORMANCE BOND AND GUARANTEE

Where the contract is over \$10,000.00, the contractor will be required to furnish a satisfactory performance bond in the amount of 100% of the contract. The Contractor shall pay the total cost of this bond. Such bond shall be executed by an authorized surety company and shall remain in full force and effect for a period of one year after the final payment for the work to guarantee workmanship and materials. A performance bond shall not be required for public works contracts below \$10,000.00 regardless of bond requirement.

The Contractor shall agree and guarantee that the material and workmanship supplied by him shall be free from all defects, and strictly in accordance with the plans and specifications, at the time of its completion and acceptance by the municipality, and for a time of one year thereafter, the Contractor agrees to forthwith repair the same upon notification by the municipality using the same material required by these specifications. In case the Contractor

shall fail to make such repairs or cause the same to be made, the Contractor agrees and guarantees to pay on demand the cost thereof, to said municipality upon the completion of such repairs, and the Contractor further agrees and guarantees to pay for all labor and material used in or about the construction of said work in his contract, which may become a lien or a claim against the municipality.

V. METHOD OF PAYMENTS

Payments will normally be made monthly throughout the progress of the work, provided the work completed is substantial enough in the opinion of the Utility Engineer.

Such payments shall be in accord with Section 66.0901 (9) b, of the State Statutes which states that the City,

“(b) Retained percentages. As the work progresses under a contract involving \$1,000 or more for the construction, execution, repair, remodeling or improvement of a public work or building or for the furnishing of supplies or materials, regardless of whether proposals for the contract are required to be advertised by law, the municipality, from time to time, shall grant to the contractor an estimate of the amount and proportionate value of the work done, which entitles the contractor to receive the amount of the estimate, less the retainage, from the proper fund. The retainage shall be an amount equal to not more than 5% of the estimate until 50% of the work has been completed. At 50% completion, further partial payments shall be made in full to the contractor and no additional amounts may be retained unless the architect or engineer certifies that the job is not proceeding satisfactorily, but amounts previously retained shall not be paid to the contractor. At 50% completion or any time after 50% completion when the progress of the work is not satisfactory, additional amounts may be retained but the total retainage may not be more than 10% of the value of the work completed. Upon substantial completion of the work, an amount retained may be paid to the contractor. When the work has been substantially completed except for work which cannot be completed because of weather conditions, lack of materials or other reasons which in the judgment of the municipality are valid reasons for noncompletion, the municipality may make additional payments, retaining at all times an amount sufficient to cover the estimated cost of the work still to be completed or may pay out the entire amount retained and receive from the contractor guarantees in the form of a bond or other collateral sufficient to ensure completion of the job. For the purposes of this section, estimates may include any fabricated or manufactured materials and components specified, previously paid for by the contractor and delivered to the work or properly stored and suitable for incorporation in the work embraced in the contract. ”

VI. TIME OF COMPLETION

The starting date for work under this contract shall be at the discretion of the Contractor, subject to the following:

- A. Preconstruction meeting as arranged by the Utility Engineer.
- B. Issuance of the Notice to Proceed by the Utility Engineer.
- C. The entire project, including surface restoration shall be completed no later than September 30, 2017.

It shall be understood by the Contractor that the date of starting construction and the date of completion of the work to be done hereunder are **ESSENTIAL CONDITIONS** of this contract, and it is further understood and agreed that the work shall be commenced as aforementioned.

The Contractor agrees that the work shall be pursued regularly, diligently, and uninterruptedly at such rate of progress as will assure completion of the work on the dates as stated in the proposal.

VII. EXTENSIONS OF TIME

Extensions of time may be allowed by the Utility for reasonable delays due exclusively to causes beyond the control and without the fault of the Contractor including but not restricted to owner purchased material delivery delays, extra work or supplemental contract work added to the original contract, fires, strikes, unusual floods, accidents and unreasonable delays in receiving ordered materials and equipment. It should be understood by the Contractor that rain events occur and fluctuate from year to year and shall not be considered cause for a time extension.

All requests for extensions of time shall be presented in writing to the Utility Engineer within ten calendar days after the occurrence of the claimed delay, accompanied by all necessary supporting data, and, if based on valid grounds will be considered by the Utility and such extensions of time shall be granted as may seem to be fair and reasonable. However, no claims will be considered when based on delays caused by conditions existing at the time bids were received and of which the Contractor might be reasonably expected to have knowledge at the time of bidding, or upon delays caused by failure on the part of the Contractor to anticipate properly the requirements of the work contracted for as to the securing of needed materials, labor and equipment.

VIII. LIQUIDATED DAMAGES

When the work embraced in the contract is not completed within the time stated in the Detail Specifications for the water main construction, and/or for the entire work, including testing, flushing, and surface restoration, as stated, and within such extra time as may be allowed by extensions, the Contractor shall pay to the Oak Creek Water & Sewer Utility the following sum for each and every calendar day that the time consumed in final completion exceeds the

time allowed therefore, plus the engineering and inspection costs incurred during the time used beyond the allowed time:

Original Contract Amount		Daily Charge
From More Than	To and Including	Calendar Day
\$0	\$50,000	\$200.00
\$50,000	\$100,000	\$250.00
\$100,000	\$300,000	\$350.00
\$300,000	\$500,000	\$500.00
\$500,000	\$1,000,000	\$700.00
\$1,000,000	\$1,500,000	\$1,000.00
\$1,500,000	\$2,000,000	\$1,350.00
\$2,000,000	\$2,500,000	\$1,400.00
\$2,500,000	---	\$1,550.00

Completion of the work under this contract on the specified time schedules is necessary and vital to the Utility. Failure to complete the project on or before specified working days or calendar dates will result in loss of revenues, loss of timely use of the proposed facilities, delays, and possibly inflated costs for related or subsequent improvement installations, detrimental to the economic development of the City and Utility, as well as the additional cost of engineering expenses which will be required to be paid by the Utility.

Said sum in view of the difficulty of accurately ascertaining the loss which the Utility will suffer by reason of delay in completion is hereby fixed and agreed by the parties hereto as the liquidated damages that will be suffered by reason of such delay, and not as a penalty. The Utility will deduct and retain out of the monies which may become due hereunder, the amount of any such liquidated damages and in case the amount which may become due hereunder shall be less than the amount of liquidated damages suffered, the Contractor shall be liable to pay the difference upon demand by the Utility.

SECTION 01010

SUMMARY OF WORK

PART 1—GENERAL

1.01 DIVISION ONE

- A. The requirements of Division 1 apply to all sections of the Contract(s).

1.02 PROJECT SCOPE

- A. CONTRACTOR shall provide all items, articles, materials, operations or methods mentioned or scheduled on the Drawings or herein specified: including all labor, supervision, equipment, incidentals, taxes, and permits necessary to complete the Work as described within the Contract Documents. CONTRACTOR shall install all items provided by OWNER as mentioned or scheduled on the Drawings or herein specified.

1.03 CONTRACT DOCUMENTS—INTENT AND USE

A. Intent of Documents:

1. Singular notations and specifications shall be considered plural where application is reasonably inferred.
2. Mention or indication of extent of work under any division or Specification section is done only for convenience of CONTRACTOR and shall not be construed as describing all work required under that division or section.
3. Some individual sections may contain a list of related sections. The list of related sections in individual sections is provided for the convenience of CONTRACTOR and is not necessarily all-inclusive. CONTRACTOR may not rely upon this listing for determination of scope of work. Other sections of the Specifications not referenced in individual sections shall apply as required for proper performance of the Work.
4. Command type sentences may be used in the Contract Documents. These sentences refer to and are directed to CONTRACTOR.
5. Symbols for various elements and systems are shown on the Drawings. Should there be any doubt regarding the meaning or intent of the symbols used, a written interpretation shall be obtained from ENGINEER.

B. Use of Documents:

1. CONTRACTOR shall examine all Specifications and Drawings for the Work, including those that may pertain to Work CONTRACTOR does not normally perform with its own forces.
2. CONTRACTOR shall use all of the Project Drawings and Specifications:
 - a. For a complete understanding of the Project.
 - b. To determine the type of construction and systems required.
 - c. For coordination with other contractors.
 - d. To determine what other work may be involved in various parts or phases.
 - e. To anticipate and notify others when work by others will be required.
 - f. And all other relevant matters related to the project.
3. CONTRACTOR is also bound by all requirements of the Contract Documents which are applicable to, pertain to, or affect its Work as may be shown or inferred by the entire set of Project Drawings and Specifications.

1.04 CONSTRUCTION REQUIREMENTS

- A. General Requirements: Permanent seeding shall be completed between August 24 and September 9, 2017.
- B. CONTRACTOR shall clear all equipment and material from South Knights Place by Noon on July 3, 2017. The street shall be swept by CONTRACTOR in preparation for the parade on July 4, 2017. No construction activities are allowed at the site on July 4, 2017. All construction activities may resume July 5, 2017.

1.05 CONTRACTOR USE OF SITE

- A. General:
 - 1. The "area of the site" referred to in these Specifications shall be as shown on the Drawings. If the "area of the site" is not shown, OWNER's property lines, the Project right-of-way and/or any easements obtained for the Project shall be considered the "area of the site."
 - 2. Construction activities shall be confined within the "area of the site" limits.
 - 3. From the start of work to completion CONTRACTOR is responsible for the care of the site and the premises which are affected by operations of Work of this Contract.
 - 4. Except for permanent site improvements provided under the Contract, CONTRACTOR shall restore property disturbed during the Work, to the conditions which previously existed.
 - 5. Work in occupied spaces shall be restricted to specified Work and essential activities, such as making necessary connections and extending services or constructing temporary access ways. Such work shall be scheduled in advance with OWNER.
- B. Parking and Deliveries:
 - 1. CONTRACTOR is responsible for control of traffic by vehicles and persons within the limits of its operations.
 - 2. Parking for employees, subcontractors, and agents of CONTRACTOR shall be on the east side of South Knights Place.
 - 3. Access to the site for delivery of construction material or equipment shall be subject to the south driveway where the tracking pad is located as shown on the Drawings.

1.06 EXISTING SERVICES, OVERHEAD UTILITIES, AND UNDERGROUND FACILITIES INCLUDING STRUCTURES

- A. Interruption of existing services and systems including heating, ventilating, air conditioning, water, sanitary, lighting and power, signal and security systems, and similar work shall be kept to an absolute minimum and shall be limited to times approved by OWNER.
- B. If deemed necessary by OWNER, such work shall be accomplished after OWNER's normal office hours.
- C. Work shall not commence until all labor, materials, and equipment are available so Work can continue without interruption or delay.
- D. Should uncharted or incorrectly charted services or Underground Facilities be encountered during installation, notify OWNER and consult with utility owner immediately.

- E. Cooperate with OWNER and utility companies in keeping respective services and Underground Facilities in operation and repair any damage.
- F. CONTRACTOR shall not interrupt existing services and Underground Facilities occupied and used by OWNER or others, except when permitted in writing by OWNER.
- G. Any accidental interruption of services and Underground Facilities shall be repaired immediately, including provision of temporary facilities until permanent repairs can be made.
- H. Wisconsin Statute 182.0175(2) requires, among other provisions, that before excavation or demolition begins, reasonable advance notice not less than three working days prior to the start of the excavation or demolition of the intent to excavate or demolish and the commencement date be provided to the owners of the Underground Facilities in and near the construction area whose facilities may be affected by the excavation or demolition. As part of this notification requirement, CONTRACTOR shall contact Digger's Hotline (811 or 1-800-242-8511). CONTRACTOR shall be aware that not all owners participate in the Digger's Hotline program. A call to this agency shall not absolve CONTRACTOR of the requirements of this statute. CONTRACTOR shall comply with all other provisions of the statute though not enumerated herein.
- I. Locations and elevations of services and Underground Facilities as shown on the Drawings are approximate. It shall be CONTRACTOR's responsibility to determine their exact location when in their vicinity. To this end, CONTRACTOR shall proceed with caution in the excavation and preparation of the Site so the exact location of services and Underground Facilities can be determined. CONTRACTOR shall include in the Contract Price any costs for temporary or permanent relocations of such services and Underground Facilities required to complete the Work unless specifically indicated otherwise in the Specifications.
- J. Where potential grade conflicts might occur with existing services and Underground Facilities, CONTRACTOR shall uncover such services and Underground Facilities sufficiently in advance of construction so that elevations may be determined to allow any necessary adjustments to be made.
- K. CONTRACTOR shall coordinate with overhead utility companies prior to the Work. CONTRACTOR shall provide all necessary temporary and permanent support relocation or temporary and permanent restraint to maintain overhead utilities in service.
- L. CONTRACTOR shall keep an accurate and complete record of all such services and Underground Facilities encountered and shall provide OWNER a copy of this record. The record shall include a description of the item encountered, opinion as to conditions, and adequate measurements and depths so that the item can be located in the future.
- M. CONTRACTOR shall inspect all services and Underground Facilities for condition and soundness. Unsound conditions shall be reported to OWNER immediately after exposing. CONTRACTOR shall not proceed with the Work until the service or facility owner has been notified. Service or facility owner shall then be given time to inspect and correct, if required, the service or Underground Facility. CONTRACTOR may make claim under the provisions of Articles 11 and 12 of the General Conditions should CONTRACTOR feel a price or time adjustment is justified.

- N. Any additional costs incurred because of failure of CONTRACTOR to report the condition of any and all existing services and Underground Facility encountered shall be paid for by CONTRACTOR.
- O. Whenever ENGINEER feels it is necessary to explore and excavate to determine the location of existing services and Underground Facilities, CONTRACTOR shall make explorations and excavations for such purposes. If CONTRACTOR is required to perform additional Work in making the explorations and excavations, extra compensation will be allowed as provided for in the General Conditions.

1.07 PROTECTION OF WORK AND IMPROVEMENTS

- A. CONTRACTOR shall protect the property of OWNER, existing improvements, and the Work installed by CONTRACTOR and others from abuse, damage, dust, debris, and other objectionable materials resulting from construction activities.
- B. CONTRACTOR shall provide suitable covers, partitions, or other dust and fume containment devices to suit construction operations.
- C. CONTRACTOR shall keep property, existing improvements, and the Work including structures, mains, fittings, and accessories free from dirt and foreign matter at all times.
- D. CONTRACTOR shall provide temporary plugging of openings, holes, and pipe ends that are existing or that CONTRACTOR has installed.
- E. Property, improvements, and Work damaged by CONTRACTOR shall be repaired or replaced by CONTRACTOR to the satisfaction of OWNER.

1.08 AVAILABILITY OF LANDS

- A. Easements were not obtained for this Project. CONTRACTOR shall confine its operations, equipment and storage areas to the lands and rights-of-way in which the Project is to be located. CONTRACTOR may enter into written agreements with property owners for use of other lands during construction. Copies of such agreements shall be provided to OWNER.

PART 2-PRODUCTS

NOT APPLICABLE

PART 3-EXECUTION

NOT APPLICABLE

END OF SECTION

SECTION 01019

CONTRACT CONSIDERATIONS

PART 1—GENERAL

1.01 SUMMARY

- A. Work Included: Measurement and Payment—Lump Sum.

1.02 MEASUREMENT AND PAYMENT—LUMP SUM

- A. Payment for Lump Sum projects will be based on the accepted schedule of values for the project.
- B. An acceptable schedule of values will include the following features:
 - 1. Schedule shall list the installed value of the component parts of the work in sufficient detail to serve as a basis for computing values for progress payments during construction. Schedule shall be subdivided as necessary by specification section and work area.
 - 2. Identify each line item with the number and title of the respective Specification Section.
 - 3. For each major line item list sub-values of major products or operations under the item.
 - 4. For the various portions of the work:
 - a. Each item shall include a directly proportional amount of CONTRACTOR's overhead and profit.
 - b. For items on which progress payments will be requested for stored materials, break down the value into:
 - (1) The cost of the materials, delivered and unloaded, with taxes paid. Paid invoices are required for materials upon request by ENGINEER.
 - (2) The total installed value.
 - 5. The sum of all values listed in the schedule shall equal the total Contract Sum.
 - 6. Schedule shall include a separate listing of general items such as bonds, insurance, mobilization, demobilization, field supervision, and record documents.
- C. Once a schedule of values is accepted, it shall not be revised, except for changes associated with subsequently executed change orders.
- D. No separate measurement for payment will be performed for Lump Sum Work.
- E. CONTRACTOR shall estimate percentage of Work completed. ENGINEER will review CONTRACTOR's estimate of quantity of Work completed.
- F. Payment will be made based on the percentage of the Contract completed less retainage and/or liquidated damages.
- G. Unless noted otherwise, all Work described in the Specifications and/or shown on the Drawings shall be included in the Lump Sum Bid.
- H. Some technical specification sections may include payment provisions. These provisions are in addition to the provisions of this section which apply to all of the Work.

PART 2-PRODUCTS

NOT APPLICABLE

PART 3-EXECUTION

NOT APPLICABLE

END OF SECTION

SECTION 01039

COORDINATION, FIELD ENGINEERING, AND MEETINGS

PART 1—GENERAL

1.01 SUMMARY

- A. Work Included:
 - 1. Coordination.
 - 2. Field engineering.
 - 3. Progress meetings.

1.02 COORDINATION

- A. CONTRACTOR shall coordinate scheduling, submittals, and work of the various sections of the work to assure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later. See Section 01010—Summary of Work for specific construction sequence.
- B. CONTRACTOR shall verify utility requirements and characteristics of operating equipment are compatible with building utilities and coordinate Work of various sections having interdependent responsibilities for installing, connecting to, and placing in service such equipment.
- C. CONTRACTOR shall coordinate space requirements and installation of mechanical and electrical work which are indicated diagrammatically on the Drawings and shall follow routing shown for pipes, ducts, and conduit as closely as practicable; place runs parallel with line of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- D. In finished areas, except as otherwise indicated, CONTRACTOR shall conceal pipes, ducts, and wiring within the construction and coordinate locations of fixtures and outlets with finish elements.
- E. CONTRACTOR shall coordinate completion and cleanup of Work of separate sections in preparation for substantial completion and for portions of Work designated for OWNER's occupancy.
- F. After OWNER occupancy of premises, CONTRACTOR shall coordinate access to Site for correction of defective Work and Work not in accordance with Contract Documents to minimize disruption of OWNER's activities.

1.03 FIELD ENGINEERING

- A. CONTRACTOR shall locate and protect property stakes, legal survey monuments, benchmarks, and survey control and reference points. CONTRACTOR shall pay for replacement of disturbed property stakes and legal survey monuments by a Registered Land Surveyor acceptable to OWNER and for replacement of benchmarks and survey control and reference points provided by ENGINEER.

- B. CONTRACTOR shall provide field engineering services as required to establish elevations, lines, and levels utilizing recognized engineering survey practices.
- C. CONTRACTOR shall furnish all required plummets and graduated poles to check all Work.
- D. If stakes and boards have to be reset because of negligence of CONTRACTOR, CONTRACTOR shall bear the cost of such work.
- E. If laser beam is used, CONTRACTOR shall check its Work against intermediate grade stakes provided between manholes. Prior to initial use of the laser, CONTRACTOR shall set up laser on ground surface and check line and gradient controls. Lasers not functioning properly shall be immediately removed.
- F. If existing property stakes not within the limits of the trench are removed or damaged by CONTRACTOR, CONTRACTOR shall bear the cost of replacement. Replacement shall be made by a legal survey performed by a licensed Land Surveyor hired by OWNER. Cost for survey shall be deducted from the Contract Price.
- G. CONTRACTOR shall be responsible for all lines, elevations, and measurements of buildings, structures, piping, utilities, and other work executed by CONTRACTOR under the Contract. CONTRACTOR must exercise proper precaution to verify figures before laying out the Work and will be held responsible for any error resulting from its failure to exercise such precaution.

1.04 PROGRESS MEETINGS

- A. Progress meetings will be held throughout progress of the Work at intervals agreed to by OWNER, ENGINEER, and CONTRACTOR.
- B. CONTRACTOR's project manager, job superintendent, major subcontractors, and suppliers shall attend as appropriate to address agenda topics for each meeting. CONTRACTOR's representatives shall have authority to bind CONTRACTOR to decisions at the meetings.
- C. The project schedule shall be updated and shall be reviewed at each progress meeting. CONTRACTOR shall provide the following information in written form at each meeting.
 - 1. Construction progress, including:
 - a. Activities completed this reporting period.
 - b. Activities in progress this reporting period.
 - c. Activities scheduled to commence this reporting period.
 - 2. Description of problem areas.
 - 3. Current and anticipated delays.
 - a. Cause of the delay.
 - b. Corrective action and schedule adjustments to correct the delay.
 - c. Impact of the delay on other activities, on milestones, and on completion dates.
 - 4. Changes in construction sequence.
- D. ENGINEER will prepare and distribute minutes to all attending parties.

PART 2-PRODUCTS

NOT APPLICABLE

PART 3-EXECUTION

NOT APPLICABLE

END OF SECTION

SECTION 01045

CUTTING, PATCHING, AND ALTERATIONS

PART 1—GENERAL

1.01 SUMMARY

- A. Work Included: CONTRACTOR shall be responsible for all cutting, fitting, patching, and other alterations required to complete the Work as specified herein or to:
 - 1. Make its several parts fit together properly.
 - 2. Uncover portions of the Work to install improperly sequenced Work.
 - 3. Remove and replace defective Work.
 - 4. Remove and replace Work not conforming to requirements of the Contract Documents.
 - 5. Remove samples of installed Work as specified for testing.
 - 6. Provide penetrations of surfaces for installation of piping and electrical conduit.

1.02 REFERENCES

- A. ANSI A10 Safety Requirements for Construction and Demolition.

1.03 QUALITY ASSURANCE

- A. CONTRACTOR shall perform all cutting, patching, and alterations in strict accordance with pertinent requirements of these Specifications.
- B. Except as modified by governing codes, CONTRACTOR shall comply with the applicable provision and recommendations of ANSI A10.

1.04 SUBMITTALS

- A. CONTRACTOR shall submit a written request to OWNER well in advance of executing any cutting or alteration which affects the following:
 - 1. Work of OWNER or any separate contractor.
 - 2. Structural value or integrity of any element of the Project.
 - 3. Integrity or effectiveness of weather-exposed or moisture-resistant elements or systems.
 - 4. Efficiency, operational life, maintenance, or safety of operational elements.
 - 5. Visual qualities of sight-exposed elements.
- B. The request shall include:
 - 1. Description of affected work.
 - 2. The necessity for cutting, patching, or alteration.
 - 3. Effect on work of OWNER, any separate contractor, or on the structural or weather-proof integrity of the Project.
 - 4. Description of proposed work to include:
 - a. Scope of cutting, patching, or alteration.
 - b. Trades who will execute the work.
 - c. Products proposed to be used.
 - d. Extent of refinishing to be done.
 - 5. Alternatives to cutting and patching.

- 6. Written permission of any separate contractor whose work will be affected.
- C. Submit written notice to OWNER designating the date and the time the Work will be uncovered or executed.

1.05 SCHEDULING AND COORDINATION

- A. All work under this section shall be coordinated with OWNER's work forces and those of other contractors and shall be accomplished at times acceptable to OWNER.
- B. Before starting any work relating to existing utilities (electrical, sewer, water, heat, gas, fire lines, etc.) that will temporarily discontinue or disrupt service, notify ENGINEER and OWNER 72 hours in advance and obtain OWNER's approval before proceeding with this phase of the work. Temporary facilities, if required, shall be in place prior to disruption of service.

PART 2-PRODUCTS

2.01 NEW MATERIALS

- A. For replacement of work removed, CONTRACTOR shall use materials which comply with the pertinent sections of these Specifications.
- B. All new materials for patching and extending work shall match existing products and work.
- C. CONTRACTOR shall determine type and quality of existing products by inspection and any necessary testing and workmanship by use of existing as the standard.

2.02 SALVAGEABLE MATERIAL

- A. Materials or items designated to be reinstalled or to become the property of OWNER shall be as specified or as shown on the Drawings.
- B. CONTRACTOR shall remove such items with care under the supervision of the trade responsible for reinstallation.
- C. CONTRACTOR shall store these materials (off-site if necessary) and protect from damage until they are incorporated into the new work.
- D. Items which are not to be reinstalled but are to become the property of OWNER shall be removed by CONTRACTOR with care, cleaned, and stored in a location at the Site to be approved by OWNER.
- E. Materials or items damaged in its removal shall be replaced by CONTRACTOR with similar new material at no additional cost to OWNER.

2.03 UNSALVAGEABLE MATERIALS

- A. Materials or items demolished and not designated to become the property of OWNER or not designated to be reinstalled shall become the property of CONTRACTOR and shall be removed from the site and legally and properly disposed of by CONTRACTOR.

- B. Materials shall be removed by CONTRACTOR in a manner that will avoid damage to materials or equipment to remain.

PART 3-EXECUTION

3.01 INSPECTION

- A. CONTRACTOR shall inspect existing conditions including elements subject to movement or damage during cutting, patching, and other alterations.
- B. After uncovering the work, CONTRACTOR shall inspect conditions affecting installation of new products or performance of new work.
- C. CONTRACTOR shall report unsatisfactory or questionable conditions to ENGINEER in writing.
- D. CONTRACTOR shall not proceed with work until unsatisfactory or questionable conditions are resolved.
- E. Beginning of cutting, patching, and alterations work means acceptance of existing conditions by CONTRACTOR.

3.02 PREPARATION AND PROTECTION

- A. CONTRACTOR shall provide temporary bracing, shoring, needling, and support of the structure during alterations work as necessary to prevent collapse, settling, or deflection and to protect persons and property from injury or damage.
- B. Temporary supports must adequately carry all existing and imposed load.
- C. CONTRACTOR shall provide and maintain temporary protection of surface finishes, equipment, and adjacent work designated to remain where demolition, removal, and new work is being done, connections are being made, materials are being handled, or equipment is being removed.
- D. CONTRACTOR shall provide temporary partitions or barriers to contain all dust, dirt, and debris from entering into finished areas or areas where OWNER is operating, storing, or manufacturing products.
- E. CONTRACTOR shall provide adequate fire protection in accordance with local Fire Department requirements.
- F. CONTRACTOR shall provide waterproofing, weather protection, heat, and other facilities for that portion of the work which may be exposed by cutting and patching, demolition, or other alterations.

3.03 PERFORMANCE

- A. CONTRACTOR shall accomplish all work of cutting, removal, demolition, patching, or other alterations using only persons skilled in the appropriate trade.

- B. CONTRACTOR shall execute the work in a careful and orderly manner with the least possible disturbance to the public.
- C. CONTRACTOR shall execute cutting and demolition by methods which will prevent damage to other work and will provide proper surfaces to receive installation of repairs.
- D. CONTRACTOR shall execute fitting and adjustment of products to provide a finished installation to comply with specified products, functions, tolerances, and finishes.
- E. CONTRACTOR shall fit work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- F. CONTRACTOR shall thoroughly clean and prepare all surfaces to receive new finish or covering to completely remove all dirt, dust, grease, oil, paint, loose materials, and soil.
- G. CONTRACTOR shall refinish entire surface as necessary to provide an even finish to match adjacent finishes:
 - 1. For continuous surfaces, refinish to nearest intersection.
 - 2. For an assembly, refinish entire unit.

3.04 DEMOLITION, CUTTING, AND REMOVAL

- A. Cutting and removal of construction shall be performed by CONTRACTOR so as not to cut or remove more than is necessary and so as not to damage adjacent work.
- B. CONTRACTOR shall cut out embedded anchorages and attachment items as required to properly provide for patching and repair of the respective finishes.
- C. CONTRACTOR shall not cut structural work in a manner resulting in a reduction of load-carrying capacity or load/deflection ratio.
- D. CONTRACTOR shall not cut operational elements and safety components in a manner resulting in decreased performance, shortened useful life, or increased maintenance.
- E. CONTRACTOR shall not cut work exposed to view (exterior or interior) in a manner resulting in noticeable reduction of visual qualities as determined by OWNER.
- F. Construction that is to remain which is loosened, cracked, or otherwise damaged or defaced as a result of careless cutting or demolition and is unsuitable for use intended shall be removed and replaced at no additional cost to OWNER.
- G. CONTRACTOR shall clean demolished areas and remove debris, waste, and rubbish from the building at the conclusion of each day's work.
- H. CONTRACTOR shall not let piled waste material endanger the structure.

3.05 PATCHING, EXTENDING, AND MATCHING

- A. Patching work shall conform to the standards of the Specifications where applicable, and where not specified, work shall conform to the highest standards of the applicable trade.
- B. CONTRACTOR shall patch construction to match adjacent work unless noted otherwise.

- C. Patching or restoration shall be carried to natural breaks (e.g., corners) wherever possible.
- D. CONTRACTOR shall provide adequate support to substrate for patching finishes.
- E. Transitions: CONTRACTOR shall restore existing work that is damaged during patching operations to a condition equal to its construction at the time of the start of work.

END OF SECTION

SECTION 01060

REGULATORY REQUIREMENTS

PART 1—GENERAL

1.01 SUMMARY

- A. Work Included:
 - 1. OSHA requirements.
 - 2. Roadway limits.
 - 3. Permits.
 - 4. Wage rates.

1.02 OSHA REQUIREMENTS

- A. All work including site safety, equipment, materials, and fabricated items provided under the Contract shall comply with the provisions of the "Occupational Safety and Health Act."

1.03 ROADWAY LIMITS

- A. CONTRACTOR shall comply with roadway weight restrictions including seasonal weight restrictions.

1.04 PERMITS

- A. No permits were obtained by OWNER for this Project. CONTRACTOR shall obtain required permits. Where the requirements of any permit are more restrictive than the Drawings or the Specifications, the permit requirements shall govern.
- B. Any permits required for dewatering operations shall be obtained and paid for by CONTRACTOR.
- C. For dewatering operations, if dewatering wells singly or in aggregate produce 70 or more gallons per minute, CONTRACTOR shall obtain from the Wisconsin Department of Natural Resources, in accordance with Paragraph 281.17(1), Wisconsin Statutes, a permit for dewatering. The Department's private water supply section's address for Well Permits is: Wisconsin Department of Natural Resources, Private Water Supply Section, Box 7921, Madison, Wisconsin 53707. All wells shall be drilled and closed in accordance with DNR requirements for installing and abandoning wells.
- D. CONTRACTOR shall comply with the provisions of Chapter 283, Wisconsin Statutes, regulating the discharge of effluent from construction pit trench dewatering. These provisions provide for the removal of suspended solids from dewatering effluent prior to the direct discharge to surface waters or wetlands. CONTRACTOR shall apply as necessary to the Department of Natural Resources for a permit to discharge effluent from construction pit or trench dewatering. This discharge may be covered by an existing state general permit for discharging contaminated stormwater runoff/or construction pit dewatering. Information about and application forms for this permit(s) may be obtained at the address shown below.

Southeast Region:
Department of Natural Resources
2300 North Dr. Martin Luther King Jr. Drive
Milwaukee, WI 53212
(414) 263-8500

1.05 WAGE RATES

- A. A wage rate determination is not a requirement of this Project.

PART 2-PRODUCTS

NOT APPLICABLE

PART 3-EXECUTION

NOT APPLICABLE

END OF SECTION

SECTION 01090

REFERENCE STANDARDS AND DEFINITIONS

PART 1—GENERAL

1.01 SUMMARY

- A. Work Included:
 - 1. Reference Standards:
 - a. Throughout the Contract Documents, reference is made to codes and standards which establish qualities and types of workmanship and materials, and which establish methods for workmanship and materials, and which establish methods for testing and reporting on the pertinent characteristics.
 - b. Where materials or workmanship are required by these Contract Documents to meet or exceed the specifically named code or standard, it is CONTRACTOR's responsibility to provide materials and workmanship which meet or exceed that specifically named code or standard.
 - c. It is also CONTRACTOR's responsibility, when so required by the Contract Documents, to deliver to ENGINEER all required proof that the material or workmanship, or both, meet or exceed the requirements of the specifically named code or standard.
 - 2. Definitions:
 - a. A substantial amount of specification language constitutes definitions for terms found in other Contract Documents, including the Drawings which must be recognized as diagrammatic in nature and not completely descriptive of requirements indicated thereon.
 - b. Certain terms used in the Contract Documents are defined generally in this section to supplement definitions of the Agreement, General Conditions, Supplementary Conditions, and other general contract documents.
 - c. Definitions and explanations of this section are not necessarily either complete or exclusive, but are general for the Work.
- B. Related Work Described Elsewhere: The specific naming of codes or standards occurs on the Drawings and in other sections of these Specifications.

1.02 QUALITY ASSURANCE

- A. Familiarity with Pertinent Codes and Standards:
 - 1. It is CONTRACTOR's responsibility to verify the requirements of the specifically named codes and standards and to verify that the items procured for use in this Work meet or exceed the specified requirements.
 - 2. When required by individual sections of these specifications, CONTRACTOR shall obtain a copy of each pertinent code or standard and maintain the copies at the job site during submittals, planning, and progress of the Work until Substantial Completion of the Work is attained.
- B. Overlapping or Conflicting Requirements:
 - 1. Where compliance with two or more industry standards or sets of requirements are specified, and the overlapping of those standards or requirements establishes different or conflicting minimums or levels of quality, the most stringent requirement (which is

generally recognized to be also most costly) is intended and will be enforced, unless more detailed language written directly into Contract Documents clearly indicates that a less stringent requirement is acceptable.

2. Refer all uncertainties to ENGINEER for decision before proceeding.

1.03 REFERENCE STANDARDS

- A. Applicable standards of the construction industry are made a part of the Contract Documents by reference as if copied directly into the Contract Documents, or as if published copies were bound herewith. See Article 3.02 of the General Conditions for additional provisions regarding references.
- B. Standards referenced directly in the Contract Documents or by governing regulation, have precedence over nonreferenced standards which are recognized in industry for applicability to the Work.
- C. Nonreference standards are hereby defined to have no particular applicability to the work except as a general measurement of whether the Work complies with standards recognized in the construction industry.
- D. Reference standards and codes listed in these specifications may include, but are not necessarily limited to, standards or codes published by the following agencies and organizations:

1. AA Aluminum Association
1525 Wilson Boulevard, Arlington, VA 22209
2. AAMA American Architectural Manufacturer's Association
1827 Walden Office Square Suite 550, Schaumburg, IL 60173-4268
3. AASHTO American Association of State Highway & Transportation Officials
444 North Capitol Street NW Suite 249, Washington, DC 20001
4. ACI American Concrete Institute
38800 Country Club Drive, Farmington Hills, MI 48331-3439
5. AI Asphalt Institute
2696 Research Park Drive, Lexington, KY 40511-8480
6. AISC American Institute of Steel Construction
One East Wacker Drive Suite 700, Chicago, IL 60601-1802
7. AISI American Iron and Steel Institute
25 Massachusetts Avenue NW Suite 800, Washington, DC 20001
8. ANSI American National Standards Institute
25 West 43rd Street, New York, NY 10036
9. APA American Plywood Association
7011 South 19th, Tacoma, WA 98466-5333

10. API American Petroleum Institute
1220 L Street NW, Washington, DC 20005-4070
11. ARI Air-Conditioning & Refrigeration Institute
4100 North Fairfax Drive Suite 200, Arlington, VA 22203
12. ASHRAE American Society of Heating, Refrigerating, and Air Conditioning Engineers
1791 Tullie Circle NE, Atlanta, GA 30329
13. ASME American Society of Mechanical Engineers
Two Park Avenue, New York, NY 10016-5990
14. ASSE American Society of Sanitary Engineering
901 Canterbury Suite A, Westlake, OH 44145
15. ASTM ASTM International
100 Barr Harbor Drive, West Conshohocken, PA 19428-2959
16. AWI Architectural Woodwork Institute
46179 Westlake Drive Suite 120, Potomac Falls, VA 20165-5874
17. AWPA American Wood Protection Association
P.O. Box 361784, Birmingham, AL 35236-1784
18. AWS American Welding Society
8669 Doral Boulevard Suite 130, Doral, FL 33166
19. AWWA American Water Works Association
6666 West Quincy Avenue, Denver, CO 80235
20. BHMA Builder's Hardware Manufacturers Association
355 Lexington Avenue 15th floor, New York, NY 10017
21. BIA Brick Industry Association
1850 Centennial Park Drive Suite 301, Reston, VA 20191
22. CRSI Concrete Reinforcing Steel Institute
9333 North Plum Grove Road, Schaumburg, IL 60173
23. EJMA Expansion Joint Manufacturers Association
25 North Broadway, Tarrytown, NY 10591
24. FM FM Global
FM Global Corporate Offices, 270 Central Avenue, Johnston, RI 02919
25. FTI Facing Tile Institute
Box 8880, Canton, OH 44711

- 26. GA Gypsum Association
6525 Belcrest Road Suite 480, Hyattsville, MD 20782

- 27. GANA Glass Association of North America
800 SW Jackson Street Suite 1500, Topeka, KS 66612-1200

- 28. ICC International Code Council
500 New Jersey Avenue NW 6th Floor, Washington, DC 20001

- 29. IES Illuminating Engineering Society
120 Wall Street, Floor 17, New York, NY 10005-4001

- 30. MIL Military Specifications
Naval Publications and Forms Center
5801 Tabor Avenue, Philadelphia, PA 19120

- 31. NAAMM National Association of Architectural Metal Manufacturers
800 Roosevelt Road Building C Suite 312, Glen Ellyn, IL 60137

- 32. NCMA National Concrete Masonry Association
13750 Sunrise Valley Drive, Herndon, VA 20171-4662

- 33. NECA NECA
National Electrical Contractors Association
3 Bethesda Metro Center Suite 1100, Bethesda, MD 20814

- 34. NEMA National Electrical Manufacturers Association
1300 North 17th Street Suite 1752, Rosslyn, VA 22209

- 35. NFPA National Fire Protection Association
1 Batterymarch Park, Quincy, MA 02169-7471

- 36. NIST National Institute of Standards and Technology
(U.S. Department of Commerce), 100 Bureau Drive, Stop 1070
Gaithersburg, MD 20899-1070

- 37. NRCA National Roofing Contractors Association
10255 West Higgins Road Suite 600, Rosemont, IL 60018-5607

- 38. NSF National Sanitation Foundation International
P.O. Box 130140, 789 North Dixboro Road, Ann Arbor, MI 48113-0140

- 39. OSHA Occupational Safety & Health Administration
200 Constitution Avenue NW, Washington, DC 20210

- 40. PCA Portland Cement Association
5420 Old Orchard Road, Skokie, IL 60077

- 41. PCI Prestressed Concrete Institute
200 West Adams Street Suite 2100, Chicago, IL 60606

- 42. SAE Society of Automotive Engineers
SAE World Headquarters
400 Commonwealth Drive, Warrendale, PA 15096-0001

- 43. SDI Steel Deck Institute
P.O. Box 25, Fox River Grove, IL 60021

- 44. SDI Steel Door Institute
30200 Detroit Road, Westlake, OH 44145-1987

- 45. SIGMA Sealed Insulating Glass Manufacturers Assoc.
401 North Michigan Avenue Suite 2400, Chicago, IL 60611

- 46. SJI Steel Joist Institute
234 Cheves Street, Florence, SC 29501

- 47. SMACNA Sheet Metal and Air Conditioning
Contractor's National Association
4201 Lafayette Center Drive, Chantilly, VA 20151-1219

- 48. SSPC Society for Protective Coatings
40 24th Street 6th Floor, Pittsburgh, PA 15222-4656

- 49. TCA Tile Council of America
100 Clemson Research Boulevard, Anderson, SC 29625

- 50. UL Underwriters Laboratories
333 Pfingston Road; Northbrook, IL 60062

1.04 SUBMITTALS

- A. For OWNER's records, CONTRACTOR shall submit copies of permits, licenses, certifications, inspection reports, and similar documents, correspondence and records established in conjunction with compliance with standards and regulations bearing upon performance of the Work.

1.05 DEFINITIONS

- A. Indicated:
 - 1. The term "indicated" is a cross-reference to details, notes, or schedules on the drawings, to other paragraphs or schedules in the specifications and to similar means of recording requirements in the Contract Documents.
 - 2. Where terms such as "shown," "noted," "scheduled," and "specified" are used in lieu of "indicated", it is for the purpose of helping the reader locate cross-reference, and no limitation is intended except as specifically noted.

- B. Approve (or Words of Similar Nature):
 - 1. Where used in conjunction with ENGINEER's response to submittals, requests, applications, inquiries, reports, and claims by CONTRACTOR, the meaning of the term "approve" will be held to the limitation of ENGINEER's responsibilities and duties as specified in Paragraph 1.02.B.1. of the General Conditions.

2. In no case will “approval” by ENGINEER be interpreted as a release of CONTRACTOR from responsibility to fulfill requirements of the Contract Documents.
- C. Minimum Requirements:
1. Indicated requirements are for a specific minimum acceptable level of quality or quantity, as recognized in the industry.
 2. Actual work must comply with (or within specified tolerances) or exceed minimums.
 3. CONTRACTOR shall refer uncertainties to ENGINEER before proceeding.
- D. Abbreviations: Abbreviations, where not defined in the Contract Documents, will be interpreted to mean the normal construction industry terminology.

PART 2–PRODUCTS

NOT APPLICABLE

PART 3–EXECUTION

NOT APPLICABLE

END OF SECTION

SECTION 01300

SUBMITTALS

PART 1—GENERAL

1.01 SUMMARY

- A. Work Included:
 - 1. Whenever possible throughout the Contract Documents, the minimum acceptable quality of workmanship and materials has been defined either by manufacturer's name and catalog number or by reference to recognized industry standards.
 - 2. To facilitate CONTRACTOR's understanding of the design intent, procedures have been established for advance submittal of design data and for its review or rejection by ENGINEER.
 - 3. The type of submittal requirements specified in this section include progress schedule, shop drawings, product data, samples, and other miscellaneous work related submittals.
- B. Related work described elsewhere: More detailed requirements for submittals are described in other sections of these specifications for some materials and equipment. They are to be considered additional requirements to supplement the requirements specified in this section. Submittals shall conform to Article 6 of the General Conditions.

1.02 IDENTIFICATION OF SUBMITTALS

- A. CONTRACTOR shall completely identify each submittal and resubmittal by showing at least the following information:
 - 1. Name and address of submitter, plus name and telephone number of the individual who may be contacted for further information.
 - 2. Name and location of project and identification number.
 - 3. Drawing number and specifications section number to which the submittal applies.
 - 4. Include the date of each submittal or resubmittal.

1.03 GROUPING OF SUBMITTALS

- A. Unless otherwise specifically permitted by ENGINEER, CONTRACTOR shall make all submittals in groups containing all associated items so that information is available for checking each item when it is received.
- B. Partial submittals may be rejected as not complying with the provisions of the Contract Documents.

1.04 TIMING OF SUBMITTALS

- A. CONTRACTOR shall make all submittals far enough in advance of scheduled dates of installation to provide required time for reviews, for securing necessary approval, for possible revision and resubmittal, and for placing orders and securing delivery.
- B. The review period for submittals that are received after 3 P.M. shall commence on the following business day.

1.05 CONSTRUCTION PROGRESS SCHEDULE

- A. Submit initial schedule in duplicate within 10 days after date of OWNER-CONTRACTOR Agreement.
- B. Revise and resubmit as required.
- C. Submit revised schedules with each Application for Payment, identifying changes since previous version.
- D. Submit a horizontal bar chart with separate line for each major portion of Work or operation, identifying first workday of each week.
- E. Show complete sequence of construction by activity, identifying Work of separate stages and other logically grouped activities. Indicate the early and late start, early and late finish, float dates, and duration.
- F. Indicate estimated percentage of completion for each item of Work at each submission.
- G. Indicate submittal dates required for shop drawings, product data, samples, and product delivery dates.

1.06 SHOP DRAWINGS

- A. Shop drawings shall include specially prepared technical data for this project including drawings, diagrams, performance curves, data sheets, schedules, templates, patterns, reports, calculations, instructions, measurements, and similar information not in standard printed form for general application to a range of similar projects. Shop drawings shall be submitted for all manufactured or fabricated items. See individual technical sections for special requirements.
- B. CONTRACTOR shall make all shop drawings accurately to scale and sufficiently large to show all pertinent aspects of the item and its method of connection to the work.
- C. Shop drawings shall be checked, approved, and stamped by CONTRACTOR in accordance with the General Conditions before transmittal to ENGINEER for review and approval.
- D. Complete shop drawings and descriptive data shall be submitted on all manufactured or fabricated items prior to 25% completion of the Work. Applications for payment beyond 25% of the Contract amount will not be recommended for payment until all shop drawings are submitted, including the required hard copies, or a revised schedule for any remaining submittals is agreed to by OWNER and ENGINEER.
- E. CONTRACTOR shall submit shop drawings following the procedure described below. Except as noted, six color copies of shop drawings and descriptive data shall be submitted to ENGINEER for approval. Three copies of these will be returned to CONTRACTOR if approved. If shop drawings are not approved or if they are stamped "Approved as Noted-Resubmit," two corrected copies will be returned to CONTRACTOR for use in resubmittal. If CONTRACTOR desires more than three approved copies, submitted quantity shall be increased accordingly.
- F. Hard copy shop drawings shall be submitted in 3-ring binders or 3-tab report covers. **OR** Shop drawings shall be submitted in 3-tab report covers, binder clips, or large envelopes.

- G. Shop drawings submitted to ENGINEER will be reviewed and stamped "Approved," "Approved as Noted," "Approved as Noted-Resubmit," or "Not Approved." CONTRACTOR shall resubmit the above number of corrected shop drawings for all shop drawings stamped "Approved as Noted-Resubmit" and "Not Approved" and will continue this process until shop drawings are stamped "Approved" or "Approved as Noted." If drawings are stamped "Approved as Noted-Resubmit," fabrication may proceed in accordance with the marked-up shop drawings. Installation shall not proceed until shop drawings have been resubmitted and stamped "Approved" or "Approved as Noted."
- H. If shop drawings are stamped "Approved as Noted" or "Approved as Noted-Resubmit" and CONTRACTOR does not agree with revisions or cannot conform with revisions, fabrication shall not proceed and shop drawings shall be resubmitted with explanation of CONTRACTOR's position.
- I. All shop drawings used for construction site activities shall bear the "Approved" or "Approved as Noted" stamp of ENGINEER.
- J. Arrangements may be made between CONTRACTOR and ENGINEER to provide additional copies of "Approved" shop drawings for field activity purposes.

1.07 RESUBMISSION REQUIREMENTS

- A. Make any corrections or changes in the submittals required by ENGINEER.
- B. Shop Drawings and Product Data:
 - 1. Revise initial drawings or data and resubmit as specified for initial submittal.
 - 2. Itemize in a cover letter any changes which have been made other than those requested by ENGINEER.

PART 2-PRODUCTS

NOT APPLICABLE

PART 3-EXECUTION

NOT APPLICABLE

END OF SECTION

SECTION 01400
QUALITY CONTROL

PART 1—GENERAL

1.01 SUMMARY

- A. Work Includes:
 - 1. Quality Assurance—Control of Installation.
 - 2. Tolerances.
 - 3. Manufacturers' Field Services and Reports.

1.02 QUALITY ASSURANCE—CONTROL OF INSTALLATION

- A. CONTRACTOR shall monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship to produce Work of specified quality.
- B. CONTRACTOR shall comply with manufacturers' instructions, including each step in sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, CONTRACTOR shall request clarification from ENGINEER before proceeding.
- D. CONTRACTOR shall comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Work shall be performed by persons qualified to produce workmanship of specified quality.
- F. CONTRACTOR shall secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

1.03 TOLERANCES

- A. CONTRACTOR shall monitor tolerance control of installed products to produce acceptable work and shall not permit tolerances to accumulate.
- B. CONTRACTOR shall comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, CONTRACTOR shall request clarification from ENGINEER before proceeding.
- C. CONTRACTOR shall adjust products to appropriate dimensions; position before securing products in place.

1.04 MANUFACTURERS' FIELD SERVICES AND REPORTS

- A. When specified in individual specification sections or when requested by ENGINEER, CONTRACTOR shall require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, and quality of workmanship.

- B. CONTRACTOR shall submit qualifications of observer to ENGINEER 30 days in advance of required observations.
- C. CONTRACTOR shall report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.
- D. CONTRACTOR shall submit report in duplicate within 30 days of observation to ENGINEER for information.

PART 2-PRODUCTS

NOT APPLICABLE

PART 3-EXECUTION

NOT APPLICABLE

END OF SECTION

SECTION 01500

TEMPORARY FACILITIES

PART 1—GENERAL

1.01 SUMMARY

- A. Work Included:
 - 1. Temporary utilities.
 - 2. Temporary support facilities.
 - 3. Removal of temporary facilities.
- B. CONTRACTOR shall arrange for and provide temporary facilities as required for proper and expeditious prosecution of the Work.
- C. CONTRACTOR shall pay all costs, except as otherwise specified, until final acceptance of the Work unless OWNER makes arrangements for use of completed portions of the Work after substantial completion in accordance with the provisions of the General Conditions.
- D. CONTRACTOR shall make all temporary connections to utilities and services in locations acceptable to OWNER and local authorities having appropriate jurisdiction.
 - 1. Furnish all necessary labor and materials.
 - 2. Make all installations in a manner subject to the acceptance of such authorities and OWNER.
 - 3. Maintain such connections.
 - 4. Remove temporary installation and connection when no longer required.
 - 5. Restore services and sources of supply to proper operating conditions.

1.02 TEMPORARY UTILITIES

- A. Temporary Toilets: CONTRACTOR shall provide and maintain sanitary temporary chemical toilets located where approved by OWNER and in sufficient number required for the work force employed by CONTRACTOR.
- B. Temporary Electrical Services:
 - 1. CONTRACTOR shall make all necessary arrangements, furnish, install, and maintain necessary temporary electrical services at the Site. CONTRACTOR shall remove all temporary services when Project is complete.
 - 2. All utility charges for installation of the temporary services shall be paid for by CONTRACTOR. All metering installation charges and all energy charges for electric current used for temporary lighting and power are to be paid by CONTRACTOR.
 - 3. No permanent electrical equipment or wiring shall be used without express written permission of OWNER. Such approval, if given, shall not affect guarantee period. If OWNER authorizes use of permanent service facilities, CONTRACTOR shall pay all metering costs until acceptance or occupancy (whichever occurs first) of building by OWNER.
- C. Weather Protection and Temporary Heat: CONTRACTOR shall provide weather protection to protect the Work from damage because of freezing, rain, snow, and other inclement weather.

- D. Temporary Water: CONTRACTOR shall supply its own water during construction. CONTRACTOR shall also provide its own piping, valves, and appurtenances for its requirements.
- E. Temporary Fire Protection: CONTRACTOR and Subcontractor(s) who maintain or provide an enclosed shed or trailer shall provide and maintain in operating order in each shed or trailer a minimum of one fire extinguisher. More extinguishers shall be provided as necessary. Fire extinguishers shall be minimum dry chemical, nonfreezing-type, UL rating 2A-30BC, with 10-pound capacity for Class A, B, and C fires.
- F. CONTRACTOR's and Subcontractor(s)' personnel shall refrain from smoking during excavation, laying pipe, backfilling, and other work at the Site which may involve potential contact with explosive vapors or gasoline products.

1.03 TEMPORARY SUPPORT FACILITIES

- A. CONTRACTOR shall provide whatever facilities and services which may be needed to properly support primary construction process and meet compliance requirements and governing regulations.
- B. CONTRACTOR shall not use permanent facilities except as otherwise indicated, unless authorized by OWNER.

1.04 REMOVAL OF TEMPORARY FACILITIES

- A. Remove temporary materials, equipment, services, and construction as soon as practicable but no later than just prior to substantial completion inspection.
- B. Clean and repair damage caused by installation or use of temporary facilities and restore existing facilities used during construction to specified, or to original, condition.
- C. Minor temporary facilities which interfere with OWNER's operations shall be removed at the end of each Work period.

PART 2-PRODUCTS

NOT APPLICABLE

PART 3-EXECUTION

NOT APPLICABLE

END OF SECTION

SECTION 01560

TEMPORARY CONTROLS

PART 1–GENERAL

1.01 SUMMARY

- A. Work Included:
 - 1. Dust Control.
 - 2. Water, Erosion, and Sediment Control.
 - 3. Noise Control.
 - 4. Traffic Control.
 - 5. Site Security.
 - 6. Daily Cleanup.

PART 2–PRODUCTS

NOT APPLICABLE

PART 3–EXECUTION

3.01 DUST CONTROL

- A. CONTRACTOR shall execute the Work by methods to minimize raising dust from construction operations.
- B. CONTRACTOR shall provide positive means to prevent airborne dust from dispersing into atmosphere.
- C. CONTRACTOR shall provide partitions, enclosures, etc., within buildings as necessary to confine dust and protect adjacent areas.

3.02 WATER, EROSION, AND SEDIMENT CONTROL

- A. CONTRACTOR shall grade site to drain and shall maintain excavations free of water. Provide, operate, and maintain pumping equipment.
- B. CONTRACTOR shall protect Site from puddling or running water.
- C. CONTRACTOR shall provide erosion control measures as necessary to control discharge of sediment laden water to surface waters and wetlands.
- D. Except as provided for in the document, overland discharge of water from dewatering operations shall not be allowed. Depending on water quality, such water shall either be piped directly to the surface water or shall be directed to sedimentation basins or other such structures or features prior to discharge to surface waters so as not to cause damage to existing ground and improvements, erosion, or deposition in the discharge area.

- E. CONTRACTOR shall use jute or synthetic netting, silt fences, straw bales, dikes, channels, and other applicable measures to prevent erosion of soils disturbed by its construction operation.
- F. Restoration of the Site shall proceed concurrently with the construction operation. See Drawings and Specifications for erosion control measures in addition to that which may be required above.
- G. Erosion control measures shall comply with DNR Conservation Practice Standards-Construction Site Erosion and Sediment Controls.

3.03 NOISE CONTROL

- A. Provide methods, means, and facilities to minimize noise produced by construction operations.

3.04 TRAFFIC CONTROL

- A. CONTRACTOR shall be responsible for providing all signs, barricades, flagmen, and other traffic control devices in the construction zone.
- B. All traffic control measures shall meet the requirements of Part 6 of the Manual on Uniform Traffic Control Devices of the State of Wisconsin.
- C. Do not close or obstruct roadways without approval of OWNER.
- D. Maintain two-way traffic on streets at all times.
- E. Conduct operations with minimum interference to roadways.

3.05 SITE SECURITY

- A. CONTRACTOR shall have the sole responsibility of safeguarding the Site perimeter to prevent unauthorized entry to the Site throughout the duration of the Project. CONTRACTOR shall at all times provide such permanent and temporary fencing or barricades or other measures as may be necessary to restrict unauthorized entry to its construction area including construction in public rights-of-way or easements. Site security measures shall include safeguards against attractive nuisance hazards as a result of construction activity.
- B. CONTRACTOR shall at all times be responsible for the security of the Work including materials and equipment. OWNER will not take any responsibility for missing or damaged equipment, tools, or personal belongings. CONTRACTOR shall have the sole responsibility of safeguarding the Work and the Site throughout the duration of the Project.

3.06 DAILY CLEANUP

- A. CONTRACTOR shall clean up the Site and remove all rubbish on a daily basis.
- B. CONTRACTOR shall clean up public streets and highways and remove any dirt, mud, or other materials due to project traffic on daily basis and shall comply with all local and state ordinances and permit requirements.

END OF SECTION

Section 01560-2

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SECTION 01590

FIELD OFFICES AND SHEDS

PART 1—GENERAL

1.01 SUMMARY

- A. Work Included:
 - 1. Materials, equipment, and furnishings.
 - 2. Construction.
 - 3. Environmental control.
 - 4. CONTRACTOR office and facilities.
 - 5. Storage areas and sheds.
 - 6. Preparation.
 - 7. Installation.
 - 8. Maintenance and cleaning.
 - 9. Removal.

PART 2—PRODUCTS

2.01 MATERIALS, EQUIPMENT, AND FURNISHINGS

- A. Materials, equipment, and furnishings shall be serviceable, new or used, and adequate for required purpose.

2.02 CONSTRUCTION

- A. Portable or mobile buildings or buildings shall be constructed with floors raised above ground, securely fixed to foundations, with steps and landings at entrance doors.
- B. CONTRACTOR shall provide structurally sound, secure, weathertight enclosures for office and storage spaces.
- C. Temperature transmission resistance of floors, walls, and ceilings shall be compatible with occupancy and storage requirements.
- D. Exterior materials shall be weather resistant.
- E. Interior materials in offices shall consist of sheet type materials for walls and ceilings, prefinished or painted; resilient floors and bases.
- F. Lighting for offices shall be 50 footcandles minimum at desk top height, with exterior lighting at entrance doors.
- G. Provide appropriate type fire extinguisher at each office and each storage area.
- H. Interior materials in storage sheds shall be as required to provide specified conditions for storage of products.

2.03 ENVIRONMENTAL CONTROL

- A. Heating, cooling, and ventilating for offices shall consist of automatic equipment to maintain comfort conditions; 70°F heating and 78°F cooling.
- B. Heating and ventilation for storage spaces shall be as needed to maintain products in accordance with Contract Documents and to provide adequate lighting for maintenance and observation of products.

2.04 CONTRACTOR OFFICE AND FACILITIES

- A. CONTRACTOR shall provide facilities to meet CONTRACTOR's needs.
- B. Provide telephone as required for CONTRACTOR's needs.

2.05 STORAGE AREAS AND SHEDS

- A. Provide storage areas and sheds of size to meet storage requirements for products of individual sections, allowing for access and orderly provision for maintenance and for observation of products to meet requirements of Section 01600–Materials and Equipment.

PART 3–EXECUTION

3.01 PREPARATION

- A. CONTRACTOR shall fill and grade sites for temporary structures to provide drainage away from buildings.

3.02 INSTALLATION

- A. CONTRACTOR shall install office spaces ready for occupancy 15 days after date fixed in Notice to Proceed or as agreed upon by ENGINEER.
- B. Provide two hard surfaced parking spaces for use by ENGINEER, connected to office by hard surfaced walk.

3.03 MAINTENANCE AND CLEANING

- A. CONTRACTOR shall maintain approach walks free of mud, water, and snow.

3.04 REMOVAL

- A. Upon final acceptance and completion of the Work, CONTRACTOR shall remove field offices, foundations, utility services, and debris and shall restore areas.

END OF SECTION

SECTION 01600

MATERIALS AND EQUIPMENT

PART 1—GENERAL

1.01 SUMMARY

- A. Work Included: CONTRACTOR shall be responsible for the delivery, handling, storage and protection of all material and equipment required to complete the Work as specified herein.
- B. Related Sections and Divisions: Specific requirements for the handling and storage of material and equipment are described in other sections of these Specifications.

1.02 PRODUCTS

- A. Components required to be supplied in quantity within a Specification section shall be the same, and shall be interchangeable.
- B. CONTRACTOR shall not use materials and equipment removed from existing construction, except as specifically required, or allowed, by the Contract Documents.
- C. When any construction deviations from the Drawings and/or Specifications necessary to accommodate equipment supplied by CONTRACTOR, result in additional costs to CONTRACTOR or other contractors, such additional costs shall be borne by CONTRACTOR. CONTRACTOR shall also pay any additional costs necessary for revisions of Drawings and/or Specifications by ENGINEER.
- D. Each major component of equipment shall bear a nameplate giving the name and address of the manufacturer and the catalogue number or designation.

1.03 TRANSPORTATION AND HANDLING

- A. Materials, products and equipment shall be properly containerized, packaged, boxed, and protected to prevent damage during transportation and handling.
- B. CONTRACTOR shall not overload any portion of the structure in the transporting or storage of materials.
- C. CONTRACTOR shall not damage other construction by careless transportation, handling, spillage, staining or impact of materials.
- D. CONTRACTOR shall provide equipment and personnel to handle products, including those provided by OWNER, by methods to prevent soiling and damage.
- E. CONTRACTOR shall provide additional protection during handling to prevent marring and otherwise damaging products, packaging, and surrounding surfaces.
- F. CONTRACTOR shall handle product by methods to avoid bending or overstressing. Lift large and heavy components only at designated lift points.

1.04 DELIVERY AND RECEIVING

- A. CONTRACTOR shall arrange deliveries of products in accordance with the Progress Schedule, allowing time for observation prior to installation.
- B. CONTRACTOR shall coordinate deliveries to avoid conflict with the Work and conditions at the Site; limitations on storage space; availability of personnel and handling equipment.
- C. CONTRACTOR shall deliver products in undamaged, dry condition, in original unopened containers or packaging with identifying labels intact and legible.
- D. CONTRACTOR shall clearly mark partial deliveries of component parts of equipment to identify equipment and contents to permit easy accumulation of parts and to facilitate assembly.
- E. Immediately on delivery, CONTRACTOR shall inspect shipment to assure:
 - 1. Product complies with requirements of Contract Documents and reviewed submittals.
 - 2. Quantities are correct.
 - 3. Accessories and installation hardware are correct.
 - 4. Containers and packages are intact and labels legible.
 - 5. Products are protected and undamaged.

1.05 STORAGE AND PROTECTION

- A. General:
 - 1. CONTRACTOR shall store products, immediately on delivery, in accordance with manufacturer's instructions, with all seals and labels intact and legible.
 - 2. Available storage space at the Site is limited. Any additional off-site space required shall be arranged by CONTRACTOR.
 - 3. CONTRACTOR shall allocate the available storage areas and coordinate their use by the trades on the job.
 - 4. CONTRACTOR shall arrange storage in a manner to provide access for maintenance of stored items and for observation.
- B. In enclosed storage, CONTRACTOR shall:
 - 1. Provide suitable temporary weather tight storage facilities as may be required for materials that will be damaged by storage in the open.
 - 2. Maintain temperature and humidity within ranges stated in manufacturer's instructions.
 - 3. Provide ventilation for sensitive products as required by manufacturer's instructions.
 - 4. Store unpacked and loose products on shelves, in bins, or in neat groups of like items.
 - 5. Store solid materials such as insulation, tile, mechanical and electrical equipment, fittings, and fixtures under shelter, in original packages, away from dampness and other hazards.
 - 6. Store liquid materials away from fire or intense heat and protect from freezing.
- C. At exterior storage, CONTRACTOR shall:
 - 1. Store unit materials such as concrete block, brick, steel, pipe, conduit, door frames, and lumber off ground, out of reach of dirt, water, mud and splashing.
 - 2. Store tools or equipment that carry dirt outside.
 - 3. Store large equipment so as not to damage the Work or present a fire hazard.
 - 4. Cover products subject to discoloration or deterioration from exposure to the elements, with impervious sheet material and provide ventilation to avoid condensation.

5. Completely cover and protect any equipment or material which is prime coated or finish painted with secured plastic or cloth tarps. Store out of reach of dirt, water, mud and splashing.
6. Store loose granular materials on clean, solid surfaces such as pavement, or on rigid sheet materials, to prevent mixing with foreign matter.
7. Provide surface drainage to prevent erosion and ponding of water.
8. Prevent mixing of refuse or chemically injurious materials or liquids.
9. Cover aggregates such as sand and gravel in cold wet weather.
10. Remove all traces of piled bulk materials at completion of work and return site to original or indicated condition.

1.06 MAINTENANCE OF STORAGE

- A. CONTRACTOR shall periodically inspect stored products on a scheduled basis.
- B. CONTRACTOR shall verify that storage facilities comply with manufacturer's product storage requirements, and verify that manufacturer required environmental conditions are maintained continually.
- C. CONTRACTOR shall verify that surfaces of products exposed to the elements are not adversely affected and that any weathering of finishes is acceptable under requirements of Contract Documents.
- D. CONTRACTOR shall perform scheduled maintenance of equipment in storage as recommended by the manufacturer. A record of the maintenance shall be kept and turned over to ENGINEER when the equipment is installed.

1.07 INSTALLATION REQUIREMENTS

- A. Manufactured articles, materials, and equipment shall be applied, installed, connected, erected, used, cleaned, and conditioned as directed by the respective manufacturers, unless otherwise specified.
- B. After installation, CONTRACTOR shall protect all materials and equipment against weather, dust, moisture, and mechanical damage.
- C. CONTRACTOR shall be responsible for all damages that occur in connection with the care and protection of all materials and equipment until completion and final acceptance of the Work by OWNER. Damaged material and equipment shall be immediately removed from the Site.

1.08 EQUIPMENT WARRANTIES

- A. Warranties shall be nonprorated, include all parts and labor, and be in written form. Warranties shall specifically exclude buyer's indemnification language. Warranty language shall not eliminate manufacturer's responsibility for sizing of the equipment. During warranty period, manufacturer shall be responsible for any travel expenses, outside contractor fees, and rental equipment fees associated with providing warranty service. Warranties shall not exclude normal wear items. Manufacturer shall pay expenses incurred for repairs and parts replacement not made by manufacturer if manufacturer's response is not within 72 hours of notification by OWNER. Warranty language shall be provided with the shop drawings.

PART 2-PRODUCTS

NOT APPLICABLE

PART 3-EXECUTION

NOT APPLICABLE

END OF SECTION

SECTION 01700

CONTRACT CLOSEOUT

PART 1—GENERAL

1.01 SUMMARY

- A. Work Included:
 - 1. Closeout procedures.
 - 2. Final cleaning.
 - 3. Adjusting.
 - 4. Project record documents.
 - 5. Warranties.

1.02 CLOSEOUT PROCEDURES

- A. CONTRACTOR shall provide submittals to ENGINEER that are required by governing or other authorities.
- B. CONTRACTOR shall comply with General Conditions and Supplementary Conditions and complete the following before requesting ENGINEER's observation of the Work or designated portion thereof for substantial completion.
 - 1. Submit executed warranties, workmanship bonds, maintenance agreements, inspection certificates, and similar required documentation for specific units of Work, enabling OWNER's unrestricted occupancy and use.
 - 2. Submit record documentation, maintenance manuals, tools, spare parts, keys, and similar operational items.
 - 3. Submit consent of surety (if surety required in Contract).
 - 4. Complete final cleaning, touch-up work of marred surfaces, and remove temporary facilities and tools.

1.03 FINAL CLEANING

- A. It is CONTRACTOR's responsibility to completely clean up the construction site at the completion of the Work.
- B. CONTRACTOR shall clean areas of the building in which painting and finishing work is to be performed just prior to the start of this work and maintain these areas in satisfactory condition for painting and finishing. This cleaning includes:
 - 1. Removal of trash and rubbish from these areas.
 - 2. Broom cleaning of floors.
 - 3. Removal of any plaster, mortar, dust, and other extraneous materials from finish surfaces, including but not limited to exposed structural steel, miscellaneous metal, masonry, concrete, mechanical equipment, piping, and electrical equipment.
- C. In addition to the cleaning specified above and the more specific cleaning that may be required in various technical sections of the Specifications, CONTRACTOR shall prepare the Project for occupancy by a thorough cleaning throughout, which shall include the following:

1. Clean interior and exterior glass surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.
2. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.
3. Replace filters of operating equipment.
4. Clean debris from roofs, gutters, downspouts, and drainage systems.
5. Clean site; sweep paved areas, rake clean landscaped surfaces.
6. Remove waste and surplus materials, rubbish, and construction facilities from the Site.

1.04 ADJUSTING

- A. CONTRACTOR shall adjust operating products and equipment to ensure smooth and unhindered operation.

1.05 PROJECT RECORD DOCUMENTS

- A. CONTRACTOR shall maintain on Site one set of the following record documents to record actual revisions to the Work:
 1. Drawings.
 2. Specifications.
 3. Addenda.
 4. Change orders and other modifications to the Contract.
 5. Reviewed shop drawings, product data, and samples.
 6. Manufacturer's instruction for assembly, installation, and adjusting.
- B. CONTRACTOR shall ensure entries are complete and accurate, enabling future reference by OWNER.
- C. CONTRACTOR shall store record documents separate from documents used for construction.
- D. CONTRACTOR shall record information concurrent with construction progress.
- E. Specifications: CONTRACTOR shall legibly mark and record at each Product section description of actual products installed, including the following:
 1. Manufacturer's name and product model and number.
 2. Product substitutions or alternates utilized.
 3. Changes made by addenda and modifications.
- F. Record Drawings: CONTRACTOR shall legibly mark each item to record actual construction including:
 1. Measured depths of foundations in relation to finish floor datum.
 2. Measured horizontal and vertical locations of underground utilities and appurtenances referenced to permanent surface improvements.
 3. Measured locations of internal utilities and appurtenances concealed in construction referenced to visible and accessible features of the work.
 4. Field changes of dimension and detail.
 5. Details not on original Contract drawings.

1.06 WARRANTIES

- A. CONTRACTOR shall provide warranties beyond project one-year warranty as required by technical sections and as follows.
- B. Submit warranty information as follows:
 - 1. Provide notarized copies.
 - 2. Execute and assemble transferable warranty documents from Subcontractors, suppliers, and manufacturers, and provide Table of Contents and assemble in three-ring binder with durable cover.
 - 3. Submit with request for certificate of Substantial Completion.
 - 4. For items of work delayed beyond date of Substantial Completion, provide updated submittal within 10 days after acceptance listing date of acceptance as start of warranty period.

PART 2-PRODUCTS

NOT APPLICABLE

PART 3-EXECUTION

NOT APPLICABLE

END OF SECTION

SECTION 02050

DEMOLITION

PART 1—GENERAL

1.01 SUMMARY

- A. Work Included: All demolition, removal, and salvage work as shown on the drawings or specified herein to include, but not necessarily limited to the following:
 - 1. Well No. 1 abandonment.
 - 2. Well No. 3 abandonment.
 - 3. Reservoir demolition.
 - 4. Pavement removal.
 - 5. Utilities removal.
 - 6. Well facility demolition.
 - 7. Pumping station demolition.

1.02 SUBMITTALS

- A. CONTRACTOR shall submit permits and notices, if required, authorizing building demolition.

1.03 QUALITY ASSURANCE

- A. CONTRACTOR shall perform demolition, removal, and salvage in conformity with applicable federal, state, and local safety practices and code requirements.
- B. CONTRACTOR shall contact all public utilities and shall shut off, cut and cap all utility services in accordance with utility requirements, codes, rules and regulations.
- C. Obtain and pay for all necessary permits, licenses and certificates required.

1.04 SEQUENCE AND EXISTING CONDITIONS

- A. No demolition, removal, or salvage work shall commence until approval to proceed has been granted by OWNER.
- B. OWNER has completed an asbestos inspection at each existing facility where work is required to be completed by CONTRACTOR. A copy of the hazardous materials survey is included in an appendix of these Specifications. CONTRACTOR shall properly dispose of all items, including but not necessarily limited to items noted in the hazardous materials survey. All costs for removal and disposal of asbestos and hazardous materials shall be included in the Lump Sum Bid.
- C. The following report regarding Hazardous Environmental Conditions at the Site is known to Owner:
 - 1. Report dated May 12, 2017, prepared by PSI, Waukesha, Wisconsin, titled: Hazardous Materials Survey Oak Creek Water and Sewer Utility 8520 and 8530 Knights Place, and Reservoir Oak Creek, Wisconsin, consisting of 56 pages.

2. The technical data contained in such report upon which CONTRACTOR may rely is limited to laboratory test methods and results, at tested locations all as of the date tested.
3. Reliance by Contractor on Technical Data Authorized: Contractor may rely upon the accuracy of the Technical Data identified above with respect to such reports and drawings, but such reports and drawings are not Contract Documents. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:
 - a. The completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or
 - b. Other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or
 - c. Any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions or information.
 - d. Contractor shall be responsible for controlling, containing, and duly removing all Constituents of Concern brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible, and for any associated costs; and for the costs of removing and remediating any Hazardous Environmental Condition created by the presence of any such Constituents of Concern.
4. If Contractor encounters, uncovers, or reveals a Hazardous Environmental Condition whose removal or remediation is not expressly identified in the Contract Documents as being within the scope of the Work, or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, then Contractor shall immediately: (1) secure or otherwise isolate such condition; (2) stop all Work in connection with such condition and in any area affected thereby (except in an emergency); and (3) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice. If Contractor or anyone for whom Contractor is responsible created the Hazardous Environmental Condition in question, then Owner may remove and remediate the Hazardous Environmental Condition, and impose a set-off against payments to account for the associated costs.
5. Contractor shall not resume Work in connection with such Hazardous Environmental Condition or in any affected area until after Owner has obtained any required permits related thereto, and delivered written notice to Contractor either (1) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work, or (2) specifying any special conditions under which such Work may be resumed safely.
6. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, then within 30 days of Owner's written notice regarding the resumption of Work, Contractor may submit a Change Proposal, or Owner may impose a set-off.
7. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under

such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work. Owner may have such deleted portion of the Work performed by Owner's own forces or others.

8. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition (1) was not shown or indicated in the Drawings, Specifications, or other Contract Documents, identified as Technical Data entitled to limited reliance pursuant to Section 02010 1.04.C.b, or identified in the Contract Documents to be included within the scope of the Work, and (2) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
 9. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the failure to control, contain, or remove a Constituent of Concern brought to the Site by Contractor or by anyone for whom Contractor is responsible, or to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- D. The following reports of explorations and tests of subsurface conditions at or adjacent to the Site is known to OWNER:
1. Report dated May 15, 2017, prepared by PSI of Waukesha, Wisconsin, titled: Preliminary Geotechnical Report Proposed Well No. 1 Abandonment/Demolition Project 8520 Knights Place, for City of Oak Creek, consisting of 23 pages.
 2. The technical data in the report(s) identified in Paragraph SC 5.03, upon which CONTRACTOR may rely, consists of boring methods, level of subsurface water, boring logs, laboratory test methods and results, and boring locations all as of the date made.
 3. ENGINEER accepts no responsibility for accuracy of the soil data or water level information. Soil information, included with these Contract Documents, was not obtained for the purposes of designing excavations and trenches. Soil information was used by ENGINEER for design purposes only. CONTRACTOR shall assure itself by personal examination as to subsurface conditions and shall provide its own investigations and make its own assumptions to comply with OSHA and any other applicable laws and regulations regarding excavation and trenching requirements.
- E. The following drawings of physical conditions relating to existing surface or subsurface structures at or adjacent to the Site (except Underground Facilities) are known to OWNER: Drawings prepared by various consultants and included in Appendix C, consisting of 28 sheets. None of the contents of such drawings is Technical Data on whose accuracy CONTRACTOR may rely.

- F. Reliance by Contractor on Technical Data Authorized: Contractor may rely upon the accuracy of the Technical Data identified above with respect to such reports and drawings, but such reports and drawings are not Contract Documents. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, with respect to:
1. The completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or
 2. Other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or
 3. Any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions, or information.

PART 2-PRODUCTS

2.01 GENERAL

- A. Compacted fill shall meet the requirements of Section 02222-Excavation, Fill, Backfill and Grading.

PART 3-EXECUTION

3.01 BREAKING DOWN AND REMOVING STRUCTURES

- A. General:
1. All existing structures, with all attached parts and connections, shown on the drawings or specified to be removed or that interfere with the new construction, shall be entirely removed within the limits shown or specified, unless otherwise provided.
 2. When a portion of any existing structure is to be retained, CONTRACTOR shall take care during construction operations so as not to impair the value of the retained portion.
 - a. Complete all operations necessary for the removal of any existing structure which might endanger the new construction prior to the construction of the new work.
 - b. Do not use any equipment or devices which might damage structures, facilities, or property which are to be preserved and retained.
 3. When existing reinforcing is exposed at the surface of removal areas, CONTRACTOR shall burn back the reinforcing bars 2 inches and patch with nonshrink grout, unless noted otherwise.
- B. Pavement, Curb, Gutter, Sidewalk, Driveways, Crosswalk, and Similar Structures:
1. Where portions of the existing structure are to be left in the surface of the finished work, CONTRACTOR shall remove the structure to an existing joint, or saw and chip the structure to a true line.
 2. Sufficient removal shall be made to provide for proper grades and connections in the new work.

- C. Walls, Piers, Surface Drains, Foundations, and Similar Masonry Structures:
 - 1. Remove entirely or break down to an elevation at least 2 feet below the earth subgrade within the areas of a road bed and elsewhere to 2 feet below the finished slopes or natural ground, as the case may be except where noted in the plans.
 - 2. Remove existing construction as required to clear new construction.
- D. Underground Tanks (Other than Septic Tanks):
 - 1. Remove the contents of underground tanks to allow the complete removal of such tanks.
 - 2. Backfill the resulting hole or pit in accordance with the backfill portion of this section.

3.02 ABANDONING STRUCTURES

- A. Tanks, Manholes, Catch Basins, and Inlets:
 - 1. CONTRACTOR shall thoroughly clean structures to be abandoned.
 - 2. CONTRACTOR shall plug existing pipe connections with brick or concrete block masonry or with any grade of concrete having a 28-day compressive strength in excess of 2,000 psi.
 - 3. CONTRACTOR shall remove the walls of the structures to an elevation at least 2 feet below the finished grade line, or to such elevation that may be designated on the drawings or as necessary to clear new construction.

3.03 ABANDONING AND REMOVING UTILITIES AND UNDERGROUND PROCESS PIPING

- A. CONTRACTOR shall be responsible for the turning off or unhooking of all utilities and process piping before starting the demolition work. Remove all utility lines, including electrical services and process piping that are shown or specified to be removed. Remove utility lines that are to be abandoned as needed to clear new construction.
- B. The ends of utility lines and process piping shown or specified to be abandoned that are exposed by excavation shall be plugged with concrete to prevent soil infiltration into the pipes.
- C. CONTRACTOR shall abandon storm sewer between demolished manholes in place and fill with sand.

3.04 EQUIPMENT

- A. CONTRACTOR shall remove all equipment.
- B. CONTRACTOR shall remove all conduit, power wiring, controls, switches, instrumentation, control wiring, control boxes, appurtenances, and their supports.
- C. CONTRACTOR shall remove all piping and appurtenances and their supports.
- D. CONTRACTOR shall remove equipment bases, anchor bolts, and other supports.

3.05 INTERIOR PIPING, DUCTWORK, AND APPURTENANCES

- A. CONTRACTOR shall remove all piping, ductwork, and appurtenances as indicated. The location and elevations of existing piping are approximate.

- B. CONTRACTOR shall remove all supports for piping, ductwork, and appurtenances indicated to be removed. Repiping and connections to new piping shall be as specified for new piping. Remaining piping and tubing, not reconnected for new piping, shall be fitted with an appropriate blind flange or plugged and insulated as required.

3.06 SALVAGE

- A. OWNER has first right of refusal to all material, piping, and equipment removed.
- B. All equipment, material, and piping, except as specified hereinafter, within the buildings and structures to be demolished and additional items as noted shall be removed by CONTRACTOR. CONTRACTOR shall inspect each structure and determine the type and amount of equipment, materials, and piping to be removed.
- C. All equipment, material, and piping, except as specified hereinafter, within the limits of the demolition and additional items noted to be removed, will become the property of CONTRACTOR if OWNER does not claim under first right of refusal and shall be removed from the project site. Comply with State and local ordinances and regulations for disposing of materials.

3.07 BACKFILL

- A. CONTRACTOR shall fill all abandoned structures and excavations resulting from removal of structures and utilities with compacted fill. See Section 02222–Excavation, Fill, Backfill, and Grading for required degree of compaction.
- B. Prior to filling reservoir, CONTRACTOR shall break 2-foot by 2-foot holes at 20 feet on center in the floor or wall near the base of each compartment to allow groundwater to freely migrate through the structure.
- C. Prior to filling Well No. 1 pipe gallery, CONTRACTOR shall remove floor in its entirety or provide a 2-foot by 2-foot hole in the floor to allow groundwater to freely migrate through the structure.

END OF SECTION

SECTION 02110

SITE CLEARING AND STRIPPING

PART 1—GENERAL

1.01 SUMMARY

- A. Work Included:
 - 1. Removal of surface debris.
 - 2. Removal of paving, curbs, and sidewalks.
 - 3. Removal of trees, shrubs, and other plant life.
 - 4. Strip and stockpile topsoil.
- B. Payment:
 - 1. Payment for site clearing and stripping will be included in Lump Sum Bid.
 - 2. Topsoil removal and stockpiling shall be considered unclassified excavation.

PART 2—PRODUCTS

NOT APPLICABLE

PART 3—EXECUTION

3.01 PREPARATION

- A. CONTRACTOR shall identify existing plant life to remain and shall tag accordingly.

3.02 PROTECTION

- A. CONTRACTOR shall protect from damage utilities and structures that are to remain.
- B. CONTRACTOR shall protect trees, plant growth, and features designated to remain as final landscaping.
- C. See Division 1 for protection of survey monumentation.

3.03 CLEARING AND GRUBBING

- A. Clearing and grubbing shall consist of cutting and disposing of trees, brush, windfalls, logs, and other vegetation, and the removing and disposing of roots, stumps, stubs, grubs, logs, and other timber from within the clearing limits as defined on the drawings, designated to be removed on the drawings or in the specifications, or fall within the excavation, embankment, or improved areas of the site.
- B. All roots and stumps shall be removed to a depth of not less than 12 inches below the original ground surface in embankment areas. In cut areas, such material shall be removed to a depth of not less than 12 inches below the subgrade.

3.04 REMOVALS

- A. CONTRACTOR shall remove from the site all trees, brush, and other vegetation, debris, and rocks that fall within the excavation and grading limits, as well as any paving, curb and gutter, and sidewalks shown on the drawings to be removed.

3.05 STRIPPING

- A. Excavate topsoil from areas to be built upon, cut or filled, or to have surface improvements, including roadways and walks.
- B. Stockpile topsoil on-site and protect from erosion. CONTRACTOR shall provide additional topsoil as required.
- C. Excess topsoil, if any, shall be removed from the site and disposed of at CONTRACTOR's expense.

END OF SECTION

SECTION 02140

DEWATERING

PART 1—GENERAL

1.01 SUMMARY

- A. Work Included:
 - 1. Removal of groundwater to allow belowgrade construction.
 - 2. Site grading to prevent surface water from entering the excavation.
- B. Payment:
 - 1. The expense for making all extra excavations necessary to prevent water from interfering with the proper construction of the work and for forming all dams or diversions, digging of sumps or pump wells, bailing, and installation and pumping of wells shall be borne by CONTRACTOR.
 - 2. The cost for removal of groundwater and surface water shall be included in the prices bid for the work. No separate payment will be made for dewatering whether accomplished by use of sumps and pumps, well point systems, deep wells, or any other method.

1.02 REFERENCES

- A. Wisconsin Administrative Code Chapter NR 141 and NR 811.
- B. See Division 1, Regulatory Requirements for permit requirements and water, erosion, and sediment control.

1.03 SYSTEM REQUIREMENTS

- A. CONTRACTOR shall, at its own expense, keep the excavation clear of water while structures, mains, and appurtenances are being built, utilities are being installed, and fill and backfill are being compacted. Under no conditions shall the work be laid in or under water. No water shall flow over the work until the joints are complete or the concrete has set.
- B. Dewatering shall be sufficient to lower the piezometric level to at least 2 feet below the bottom of the excavation. Additional lowering shall be provided as necessary to create a stable subgrade.
- C. In areas where rock is encountered, the water level shall be kept at or below top of rock, but at least 6 inches below bottom of concrete. Additional rock shall be removed as needed to provide clearances.
- D. The control of groundwater shall be such that softening or heaving of the bottom of excavations or formation of "quick" conditions or "boils" shall be prevented.
- E. Dewatering systems shall be designed and operated so as to prevent the migration or removal of soils.

1.04 QUALITY ASSURANCE

- A. All dewatering shall be done in accordance with applicable federal, state, and local code requirements.
- B. In particular, groundwater observation wells shall be provided and subsequently abandoned in accordance with NR 141. CONTRACTOR shall complete all observation well construction and abandonment forms as required by NR 141 and shall submit the forms to OWNER within 15 days of construction or abandonment activities.

PART 2-PRODUCTS

NOT APPLICABLE

PART 3-EXECUTION

3.01 DEWATERING

- A. Dewatering shall be started, and the water level shall be lowered as specified herein prior to beginning excavation and shall be continued until structure, main, or appurtenance has been completed and fill has been placed and compacted to final grade.
- B. CONTRACTOR shall provide at least two groundwater observation wells near each area to be excavated to aid CONTRACTOR in determining whether the minimum specified requirements have been met prior to excavation. The observation well shall be a minimum 2-inch-diameter slotted PVC pipe. The observation well shall be installed and backfilled in such a way as to allow an accurate determination of actual groundwater levels. The observation well shall be properly abandoned after use unless specified otherwise.
- C. CONTRACTOR shall provide all necessary materials and equipment to keep the excavation free from water during construction. CONTRACTOR shall at all times have on hand sufficient pumping equipment and machinery in good working condition for all ordinary emergencies, including power outages, and shall have available at all times competent workers for the operation of the pumping equipment. The dewatering systems shall not be shut down between shifts, on holidays or weekends, or during the work stoppages.
- D. CONTRACTOR shall meet all requirements of applicable WDNR permits for construction pit or trench dewatering.
- E. The release of groundwater to its static level shall be performed in such a manner as to maintain the undisturbed state of the natural foundation soils, prevent disturbance of compacted fill or backfill, and prevent floatation or movement of all structures and pipelines.

3.02 PROTECTION

- A. CONTRACTOR shall take all necessary precautions during the dewatering operation to protect adjacent structures against subsidence, flooding, or other damage. The dewatering system shall be installed and operated so that the groundwater level outside the excavation is not reduced to the extent that would damage or endanger adjacent structures or property.

Any such facilities and structures damaged shall be repaired or replaced to the satisfaction of their owner.

- B. In areas where continuous operation of dewatering pumps is required, CONTRACTOR shall avoid noise disturbance to nearby residences to the greatest extent possible by using electric-driven pumps, or intake and exhaust silencers or housing to minimize noise from engine-driven generators or engine-driven pumps.

END OF SECTION

SECTION 02222

EXCAVATION, FILL, BACKFILL, AND GRADING

PART 1—GENERAL

1.01 SUMMARY

- A. Work Included: Excavating, filling, backfilling, and grading for this work includes, but is not necessarily limited to:
 - 1. Placing and compacting all fill and backfill.
 - 2. Rough and finish grading prior to paving, seeding, etc.
- B. Payment:
 - 1. General excavation shall include all excavation specified, undercutting, fill, backfill and grading, including rock excavation, as hereinafter described.
 - 2. All general excavation shall be included in the Lump Sum Bid.

1.02 REFERENCES

- A. ASTM C33—Standard Specification for Concrete Aggregates.
- B. ASTM D698—Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
- C. ASTM D1557—Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)).
- D. Standard Specifications: Unless otherwise indicated, Standard Specifications within this section shall refer to the State of Wisconsin Department of Transportation, Standard Specifications for Highway and Structure Construction, current edition, including all issued supplemental specifications.

1.03 SUBMITTALS

- A. CONTRACTOR shall submit samples of materials proposed for use as fill to soils testing laboratory for analysis of their suitability and for recommendations on moisture content during compaction, compaction methods, or other appropriate information.
- B. CONTRACTOR shall submit sufficient samples of each different type or classification of soil to obtain representative values.

1.04 JOB CONDITIONS

- A. The elevations shown for existing work and ground are reasonably correct, but are not guaranteed to be absolutely accurate. No extras will be allowed because of variations between drawings and actual grades.
- B. Soil borings can be found in Appendix B.

PART 2-PRODUCTS

2.01 BEDDING AND COVER, ALL WATER MAIN

- A. All water main shall consist of 4 inches torpedo sand bedding and cover to 6 inches above the pipe. Sand backfill shall also be used to a minimum of 6 inches on either side of the pipe.

2.02 GRANULAR BACKFILL

- A. Where shown on the drawings, CONTRACTOR shall use mechanically compacted granular backfill conforming to Section 209 of the State Specifications.

2.03 EMBANKMENT FILL

- A. Embankment fill shall contain no stumps, brush, rubbish, or other perishable material. The top 12 inches of the earth embankment shall be earthy material free from large stones.

2.04 FLOWABLE FILL

- A. Flowable fill shall be a self-compacting, self-leveling, material consisting of a mixture of fine aggregate and filler (as needed), water, and cementitious materials (Portland cement, fly ash, granulated blast furnace slag) that is in a flowable state at the time of placement meeting the requirements of the National Ready Mixed Concrete Association Guide Specification for Controlled Low Strength Materials (CLSM). The flowable fill shall be proportioned by the ready mixed concrete supplier on the basis of field experience and/or laboratory trial mixtures to produce a cohesive and nonsegregating mixture which has the following properties:
 - 1. Minimum compressive strength: 50 psi.
 - 2. Maximum compressive strength: 150 psi.
- B. CONTRACTOR shall submit the following information well in advance of fill placement to avoid any delay in construction:
 - 1. Gradation of fine aggregate.
 - 2. Design mix.
 - 3. Previous test results with 7- and 28-day compressive strengths.
 - 4. Certified mill test results for cement identifying brand, type, and chemistry of cement to be used.
 - 5. Brand, type, principle ingredient, and amount of each admixture if used.

PART 3-EXECUTION

3.01 GENERAL

- A. Prior to all excavating, CONTRACTOR shall become thoroughly familiar with the site and site conditions.

3.02 PROTECTION

- A. CONTRACTOR shall provide all necessary sheeting, shoring, or other soil retention systems including all labor, material, equipment, and tools required, or as necessary to maintain the excavation in a condition to provide safe working conditions, to permit the safe and efficient

installation of all items of Contract work, and to protect adjacent property. CONTRACTOR shall be held liable for any damage which may result to property from excavation or construction operations. Sheet piling, shoring, and other soil retainage systems shall be withdrawn or removed in a manner so as to prevent subsequent settlement of structures, utilities, and other improvements.

- B. Design of sheet piling and other soil retaining systems shall be the sole responsibility of CONTRACTOR. Where such systems are shown on the drawings, no parameters such as embedment depth, section profile, presence or lack of walers, etc., nor system type or suitability shall be inferred. CONTRACTOR is responsible for designing and providing a fully functional system compatible with construction and site requirements.
- C. Nothing in this specification shall be deemed to allow the use of protective systems less effective than those required by the Occupational Safety and Health Administration (OSHA) and other applicable code requirements.

3.03 UTILITIES

- A. Before starting excavations, CONTRACTOR shall locate existing underground utilities in all areas of the work.
- B. If utilities are to remain in place, CONTRACTOR shall provide adequate means of protection during earthwork operations.
- C. Should uncharted or incorrectly charted piping or other utilities be encountered during excavation, consult utility owner immediately for directions.
- D. Cooperate with OWNER and utility companies in keeping respective services and facilities in operation, and repair any damaged utilities to satisfaction of utility owner.
- E. CONTRACTOR shall not interrupt existing utilities serving facilities occupied and used by OWNER or others except when permitted in writing by OWNER.
- F. CONTRACTOR shall demolish and completely remove from the site existing underground utilities indicated to be removed after utility has been capped and sealed.
- G. CONTRACTOR shall accurately locate and record abandoned and active utility lines rerouted or extended on project record drawings.

3.04 FINISH ELEVATIONS AND LINES

- A. CONTRACTOR is responsible for setting and establishing finish elevations and lines.

3.05 EXCAVATION

- A. All excavated material that does not meet the specification for compacted fill or embankment fill or meets the specification but is not required for backfill or fill shall be classified as excess material and shall be removed from the site and disposed of at CONTRACTOR's expense.
- B. OWNER maintains ownership of any excess material. The hauling cost shall be at CONTRACTOR's expense unless otherwise specified.

- C. Excavations scheduled to extend below groundwater shall not be started until the area has been dewatered. See Section 02140–Dewatering.
- D. CONTRACTOR shall backfill and compact all overexcavated areas.

3.06 PREPARATION OF SUBGRADE

- A. After the site has been cleared, stripped, and excavated to subgrade, thoroughly compact subgrade to the requirements specified for compacted fill below.

3.07 BACKFILL

- A. All fill and backfill, except as otherwise specified, shall be compacted fill except as noted in the drawings.
- B. No fill shall be placed under water or over unsuitable subgrade conditions.
- C. All fill and backfill, except embankment fill and clay fill, shall be compacted as follows:
 - 1. Class 1 Compaction: This class of compaction shall apply to all fill areas under buildings, structures, piping, bituminous roadway and parking areas, curb and gutter, and backfill within 10 feet of structure walls. All compacted material shall be placed in uniform layers not exceeding 8 inches in loose thickness prior to compaction. Each layer shall be uniformly compacted to a dry density at least 95% of the maximum dry density as determined by a laboratory compaction test at the optimum moisture content (ASTM Test Designation D1557). Compaction shall be obtained by compaction equipment appropriate for the conditions.
 - 2. Class 2 Compaction: This class of compaction shall be used in excavated areas beyond 10 feet of structures without any piping or adjacent foundations. Material for backfill shall be granular material as specified above. The material shall be deposited, spread, and leveled in layers generally not exceeding 12 inches in thickness before compaction. Each layer of the fill shall be compacted to at least 90% of the maximum dry density (testing same as Class 1). Compaction shall be obtained by compaction equipment appropriate for the conditions.
- D. No frozen material shall be placed nor shall any material be placed on frozen ground.
- E. OWNER has 600 CY of backfill available to CONTRACTOR for use on the site. Backfill is available at the Department of Public Works ground at 800 West Puetz Road.

3.08 EMBANKMENT FILL

- A. Embankment fill may be placed in fill areas to be seeded or sodded if no piping exists in the fill and the areas are at least 10 feet from any structure.
- B. Embankment fill shall be deposited, spread, and leveled in layers generally not exceeding 12 inches in thickness before compaction. Each layer shall be compacted to the degree that no further appreciable consolidation is evidenced under the action of the compaction equipment. The required compaction shall be obtained for each layer before any material for a succeeding layer is placed thereon. Compaction shall be obtained using the hauling and leveling equipment, and in addition, tamping rollers, pneumatic-tired rollers, vibratory rollers, or other types of equipment required to produce the desired results.

3.09 GRADING

- A. CONTRACTOR shall perform all rough and finish grading required to attain the elevations shown on the drawings.
- B. Grading Tolerances: Lawn areas away from buildings, parking areas, and sidewalks— ± 0.25 feet.

END OF SECTION

SECTION 02231

AGGREGATE BASE COURSE

PART 1—GENERAL

1.01 SUMMARY

- A. Work Included: Aggregate base course for water main, sidewalk, and curb and gutter.
- B. Related Sections and Divisions: Applicable provisions of Division 1 shall govern work in this section.
- C. Repair or replacement of aggregate base course shall be considered incidental and included in the price bid.

1.02 REFERENCES

- A. Standard Specifications: Unless otherwise indicated, Standard Specifications shall refer to the State of Wisconsin Department of Transportation, Standard Specifications for Highway and Structure Construction, current edition, including all issued supplemental specifications.

1.03 DEFINITIONS

- A. Street or road shall include streets, roads, driveways, and parking lots.

1.04 SUBMITTALS

- A. Submit sieve analysis for proposed materials in accordance with Section 01300—Submittals.

1.05 DRAINAGE DURING CONSTRUCTION

- A. CONTRACTOR shall comply with the provisions of Section 205.3.3 of the Standard Specifications.

PART 2—PRODUCTS

2.01 AGGREGATES

- A. Aggregate for base course shall meet the requirements of Sections 301 and 305 of the Standard Specifications.
- B. Base course shall be uniformly graded and shall conform to the requirements of Base Aggregate Dense, 1 1/4 inch.
- C. Material to backfill water main shall meet the requirements of Base Aggregate Dense, 3/4 inch. The backfill material shall be graded crushed 3/4-inch stone per Section 6.43.7(c) of the Standard Specification (3/4-inch T.B.).

PART 3-EXECUTION

3.01 PREPARATION

- A. The subgrade shall be graded and rolled to provide uniform density and shall comply with the profile and cross sections contained in the drawings. All street subgrade in cut areas and all areas to receive fill shall be proof-rolled in the presence of OWNER or ENGINEER with a heavily loaded triaxle dump truck or similar equipment prior to the placement of any fill materials or base course. The subgrade shall be prepared in accordance with Section 211 of the Standard Specifications.

3.02 CONSTRUCTION

- A. Base course grade shall be set to allow placement of thickness of asphaltic pavement shown or specified.
- B. Depth of base course shall be provided according to the standard cross sections or details provided on the drawings.
- C. Depth of base course shall be the existing depth or 9 inches, whichever is greater.
- D. Each layer of base course shall be wetted and rolled to provide maximum compaction in accordance with Section 305 of the Standard Specifications.
- E. The finished base course shall be fine graded in preparation for paving.
- F. After final grading, CONTRACTOR shall maintain the base course until asphaltic paving work has been completed.
- G. All gravel surfaces damaged during construction shall be replaced. The depth of aggregate shall match existing or 8 inches, whichever is greater.

END OF SECTION

SECTION 02270

SLOPE PROTECTION AND EROSION CONTROL

PART 1—GENERAL

1.01 SUMMARY

- A. Work Included: Erosion control devices.

1.02 PAYMENT

- A. All costs associated with slope protection and erosion control shall be included in CONTRACTOR's Bid. This work shall include, but is not limited to, erecting fence, excavation, placing posts, backfilling, attaching woven wire and geotextile fabric; placing ditch checks; installing sediment traps; removing the fence at completion of project; cleaning and repairing; removing or spreading accumulated sediment to form a surface suitable for seeding; replacing silt fence and damages caused by overloading of sediment material or ponding of water adjacent to silt fence; and furnishing labor, tools, equipment, and incidentals necessary to complete the work in accordance with the Contract.

1.03 REFERENCES

- A. Wisconsin Department of Natural Resources Conservation Practice Standards-Construction Site Erosion and Sediment Control (Conservation Practice Standards).
- B. Erosion Control Product Applicability List (PAL) for Multi-Modal Applications (PAL) Wisconsin Department of Transportation.
- C. City of Oak Creek Erosion Control requirements provided by OWNER.

1.04 REGULATORY REQUIREMENTS

- A. Land disturbance less than one acre. Where land disturbance activities do not exceed one acre, CONTRACTOR shall maintain site conditions where erosion and pollution are controlled.

1.05 QUALITY CONTROL

- A. Construct and maintain erosion sediment control measures in accordance with the Conservation Practice Standards.
- B. Check facilities weekly and after any rainfall event, and make needed repairs within 24 hours.

PART 2–PRODUCTS

2.01 EROSION CONTROL PRODUCTS

- A. Erosion control products shall be as listed in the *Erosion Control Product Acceptability List for Multi-Modal Applications (PAL)* of the Wisconsin Department of Transportation. Contractors may obtain copies of the PAL and PAL qualification procedures from the WisDOT Bureau of Highway Construction.

2.02 SILT FENCE

- A. Silt fence shall conform to Conservation Practice Standard 1056-Silt Fence. Silt fence shall conform to Table 2 of Conservation Practice Standard 1056.
- B. Furnish wrapping on each roll of fabric to protect the fabric from ultraviolet radiation and from abrasion during shipping and handling. Keep geotextile dry until installed.

2.03 INLET PROTECTION

- A. Inlet protection shall conform to Conservation Practice Standard 1060-Storm Drain Inlet Protection for Construction Sites. Manufactured bags shall conform to Table 1 of Conservation Practice Standard 1060.

2.04 STONE TRACKING PADS AND TIRE WASHING STATION

- A. Stone tracking pads and tire washing stations shall conform to Conservation Practice Standard 1057-Stone Tracking Pad and Tire Washing.

2.05 TEMPORARY SEEDING

- A. Temporary seeding for construction site erosion control shall conform to Conservation Standard Practice 1059-Seeding for Construction Site Erosion Control.

PART 3–EXECUTION

3.01 GENERAL

- A. Install devices before construction activities begin.
- B. Proceed carefully with construction adjacent to stream channels to avoid washing, sloughing, or deposition of materials into the stream. If possible, the work area should be diked off and the volume and velocity of water that crosses disturbed areas be reduced by means of planned engineering works (diversion, detention basins, berms).
- C. Unless noted on drawings, do not remove trees and surface vegetation.
- D. Expose the smallest practical area of soil at any given time through construction scheduling. Make the duration of such exposure before application of temporary erosion control measures or final revegetation as short as practicable.

- E. CONTRACTOR shall provide a “qualified” inspector to inspect erosion control and sediment controls once in place. Inspector shall have prior experience with and knowledge of installation and maintenance of erosion and pollution controls. Unless stricter requirements are mandated by DNR or by any local permits, project site erosion control inspection shall be conducted every seven days and after each one-half-inch rainfall or greater. CONTRACTOR shall maintain hard copies of the inspection reports for the duration of the Project.
- F. Any necessary repairs to erosion and sediment control facilities shall be provided within 24 hours to all corrective measures noted on the inspection reports to address pollution issues. CONTRACTOR shall submit to OWNER a written notice stating the times, dates and actions taken to rectify the defective erosion and sediment controls.
- G. CONTRACTOR shall also make any necessary additions for erosion and sediment control as may result from on-site conditions or the progress of the Work or as may be required by DNR or OWNER.
- H. Disturbed areas shall be stabilized with temporary or permanent measures within 14 calendar days of the soil disturbance or redisturbance.
- I. All temporary erosion and sediment control measures shall be removed within 30 days after final stabilization is achieved or after the temporary measures are no longer needed. All sediment accumulated in temporary and permanent facilities shall be removed and properly disposed of and the area restored.

3.02 SILT FENCE

- A. Silt fence shall be constructed in conformance with the criteria specified in Conservation Practice Standard 1056–Silt Fence.

3.03 INLET PROTECTION

- A. All storm drains that are or will be functioning during construction shall be provided with inlet protection. Inlet protection shall be provided in conformance with the criteria specified in Conservation Practice Standard 1060–Storm Drain Inlet Protection for Construction Sites.

3.04 STONE TRACKING PADS AND TIRE WASHING

- A. Tracking pads (tire washing stations as required) shall be installed in accordance with the criteria in Conservation Practice Standard 1057–Stone Tracking Pad and Tire Washing.
- B. Surface water must be prevented from passing through tracking pads. Flows shall be diverted away from tracking pads and conveyed under and around them such as with culverts.
- C. Any sediment tracked onto a road shall be removed before the end of each day. Flushing sediment shall not be allowed.

3.05 SEEDING FOR EROSION CONTROL

- A. Temporary seeding for erosion control shall be provided in conformance with the criteria specified in Conservation Practice Standard 1059—Seeding for Construction Site Erosion Control.

END OF SECTION

SECTION 02521

CONCRETE CURB AND GUTTER, SIDEWALKS, AND DRIVEWAY APRONS

PART 1—GENERAL

1.01 SUMMARY

- A. Work includes concrete curb and gutter, and sidewalks as shown on the drawings.

1.02 REFERENCES

- A. Standard Specifications: Unless otherwise indicated, Standard Specifications shall refer to the State of Wisconsin Department of Transportation, Standard Specifications for Highway and Structure Construction, current edition, including all issued supplemental specifications.
- B. AASHTO M148 Standard Specifications for Liquid Membrane-Forming Compounds for Curing Concrete.

1.03 QUALITY ASSURANCE

- A. Unless otherwise specified, all curb and gutter, sidewalks, and driveway apron construction shall meet the requirements of the Standard Specifications.

PART 2—PRODUCTS

2.01 CONCRETE

- A. All concrete shall conform to Section 501 of the Standard Specifications for Grade A air entrained concrete.

2.02 CURING COMPOUND

- A. Liquid curing compounds shall conform to the requirements of the Standard Specifications for Liquid Membrane-Forming Compounds for Curing Concrete, AASHTO Designation M148, Type 2, White Pigmented.

PART 3—EXECUTION

3.01 BASE PREPARATION—CURB AND GUTTER

- A. The base course beneath the curb and gutter shall be trimmed or filled as necessary to provide a full depth of curb and gutter as detailed in Drawing No. 3. Prior to placement of concrete, the base shall be thoroughly compacted and moistened.

3.02 BASE PREPARATION—SIDEWALKS

- A. The subgrade shall be thoroughly compacted and finished to a trim, firm surface. All soft or unsuitable material shall be removed and replaced with suitable material.

- B. A minimum 4-inch-thick layer of sand, sand and gravel, or base course shall be placed under all sidewalks. This material shall be thoroughly moistened and compacted before the concrete is placed.

3.03 FORMS

- A. Forms shall be of metal and of sufficient strength to resist distortion or displacement. Metal forms shall be used to construct a curb and gutter cross section to match existing curb and gutter section. Forms shall be full depth of the required work. Facing boards, if used, shall be built so as to obtain the cross section called for on the drawings. Forms shall be securely staked and held firmly to line and grade. Forms shall be cleaned thoroughly and oiled before reuse.
- B. All curved curb and gutter shall form smooth curves and shall not be a series of chords. Radius forms shall be used for all curved curb and gutter where the radius of curvature is 100 linear feet or less.

3.04 PLACING AND FINISHING CONCRETE

- A. Concrete shall be thoroughly tamped to remove all voids. The exposed surfaces of the curb and gutter shall be thoroughly troweled and finished with a brush at right angles to the line of the curb and gutter. The back edge of the curb, the edge of the gutter adjacent to the pavements, and edges adjacent to expansion joints shall be rounded with a 1/4-inch-radius edger. Honeycombed areas along the back of the curb shall be pointed with mortar.
- B. Before final finishing of curb and gutter, a 10-foot straight edge shall be used to check the surface. Any areas showing a variation of more than 1/4 inch from the straight edge shall be corrected. Final finishing shall be delayed a sufficient time so that excess water and grout will not be brought to the surface.
- C. Concrete for sidewalk shall be placed to a minimum thickness of 5 inches, except at driveways and alleys, which shall have a minimum thickness equal to that of the driveway. Driveways shall have a minimum thickness of 8 inches. The concrete shall be thoroughly spaded and tamped to remove all voids. The surface of the driveway or sidewalk shall be thoroughly troweled and finished with a brush at right angles to the driveways or sidewalk line.

3.05 JOINTING—CURB AND GUTTER

- A. A 3/4-inch expansion joint filler shall be placed through the curb and gutter at the radius points of all intersection curbs. This expansion joint filler shall extend through the entire thickness of concrete and shall be perpendicular to the surface and at right angles to the line of the curb and gutter.
- B. At intervals of not more than 10 feet, a contraction joint shall be tooled to a depth of one-fifth of the total concrete thickness with a 1/4-inch-radius jointer. The contraction joint shall be at right angles to the line of the curb and gutter.
- C. CONTRACTOR may saw contraction joints. The depth of cut shall be a minimum of one-fifth of the total concrete thickness. Sawing shall be done as soon as practicable after the concrete has set sufficiently to preclude raveling during the sawing and before any shrinkage

cracking takes place in the concrete. If this method results in random cracking, CONTRACTOR will be required to tool the contraction joints as specified above.

- D. The use of steel separator plates will not be allowed.
- E. Jointing shall be included in the price bid for curb and gutter.

3.06 JOINTING--SIDEWALKS AND DRIVEWAYS

- A. Concrete sidewalk shall be cut into rectangular blocks approximately 5 feet long. The cut must extend at least one-fifth of the total thickness of concrete. The edges of the sidewalk along forms and joints shall be rounded with an edging tool of 1/4-inch radius. All joints shall be at right angles to the centerline of the sidewalk.
- B. Concrete driveways shall be jointed in approximately square sections. The depth of the joint and the finishing of the edges shall be the same as for concrete sidewalk.

3.07 EXPANSION JOINTS

- A. A 1-inch-thick expansion joint filler shall be placed between curb ramps and back of curb.
- B. A 3/4-inch-thick expansion joint shall be placed at all sidewalk corners, between sidewalks and buildings, and between back of curb and sidewalk.

3.08 SLOPE

- A. Sidewalk cross slope shall be 1/4 inch per foot unless otherwise noted in the drawings or requested by ENGINEER.

3.09 INLET CASTING ADJUSTMENT

- A. Inlet casting shall be adjusted to grade as required for the installation of the new curb and gutter. Inlet casting backs shall be adjusted for a depressed flow line at all inlets in the low points (0.72 feet); all other inlet shall be adjusted for a normal flow line (0.50 feet).

3.10 UTILITY MARKINGS

- A. CONTRACTOR shall coordinate with OWNER and RPR to record sanitary sewer termination point and new water main modifications with GPS equipment. CONTRACTOR shall allow OWNER to record a GPS location at top of pipe while pipe is exposed.

3.11 CURING

- A. As soon after finishing operations as the free water has disappeared, the concrete surface shall be sealed by spraying on it a uniform coating of curing material in such a manner as to provide a continuous water impermeable film on the entire concrete surface.
- B. The material shall be applied to form a uniform coverage at the rate of not less than one-half gallon per 100 square feet of surface area.
- C. Within 30 minutes after the forms have been removed, the edges of the concrete shall be coated with the curing compound applied at the same rate as on the finished surface.

3.12 PROTECTION OF CONCRETE

- A. CONTRACTOR shall erect and maintain suitable barricades to protect the new concrete. Where it is necessary to provide for pedestrian traffic, CONTRACTOR shall, at his own cost, construct adequate crossings. Crossing construction shall be such that no load is transmitted to the new concrete.
- B. Any part of the work damaged or vandalized prior to final acceptance shall be repaired or replaced at the expense of CONTRACTOR in a manner satisfactory to ENGINEER.
- C. Pedestrian traffic shall not be permitted over new concrete prior to 72 hours after application of curing material. Vehicular traffic shall not be permitted over newly placed concrete within 7 days after completion when temperatures are 70°F or higher, 10 days when temperatures are not lower than 60°F and up to a maximum of 21 days when the temperatures are generally lower than 60°F.

END OF SECTION

SECTION 02600

BURIED PIPING AND APPURTENANCES

PART 1—GENERAL

1.01 SUMMARY

- A. Work Included:
 - 1. All underground piping and valves of every description.
 - 2. Excavation, dewatering, and backfilling for all work under this section unless otherwise noted.
 - 3. Concrete reaction blocking, gaskets, and all miscellaneous equipment furnished under this section.
 - 4. Underground piping connections to all equipment, whether furnished under this section or not.

1.02 REFERENCES

- A. ASTM D2774—Standard Test Method for Oxidation Stability of Distillate Fuel Oil.
- B. ASTM D3034—Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
- C. AWWA C900—Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4-Inch through 48-Inch for Water Transmission and Distribution.
- D. AWWA C905—Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 14-Inch through 12-Inch for Water Transmission and Distribution.
- E. ASTM D2513—Standard Specification for Polyethylene (PE) Gas Pressure Pipe, Tubing, and Fittings.
- F. ASTM D3350—Standard Specification for Polyethylene Plastics Pipe and Fittings Materials.
- G. ASTM D3261—Standard Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing.
- H. ASTM D2683—Standard Specification for Socket-Type Polyethylene Fittings for Outside Diameter-Controlled Polyethylene Pipe and Tubing.
- I. AGA XR0603—American Gas Association Plastic Pipe Manual for Gas Service.
- J. AWWA C600—Installation of Ductile Iron Water Mains and Their Appurtenances.
- K. AWWA C605—Underground Installation of Polyvinyl Chloride (PVC) and Molecularly Oriented Polyvinyl Chloride (PVCO) Pressure Pipe and Fittings.
- L. AWWA C651—Disinfecting Water Mains.

1.03 CODES AND STANDARDS

- A. Comply with the requirements of:
 - 1. Wisconsin Administrative Code SPS 365–Fuel Gas Appliances and applicable standard(s).
 - 2. NFPA 54–National Fuel Gas Code (Current Edition).
 - 3. Polyethylene gas distribution piping shall be installed in accordance with CFR 49, Part 192, Subpart G (mains), Subpart H (service lines), applicable codes and regulations, and ASTM D2774.
- B. Before any polyethylene fusion welding is performed, CONTRACTOR shall submit certification that the welders to be used on this project have successfully demonstrated proper welding procedures in accordance with the Code of Federal Regulations, Title 49, Part 192, Section 192.285.
- C. ENGINEER and OWNER reserve the right to test the work of any welder employed on the project, at CONTRACTOR's expense. If the work of the welder is found to be unsatisfactory, the welder shall be prevented from doing further welding on the project.

PART 2–PRODUCTS

2.01 MATERIALS OF CONSTRUCTION

- A. All materials used in the manufacture, assembly, and painting of piping and valves in contact with water shall be compatible with potable water supplies and in contact with chemical feed systems shall be compatible with the chemicals being used. All glues, solvents, solders, etc., shall likewise be compatible. For instance, no lead-base solders shall be used. All materials shall be National Sanitation Foundation (NSF)-approved.
- B. Size and Type:
 - 1. All materials shall conform to the size and type shown on the drawings or called for in the specifications.
 - 2. In joining two dissimilar types of pipe, standard fittings shall be used when available. In the event standard fittings are not available, the method of joining shall be standard selected by CONTRACTOR and submitted for review by ENGINEER.
- C. Piping appurtenances shall be made of the materials specified. All appurtenances not designated as to type shall be selected by CONTRACTOR and submitted for review by ENGINEER.

2.02 BURIED PIPING

- A. PVC Piping:
 - 1. Sanitary and Storm Sewers:
 - a. Polyvinyl chloride (PVC) pipe shall meet the requirements of ASTM D3034 for pipe sizes 4 inches through 15 inches and ASTM F679 for pipe sizes 18 inches through 36 inches.
 - b. PVC material for ASTM D3034 pipe shall have cell classification 12454-B or 12454-C as defined in ASTM D1784 with minimum modulus of elasticity of 400,000 psi. Pipe stiffness shall be minimum 46 psi when tested in accordance

with ASTM D2412. Pipe shall have a maximum standard dimension ratio (SDR) of 35.

- c. PVC material shall have cell classification 12454-B or 12454-C as defined in ASTM D1784 with minimum modulus of elasticity of 400,000 psi in tension. Pipe stiffness shall be minimum 46 psi when tested in accordance with ASTM D2412.
 - d. Pipe and fittings shall be the product of one manufacturer and the manufacturer shall have experience records substantiating acceptable performance of the pipe to be furnished.
 - e. Fittings shall be injection molded.
 - f. Acceptance of piping shall be subject to tests conducted in accordance with ASTM D3034 and/or ASTM F679.
 - g. Fittings such as saddles, elbows, tees, wyes and others shall be of material and construction corresponding to and have a joint design compatible with the adjacent pipe. Approved adapters shall be provided for transitions to other types of pipe.
 - h. Joints shall be of the elastomeric type for pipes 4 inches or larger and elastomeric or solvent cement for pipes less than 4 inches.
 - i. Elastomeric joints shall be a bell and spigot joint conforming to ASTM D3212 sealed by a rubber gasket conforming to ASTM F477 so that the assembly will remain watertight under all conditions of service, including the movements resulting from the expansion, contraction, settlement and deformation of the pipe. Bells shall be formed integrally with the pipe and shall contain a factory-installed positively restrained gasket.
 - j. Solvent cement joints shall be assembled using solvent cement obtained from the pipe manufacturer, which conforms to the requirements of ASTM D2564.
 - k. The assembled joint shall pass the performance tests as required in ASTM D3212.
 - l. Sanitary sewer laterals shall conform to Drawing 01-975-75A.
2. Water Main:
 - a. PVC water main shall be AWWA PVC pressure-rated pipe and shall conform to the requirements of AWWA C900 for pipe 4 inches through 12 inches and AWWA C905 for pipe from 14 inches through 36 inches. Pipe shall be furnished with integral elastomeric bell and spigot joints.
 - b. PVC pipe diameter shall conform to the o.d. of ductile iron pipe. The type of PVC material, nominal pipe size, standard dimension ratio, and pressure rating shall be not less than pressure class 235 and not greater than dimension ratio 18.
 - c. Markings on pipe shall include the following: Nominal pipe size, type of plastic pipe material, DR number, AWWA Designation with which the pipe complies, manufacturer's name, and the seal or mark of the laboratory making the evaluation of the suitability of the pipe for transport of potable water.
 3. Provide tracer wire for underground PVC piping as specified herein, unless otherwise noted.

B. Tracer Wire:

1. Install 10 gauge solid tracer wire with buried pipe where specified. Wire shall be continuous and terminate at valve boxes, manholes, or at test stations as specified below. Wire shall be taped to pipe at 5-foot intervals for all piping except piping carrying combustible material. For pipe carrying combustible material, the tracer wire shall be placed in the trench directly above the pipe, maintaining 6 inches separation between the tracer wire and the pipe. Any splices in copper wire shall be soldered and fitted with a Raco, or equal, insulated watertight boot.
2. Tracer wire test stations shall be SnakePit magnetized tracer boxes by Copperhead Industries, or equal. Tracer box shall be corrosion-resistant brass wire lugs and wax pad to cover wire connection. Cover shall be color-coded according to APWA

standards for fluid conveyed. Provide SnakePit Lite Duty Box in unpaved areas and Roadway Box in paved areas. Provide Rhino Triview Marker Posts, or equal, at all test stations. Provide custom decals to identify fluid in piping. The tracer wire shall be accessible at a minimum of every 500 feet along the pipeline and at horizontal bends in piping. The tracer wire shall run into and up the sides of all manholes and be secured near the casting. Test stations shall be placed as required between manholes to comply with the minimum 500-foot tracer wire accessibility requirement.

3. CONTRACTOR shall perform continuity testing of all tracer wire in the presence of OWNER ENGINEER.
- C. Galvanic Anode Protection: Where connecting to an existing ductile iron water main, CONTRACTOR shall install galvanic anode protection in accordance with the galvanic anode installation detail. For ductile iron water mains 12 inches in diameter and less, CONTRACTOR shall provide and install one 32 lb. magnesium anode. For ductile iron water mains greater than 12-inch diameter, CONTRACTOR shall provide and install two 32 lb. magnesium anodes. The weld shall be coated using REBOUND Aerosol Rubberized Coating or approved equal.

PART 3-EXECUTION

3.01 INSTALLATION

- A. Installation Standards:
 1. Except where noted or specified, all underground water main piping shall be laid in accordance with AWWA C600 or AWWA C605 with all sewer clearances and separations from water main in accordance with Wisconsin Commercial Building Code.
 2. Except where noted or specified, reinforced concrete pipe shall be laid in accordance with ASTM C12.
- B. General Excavation:
 1. CONTRACTOR shall do all excavation, undercutting, dewatering, and backfilling necessary for work under this Contract, unless otherwise noted.
 2. Work shall conform to other sections of Division 2 except where modified by this section.
 3. The width of trench below the top of the pipe shall not exceed the nominal diameter of the pipe plus 2 feet for all pipelines.
 4. Where the maximum trench width is exceeded, the pipe shall be placed in a concrete cradle or a stronger pipe used as necessary.
 5. If the maximum trench width is exceeded for any reason other than by request of ENGINEER, the concrete cradle or the stronger pipe shall be placed at CONTRACTOR's expense.
 6. Excavation shall include all necessary clearing of excavated areas, tree removal, all grubbing, all wet, dry, fill, and rock excavation, the removal of pavement, and all incidental work thereto. All above work shall be included in the Lump Sum Bid except rock excavation as defined in Section 02229-Rock Removal.
 7. CONTRACTOR shall excavate whatever materials are encountered as required to place at the elevations shown, all pipe, manholes, and other work as required to complete the project as shown.
 8. The bottom of the excavation shall be leveled off, all loose and disturbed soil shall be removed, and it shall be hand-tamped prior to pipe, manhole, etc., installation. Where

requested by ENGINEER, original material below the excavation necessary for construction according to grades shown or specified shall be removed and replaced with material and placing methods as specified in Section 02222–Excavating, Backfilling and Compaction.

9. The excavation at the crossing of all underground utility services in place shall be as narrow as practicable.
10. All underground services shall be protected from damage and maintained in service at their original location and grade during the process of the work.
11. Any damage to underground services shall be replaced or repaired at no cost to OWNER or to the owner of the service.
12. The present underground services shown on the drawings are located in accordance with available data.
13. Encountering these services at a different location or encountering services not shown shall not release CONTRACTOR from the above-stated conditions.
14. Any service connections encountered which are to be removed shall be cut off at the limits of the excavation and capped in accordance with the requirements of owners of such connections.
15. Excavated material that is unsuitable or not required for filling shall be wasted.
16. Materials to be used for fill and suitable for this purpose shall be deposited where required, except that no fill shall be placed where trenches for sewers, water lines or other services will be located until after the trench work is completed.
17. CONTRACTOR shall provide adequate shoring, sheet piling, and bracing to prevent earth from caving or washing into the excavation and shall do all shoring and underpinning necessary to properly support adjacent or adjoining structures. All shoring, sheet piling, and underpinning must be maintained until permanent support is provided.

C. Laying Pipe:

1. CONTRACTOR shall excavate and lay all pipe to the line and grade shown on the drawings with bell ends uphill.
2. Grade stakes will be required for all lines.
3. Water lines shall have a minimum of 6 1/2 feet of cover, unless noted otherwise.
4. Unless shown otherwise, under floor piping shall clear floor slabs or footings by a minimum of 6 inches.
5. Any pipe or fittings cracked in cutting or handling or otherwise not free from defects shall not be used.
6. Pipe must be kept clean of mortar, cement, clay, sand or other material.
7. Trenches shall be kept water-free and dry during bedding, laying, and jointing.
8. CONTRACTOR shall provide, operate, and maintain all pumps or other equipment necessary to drain and keep all excavation pits and trenches and the entire subgrade area free from water under any and all circumstances that may arise.
9. All trees, shrubs, and improved areas outside the excavation shall be protected from damage.

D. Restraint Based on Flexible Restrained Joints:

1. Except where noted or indicated, all bends, caps, plugs, tees, and other fittings shall be restrained with flexible restrained joints.
2. Mechanical joints and ductile iron pipe shall be restrained by MEGALUG® 1100 or 1100SD Series by EBAA Iron Sales, Inc. or equal restraining system.
3. Ductile iron push-on joint pipe shall be restrained by Lok-Ring Joint by American Ductile Iron Pipe, TRFLEX by U.S. Pipe, MEGALUG® 1700 Series by EBAA Iron Sales, Inc., or equal.

4. Push-on joints for PVC piping shall be restrained with MEGALUG® Series 1500 (AWWA C900) or Series 2800 (AWWA C905) by EBAA Iron Sales, Inc., Uni-Flange® Series 1350 by Ford Meter Box Co., Inc., or equal. PVC piping with ductile iron mechanical joint fittings shall be restrained with MEGALUG® Series 2000 PV by EBBA Iron Sales Inc., Uni-Flange® Series 1500 by Ford Meter Box Co., Inc., or equal.
5. For restrained pipe joints, all underground ductile iron pipe joints (except for the branch of tees and dead ends) shall be restrained to the length listed below in all directions from all bends and fittings. The branch of tees and all dead ends shall be restrained to two times the length listed below. All joints on yard and fire hydrant leads shall be restrained. Where wall penetrations occur at less than the length indicated below, the wall fittings shall also be restrained. Additional restraint shall be provided inside of structures as required.

**MINIMUM LENGTH (IN FEET) RESTRAINED PIPE FROM BENDS
OR FITTINGS (POLYWRAPPED AND MINIMUM 6 FEET
BURY DEPTH**

	Test Pressure, psi				
	10	25	50	100	150
Pipe Size, Inches					
3 to 12	5	18	18	36	36

6. PVC water main and sanitary force main shall be restrained as specified above for ductile iron underground piping and shall be installed in accordance with AWWA C605.

E. Bedding:

1. All underground pipe shall be bedded in torpedo sand and cover in accordance with Section 4.3.3 and File No. 36 of the Standard Specification.
2. All other piping, except perforated piping and ductile iron piping, shall be placed using Connection Detail as shown on Drawing No. 3.
3. CONTRACTOR shall perform all necessary excavation and shall furnish all required materials to provide bedding material.
4. Bedding material for water main shall be of "Road Sand" quality and when tested in accordance with ASTM C117 and C136, it shall conform to the requirements in Table 7-A.

U.S. Standard Sieve Size	Percent by Weight Passing
3/8 inch	100
#4	90 to 100
#16	45 to 80
#50	5 to 30
#100	0 to 10
#200	0 to 3

5. CONTRACTOR shall furnish ENGINEER with a sieve analysis of the bedding material for approval prior to construction.
6. No materials native to the trench shall be used as bedding material unless they meet the above specifications.
7. Native material may be used for ductile iron piping if it consists mostly of sand and contains no stones larger than 3/4 inch.

8. Immediately prior to placing the pipe, bedding shall be shaped by hand to fit the entire bottom quadrant of the pipe between bell holes.
9. Bell holes shall be large enough to permit proper making of the joint but not larger than necessary to make the joint.
10. All adjustments to line and grade must be done by scraping away or filling in bedding under the body of the pipe. Bedding must be tamped into place.
11. If necessary to obtain uniform contact of the pipe with the bedding, a template shall be used.

F. Cover Material:

1. Material which is to be placed from the bedding material around and to 1 foot above the top of all pipe shall be termed cover material.
2. Except for copper piping, cover material shall consist of durable granular particles ranging in size from fine to coarse in a substantially uniform combination.
3. Unwashed bank run sand and crushed bank run gravel will be considered generally acceptable for cover material.
4. No stones larger than 3/4 inches in their greatest dimension shall be allowed in the cover material.
5. Native materials may be used if they conform to the above specifications.
6. Cover material for copper piping shall be sand.
7. Cover material shall be deposited in the trench for its full width on each side of the pipe, fittings, and appurtenances simultaneously.
8. Granular cover material shall be placed over the top of the pipe to the height as shown in Typical Trench Detail for Class "B" (12 inches) or Class "C" (6 inches) Bedding.
9. This cover material shall be placed by hand in 6-inch layers and shall be compacted using hand-tamping bars and/or mechanical tampers.
10. If bedding material, except sand, conforming to any of the above three gradations under "Bedding" is used as cover material, it need not be tamped.
11. Sand cover material must be tamped.
12. Unless sand backfill is required, the remaining 6 inches to make up the required 1 foot of cover material for Class "C" Bedding shall be granular material specified previously with no stones larger than 3/4 inch.
13. Compaction shall be equivalent to that described under "Filling and Backfilling" in these specifications.

- G. Backfill: Except as otherwise specified, all backfill above 1 foot above the pipe shall be granular material specified in Section 02222–Excavation, Fill, Backfill and Grading. Compaction shall be as specified herein.

3.02 REPAIR/RESTORATION

- A. Upon completion of the work, all improvements disturbed by CONTRACTOR's operations shall be repaired or replaced, including all site improvements, landscaping, and/or paving material as existed prior to construction.

3.03 FIELD QUALITY CONTROL

A. Site Tests:

1. CONTRACTOR shall include the cost of all testing, cleaning, and disinfection in the price bid.
2. All piping shall be subject to test before being covered with base course or pavement. All piping and appurtenances shall be watertight or airtight and free from visible leaks.

3. All piping and appurtenances shall be flushed or cleaned after installation prior to testing.
4. When test medium for piping is water, all air shall be removed from piping by flushing and/or installation of corporations at high points in system. Presence or absence of air will be determined during pressurization of the piping system.
5. CONTRACTOR shall provide all necessary piping connections, water, air, test pumping equipment, water meter, bulkheads, valves, pressure gauge, and other equipment, materials, and facilities necessary to complete the specified tests. CONTRACTOR shall provide all temporary sectionalizing devices and vents for testing. Note, when pressure testing against existing valves or piping, CONTRACTOR shall assume these items will fail and provide temporary plugging or valving as required.
6. Pressure Tests: The test pressure in all nongravity lines shall be held for one hour during which time the leakage allowance shall not exceed that specified. In case repairs are required, the pressure test shall be repeated until the pipeline installation conforms to the specified requirements. Pumps, air compressors, instrumentation, and similar equipment shall not be subjected to the pressure tests.
7. Test Requirements:

Fluid Abbreviation or Name	Minimum Test Pressure in psi	Test Medium	Leakage Allowance Designation
Potable Water	150	Water	"A"

8. Leakage allowance Designation "A" shall be not more than 0.002 gallon per hour per inch diameter per 100 feet of buried pipe for compression or solder joint pipe. Buried mechanical and push-on joint pipe shall meet the leakage specifications of AWWA C600.
9. Tests for all gravity sewers shall be as follows: Pipe will be plugged at its downstream end and water will be placed inside the pipe to a minimum head of 10 feet. Water shall be held for 15 minutes without dropping. No leakage is allowed.

3.04 CLEANING AND DISINFECTION

- A. All equipment and materials shall be clean before installation. CONTRACTOR shall disinfect and flush the system before it is put on line. Water main, including buried and exposed piping, shall be disinfected according to AWWA C651.
- B. In accordance with the requirements of AWWA C651, at least one set of samples shall be collected from every 1,200 feet of new water main, plus one set from the end of the line and at least one set from each branch.
- C. CONTRACTOR shall obtain water samples and arrange for analysis of water in potable systems for bacteria in accordance with Option A of Section 5.1 of AWWA C651. Copies of test results shall be submitted to OWNER and ENGINEER.
- D. Water main shall be disinfected according to the Standard Specifications for Water and Sewer Main Construction in Illinois, which shall include initial flush and disinfection to 50 ppm with gaseous chlorine or other acceptable methods. Acceptable concentration after 24 hours shall be 25 ppm. Satisfactory disinfection shall be demonstrated in accordance with the requirements of 35 Ill. Adm. Code 652.203.

- E. Broken concrete, rubble fill, and other excess material shall be removed from the site and wasted.
- F. All waste disposal areas and all areas used for the storage of materials or the temporary deposit of excavated earth shall be leveled off, cleaned up, and returned to condition that existed prior to construction.
- G. All surplus material, tools, and equipment shall be removed, and the premises shall be left free of everything of the kind.

END OF SECTION

SECTION 02670

WELL ABANDONMENT

PART 1–GENERAL

1.01 SUMMARY

- A. Work Included:
 - 1. The work to be done in this section includes the furnishing of all labor, materials, transportation, tools, supplies, plant, equipment, and appurtenances, unless hereinafter specifically excepted, necessary for the complete and satisfactory abandonment of the proposed water supply wells described herein.
 - 2. The work includes the abandonment of Well Nos. 1 and 3.

1.02 PROJECT CONDITIONS

- A. Well Location: The production Well Nos. 1 and 3 are located in their existing respective well houses as indicated on Drawing Nos. 5 and 7.
- B. Geological Information: Copies of the available detailed logs are bound into the Appendix at the back of the specifications. Depths in the tabulation are in feet.
 - 1. Wisconsin DNR Well Construction Logs.
 - 2. WSGS Geologic Logs.
- C. Driller's Availability:
 - 1. CONTRACTOR shall make arrangements so that ENGINEER can reach the crew by phone at any time during the working day. A mobile cellular phone will be acceptable if accessible by crew at all times during working hours.
 - 2. The crew chief shall immediately, by phone, advise ENGINEER of any circumstances which might alter abandonment of the well.
- D. Boundaries of Work:
 - 1. CONTRACTOR shall confine his operations to the well site.
 - 2. Operations outside the site will be permitted only with the written consent of OWNER of such ground.

1.03 REFERENCES

- A. ASTM C150–Standard Specification for Portland Cement.
- B. AWWA A100–Standard for Water Wells.

PART 2–PRODUCTS

NOT APPLICABLE

PART 3—EXECUTION

3.01 CONSTRUCTION

- A. CONTRACTOR shall remove pumps and all piping and equipment in each well prior to abandonment.
- B. Abandonment of Production Well:
 - 1. General:
 - a. No payment will be made for materials left in place because of inability of CONTRACTOR to remove them.
 - b. CONTRACTOR shall fill the abandoned hole in accordance with the requirements established below.
 - 2. Abandonment Procedure:
 - a. For wells cased and grouted through the Maquoketa Shale formation, chlorinated, sand-free pea gravel may be used to fill the open drillhole from the bottom of the well up to a 250-foot depth or to a depth of 20 feet below the bottom of the protective casing, whichever is deeper. Additionally, minimum 40-foot-thick plugs of sealing materials meeting the requirements of 811.13(5) shall be centered at the top of the uppermost Cambrian Sandstone formation and at the top of the Eau Claire formation where these formation are open in the drillhole.
 - b. Pea gravel shall be poured into well in accordance with NR 811.13(5)(c). Neat cement grout, sand cement grout, or concrete meeting the specification in s. NR 81612(14)(a) may also be used to abandon the well. Conductor piping used for pressure methods shall meet the requirements of s. NR 811.12(14)(b)8 for well grouting.
 - 3. Exception to Filling Casing with Concrete: An exception to filling the cased portion with concrete may be made where the well casing is set in rock and sealed in place with cement grout; in such case a concrete plug at least 40 feet thick shall be placed extending at least 20 feet above and below the bottom of the casing. The remainder of the cased portion, up to 20 feet from the surface, may be filled with gravel, crushed rock, sand, or clay, but the top 20 feet shall be filled with concrete.
 - 4. Obstructions: Any debris or obstructions that may interfere with sealing operations shall be removed from the well prior to abandonment.
 - 5. Limitations: Filling material for nonflowing wells shall be applied through a conductor pipe unless a dump bailer is used. When concrete is placed under water by a conductor pipe, the bottom end of the conductor pipe shall be submerged in the concrete at all times. Pump piping and removable liner pipes shall be pulled from a well prior to sealing.

3.02 PROTECTION

- A. Protection of Site:
 - 1. Except as otherwise provided herein, CONTRACTOR shall protect all structures, walks, pipelines, trees, shrubbery, lawns, etc., during the progress of his work.
 - 2. Remove all debris and unused materials from the site.
 - 3. Upon completion of the work, restore the site as nearly as possible to its original condition, including the replacement, at CONTRACTOR's sole expense, of any facility or landscaping that has been damaged or destroyed beyond restoration to its original condition.

B. Protection of Work:

1. CONTRACTOR shall take such precautions as are necessary or as may be required to permanently prevent contaminated water from entering, through the openings made by CONTRACTOR, the well or the stratum from which the well is to draw its supply.
2. CONTRACTOR shall also take all necessary precautions during the construction period to prevent contaminated water, gasoline, and other liquids, from entering the well either through the opening or by seepage through the ground surface.
3. In the event that the well becomes contaminated or that water having undesirable physical characteristics does enter the well because of the neglect of CONTRACTOR, CONTRACTOR 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.

END OF SECTION

SECTION 02930

RESTORATION

PART 1—GENERAL

1.01 SUMMARY

- A. Work Included:
 - 1. Placement of topsoil.
 - 2. Fertilizing.
 - 3. Seeding.
 - 4. Mulching.
 - 5. Maintenance.
 - 6. Tree damage liability and replacement.
- B. All areas disturbed by curb and gutter, and sidewalk construction shall be restored. Backslopes adjacent to the sidewalk shall be seeded to the slope intercept. Borrow sites and disposal sites will not require seeding, but they shall be graded smooth.
- C. Payment: Payment for restoration shall be at the lump sum price bid. Costs for topsoiling, seeding, fertilizer, mulching, and maintenance of restored areas shall be included in the lump sum price bid. One percent of the total Contract price shall be retained following project completion until a uniform 2-inch growth of vegetation is established over all restored areas.

1.02 REFERENCES

- A. Standard Specifications: Unless otherwise indicated, Standard Specifications shall refer to the State of Wisconsin Department of Transportation, Standard Specifications for Highway and Structure Construction, current edition, including all issued supplemental specifications.

1.03 QUALITY ASSURANCE

- A. All work shall be in accordance with Standard Specifications, unless noted otherwise.

PART 2—PRODUCTS

2.01 TOPSOIL

- A. Topsoil: Fertile, agricultural soil, typical for locality, capable of sustaining vigorous plant growth, taken from drained site; free of subsoil, stones greater than 3/4 inches in size, clay or impurities, plants, weeds and roots; pH value of minimum 5.4 and maximum 7.0.
- B. Topsoil from the site may be used if it meets the above requirements.

2.02 SEED

- A. Seed mixture shall be Seed Mix Deluxe 50 Seed Mix, or equal. Seed mixture formula shall be 20% Kentucky Bluegrass (sod quality), 15% Newport Kentucky Bluegrass, 15% Ken Blue Kentucky Bluegrass, 25% Creeping Red Fescue, 15% Quebec Perennial Ryegrass, and

10% Fiesta III Perennial Ryegrass. Use blue tag certified seed. Do NOT use bent or Poa Annua. Each seed lot will be subject to sampling and testing by the State seed laboratory..

2.03 FERTILIZER

- A. Fertilizer shall be Type B per Section 629.

PART 3—EXECUTION

3.01 TOPSOIL

- A. Placing topsoil shall be in accordance with Section 625.3.3 of the Standard Specifications. Topsoil shall be placed to a uniform depth of 4 inches in place. Topsoil placement shall be incidental to sodding or seed, fertilizer, and mulching.

3.02 SEEDING

- A. Seeding shall be performed in accordance with Section 630 of the Standard Specifications.
- B. Seed shall be applied at the rates specified in Section 630.3.3.4.1 of the Standard Specifications.
- C. Final seeding shall be completed between August 24 and September 9, 2017.
- D. If final seeding is not completed within the time specified above, CONTRACTOR shall forfeit \$2,000 to the City Forestry Department to complete the final seeding for the project.

3.03 FERTILIZER

- A. Fertilizer shall be applied per Section 629 of the Standard Specifications.

3.04 MULCHING

- A. All areas receiving seed shall be mulched.
- B. Mulching shall be performed in accordance with Method B of Section 627 of the Standard Specifications.

3.05 MAINTENANCE

- A. Seeding/sodding shall proceed concurrently with construction. Seeding/sodding shall be maintained by CONTRACTOR until grass is well established. Grass is well established when it covers the entire seeded areas to a height of 2 inches.
- B. Mow sod at regular intervals to maintain at a maximum height of 2 1/2 inches. Do not cut more than 1/3 of grass blade at any one mowing.
- C. Immediately remove clippings after mowing.
- D. Water to prevent seed/sod and soil from drying out.

- E. Roll surface to remove minor depressions or irregularities.
- F. Control growth of weeds. Apply herbicides in accordance with manufacturer's instructions. Remedy damage resulting from improper use of herbicides.
- G. Immediately reseed areas which fail to show adequate catch. Bare spots shall not exceed 5 square feet in area and not exceed 3% of the total seeded areas.
- H. Immediately replace sod in areas which show bare spots or deterioration.
- I. Protect seeded areas with warning signs during maintenance period.
- J. Correct damage resulting from erosion, gullies, rills, or other causes by filling with topsoil, tamping, refertilizing, and reseeding or resodding if damage occurs prior to acceptance of work.

3.06 TREE DAMAGE LIABILITY AND REPLACEMENT

- A. See Forestry Report and Specifications for Tree Preservation in Appendix F for additional requirements.
- B. For each tree damaged there shall be a penalty as shown in the table below.

Tree Type	Penalty
Honey Locust	\$500
Street Tree Pin Oak	\$500
Norway Maple	\$500
Shagbark Hickory	\$1,250
White Oak	\$1,250
Red Oak	\$1,250

END OF SECTION

APPENDIX A

May 15, 2017

Oak Creek Water and Sewer Utility
170 West Drexel Avenue
Oak Creek, WI 53154

Attn: Mr. Ben Wood
Strand Associates, Inc.

Re: Preliminary Geotechnical Exploration Report
Proposed Well No. 1 Abandonment/Demolition Project
8520 Knights Place
Oak Creek, Wisconsin
PSI Report No.: 00521882


Dear Mr. Wood:

Professional Service Industries, Inc. is pleased to submit our Preliminary Geotechnical Exploration Report for the proposed project in Oak Creek, Wisconsin. This report includes the results of field and laboratory testing, and preliminary site development recommendations.

PSI appreciates the opportunity to perform this preliminary geotechnical study and looks forward to continued participation during the final design and construction phases of this project. If you have any questions pertaining to this report, or if we may be of further service, please contact our office.

Respectfully submitted,

PROFESSIONAL SERVICE INDUSTRIES, INC.


Bradley J. Broback, P.E.
Project Engineer
Geotechnical Services




Ted A. Cera, P.E.
Department Manager
Geotechnical Services



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PRELIMINARY GEOTECHNICAL EXPLORATION REPORT

For the

Proposed Well No. 1 Abandonment/Demolition Project
8520 Knights Place
Oak Creek, Wisconsin

Prepared for:

Oak Creek Water and Sewer Utility
170 West Drexel Avenue
Oak Creek, WI 53154

Prepared by:


Professional Service Industries, Inc.
821 Corporate Court
Waukesha, Wisconsin 53189
Phone (262) 521-2125
Fax (262) 521-2471

PSI Report Number: 00521882


May 15, 2017

psi *Information
To Build On*
Engineering • Consulting • Testing




Bradley J. Broback, P.E.
Project Engineer
Geotechnical Services




Ted A. Cera, P.E.
Department Manager
Geotechnical Services

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Information To Build On

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PROJECT INFORMATION

Project Authorization

The following Table summarizes, in chronological order, the project authorization history for the services performed and represented in this report by Professional Service Industries, Inc. (PSI).

DOCUMENT AND REFERENCE NUMBER	DATE	SOURCE OF REQUEST	AUTHOR OR AGENT
Email Request for Proposal	4/13/2017	Strand Associates, Inc.	Mr. Ben Wood
PSI Proposal No: 202148A	4/18/2017	PSI	Kenneth R. Wojtanowski, P.E. Ted A. Cera, P.E.
Notice to Proceed (via signed proposal)	3/7/2017	Strand Associates, Inc.	Mr. Ben Wood

Project Description

PSI understands that the Oak Creek Water and Sewer Utility will be abandoning Well No. 1 at 8520 Knights Place in Oak Creek, Wisconsin. The following Table lists the material and information provided for this project:

DESCRIPTION OF MATERIAL	PROVIDER/SOURCE	DATE
Proposed Demolition Plan - Draft	Strand Associates, Inc.	4/12/2017

PSI understands that the proposed project will include the abandonment of Well No. 1 at the subject site. Various structures at the site will be demolished and removed, including 2 small buildings associated with the well site, as well as the reservoir structure which exists in the center of the property. Existing pavements will also be removed. Future plans for the parcel are not yet established, however consideration is being given to redeveloping the site at some point in the future with a lightly loaded, slab-on grade structure, without a basement, in the general area of the existing reservoir. The specific building location, as well as the design details and structural loads are unknown at this time.

Grades for the possible future building have not been established at the time of this report; however, it is understood that it is desired to regrade the site to EL. 130 after removal of the structures. Since design level details of the future slab-on-grade structure are unknown at this time, additional borings and geotechnical analysis will likely be necessary at a later date where specific recommendations regarding this new construction are desired.

The preliminary geotechnical recommendations presented in this report are based on the available project information, and the subsurface materials described in this report. If any of the noted project information is incorrect, please inform PSI in writing so that we may amend the recommendations presented in this report if appropriate and if desired by the client. PSI will not be responsible for the implementation of its recommendations

when it is not notified of changes in the project.

Purpose and Scope of Services

The purpose of this preliminary geotechnical exploration is to evaluate the general subsurface conditions at the site and evaluate the feasibility of the site for redevelopment with a possible future lightly loaded structure and provide preliminary geotechnical recommendations for foundations, floor slabs, pavements, utilities, and general site development.

PSI's scope of services included drilling a total of two soil test borings, select laboratory testing, and preparation of this preliminary geotechnical report. This report briefly outlines the testing procedures, presents available project information, describes the site and subsurface conditions, and presents our preliminary recommendations.

PSI is also providing a limited environmental assessment of the soils encountered in the borings concurrently with this preliminary geotechnical analysis. Four samples were obtained during the exploration (2 samples from each boring), and submitted to an analytical laboratory to test for Volatile Organic Compounds (VOCs) and Polycyclic Aromatic Hydrocarbons (VAHs). The results of this testing are being provided within a separate report, under separate cover. PSI's scope did not include services for determining the presence or absence of wetlands, or hazardous or toxic materials in the soil, bedrock, surface water, groundwater, or air on or below, or around this site. Statements in this report or on the boring logs regarding odors, colors, and unusual or suspicious items or conditions are strictly for informational purposes.

PSI did not provide any service to investigate or detect the presence of moisture, mold or other biological contaminants in or around any structure, or any service that was designed or intended to prevent or lower the risk of the occurrence of the amplification of the same. Client acknowledges that mold is ubiquitous to the environment with mold amplification occurring when building materials are impacted by moisture. Client further acknowledges that site conditions are outside of PSI's control, and that mold amplification will likely occur, or continue to occur, in the presence of moisture. As such, PSI cannot and shall not be held responsible for the occurrence or recurrence of mold amplification.

SITE AND SUBSURFACE CONDITIONS

Site Location and Description

The project site is located on the east side of Knights Place at 8520 Knights Place, in Oak Creek, Wisconsin. The site is currently occupied by several building structures associated with the existing well site, a circular reservoir structure, and associated pavements. It is understood that the well will be abandoned, the structures will be removed, and the site regraded for possible future redevelopment. The project site is currently bound by East Groveland Drive to the north; Henry Miller Park to the east; Knights Place to the west; and Oak Creek High School to the south. The Latitude and

Longitude at the center of the site are approximately 42.8896°N and 87.9089°W, respectively.

The topography of the project site is sloping in nature, with site grades ranging from about EL. 135 near the perimeter of the reservoir, to EL. 125±, sloping down from the reservoir in all directions.

Subsurface Conditions

The subsurface conditions were explored with 2 soil test borings. Boring R-1 was extended to a planned depth of about 20 feet below existing ground surface; and R-2 was extended to a depth of 21½ feet (beyond the planned 20 foot depth) due to poor sample recovery at 20 feet. The following Table indicates the general locations, approximate ground surface elevations, and depths to which each boring was completed:

BORING NO.	GENERAL LOCATION	APPROXIMATE GROUND SURFACE ELEVATION (FT [LOCAL])	BORING COMPLETION DEPTH (FT)
R-1	Just Outside East Side of Reservoir	EL. 134±	20
R-2	Just Outside Southwest quadrant of Reservoir	EL. 134±	21½*

*Boring extended beyond the planned depth due to poor sample recovery at 20 feet.

The borings were located in the field by PSI using conventional taping procedures referencing existing site features, as indicated on the attached Boring Location Plan. They are considered accurate to within several feet. The surface elevations shown on the logs were estimated by interpolation of a one-foot topographic map of the property, provided to PSI by Strand Associates, Inc. The elevations are considered accurate to within about 1 foot and were also rounded to the nearest foot for the purposes of this report. The units of the elevations used in this report are listed in feet (Local). The borings were advanced utilizing hollow-stem auger drilling methods and soil samples were routinely obtained during the drilling process. Drilling and sampling techniques were accomplished generally in accordance with ASTM procedures. Upon completion, the borings were backfilled with bentonite chips.

Representative soil samples were obtained from the soil borings and were returned to PSI's laboratory where they were visually classified using the Unified Soil Classification System (USCS) as a guideline. Further, PSI conducted limited laboratory testing on select soil samples to aid in identifying and describing the physical characteristics of the soils and to aid in defining the site soil stratigraphy. The results of the field exploration and laboratory tests were used in PSI's engineering analysis and in the formulation of our engineering recommendations.

The surface materials at the borings consisted of about 12 inches of dark brown silty clay or sandy silt topsoil. The surficial topsoil was underlain by brown and gray mixed lean clay fill soils extending to depths of about 5½ to 7 feet (EL. 128.5 to EL. 127±). The moisture content of the fill ranged from approximately 19 to 25%, indicating a moist to **very moist** condition.

At both borings, the fill was underlain by buried topsoil material consisting of black silty clay, extending to depths ranging from about 6½ to 8½ feet (EL. 125.5 to EL. 127.5±). Moisture contents of these soils ranged from about 26% to 34%, indicating a **very moist** condition.

Natural cohesive soils consisting of soft to medium stiff, dark gray lean clay were present below the buried topsoil extending to depths of about 8 to 12½ feet (EL. 126 to EL. 121.5±). Moisture contents of these soils ranged from about 20% to 34%, indicating a **very moist** condition. These soils were very soft to medium stiff in consistency, with estimated unconfined compressive strengths ranging from about 0.5 to 2.5 tons per square foot (tsf).

The dark gray lean clay soils were underlain by very stiff, brown and gray mottled lean clay soils which extended to the boring termination depths. These soils exhibited estimated unconfined compressive strengths ranging from about 2 to 6.8 tons per square foot (tsf). Moisture contents of these soils ranged from about 17% to 20%, indicating a moist condition.

The subsurface description is of a generalized nature to highlight the major subsurface stratification features and material characteristics. The boring logs included in the appendix should be reviewed for specific information at individual boring locations. These records include soil descriptions, stratifications, penetration resistances, locations of the samples and laboratory test data. The stratifications shown on the boring logs represent the conditions at the actual boring locations only. The borings were widely spaced, and variations may occur and should be expected between boring locations. The stratifications represent the approximate boundaries between subsurface materials and the actual transitions may be gradual. Water level information obtained during field operations is also shown on these boring logs. The samples which were not altered by laboratory testing will be retained for 60 days from the date of this report and then will be discarded.

Groundwater Information

Groundwater was not observed in the boreholes during or upon completion of drilling. The holes caved to varying depths upon withdrawal of the auger; therefore, observations could not be made below the caved depths. Observations made within the boreholes after 24 hours indicated water at a depth of about 9 feet (EL. 125) at boring R-2. No water was observed above the caved depth after 24 hours at R-1. The delayed water level reading at R-2 is considered to be a perched condition.

Due to the predominance of cohesive fine-grained soils at this site, which exhibit generally low permeability characteristics, longer observation times (not included in PSI's project work scope) are typically required in order to more accurately estimate the subsurface static water level for these soil types.

Fluctuations in the groundwater level should be anticipated throughout the year depending on variations in climatological conditions and other factors not apparent at the time the borings were performed. The possibility of groundwater level fluctuation and perched water conditions should be considered when developing the design and construction plans for the project. Longer term monitoring would be required to better

evaluate groundwater levels on this site.

EVALUATION AND RECOMMENDATIONS

When preliminary building and site development plans are more complete, PSI recommends that additional test borings be completed within the proposed construction areas (building and pavements). At that time, specific foundation and site development recommendations can be provided.

Geotechnical Discussion

There are four primary geotechnical related concerns at this site as they relate to preparation of the site for future development with a lightly loaded structure. However, this report must be read in its entirety, and all recommendations included herein must be followed. The following summarizes these concerns:

- 1) Fill and buried topsoil were present at the borings extending to depths of about 6½ to 8½ feet (EL. 125.5 to EL. 127.5±). Additionally, very moist, soft native lean clay soils were present below the buried topsoil at boring R-2 extending to about 8 feet (EL 126±). It should be anticipated that the depth and consistency of these soils may vary between and beyond boring locations, and between sampling intervals.***

Low strength natural clay soils, organic soils, and undocumented fill soils are not considered suitable for foundation or floor slab support due to potential excessive total and differential settlements. Therefore, it is recommended that these soils be removed and replaced in their entirety from within proposed structural areas (including appropriate lateral extents) during the site preparation activities, following removal of the existing structures and pavements. It is understood that the site will be regraded to about EL. 130. Therefore, once removal of the unsuitable soils is performed to expose medium stiff to very stiff lean clay soils, the exposed grade will be at about EL. 125.5 to EL. 126.0 based on the borings. Therefore, structural fill placement of about 4 to 5 feet will then be required to reestablish the site to EL. 130.

- 2) Several small buildings and a reservoir structure were located on the project site. These structures will be removed as part of the site abandonment activities.***

Old building foundations (footings and foundation walls), slabs, building remnants, associated underground utilities, or unsuitable backfill materials, should be completely removed from within and a minimum of 10 feet beyond new building areas. The resulting excavations should then be backfilled with properly placed and compacted engineered fill as outlined in the Site Preparation section of this report. Complete removal of foundations, foundation walls or concrete floor slabs need not be completely removed from within pavement and landscape areas; however, PSI recommends they be removed to a minimum depth of 2 feet below subgrade (bottom of aggregate base course elevation) to provide a more uniform subgrade condition. Basement slabs

located below 2 feet from planned bottom of base course elevation in pavement areas may be left in place; however, they should be broken into maximum 6 inch pieces to facilitate drainage. It should be recognized that if portions of structures are elected to be left in place below proposed pavement areas, they can be encountered when performing other excavations on the site, such as for utilities, and can cause obstructions and excavation difficulty.

- 3) It should be anticipated that the clay soils exposed after removal of the existing fill, buried topsoil and soft natural soils, will generally be in a moist to very moist condition and may therefore require some form of stabilization efforts. These soils are considered moisture and disturbance sensitive.**

Where the natural subgrade soils at the overexcavated surface are in a very moist condition, it may be necessary to place a coarse crushed stone, possibly in conjunction with a geogrid, in order to create a stable surface to begin placing structural compacted fill.

The following geotechnical related recommendations have been developed on the basis of the subsurface conditions encountered and PSI's understanding of the proposed development. Should changes in the project criteria occur, a review must be made by PSI to determine if modifications to our recommendations will be required. Additional borings are recommended once design level details of proposed future structures on the site become available.

Site Preparation

Special care should be given in the removal of the existing structures, and any underground utilities or other structures. PSI recommends that the existing foundations, walls, floor slabs, underground utilities, unsuitable backfill materials, as well as any foundation elements from other structures (such as telephone poles), be removed in their entirety from beneath and a minimum of 10 feet beyond the new building addition footprint and properly disposed of off-site. Within any new pavement areas, the walls/footings/slabs should be removed to a depth of at least 2 feet below planned subgrade (bottom of aggregate base elevation). However, the slabs are recommended to be broken into pieces having a maximum dimension of 6 inches in any direction. The removal and/or breaking of buried structures should be observed by a representative of a geotechnical engineer. Excavations and voids caused by the removal of the debris and structures, including basements, should be replaced with compacted engineered fill as outlined below. Prior to the backfilling, the areas must be observed by a representative of qualified geotechnical engineer to evaluate the suitability of the subgrade for subsequent support of the new building.

Prior to the placement of new fill or preparation of the construction area subgrade, PSI recommends that the existing fill, buried topsoil, and underlying soft native soils encountered in the borings be removed from within and at a minimum of 10 feet beyond the proposed building and pavement areas. The existing fill can be sorted and reused as structural fill for raising the site grade to the planned elevation once the surficial topsoil is removed. However, some drying of the existing fill may be necessary. The thickness of the surficial topsoil at the borings was observed to be about 12 inches.

However, some variation should be anticipated.

Following the removal of the structures and unsuitable materials described above, the exposed subgrades in proposed future building and pavement areas should be proofrolled. Proofrolling should be performed with a fully-loaded tandem axle dump truck or rubber tired vehicle of similar size and weight, typically 9 tons/axle. Soils that are observed to rut or deflect excessively under the moving load (typically greater than about 1 inch) should be scarified, aerated, and recompact, if feasible, or undercut and replaced with properly compacted engineered fill. It must be recognized that the clay soils present on the site are highly moisture and disturbance sensitive. Some difficulty with subgrade preparation is therefore expected on this site, especially if these soils are wet or become wet during construction. equipment and worker traffic must be kept to a minimum on subgrade bearing surfaces, especially during times of precipitation or following spring thaw. Consideration should be given to installing construction roads to reduce disturbance to the sensitive subgrade soils. The proofrolling activities should be documented by a qualified representative of PSI and should be performed during a period of dry weather.

Removal of unsuitable portions of the exposed soils and replacement with structural fill may be required in areas, especially if earthwork is not carried out during periods of relatively warm, dry weather, which provide more favorable conditions for drying of these soils. Any soft zones, which cannot be improved by scarification and aeration, must be removed and replaced with compacted structural fill.

Newly placed engineered fill required to establish site grades should be free of organic, frozen, or other deleterious materials, have a maximum particle less than three inches. Clay fills should have a liquid limit less than 45 and plasticity index less than 25 and greater than 11. Other soils with Atterberg limits outside those recommended should be reviewed by the geotechnical for their intended use. If a fine-grained clay soil is used for fill, close moisture content control will be required to achieve the recommended degree of compaction. On-site soils can generally be reused as structural fill. However, some sorting of organic soils and wet materials will be necessary. Moisture conditioning of the fine-grained soils will also likely be necessary in order to facilitate the minimum required compaction.

Engineered fill should be placed in maximum lifts of 8 inches of loose material and should be compacted to at least 95 percent of the maximum dry density and within 3 percent of the optimum moisture content as determined by the Modified Proctor test (ASTM D-1557). Also, PSI recommends that a qualified geotechnical engineer test and document the engineered fill materials prior to placement. If water is to be added, it should be uniformly applied and thoroughly mixed into the soil by disk or scarifying. Each lift of compacted engineered fill should be observed and tested by a representative of PSI prior to placement of subsequent lifts. The minimum lateral extent of the overexcavation of poor soil and subsequent placement and compaction of engineered fill should be equal to or greater than the depth of overexcavation below finished floor elevation or 10 feet, whichever is greater.

It is recommended that well-graded granular soils be utilized as backfill in new utility trenches and alongside below grade walls to reduce the potential for consolidation and

settlement of the fill. All fill soils must be placed and compacted under engineering controlled conditions, to provide suitable support for overlaying structures and roadways. Additional guidance can be provided at the time of construction in the selection process for grade-raising fill and trench backfill.

When excavations encroach upon or extend below the groundwater or perched zones, and into silty or soft clay soils, subgrade instability and sloughing/caving of sidewalls can occur. Some overexcavation of softened or loosened soils, in conjunction with the use of a crushed stone working mat, may be necessary. Additionally, significantly widened excavations may result, or be required for stability. Dewatering may be required depending on location and depth of future buildings and utilities.

The selection of fill materials for various applications should be done in consultation with the soils engineer. Similarly, the evaluation of the subgrade and placement and compaction of fill for structural applications should be monitored and tested by a qualified representative of the soils engineer.

Preliminary Foundation Recommendations

The following information is provided for preliminary informational purposes only to aid in determination of feasibility of the site for development with a lightly loaded slab-on-grade structure. When preliminary building and site development plans are more complete, PSI recommends that additional test borings be completed within the proposed building area. At that time, specific foundation recommendations can be provided.

Based on this preliminary study, it is anticipated that typical single story slab-on-grade buildings with light to moderate foundation and slab loadings could be supported by conventional shallow column and continuous wall foundation systems on this site, provided the site is properly prepared as outlined in this report. Based on the recommended removal of the unsuitable existing fill, buried topsoil, and soft natural soils; and placement of compacted structural fill to replace these unsuitable materials and to establish site development grades, new footings are estimated to bear upon newly placed and compacted engineered fill, or natural soils. For preliminary design considerations, foundations for lightly to moderately loaded structures, bearing upon suitable native soils or within compacted structural fill placed upon suitable native soils, can be proportioned for allowable soil bearing pressures ranging from 2,000 to 4,000 pounds per square foot (psf) depending upon location and depth. Additional geotechnical work must be performed for planned structures and pavements when a design and layout of the site is created. At that time, more detailed foundation recommendations can be developed.

Preliminary Floor Slab Recommendations

The information is provided for informational purposes only and should be verified once a final grading plan and site plan is established for the project.

Based upon the recommended site preparation, which includes removal and replacement of existing fill, buried topsoil, and underlying soft native soils, it is estimated that floor slab subgrades will generally consist of natural clay soils or newly placed and compacted engineered fill used to raise grades. These soils can be used for floor slab

support when properly prepared as outlined in the Site Preparation section of this report.

Where the subgrade is prepared as recommended herein, a modulus of subgrade reaction, k value, in the range of about 125 to 150 pounds per cubic inch (pci) is generally expected for floor slabs on this site.

Exterior/Unheated Area Slabs

Entry slabs, sidewalks, aprons, and other slabs in exterior or unheated areas may bear upon silty or clayey soils. Such materials are highly frost susceptible and poorly drained. Slabs placed directly upon such soils are subject to heaving and subsequent settlement due to freeze/thaw cycles. This can result in cracking, misalignment, and other related effects (especially at joints). It is recommended that consideration be given to limited undercutting of the frost susceptible materials to a depth of 1 to 2 feet below the slabs, and replacement with well graded, properly placed and compacted granular soils. A properly designed underdrain system connected to the municipal sewer (if permissible) or directed to on-site stormwater management areas should also be incorporated to reduce the potential effects of freeze/thaw cycles.

Seismic Site Class

The 2009 International Building Code requires a site class for the calculation of earthquake design forces. This class is a function of soils type (i.e. depth of soil and strata types). Based on the natural soils observed within the boring locations and local experience, **Site Class "D"** is recommended.

Preliminary Pavement Recommendations

PSI recommends that the subgrade soils for the pavements be prepared in accordance with the Site Preparation section of this report, including removal of the existing fill, buried topsoil, and soft natural clay. Based on the recommended site preparation, PSI anticipates the subgrade soils will generally consist of natural clay soils, or newly placed and compacted engineered fill used to replace unsuitable soils and raise grades. The following subgrade parameters are recommended on a preliminary basis for design considerations based on a predominantly clay subgrade expected on this site:

AASHTO Soil Classification	Material	SSV	DGI	Subgrade Reaction Modulus, k (pci)	Resilient Modulus, M_R (psi)	CBR	Frost Index
A-6	II-Poorly Sorted	4.0	14	150	3,000	3	F-3

Note: The above parameters were estimated based upon the soil classification and boring information and were not measured in the laboratory. Based on the existing subgrade passing proofroll. If the subgrade does not pass proofroll, EBS or other form of remediation must be performed.

Engineered fill added to raise grades must have design values at least equal to or greater than listed above. The CBR value given above has been estimated. For a less conservative CBR value, PSI recommends that actual CBR tests be performed on each type of material, including the proposed base course material. Preparation of the existing ground surface and construction of the new subgrade and pavements should

be in accordance with the WisDOT Standard Specifications.

The granular base course should consist of well-graded crushed stone meeting the requirements from Section 305 of the State of Wisconsin Standard Specifications for Construction for a 1¼" dense graded base. The granular base course material should be placed and compacted to a minimum of 95% of maximum density as determined by the Modified Proctor test (ASTM D-1557) and within +/-3% of the optimum moisture content value. Also, a representative of a qualified geotechnical engineer must test the base course material prior to, and during, placement.

Asphaltic binder and surface courses should meet the requirements from Section 460 of the State of Wisconsin Standard Specifications for Construction. Asphaltic courses should be placed and compacted to the minimum required density contained within section 460 of the Standard Specifications. An adequate number of in-place density tests should be performed during construction to document the placement compaction.

Pavement Drainage and Maintenance

Pavements should be sloped to provide positive surface drainage. Water should not be allowed to pond on or adjacent to the pavement as this could saturate the subgrade and cause premature pavement deterioration. The granular base course should be protected from water inflow along drainage paths. Additionally, the granular base course should extend beyond the edges of the pavement in low areas to allow any water that enters the base course stone a path for exit. **PSI recommends that where site grades are sloping toward the pavement edge, an edge drain be used in order to minimize additional water from entering the granular base course layer, thus causing subgrade base failure and heaving. Edge drains should be sloped to the nearest storm sewer.**

Due to the fine-grained nature of the subgrade soils, it is very important to not trap water within the base course layer or granular fills above the clay soils. **If granular fills are used to fill over clay soils within pavement areas, water can collect and pond on top of the clay soils. Therefore, in these cases PSI recommends subsurface drains be installed.** If placed properly, subsurface drains will greatly reduce the amount of trapped water under the pavement surfaces. Trapped water leads to subgrade degradation and increases pavement heave during winter months.

Minimally, these drains should be placed in low spots in the pavement, at the toe of slopes that are draining toward pavement surfaces, in undercuts that have been filled with granular fill, and as finger drains extending for a distance of at least 10 feet from the edge of catch basins or curb inlets. The drain system should consist of minimum three-inch diameter perforated PVC drainpipes surrounded by at least 6 inches of clean crushed ¾" to 1" limestone. The granular fill should be filter protected by wrapping the clean stone fill in a 6 oz. non-woven geotextile filter fabric to reduce the potential of soils from migrating into and obstructing the pipe. It is also recommended that roof drains be connected to the storm water collection system to minimize the potential for this water to enter the base and subgrade. The top of the draitile trench should coincide with the pavement base course layer. Additionally, the draitile should be installed with a positive slope (Minimum ½%-1%) throughout the length of the tile. The drains should

connect to the nearest storm sewer catch basin.

The pavements are recommended to be constructed with attention to final grades to facilitate drainage. Where surface drainage of water alone is not possible, a storm sewer system may be appropriate to carry away storm run-off water. Construction of the subgrade and pavements should be in accordance with the project specifications.

Periodic pavement maintenance is required to keep a pavement, under normal traffic and environmental conditions, as near as possible to its constructed condition. Maintenance is necessary to reduce the effects of pavement stress caused by changes in temperature and moisture, repetitive traffic loadings, and movement of the subgrade soils. As pavement distress is observed, it should be repaired as quickly as possible. Unrepaired areas will generally lead to more severe and widespread distress, and eventually, pavement disintegration. Therefore, routine maintenance consisting of annual crack sealing, seal coating every 3 to 5 years, and other necessary repairs at least annually, will be required to obtain the design service life.

CONSTRUCTION CONSIDERATIONS

PSI should be retained to provide observation and testing of construction activities involved in the foundation, earthwork, and related activities of this project. PSI will not accept responsibility for conditions that deviated from those described in this report, nor for the performance of the foundation or pavement if we are not engaged to also provide construction observation and testing for this project.

Moisture Sensitive Soils/Weather Related Concerns

The clay soils encountered at this site are expected to be extremely sensitive to disturbances caused by construction traffic and changes in moisture content. Increases in the moisture content of the soil can cause significant reduction in the soil strength and support capabilities. In addition, soils that become wet may be slow to dry and thus significantly delay the progress of grading and compaction activities. It will, therefore, be advantageous to perform earthwork and foundation construction activities during dry weather.

Water should not be allowed to collect in the foundation excavation, on floor slab areas, or on prepared subgrades during or after construction. Areas should be sloped to facilitate removal of collected rainwater, groundwater, or surface runoff. Positive site drainage should be provided to reduce infiltration of surface water around the perimeter of buildings, beneath floor slabs, and within pavement areas. The grades should be sloped away from buildings and surface drainage should be collected and discharged such that water is not permitted to infiltrate the backfill and floor slab areas of the building.

Drainage and Groundwater Concerns

Groundwater was not observed in the boreholes during or upon completion of drilling.

The holes caved to varying depths upon withdrawal of the auger; therefore, observations could not be made below the caved depths. Observations made within the boreholes after 24 hours indicated water at a depth of about 9 feet (EL. 125) at boring R-2. No water was observed above the caved depth after 24 hours at R-1. The delayed water level at R-2 was considered to be a perched condition. However, due to the predominance of cohesive soils at this site, which exhibit generally low permeability characteristics, longer observation times (not included in PSI's project work scope) are typically required in order to more accurately estimate the subsurface static water level for these soil types.

Based on the above observations and the soil conditions encountered, no major difficulties during excavation and construction of a shallow foundation system or typical shallow depth utilities is anticipated on this site. A gravity drainage system and filtered sump pumps or other conventional dewatering procedures, should be adequate to control perched water if encountered, such as possibly near R-2.

Fluctuations in the groundwater level should be anticipated throughout the year depending on variations in climatological conditions and other factors not apparent at the time the borings were performed. The possibility of groundwater level fluctuation and perched water conditions should be considered when developing the design and construction plans for the project.

Excavations

Sloping, shoring or bracing of the excavation sidewalls will be necessary. Trenching in fill and organic soils may be difficult due to the instability of vertical slopes, and will therefore require a flattening of trench sides, or some other means of protection, to facilitate construction and to protect life and property. Substantial sloughing and caving should be expected within unprotected excavations. The degree of excavation instability problems is dependent upon the depth and length of time that excavations remain open, excavation bank slopes, water levels and the effectiveness of any dewatering systems. However, severe instability can be expected within granular soils, especially encroaching upon and extending below the groundwater. All excavation work must be performed in accordance with OSHA and local building code requirements.

It is mandated that excavations, whether they be for utility trenches, basement excavations or footing excavations, be constructed in accordance with current Occupational Safety and Health Administration (OSHA) guidelines to protect workers and others during construction. PSI recommends that these regulations be strictly enforced; otherwise, workers could be in danger and the owner(s) and the contractor(s) could be liable for substantial penalties.

The contractor is solely responsible for designing and constructing stable, temporary excavations and should shore, slope, or bench the sides of the excavations as required to maintain stability of both the excavation sides and bottom. The contractor's "responsible person", as defined in 29 CFR Part 1926, should evaluate the soil exposed in the excavations as part of the contractor's safety procedures. In no case should slope height, slope inclination, or excavation depth, including utility trench excavation depth, exceed those specified in local, state, and federal safety regulations.

PSI is providing this information solely as a service to our client. PSI does not assume responsibility for construction site safety or the contractor's or other parties' compliance with local, state, and federal safety or other regulations.

Utilities Trenching

In general, suitable native soils and newly placed fill used to raise grades or replace unsuitable soils as previously recommended in this report can be used for support of utility lines. Organic/soft/or otherwise unsuitable soils are recommended to be removed and replaced where encountered. Some difficulty with the stability of utility trenches may be encountered in areas. The use of shoring, bracing, or trench boxes will be required. Utility construction should be performed in accordance with "The Standard Specifications for Sewer and Water Line Construction" for the State of Wisconsin.

Excavation for utility trenches shall be performed in accordance with OSHA regulations as stated in 29 CFR Part 1926. It should be noted that utility trench excavations have the potential to degrade the properties of the adjacent fill materials. Utility trench walls that are allowed to move laterally can lead to reduced bearing capacity and increased settlement of adjacent structural elements and overlying slabs.

It is recommended that well graded granular soils such as those specified in Tables 37 and 39 of the Standard Specification for Sewer and Water Construction be utilized as backfill in utility trenches to reduce the potential for consolidation and settlement of the backfill. All fill soils must be placed and compacted under engineering controlled conditions, to provide suitable support for overlaying structures and roadways. Silty and clayey soils, wet granular soils, and organic materials, are not recommended for re-use as backfill within utility trenches due to the substantial difficulty of obtaining proper compaction in confined areas. Due to the clay soils that predominate this site, importing of suitable granular soils will be necessary.

Backfill for utility trenches is as important as the original subgrade preparation or engineered fill placed to support either a foundation or slab. Therefore, it is imperative that the backfill for utility trenches be placed to meet the project specifications for the engineered fill of this project. Unless otherwise specified, the backfill for the utility trenches should be placed in 4 to 6 inch loose lifts and compacted to a minimum of 95 percent of the maximum dry density achieved by the Modified Proctor test (ASTM D-1557). The backfill soil should be moisture conditioned to be within $3\pm$ percent of the optimum moisture content as determined by the Modified Proctor test. Up to 4 inches of bedding material placed directly under the pipes or conduits placed in the utility trench can be compacted to the 90 percent compaction criteria with respect to the Modified Proctor.

Compaction testing should be performed for every 200 cubic yards of backfill placed or each lift within 200 linear feet of trench, whichever is less. Backfill of utility trenches should not be performed with water standing in the trench. If granular material is used for the backfill of the utility trench, the granular material should have a gradation that will filter protect the backfill material from the adjacent soils. If this gradation is not available, a geosynthetic non-woven filter fabric should be used to reduce the potential for the

migration of fines into the backfill material. Granular backfill material shall be compacted to meet the above compaction criteria. The geotechnical engineer can also specify a relative density specification for clean granular materials. The granular backfill material should be compacted to achieve a relative density greater than 75 percent or as specified by the geotechnical engineer for the specific material used.

GEOTECHNICAL RISK

The concept of risk is an important aspect of the geotechnical evaluation. The primary reason for this is that the analytical methods used to develop geotechnical recommendations do not comprise an exact science. The analytical tools which geotechnical engineers use are generally empirical and must be used in conjunction with engineering judgment and experience. Therefore, the solutions and recommendations presented in the geotechnical evaluation should not be considered risk-free and, more importantly, are not a guarantee that the interaction between the soils and the proposed structure will perform as planned. The engineering recommendations presented in the preceding section constitutes PSI's professional estimate of those measures that are necessary for the proposed structure to perform according to the proposed design based on the information generated and referenced during this evaluation, and PSI's experience in working with these conditions.

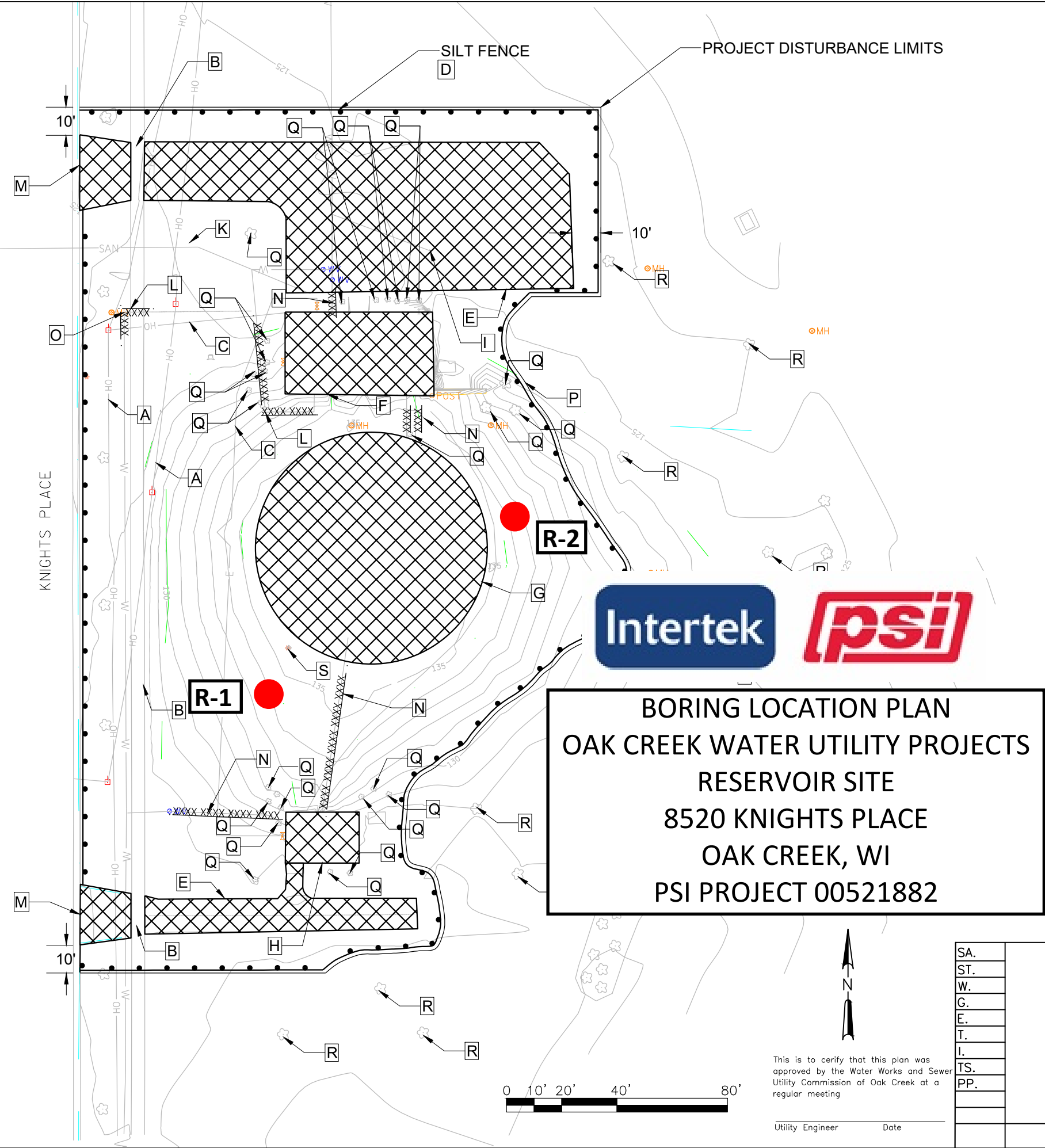
REPORT LIMITATIONS

PSI's recommendations are based on the available subsurface information obtained by PSI and design details furnished by others. If there are any revisions to the plans for this project or if deviations from the subsurface conditions noted in this report are encountered during construction, PSI must be notified immediately to determine if changes in the recommendations are required. If PSI is not retained to perform these functions, PSI will not be responsible for the impact of those conditions on the project.

PSI warrants that the findings, recommendations, specifications, or professional advice contained herein have been made in accordance with generally accepted professional geotechnical engineering practices in the local area. No other warranties are implied or expressed.

After the plans and specifications are complete, PSI must be retained and provided the opportunity to review the final design plans and specifications to check that our engineering recommendations have been properly incorporated into the design documents. At this time, it may be necessary to submit supplementary recommendations. This report has been prepared for the exclusive use by the Oak Creek Water and Sewer Utility for the evaluation of the site in Oak Creek, Wisconsin for possible future development.

APPENDIX
BORING LOCATION PLAN
LOGS OF BORINGS
GENERAL NOTES



BORING LOCATION PLAN
OAK CREEK WATER UTILITY PROJECTS
RESERVOIR SITE
8520 KNIGHTS PLACE
OAK CREEK, WI
PSI PROJECT 00521882

- GENERAL NOTES:**
- CONTRACTOR WILL BE RESPONSIBLE FOR HAULING AND PROPERLY DISPOSING OF ALL EXCESS MATERIAL ON THE SITE.
 - OWNER CAN PROVIDE CLEAN FILL, AS NEEDED.
 - CONTRACTOR SHALL REPAIR ANY DAMAGE TO EXISTING CURB, SIDEWALK, OR ROADWAY.
- DEMOLITION NOTES:**
- A. EXISTING OVERHEAD LINES TO REMAIN AND SHALL BE PROTECTED.
 - B. EXISTING SIDEWALK TO REMAIN AND SHALL BE PROTECTED.
 - C. CONTRACTOR TO COORDINATE WITH WE ENERGIES TO DEMOLISH ELECTRICAL SERVICE. EXISTING ELECTRICAL SERVICE TO BE TERMINATED AT EXISTING OVERHEAD TRANSFORMER. WE ENERGIES SHALL DENERGIZE EXISTING UNDERGROUND ELECTRICAL AT EACH WELL HOUSE AT AT THE UTILITY POLE.
 - D. SILT FENCE SHALL BE INSTALLED AND MAINTAINED BY CONTRACTOR.
 - E. CONTRACTOR SHALL REMOVE DRIVEWAY IN ITS ENTIRETY INCLUDING ALL BASE AND SUBSURFACE MATERIAL.
 - F. CONTRACTOR SHALL REMOVE WELLHOUSE NO. 1 TO A DEPTH OF 2 FEET BELOW PROPOSED GROUND ELEVATION AS SHOWN ON SITE PLAN.
 - G. CONTRACTOR SHALL REMOVE RESERVIOR TO A DEPTH OF 2 FEET BELOW PROPOSED GROUND ELEVATION AS SHOWN ON SITE PLAN.
 - H. CONTRACTOR SHALL REMOVE WELLHOUSE NO 3 TO A DEPTH OF 2 FEET BELOW PROPOSED GROUND ELEVATION AS SHOWN ON SITE PLAN.
 - I. EXISTING WATER SERVICE TO REMAIN AND SHALL BE PROTECTED.
 - J. CONTRACTOR TO COORDINATE WITH WE ENERGIES TO DEMOLISH GAS SERVICECAP THE SERVICE FOR FUTURE USE. EXISTING GAS SERVICE TO BE REMOVED AT WELLHOUSES NO. 1.
 - K. CONTRACTOR TO REMOVE EXISTING SANITARY LATERAL TO PROPERTY LINE. CONTRACTOR SHALL PLUG AND CAP THE LATERAL TO PREVENT ANY INFILTRATION INTO THE SANITARY SEWER.
 - L. CONTRACTOR SHALL ABANDON WATERMAIN AFTER LOOPING MODIFICATIONS HAVE BEEN COMPLETED. SEE DETAIL XX.
 - M. EXISTING CURB SHALL BE REMOVED AND REPLACED WITH NEW CURB AS SHOWN IN DETAIL XX.
 - N. WATERMAIN TO BE ABANDONED AND CAPPED AT EXISTING WATER VALVE.
 - O. WATER VALVES WILL BE ABANDONED IN PLACE, AND VALVE STEM WILL BE REMOVED.
 - P. TREE PROTECTION FENCING TO BE ERECTED AND REMOVED BY CITY FORESTRY DEPARTMENT. THIS FENCE DELINEATES A NO ENTRY ZONE WHERE NO CONSTRUCTION EQUIPMENT, MATERIALS, SOIL, OR ANY OTHER MATERIALS SHALL BE PLACED, PARKED, OR STORED ON THE SURFACE OF ANY UNPAVED AREA WITHIN THE TREE PROTECTION ZONE.
 - Q. TREES AND SHRUBS TO BE REMOVED BY CITY FORESTRY DEPARTMENT.
 - R. TREES TO BE PROTECTED IN TREE PROTECTION ZONE.
 - S. EXISTING LIGHT POLE TO BE REMOVED.

SA.	CITY OF OAK CREEK, WISCONSIN				APPROVED BY			
ST.					UTILITY ENGINEER		DATE	
W.	DESIGNED BY		DATE	DRAWN BY		DATE		
G.	B.W.		4/10/17	V.S.		4/10/17		
E.				X.X.		X/XX/XX		
T.	DEMOLITION PLAN				CITY ENGINEER		DATE	
I.					SCALE		SHEET	
TS.					PLAN		5	
PP.					HOR. N/A			
					PROFILE		OF	
					HOR. N/A			
					VER. N/A		6	
			APPROVED BY COUNCIL RESOLUTION NO.			FILE NO: XXXXX-3C-XXXX		

PSI Job No.: 00521882		Drilling Method: Hollow Stem Auger		WATER LEVELS	
Project: Oak Creek Water Utility Projects		Sampling Method: 2-in SS		▽ While Drilling	Not Obsvd
Location: Oak Creek, WI		Hammer Type: Automatic		▼ Upon Completion	Not Obsvd
		Boring Location:		▼ Delay	Not Obsvd

Elevation (feet)	Depth, (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	Station: N/A Offset: N/A	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft @				Additional Remarks
							Surface Elev.: 134 ft				<div> <div> X Moisture </div> <div> <div>PL</div> <div>LL</div> </div> </div> <div> <div>0 25 50</div> </div> <div> <div>STRENGTH, tsf</div> <div>▲ Qu * Qp</div> <div>0 2.0 4.0</div> </div>				
	0						Topsoil, Dark Brown Silty Clay (12"± Thick)	OL							
				1	12		Fill, Brown and Gray Mixed Lean Clay, Moist to Very Moist, Stiff		2-3-4 N=7	21		X	*		
130	5			2	14			FILL	2-3-2 N=5	25		X	*		
				3	14		Black Silty Clay, Very Moist, Medium Stiff (Buried Topsoil)	OL	2-2-3 N=5	26		X	*		
125	10			4	16		Dark Gray Lean Clay, Very Moist, Medium Stiff	CL	2-2-4 N=6	20		X	*		
				5	18		Brown and Gray Mottled Lean Clay, Moist, Very Stiff	CL	7-15-11 N=26	17		X		>>*	Q _r = 6.6 tsf
115	20			6	18				4-5-11 N=16	19		X	*		Q _r = 3.9 tsf
							End of Boring at 20'								
							Cave-In at 9'								
							Cave-In at 9' After 24 Hours								

Completion Depth: 20.0 ft		Sample Types:		Latitude:	
Date Boring Started: 4/26/17		<div> <div>Auger Cutting</div> <div>Split-Spoon</div> <div>Rock Core</div> </div>		Longitude:	
Date Boring Completed: 4/26/17		<div> <div>Shelby Tube</div> <div>Hand Auger</div> <div>Calif. Sampler</div> <div>Texas Cone</div> </div>		Drill Rig: CME ATV 550	
Logged By: Gabriel				Remarks:	
Drilling Contractor: Groundbreaking Explor.					

The stratification lines represent approximate boundaries. The transition may be gradual.



Professional Service Industries, Inc.
821 Corporate Court, Suite 100
Waukesha, WI 53189
Telephone: (262) 521-2125
Fax: (262) 521-2471

LOG OF BORING R-2

Sheet 1 of 1

PSI Job No.: 00521882		Drilling Method: Hollow Stem Auger		WATER LEVELS	
Project: Oak Creek Water Utility Projects		Sampling Method: 2-in SS		▽ While Drilling	Not Obsvd
Location: Oak Creek, WI		Hammer Type: Automatic		▼ Upon Completion	Not Obsvd
		Boring Location:		▼ Delay	9 feet

Elevation (feet)	Depth (feet)	Graphic Log	Sample Type	Sample No.	Recovery (inches)	Station: N/A Offset: N/A	MATERIAL DESCRIPTION	USCS Classification	SPT Blows per 6-inch (SS)	Moisture, %	STANDARD PENETRATION TEST DATA N in blows/ft © X Moisture PL LL STRENGTH, tsf ▲ Qu * Qp				Additional Remarks
	0						Surface Elev.: 134 ft								
				1	12		Topsoil, Dark Brown Sandy Silt (12"± Thick)	OL	3-3-4 N=7	19	○	X		*	
				2	18		Fill, Brown and Gray Mixed Lean Clay, Moist to Very Moist, Medium Stiff	FILL	1-2-3 N=5	22	○	X	*		
	5			3	14		Black Silty Clay, Very Moist, Soft (Buried Topsoil)	OL	2-2-2 N=4	34	○		X		
				4	18		Dark Gray Lean Clay, Very Moist, Soft	CL	2-5-6 N=11	19	○	X			Q _r = 4.5 tsf 24 Hour Delay Water Level
	10			5	18		Brown and Gray Mottled Lean Clay, Moist, Very Stiff	CL	5-8-11 N=19	20	○	X		>>*Q _r = 6.8 tsf	
	15			6	0				9-11-11 N=22	20	○	X		>>*Q _r = 2.5 tsf	
	20			7	8				11-16-17 N=33			*	○		
							End of Boring at 21.5'								
							Cave-In at 9'								
							Cave-In at 10.8' After 24 Hours								

Completion Depth: 21.5 ft
Date Boring Started: 4/26/17
Date Boring Completed: 4/26/17
Logged By: Gabriel
Drilling Contractor: Groundbreaking Explor.

Sample Types:

Auger Cutting
Split-Spoon
Rock Core

Shelby Tube
Hand Auger
Calif. Sampler
Texas Cone

Latitude:
Longitude:
Drill Rig: CME ATV 550
Remarks:

The stratification lines represent approximate boundaries. The transition may be gradual.



GENERAL NOTES

SAMPLE IDENTIFICATION

The Unified Soil Classification System (USCS), AASHTO 1988 and ASTM designations D2487 and D-2488 are used to identify the encountered materials unless otherwise noted. Coarse-grained soils are defined as having more than 50% of their dry weight retained on a #200 sieve (0.075mm); they are described as: boulders, cobbles, gravel or sand. Fine-grained soils have less than 50% of their dry weight retained on a #200 sieve; they are defined as silts or clay depending on their Atterberg Limit attributes. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size.

DRILLING AND SAMPLING SYMBOLS

SFA: Solid Flight Auger - typically 4" diameter flights, except where noted.	☒ SS: Split-Spoon - 1 3/8" I.D., 2" O.D., except where noted.
HSA: Hollow Stem Auger - typically 3 1/4" or 4 1/4" I.D. openings, except where noted.	■ ST: Shelby Tube - 3" O.D., except where noted.
M.R.: Mud Rotary - Uses a rotary head with Bentonite or Polymer Slurry	▮ RC: Rock Core
R.C.: Diamond Bit Core Sampler	↓ TC: Texas Cone
H.A.: Hand Auger	☞ BS: Bulk Sample
P.A.: Power Auger - Handheld motorized auger	☒ PM: Pressuremeter
	CPT-U: Cone Penetrometer Testing with Pore-Pressure Readings

SOIL PROPERTY SYMBOLS

N: Standard "N" penetration: Blows per foot of a 140 pound hammer falling 30 inches on a 2-inch O.D. Split-Spoon.
N ₆₀ : A "N" penetration value corrected to an equivalent 60% hammer energy transfer efficiency (ETR)
Q _u : Unconfined compressive strength, TSF
Q _p : Pocket penetrometer value, unconfined compressive strength, TSF
w%: Moisture/water content, %
LL: Liquid Limit, %
PL: Plastic Limit, %
PI: Plasticity Index = (LL-PL), %
DD: Dry unit weight, pcf
▼, ▽, ▾ Apparent groundwater level at time noted

RELATIVE DENSITY OF COARSE-GRAINED SOILS ANGULARITY OF COARSE-GRAINED PARTICLES

<u>Relative Density</u>	<u>N - Blows/foot</u>
Very Loose	0 - 4
Loose	4 - 10
Medium Dense	10 - 30
Dense	30 - 50
Very Dense	50 - 80
Extremely Dense	80+

<u>Description</u>	<u>Criteria</u>
Angular:	Particles have sharp edges and relatively plane sides with unpolished surfaces
Subangular:	Particles are similar to angular description, but have rounded edges
Subrounded:	Particles have nearly plane sides, but have well-rounded corners and edges
Rounded:	Particles have smoothly curved sides and no edges

GRAIN-SIZE TERMINOLOGY

<u>Component</u>	<u>Size Range</u>
Boulders:	Over 300 mm (>12 in.)
Cobbles:	75 mm to 300 mm (3 in. to 12 in.)
Coarse-Grained Gravel:	19 mm to 75 mm (3/4 in. to 3 in.)
Fine-Grained Gravel:	4.75 mm to 19 mm (No.4 to 3/4 in.)
Coarse-Grained Sand:	2 mm to 4.75 mm (No.10 to No.4)
Medium-Grained Sand:	0.42 mm to 2 mm (No.40 to No.10)
Fine-Grained Sand:	0.075 mm to 0.42 mm (No. 200 to No.40)
Silt:	0.005 mm to 0.075 mm
Clay:	<0.005 mm

PARTICLE SHAPE

<u>Description</u>	<u>Criteria</u>
Flat:	Particles with width/thickness ratio > 3
Elongated:	Particles with length/width ratio > 3
Flat & Elongated:	Particles meet criteria for both flat and elongated

RELATIVE PROPORTIONS OF FINES

<u>Descriptive Term</u>	<u>% Dry Weight</u>
Trace:	< 5%
With:	5% to 12%
Modifier:	>12%



GENERAL NOTES

(Continued)

CONSISTENCY OF FINE-GRAINED SOILS

<u>Q_u - TSF</u>	<u>N - Blows/foot</u>	<u>Consistency</u>
0 - 0.25	0 - 2	Very Soft
0.25 - 0.50	2 - 4	Soft
0.50 - 1.00	4 - 8	Firm (Medium Stiff)
1.00 - 2.00	8 - 15	Stiff
2.00 - 4.00	15 - 30	Very Stiff
4.00 - 8.00	30 - 50	Hard
8.00+	50+	Very Hard

MOISTURE CONDITION DESCRIPTION

<u>Description</u>	<u>Criteria</u>
Dry:	Absence of moisture, dusty, dry to the touch
Moist:	Damp but no visible water
Wet:	Visible free water, usually soil is below water table

RELATIVE PROPORTIONS OF SAND AND GRAVEL

<u>Descriptive Term</u>	<u>% Dry Weight</u>
Trace:	< 15%
With:	15% to 30%
Modifier:	>30%

STRUCTURE DESCRIPTION

<u>Description</u>	<u>Criteria</u>	<u>Description</u>	<u>Criteria</u>
Stratified:	Alternating layers of varying material or color with layers at least ¼-inch (6 mm) thick	Blocky:	Cohesive soil that can be broken down into small angular lumps which resist further breakdown
Laminated:	Alternating layers of varying material or color with layers less than ¼-inch (6 mm) thick	Lensed:	Inclusion of small pockets of different soils
Fissured:	Breaks along definite planes of fracture with little resistance to fracturing	Layer:	Inclusion greater than 3 inches thick (75 mm)
Slickensided:	Fracture planes appear polished or glossy, sometimes striated	Seam:	Inclusion 1/8-inch to 3 inches (3 to 75 mm) thick extending through the sample
		Parting:	Inclusion less than 1/8-inch (3 mm) thick

SCALE OF RELATIVE ROCK HARDNESS

<u>Q_u - TSF</u>	<u>Consistency</u>
2.5 - 10	Extremely Soft
10 - 50	Very Soft
50 - 250	Soft
250 - 525	Medium Hard
525 - 1,050	Moderately Hard
1,050 - 2,600	Hard
>2,600	Very Hard

ROCK BEDDING THICKNESSES

<u>Description</u>	<u>Criteria</u>
Very Thick Bedded	Greater than 3-foot (>1.0 m)
Thick Bedded	1-foot to 3-foot (0.3 m to 1.0 m)
Medium Bedded	4-inch to 1-foot (0.1 m to 0.3 m)
Thin Bedded	1¼-inch to 4-inch (30 mm to 100 mm)
Very Thin Bedded	½-inch to 1¼-inch (10 mm to 30 mm)
Thickly Laminated	1/8-inch to ½-inch (3 mm to 10 mm)
Thinly Laminated	1/8-inch or less "paper thin" (<3 mm)

ROCK VOIDS

<u>Voids</u>	<u>Void Diameter</u>
Pit	<6 mm (<0.25 in)
Vug	6 mm to 50 mm (0.25 in to 2 in)
Cavity	50 mm to 600 mm (2 in to 24 in)
Cave	>600 mm (>24 in)

GRAIN-SIZED TERMINOLOGY

<u>(Typically Sedimentary Rock)</u>	
<u>Component</u>	<u>Size Range</u>
Very Coarse Grained	>4.76 mm
Coarse Grained	2.0 mm - 4.76 mm
Medium Grained	0.42 mm - 2.0 mm
Fine Grained	0.075 mm - 0.42 mm
Very Fine Grained	<0.075 mm

ROCK QUALITY DESCRIPTION

<u>Rock Mass Description</u>	<u>RQD Value</u>
Excellent	90 - 100
Good	75 - 90
Fair	50 - 75
Poor	25 - 50
Very Poor	Less than 25

DEGREE OF WEATHERING

Slightly Weathered:	Rock generally fresh, joints stained and discoloration extends into rock up to 25 mm (1 in), open joints may contain clay, core rings under hammer impact.
Weathered:	Rock mass is decomposed 50% or less, significant portions of the rock show discoloration and weathering effects, cores cannot be broken by hand or scraped by knife.
Highly Weathered:	Rock mass is more than 50% decomposed, complete discoloration of rock fabric, core may be extremely broken and gives clunk sound when struck by hammer, may be shaved with a knife.

SOIL CLASSIFICATION CHART

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS LIQUID LIMIT LESS THAN 50			ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50			MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS			PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS	



APPENDIX B



May 12, 2017

Mr. Ben Wood
Strand Associates, Inc.
126 N. Jefferson Street, Suite 350
Milwaukee, Wisconsin 53202

Re: Hazardous Materials Survey
Oak Creek Water and Sewer Utility
8520 and 8530 Knights Place, and Reservoir
Oak Creek, Wisconsin
PSI Project No.: 00541399

Dear Mr. Wood:

Professional Service Industries, Inc. (PSI), has performed a Hazardous Materials Survey (H.M. Survey) of the above-referenced property to identify all Asbestos-Containing Materials (ACM) including Category I and Category II non-friable ACM, building components coated in lead-based paint, and identify potential hazardous material-containing items in the facility. Below, please find a discussion of our survey and results.

Facility Description

The subject buildings are known as Austin St. Booster pump station/Well station No. 1, (8520); Well station No. 3, (8530); and the Ground Storage Reservoir of the Oak Creek Water and Sewer Utility; in Oak Creek, Wisconsin. The buildings are single-story structures with no basements. The building at the address of 8520 is approximately 1,560 square feet in plan; the building at 8530 is approximately 400 square feet; and the reservoir is a circular structure with a diameter of approximately 80 feet. PSI understands that the structures are to be demolished.

Survey Intent

The asbestos survey performed as part of the H.M. Survey was intended to meet the requirements of the National Emissions Standard for Hazardous Air Pollutants (NESHAP) for Asbestos demolition or renovation. The asbestos survey included a thorough inspection of all areas, based on drawings provided to PSI by Strand Associates, Inc. It should be recognized that the reservoir and a portion of the building at 8520 are confined spaces and were not entered for this H.M. Survey. Observations were made from outside the confined spaces, where possible. PSI's inspection team identified, quantified and assessed the condition of all RACM, and Category I and Category II non-friable ACM. A hand pressure test was used to determine whether the material was friable.

Representative samples of identified suspect materials were collected and submitted to an accredited laboratory for analysis by Polarized Light Microscopy. Reports of Analysis and Chain of Custody documentation are attached.

PSI also tested painted surfaces for the presence of lead-based paint to evaluate options for disposal. In addition, PSI quantified other hazardous materials in the structures, such as potential PCB-containing light ballasts, mercury-containing switches, fire extinguishers, and refrigerants.

Findings

Asbestos-containing materials were discovered during the asbestos survey. The following tables detail the findings of this survey. A complete listing of all materials sampled can be found in Appendix B of this report.

Table 1.1 Asbestos-Containing Materials Identified

Austin St. Booster Pump Station and Well Station No.1

Material Description	Locations in Facility	Total Quantity	RACM	Friable	Condition
			Cat. I or Cat. II	Y / N	
Black mastic from wallboard (Sample 3)	Bathroom	35 SF	Cat. II	N	Good
Silver over Black Resinous Flashing (Sample 6)	Roof Penetrations	15 SF	Cat. I	N	Good
Caulk, White (Sample 8)	on CMU around glass block windows	8 SF	Cat. I	N	Good

Well Station No.3

Material Description	Locations in Facility	Total Quantity	RACM	Friable	Condition
			Cat. I or Cat. II	Y / N	
Gray glazing, perimeter of glass block windows (Sample 3)	Perimeter of Glass Block Windows	5 SF	RACM	Y	Poor
Black resinous flashing (Sample 4)	Roof Penetrations	5 SF	Cat. 1	N	Good
Silver and Black resinous flashing (Sample 5)	Roof Penetrations	3 SF	Cat. 1	N	Good
Gray resinous flashing (Sample 6)	Roof Penetrations	3 SF	Cat. 1	N	Good

Limited Lead-Based Paint Testing

The XRF testing was performed with a LPA-1 XRF Lead Paint Analyzer (LPA-1) manufactured by Radiation Monitoring Devices (RMD), operated in the quick mode. Validation checks against known lead-based paint standards were performed before testing began, periodically during the testing session, and after the testing was completed to ensure proper operation of the XRF testing device.

XRF testing values were collected by placing the LPA-1 scanner on the surface to be tested and exposing the paint film to gamma radiation. XRF analyzers are usually capable of penetrating up to 3/8" of paint to determine lead content. At the conclusion of each test, the display on the control console shows the lead concentration in mg/cm² for manual tabulation.

The accuracy and precision of any measurement is determined by the length of each test, instrument validation checks against known standards or control blocks, measurement conditions, and mathematical laws of random error. Even when XRF equipment is properly operated within the manufacturer's specification, unusual substrates, paint additives, uneven paint applications,

electrical fields, lead components in wall cavities and many other variables may cause significant fluctuations in apparent test values. Due to the limitations and inherent problems associated with XRF field-testing, confirmation sampling and assessment of XRF data is recommended before major abatement activities are started.

Sampling Strategies

PSI was authorized to conduct up to 50 XRF tests per the agreement with Strand Associates, Inc. Tests were conducted on a random sampling of suspect building components within the facility. There were no inaccessible rooms. XRF testing was performed on representative components that were painted, stained or varnished.

Interpreting XRF Results

XRF testing results are based upon the published Performance Characteristic Sheet (PCS) for the RMD LPA-1 device. The PCS lists the performance parameters as determined by current WDNR criteria as set forth in HFS 163.

Test readings of 0.9 mg/cm² or below are reported as negative for lead-based paint.

Test readings of 1.0 mg/cm² or above are reported as positive for lead-based paint.

Inconclusive results require confirmation bulk paint chip sampling for laboratory analysis.

Explanation of Spreadsheets

The survey data and the XRF testing results are presented in a spreadsheet format, which can be found in Appendix B of this report. A brief explanation of each spreadsheet element is given below. The data is organized under ten column headings. Shaded rows with bold text indicate samples that were identified as being positive for lead content.

XRF Test #: This is the number assigned to a XRF test of a painted, stained or varnished building component.

VAL: This column contains the XRF validation results. Validation tests are conducted using known standards to ensure the XRF device is operating properly.

Building Component/Orientation: This is a description of the building component or material and direction that was tested.

Paint/Varnish Color: This lists the color of the surface that was tested.

CLC mg/cm²: This is the XRF test result, which identifies the approximate level of lead that is present in the component being tested.

Result: This column identifies if the painted surface is considered to be lead-based (test readings of 1.0 mg/cm² or above) or was found not to be lead-based paint (test readings of 0.9 mg/cm² or below).

Paint Condition: The paint film quality is identified in this column. The paint film quality is identified as being good or poor.

Substrate: A description of the type of material the paint, stain or varnish is applied to. Examples include: wood, plaster, metal and brick.

Room/Height: This column gives the specific room number or name and elevation where the test was conducted.

Lead-Based Paint Findings

The limited lead-based paint survey consisted of testing 28 painted surfaces for lead-based paint with an X-ray Fluorescence (XRF) lead testing device. Lead based paint was found on the off-white water pipe on the exterior of Building 8520 (East wall). No other surfaces were found to contain lead-based paint.

Spreadsheets detailing all of the surfaces tested and their results can be found in the appendix of this report.

Hazardous Materials Findings

PSI also performed a visual hazardous materials inventory that included fluorescent light bulbs, potentially polychlorinated biphenyl (PCB)-containing light ballasts, potentially mercury-containing thermostats, fire extinguishers (possible halon-containing), exit light batteries (possibly containing tritium, a radioactive material), chlorofluorocarbon (CFC)-containing equipment (i.e. drinking water fountains, air cooling units), and high intensity discharge (HID) lights. These “other” hazardous materials were limited to those materials that are attached to the structure. PSI did not conduct testing on these potential materials to confirm the presence of PCBs, mercury, CFCs, or other hazardous material; thus, their actual presence in the building materials is only suspected. PSI did not inventory unattached/loose items, such as paint containers, drums, old batteries, etc., as these are typically removed by the owner before renovation/razing activities. PSI identified the following quantities of potential hazardous materials:

8520

- 12 Fluorescent Bulbs
- 5 Ballasts
- 1 CFC-Containing Item
- 1 Exit Light
- 1 Fire Extinguisher
- 3 Other Mercury-Containing Items

8530

- 8 Fluorescent Bulbs
- 3 Ballasts
- 1 CFC-Containing Item
- 1 Exit Light
- 1 Fire Extinguisher
- 0 Other Mercury-Containing Items

A detailed listing of observed potential hazardous materials and observed locations can be found in the appendix of this report.

Warranty

The information contained in this report is based upon the data furnished by the Client and observations and test results provided by PSI. These observations and results are time dependent, are subject to changing site conditions, and revisions to Federal, State and local regulations.

PSI warrants that these findings have been promulgated after being prepared in general accordance with generally accepted practices in the asbestos and abatement industries. PSI also recognizes that raw laboratory test data are not usually sufficient to make all abatement and management decisions.

As directed by the client, PSI did not provide any service to investigate or detect the presence of moisture, mold or other biological contaminants in or around any structures, or any service that was designed or intended to prevent or lower the risk of the occurrence of the amplification of the same. Client acknowledges that mold is ubiquitous to the environment with mold amplification occurring when building materials are impacted by moisture. Client further acknowledges that site conditions are outside of PSI's control, and that mold amplification will likely occur, or continue to occur, in the presence of moisture. As such, PSI cannot and shall not be held responsible for the occurrence or recurrence of mold amplification.

This report was prepared pursuant to the contract PSI has with Strand Associates, Inc. That contractual relationship included an exchange of information about the subject site that was unique and between PSI and its client and serves as the basis upon which this report was prepared. Because of the importance of the communication between PSI and its client, reliance or any use of this report by anyone other than Strand Associates, Inc., for whom it was prepared, is prohibited and therefore not foreseeable to PSI.

Reliance or use by any such third party without explicit authorization in the report does not make said third party a third-party beneficiary to PSI's contract with Strand Associates, Inc. Any such unauthorized reliance on or use of this report, including any of its information or conclusions, will be at third party's risk. For the same reasons, no warranties or representations, expressed or implied in this report, are made to any such third party.

No other warranties are implied or expressed.

Unidentifiable Conditions

This report is necessarily limited to the conditions observed and to the information available at the time of the work. Due to the nature of the work, there is a possibility that conditions may exist which could not be identified within the scope of work or which were not apparent at the time of our site work. This report is also limited to information available from the client at the time it was conducted. The report may not represent all conditions at the subject site as it only reflects the information gathered from specific locations.

Thank you for choosing PSI as your consultant for this project. If you have any questions, or if we can be of additional service, please call us at (262) 521-2125.

Respectfully submitted,

PROFESSIONAL SERVICE INDUSTRIES, INC.



Shelley Hildebrandt
WI Asbestos Inspector #4373



Jeffrey Chapman
Principal Consultant

Appendices

- A. Asbestos Bulk Sample Log
- B. Report of Bulk Sample Analysis for Asbestos/Chain of Custody
- C. Site Layout Drawings
- D. Lead- Based Paint Spreadsheets
- E. Inspector & Company Certifications

BULK SAMPLE LOG

Client: Strand Associates, Inc.
Project: Oak Creek Sewer and Water Utility
Address: 8520 Knights Place

Date of Inspection: 4/26/2017
Inspector: Shelley Hildebrandt
Inspector #: All-4373

Austin St. Booster Pump Station and Well Station No. 1

SAMPLE NUMBER	SAMPLE LOCATION	ROOM/AREA	MATERIAL DESCRIPTION
1A	Interior Floor	Bath	Tan fleck 12 inch floor tile with tan mastic and gray mastic
1B		Bath	Tan fleck 12 inch floor tile with tan mastic and gray mastic
1C		Bath	Tan fleck 12 inch floor tile with tan mastic and gray mastic
2A	Interior Wall	Bath	Black mopboard with brown mastic
2B		Bath	Black mopboard with brown mastic
2C		Bath	Black mopboard with brown mastic
3A	Interior Wall	Bath	Black mastic from wallboard
3B		Bath	Black mastic from wallboard
3C		Bath	Black mastic from wallboard
4A	Glass block windows - interior and exterior - perimeter	Main	Gray mortar
4B		Main	Gray mortar
4C		Storage	Gray mortar
5A	Glass block windows - interior and exterior - between blocks	Main	White mortar
5B		Main	White mortar
5C		Storage	White mortar
6A	Roof - penetrations	Roof	Black and silver resinous flashing
6B		Roof	Black and silver resinous flashing
6C		Roof	Black and silver resinous flashing
6A	Exterior Door Perimeter	Exterior	Caulk, Gray
6B		Exterior	Caulk, Gray
6C		Exterior	Caulk, Gray
7A	Joint between concrete and CMU	Exterior	Mortar
7B		Exterior	Mortar
7C		Exterior	Mortar
8A	on CMU around glass block windows	Exterior	Caulk, White
8B		Exterior	Caulk, White
8C		Exterior	Caulk, White
9A	CMU	Between blocks	Mortar
9B			Mortar
9C			Mortar
10A	on pipes	Throughout	Foam wrap, black
10B			Foam wrap, black
10C			Foam wrap, black
11A	Main Entry Doors	Interior of Doors	Paper, Tan
11B			Paper, Tan
11C			Paper, Tan
12A	Roof	Exterior	Resinous Composite Roofing, black
12B			Resinous Composite Roofing, black
12C			Resinous Composite Roofing, black

BULK SAMPLE LOG

Client: Strand Associates, Inc.
Project: Oak Creek Sewer and Water Utility
Address: 8530 Knights Place

Date of Inspection: 4/26/2017
Inspector: Shelley Hildebrandt
Inspector #: All-4373

Well Station No. 3

SAMPLE NUMBER	SAMPLE LOCATION	ROOM/AREA	MATERIAL DESCRIPTION
1	Electrical Pipe	Main	Gray flexible joint sleeve
2A	Glass Block Windows	Main	Gray Mortar
2B		Main	Gray Mortar
2C		Main	Gray Mortar
3A	Perimeter of Glass Block Windows	Interior perimeter	Gray glazing
3B		Interior perimeter	Gray glazing
3C		Exterior perimeter	Gray glazing
4	Roof	Penetrations	Black resinous flashing
5			Black and silver resinous flashing
6			Gray resinous flashing
7	Large Diameter Pipes	Main	Black gasket
8A	Interior Metal Wall Perimeter	East Wall-North	White caulk
8B		East Wall-North	White caulk
8C		East Wall-South	White caulk
9A	CMU	Between blocks	Mortar
9B			Mortar
9C			Mortar
10A	on Pipes	Throughout	Foam wrap, black
10B			Foam wrap, black
10C			Foam wrap, black
11A	Roof	Exterior	Resinous Composite Roofing, black
11B			Resinous Composite Roofing, black
11C			Resinous Composite Roofing, black



BULK SAMPLE LOG

Client:	Strand Associates, Inc.
Project:	Oak Creek Sewer and Water Utility
Address:	Reservoir

Date of Inspection:	4/26/2017
Inspector:	Shelley Hildebrandt
Inspector #:	All-4373

Reservoir

[illegible]



May 2, 2017

PSI
821 Corporate Ct.
Waukesha, WI 53189

CLIENT PROJECT: Oak Creek Sewer & Water; 00541399
CEI LAB CODE: A17-6185

Dear Customer:

Enclosed are asbestos analysis results for PLM Bulk samples received at our laboratory on April 28, 2017. The samples were analyzed for asbestos using polarizing light microscopy (PLM) per the EPA 600 Method.

Sample results containing >1% asbestos are considered asbestos-containing materials (ACMs) per EPA regulatory requirements. The detection limit for the EPA 600 Method is <1% asbestos by weight as determined by visual estimation.

Thank you for your business and we look forward to continuing good relations. If you have any questions, please feel free to call our office at 919-481-1413.

Kind Regards,

A handwritten signature in black ink, appearing to read "Tianbao Bai", written in a cursive style.

Tianbao Bai, Ph.D., CIH
Laboratory Director





ASBESTOS ANALYTICAL REPORT

By: Polarized Light Microscopy

Prepared for

PSI

CLIENT PROJECT: Oak Creek Sewer & Water; 00541399

CEI LAB CODE: A17-6185

TEST METHOD: EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020

REPORT DATE: 05/02/17

TOTAL SAMPLES ANALYZED: 18

SAMPLES >1% ASBESTOS: 5

TEL: 866-481-1412

www.ceilabs.com



Asbestos Report Summary

By: POLARIZING LIGHT MICROSCOPY

PROJECT: Oak Creek Sewer & Water; 00541399

CEI LAB CODE: A17-6185

METHOD: EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020

Client ID	Layer	Lab ID	Color	Sample Description	ASBESTOS %
1A		A2389503A	Tan	Floor Tile	None Detected
		A2389503B	Tan,Gray	Mastic	None Detected
1B		A2389504A	Tan	Floor Tile	None Detected
		A2389504B	Tan,Gray	Mastic	None Detected
1C		A2389505A	Tan	Floor Tile	None Detected
		A2389505B	Tan,Gray	Mastic	None Detected
2A		A2389506A	Black	Mopboard	None Detected
		A2389506B	Brown	Mastic	None Detected
2B		A2389507A	Black	Mopboard	None Detected
		A2389507B	Brown	Mastic	None Detected
2C		A2389508A	Black	Mopboard	None Detected
		A2389508B	Brown	Mastic	None Detected
3A		A2389509	Black	Mastic	Chrysotile 5%
3B		A2389510	Black	Mastic	Chrysotile 5%
3C		A2389511	Black	Mastic	Chrysotile 5%
4A		A2389512	Gray	Mortar	None Detected
4B		A2389513	Gray	Mortar	None Detected
4C		A2389514	Gray	Mortar	None Detected
5A		A2389515	White	Mortar	None Detected
5B		A2389516	White	Mortar	None Detected
5C		A2389517	White	Mortar	None Detected
6A		A2389518	Black,Silver	Resinous Flashing	Chrysotile 5%
6B		A2389519	Silver	Resinous Flashing	None Detected
6C		A2389520	Black,Silver	Resinous Flashing	Chrysotile 5%



ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

Client: PSI
821 Corporate Ct.
Waukesha, WI 53189

CEI Lab Code: A17-6185
Date Received: 04-28-17
Date Analyzed: 05-01-17
Date Reported: 05-02-17

Project: Oak Creek Sewer & Water; 00541399

ASBESTOS BULK PLM, EPA 600 METHOD

Client ID Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS				ASBESTOS %
			Fibrous		Non-Fibrous		
1A A2389503A	Floor Tile	Heterogeneous Tan Fibrous Bound	2%	Cellulose	60% 30% 8%	Vinyl Calc Carb Binder	None Detected
A2389503B	Mastic	Heterogeneous Tan,Gray Fibrous Bound	2%	Cellulose	70% 28%	Mastic Binder	None Detected
1B A2389504A	Floor Tile	Heterogeneous Tan Fibrous Bound	2%	Cellulose	60% 30% 8%	Vinyl Calc Carb Binder	None Detected
A2389504B	Mastic	Heterogeneous Tan,Gray Fibrous Bound	2%	Cellulose	70% 28%	Mastic Binder	None Detected
1C A2389505A	Floor Tile	Heterogeneous Tan Fibrous Bound	2%	Cellulose	60% 30% 8%	Vinyl Calc Carb Binder	None Detected
A2389505B	Mastic	Heterogeneous Tan,Gray Fibrous Bound	2%	Cellulose	70% 28%	Mastic Binder	None Detected
2A A2389506A	Mopboard	Heterogeneous Black Non-fibrous Bound			100%	Vinyl	None Detected



ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

Client: PSI
821 Corporate Ct.
Waukesha, WI 53189

CEI Lab Code: A17-6185
Date Received: 04-28-17
Date Analyzed: 05-01-17
Date Reported: 05-02-17

Project: Oak Creek Sewer & Water; 00541399

ASBESTOS BULK PLM, EPA 600 METHOD

Client ID Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS				ASBESTOS %
			Fibrous		Non-Fibrous		
A2389506B	Mastic	Heterogeneous Brown Fibrous Bound	2%	Cellulose	98%	Mastic	None Detected
2B A2389507A	Mopboard	Heterogeneous Black Non-fibrous Bound			100%	Vinyl	None Detected
A2389507B	Mastic	Heterogeneous Brown Fibrous Bound	2%	Cellulose	98%	Mastic	None Detected
2C A2389508A	Mopboard	Heterogeneous Black Non-fibrous Bound			100%	Vinyl	None Detected
A2389508B	Mastic	Heterogeneous Brown Fibrous Bound	2%	Cellulose	98%	Mastic	None Detected
3A A2389509	Mastic	Heterogeneous Black Fibrous Bound			95%	Mastic	5% Chrysotile
3B A2389510	Mastic	Heterogeneous Black Fibrous Bound			95%	Mastic	5% Chrysotile



ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

Client: PSI
821 Corporate Ct.
Waukesha, WI 53189

CEI Lab Code: A17-6185
Date Received: 04-28-17
Date Analyzed: 05-01-17
Date Reported: 05-02-17

Project: Oak Creek Sewer & Water; 00541399

ASBESTOS BULK PLM, EPA 600 METHOD

Client ID Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS				ASBESTOS %
			Fibrous		Non-Fibrous		
3C A2389511	Mastic	Heterogeneous Black Fibrous Bound			95%	Mastic	5% Chrysotile
4A A2389512	Mortar	Heterogeneous Gray Fibrous Bound	<1%	Cellulose	70% 20% 10%	Silicates Calc Carb Binder	None Detected
4B A2389513	Mortar	Heterogeneous Gray Fibrous Bound	<1%	Cellulose	70% 20% 10%	Silicates Calc Carb Binder	None Detected
4C A2389514	Mortar	Heterogeneous Gray Fibrous Bound	<1%	Cellulose	70% 20% 10%	Silicates Calc Carb Binder	None Detected
5A A2389515	Mortar	Heterogeneous White Fibrous Bound	<1%	Cellulose	70% 20% 10%	Silicates Calc Carb Binder	None Detected
5B A2389516	Mortar	Heterogeneous White Fibrous Bound	<1%	Cellulose	70% 20% 10%	Silicates Calc Carb Binder	None Detected
5C A2389517	Mortar	Heterogeneous White Fibrous Bound	<1%	Cellulose	70% 20% 10%	Silicates Calc Carb Binder	None Detected



ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

Client: PSI
821 Corporate Ct.
Waukesha, WI 53189

CEI Lab Code: A17-6185
Date Received: 04-28-17
Date Analyzed: 05-01-17
Date Reported: 05-02-17

Project: Oak Creek Sewer & Water; 00541399

ASBESTOS BULK PLM, EPA 600 METHOD

Client ID Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS		ASBESTOS %
			Fibrous	Non-Fibrous	
6A A2389518	Resinous Flashing	Heterogeneous		80% Tar	5% Chrysotile
		Black, Silver		10% Paint	
		Fibrous		5% Binder	
		Bound			
6B A2389519	Resinous Flashing	Heterogeneous		100% Metal	None Detected
		Silver		<1% Non-Fibrous	
		Non-fibrous		Debris	
		Bound			
6C A2389520	Resinous Flashing	Heterogeneous		80% Tar	5% Chrysotile
		Black, Silver		10% Paint	
		Fibrous		5% Binder	
		Bound			



LEGEND: Non-Anth = Non-Asbestiform Anthophyllite
 Non-Trem = Non-Asbestiform Tremolite
 Calc Carb = Calcium Carbonate

METHOD: EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020

REPORTING LIMIT: <1% by visual estimation

REGULATORY LIMIT: >1% by weight

Due to the limitations of the EPA 600 method, nonfriable organically bound materials (NOBs) such as vinyl floor tiles can be difficult to analyze via polarized light microscopy (PLM). EPA recommends that all NOBs analyzed by PLM, and found not to contain asbestos, be further analyzed by Transmission Electron Microscopy (TEM). Please note that PLM analysis of dust and soil samples for asbestos is not covered under NVLAP accreditation. Estimated measurement of uncertainty is available on request.

This report relates only to the samples tested or analyzed and may not be reproduced, except in full, without written approval by CEI Labs, Inc. CEI Labs makes no warranty representation regarding the accuracy of client submitted information in preparing and presenting analytical results. Interpretation of the analytical results is the sole responsibility of the client. Samples were received in acceptable condition unless otherwise noted. This report may not be used by the client to claim product endorsement by NVLAP or any other agency of the U.S. Government.

ANALYST: Sarah Talley
Sarah Talley

APPROVED BY: Tianbao Bai
Tianbao Bai, Ph.D., CIH
Laboratory Director





107 New Edition Court, Cary, NC 27511

Tel: 866-481-1412; Fax: 919-481-1442

ASBESTOS CHAIN OF CUSTODY

18) 477-6185
A2389503-
A2389520

LAB USE ONLY:

CEI Lab Code:

CEI Lab I.D. Range:

COMPANY INFORMATION	PROJECT INFORMATION
CEI CLIENT #:	Job Contact: <u>Shelley Hildebrandt</u>
Company: <u>PSI, Inc</u>	Email / Tel: <u>Shelley.hildebrandt@psiusa.com</u>
Address: <u>821 Corporate Ct</u>	Project Name: <u>Dale Creek Sewer & Water</u>
<u>Waukesha, WI 53189</u>	Project ID# <u>00541399</u>
Email: <u>Shelley.hildebrandt@psiusa.com</u>	PO #: <u>0054</u>
Tel: <u>262-521-2125</u> Fax: <u>262-521-2474</u>	STATE SAMPLES COLLECTED IN: <u>WI</u>

IF TAT IS NOT MARKED STANDARD 3 DAY TAT APPLIES.

ASBESTOS	METHOD	TURN AROUND TIME					
		4 HR	8 HR	24 HR	2 DAY	3 DAY	5 DAY
PLM BULK	EPA 600	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
PLM POINT COUNT (400)	EPA 600	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PLM POINT COUNT (1000)	EPA 600	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PLM GRAV w POINT COUNT	EPA 600	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PLM BULK	CARB 435	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PCM AIR	NIOSH 7400	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM AIR	EPA AHERA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM AIR	NIOSH 7402	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM AIR	ISO 10312	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM AIR	ASTM 6281-09	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM BULK	CHATFIELD	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM DUST WIPE	ASTM D6480-05	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM DUST MICROVAC	ASTM D5755-09	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM SOIL	ASTM D7521-13	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM VERMICULITE	CINCINNATI METHOD	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OTHER:		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

REMARKS / SPECIAL INSTRUCTIONS:

☒ Accept Samples

☐ Reject Samples

Relinquished By:	Date/Time	Received By:	Date/Time
<u>Shelley Hildebrandt</u>	<u>4-27-17</u>	<u>DL</u>	<u>4-28 9:00</u>

Samples will be disposed of 30 days after analysis

[illegible]



May 4, 2017

PSI
821 Corporate Ct.
Waukesha, WI 53189

CLIENT PROJECT: Oak Creek Sewer & Water; 00541399 Bldg 8520
CEI LAB CODE: A17-6387

Dear Customer:

Enclosed are asbestos analysis results for PLM Bulk samples received at our laboratory on May 3, 2017. The samples were analyzed for asbestos using polarizing light microscopy (PLM) per the EPA 600 Method.

Sample results containing >1% asbestos are considered asbestos-containing materials (ACMs) per EPA regulatory requirements. The detection limit for the EPA 600 Method is <1% asbestos by weight as determined by visual estimation.

Thank you for your business and we look forward to continuing good relations. If you have any questions, please feel free to call our office at 919-481-1413.

Kind Regards,

A handwritten signature in black ink, appearing to read "Tianbao Bai", written in a cursive style.

Tianbao Bai, Ph.D., CIH
Laboratory Director





ASBESTOS ANALYTICAL REPORT

By: Polarized Light Microscopy

Prepared for

PSI

CLIENT PROJECT: Oak Creek Sewer & Water; 00541399 Bldg 8520

CEI LAB CODE: A17-6387

TEST METHOD: EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020

REPORT DATE: 05/04/17

TOTAL SAMPLES ANALYZED: 21

SAMPLES >1% ASBESTOS: 3

TEL: 866-481-1412

www.ceilabs.com



Asbestos Report Summary

By: POLARIZING LIGHT MICROSCOPY

PROJECT: Oak Creek Sewer & Water; 00541399
Bldg 8520

CEI LAB CODE: A17-6387

METHOD: EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020

Client ID	Layer	Lab ID	Color	Sample Description	ASBESTOS %
6A		A2392215	Gray	Caulk	None Detected
6B		A2392216	Gray	Caulk	None Detected
6C		A2392217	Gray	Caulk	None Detected
7A		A2392218	Gray	Mortar	None Detected
7B		A2392219	Gray	Mortar	None Detected
7C		A2392220	Gray	Mortar	None Detected
8A		A2392221	White	Caulk	Chrysotile 2%
8B		A2392222	White	Caulk	Chrysotile 2%
8C		A2392223	White	Caulk	Chrysotile 2%
9A		A2392224	Gray	Mortar	None Detected
9B		A2392225	Gray	Mortar	None Detected
9C		A2392226	Gray	Mortar	None Detected
10A		A2392227	Black	Foam Wrap	None Detected
10B		A2392228	Black	Foam Wrap	None Detected
10C		A2392229	Black	Foam Wrap	None Detected
11A		A2392230	Tan	Paper	None Detected
11B		A2392231	Tan	Paper	None Detected
11C		A2392232	Tan	Paper	None Detected
12A		A2392233	Black	Resinous Composite Roofing, Black	None Detected
12B		A2392234	Black	Resinous Composite Roofing, Black	None Detected
12C		A2392235	Black	Resinous Composite Roofing, Black	None Detected



ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

Client: PSI
821 Corporate Ct.
Waukesha, WI 53189

CEI Lab Code: A17-6387

Date Received: 05-03-17

Date Analyzed: 05-04-17

Date Reported: 05-04-17

Project: Oak Creek Sewer & Water; 00541399 Bldg 8520

ASBESTOS BULK PLM, EPA 600 METHOD

Client ID Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS				ASBESTOS %
			Fibrous		Non-Fibrous		
6A A2392215	Caulk	Heterogeneous Gray Fibrous Bound	2%	Cellulose	98%	Caulk	None Detected
6B A2392216	Caulk	Heterogeneous Gray Fibrous Bound	2%	Cellulose	98%	Caulk	None Detected
6C A2392217	Caulk	Heterogeneous Gray Fibrous Bound	2%	Cellulose	98%	Caulk	None Detected
7A A2392218	Mortar	Heterogeneous Gray Fibrous Bound	<1%	Cellulose	85% 15%	Silicates Binder	None Detected
7B A2392219	Mortar	Heterogeneous Gray Fibrous Bound	<1%	Cellulose	85% 15%	Silicates Binder	None Detected
7C A2392220	Mortar	Heterogeneous Gray Fibrous Bound	<1%	Cellulose	85% 15%	Silicates Binder	None Detected
8A A2392221	Caulk	Heterogeneous White Fibrous Bound	<1%	Cellulose	65% 31% 2%	Silicates Calc Carb Paint	2% Chrysotile



ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

Client: PSI
821 Corporate Ct.
Waukesha, WI 53189

CEI Lab Code: A17-6387
Date Received: 05-03-17
Date Analyzed: 05-04-17
Date Reported: 05-04-17

Project: Oak Creek Sewer & Water; 00541399 Bldg 8520

ASBESTOS BULK PLM, EPA 600 METHOD

Client ID Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS				ASBESTOS %
			Fibrous		Non-Fibrous		
8B A2392222	Caulk	Heterogeneous White Fibrous Bound	<1%	Cellulose	65% 31% 2%	Silicates Calc Carb Paint	2% Chrysotile
8C A2392223	Caulk	Heterogeneous White Fibrous Bound	<1%	Cellulose	65% 31% 2%	Silicates Calc Carb Paint	2% Chrysotile
9A A2392224	Mortar	Heterogeneous Gray Fibrous Bound	<1%	Cellulose	85% 13% 2%	Silicates Binder Paint	None Detected
9B A2392225	Mortar	Heterogeneous Gray Fibrous Bound	<1%	Cellulose	85% 13% 2%	Silicates Binder Paint	None Detected
9C A2392226	Mortar	Heterogeneous Gray Fibrous Bound	<1%	Cellulose	85% 13% 2%	Silicates Binder Paint	None Detected
10A A2392227	Foam Wrap	Heterogeneous Black Fibrous Bound	<1%	Cellulose	97% 3%	Foam Paint	None Detected
10B A2392228	Foam Wrap	Heterogeneous Black Fibrous Bound	<1%	Cellulose	97% 3%	Foam Paint	None Detected



ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

Client: PSI
821 Corporate Ct.
Waukesha, WI 53189

CEI Lab Code: A17-6387

Date Received: 05-03-17

Date Analyzed: 05-04-17

Date Reported: 05-04-17

Project: Oak Creek Sewer & Water; 00541399 Bldg 8520

ASBESTOS BULK PLM, EPA 600 METHOD

Client ID Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS				ASBESTOS %
			Fibrous		Non-Fibrous		
10C A2392229	Foam Wrap	Heterogeneous Black Fibrous Bound	<1%	Cellulose	97% 3%	Foam Paint	None Detected
11A A2392230	Paper	Heterogeneous Tan Fibrous Loosely Bound	100%	Cellulose			None Detected
11B A2392231	Paper	Heterogeneous Tan Fibrous Loosely Bound	100%	Cellulose			None Detected
11C A2392232	Paper	Heterogeneous Tan Fibrous Loosely Bound	100%	Cellulose			None Detected
12A A2392233	Resinous Composite Roofing, Black	Heterogeneous Black Fibrous Bound	20%	Fiberglass	80%	Tar	None Detected
12B A2392234	Resinous Composite Roofing, Black	Heterogeneous Black Fibrous Bound	20%	Fiberglass	80%	Tar	None Detected
12C A2392235	Resinous Composite Roofing, Black	Heterogeneous Black Fibrous Bound	20%	Fiberglass	80%	Tar	None Detected



LEGEND: Non-Anth = Non-Asbestiform Anthophyllite
 Non-Trem = Non-Asbestiform Tremolite
 Calc Carb = Calcium Carbonate

METHOD: EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020

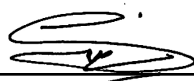
REPORTING LIMIT: <1% by visual estimation

REGULATORY LIMIT: >1% by weight

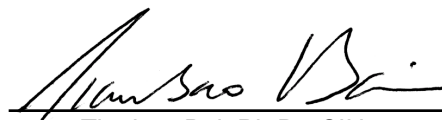
Due to the limitations of the EPA 600 method, nonfriable organically bound materials (NOBs) such as vinyl floor tiles can be difficult to analyze via polarized light microscopy (PLM). EPA recommends that all NOBs analyzed by PLM, and found not to contain asbestos, be further analyzed by Transmission Electron Microscopy (TEM). Please note that PLM analysis of dust and soil samples for asbestos is not covered under NVLAP accreditation. Estimated measurement of uncertainty is available on request.

This report relates only to the samples tested or analyzed and may not be reproduced, except in full, without written approval by CEI Labs, Inc. CEI Labs makes no warranty representation regarding the accuracy of client submitted information in preparing and presenting analytical results. Interpretation of the analytical results is the sole responsibility of the client. Samples were received in acceptable condition unless otherwise noted. This report may not be used by the client to claim product endorsement by NVLAP or any other agency of the U.S. Government.

ANALYST:


Saithya Paikal

APPROVED BY:


Tianbao Bai, Ph.D., CIH
Laboratory Director





107 New Edition Court, Cary, NC 27511

Tel: 866-481-1412; Fax: 919-481-1442

ASBESTOS CHAIN OF CUSTODY

(21) A17-6387
A239 2215-
A239 2235

LAB USE ONLY:
CEI Lab Code:
CEI Lab I.D. Range:

COMPANY INFORMATION	PROJECT INFORMATION
CEI CLIENT #:	Job Contact: <i>Shelley Hildebrandt</i>
Company: <i>PSI, Inc</i>	Email / Tel: <i>shelley.hildebrandt@psiusa.com</i>
Address: <i>821 Corporate Ct Suite 102</i>	Project Name: <i>Oak Creek Sewer + Water</i>
<i>Waukesha WI 53189</i>	Project ID# <i>00541399 Bldg 8520</i>
Email: <i>Shelley.hildebrandt@psiusa.com</i>	PO #: <i>0654</i>
Tel: <i>262-521-2125</i> Fax: <i>262-521-2471</i>	STATE SAMPLES COLLECTED IN: <i>WI</i>

IF TAT IS NOT MARKED STANDARD 3 DAY TAT APPLIES.

ASBESTOS	METHOD	TURN AROUND TIME					
		4 HR	8 HR	24 HR	2 DAY	3 DAY	5 DAY
PLM BULK	EPA 600	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
PLM POINT COUNT (400)	EPA 600	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PLM POINT COUNT (1000)	EPA 600	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PLM GRAV w POINT COUNT	EPA 600	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PLM BULK	CARB 435	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PCM AIR	NIOSH 7400	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM AIR	EPA AHERA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM AIR	NIOSH 7402	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM AIR	ISO 10312	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM AIR	ASTM 6281-09	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM BULK	CHATFIELD	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM DUST WIPE	ASTM D6480-05	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM DUST MICROVAC	ASTM D5755-09	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM SOIL	ASTM D7521-13	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM VERMICULITE	CINCINNATI METHOD	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OTHER:		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

REMARKS / SPECIAL INSTRUCTIONS:

- ☒ Accept Samples
☐ Reject Samples

Relinquished By:	Date/Time	Received By:	Date/Time
<i>Shelley Hildebrandt</i>	<i>5-2-17 3:15p</i>	<i>DC</i>	<i>5-3 9:10</i>

Samples will be disposed of 30 days after analysis

[illegible]



May 2, 2017

PSI
821 Corporate Ct.
Waukesha, WI 53189

CLIENT PROJECT: Oak Creek Sewer & Water; 00541399
CEI LAB CODE: A17-6186

Dear Customer:

Enclosed are asbestos analysis results for PLM Bulk samples received at our laboratory on April 28, 2017. The samples were analyzed for asbestos using polarizing light microscopy (PLM) per the EPA 600 Method.

Sample results containing >1% asbestos are considered asbestos-containing materials (ACMs) per EPA regulatory requirements. The detection limit for the EPA 600 Method is <1% asbestos by weight as determined by visual estimation.

Thank you for your business and we look forward to continuing good relations. If you have any questions, please feel free to call our office at 919-481-1413.

Kind Regards,

A handwritten signature in black ink, appearing to read "Tianbao Bai".

Tianbao Bai, Ph.D., CIH
Laboratory Director





ASBESTOS ANALYTICAL REPORT

By: Polarized Light Microscopy

Prepared for

PSI

CLIENT PROJECT: Oak Creek Sewer & Water; 00541399

CEI LAB CODE: A17-6186

TEST METHOD: EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020

REPORT DATE: 05/02/17

TOTAL SAMPLES ANALYZED: 14

SAMPLES >1% ASBESTOS: 6

TEL: 866-481-1412

www.ceilabs.com



Asbestos Report Summary

By: POLARIZING LIGHT MICROSCOPY

PROJECT: Oak Creek Sewer & Water; 00541399

CEI LAB CODE: A17-6186

METHOD: EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020

Client ID	Layer	Lab ID	Color	Sample Description	ASBESTOS %
1		A2389521	Gray	Joint Sleeve	None Detected
2A		A2389522	Gray	Mortar	None Detected
2B		A2389523	Gray	Mortar	None Detected
2C		A2389524	Gray	Mortar	None Detected
3A		A2389525	Gray	Glazing	Chrysotile 2%
3B		A2389526	Gray	Glazing	Chrysotile 2%
3C		A2389527	Gray	Glazing	Chrysotile 2%
4		A2389528	Black	Resinous Flashing	Chrysotile 10%
5		A2389529	Black,Silver	Resinous Flashing	Chrysotile 5%
6		A2389530	Gray	Resinous Flashing	Chrysotile 10%
7		A2389531	Black	Gasket	None Detected
8A		A2389532	White	Caulk	None Detected
8B		A2389533	White	Caulk	None Detected
8C		A2389534	White	Caulk	None Detected



ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

Client: PSI
821 Corporate Ct.
Waukesha, WI 53189

CEI Lab Code: A17-6186
Date Received: 04-28-17
Date Analyzed: 05-01-17
Date Reported: 05-02-17

Project: Oak Creek Sewer & Water; 00541399

ASBESTOS BULK PLM, EPA 600 METHOD

Client ID Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS				ASBESTOS %
			Fibrous		Non-Fibrous		
1 A2389521	Joint Sleeve	Heterogeneous Gray Non-fibrous Bound			100%	Vinyl	None Detected
2A A2389522	Mortar	Heterogeneous Gray Fibrous Bound	<1%	Cellulose	70% 20% 10%	Silicates Calc Carb Binder	None Detected
2B A2389523	Mortar	Heterogeneous Gray Fibrous Bound	<1%	Cellulose	70% 20% 10%	Silicates Calc Carb Binder	None Detected
2C A2389524	Mortar	Heterogeneous Gray Fibrous Bound	<1%	Cellulose	70% 20% 10%	Silicates Calc Carb Binder	None Detected
3A A2389525	Glazing	Heterogeneous Gray Fibrous Bound			70% 28%	Calc Carb Binder	2% Chrysotile
3B A2389526	Glazing	Heterogeneous Gray Fibrous Bound			70% 28%	Calc Carb Binder	2% Chrysotile
3C A2389527	Glazing	Heterogeneous Gray Fibrous Bound			70% 28%	Calc Carb Binder	2% Chrysotile



ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

Client: PSI
821 Corporate Ct.
Waukesha, WI 53189

CEI Lab Code: A17-6186
Date Received: 04-28-17
Date Analyzed: 05-01-17
Date Reported: 05-02-17

Project: Oak Creek Sewer & Water; 00541399

ASBESTOS BULK PLM, EPA 600 METHOD

Client ID Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS		ASBESTOS %
			Fibrous	Non-Fibrous	
4 A2389528	Resinous Flashing	Heterogeneous Black Fibrous Bound		90% Tar	10% Chrysotile
5 A2389529	Resinous Flashing	Heterogeneous Black, Silver Fibrous Bound		90% Tar 5% Paint	5% Chrysotile
6 A2389530	Resinous Flashing	Heterogeneous Gray Fibrous Bound		90% Tar	10% Chrysotile
7 A2389531	Gasket	Heterogeneous Black Non-fibrous Bound		100% Rubber	None Detected
8A A2389532	Caulk	Heterogeneous White Non-fibrous Bound		95% Caulk 5% Paint	None Detected
8B A2389533	Caulk	Heterogeneous White Non-fibrous Bound		95% Caulk 5% Paint	None Detected
8C A2389534	Caulk	Heterogeneous White Non-fibrous Bound		95% Caulk 5% Paint	None Detected



LEGEND: Non-Anth = Non-Asbestiform Anthophyllite
 Non-Trem = Non-Asbestiform Tremolite
 Calc Carb = Calcium Carbonate

METHOD: EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020

REPORTING LIMIT: <1% by visual estimation

REGULATORY LIMIT: >1% by weight

Due to the limitations of the EPA 600 method, nonfriable organically bound materials (NOBs) such as vinyl floor tiles can be difficult to analyze via polarized light microscopy (PLM). EPA recommends that all NOBs analyzed by PLM, and found not to contain asbestos, be further analyzed by Transmission Electron Microscopy (TEM). Please note that PLM analysis of dust and soil samples for asbestos is not covered under NVLAP accreditation. Estimated measurement of uncertainty is available on request.

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ANALYST: Sarah Talley
Sarah Talley

APPROVED BY: Tianbao Bai
Tianbao Bai, Ph.D., CIH
Laboratory Director





107 New Edition Court, Cary, NC 27511
Tel: 866-481-1412; Fax: 919-481-1442

**ASBESTOS
CHAIN OF CUSTODY**

(14) A17.6186
A2389521-
A2389534

LAB USE ONLY:
CEI Lab Code:
CEI Lab I.D. Range:

COMPANY INFORMATION	PROJECT INFORMATION
CEI CLIENT #:	Job Contact: Shelley Hildebrandt
Company: PSI, Inc	Email / Tel: shelly.hildebrandt@psiusa.com
Address: 821 Corporate Ct Waukesha, WI 53189	Project Name: Oak Creek Sewer & Water
Email: shelly.hildebrandt@psiusa.com	Project ID# 00541399
Tel: 262-521-2125 Fax: 262-521-2471	PO #: 0054
	STATE SAMPLES COLLECTED IN: WI

IF TAT IS NOT MARKED STANDARD 3 DAY TAT APPLIES.

ASBESTOS	METHOD	TURN AROUND TIME					
		4 HR	8 HR	24 HR	2 DAY	3 DAY	5 DAY
PLM BULK	EPA 600	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
PLM POINT COUNT (400)	EPA 600	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PLM POINT COUNT (1000)	EPA 600	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PLM GRAV w POINT COUNT	EPA 600	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PLM BULK	CARB 435	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PCM AIR	NIOSH 7400	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM AIR	EPA AHERA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM AIR	NIOSH 7402	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM AIR	ISO 10312	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM AIR	ASTM 6281-09	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM BULK	CHATFIELD	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM DUST WIPE	ASTM D6480-05	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM DUST MICROVAC	ASTM D5755-09	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM SOIL	ASTM D7521-13	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM VERMICULITE	CINCINNATI METHOD	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OTHER:		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

REMARKS / SPECIAL INSTRUCTIONS:

☒ Accept Samples
☐ Reject Samples

Relinquished By:	Date/Time	Received By:	Date/Time
Shelley Hildebrandt	4-27-17	DL	4-28 9:00

Samples will be disposed of 30 days after analysis

BULK SAMPLE LOG

Client:	Strand Associates, Inc.
Project:	Oak Creek Sewer and Water Utility
Address:	8530 Knights Place

Date of Inspection:	4/26/2017
Inspector:	Shelley Hildebrandt
Inspector #:	All-4373

Well Station No. 3

[illegible]



May 5, 2017

PSI
821 Corporate Ct.
Waukesha, WI 53189

CLIENT PROJECT: Oak Creek Sewer & Water; 00541399 Bldg 8530
CEI LAB CODE: A17-6388

Dear Customer:

Enclosed are asbestos analysis results for PLM Bulk samples received at our laboratory on May 3, 2017. The samples were analyzed for asbestos using polarizing light microscopy (PLM) per the EPA 600 Method.

Sample results containing >1% asbestos are considered asbestos-containing materials (ACMs) per EPA regulatory requirements. The detection limit for the EPA 600 Method is <1% asbestos by weight as determined by visual estimation.

Thank you for your business and we look forward to continuing good relations. If you have any questions, please feel free to call our office at 919-481-1413.

Kind Regards,

A handwritten signature in black ink, appearing to read "Tianbao Bai", written in a cursive style.

Tianbao Bai, Ph.D., CIH
Laboratory Director





ASBESTOS ANALYTICAL REPORT

By: Polarized Light Microscopy

Prepared for

PSI

CLIENT PROJECT: Oak Creek Sewer & Water; 00541399 Bldg 8530

CEI LAB CODE: A17-6388

TEST METHOD: EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020

REPORT DATE: 05/05/17

TOTAL SAMPLES ANALYZED: 9

SAMPLES >1% ASBESTOS: 3

TEL: 866-481-1412

www.ceilabs.com



Asbestos Report Summary

By: POLARIZING LIGHT MICROSCOPY

PROJECT: Oak Creek Sewer & Water; 00541399
Bldg 8530

CEI LAB CODE: A17-6388

METHOD: EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020

Client ID	Layer	Lab ID	Color	Sample Description	ASBESTOS %
9A		A2392236	Gray	Mortar	None Detected
9B		A2392237	Gray	Mortar	None Detected
9C		A2392238	Gray	Mortar	None Detected
10A		A2392239	Black	Foam Wrap	None Detected
10B		A2392240	Black	Foam Wrap	None Detected
10C		A2392241	Black	Foam Wrap	None Detected
11A		A2392242	Black	Resinous Composite Roofing	Chrysotile 2%
11B		A2392243	Black	Resinous Composite Roofing	Chrysotile 2%
11C		A2392244	Black	Resinous Composite Roofing	Chrysotile 3%



ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

Client: PSI
821 Corporate Ct.
Waukesha, WI 53189

CEI Lab Code: A17-6388
Date Received: 05-03-17
Date Analyzed: 05-04-17
Date Reported: 05-05-17

Project: Oak Creek Sewer & Water; 00541399 Bldg 8530

ASBESTOS BULK PLM, EPA 600 METHOD

Client ID Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS		ASBESTOS %
			Fibrous	Non-Fibrous	
9A A2392236	Mortar	Heterogeneous		65% Silicates	None Detected
		Gray		35% Binder	
		Non-fibrous		<1% Paint	
		Bound			
9B A2392237	Mortar	Heterogeneous		65% Silicates	None Detected
		Gray		35% Binder	
		Non-fibrous		<1% Paint	
		Bound			
9C A2392238	Mortar	Heterogeneous		65% Silicates	None Detected
		Gray		30% Binder	
		Non-fibrous		5% Paint	
		Bound			
10A A2392239	Foam Wrap	Heterogeneous		95% Foam	None Detected
		Black		5% Binder	
		Non-fibrous			
		Bound			
10B A2392240	Foam Wrap	Heterogeneous		95% Foam	None Detected
		Black		5% Binder	
		Non-fibrous			
		Bound			
10C A2392241	Foam Wrap	Heterogeneous		95% Foam	None Detected
		Black		5% Binder	
		Non-fibrous			
		Bound			
11A A2392242	Resinous Composite Roofing	Heterogeneous	25% Cellulose	58% Tar	2% Chrysotile
		Black	15% Fiberglass		
		Fibrous			
		Bound			



ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

Client: PSI
821 Corporate Ct.
Waukesha, WI 53189

CEI Lab Code: A17-6388

Date Received: 05-03-17

Date Analyzed: 05-04-17

Date Reported: 05-05-17

Project: Oak Creek Sewer & Water; 00541399 Bldg 8530

ASBESTOS BULK PLM, EPA 600 METHOD

Client ID	Lab	Lab	NON-ASBESTOS COMPONENTS				ASBESTOS
Lab ID	Description	Attributes	Fibrous		Non-Fibrous		%
11B A2392243	Resinous Composite Roofing	Heterogeneous	20%	Cellulose	63%	Tar	2% Chrysotile
		Black	15%	Fiberglass			
		Fibrous					
		Bound					
11C A2392244	Resinous Composite Roofing	Heterogeneous	25%	Cellulose	52%	Tar	3% Chrysotile
		Black	<1%	Fiberglass	20%	Silicates	
		Fibrous					
		Bound					



LEGEND: Non-Anth = Non-Asbestiform Anthophyllite
 Non-Trem = Non-Asbestiform Tremolite
 Calc Carb = Calcium Carbonate

METHOD: EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020

REPORTING LIMIT: <1% by visual estimation

REGULATORY LIMIT: >1% by weight

Due to the limitations of the EPA 600 method, nonfriable organically bound materials (NOBs) such as vinyl floor tiles can be difficult to analyze via polarized light microscopy (PLM). EPA recommends that all NOBs analyzed by PLM, and found not to contain asbestos, be further analyzed by Transmission Electron Microscopy (TEM). Please note that PLM analysis of dust and soil samples for asbestos is not covered under NVLAP accreditation. Estimated measurement of uncertainty is available on request.

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ANALYST: Samantha Card
Samantha Card

APPROVED BY: Tianbao Bai
Tianbao Bai, Ph.D., CIH
Laboratory Director





107 New Edition Court, Cary, NC 27511

Tel: 866-481-1412; Fax: 919-481-1442

⑨ 47-6388
A2392236-
CHAIN OF CUSTODY 12392244

ASBESTOS CHAIN OF CUSTODY

LAB USE ONLY:
CEI Lab Code:
CEI Lab I.D. Range:

COMPANY INFORMATION	PROJECT INFORMATION
CEI CLIENT #:	Job Contact: <u>Shelley Hildebrandt</u>
Company: <u>PSI Inc</u>	Email / Tel:
Address: <u>821 Corporate Ct Suite 102</u>	Project Name: <u>Oak Creek Sewer + Water</u>
<u>Waukesha, WI 53189</u>	Project ID# <u>00541399 Bldg 8530</u>
Email: <u>Shelley.hildebrandt@psiwa.com</u>	PO #: <u>0054</u>
Tel: <u>262-521-2125</u> Fax: <u>262-521-2471</u>	STATE SAMPLES COLLECTED IN: <u>WI</u>

IF TAT IS NOT MARKED STANDARD 3 DAY TAT APPLIES.

ASBESTOS	METHOD	TURN AROUND TIME					
		4 HR	8 HR	24 HR	2 DAY	3 DAY	5 DAY
PLM BULK	EPA 600	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
PLM POINT COUNT (400)	EPA 600	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PLM POINT COUNT (1000)	EPA 600	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PLM GRAV w POINT COUNT	EPA 600	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PLM BULK	CARB 435	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PCM AIR	NIOSH 7400	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM AIR	EPA AHERA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM AIR	NIOSH 7402	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM AIR	ISO 10312	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM AIR	ASTM 6281-09	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM BULK	CHATFIELD	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM DUST WIPE	ASTM D6480-05	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM DUST MICROVAC	ASTM D5755-09	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM SOIL	ASTM D7521-13	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM VERMICULITE	CINCINNATI METHOD	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OTHER:		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

REMARKS / SPECIAL INSTRUCTIONS:

☒ Accept Samples
☐ Reject Samples

Relinquished By:	Date/Time	Received By:	Date/Time
<u>Shelley Hildebrandt</u>	<u>5-2-17 3:15p</u>	<u>DC</u>	<u>5-3 9:10</u>

Samples will be disposed of 30 days after analysis

BULK SAMPLE LOG

Date of Inspection:	5/2/2017
Inspector:	Shelley Hildebrandt
Inspector #:	All-4373

Well Station No. 3

[illegible]



May 3, 2017

PSI
821 Corporate Ct.
Waukesha, WI 53189

CLIENT PROJECT: Oak Creek Sewer & Water; 00541399
CEI LAB CODE: A17-6187

Dear Customer:

Enclosed are asbestos analysis results for PLM Bulk samples received at our laboratory on April 28, 2017. The samples were analyzed for asbestos using polarizing light microscopy (PLM) per the EPA 600 Method.

Sample results containing >1% asbestos are considered asbestos-containing materials (ACMs) per EPA regulatory requirements. The detection limit for the EPA 600 Method is <1% asbestos by weight as determined by visual estimation.

Thank you for your business and we look forward to continuing good relations. If you have any questions, please feel free to call our office at 919-481-1413.

Kind Regards,

A handwritten signature in black ink, appearing to read "Tianbao Bai", written in a cursive style.

Tianbao Bai, Ph.D., CIH
Laboratory Director





ASBESTOS ANALYTICAL REPORT

By: Polarized Light Microscopy

Prepared for

PSI

CLIENT PROJECT: Oak Creek Sewer & Water; 00541399

CEI LAB CODE: A17-6187

TEST METHOD: EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020

REPORT DATE: 05/03/17

TOTAL SAMPLES ANALYZED: 3

SAMPLES >1% ASBESTOS:

TEL: 866-481-1412

www.ceilabs.com



Asbestos Report Summary

By: POLARIZING LIGHT MICROSCOPY

PROJECT: Oak Creek Sewer & Water; 00541399

CEI LAB CODE: A17-6187

METHOD: EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020

Client ID	Layer	Lab ID	Color	Sample Description	ASBESTOS %
1A		A2389535	Gray	Caulking	None Detected
1B		A2389536	Gray	Caulking	None Detected
1C		A2389537	Gray	Caulking	None Detected



ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

Client: PSI
821 Corporate Ct.
Waukesha, WI 53189

CEI Lab Code: A17-6187
Date Received: 04-28-17
Date Analyzed: 05-02-17
Date Reported: 05-03-17

Project: Oak Creek Sewer & Water; 00541399

ASBESTOS BULK PLM, EPA 600 METHOD

Client ID Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS		ASBESTOS %
			Fibrous	Non-Fibrous	
1A A2389535	Caulking	Heterogeneous Gray Non-fibrous Bound		100% Caulk	None Detected
1B A2389536	Caulking	Heterogeneous Gray Non-fibrous Bound		100% Caulk	None Detected
1C A2389537	Caulking	Heterogeneous Gray Non-fibrous Bound		100% Caulk	None Detected



LEGEND: Non-Anth = Non-Asbestiform Anthophyllite
 Non-Trem = Non-Asbestiform Tremolite
 Calc Carb = Calcium Carbonate

METHOD: EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020

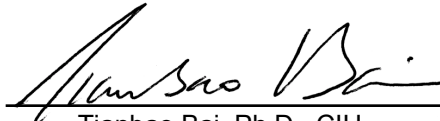
REPORTING LIMIT: <1% by visual estimation

REGULATORY LIMIT: >1% by weight

Due to the limitations of the EPA 600 method, nonfriable organically bound materials (NOBs) such as vinyl floor tiles can be difficult to analyze via polarized light microscopy (PLM). EPA recommends that all NOBs analyzed by PLM, and found not to contain asbestos, be further analyzed by Transmission Electron Microscopy (TEM). Please note that PLM analysis of dust and soil samples for asbestos is not covered under NVLAP accreditation. Estimated measurement of uncertainty is available on request.

This report relates only to the samples tested or analyzed and may not be reproduced, except in full, without written approval by CEI Labs, Inc. CEI Labs makes no warranty representation regarding the accuracy of client submitted information in preparing and presenting analytical results. Interpretation of the analytical results is the sole responsibility of the client. Samples were received in acceptable condition unless otherwise noted. This report may not be used by the client to claim product endorsement by NVLAP or any other agency of the U.S. Government.

ANALYST: 
Ritika Seal

APPROVED BY: 
Tianbao Bai, Ph.D., CIH
Laboratory Director





107 New Edition Court, Cary, NC 27511
Tel: 866-481-1412; Fax: 919-481-1442

③ 47-6187
A 2389535-
A2389537

ASBESTOS CHAIN OF CUSTODY

LAB USE ONLY:
CEI Lab Code:
CEI Lab I.D. Range:

COMPANY INFORMATION	PROJECT INFORMATION
CEI CLIENT #:	Job Contact: Shelley Hildebrandt
Company: PSI, Inc	Email / Tel: shelly.hildebrandt@psiusa.com
Address: 821 Corporate Ct Waukesha, WI 53189	Project Name: Oak Creek Sewer & Water
Email: shelly.hildebrandt@psiusa.com	Project ID# 00541399
Tel: 262-521-2125 Fax: 262-521-2471	PO #: 0054
	STATE SAMPLES COLLECTED IN: WI

IF TAT IS NOT MARKED STANDARD 3 DAY TAT APPLIES.

ASBESTOS	METHOD	TURN AROUND TIME					
		4 HR	8 HR	24 HR	2 DAY	3 DAY	5 DAY
PLM BULK	EPA 600	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
PLM POINT COUNT (400)	EPA 600	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PLM POINT COUNT (1000)	EPA 600	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PLM GRAV w POINT COUNT	EPA 600	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PLM BULK	CARB 435	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PCM AIR	NIOSH 7400	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM AIR	EPA AHERA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM AIR	NIOSH 7402	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM AIR	ISO 10312	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM AIR	ASTM 6281-09	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM BULK	CHATFIELD	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM DUST WIPE	ASTM D6480-05	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM DUST MICROVAC	ASTM D5755-09	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM SOIL	ASTM D7521-13	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM VERMICULITE	CINCINNATI METHOD	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OTHER:		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

REMARKS / SPECIAL INSTRUCTIONS:		<input checked="" type="checkbox"/> Accept Samples	
		<input type="checkbox"/> Reject Samples	
Relinquished By:	Date/Time	Received By:	Date/Time
Shelley Hildebrandt	4-27-17	DL	4-28 9:00

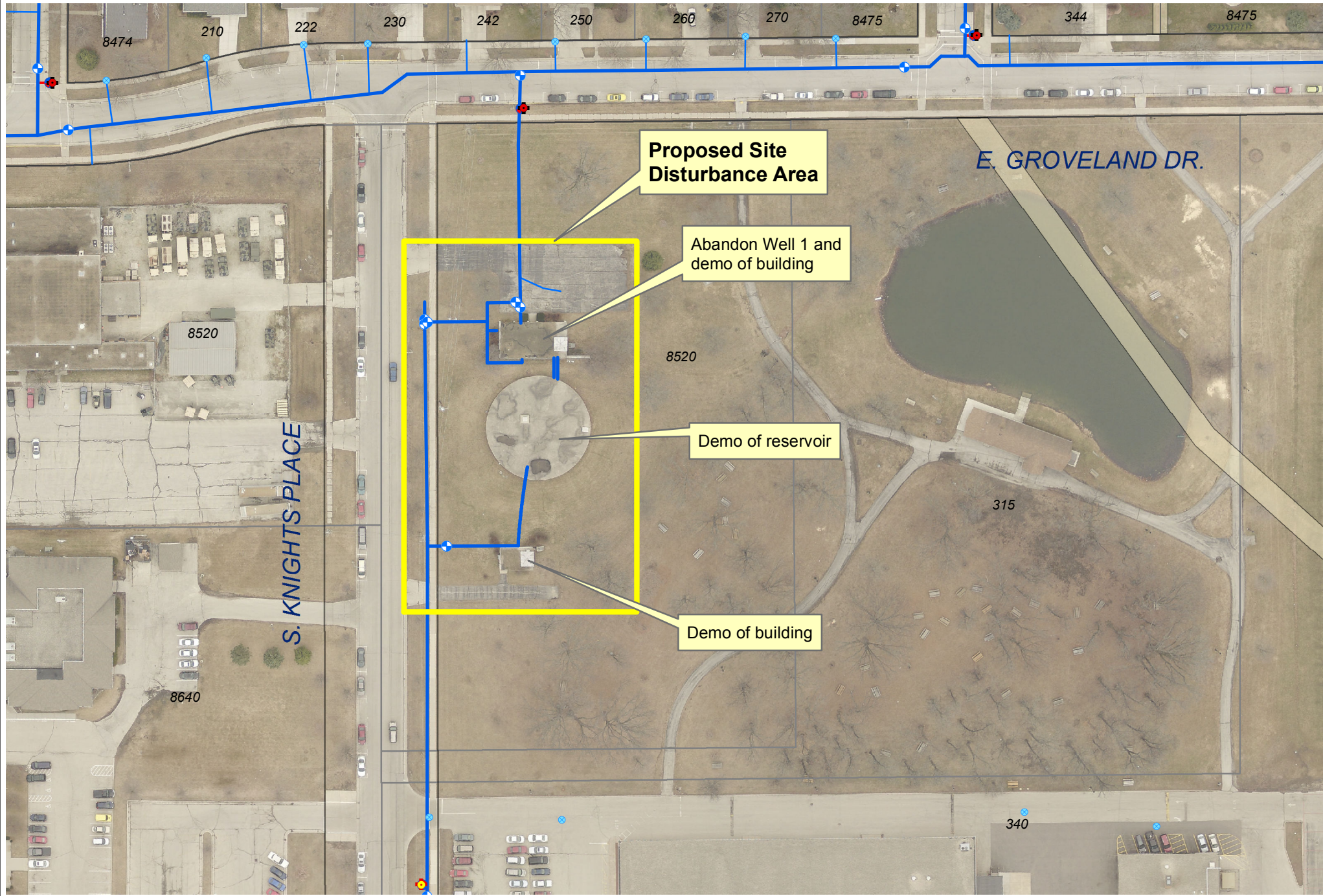
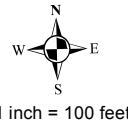
Samples will be disposed of 30 days after analysis

Client: Strand Associates, Inc.
Project: Oak Creek Sewer and Water Utility
Address: Reservoir

Date of Inspection:	4/26/2017
Inspector:	Shelley Hildebrandt
Inspector #:	All-4373

[illegible]

Figure 1: **Well 1 Abandonment, Well House
& Reservoir Demolition**



LEAD INSPECTION FIELD DATA SHEET

Client: Strand & Associates
Project Name: Oak Creek Water Utility
Building Address: 8520 & 8530 Knights Place

Page: 1 of 1
Location: Oak Creek, Wisconsin
XRF Serial #: 1622

XRF TEST #	VAL.	BUILDING COMPONENT/ ORIENTATION	PAINT/ VARNISH COLOR	CLC mg/cm ²	RESULT	PAINT COND.	SUBSTRATE	ROOM/AREA
1	1.0	Calibration	NA	1.1	NA	NA	NA	NA
2	1.0	Calibration	NA	1.0	NA	NA	NA	NA
3	1.0	Calibration	NA	1.0	NA	NA	NA	NA
4	NA	Bldg. 8520 - Exterior Wall (North)	Beige	-0.3	Non-LBP	Intact	Cement	Exterior
5	NA	Bldg. 8520 - Exterior Door (North)	Peach	0.1	Non-LBP	Intact	Metal	Exterior
6	NA	Bldg. 8520 - Exterior Wall (West)	Beige	-0.1	Non-LBP	Fair	Cement	Exterior
7	NA	Bldg. 8520 - Exterior Wall (South)	Beige	-0.1	Non-LBP	Intact	Cement	Exterior
8	NA	Bldg. 8520 - Roof Fascia (South)	Peach	0.4	Non-LBP	Intact	Metal	Exterior
9	NA	Bldg. 8520 - Exterior Wall (East)	Beige	-0.1	Non-LBP	Intact	Cement	Exterior
10	NA	Bldg. 8520 - Exterior Pipe (East)	Off-White	2.0	LBP	Poor	Metal	Exterior (water pipe)
11	NA	Reservoir - Roof Fascia	Peach	-0.3	Non-LBP	Intact	Cement	Exterior
12	NA	Reservoir - Exterior Wall (East)	Beige	-0.3	Non-LBP	Intact	Cement	Exterior
13	NA	Bldg. 8530 - Exterior Wall (North)	Beige	-0.1	Non-LBP	Intact	Cement	Exterior
14	NA	Bldg. 8530 - Roof Fascia	Peach	-0.4	Non-LBP	Intact	Metal	Exterior
15	NA	Bldg. 8530 - Exterior Wall (East)	Beige	-0.1	Non-LBP	Intact	Cement	Exterior
16	NA	Bldg. 8530 - Exterior Pipe (East)	Beige	-0.1	Non-LBP	Poor	Metal	Exterior (water pipe)
17	NA	Bldg. 8530 - Exterior Wall (South)	Beige	0.0	Non-LBP	Intact	Cement	Exterior
18	NA	Bldg. 8530 - Exterior Door (Southwest)	Peach	-0.2	Non-LBP	Intact	Metal	Exterior
19	NA	Bldg. 8530 - Exterior Wall (West)	Beige	-0.1	Non-LBP	Intact	Cement	Exterior
20	NA	Bldg. 8530 - Interior Wall (West)	Blue	-0.1	Non-LBP	Intact	Cement	Interior
21	NA	Bldg. 8530 - Interior Wall (North)	Blue	0.0	Non-LBP	Intact	Cement	Interior
22	NA	Bldg. 8530 - Interior Wall (South)	Blue	0.4	Non-LBP	Intact	Cement	Interior
23	NA	Bldg. 8530 - Interior Pipe (East)	Beige	0.3	Non-LBP	Intact	Metal	Interior (storm sewer)
24	NA	Bldg. 8530 - Interior Pipe (West)	Blue	0.3	Non-LBP	Intact	Cement	Interior (potable)
25	NA	Bldg. 8520 - Interior Wall (East)	Beige	-0.1	Non-LBP	Intact	Cement	Interior
26	NA	Bldg. 8520 - Interior Wall (North)	Blue	-0.2	Non-LBP	Intact	Cement	Interior
27	NA	Bldg. 8520 - Interior Wall (South)	White	-0.2	Non-LBP	Intact	Metal	Interior
28	NA	Bldg. 8520 - Interior Pipe (Southeast)	Blue	0.4	Non-LBP	Intact	Drywall	Interior

Milwaukee Lead/Asbestos Information Center

A division of Midwest Certified Training, Inc.
3495 North 124th Street, Brookfield, WI 53005 Phone: 414-481-9070



Shelley L. Hildebrandt

Has successfully completed a course and passed the examination on March 30, 2017 with a minimum score of 70 percent, that meets all criteria for the State of Wisconsin Recertification as an

Asbestos Inspector Refresher Course

Date of Course: March 30, 2017

Date Issued March 30, 2017

Date of Expiration: March 30, 2018

Certification Number: AIR17033057033

Location: Milwaukee Lead/Asbestos Information Center, 3495 North 124th Street, Brookfield, WI 53005

DCQ Course ID #: 9606

Rocky Everly

Rocky Everly, Director of Milwaukee Lead/Asbestos Information Center, Inc.
3495 North 124th Street
Brookfield, WI 53005
414-481-9070

Company Certificate

This certifies that

PSI - PROFESSIONAL SERVICE INDUSTRIES INC

821 CORPORATE CT
WAUKESHA WI 53189-5009

is certified under ch. DHS 159, Wis. Adm. Code as a

Asbestos Company - Primary

Certificate Issue Date: 07/16/2015
Expiration Date: 08/01/2017, 12:01 a.m.
Certification #: CAP-16820

Wisconsin Department of Health Services
Division of Public Health
Bureau of Environmental and Occupational Health
Asbestos & Lead Section
PO Box 2659
Madison WI 53701-2659
Phone: (608) 261-6876



Shelley A Bruce
Shelley A Bruce,
Unit Supervisor

Milwaukee Lead/Asbestos Information Center

*A division of Midwest Certified Training, Inc.
3495 North 124th Street, Brookfield, WI 53005 Phone: 414-481-9070*



Michael W. Rehfeldt

*N36w6045 Wurthmann Street
Cedarburg WI 53012*

*has successfully passed the required course test and completed all other requirements
for the 8-hour*

Lead Risk Assessor Refresher Course

on June 8, 2016 in Milwaukee WI .

Course Test Date: June 8, 2016

Date Course Certificate Issued: June 8, 2016

Course Certificate #: LRAR16060855008

Expiration Date: June 8, 2018



Rocky Everly, Training Manager MLAIC

DCQ Course ID #: 10965

*This training course complies with the requirements of and is accredited by the State of Wisconsin, Department of Health and Family Services
under ch. HFS 163, Wis. Admin. Code.*

Company Certificate

This certifies that

PSI - PROFESSIONAL SERVICE INDUSTRIES INC

821 CORPORATE CT
WAUKESHA WI 53189-5009

is certified under ch. DHS 163, Wis. Adm. Code as a

Lead (Pb) Company

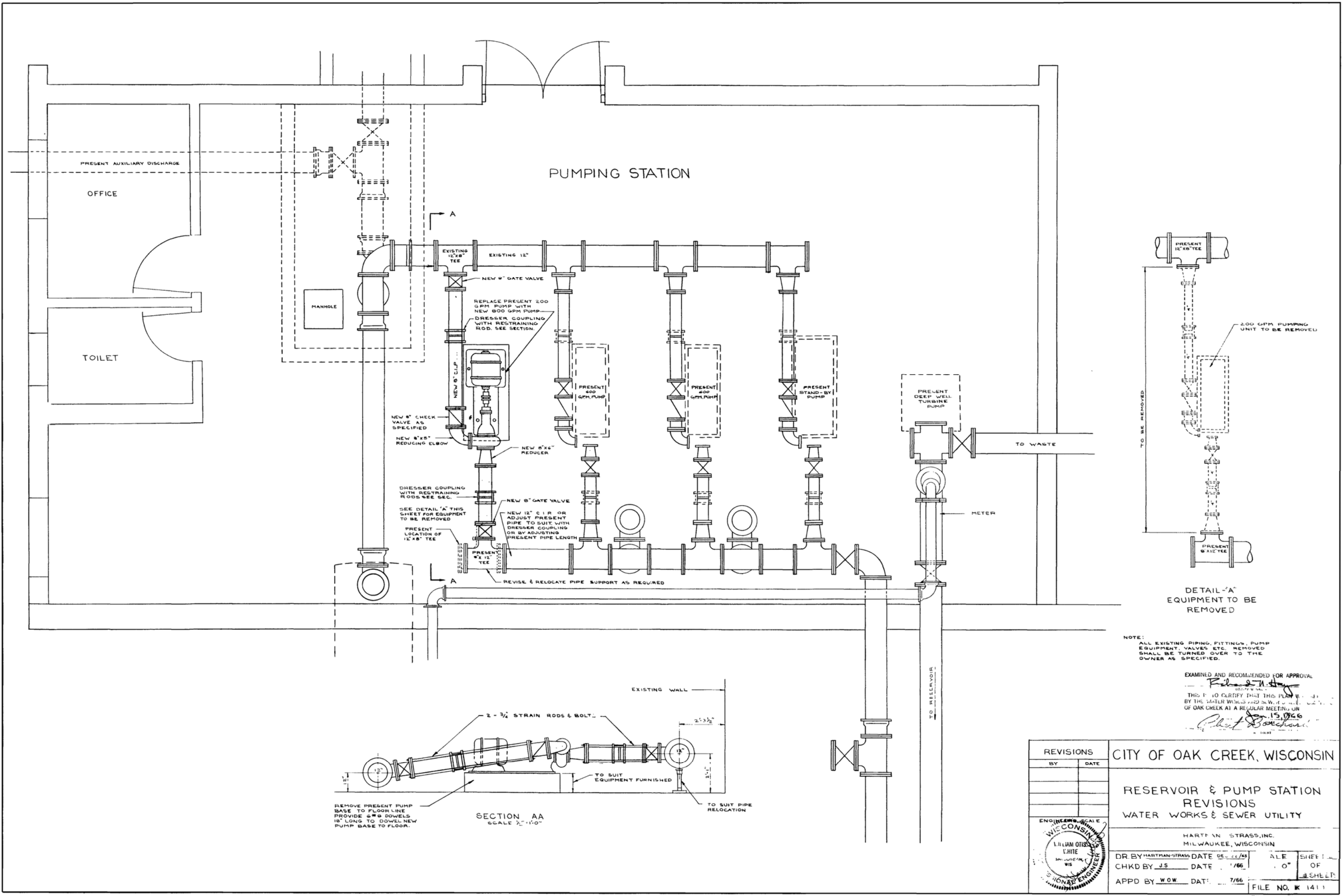
Certificate Issue Date: 07/14/2015
Expiration Date: 08/01/2017, 12:01 a.m.
Certification #: DHS-16820


Wisconsin Department of Health Services
Division of Public Health
Bureau of Environmental and Occupational Health
Asbestos & Lead Section
PO Box 2659
Madison WI 53701-2659
Phone: (608) 261-6876

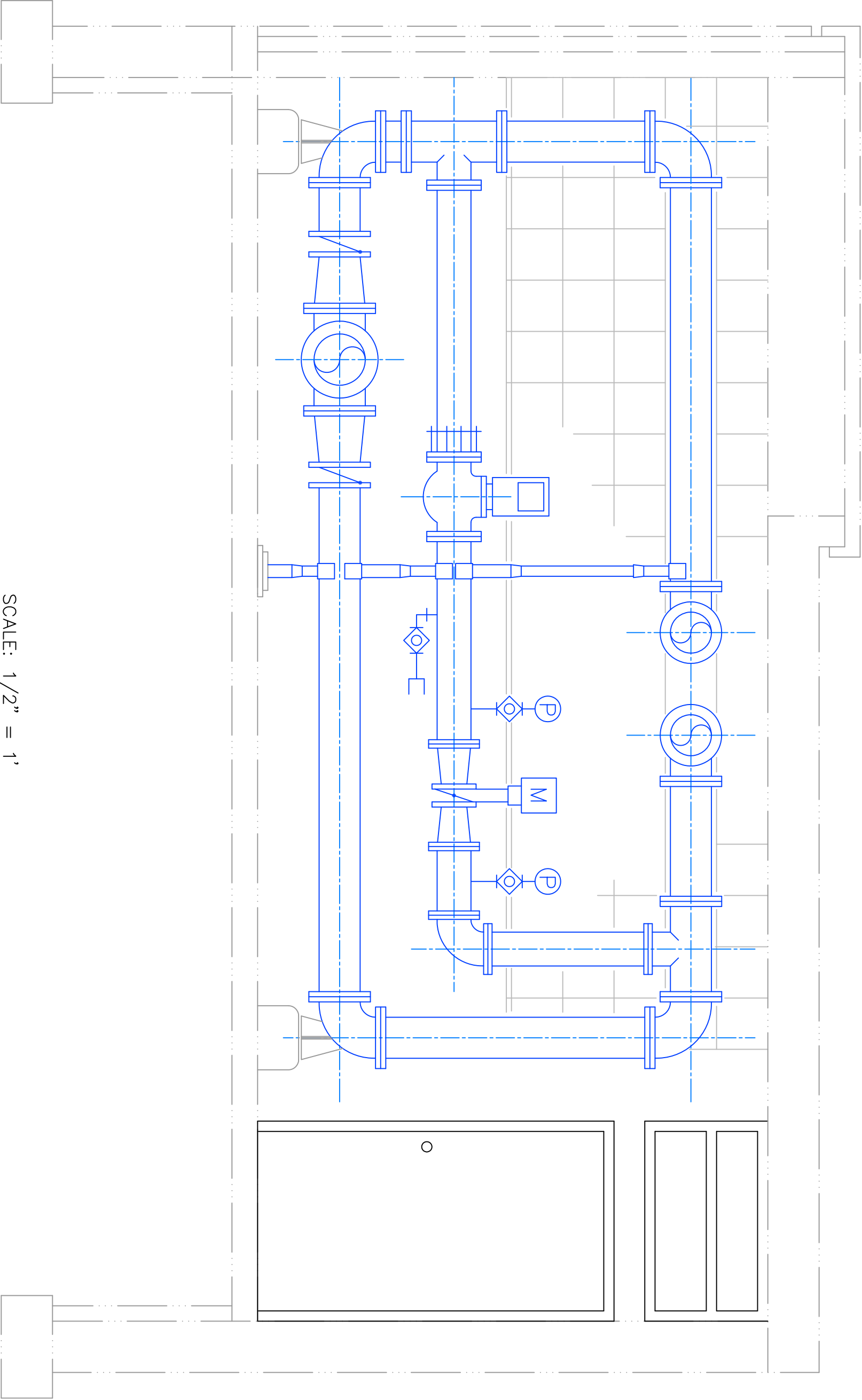


Shelley A Bruce
Shelley A Bruce,
Unit Supervisor

APPENDIX C

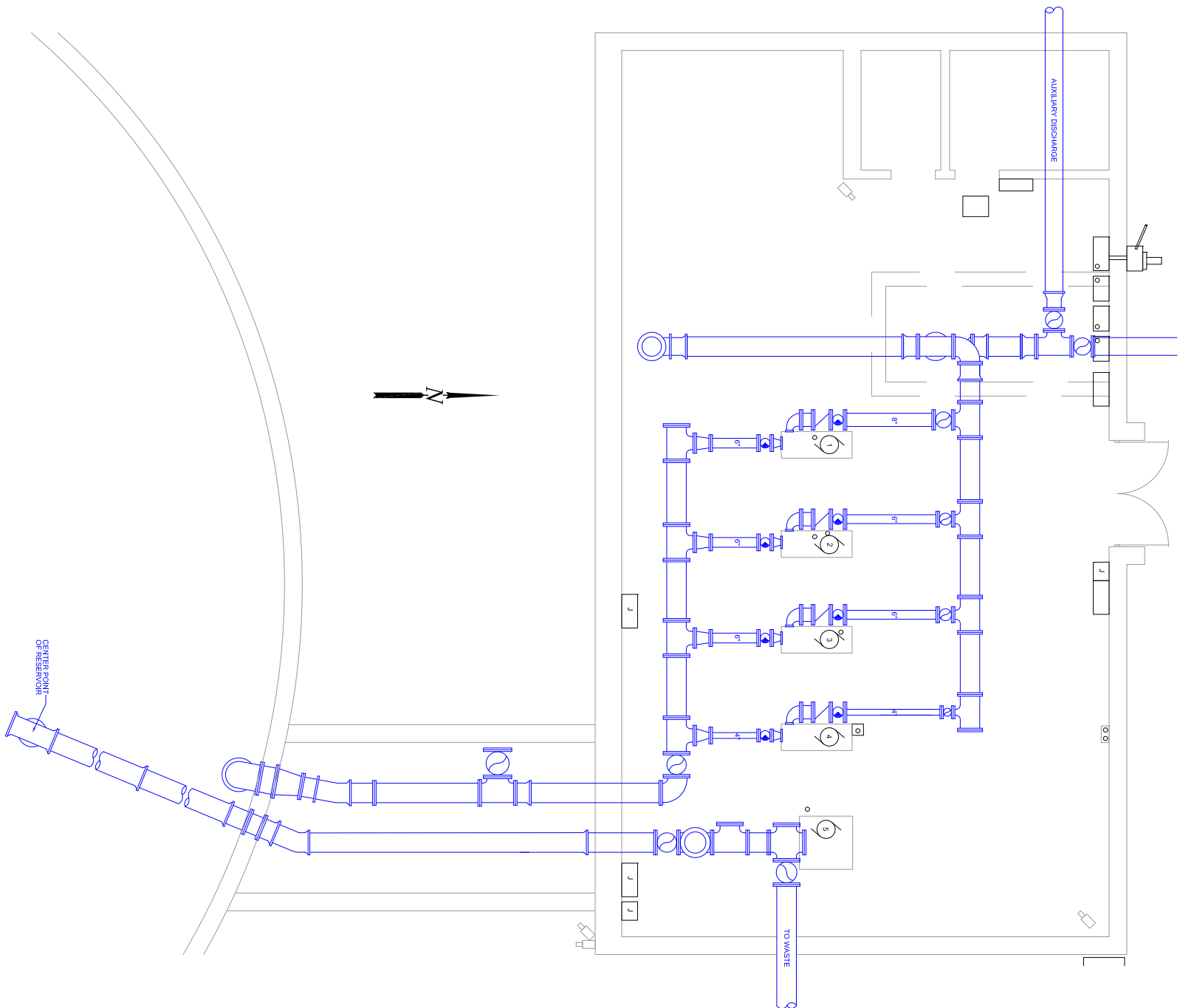


REVISIONS		CITY OF OAK CREEK, WISCONSIN	
BY	DATE	RESERVOIR & PUMP STATION REVISIONS WATER WORKS & SEWER UTILITY	
		HARTMAN STRASS, INC. MILWAUKEE, WISCONSIN	
DR. BY <u>HARTMAN-STRASS</u>		DATE <u>02-22/63</u>	FILE NO. <u>1411</u>
CHKD BY <u>JS</u>		DATE <u>1/66</u>	SHEET <u>1</u> OF <u>2</u>
APPD BY <u>WOW</u>		DATE <u>7/66</u>	SHEET <u>1</u> OF <u>2</u>



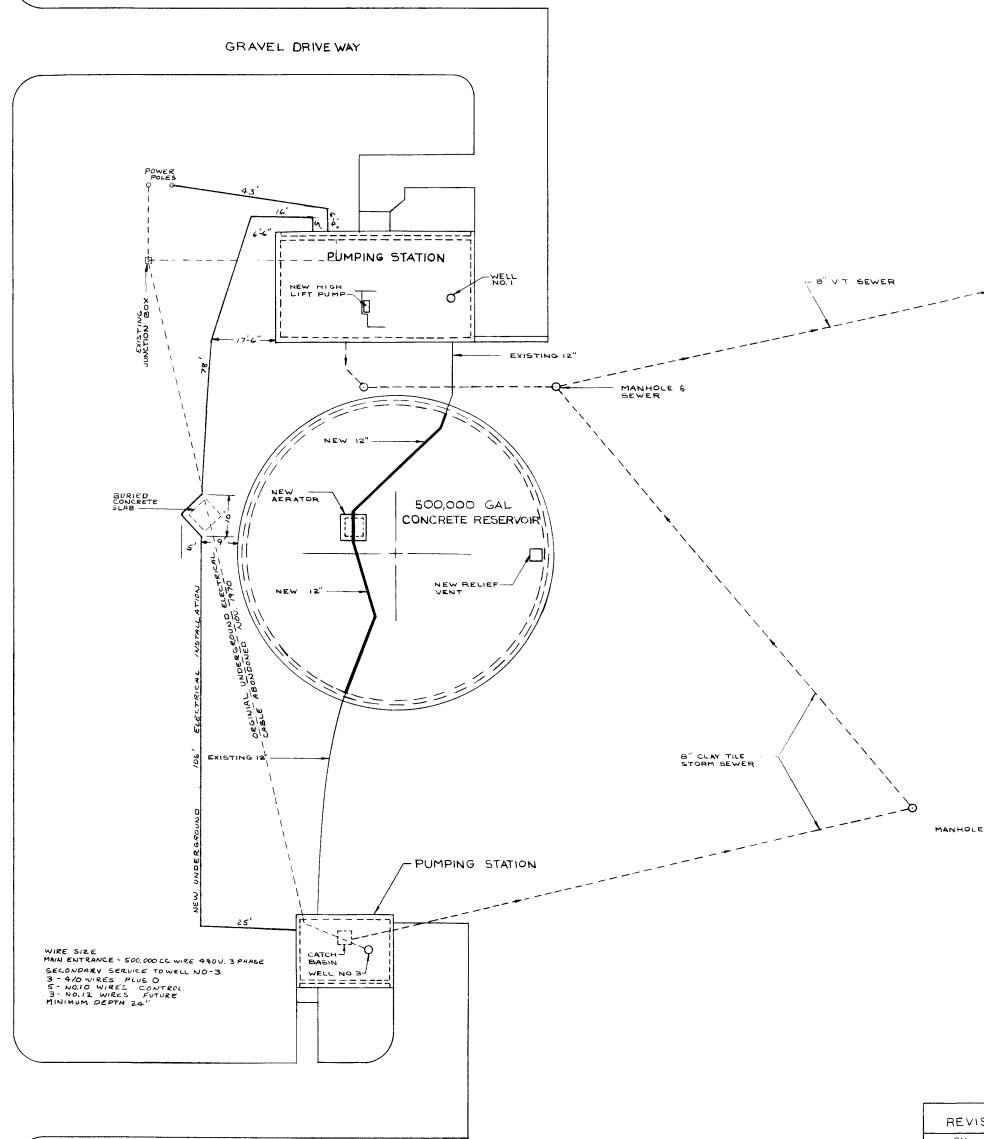
SCALE: 1/2" = 1'

AUSTIN ST. (KNIGHT'S PL./NORTH STATION)



SA.	CITY OF OAK CREEK, WISCONSIN				APPROVED BY _____			
ST.					PLANT MANAGER _____		DATE _____	
W.					APPROVED BY _____			
G.					DESIGNED BY _____	DATE _____	DRAWN BY _____	DATE _____
E.					SG		3/17/2010	
T.					AUSTIN ST. (KNIGHT'S PL.) CAST IRON PIPING			
L.								
TS.								
PP.								
					PROFILE _____	OF _____		
					VER. _____	4 _____		
					FILE NO: _____			
	SG/MM 3/17/2010							
	REVISION BY	DATE						

AUSTIN STREET



WIRE SIZE
MAIN ENTRANCE - 800,000 G. WIRE 3 PHASE
SECONDARY SERVICE TUNNEL NO. 3
3 - 4/0 WIRE PLUS 0
5 - 1/2 WIRE CABLED
3 - NO. 12 WIRE FUTURE
MINIMUM DEPTH 24"

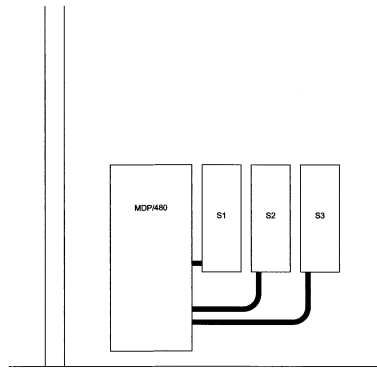
GRAVEL DRIVEWAY

PLOT PLAN
1/4" = 1'-0"

EXAMINED FOR A SPECIAL
IN THE CITY OF OAK CREEK, WISCONSIN
JAN 13, 1966

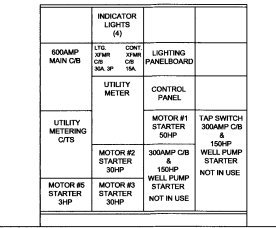
REVISIONS		CITY OF OAK CREEK, WISCONSIN		
BY	DATE			
ENGINEER'S SEAL		HARTMAN ENGINEERING		
DR. BY HARTMAN ENGINEERING		CHADLEY J.S.		
APPD. BY W.O.W.		11/66	11/66	11/66
		FILE NO. 4-14189		

FILE: 00005-1-C-124



**ELEVATION "A-A" -
ELECTRICAL EQUIPMENT LAYOUT**

SCALE: 1/2" = 1'-0"



**EXISTING MOTOR CONTROL CENTER
TO BE REMOVED**

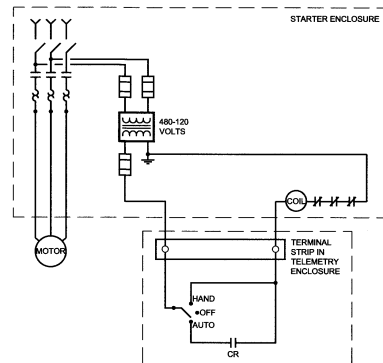
SCALE: 1/2" = 1'-0"

SHEET NOTES

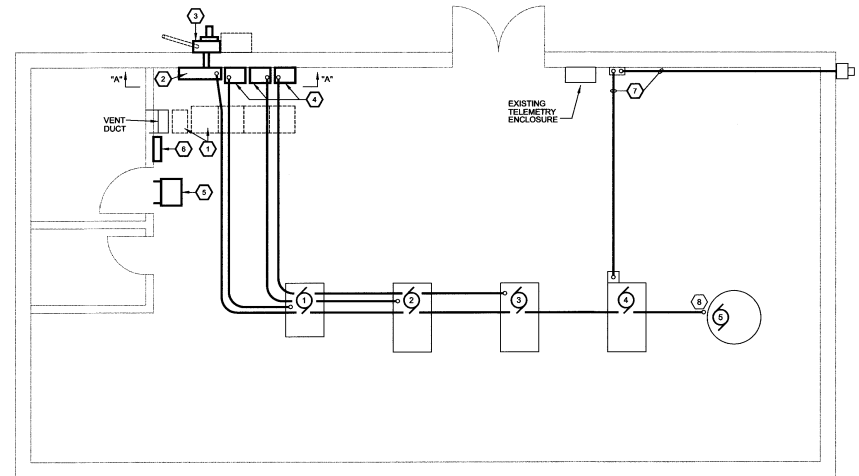
1. DE-ENERGIZE AND REMOVE EXISTING MOTOR CONTROL CENTER, 15 KVA LIGHTING TRANSFORMER, AND ASSOCIATED CONDUITS AND FEEDERS. TAG AND IDENTIFY EXISTING CIRCUITING WHICH WILL BE RECONNECTED TO OPERATE FROM NEW DISTRIBUTION EQUIPMENT. E.G. LIGHTING AND RECEPTACLE CIRCUITS, CONTROL CIRCUITS, ETC.
2. PROVIDE NEW MAIN DISTRIBUTION PANEL "MDP480" PER SCHEDULE AT LOCATION INDICATED.
3. PROVIDE UTILITY APPROVED METERING TRANSOCKET 400 AMPS, 480 VOLTS, 3Ø-4 WIRE WITH INCOMING 3-1/2" CONDUIT STUBBED UNDERGROUND IN DIRECTION OF EXISTING UTILITY TRANSFORMER POLES. REMOVE EXISTING JUNCTION BOX AND ASSOCIATED CONDUITS. PROVIDE 4-500 KCM & 1 #10 GRD. - 3-1/2" CONDUIT FROM TRANSOCKET TO "MDP480".
4. PROVIDE MOTOR STARTERS FOR MOTORS #1, 2, & 3 PER MOTOR WIRING SCHEDULE. MOUNTED AND WIRED AS INDICATED. EXTEND 2 #14 CONTROL CIRCUIT TO EXISTING TELEMETRY ENCLOSURE FROM EACH STARTER PER CONTROL CIRCUIT DIAGRAM.
5. PROVIDE 15 KVA, 480 Δ, 3Ø/120 VOLTS (NEMA TP-2002) DRY TYPE TRANSFORMER WALL-MOUNTED ABOVE DOOR TO OFFICE.
6. PROVIDE LIGHTING/RECEPTACLE PANELBOARD 1/A PER SCHEDULE AND LOCATION ON DRAWING AND REFEED EXISTING LIGHTING AND RECEPTACLE CIRCUITS REMOVED FROM MCC PANEL (PER NOTE-1 ABOVE) THEREFROM.
7. PUMP MOTOR #4, STARTER THEREOF, AND MOBILE GENERATOR RECEPTACLE ON EAST EXTERIOR WALL SHALL REMAIN WITHOUT MODIFICATION.
8. PUMP MOTOR #5 IS PROVIDED WITH EXISTING STARTER AND CONTROLS AT THE PUMP LOCATION. EXTEND DESIGNATED CIRCUIT AND CONNECT THERETO.

DISTRIBUTION PANEL/FEEDER SCHEDULE: DP									
MARK: MDP480		VOLTAGE RATING: 480Y/277 VOLTS, 3Ø/4W			MAINS: 400A MCB				
LOCATION:		AMPERAGE RATING: 400 AMPS.			ENCLOSURE TYPE: SURFACE				
CB	CB COMPLIMENT	TO FEED		LOAD (KVA)	CU FEEDER	DP	NOTE		
P	TRIP	AIC			NO.	SIZE	CDT		
1	3	100	18,000	PUMP #1	54	3/1"	4/8 GRD.	1-1/4"	
2	3	80	18,000	PUMP #2	33.5	3/1"	6/8 GRD.	1"	
3	3	80	18,000	PUMP #3	33.5	3/1"	6/8 GRD.	1"	
4	3	20	18,000	PUMP #5	4	3/1"	12/10 GRD.	3/4"	
5	3	25	18,000	15 KVA LTG. TRANSFORMER	4	3/1"	10/10 GRD.	3/4"	
6	3	100		SPACE ONLY					
7	3	100		SPACE ONLY					
8	3	70		SPACE ONLY					
9	3	70		SPACE ONLY					
10	3	70		SPACE ONLY					

PANELBOARD SCHEDULE									
PANEL 1/A		VOLTAGE 208Y/120 V, 3Ø, 4W				AIC			
<input type="checkbox"/> FLUSH		<input type="checkbox"/> MAIN 60A MCB		<input type="checkbox"/> GROUND BUS		<input type="checkbox"/> BUS			
<input type="checkbox"/> SURFACE		<input type="checkbox"/> MLO		<input type="checkbox"/> ISOLATED GROUND BUS		<input type="checkbox"/> FEED THRU			
REMARKS: TYPE "NOOD"									
CIR #	CB # SIZE	DESCRIPTION	LOAD A Ø KVA	LOAD B Ø KVA	LOAD C Ø KVA	LOAD D Ø KVA	DESCRIPTION	CB # SIZE	CIR #
1	20	LTS PUMP ROOM	0.6	1.8		1.2	WATER HEATER	20	2
3	20	OFFICE RECEPT.	1.0		1.2	0.2	5 CNTRL. PANEL	20	4
5	20	SPARE				0.5	METER PRT-1TS & RECEPT	15	6
7	20	LIGHT-OUTSIDE	0.3	0.3			SPARE	15	8
9	20	SPARE					SPARE	20	10
11	20	SPARE					SPARE	20	12
13		SPACE					SPACE		14
15		SPACE					SPACE		16
17		SPACE					SPACE		18
19		SPACE					SPACE		20
21									22
23									24
25									26
27									28
29									30
31									32
33									34
35									36
37									38
39									40
41									42
TOTALS			2.1	1.2	0.5				
TOTAL CONNECT, KVA			3.8						

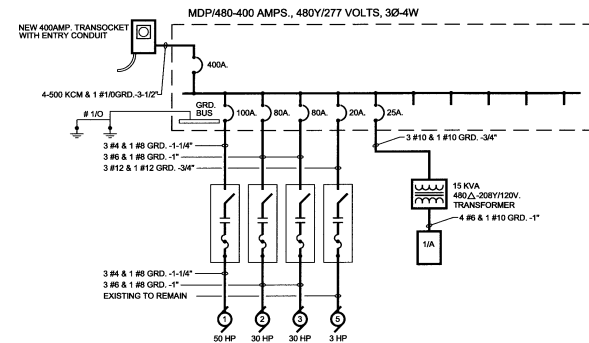


CONTROL CIRCUIT FOR MOTORS NO. 1, 2, & 3



PUMP STATION ELECTRICAL PLAN

SCALE: 1/2" = 1'-0"



SINGLE-LINE POWER SYSTEM DIAGRAM

MOTOR WIRING SCHEDULE									
NO.	HP	VOLT	Ø	MOTOR CHARACTERISTICS	X-REF. DES.	PWR FEED	STARTER	CONTROL	MW
				DRIVING/LOCATION		SOURCE	NO	TYPE	NOTE
1	50	480	3	PUMP #1		MDP480	1	8538-SECT1V8	E E E NORTH WALL H.D.A. RELAY EXISTING TELEMETRY ENCLOSURE
2	30	480	3	PUMP #2		MDP480	2	8538-SECT1V8	E E E NORTH WALL H.D.A. RELAY EXISTING TELEMETRY ENCLOSURE
3	30	480	3	PUMP #3		MDP480	3	8538-SECT1V8	E E E NORTH WALL H.D.A. RELAY EXISTING TELEMETRY ENCLOSURE
4	30	480	3	PUMP- EMERGENCY					
5	3	480	3	SAMPLING PUMP		MDP480	4	EXISTING	AT PUMP EXISTING ON START

OAK CREEK WATER AND SEWER UTILITY
WATER SYSTEM IMPROVEMENTS
WELL STATION NO. 3 RENOVATION

PROJECT NO. 97047

INDEX OF DRAWINGS

SHEET NO.	DRAWING NO.	DESCRIPTION
1	G1	VICINITY MAP AND INDEX OF DRAWINGS
2	G2	GENERAL SYMBOLS AND ABBREVIATIONS
3	G3	PROCESS PIPING SCHEMATIC AND DESIGN DATA
4	G301	GENERAL SITE PLAN
5	G310	DEMOLITION PLAN
6	M1	MECHANICAL DETAILS
7	M301	OUTSIDE PIPING PLAN
8	M302	OUTSIDE PIPING PROFILES
9	M310	MECHANICAL PLAN AND DETAILS
10	M311	MECHANICAL SECTIONS
11	W301	WELL DETAILS AND WORK ITEM SCHEDULE
12	W302	WELL PUMP DETAILS AND DESIGN DATA
13	I1	INSTRUMENTATION SYMBOLS AND DETAILS
14	I301	INSTRUMENTATION DIAGRAMS
15	I310	CONTROL LOGIC DIAGRAM
16	I315	TIMING SEQUENCE AND LOGIC DIAGRAMS
17	E1	ELECTRICAL SYMBOLS AND DETAILS
18	E301	ONE LINE DIAGRAM AND MOTOR CONTROL DIAGRAMS
19	E302	ELECTRICAL SCHEDULES AND MCC DETAILS
20	E310	ELECTRICAL PLANS



CITY OF OAK CREEK
MILWAUKEE COUNTY

RECORD DRAWING
BY *CK* DATE *6/22/00*

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NO.	DATE	APPR	REVISION	NO.	DATE	APPR	REVISION	DRAWN	RB
								DESIGNED	CK
								CHECKED	DAM

OAK CREEK WATER AND SEWER UTILITY
WATER SYSTEM IMPROVEMENTS
WELL STATION NO. 3 RENOVATION

VICINITY MAP AND INDEX OF DRAWINGS

JOB E129-10.01
DATE 5/21/98

Kaempfer & Associates Inc.
P.O. Box 150 650 E. Jackson St.
Oconomowoc, Wisconsin 54154
Consulting Engineers
(920) 848-3932

SHEET NO.
1
DRAWING NO.
G1

MECHANICAL PIPING

PIPING

	INSULATED PIPE		NEEDLE VALVE
	FLANGED JOINT		VALVE WITH ACTUATOR S - SOLENOID P - PNEUMATIC M - MOTOR T - THERMOSTATIC
	GROOVED PIPE COUPLING		HYDRAULICALLY ACTUATED VALVE
	MECHANICAL JOINT		RELIEF VALVE
	MECHANICAL PIPE COUPLING		ANGLE VALVE, HOSE BIB
	FLEXIBLE RUBBER COUPLING		STRAINER
	FLANGED COUPLING ADAPTOR		GAUGE, P - PRESSURE T - TEMPERATURE
	GATE VALVE		SWITCH, PS - PRESSURE TS - TEMPERATURE FL - FLOW
	GLOBE VALVE		UNION
	BUTTERFLY VALVE		SANITARY TRAP
	PLUG VALVE		3 - WAY VALVE
	BALL VALVE		
	SWING CHECK VALVE		
	BALL CHECK VALVE		
	CENTER GUIDED CHECK VALVE		
	SPLIT DISC CHECK VALVE		
	KNIFE GATE VALVE		
	WELDED STEEL PIPE		

HVAC

	SUPPLY FAN		SUPPLY DUCT
	EXHAUST FAN		INTAKE, RETURN OR EXHAUST DUCT
	UNIT HEATER		AIR TURNING VANES IN DUCT
	WALL LOUVER		OPPOSED BLADE DAMPER
	THERMOSTAT		FIRST DIMENSION, DUCT SIDE SHOWN SECOND DIMENSION, SIDE NOT SHOWN

GENERAL SYMBOLS

	POURED IN PLACE CONCRETE		MANHOLE
	CONCRETE MASONRY UNITS		BURIED VALVE & BOX TYPE AS INDICATED
	PRECAST CONCRETE		REDUCER/ INCREASER
	MORTAR OR GROUT		THRUST BLOCK WITH BEARING AREA IN SQ. FT.
	STEEL OR STAINLESS STEEL		HYDRANT
	WOOD, FINISH, AND ROUGH		PROPOSED PIPELINE DESIGNATION SHOWING SIZE & SERVICE
	PLYWOOD		PROPOSED EQUIPMENT DESIGNATION
	FIBERGLASS INSULATION		EXISTING PIPELINE DESIGNATION SHOWING SIZE & SERVICE
	BATT OR LOOSE FILL RIGID INSULATION		EXISTING EQUIPMENT DESIGNATION
	GRATING, ARROW INDICATES DIRECTION OF SPAN		CENTERLINE
	CHECKER PLATE		PROPERTY LINE
	REINFORCING IN SECTION		EASEMENT LINE
	REINFORCING IN PLAN		JOINT RESTRAINT SYSTEM WITH LENGTH IN FEET ON EITHER SIDE OF CENTERLINE
	STUD WALL		SOIL BORING LOCATION AND NUMBER
	EXISTING CONCRETE		BENCH MARK DESIGNATION
	EXISTING STRUCTURE OR EQUIPMENT		DOOR NUMBER
	EXISTING FACILITY TO BE REMOVED		ROOM NUMBER
			FIRE EXTINGUISHER
			HANDRAILING
			EXISTING GRADE CONTOURS
			FINISH GRADE CONTOURS
			LOCATION COORDINATES
			ELEVATION
			SILT FENCE

EXISTING FEATURES

	OUTFALL SEWER
	FORCE MAIN
	WATER MAIN
	SANITARY SEWER
	STORM SEWER
	NATURAL GAS
	ELECTRIC CABLE
	TELEPHONE CABLE
	VALVE (V)
	MANHOLE (MH)
	CATCH BASIN (CB)
	HYDRANT (HYD)
	TEL. OR ELEC. PEDESTAL
	CULVERT
	UTILITY POLE
	LIGHT POLE
	SIGN
	MAILBOX
	BRUSH AND TREES
	DITCH, WATER EDGE
	FENCE
	PAVED ROADWAY
	UNPAVED ROADWAY
	VALVE MANHOLE
	PIPELINE TO BE ABANDONED IN PLACE
	PIPELINE TO BE REMOVED
	HORIZONTAL CONTROL POINT

GENERAL NOTES

- 1) DRAWINGS ARE SUBDIVIDED AND HAVE THE FOLLOWING PREFIXES TO THEIR NUMBERS ACCORDING TO CATEGORY:
- | | |
|------------------------|---------------------|
| G - GENERAL | I - INSTRUMENTATION |
| M - MECHANICAL | E - ELECTRICAL |
| W - WELL AND WELL PUMP | |
- 2) DRAWINGS FOR THIS PROJECT ARE NUMBERED AS FOLLOWS:
- | | |
|---------------------|-----------|
| GENERAL INFORMATION | 01 - 99 |
| WELL STATION NO. 3 | 300 - 399 |
- 3) SECTION AND DETAIL NUMBERING SYSTEM:
- (A) SECTION IS CUT ON DWG. G5
- (B) ON DWG. G6 THIS SECTION IS IDENTIFIED AS
- NOTE: DETAILS ARE IDENTIFIED BY LETTERS, SECTIONS BY NUMBERS. "VAR" INDICATES THE DETAIL APPEARS AT VARIOUS LOCATIONS.

ABBREVIATIONS

CL	CENTER LINE
PL	PROPERTY LINE
D	DIAMETER
A	ANGLE
AT	AT
BM	BENCH MARK
GV	GATE VALVE
BV	BUTTERFLY VALVE
RJ	RESTRAINED JOINT
BA	BEARING AREA
FV	FIELD VERIFY
RCP	REINFORCED CONCRETE PIPE
CMP	CORRUGATED METAL PIPE
CCP	CONCRETE CYLINDER PIPE
DIP	DUCTILE IRON PIPE
CTRS	CENTERS
TYP	TYPICAL
MIN	MINIMUM
ELEV	ELEVATION
INV	INVERT
DIA	DIAMETER
CSW	CONCRETE SIDEWALK
LF	LINEAL FEET
TOS	TOP OF SUPPORT

RECORD DRAWING
BY DAM DATE 5/21/98

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NO.	DATE	APPR	REVISION	NO.	DATE	APPR	REVISION	DRAWN RB	OAK CREEK WATER AND SEWER UTILITY WATER SYSTEM IMPROVEMENTS WELL STATION NO. 3 RENOVATION	GENERAL SYMBOLS AND ABBREVIATIONS	JOB E129-10.01	Kaempfer & Associates Inc. P.O. Box 150 650 E. Jackson St. Oconto Falls, Wisconsin 54154 Consulting Engineers (920) 846-3932	SHEET NO. 2
								DESIGNED CK			DATE: 5/21/98		DRAWING NO. 62
								CHECKED DAM					

EQUIPMENT PREFIXES - The following equipment prefixes will be used throughout the project.

- C = Contactor
- CMP = Metering Pump
- CV = Control Valve
- D = Damper
- EF = Exhaust Fan
- FIC = Flow Indicator Controller
- FL = Float or Level Switch
- IL = Instrument Loop
- LE = Level Element (Meter)
- LIT = Level Indicator Transmitter
- LMS = Limit Switch
- LS = Limit Switch
- M = Motor
- MCC = Motor Control Center
- MIE = Miscellaneous Instrumentation Equipment
- MME = Miscellaneous Mechanical Equipment
- P = Pump
- PDR = Process Data Recorder
- PLC = Programmable Logic Controller
- PNL = Panel
- PS = Pressure Switch
- SV = Solenoid Valve
- TFR = Transformer
- TS = Temperature Switch
- UH = Unit Heater
- ZZ = Actuator/Positioner

EQUIPMENT DESIGNATIONS

- 3000 STATION AREA GENERAL
- 3100 EQUIPMENT ROOM
- P3101 WELL PUMP WP-3
- M3101 WELL PUMP WP-3 MOTOR
- PS3101A PUMP RUN PRESSURE SWITCH
- PS3101B PUMP HIGH PRESSURE SWITCH
- FL3101 PRELUBE FAIL FLOW SWITCH
- SV3101 PRELUBE SOLENOID VALVE
- CV3105 AIR/VACUUM RELEASE VALVE
- CMP3110 HYPOCHLORITE METERING PUMP
- MME3111 HYPOCHLORITE STORAGE TANK SCALE
- CV3115 FLOW REGULATING VALVE
- CV3121 STORAGE CONTROL VALVE
- SV3121 PILOT CONTROL SOLENOID VALVE
- LMS3121A CLOSED INDICATION LIMIT SWITCH
- LMS 3121B OPEN INDICATION LIMIT SWITCH
- CV3122 RECOVERY CONTROL VALVE
- SV3122 PILOT CONTROL SOLENOID VALVE
- LMS3122A CLOSED INDICATION LIMIT SWITCH
- LMS 3122B OPEN INDICATION LIMIT SWITCH
- CV3123 WASTE CONTROL VALVE
- SV3123 PILOT CONTROL SOLENOID VALVE
- LMS3123A CLOSED INDICATION LIMIT SWITCH
- LMS3123B OPEN INDICATION LIMIT SWITCH

- EF3155 EXHAUST FAN
- TS3155 TEMPERATURE SWITCH
- D3155A INTAKE DAMPER
- UH3165 UNIT HEATER (EXISTING)
- TS3165 TEMPERATURE SWITCH (EXISTING)
- MCC3170 MOTOR CONTROL CENTER
- TFR3174 LIGHTING & POWER TRANSFORMER
- PNL3175 LIGHTING & POWER PANEL "A"
- C3180 HYPOCHLORITE METERING PUMP CONTACTOR
- C3185 VENTILATION CONTACTOR
- PNL3190 INSTRUMENT PANEL IP-1
- MIE3190 OPERATOR INTERFACE
- IL3191 WELL WATER LEVEL
- LE3191 LEVEL TRANSDUCER
- LIT3191 LEVEL INDICATOR TRANSMITTER
- IL3192 STATION FLOW
- FE3192 STATION FLOW METER
- FIT3192 STATION FLOW INDICATOR TRANSMITTER
- IL3193 STATION FLOW REGULATION
- FIC3193 FLOW INDICATOR CONTROLLER
- ZZ3193 VALVE POSITIONER
- IL3194 STATION FLOW CONTROL
- PLC3194 STATION FLOW CONTROL PLC
- PDR3194 STATION PROCESS DATA RECORDER
- TS3198 STATION LOW TEMPERATURE SWITCH
- LS3199 STATION FLOOD LEVEL SWITCH

PIPING SYSTEMS - The following piping systems will be used throughout the project.

- ED = Equipment Drain
- EV = Equipment Vent
- NG = Natural Gas
- PD = Process Drain
- PV = Process Vent
- PW = Potable Water
- SHS = Sodium Hypochlorite Solution
- STD = Storm Drain

DESIGN DATA

DESIGN FLOWS

STORAGE FLOW RATE, GPM	700
RECOVERY FLOW RATE, GPM	1050
WASTE FLOW RATE, GPM	1050

CHLORINATION SYSTEM

DESIGN DOSE, MGL	
AVERAGE	1.0
MAXIMUM	2.0
DESIGN FLOW, GPM	1050
FEED RATE, PPD (a)	
AVERAGE	12.5
MAXIMUM	25.0
FEED RATE, GPD (b)	
AVERAGE	10
MAXIMUM	20

(a) AS AVAILABLE CHLORINE
(b) USING 15% (TRADE PERCENT) SODIUM HYPOCHLORITE SOLUTION

WELL PUMP

CAPACITY, GPM	1050
TDH, FT	500
SETTING, FT	550
MOTOR SIZE, HP	250

FLOW METER

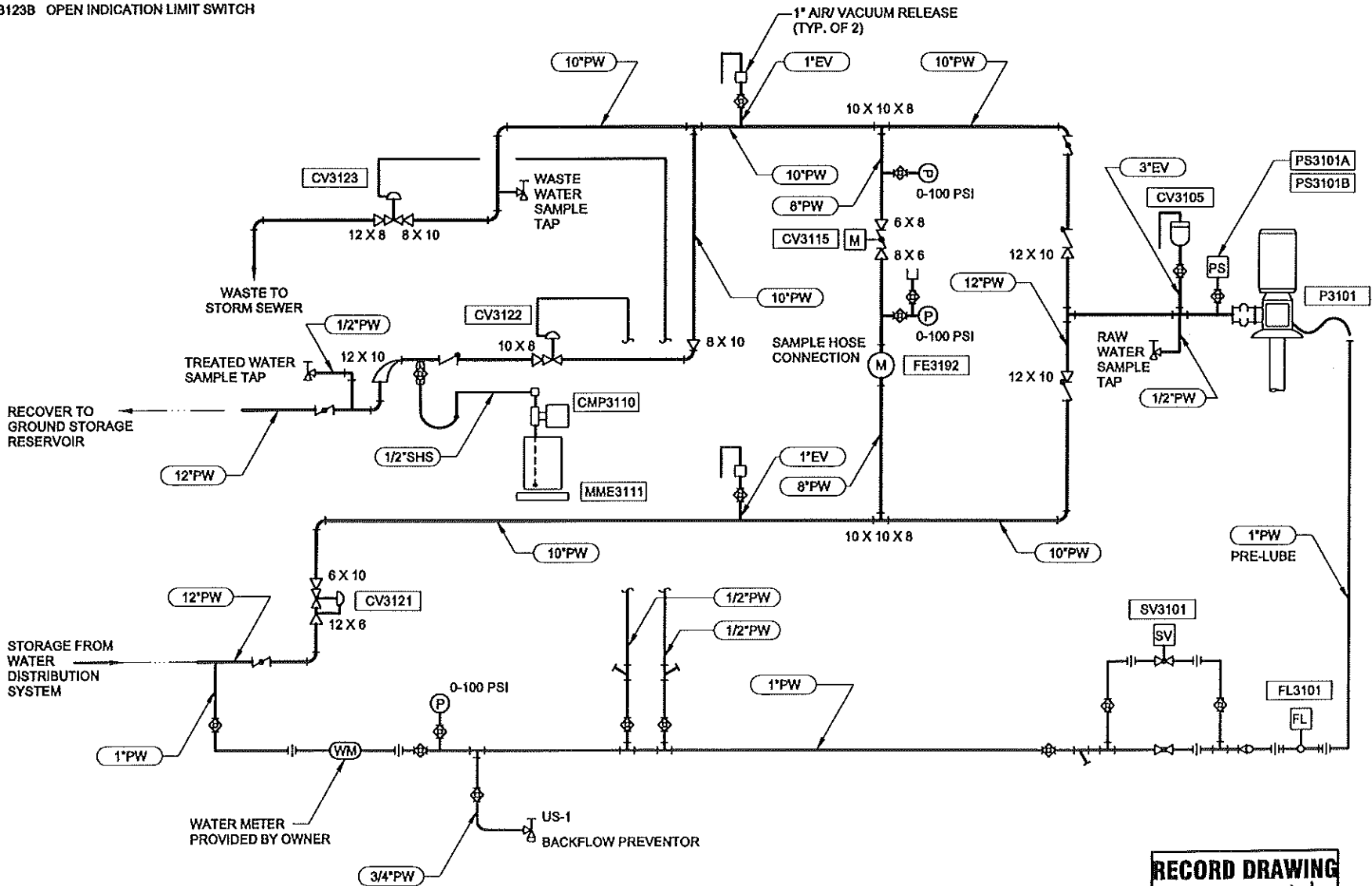
NUMBER	1
SIZE, INCHES	8
CAPACITY, GPM	2000

SODIUM HYPOCHLORITE METERING PUMP

NUMBER	1
CAPACITY, GPD	60
PRESSURE RATING, PSI	100

SODIUM HYPOCHLORITE SCALE

NUMBER	1
CAPACITY, LBS	400
ACCURACY, LBS	0.1

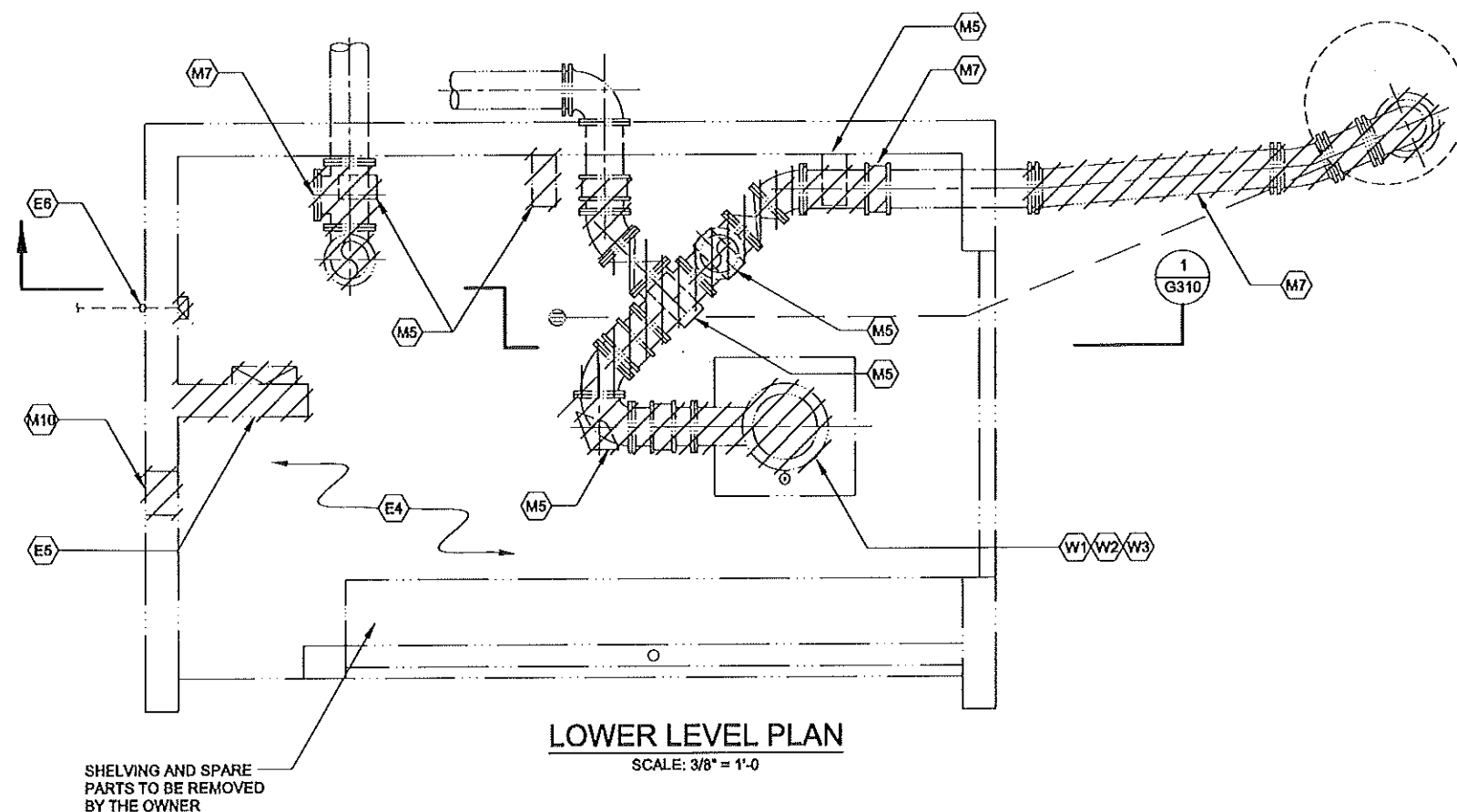
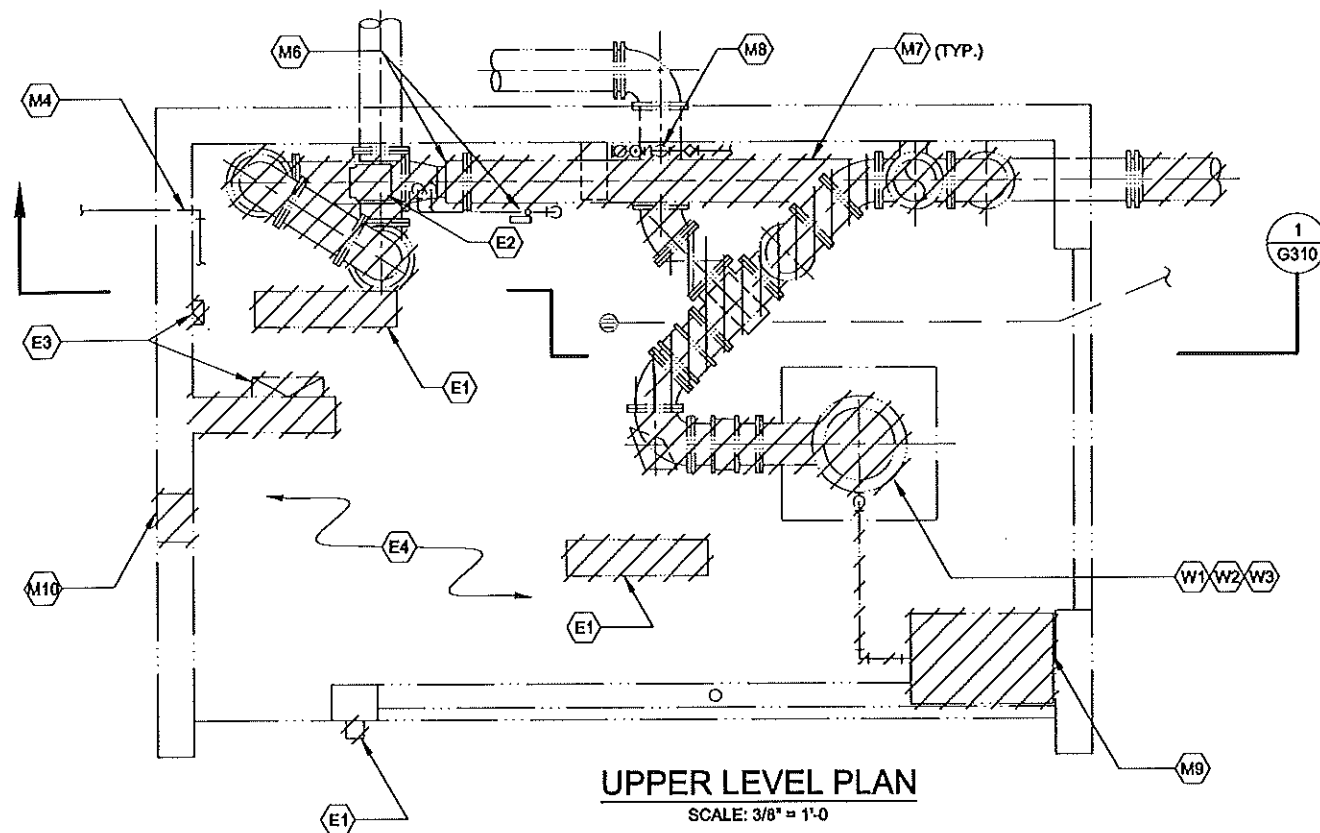


PROCESS PIPING SCHEMATIC

RECORD DRAWING
BY *DAM* DATE *1/21/99*

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NO.	DATE	APPR	REVISION	NO.	DATE	APPR	REVISION	DRAWN	RB	OAK CREEK WATER AND SEWER UTILITY WATER SYSTEM IMPROVEMENTS WELL STATION NO. 3 RENOVATION	PROCESS PIPING SCHEMATIC AND DESIGN DATA	JOB E129-10.01 DATE: 5/21/98	Kaempfer & Associates Inc. P.O. Box 150 850 E. Jackson St. Oconto Falls, Wisconsin 54154 Consulting Engineers (920) 848-3932	SHEET NO. 3 DRAWING NO. 63
								DESIGNED	CK					
								CHECKED	DAM					



NOTES:

1. WORK ITEMS ARE AS INDICATED:

- (W) WELL AND WELL PUMP CONTRACTOR
- (M) MECHANICAL CONTRACTOR
- (E) ELECTRICAL CONTRACTOR

MECHANICAL WORK ITEMS

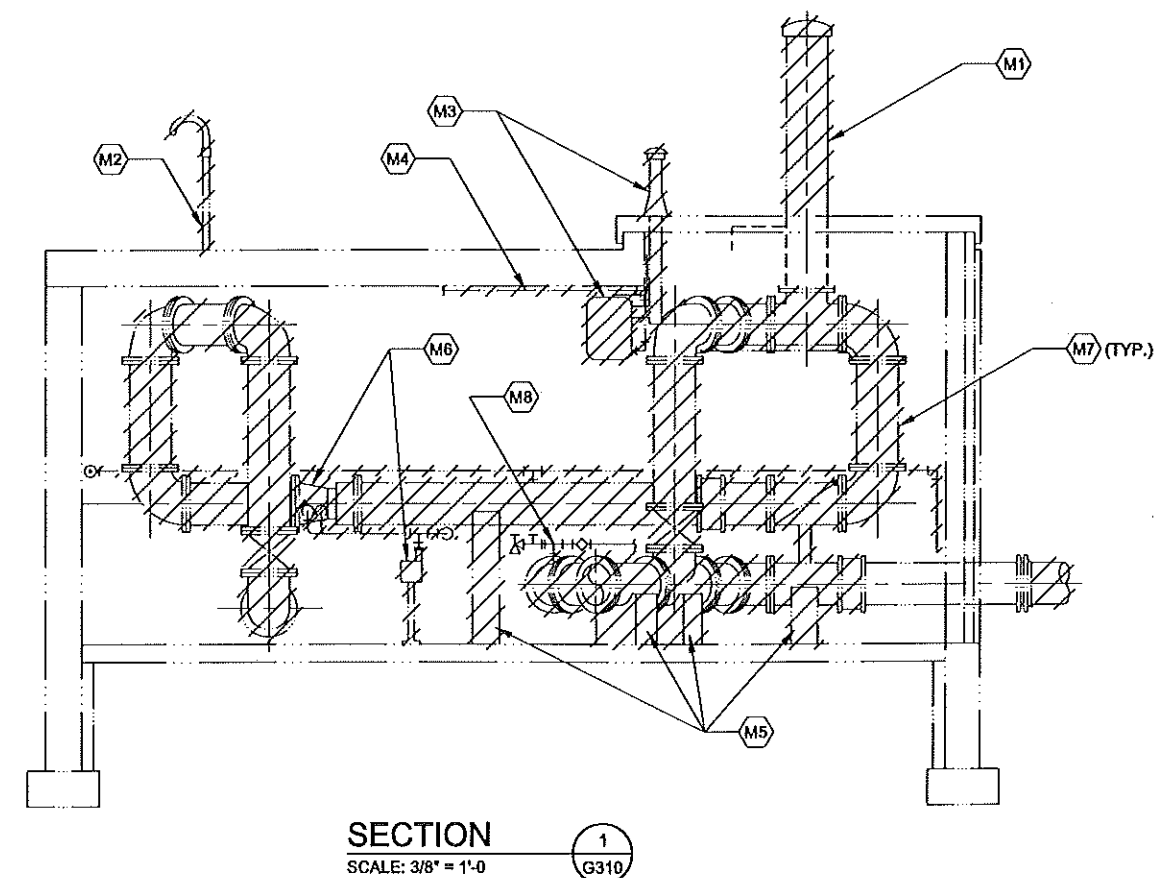
- (M1) REMOVE 12" VENT LINE TO WITHIN 6" OF THE ROOF. DISCONNECT 2" VENT LINE DRAIN. CAP 2" VENT LINE DRAIN 3" ABOVE ROOF.
- (M2) REMOVE 2" VENT LINE. PATCH HOLE IN WALL.
- (M3) REMOVE NATURAL GAS UNIT HEATER. CAP COMBUSTION GAS VENT ABOVE ROOF.
- (M4) REMOVE NATURAL GAS PIPELINE. CAP AT WALL.
- (M5) REMOVE CONCRETE PIPE SUPPORTS.
- (M6) DISCONNECT AND REMOVE VENTURI FLOW METER AND TRANSMITTER.
- (M7) REMOVE PIPING, VALVES AND FITTINGS UP TO JOINT CLOSEST TO WALL.
- (M8) REMOVE INTERIOR WATER SERVICE PIPING. PLUG 3/4" TAP ON 12" PIPELINE.
- (M9) REMOVE STEEL TANK AND PIPING.
- (M10) PROVIDE 16" SQ. HOLE FOR LOUVER AND DAMPER 8'-0" ABOVE FLOOR.

WELL AND WELL PUMP WORK ITEMS

- (W1) DISCONNECT AND REMOVE WELL PUMP MOTOR.
- (W2) DISCONNECT AND REMOVE WELL PUMP ASSEMBLY.
- (W3) PROVIDE 24"Ø STL. PLATE TO SEAL WELL CASING DURING CONSTRUCTION.

ELECTRICAL WORK ITEMS

- (E1) REMOVE LIGHT FIXTURES (3)
- (E2) REMOVE ELECTRIC UNIT HEATER (1)
- (E3) REMOVE WIREWAY & WELL PUMP DISCONNECT
- (E4) REMOVE INTERIOR CONDUIT, WIRE, OUTLETS, SWITCHES, BOXES & PANEL BOARD THROUGHOUT STATION
- (E5) REMOVE CONCRETE BLOCKWALL TO ACCOMMODATE INSTALLATION OF MOTOR CONTROL CENTER
- (E6) DISCONNECT CONDUCTORS FOR WELL PUMP MOTOR AND SINGLE PHASE POWER AT MCC IN AUSTIN ST. BOOSTER PUMP STATION. CONDUIT SHALL BE ABANDONED-IN-PLACE.

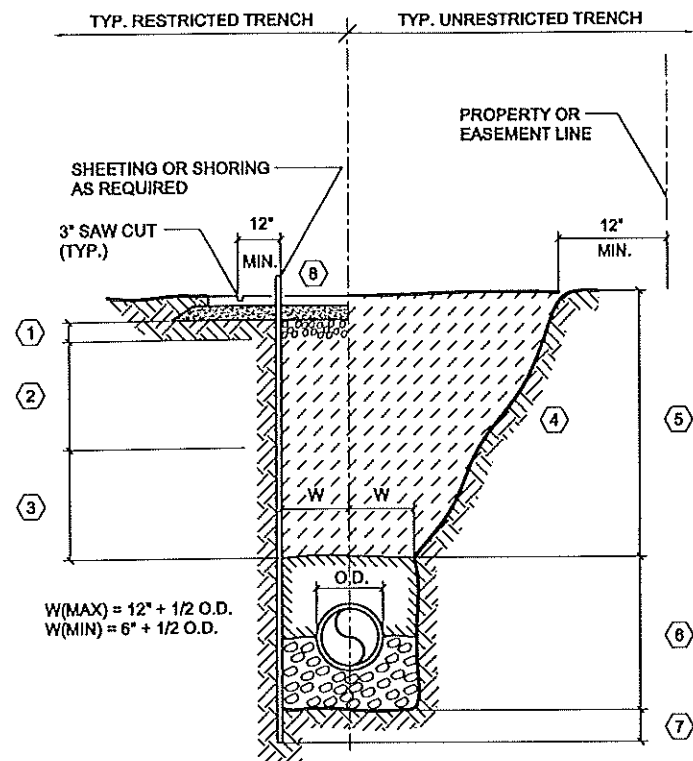


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BY DAM DATE 9/21/97

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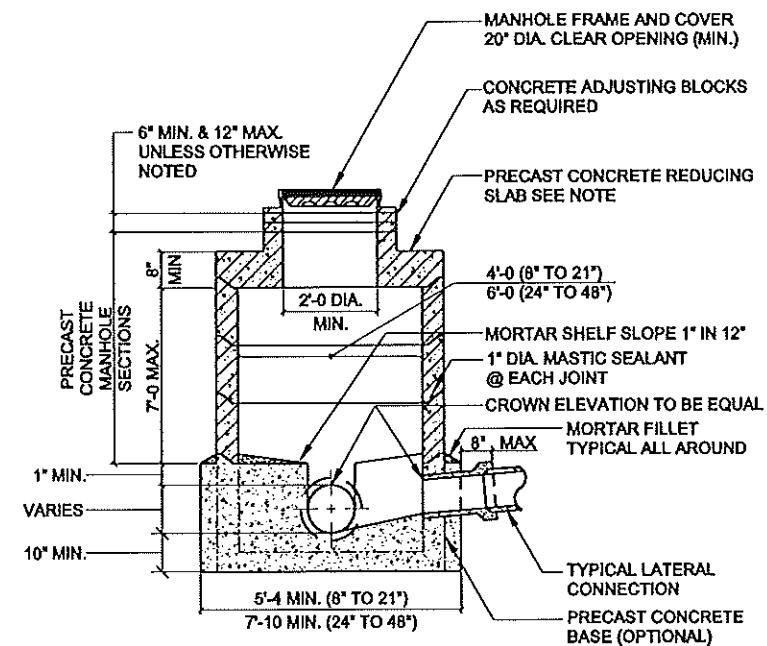
NO.	DATE	APPR	REVISION	NO.	DATE	APPR	REVISION	DRAWN	TAS	OAK CREEK WATER AND SEWER UTILITY	JOB	SHEET NO.
								DESIGNED	CK	WATER SYSTEM IMPROVEMENTS	E129-10.01	5
								CHECKED	DAM	WELL STATION NO. 3 RENOVATION	DATE: 5/21/98	6310
										DEMOLITION PLAN	P.O. Box 150 850 E. Jackson St. Oconomowoc Falls, Wisconsin 54154	Consulting Engineers (920) 846-3932

Kaempfer & Associates Inc.



TYPICAL TRENCH SECTION

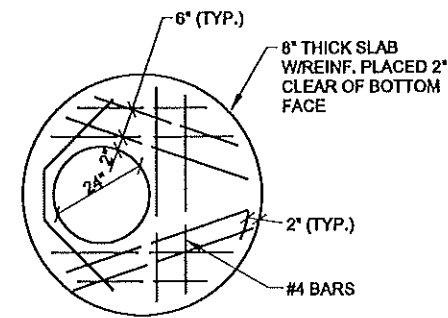
DETAIL A
NTS VAR.



NOTE: POSITION HOLE IN REDUCING SLAB ON UPSTREAM SIDE OF MANHOLE.

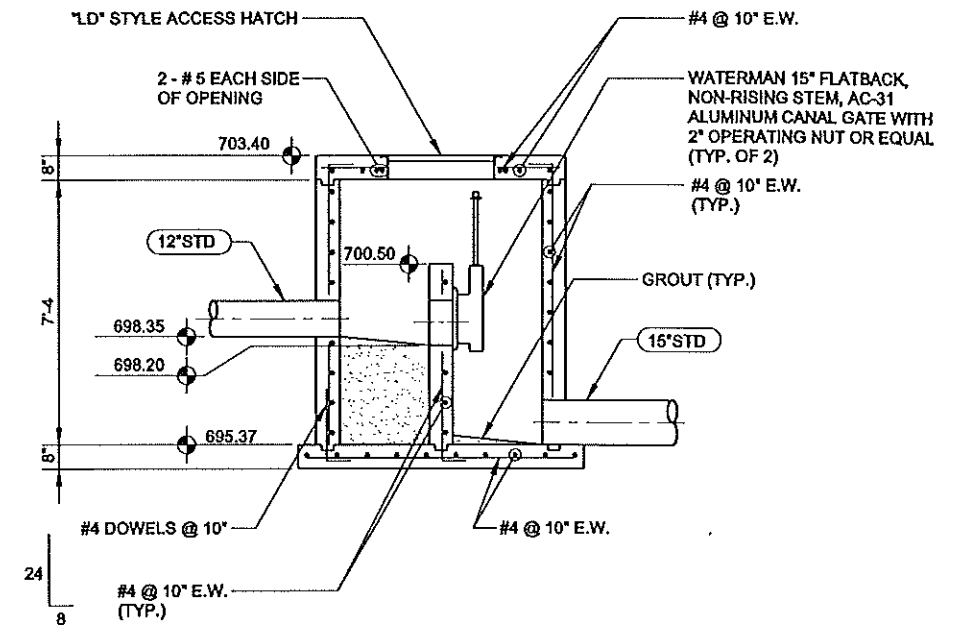
LOW HEADROOM MANHOLE 8" TO 48" (INCLUSIVE)

DETAIL C
NTS VAR.

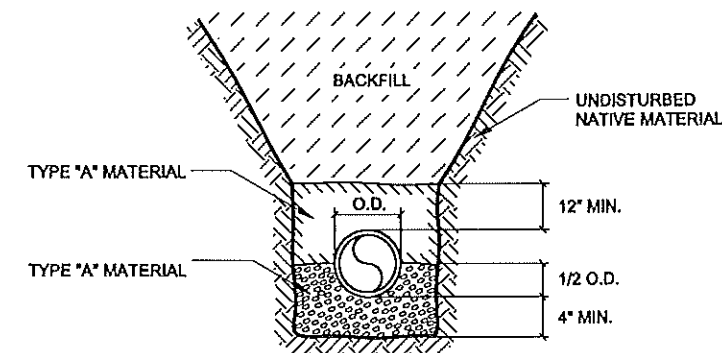


48" TO 24" REDUCING SLAB

DETAIL E
NTS VAR.

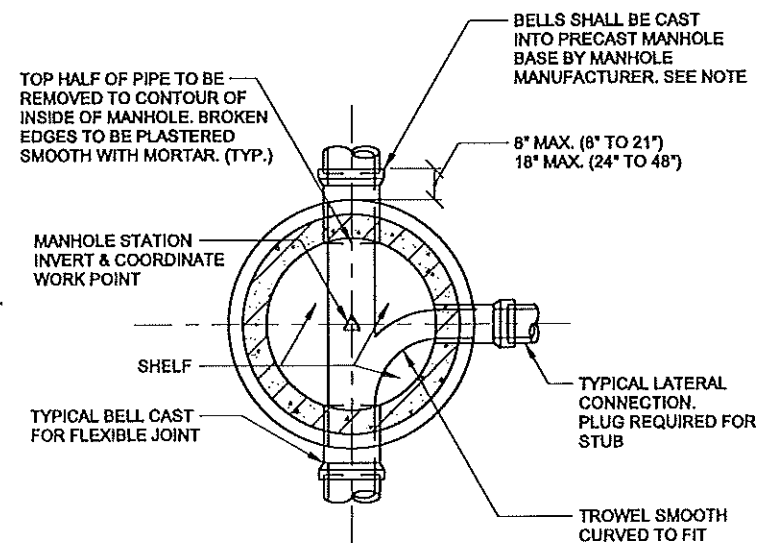


SECTION 1
SCALE: 3/8" = 1'-0" M1



CLASS "E" BEDDING

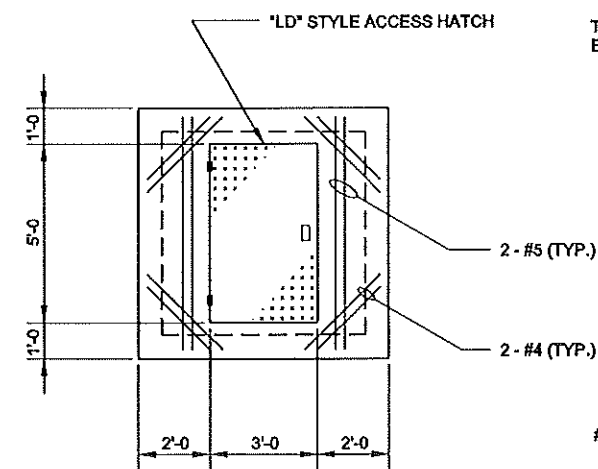
DETAIL B
NTS VAR.



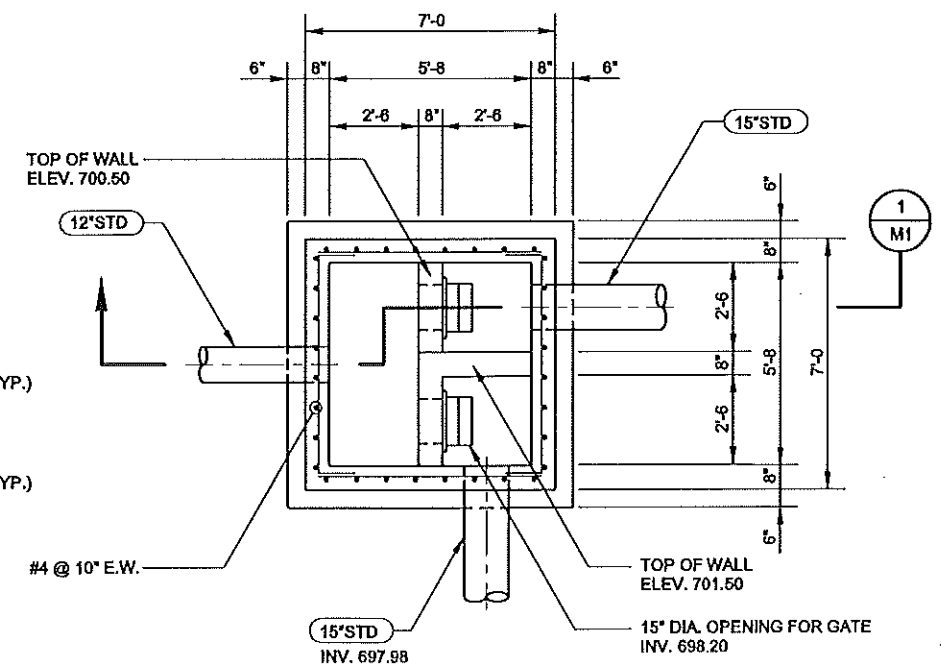
NOTE: PROVIDE AN APPROVED FLEXIBLE JOINT FOR PVC PIPE.

TYPICAL BASE PLAN 8" TO 48" (INCLUSIVE)

DETAIL D
NTS VAR.



TOP PLAN



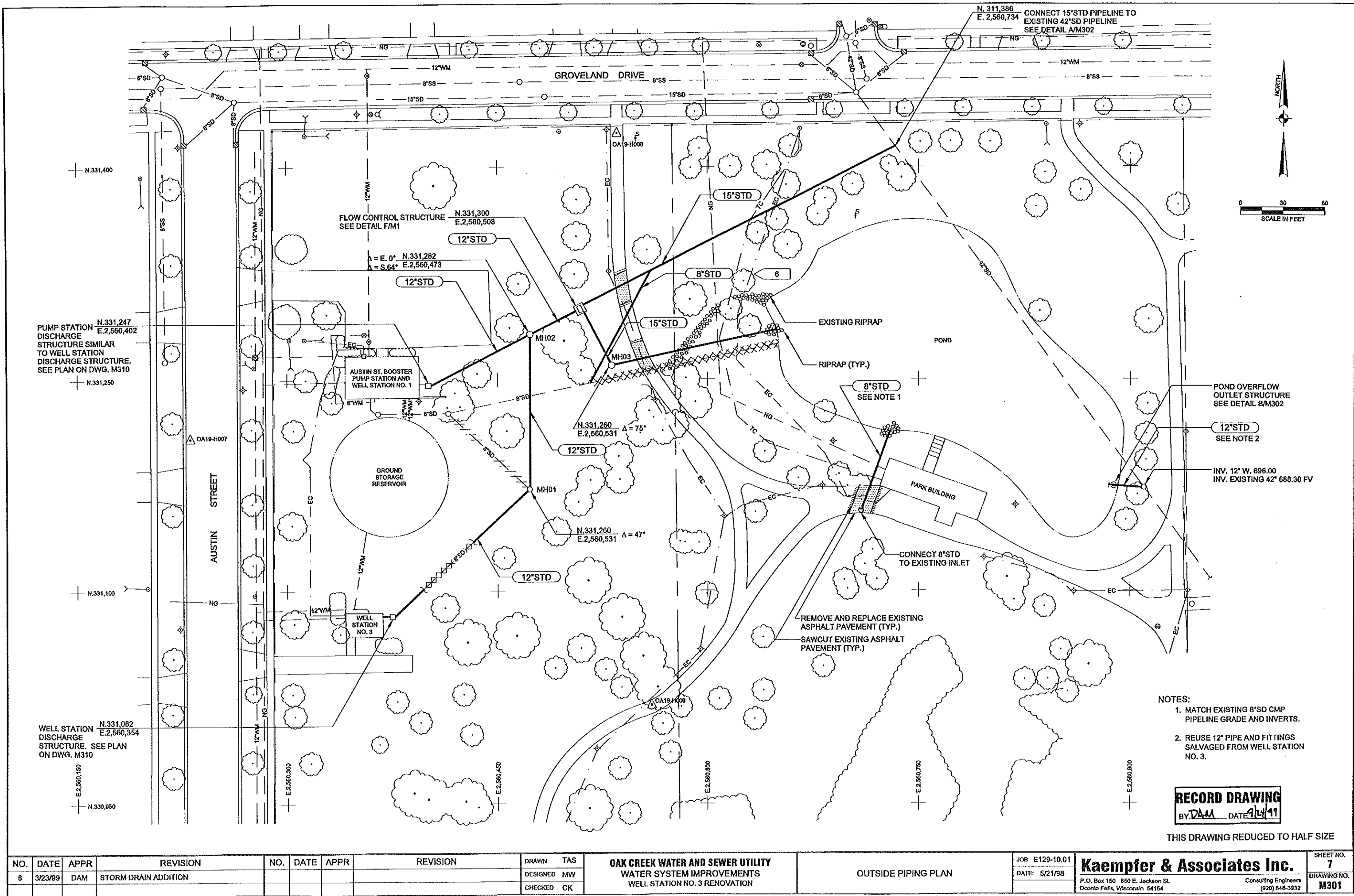
BASE PLAN

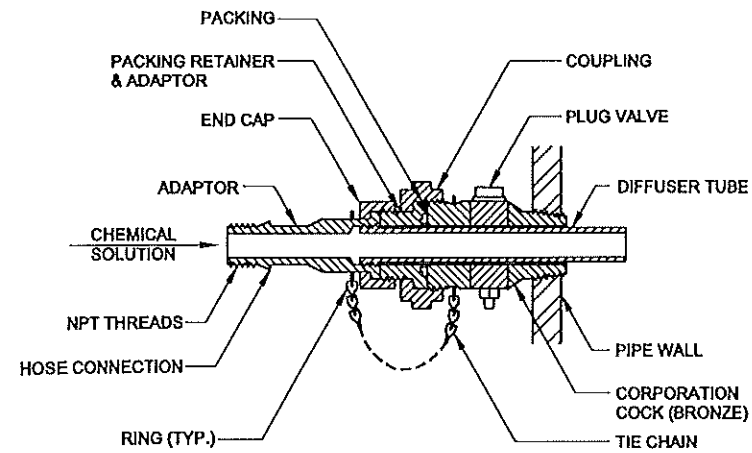
FLOW CONTROL STRUCTURE

DETAIL F
SCALE: 3/8" = 1'-0" VAR.

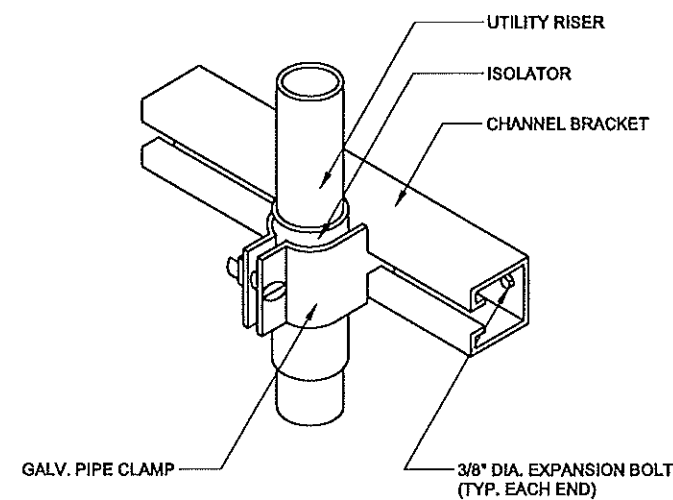
RECORD DRAWING
BY: DAM DATE: 9/2/99

NO.	DATE	APPR	REVISION	NO.	DATE	APPR	REVISION	DRAWN	JS	OAK CREEK WATER AND SEWER UTILITY	JOB	SHEET NO.
								DESIGNED	CK	WATER SYSTEM IMPROVEMENTS	E113-10.01	6
								CHECKED	DAM	WELL STATION NO. 3 RENOVATION	DATE: 5/21/98	M1
										MECHANICAL DETAILS	Kaempfer & Associates Inc.	
											P.O. Box 150 850 E. Jackson St. Oconomowoc, WI 53154	
											Consulting Engineers (920) 846-3932	

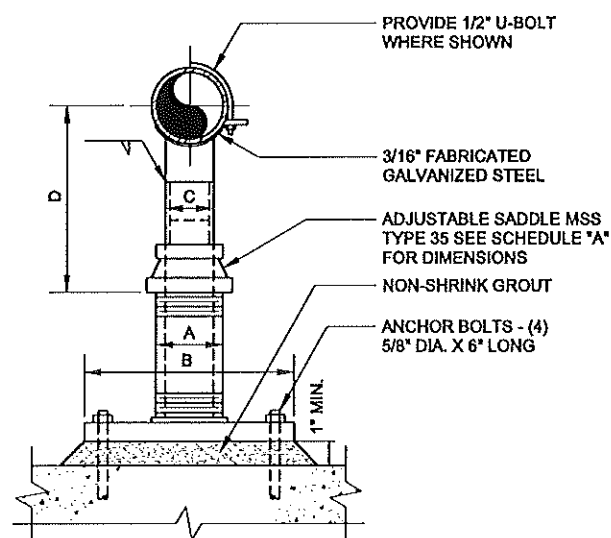




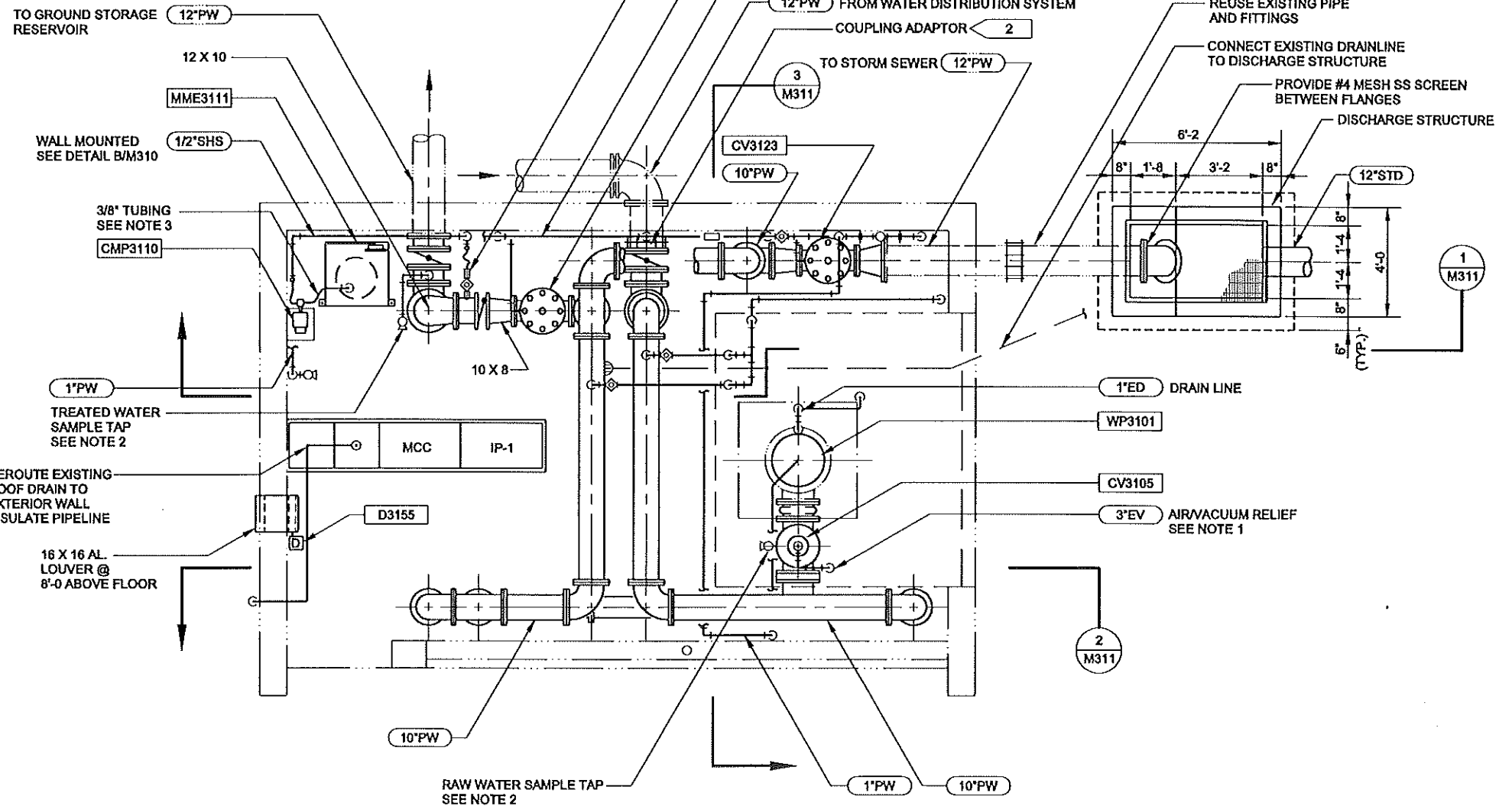
DETAIL A
NTS



DETAIL B
NTS



DETAIL C
NTS



PLAN
SCALE: 3/8\"/>

SCHEDULE A

ADJUSTABLE PIPE SADDLE DIMENSIONS IN INCHES

PIPE SIZE	A	B	C	MIN. D	MAX.
2-1/2	2-1/2	9	1-1/2	8	13
3	2-1/2	9	1-1/2	8-1/4	13-1/4
4	2-1/2	9	1-1/2	9-1/8	14-1/8
5	2-1/2	9	1-1/2	9-5/8	14-5/8
6	3	9	2-1/2	10-1/4	15-1/4
8	3	9	2-1/2	11-1/4	16-1/4
10	3	9	2-1/2	12-3/8	17-3/8
12	3	9	2-1/2	13-3/8	18-3/8
14	4	12	3	16-1/4	20-3/4
16	4	12	3	17-3/4	22-1/4

NOTES:

1. PROVIDE A 24 MESH STAINLESS STEEL SCREEN AT THE END OF THE WELL VENT AND THE AIR/VACUUM RELIEF DISCHARGE PIPING.
2. SMOOTH END SAMPLE TAP SHALL BE CHICAGO FAUCET NO. 4 OR EQUAL.
3. SUCTION AND DISCHARGE TUBING FURNISHED WITH SODIUM HYPOCHLORITE FEED PUMP.

RECORD DRAWING
BY: *[Signature]* DATE: *[Date]*

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NO.	DATE	APPR	REVISION	NO.	DATE	APPR	REVISION	DRAWN	TAS
2	11/4/98	DAM	ADD COUPLING ADAPTOR					DESIGNED	CK
								CHECKED	DAM

OAK CREEK WATER AND SEWER UTILITY
WATER SYSTEM IMPROVEMENTS
WELL STATION NO. 3 RENOVATION

MECHANICAL PLAN AND DETAILS

JOB E129-10.01
DATE: 5/21/98

Kaempfer & Associates Inc.
P.O. Box 150 650 E. Jackson St.
Oconomowoc, Wisconsin 54154
Consulting Engineers
(920) 846-3932

SHEET NO. 9
DRAWING NO. M310

YEAR CONSTRUCTED	1958	
CONTRACTOR	LAYNE-NORTHWEST CO.	
METHOD	CABLE TOOL	
STATIC WATER LEVEL	1958	189.5 FT.
	1996	322.0 FT.
SPECIFIC CAPACITY	1958	7.1 GPM/FT.
	1996	11.7 GPM/FT.



WORK ITEMS	QUANTITY	UNIT	NOTE
MOBILIZE WELL PUMP SERVICE EQUIPMENT	1	EA	
SHOCK CHLORINATE WELL	1	EA	
REMOVE WELL PUMP ASSEMBLY AND APPURTENANCES	1	EA	
DEMobilize WELL PUMP SERVICE EQUIPMENT	1	EA	
MOBILIZE WELL SERVICE EQUIPMENT	1	EA	
CONDUCT CASING PRESSURE TEST	1	EA	
SOUND WELL	1	EA	
BRUSH CASING AND BORE HOLE	1	EA	
PERFORM WELL MAINTENANCE BLASTING	1	EA	
SOUND WELL	1	EA	
DRILL AND BAIL	0	HRS	
TELEVIEW WELL	1	EA	
CONDUCT CALIPER TEST	1	EA	
CONDUCT PLUMBNESS TEST	1	EA	
CONDUCT ALIGNMENT TEST	1	EA	
CONDUCT GEOPHYSICAL LOGGING TESTS	1	EA	C
MOBILIZE WELL PERFORMANCE TEST PUMP EQUIPMENT	1	EA	
CONDUCT PRELIMINARY WELL TEST PUMPING	8	HRS	
CONDUCT WELL PERFORMANCE TEST	24	HRS	
CONDUCT GEOPHYSICAL LOGGING TESTS	1	EA	D
DEMobilize WELL PERFORMANCE TEST PUMP EQUIPMENT	1	EA	
TELEVIEW WELL	1	EA	
DEMobilize WELL SERVICE EQUIPMENT	1	EA	
MOBILIZE WELL PUMP SERVICE EQUIPMENT	1	EA	
FURNISH COLUMN ASSEMBLY AND AIRLINE	550	LF	A
FURNISH SUCTION PIPE AND STRAINER	1	EA	A
FURNISH WATER LEVEL MONITORING SYSTEM	1	EA	A
PROVIDE STUFFING BOX AND PACKING	1	EA	
INSTALL WELL PUMP ASSEMBLY, WATER LEVEL MONITORING SYSTEM, AND APPURTENANCES	1	EA	E
SHOCK CHLORINATE WELL	1	EA	
CONDUCT WELL PUMP FIELD TEST	1	EA	
CONDUCT WELL PERFORMANCE TEST	24	HRS	B
DEMobilize WELL PUMP SERVICE EQUIPMENT	1	EA	

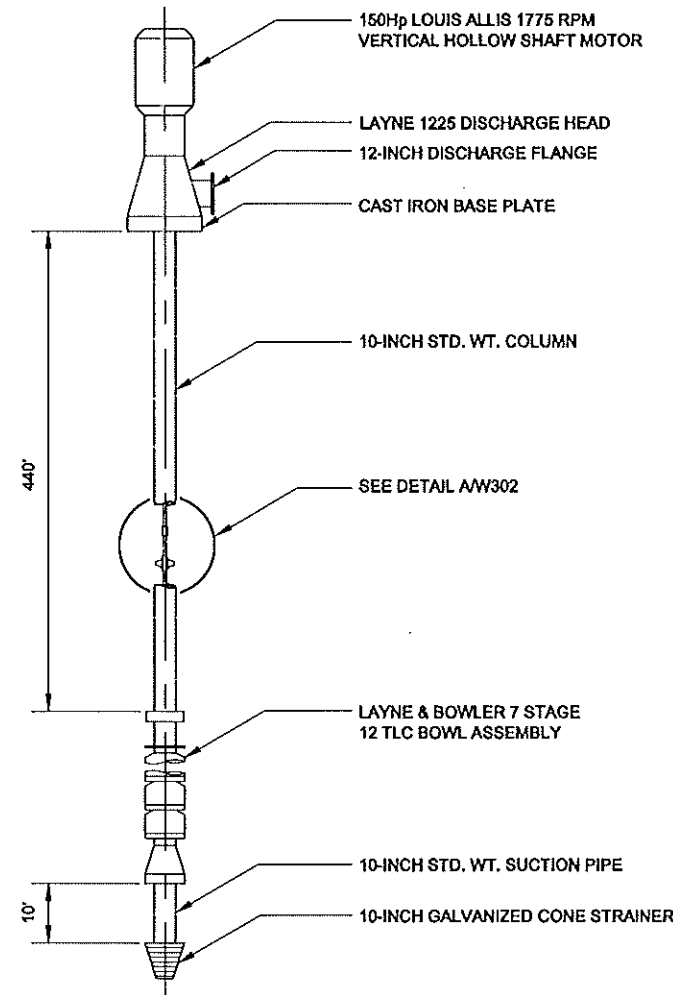
WORK ITEMS	QUANTITY	UNIT	NOTES
FURNISH 12" WELL PUMP BOWL ASSEMBLY	1	EA	A

- A. SEE NEW EQUIPMENT DATA.
- B. USE WELL PUMP TO CONDUCT WELL PERFORMANCE TEST, UNLESS AUTHORIZED OTHERWISE.
- C. GEOPHYSICAL LOGGING TESTS TO BE PERFORMED UNDER NON-PUMPING CONDITIONS.
- D. GEOPHYSICAL LOGGING TESTS TO BE PERFORMED UNDER PUMPING CONDITIONS.
- E. MODIFY EXISTING DISCHARGE HEAD TO ACCOMMODATE NEW MOTOR, COLUMN PIPE, AND SHAFTING.

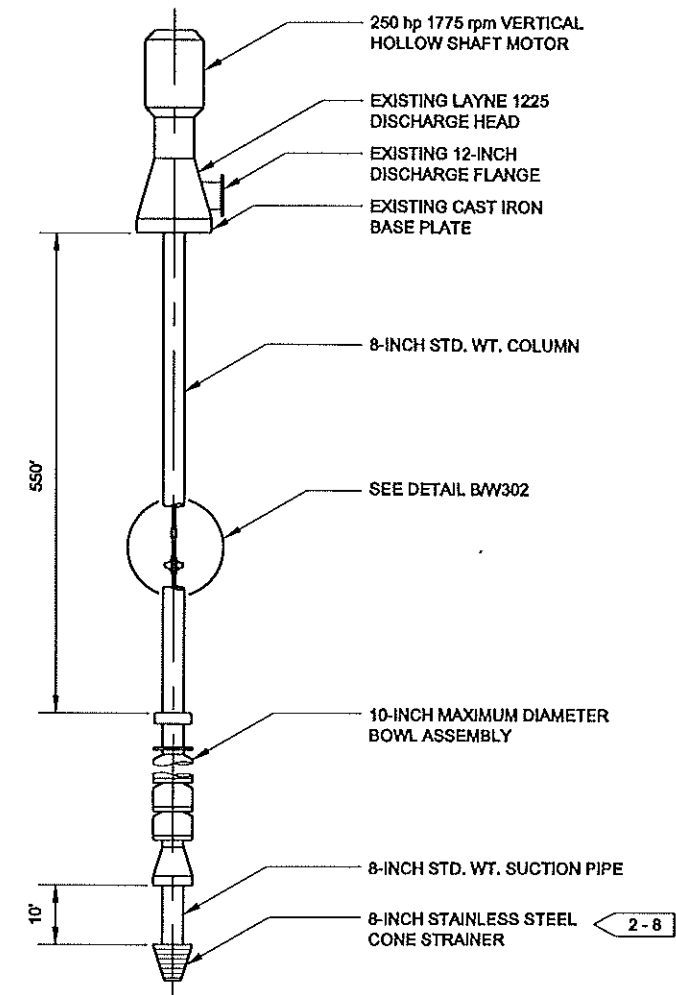
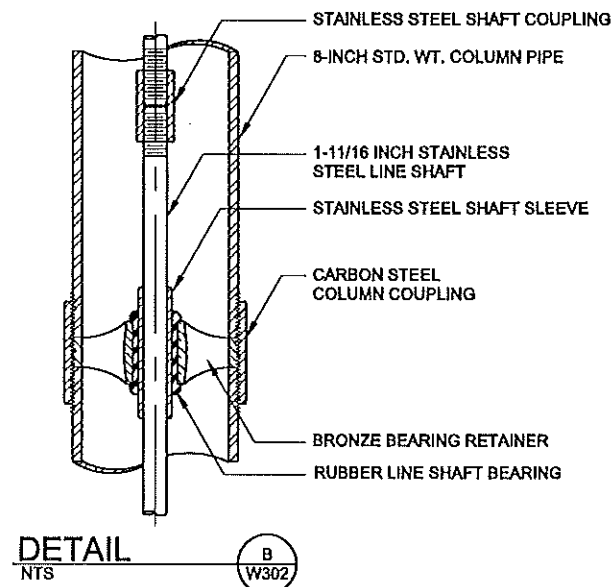
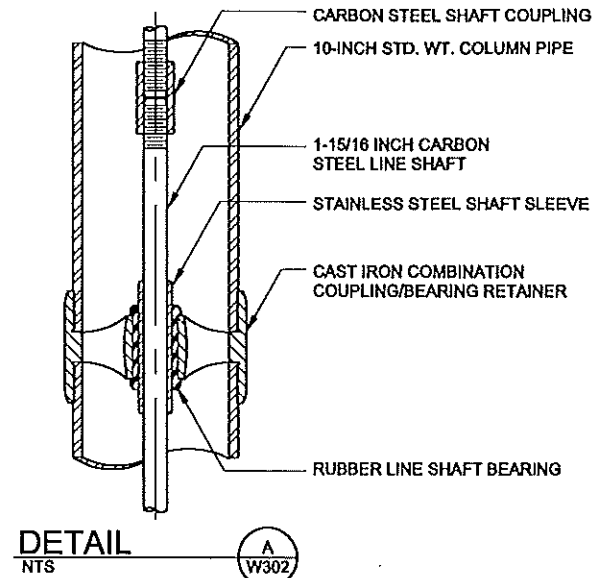
RECORD DRAWING
BY CK DATE 6/22/00

THIS DRAWING REDUCED TO HALF SIZE

NO.	DATE	APPR	REVISION	NO.	DATE	APPR	REVISION	DRAWN	RB	OAX CREEK WATER AND SEWER UTILITY WATER SYSTEM IMPROVEMENTS WELL STATION NO. 3 RENOVATION	WELL DETAILS AND WORK ITEM SCHEDULE	JOB E-129-10.01	Kaempfer & Associates Inc. P.O. Box 150 650 E. Jackson St. Oconto Falls, Wisconsin 54154 Consulting Engineers (920) 848-3932	SHEET NO. 11
								DESIGNED	OK			DATE: 5/21/98		DRAWING NO. W301
								CHECKED	DAM					



EXISTING CONSTRUCTION
WELL PUMP NO. 3
NTS



PROPOSED CONSTRUCTION
WELL PUMP NO. 3
NTS

NEW EQUIPMENT DESIGN DATA WELL PUMP NO. 3

BOWL ASSEMBLY

	OPERATING POINT		
	1	DESIGN	2
CAPACITY, GPM	900	1050	1200
TDH, FEET	528	500	444
MINIMUM EFFICIENCY, %	79	81	81

COLUMN ASSEMBLY

SETTING, FEET	550
COLUMN SIZE, INCHES	8
LINE SHAFT SIZE, INCHES	1-11/16
SHAFT SLEEVES	YES
AIRLINE	YES

SUCTION PIPE

SIZE, INCHES	8
LENGTH, FEET	10
STRAINER	YES

MOTOR

SIZE, hp	250
SPEED, rpm	1775
TYPE	E
NON-REVERSE RATCHET	YES

WATER LEVEL MONITORING SYSTEM

TRANSDUCER AND CABLE	YES
METER/ CONTROLLER	YES

DISCHARGE HEAD (OPTIONAL WORK ITEM)

DISCHARGE FLANGE SIZE, INCHES	12
COLUMN CONNECTION SIZE, INCHES	8
BASE PLATE	YES

2-9 NOTE: PROVIDE A 1-INCH DIAMETER SCH. 40 PVC PIPE FROM THE DISCHARGE HEAD TO THE TOP OF THE BOWL ASSEMBLY. PIPE SHALL BE STRAPPED TO THE COLUMN AT 10 FOOT INTERVALS. PERFORATE THE TOP OF THE PIPE WITH FOUR 1/4-INCH DIAMETER HOLES. PROVIDE A STEEL NIPPLE WITH CAP THROUGH THE DISCHARGE HEAD.

RECORD DRAWING
BY: DAM DATE: 9/24/99

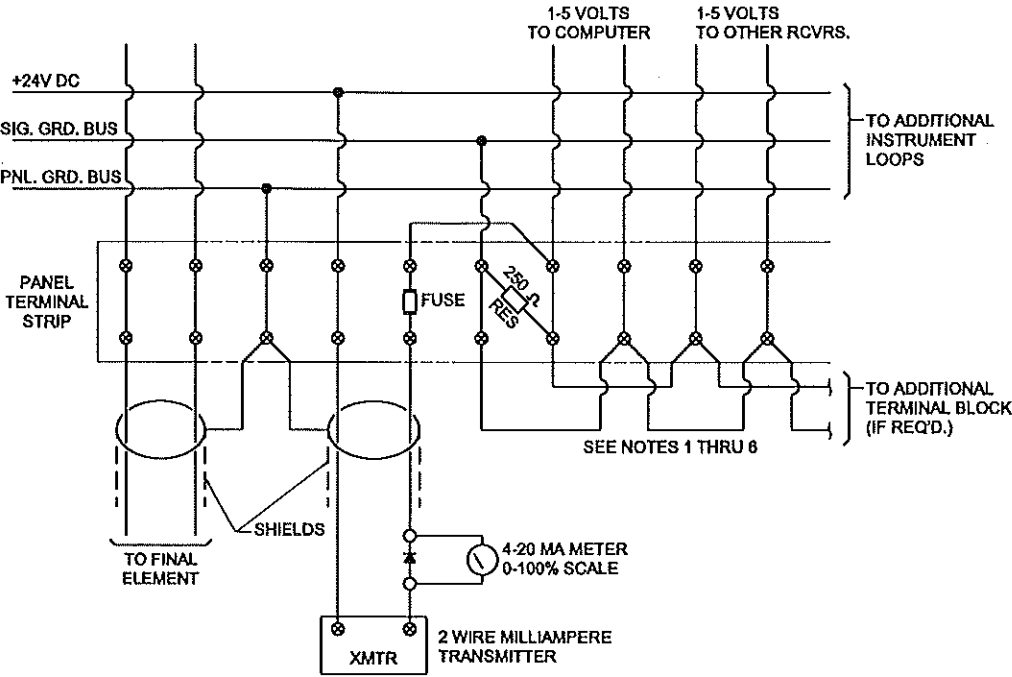
THIS DRAWING REDUCED TO HALF SIZE

NO.	DATE	APPR	REVISION	NO.	DATE	APPR	REVISION	DRAWN	RB	OAK CREEK WATER AND SEWER UTILITY WATER SYSTEM IMPROVEMENTS WELL STATION NO. 3 RENOVATION	WELL PUMP DETAILS AND DESIGN DATA	JOB E129-10.01	Kaempfer & Associates Inc. P.O. Box 150 650 E. Jackson St. Oconto Falls, Wisconsin 54154 Consulting Engineers (920) 848-3932	SHEET NO. 12
2	7/6/98	CK	ADDENDUM NO. 2, ITEM NO. 8, 9					DESIGNED	CK			DATE: 5/21/98		DRAWING NO. W302
								CHECKED	DAM					

INSTRUMENTATION LEGEND

FIRST LETTER		SUCCEEDING LETTERS	
MEASURED OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION
A ANALYSIS	DIFFERENTIAL	ALARM	CONTROL STATION
B BURNER		BURNER	
C CONDUCTIVITY (ELEC.)		CONTROLLER	
D DENSITY, SPECIFIC GRAVITY			
DO DISSOLVED OXYGEN	RATIO (FUNCTION)	ELEMENT (PRIMARY)	
E VOLTAGE (EMF)		GLASS	
F FLOW RATE		INDICATOR	
G GAGING (DIMENSIONAL)			
H HAND (MANUAL IMITATION)	HIGH	ORIFICE (RESTRICTION)	
I CURRENT (ELEC.)		POINT (TEST CONNECTION)	
J POWER			
K TIME, TIME SCHEDULE		RECORDER	
L LEVEL	LOW	SWITCH	TRANSMITTER
M MOISTURE, HUMIDITY		MULTIFUNCTION	
N VIBRATION		VALVE, DAMPER, LOUVER	
O USERS CHOICE (a)			
P PRESSURE, VACUUM	INTEGRATE, TOTALIZE	WELL	RELAY, COMPUTING DEVICE
Q QUANTITY, EVENT		UNCLASSIFIED	
R SPEED, FREQUENCY		DRIVE, ACTUATE	
S TEMPERATURE			
T MULTIVARIABLE	SAFETY		
U VISCOSITY			
V WEIGHT, FORCE			
X UNCLASSIFIED			
Y TURBIDITY			
Z POSITION			

(a) USE DEFINED ADJACENT TO SYMBOL

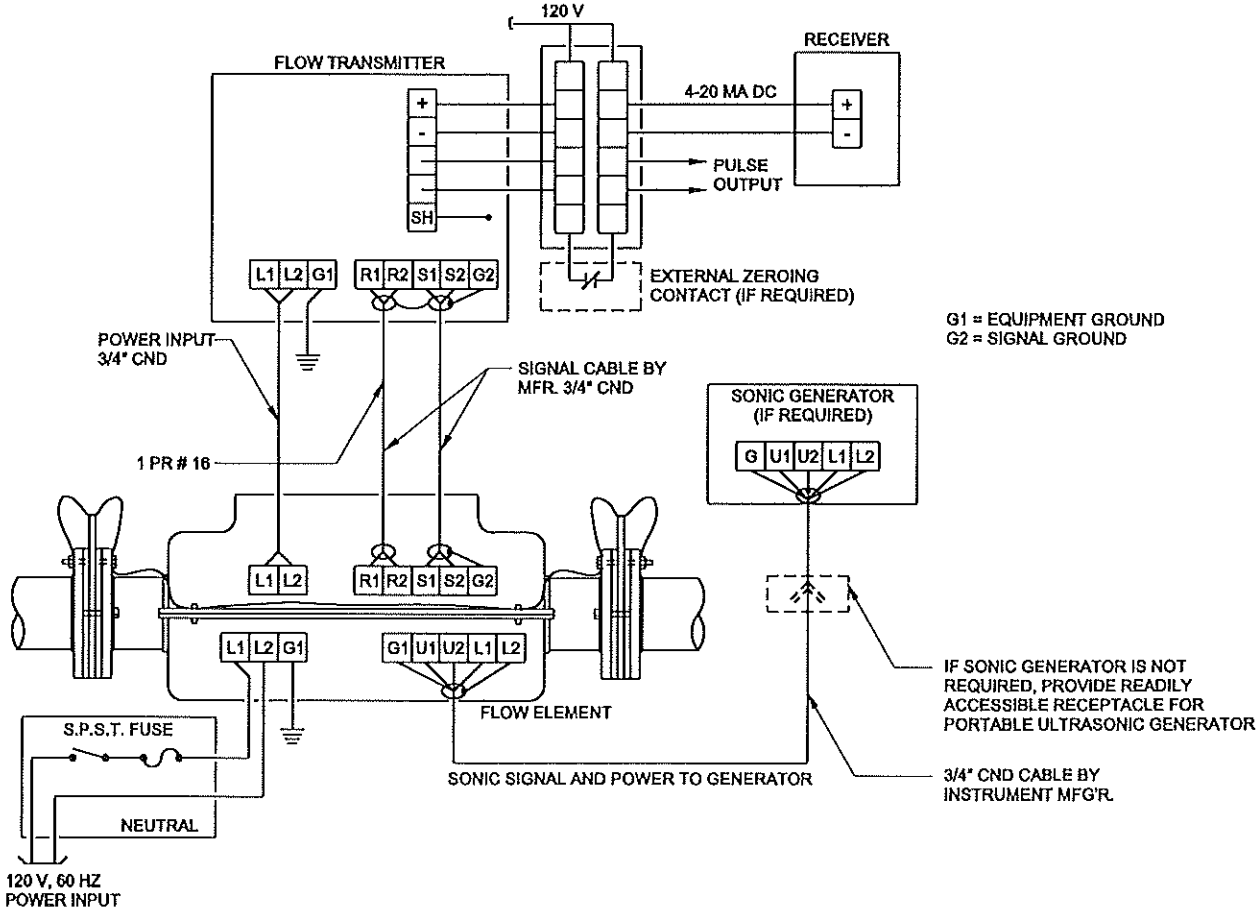


- NOTES:
1. ALL SIGNAL LINES SHALL BE CARRIED TO PANEL TERMINAL BLOCKS. DO NOT LOOP FROM INSTRUMENT TO INSTRUMENT.
 2. MAXIMUM NUMBER OF WIRES PER TERMINAL SHALL BE TWO.
 3. SUFFICIENT TERMINALS SHALL BE PROVIDED TO PERMIT ADDING AT LEAST ONE INSTRUMENT TO EACH LOOP.
 4. TERMINALS FOR CONNECTION OF FIELD WIRING SHALL HAVE NO PANEL WIRING.
 5. EACH LOOP SHALL BE BONDED TO SIGNAL GROUND BUS SEPARATELY.
 6. BOND SIGNAL GROUND BUS AT ONE POINT ONLY.

INSTRUMENTATION ABBREVIATIONS AND SYMBOLS

	INSTRUMENT		INTERLOCK WITH ELECTRICAL CONTROLS
	INSTRUMENT MOUNTED IN FIELD		HIGHEST VALUE SELECTION
	ITEM IDENTIFICATION FRONT MOUNTED PANEL INSTRUMENT CONTROL BOARD SYMBOL		LOWEST VALUE SELECTION
	ITEM IDENTIFICATION REAR MOUNTED PANEL INSTRUMENT CONTROL BOARD SYMBOL		EXTRACT SQUARE ROOT
	CONNECTION TO PROCESS OR INSTRUMENT AIR SUPPLY		ADD
	VOLTAGE SIGNAL		SUBTRACT
	MILLIAMPERE SIGNAL		MULTIPLY
	PULSE SIGNAL		DIVIDE
	MECHANICAL CONNECTION		CHARACTERIZE
	120V AC SUPPLY		PROPORTIONAL CONTROL ACTION
	INSTRUMENT POWER SUPPLY (OTHER THAN 120V AC)		INTEGRAL CONTROL ACTION
	PRESSURE TAP		DERIVATIVE CONTROL ACTION
	MAGNETIC FLOW METER		AVERAGE
	NEEDLE VALVE		CURRENT TO CURRENT, BOOST TO ISOLATE
	3 WAY SOLENOID VALVE		PULSE SIGNAL TO CURRENT
	BUTTERFLY VALVE		VOLTAGE TO CURRENT
			DIFFERENTIAL PRESSURE
			SET POINT
			ANNUNCIATOR POINT
			HYDRAULICALLY OPERATED DIAPHRAGM ACTUATED VALVE
			MOTOR OPERATED VALVE

TYPICAL ELECTRONIC INSTRUMENT LOOP WIRING

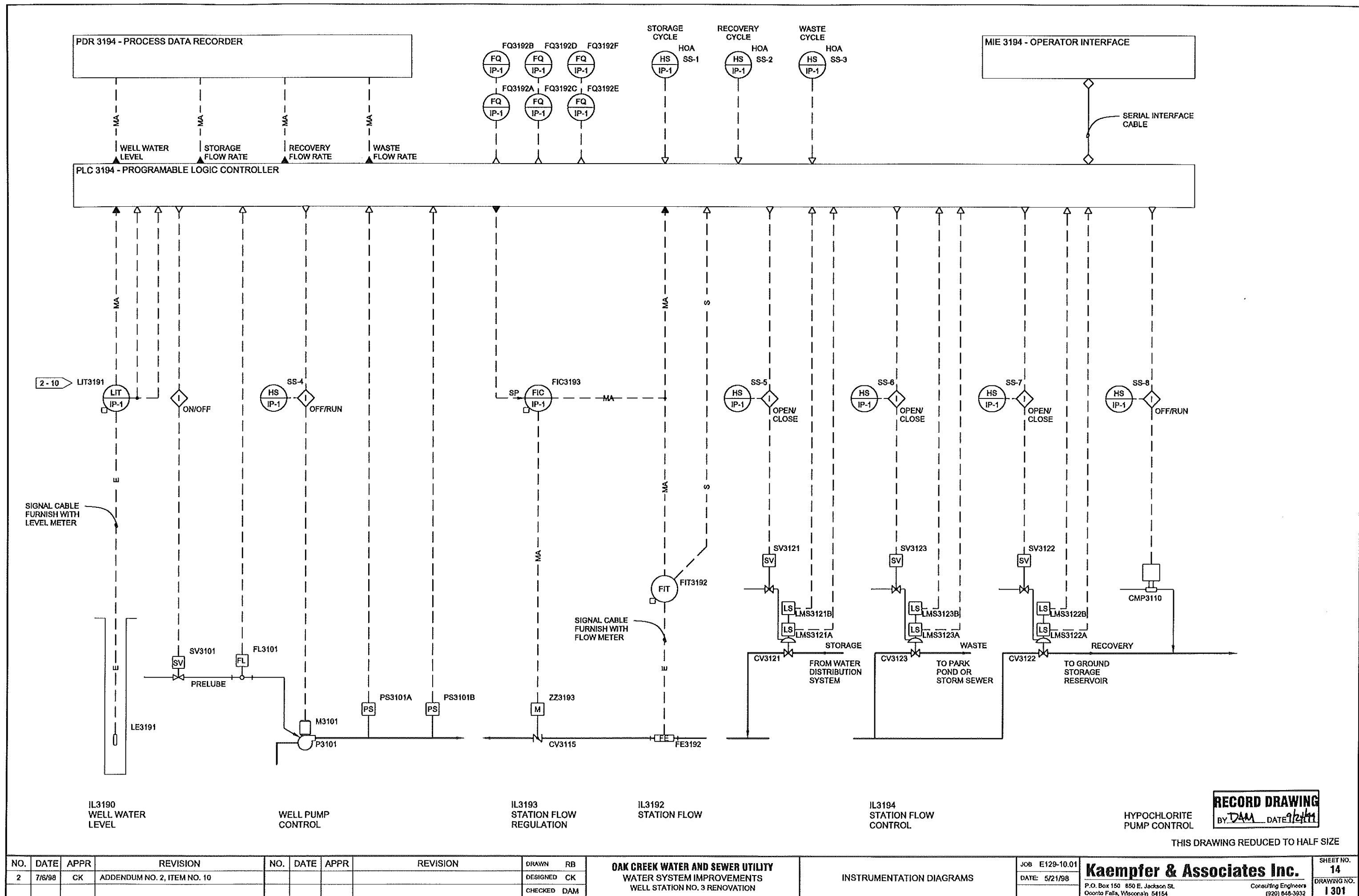


MAGNETIC FLOW METER WIRING SCHEMATIC

RECORD DRAWING
By *DAM* DATE *5/21/98*

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NO.	DATE	APPR	REVISION	NO.	DATE	APPR	REVISION	DRAWN	RB	OAK CREEK WATER AND SEWER UTILITY WATER SYSTEM IMPROVEMENTS WELL STATION NO. 3 RENOVATION	INSTRUMENTATION SYMBOLS AND DETAILS	JOB E129-10.01 DATE: 5/21/98	Kaempfer & Associates Inc. P.O. Box 150 650 E. Jackson St. Oconto Falls, Wisconsin 54154 Consulting Engineers (920) 848-3932	SHEET NO. 13 DRAWING NO. 11
								DESIGNED	CK					
								CHECKED	DAM					



NO.	DATE	APPR	REVISION	NO.	DATE	APPR	REVISION	DRAWN	RB	OAK CREEK WATER AND SEWER UTILITY	INSTRUMENTATION DIAGRAMS	JOB E129-10.01	SHEET NO. 14
2	7/8/98	CK	ADDENDUM NO. 2, ITEM NO. 10					DESIGNED	CK	WATER SYSTEM IMPROVEMENTS		DATE: 5/21/98	14
								CHECKED	DAM	WELL STATION NO. 3 RENOVATION			DRAWING NO. 1301

RECORD DRAWING
 BY: DAM DATE: 7/2/99

Kaempfer & Associates Inc.
 Consulting Engineers
 (920) 848-3932

P.O. Box 150 850 E. Jackson St.
 Oconto Falls, Wisconsin 54154

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TIMING AND SEQUENCE LOGIC - STORAGE CYCLE										
DEVICE	STATUS	TIME								
		OFF	TS1	TS2	TS3	TS2	TS3	TS2	TS4	OFF
CV3121 STORAGE CONTROL VALVE	OPEN									
	CLOSED									
CV3122 RECOVERY CONTROL VALVE	OPEN									
	CLOSED									
CV3123 WASTE CONTROL VALVE	OPEN									
	CLOSED									
CV3115 FLOW REGULATING VALVE	OPEN									
	SPs									
	SPr									
	SPw									
SV3101 PRE-LUBE	OPEN									
	CLOSED									
P3101 WELL PUMP	RUN									
	OFF									
CMP3110 HYPOCHLORITE METERING PUMP	RUN									
	OFF									
STORAGE CYCLE	ON									
	OFF									

NOTE: "OFF" TIME DETERMINED BY Qsc OR MANUAL CONTROL.

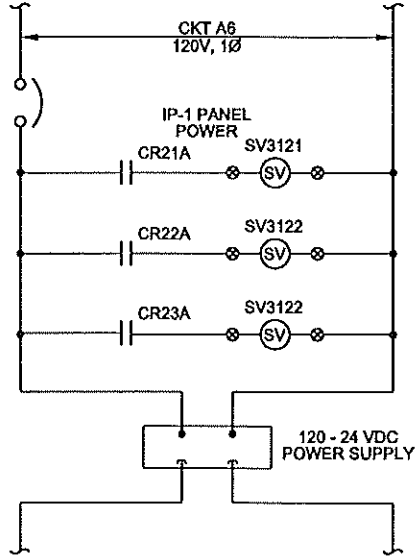
TIMING AND SEQUENCE LOGIC - RECOVERY CYCLE										
DEVICE	STATUS	TIME								
		OFF	TR1							OFF
CV3121 STORAGE CONTROL VALVE	OPEN									
	CLOSED									
CV3122 RECOVERY CONTROL VALVE	OPEN									
	CLOSED									
CV3123 WASTE CONTROL VALVE	OPEN									
	CLOSED									
CV3115 FLOW REGULATING VALVE	OPEN									
	SPs									
	SPr									
	SPw									
SV3101 PRE-LUBE	OPEN									
	CLOSED									
P3101 WELL PUMP	RUN									
	OFF									
CMP3110 HYPOCHLORITE METERING PUMP	RUN									
	OFF									
RECOVERY CYCLE	ON									
	OFF									

NOTE: "OFF" TIME DETERMINED BY Qrc OR MANUAL CONTROL.

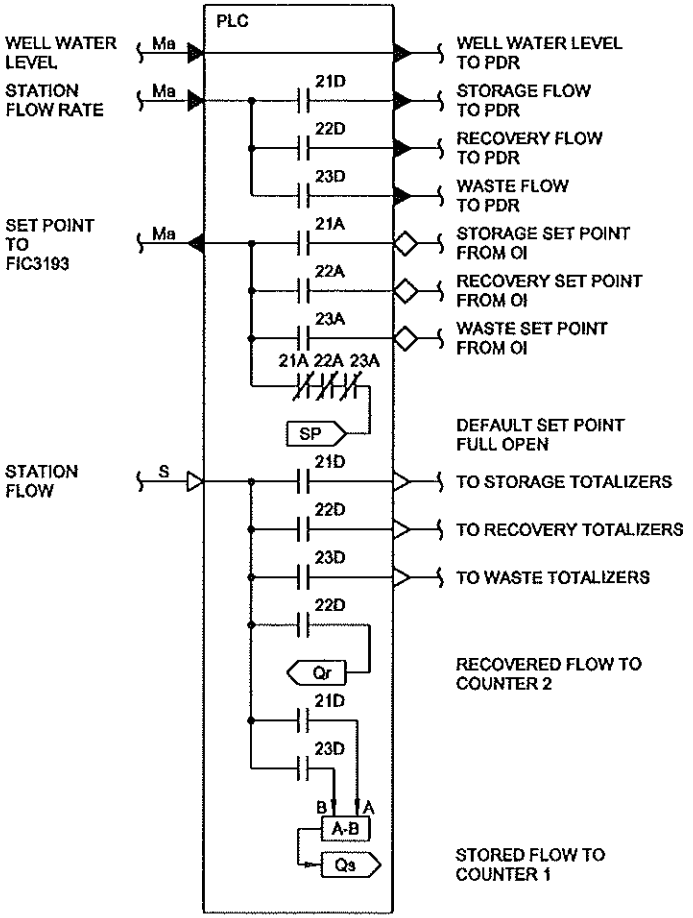
TIMING AND SEQUENCE LOGIC - WASTE CYCLE										
DEVICE	STATUS	TIME								
		OFF	TW1	TW2	TW1	TW2	TW1			OFF
CV3121 STORAGE CONTROL VALVE	OPEN									
	CLOSED									
CV3122 RECOVERY CONTROL VALVE	OPEN									
	CLOSED									
CV3123 WASTE CONTROL VALVE	OPEN									
	CLOSED									
CV3115 FLOW REGULATING VALVE	OPEN									
	SPs									
	SPr									
	SPw									
SV3101 PRE-LUBE	OPEN									
	CLOSED									
P3101 WELL PUMP	RUN									
	OFF									
CMP3110 HYPOCHLORITE METERING PUMP	RUN									
	OFF									
WASTE CYCLE	ON									
	OFF									

NOTE: "OFF" TIME DETERMINED BY MANUAL CONTROL.

OPERATOR INTERFACE INPUT			
CYCLE	ITEM	UNITS	DESCRIPTION
STORAGE	TS1	0.1 HOURS	LENGTH OF INITIAL WASTE PERIOD FOR STORAGE CYCLE. 0.0 INDICATES NO INITIAL WASTE PERIOD.
	TS2	0.1 HOURS	LENGTH OF STORAGE PERIODS BETWEEN WASTE PERIODS DURING STORAGE CYCLE.
	TS3	0.1 HOURS	LENGTH OF WASTE PERIODS DURING STORAGE CYCLE. 0.0 INDICATES NO WASTE PERIODS DURING STORAGE CYCLE.
	TS4	0.1 HOURS	LENGTH OF FINAL WASTE PERIOD FOR STORAGE CYCLE. 0.0 INDICATES NO FINAL WASTE PERIOD.
	Qsc	0.1 MG	VOLUME OF WATER TO BE STORED DURING STORAGE CYCLE.
	SPs	gpm	STORAGE FLOWRATE SET POINT.
RECOVERY	TR1	0.1 HOURS	LENGTH OF INITIAL WASTE PERIOD FOR RECOVERY CYCLE. 0.0 INDICATES NO INITIAL WASTE PERIOD.
	Qrc	0.1 MG	VOLUME OF WATER TO BE RECOVERED DURING RECOVERY CYCLE.
	SPr	gpm	RECOVERY FLOWRATE SET POINT.
WASTE	TW1	0.1 HOURS	LENGTH OF TIME BETWEEN WASTE PERIODS DURING WASTE CYCLE.
	TW2	0.1 HOURS	LENGTH OF WASTE PERIOD DURING WASTE CYCLE.
	SPw	gpm	WASTE FLOWRATE SET POINT.



DETAIL
NTS



SIGNAL SWITCHING AND
PROCESS LOGIC

RECORD DRAWING
BY *CK* DATE *4/22/98*

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ELECTRICAL SYMBOLS

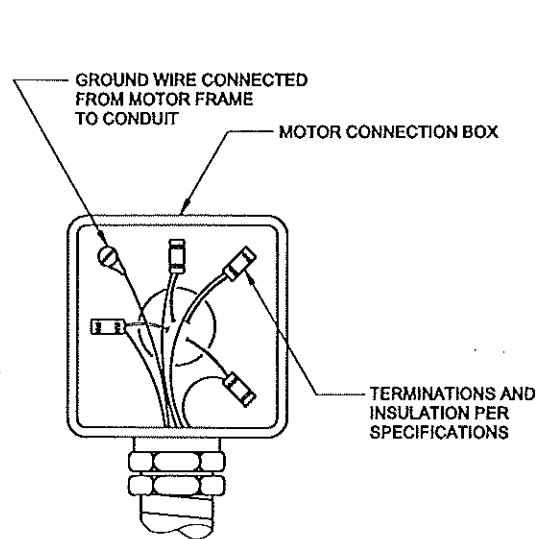
PLAN	ONE LINE DIAGRAM	CONTROL DIAGRAM	DESCRIPTION	SYMBOL	DESCRIPTION
			MOTOR, NUMBER INSIDE CIRCLE INDICATES H.P.		CONTROL DEVICE, CR-CONTROL RELAY TR-TIME RELAY, TM-TIMER NUMBER IDENTIFIES DEVICE
			HEATER, NUMBER INDICATES KW		N.O. CONTACT
			PUSH BUTTON N.O. SHOWN		N.C. CONTACT
			SELECTOR SWITCH, X'S & O'S WHEN USED INDICATE CONTACT DEVELOPMENT		NORMALLY OPEN WITH TIME DELAY CLOSING (ON DELAY)
			FLOAT SWITCH, N.C. SHOWN CONTACT OPENS ON RISING LEVEL		NORMALLY CLOSED WITH TIME DELAY OPENING (ON DELAY)
			PRESSURE SWITCH, N.O. SHOWN CLOSING ON RISING PRESSURE		NORMALLY OPEN WITH TIME DELAY OPENING (OFF DELAY)
			TEMPERATURE SWITCH N.C. SHOWN OPENS ON RISING TEMP.		NORMALLY CLOSED WITH TIME DELAY CLOSING (OFF DELAY)
			LIMIT SWITCH, N.O. SHOWN CLOSING WHEN DEFLECTED		PUSH TO TEST INDICATING LIGHT R-RED, G-GREEN, A-AMBER, B-BLUE W-WHITE, & Y-YELLOW
			FLOW SWITCH, N.O. SHOWN. CONTACT CLOSING ON INCREASING FLOW		TRANSIENT SUPPRESSOR
			SOLENOID VALVE		TERMINAL FOR EXTERNAL CONNECTIONS
			DISCONNECT SWITCH		SINGLE RECEPTACLE, 208V, SINGLE PHASE
			CONTACTOR, NUMBER INDICATES NEMA SIZE		GROUND CONNECTION
			MOTOR CONTROLLER NUMBER INDICATES NEMA SIZE		MECHANICAL CONNECTION
			CAPACITOR, NUMBER INDICATES KILOVAR		METER A-AMMETER, H- HOURMETER, W-WATTMETER
			MANUAL MOTOR STARTER		EXPOSED CONDUIT
			SWITCH, 3 EQUALS 3-WAY 4 EQUALS 4-WAY		CONCEALED CONDUIT, FLOOR OR WALL
			MATING EQUIPMENT DRAWOUT EQUIPMENT		CONCEALED CONDUIT, CEILING
			CIRCUIT BREAKER, RATING AND NUMBER OF POLES INDICATED		JUNCTION BOX
			MCP MOTOR CIRCUIT PROTECTOR		LIGHTING FIXTURE, FLUORESCENT
			FUSE WITH BLOWN-FUSE INDICATING DEVICE		LIGHTING FIXTURE, WALL MOUNTED
			CARTRIDGE FUSE & FUSEHOLDER		LIGHTING FIXTURE, CEILING MOUNTED OR SUSPENDED
			BATTERY		CONDUCTORS NOT CONNECTED
			TRANSFORMER		CONDUCTORS CONNECTED
			RESISTOR		AS-AMMETER SELECTOR SWITCH VS-VOLTAGE SELECTOR SWITCH
					DUPLEX RECEPTACLE GROUNDING TYPE
					RESISTOR

NOTES:

1. ALL CONTACTS ARE SHOWN IN THE DE-ENERGIZED (SHELF) POSITION. BI-STABLE RELAYS ARE SHOWN IN THE RESET POSITION.
2. ONE-LINE DIAGRAMS FOR POWER SWITCHGEAR USE ANSI STANDARD SYMBOLS AND ABBREVIATIONS.
3. SEE INSTRUMENTATION DRAWINGS FOR INSTRUMENTATION SYMBOLS AND DETAILS.
4. OTHER ABBREVIATIONS PER ANSI Z32 AND ISA S5.1.
5. ELEVATIONS ADJACENT TO SYMBOLS ARE BASED ON FACILITY DATUM. HEIGHTS ADJACENT TO SYMBOLS (+/- 0) ARE REFERENCED TO FINISHED FLOOR GRADE.
6. THE LETTERS "GFI" ADJACENT TO A RECEPTACLE INDICATE A GROUND FAULT INTERRUPTER FEED-THROUGH ASSEMBLY. THE LETTERS ADJACENT TO A PANELBOARD CIRCUIT BREAKER INDICATE A GROUND FAULT CIRCUIT BREAKER.
7. SEE SPECIFICATIONS AND SCHEDULES FOR COMPONENT REQUIREMENTS FOR MOTOR CONTROLLERS AND FOR CONTACTORS.

CIRCUIT PREFIX TABULATION

C - CONTROL
G - GROUND
J - ELECTRONIC INSTRUMENTATION
P - POWER (UNDER 600 VAC)
PC - POWER AND CONTROL
S - SIGNAL
D - DIRECT CURRENT
H - HIGH VOLTAGE (OVER 600 VOLTS)
M - MISCELLANEOUS
N - PNEUMATIC
T - COMMERCIAL TELEPHONE

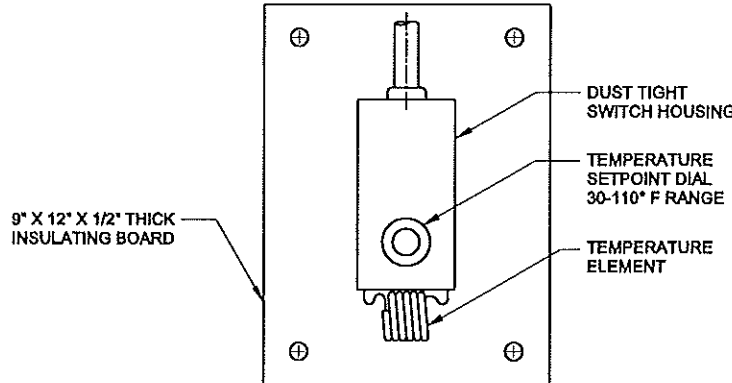


MOTOR CONNECTION

DETAIL

NTS

A
VAR

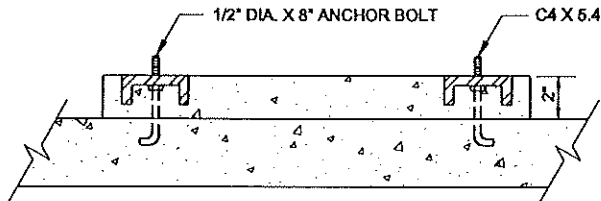


NOTE:

1. MOUNT SWITCH HOUSING ON INSULATING BOARD. MOUNT INSULATING BOARD ON STRUCTURE.

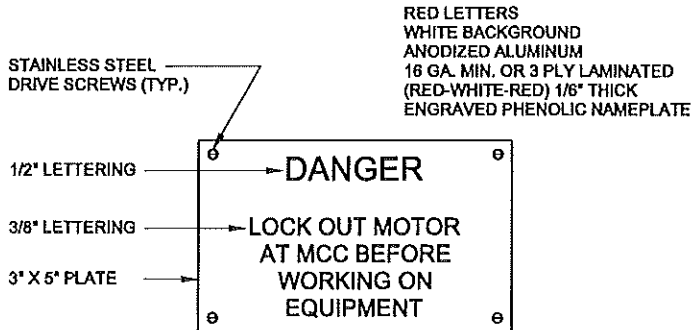
TEMPERATURE SWITCH MOUNTING

DETAIL	
NTS	X
	X



MOTOR CONTROL CENTER MOUNTING

DETAIL _____ (D)
NTS _____ VAR.



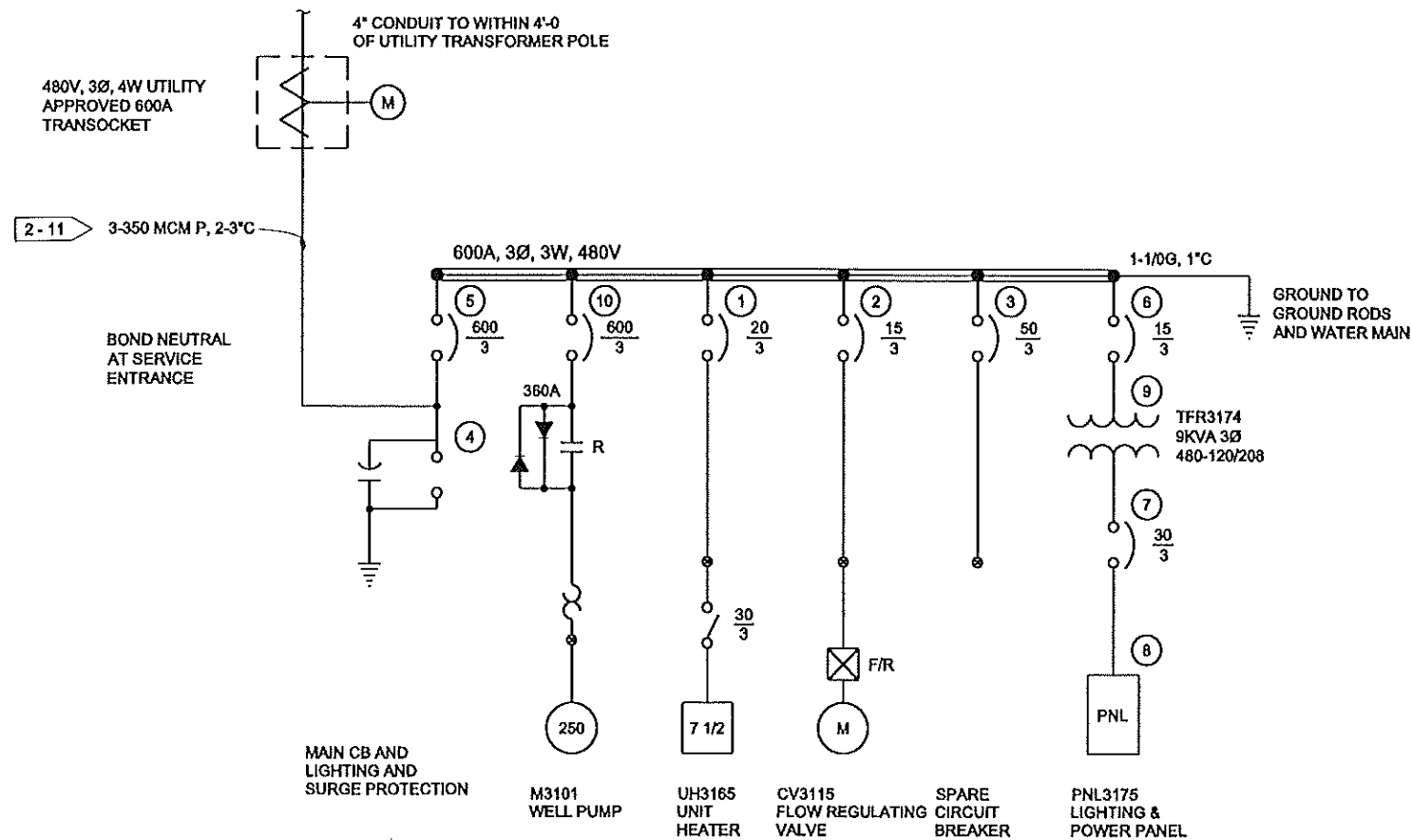
SAFETY REMINDER

DETAIL

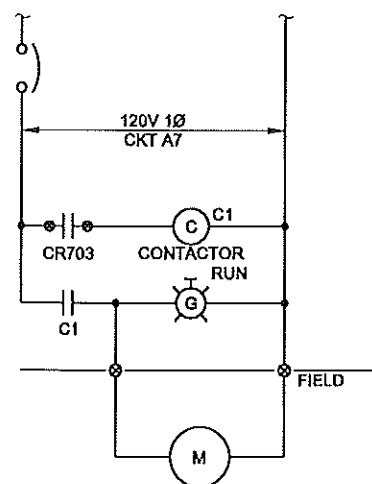
NTS

C
VAR.

[illegible]



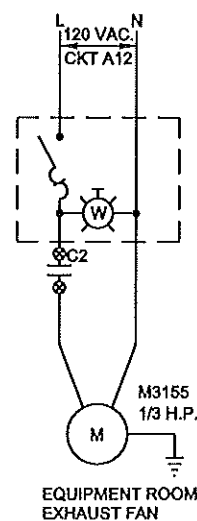
ONE LINE DIAGRAM



M3110 HYPOCHLORITE METERING PUMP

NOTES:

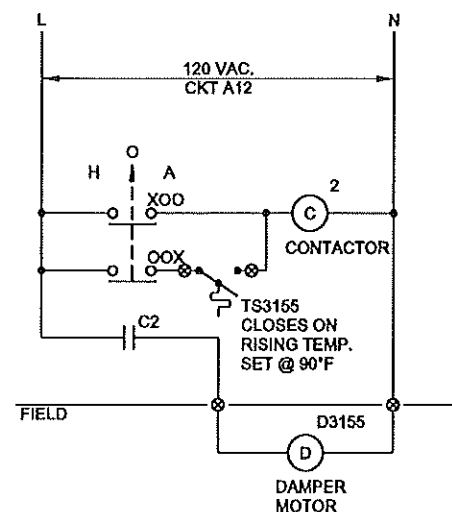
1. CR703 CONNECTION ARE LOCATED IN IP-1.
2. CONTACTOR C1 IS WALL MOUNTED. THE GREEN RUN LIGHT IS MOUNTED ON COMPARTMENT DOOR.



M3155 EQUIPMENT ROOM EXHAUST FAN

NOTES:

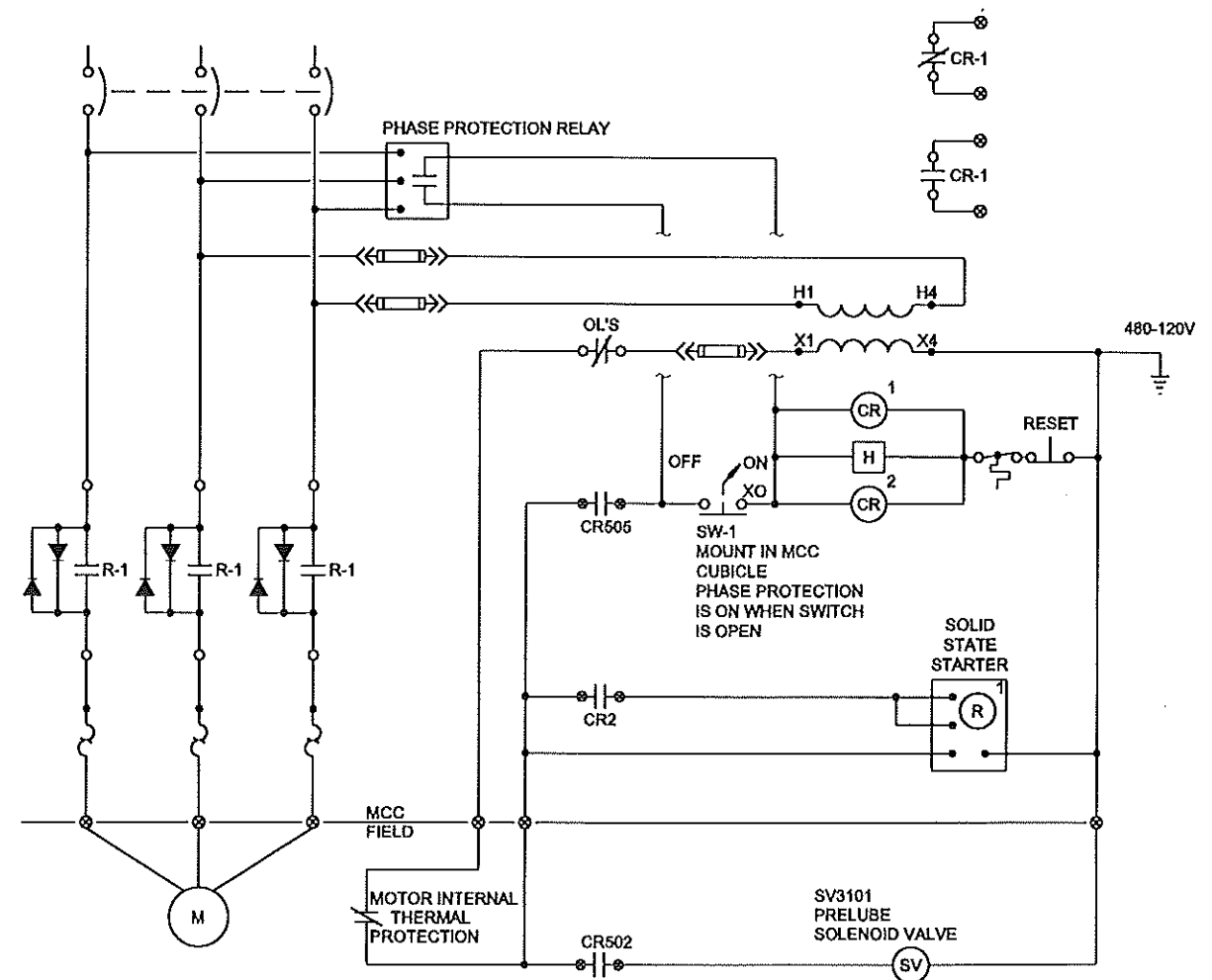
1. CONTACTOR C2 IS WALL MOUNTED. THE HOA SWITCH IS MOUNTED ON COMPARTMENT DOOR.



M3101 WELL PUMP WP-3

NOTES:

1. CR502 AND CR505 CONNECTIONS ARE LOCATED IN IP-1.
2. STARTER IS RESET BY USING THE "RESET" PUSHBUTTON.



RECORD DRAWING
BY: CK DATE: 6/22/00

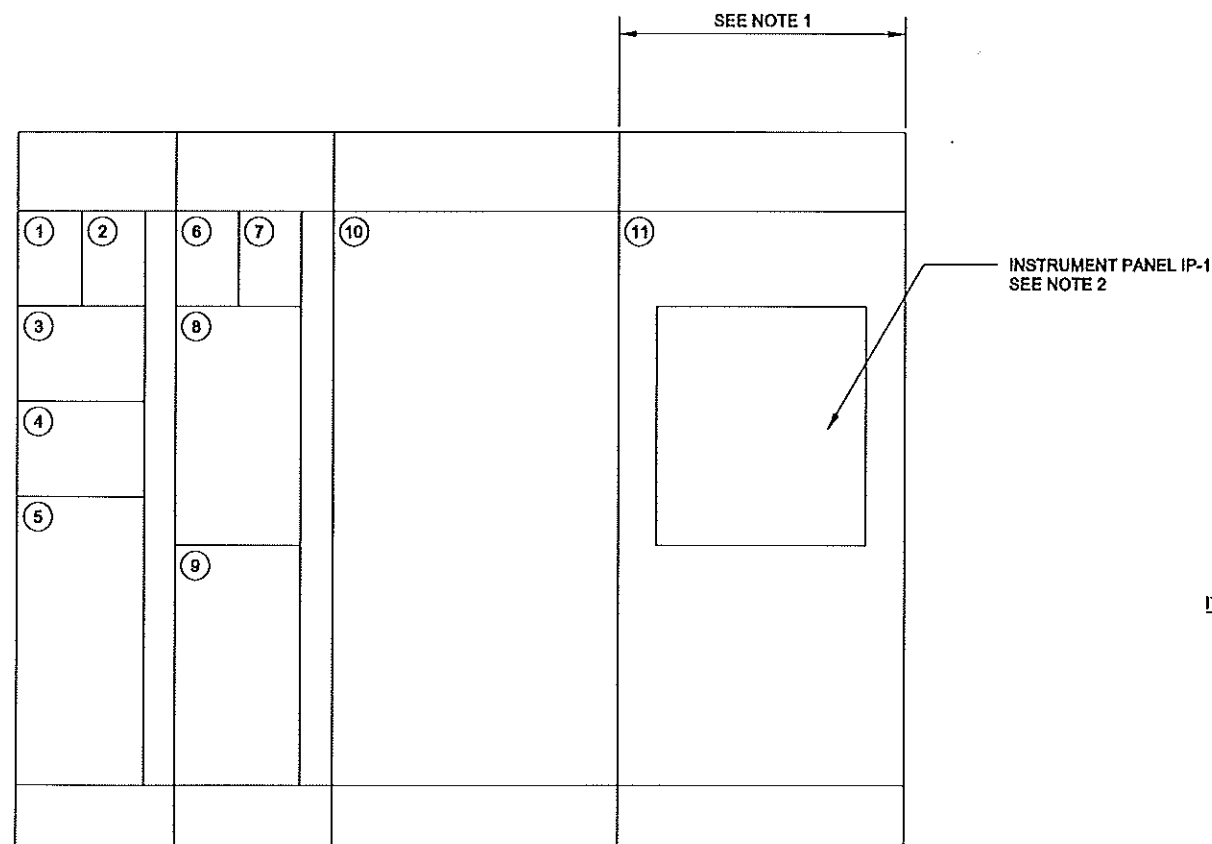
THIS DRAWING REDUCED TO HALF SIZE

NO.	DATE	APPR	REVISION	NO.	DATE	APPR	REVISION	DRAWN	JS	OAK CREEK WATER AND SEWER UTILITY WATER SYSTEM IMPROVEMENTS WELL STATION NO. 3 RENOVATION	ONE LINE DIAGRAM AND MOTOR CONTROL DIAGRAMS	JOB E129-10.01 DATE: 5/21/98	Kaempfer & Associates Inc. P.O. Box 150 850 E. Jackson St. Oconto Falls, Wisconsin 54154 Consulting Engineers (920) 846-3932	SHEET NO. 18 DRAWING NO. E301
2	7/6/98	CK	ADDENDUM NO. 2, ITEM NO. 11					DESIGNED	CK					
								CHECKED	DAM					

120/208V AC, 3Ø, 4W, 100 AMP MAIN BUS														
LOAD			DESCRIPTION	BRK SIZE	CKT		CKT	BRK SIZE	DESCRIPTION	LOAD				
ØA	ØB	ØC								ØA	ØB	ØC		
1200			EQUIPMENT ROOM RECEPTACLES - (3)	20/1	1	●	2	20/1	INTERIOR LIGHTS	370				
	1200		EQUIPMENT ROOM RECEPTACLES - (3)	20/1	3	—	4	20/1	EXTERIOR LIGHTS		90			
		—	SPARE	20/1	5	—	6	20/1	INSTRUMENT PANEL IP-1-PNL3190			500		
50			SODIUM HYPOCHLORITE METERING PUMP-CMP3110	20/1	7	●	8	20/1	WELL WATER LEVEL INDICATOR TRANSMITTER-LIT3191	50				
	50		SODIUM HYPOCHLORITE SCALE-MME3111	20/1	9	—	10	20/1	WELL STATION FLOW METER-FIT3193		50			
		50	STORAGE CONTROL VALVE PILOT SOLENOID VALVE-SV3121	20/1	11	—	12	20/1	EQUIPMENT ROOM VENTILATION SYSTEM-EF3155			750		
50			RECOVERY CONTROL VALVE PILOT SOLENOID VALVE-SV3122	20/1	13	●	14	20/1	SPARE	—				
	50		WASTE CONTROL VALVE PILOT SOLENOID VALVE-SV3123	20/1	15	—	16	20/1	SPARE		—			
		20	EMERGENCY LIGHT	20/1	17	—	18	20/1	SPARE			—		
1300	1300	70	SUB-TOTAL			ØA	ØB	ØC	SUB-TOTAL			420	140	1250
1720	1440	1320	TOTAL											

TYPE	DESCRIPTION	NO. & TYPE LAMPS	WATTS	MANUFACTURER & CATALOG NUMBER
A	WET LOCATION, ACRYLIC DIFFUSER, PLASTIC HOUSING	(2) F40CW	92	LITHONIA DMW240120ESCW OR EQUAL
B	WALL BRACKET, PRISMATIC GLASS REFRACTOR, CAST ALUMINUM HOUSING	(1) 70W HPS	88	AMERICAN HWB07SMIMIC OR EQUAL
C	EMERGENCY LIGHT	(2) 8W, 6V	20	LITHONIA ELT24N OR EQUAL

EQUIP. NO.	MTG.	DESCRIPTION	POWER SUPPLY	RATING KW	REMARKS
UH3165	WALL	UNIT HEATER BERKO HU4AA-748 OR EQUAL	480V, 3Ø	7.5	WALL MOUNTED THERMOSTAT



ITEM	DESCRIPTION	NAME PLATE
1	20/3 CB	UH3165 EQUIPMENT RM UNIT HEATER
2	15/3 CB	CV3115 FLOW MODULATING VALVE
3	50/3 CB	SPARE CIRCUIT BREAKER
4	CAPACITOR & ARRESTOR	LIGHTNING AND SURGE PROTECTION
5	600/3 CB	MCC3170 MAIN CIRCUIT BREAKER
6	15/3 CB	TFR3174 MAIN CIRCUIT BREAKER
7	30/3 CB	PNL3175 MAIN CIRCUIT BREAKER
8	18 CKT PNL BOARD	PNL3175 LIGHTING & POWER PANEL
9	9 KVA TFR	TFR3174 LIGHTING & POWER TRANSFORMER
10	NEMA 6 AT STARTER	M3101 WELL PUMP WP-3
11	---	PANEL 3190 INSTRUMENT PANEL IP-1

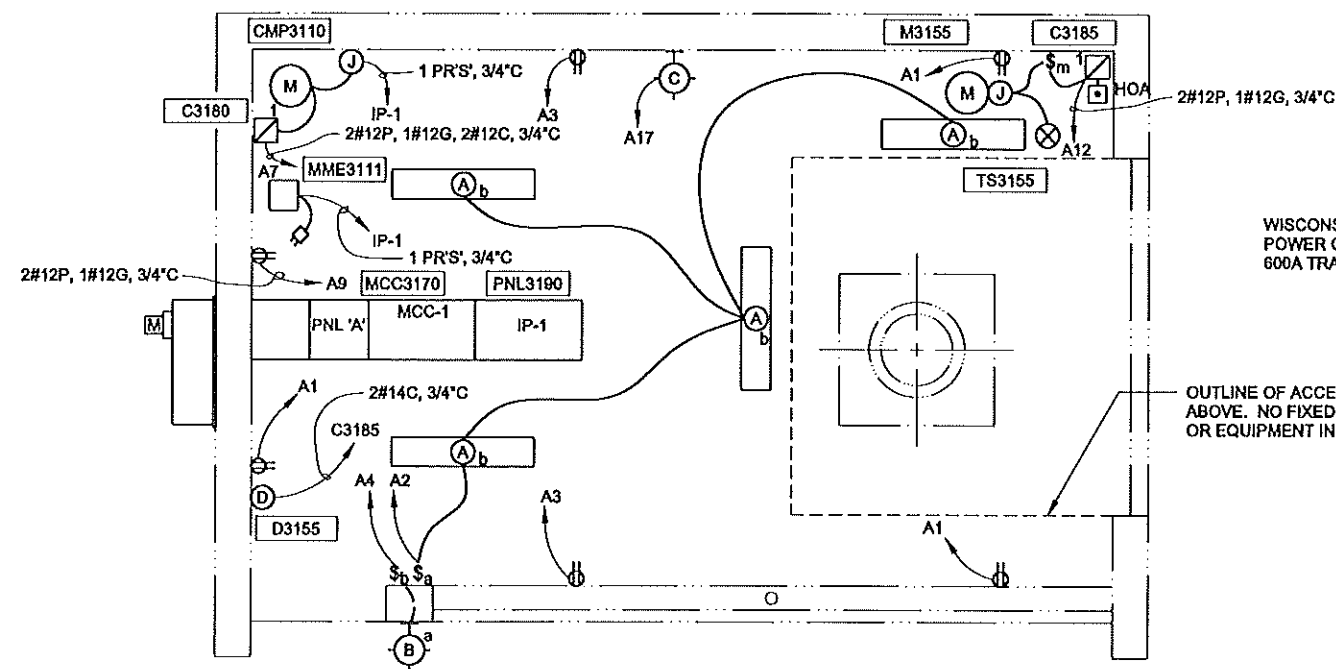
1. WIDTH TO BE DETERMINED BY INSTRUMENTATION PANEL LAYOUT. MINIMUM WIDTH SHALL BE 20". MAXIMUM WIDTH SHALL BE 36".
2. SUBMIT PANEL LAYOUT TO ENGINEER FOR REVIEW AND APPROVAL BEFORE FABRICATION.

MOTOR CONTROL CENTER SCHEDULE

RECORD DRAWING
BY DAM DATE 9/24/99

THIS DRAWING REDUCED TO HALF SIZE

NO.	DATE	APPR	REVISION	NO.	DATE	APPR	REVISION	DRAWN	JS	OAK CREEK WATER AND SEWER UTILITY WATER SYSTEM IMPROVEMENTS WELL STATION NO. 3 RENOVATION	ELECTRICAL SCHEDULES AND MCC DETAILS	JOB E129-10.01	Kaempfer & Associates Inc. P.O. Box 150 650 E. Jackson St. Oconomowoc, Wisconsin 53154 Consulting Engineers (414) 846-3332	SHEET NO. 19
								DESIGNED	CK			DATE: 5/21/98		DRAWING NO. E302
								CHECKED	DAM					



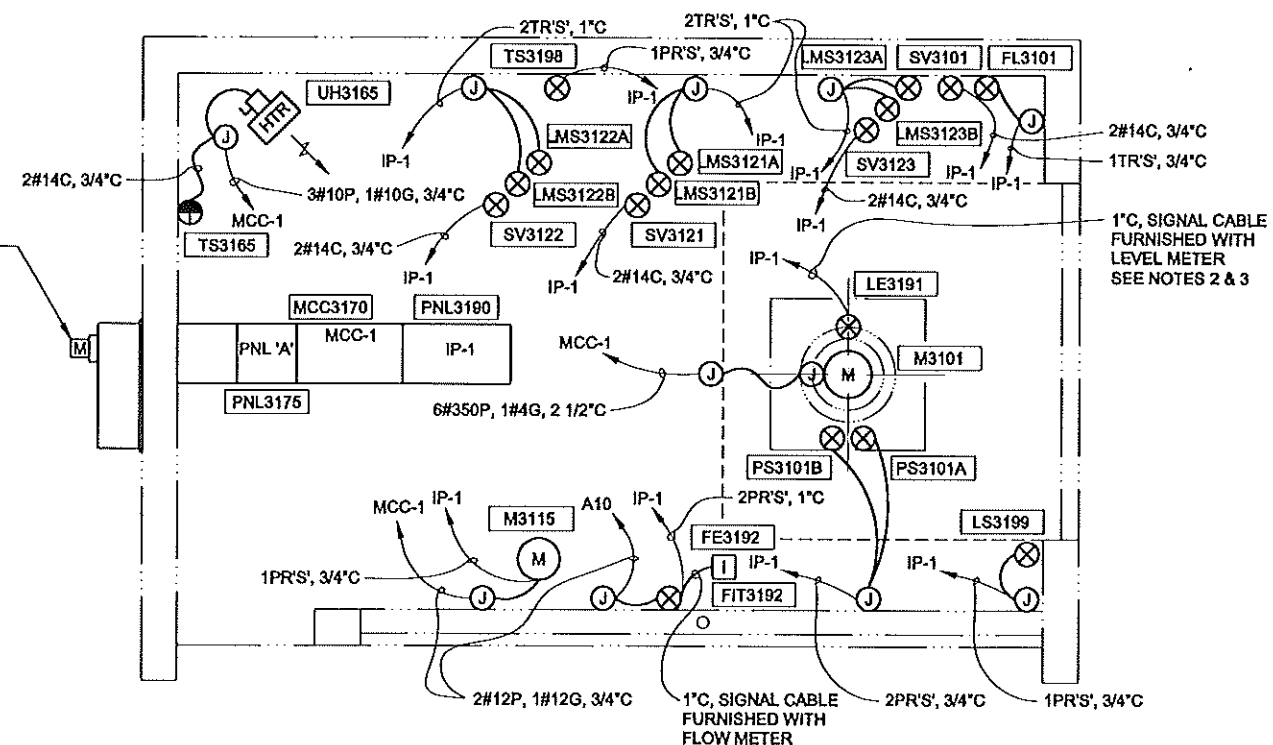
LIGHTING & OUTLET PLAN
SCALE: 3/8" = 1'-0"

WISCONSIN ELECTRIC
POWER CO. APPROVED
600A TRANSOCKET

OUTLINE OF ACCESS HATCH
ABOVE. NO FIXED WIRING
OR EQUIPMENT IN THIS AREA.

NOTES:

1. INSTRUMENTATION SIGNAL CABLE IS IDENTIFIED WITH THE FOLLOWING DESIGNATIONS:
1PR'S' = ONE PAIR OF SHIELDED #16 AWG CONDUCTORS.
1TR'S' = ONE TRIAD OF SHIELDED #16 AWG CONDUCTORS.
2. WELL WATER LEVEL ELEMENT LE3191 AND CABLE FURNISHED AND INSTALLED BY WELL & WELL PUMP CONTRACTOR.
3. WELL WATER LEVEL INDICATOR CONTROLLER LIC3191 FURNISHED BY WELL & WELL PUMP CONTRACTOR FOR INSTALLATION IN IP-1 BY ELECTRICAL CONTRACTOR.
4. USE EXISTING CONDUIT FOR EQUIPMENT GROUND.



POWER & CONTROL PLAN
SCALE: 3/8" = 1'-0"

RECORD DRAWING
BY DAM DATE 12/1/11

THIS DRAWING REDUCED TO HALF SIZE

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								DESIGNED	CK
								CHECKED	DAM

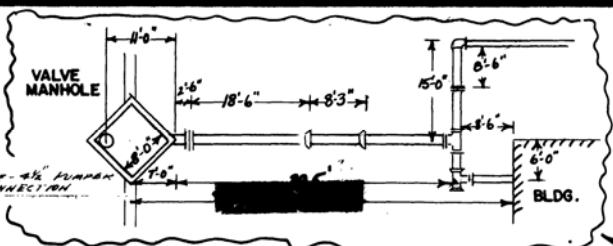
OAK CREEK WATER AND SEWER UTILITY
WATER SYSTEM IMPROVEMENTS
WELL STATION NO. 3 RENOVATION

ELECTRICAL PLANS

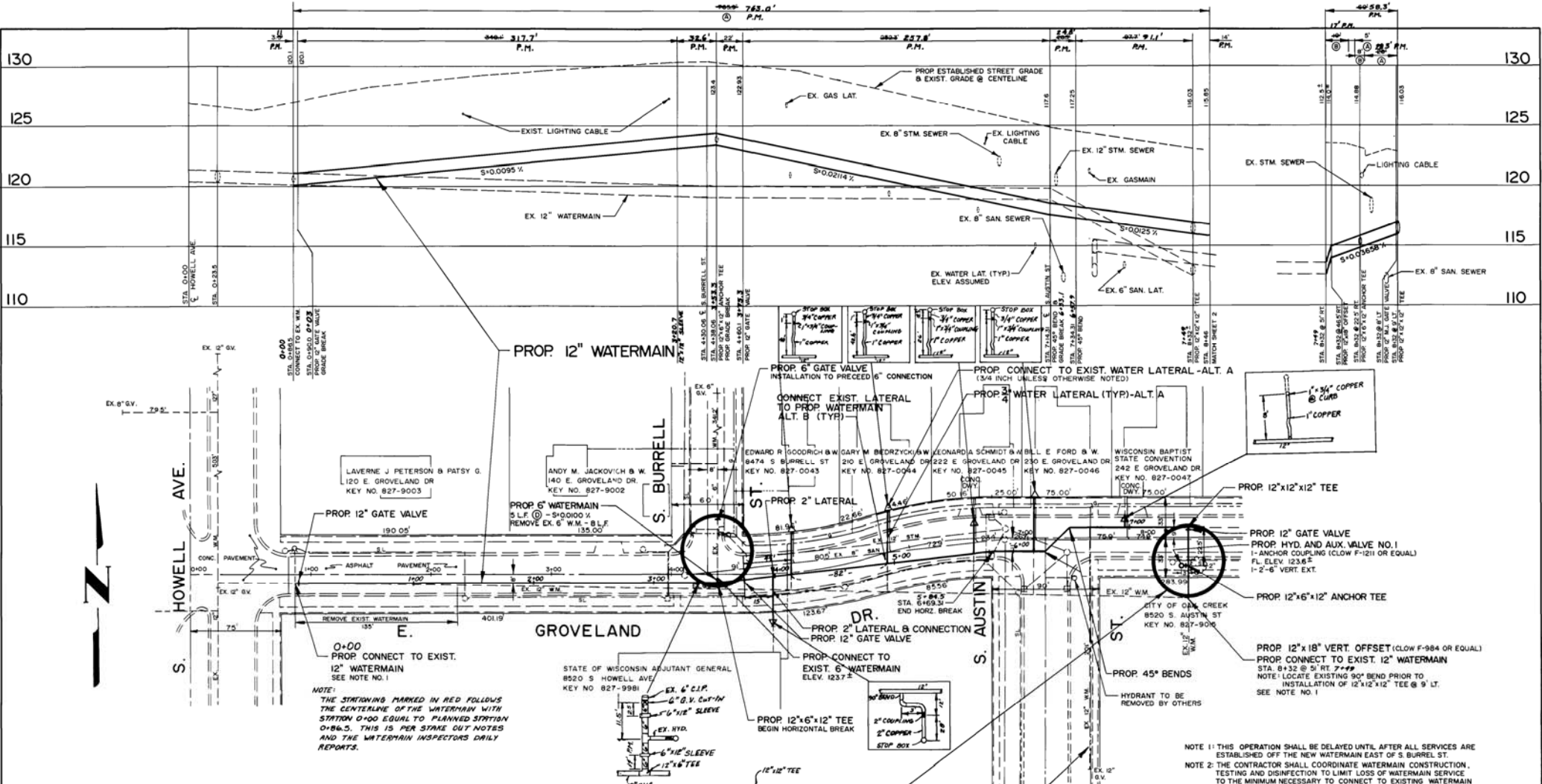
JOB E129-10.01
DATE: 5/21/98

Kaempfer & Associates Inc.
P.O. Box 150 850 E. Jackson St.
Oconomowoc, Wisconsin 54154
Consulting Engineers
(920) 846-3332

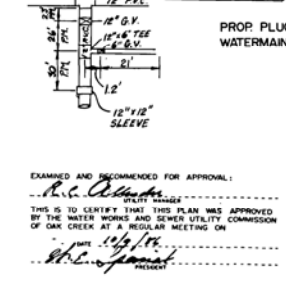
SHEET NO.
20
DRAWING NO.
E310



SHEET NO. 2
OF 5 SHEETS



ESTIMATE OF QUANTITIES		
12\"/>	796.3	L.F.
12\"/>	10.0	L.F.
6\"/>	110	L.F.
REMOVE EXISTING 12\"/>	10.0	L.F.
REMOVE EXISTING 6\"/>	3	EA
12\"/>	1	EA
6\"/>	1	EA
CONNECT TO EXISTING 12\"/>	2	EA
CONNECT TO EXISTING 6\"/>	1	EA
SET HYDRANT AND AUXILIARY VALVE	1	EA
CONNECT EXISTING WATER LATERAL, ALT. A ONLY	2.6	EA
6\"/>	2.6	EA
3/4\"/>	5	EA
RESTORATION ALT. A ONLY	1	EA
RESTORATION ALT. A ONLY	1	EA
CONNECT EXIST. 3/4\"/>	6	EA



SA S.S.
ST S.S.
W. TL
G. S.S.
G. S.S.
T. S.S.
TS S.S.
PP

WISCONSIN
ANTHONY LEE
LAND
ENGINEER
PROFESSIONAL ENGINEER

CITY OF OAK CREEK, WISCONSIN - ENGINEERING DEPARTMENT

DESIGNED BY	DATE	DRAWN BY	DATE	CHECKED BY	DATE	APPROVED BY
A.L. LANG	4/86	S.A. SUSTACHEK	4/86	J. GREEN	5/86	W.D. Thompson

PROP. 12\"/>
IN: E. GROVELAND DR.
FROM: S. HOWELL AVE.
TO: 846' E. OF S. HOWELL AVE

SCALE	SHEET
PLAN HOR. 1\"/>	1
PROFILE HOR. 1\"/>	OF
VER. 1\"/>	3

FILE NO: 8605-IC-841

REVISION BY DATE APPROVED BY COUNCIL RESOLUTION NO. 7009-071586

CONTRACTOR: MICHEL'S PIPELINE
INSPECTOR: PAT CZIMINEKI
AS-BUILT BY: JOHN OTOLINS
P.B.'S TO OWNER: SALLY GRIEWANKI
DATE: APRIL 9, 1987

NOTE:
THE LOCATION AND SIZE OF ALL UNDERGROUND
STRUCTURES SHOWN HEREON HAVE BEEN LOCATED
TO A REASONABLE DEGREE OF ACCURACY, BUT
THE CITY OF OAK CREEK DOES NOT GUARANTEE
THEIR EXACT LOCATION OR THE LOCATION OF
OTHERS NOT SHOWN.

- NOTE 1: THIS OPERATION SHALL BE DELAYED UNTIL AFTER ALL SERVICES ARE
ESTABLISHED OFF THE NEW WATERMAIN EAST OF S. BURRELL ST.
- NOTE 2: THE CONTRACTOR SHALL COORDINATE WATERMAIN CONSTRUCTION,
TESTING AND DISINFECTION TO LIMIT LOSS OF WATERMAIN SERVICE
TO THE MINIMUM NECESSARY TO CONNECT TO EXISTING WATERMAIN
AND WATER LATERALS.
- NOTE 3: IT IS INTENDED THAT CONSTRUCTION OF THIS PROJECT PROCEED
FROM S. SHEPARD AVE. TO THE WEST. APPROVAL BY THE
ENGINEER SHALL BE REQUIRED TO ALTER THIS CONSTRUCTION
PROCESS.

APPENDIX D

B6459

CITY WELL, OAK CREEK, MILWAUKEE CO., WIS. #1

1113' N. Puetz Road, 819' E. Howell Ave.

R. 22E.

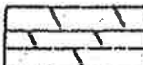





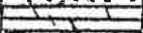
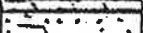
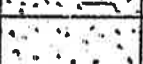






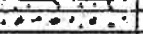
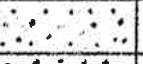
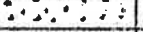

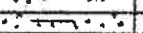
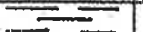
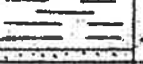

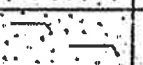

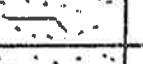
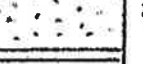



 Elevation 707'ETM Loc: NE $\frac{1}{4}$, SW $\frac{1}{4}$, NW $\frac{1}{4}$, NE $\frac{1}{4}$, SW $\frac{1}{4}$, SW $\frac{1}{4}$, Sec. 16, T. 5N.,

Milaeger Well Drilling Co., Maxon and Moore, Engineers, 1956

Samples examined by R. T. Thwaites, Nos. 193477-193726

D R I F T	0-5	5		No sample	
	5-55	50		Till, light gray, dolomitic	24" pipe
	55-60	5		Gravel, very silty	
	60-145	85		Till, light gray, more stony than above, dolomitic	
145					
N I A G A R A	145-150	5		No sample	144
	150-160	10		Dolomite, very light gray to black	
	160-245	85		Dolomite, very light gray; no sample 170-175	200 water
	245-290	45		Dolomite, light gray and pale red	20" pipe cemented
	290-305	15		Dolomite, light gray	
	305-310	5		Dolomite, light gray; some shale, light pink	
	310-330	20		Dolomite, light gray	23" hole
	330-365	35		Dolomite, medium gray, light gray	
	365-375	10		Shale, blue-gray, dol.; dolomite, lt. blue-gray	
	375-405	30		Shale, blue-gray, dolomitic	
R I C H M O N D	405-420	15		Dolomite, light gray, dark blue-gray	
	420-425	5		Shale, blue-gray, dol.; dolomite, blue-gray	
	425-490	65		Shale, blue-gray, dolomitic	
	490-500	10		Shale, blue-gray, dol.; dolomite, blue-gray	
	500-555	55		Shale, blue-gray, dolomitic; no sample 545-550	
	555-640	85		Dolomite, very light brown-gray to light medium gray	
	640-645	5		Dolomite, light gray; some chert, white	
	645-710	65		Dolomite, light gray to light medium gray	
G A L E N A P L A T T E V	710-720	10		Dolomite, dark blue gray to gray mottled	
	720-730	10		No samples	
	730-740	10		Dolomite, medium gray, light blue gray	
190					
					583

City of Oak Creek, p. 2 (193477-193726)

I L L E	325	740-780	40		Dolomite, medium gray, light blue-gray, light gray
		780-790	10		Dolomite, medium gy, lt. bu-gy, very lt. gy
		790-805	15		Dolomite, medium gray
		805-820	15		Dolomite, medium gray, spots blue gray
		820-840	20		Dolomite, light gray, light blue-gray
		840-850	10		Sandstone, fine to coarse, med. gy, dolomitic
		850-865	15		Dolomite, very light gray, sandy
		865-880	15		Sandstone, medium to fine, lt. gy, dolomitic
S T P E T E R	110	880-915	35		Sandstone, very fine to medium, light gray
		915-925	10		Sandstone, medium to fine, light gray
		925-945	20		Sandstone, very fine to medium, light gray
		945-990	45		Sandstone, fine to medium, light gray
F G A L E S	75	990-1000	10		Sandstone, fine to medium, pale red, glau, do
		1000-1010	10		Sandstone, medium to coarse, light gray
		1010-1035	25		Sandstone, medium to fine, very light gy to light pink-gray
		1035-1050	15		Sandstone, medium to fine, light gray, pink
		1050-1085	35		Sandstone, fine to medium, light gray
E A U C L A I R E	330	1085-1095	10		Sandstone, fine to medium, lt. gy, lt. pink, d
		1095-1130	35		Shale, sandy, pale red, glauc, dolomitic
		1130-1135	5		Sandstone, very fine to fine, lt. pk, gy
		1135-1155	20		Sandstone, fine to medium, light pink, gray
		1155-1195	40		Sandstone, very fine, pale red, lt. gy, glauconitic, dolomitic, hard
		1195-1200	5		Sandstone, very fine to medium, pale red, g.d
		1200-1250	50		Sandstone, medium to fine, pink, light gray, dolomitic
		1250-1415	165		Sandstone, fine to medium, light gray, dolomitic; no sample 1440-1445
		1415-1470	55		Sandstone, fine to medium, light gray; no sample 1440-1445
		1470-1510	40		Sandstone, fine to medium, light gray, slightly dolomitic
M T S I M O N		1510-1540	30		Sandstone, medium to fine, light gray; thin layers pink dolomite
		1540-1590	50		Sandstone, fine to medium, light gray
		1590-1595	5		Sandstone, medium to fine, light gray

19" hole

Cot City of Oak Creek, p. 3 (193477-193726)

ML-412

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1595-1625	30	Sandstone, fine to medium, light gray
1625-1630	5	Sandstone, medium to fine, light gray
1630-1650	20	.....	Sandstone, fine to medium, light gray; thin layers red dolomite
1650-1665	15	.....	Sandstone, fine to medium, light gray
1665-1680	15	.....	Sandstone, medium to fine, light gray
1680-1710	30	.....	Sandstone, fine to medium, light gray
1710-1715	5	.....	Sandstone, medium to fine, light gray
1715-1740	25	.....	Sandstone, fine to medium, light gray
1740-1785	45	.....	Sandstone, medium to fine, light gray
1785-1800	15	.....	Sandstone, fine to medium, light gray
1800-1810	10	.....	Sandstone, medium to fine, light gray
1810-1815	5	.....	Sandstone, fine to medium, light gray

19" hole

400

Formations: Drift; Niagara; Richmond (Maquoketa); Galena-Platteville; St. Peter; Franconia; Galesville (Dresbach); Eau Claire; Mt. Simon

Tested(24 hrs.?) at 1200 g.p.m. specific capacity = 10.4 g.p.m./ft.

Additional copies may be secured from Wisconsin Geological Survey, Science Hall, Madison 6, Wis.

BG458


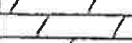
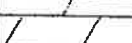
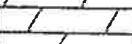
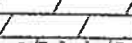
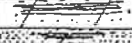

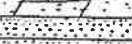


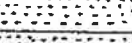


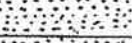

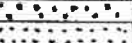


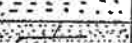













OAK CREEK CITY WELL NO. 3, OAK CREEK, WISCONSIN

 1200' N.E. of Highway 38 & Pautz Road intersection, Loc: NE $\frac{1}{4}$, NW $\frac{1}{4}$, SW $\frac{1}{4}$, NE $\frac{1}{4}$,
 Maxon and Moore, Engineers, SW $\frac{1}{4}$, SW $\frac{1}{4}$, Sec. 16, T. 5N.,
 Layne-Northwest Co., Driller, August 1958 R. 22E.

Alt. = 710' ETM

Sample Nos. 206012-206371 - Examined by J. B. Steuerwald

D R I F T	0 - 50	50		Till, medium brown-gray, much clay, little silt & sand, very few small stones, dolomitic	26" pipe
	50 - 55	5		Silt, medium gray, dolomitic	
	55 - 80	25		Till, medium gray, stony, clayey, dolomitic	
	80 - 110	30		Till, brown-gray, much clay, little silt & sand, very few small stones, dolomitic	
	110 - 135	25		Till, pink-brown & medium gray, much clay, sandy, dolomitic	
N I A G A R A	135 - 165	30		Dolomite, very light gray, vuggy	146' 189.5' water 23" hole 20" pipe
	165 - 175	10		Dolomite, very light gray	
	175 - 235	60		Dolomite, very light gray, some white chert	
	235 - 260	25		Dolomite, pale red, some light gray	
	260 - 280	20		Dolomite, pale red, rusty red, some light gray, much rusty red shale or weathered dolomite	
	280 - 355	75		Dolomite, light cream-gray, some pink dolomite 280-300, some purple-gray dolomite 335-345	
	355 - 370	15		Dolomite, dark gray	
	370 - 385	15		Dolomite, light medium gray	
	385 - 405	20		Shale, green-gray, dolomitic	
	405 - 415	10		Shale, dark gray, dolomitic	
R I C H M O N D	415 - 445	30		Shale, dark gray, dolomitic, & dolomite, medium & dark gray	584'
	445 - 465	20		Shale, green-gray, dolomitic	
	465 - 485	20		Shale, dark gray, dolomitic	
	485 - 490	5		Dolomite, medium & dark gray, shaly	
	490 - 555	65		Shale, dark gray, dolomitic	
G A L E N A P L A T E S	555 - 640	85		Dolomite, medium gray	19 1/2" hole
	640 - 705	65		Dolomite, light medium gray	
	705 - 730	25		Dolomite, medium & dark gray (Decorah) No sample 730-735	
	735 - 750	15		Dolomite, light medium gray	
	750 - 780	30		Dolomite, medium brown, some medium gray	

L E V I L L E		735 - 750	15		Dolomite, light medium gray
		750 - 780	30		Dolomite, medium brown, some medium gray
		780 - 795	15		Dolomite, medium gray
		795 - 825	30		Dolomite, medium brown-gray
		825 - 840	15		Dolomite, light gray, sandy, & green shale & ss.
S T P E T E R		840 - 855	15		Sandstone, medium grained, light gray, dolomitic, some green shale
	325	855 - 870	15		Dolomite, light gray, sandy, & sandstone, fine grained, little green shale
		870 - 880	10		Sandstone, vy fine - med. gr., lt gy, vy dolo.
		880 - 895	15		Sandstone, fine to lit. coarse gr., light gray
		895 - 915	20		Sandstone, fine & medium grained, light gray
F A L E S		915 - 930	15		Sandstone, medium grained, light gray
		930 - 985	55		Sandstone, fine & medium grained, light gray
		985 - 995	10		Sandstone, medium grained, light gray
	10	995 - 1005	10		Sandstone, med. gr., red, some dolo., glauc., siltst.
		1005 - 1015	10		Sandstone, coarse grained, pale red-gray
E A U C L A I R E		1015 - 1070	55		Sandstone, medium grained, light gray
	65	1070 - 1085	15		Sandstone, fine gr., lt pk-gy, vy dolo.,
		1085 - 1120	35		Sandstone, fine grained, light pink-gray, dolomitic
		1120 - 1135	15		Shale-siltstone, dk red, micaceous, dolo., vy glauc.
		1135 - 1145	10		Sandstone, fine grained, pink, glauc., very dolo.
M T S		1145 - 1170	25		Sandstone, fine grained, pink, very dolomitic
		1170 - 1220	50		Siltstone-shale, dark red, micaceous, glauconitic, dolomitic
		1220 - 1275	55		Sandstone, medium grained, pink-gray, pyritic, dolomitic
		1275 - 1300	25		Sandstone, fine grained, light pink-gray, dolomitic, some pink dolomite
		1300 - 1385	85		Sandstone, fine & medium grained, light cream-gray, dolomitic
		1385 - 1400	15		Sandstone, fine & medium grained, light brown-gray, dolomitic
		1400 - 1440	40		Sandstone, fine & medium grained, light gray, dolomitic
	375	1440 - 1445	5		Sandstone, fine grained, cream, very dolomitic
		1445 - 1465	20		Sandstone, medium grained, light gray
		1465 - 1495	30		Sandstone, fine grained, cream-gray, dolomitic
		1495 - 1570	75		Sandstone, fine & medium grained, light gray
		1570 - 1590	20		Sandstone, fine grained, light gray, slightly dolomitic

A J C L A I R E	1120 - 1135	15		Shale-siltstone, dk red, micaceous
	1135 - 1145	10		Sandstone, fine grained, pink, glauc., very dolo.
	1145 - 1170	25		Sandstone, fine grained, pink, very dolomitic
	1170 - 1220	50		Siltstone-shale, dark red, micaceous, glauconitic, dolomitic
	1220 - 1275	55		Sandstone, medium grained, pink-gray, pyritic, dolomitic
	1275 - 1300	25		Sandstone, fine grained, light pink-gray, dolomitic, some pink dolomite
	1300 - 1385	85		Sandstone, fine & medium grained, light cream-gray, dolomitic
	1385 - 1400	15		Sandstone, fine & medium grained, light brown-gray, dolomitic
	1400 - 1440	40		Sandstone, fine & medium grained, light gray, dolomitic
	1440 - 1445	5		Sandstone, fine grained, cream, very dolomitic
M T S I M O N	1445 - 1465	20		Sandstone, medium grained, light gray
	1465 - 1495	30		Sandstone, fine grained, cream-gray, dolomitic
	1495 - 1570	75		Sandstone, fine & medium grained, light gray
	1570 - 1590	20		Sandstone, fine grained, light gray, slightly dolomitic
	1590 - 1605	15		Sandstone, fine & medium grained, pink-gy, dolo.
	1605 - 1620	15		Sandstone, fine gr., light gray, slightly dolo.
	1620 - 1640	20		Sandstone, fine & medium grained, light gray, dolomitic
	1640 - 1660	20		Sandstone, fine & medium, light tan-gray, dolomitic
	1660 - 1710	50		Sandstone, fine & medium, light gray, dolomitic
	1710 - 1745	35		Sandstone, fine grained, light gray, dolomitic
355	1745 - 1800	55		Sandstone, medium grained, light gray, dolomitic

71-454
(pg.3)

Formations: Drift, Niagara, Richmond, Galena-Platteville, St. Peter, Franconia, Galesville, Eau Claire, Mt. Simon

While drilling the water level dropped from 40' to 199'. When well reached a depth of 877'. The water level returned to 193' at 1283' and was reported 209' at 1792' (INTERFERENCE FROM WELL NO. 1). Tested for 24 hours @ 1012 gpm, specific capacity = 7.09 gpm/ft. of drawdown.

APPENDIX E

WISCONSIN UNIQUE WELL NUMBER

Source: SWAP PROJECT KEYED

BG459

State of Wi-Private Water Systems-DG/2
Department Of Natural Resources, Box 7921
Madison, WI 53707

Form 3300-77A
(Rev 02/02)bw

Property Owner

OAK CREEK WATER UTILITY

Telephone Number

- -

Mailing Address

8640 S. HOWELL AV.

City

OAK CREEK

State

WI

Zip Code

53154

County of Well Location

2

41 MILWAUKEE

Co Well Permit No

W

Well Completion Date

January 1, 1956

Well Constructor

MILAEGER WELL & PUMP

License #

82

Facility ID (Public)

24101726

Address

20950 ENTERPRISE AV

Public Well Plan Approval#

City

BROOKFIELD

State

WI

Zip Code

53005

Date Of Approval

Hicap Permanent Well #

82742

Common Well #

EP3

Specific Capacity

10.4 gpm/ft

3. Well Serves

of homes and or

M

(eg: barn, restaurant, church, school, industry, etc.)

High Capacity: Well?

Y

Property?

Y

M=Munic O=OTM N=NonCom P=Private Z=Other X=NonPot A=Anode L=Loop H=Drillhole

1. Well Location

T=Town C=City V=Village

C of OAK CREEK

Fire#

Street Address or Road Name and Number

8530 S. KNIGHTSBRIDGE

Subdivision Name

Lot#

Block #

Gov't Lot

or

SW

1/4 of

SW

1/4 of

Section

16

T

5

N

R

22

E

2. Well Type

1

(See item 12 below)

1=New 2=Replacement 3=Reconstruction

of previous unique well #

constructed in

Reason for replaced or reconstructed Well?

1 1=Drilled 2=Driven Point 3=Jetted 4=Other

4. Is the well located upslope or sideslope and not downslope from any contamination sources, including those on neighboring properties?

N

Well located in floodplain?

N

Distance in feet from well to nearest: (including proposed)

1. Landfill

2. Building Overhang

3. 1=Septic 2= Holding Tank

4. Sewage Absorption Unit

5. Nonconforming Pit

6. Buried Home Heating Oil Tank

7. Buried Petroleum Tank

8. 1=Shoreline 2= Swimming Pool

9. Downspout/ Yard Hydrant

10. Privy

11. Foundation Drain to Clearwater

12. Foundation Drain to Sewer

13. Building Drain

1=Cast Iron or Plastic 2=Other

14. Building Sewer 1=Gravity 2=Pressure

1=Cast Iron or Plastic 2=Other

15. Collector Sewer: ___ units ___ in . diam.

16. Clearwater Sump

17. Wastewater Sump

18. Paved Animal Barn Pen

19. Animal Yard or Shelter

20. Silo

21. Barn Gutter

22. Manure Pipe 1=Gravity 2=Pressure

1=Cast iron or Plastic 2=Other

23. Other manure Storage

24. Ditch

25. Other NR 812 Waste Source

5. Drillhole Dimensions and Construction Method

From

To

Upper Enlarged Drillhole

Lower Open Bedrock

Dia.(in.)

(ft)

(ft)

-- 1. Rotary - Mud Circulation -----

-- 2. Rotary - Air -----

-- 3. Rotary - Air and Foam -----

-- 4. Drill-Through Casing Hammer

-- 5. Reverse Rotary

-- 6. Cable-tool Bit _ n. dia -----

-- 7. Temp. Outer Casing _ in. dia. _ depth ft. Removed ?

Other

6. Casing Liner Screen

Material, Weight, Specification

From

To

Dia. (in.)

Manufacturer & Method of Assembly

(ft.)

(ft.)

24.0

PIPE

surface

144

20.0

PIPE

144

583

Dia.(in.)

Screen type, material & slot size

From

To

8. Geology

Geology Codes

Type, Caving/Noncaving, Color, Hardness, etc

From (ft.)

To (ft.)

___ DRIFT

0

145

___L_ NIAGARA

145

365

___H_ RICHMOND(MAQUOKETA)

365

555

___L_ GALENA PLATTEVILLE

555

880

___N_ ST PETERS

880

990

___N_ FRANCONIAN

990

1010

___N_ GALESVILLE(DRESBACH)

1010

1085

___N_ EAU CLAIRE

1085

1415

___N_ MT. SIMON

1415

1815

9. Static Water Level

200.0

feet

B

ground surface

A=Above B=Below

11. Well Is:

in.

Grade

Developed?

N

Disinfected?

N

Capped?

N

10. Pump Test

Pumping level

ft. below surface

Pumping at

1200.0

GP

24.0

Hrs

12. Did you notify the owner of the need to permanently abandon and fill all unused wells on this property?

N

If no, explain

13. Initials of Well Constructor or Supervisory Driller

Date Signed

Initials of Drill Rig Operator (Mandatory unless same as above)

Date Signed

7. Grout or Other Sealing Material

Method

From

To

#

Kind of Sealing Material

(ft.)

(ft.)

Sacks Cement

CEMENT

surface

583.0

Additional Comments?

Variance Issued?

Owner Sent Label?

Y

More Geology?

Batch 77777777

WISCONSIN UNIQUE WELL NUMBER

Source: SWAP PROJECT KEYED

BG458

Property Owner

CITY OF OAK CREEK-WATER UTILITY

Telephone Number

- -

Mailing Address

8640 S. HOWELL AV

City

OAK CREEK

State

WI

Zip Code

53154

County of Well Location

41 MILWAUKEE

2

Co Well Permit No

W

Well Completion Date

August 1, 1958

Well Constructor

LAYNE CHRISTENSEN COMPANY

License #

582

Facility ID (Public)

24101726

Address

W229 N5005 DUPLAINVILLE

Public Well Plan Approval#

City

PEWAUKEE

State

WI

Zip Code

53072

Date Of Approval

Hicap Permanent Well #

82743

Common Well #

Specific Capacity

7.1 gpm/ft

3. Well Serves

of homes and or

M

(eg: barn, restaurant, church, school, industry, etc.)

High Capacity: Well? Y

Property? Y

M=Munic O=OTM N=NonCom P=Private Z=Other X=NonPot A=Anode L=Loop H=Drillhole

4. Is the well located upslope or sideslope and not downslope from any contamination sources, including those on neighboring properties?

N

Well located in floodplain? N

Distance in feet from well to nearest: (including proposed)

1. Landfill

2. Building Overhang

3. 1=Septic 2= Holding Tank

4. Sewage Absorption Unit

5. Nonconforming Pit

6. Buried Home Heating Oil Tank

7. Buried Petroleum Tank

8. 1=Shoreline 2= Swimming Pool

9. Downspout/ Yard Hydrant

10. Privy

11. Foundation Drain to Clearwater

12. Foundation Drain to Sewer

13. Building Drain

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14. Building Sewer 1=Gravity 2=Pressure

1=Cast Iron or Plastic 2=Other

15. Collector Sewer: ___ units ___ in . diam.

16. Clearwater Sump

17. Wastewater Sump

18. Paved Animal Barn Pen

19. Animal Yard or Shelter

20. Silo

21. Barn Gutter

22. Manure Pipe 1=Gravity 2=Pressure

1=Cast iron or Plastic 2=Other

23. Other manure Storage

24. Ditch

25. Other NR 812 Waste Source

5. Drillhole Dimensions and Construction Method

Lower Open Bedrock

From

To

Upper Enlarged Drillhole

Dia.(in.)

(ft)

(ft)

-- 1. Rotary - Mud Circulation -----

-- 2. Rotary - Air -----

-- 3. Rotary - Air and Foam -----

-- 4. Drill-Through Casing Hammer

-- 5. Reverse Rotary

-- 6. Cable-tool Bit _ n. dia -----

-- 7. Temp. Outer Casing _ in. dia. _ depth ft.

Removed ?

Other

28.0

surface

146

23.0

146

584

19.3

584

1800

6. Casing Liner Screen

Material, Weight, Specification

From

To

Dia. (in.)

Manufacturer & Method of Assembly

(ft.)

(ft.)

26.0

PIPE

surface

146

20.0

PIPE

146

584

7. Grout or Other Sealing Material

Method

From

To

#

Kind of Sealing Material

(ft.)

(ft.)

Sacks Cement

CEMENT

surface

584.0

8. Geology

Geology

From

To

Codes

Type, Caving/Noncaving, Color, Hardness, etc

(ft.)

(ft.)

___ DRIFT

0

135

__L_ NIAGARA

135

385

__H_ RICHMOND

385

555

__L_ GALENE-PLATTEVILLE

555

880

__N_ ST. PETER

880

995

__N_ FRANCONIAN

995

1005

__N_ GALESVILLE

1005

1070

__N_ EAU CLAIRE

1070

1445

__N_ MT. SIMON

1445

1800

9. Static Water Level

119.5 feet

B

ground surface

A=Above B=Below

10. Pump Test

Pumping level

ft. below surface

Pumping at

1012.0 GP

24.0 Hrs

11. Well Is:

in.

Grade

Developed? Y

Disinfected? Y

Capped? N

A=Above B=Below

12. Did you notify the owner of the need to permanently abandon and fill all unused wells on this property?

N

If no, explain

13. Initials of Well Constructor or Supervisory Driller

Date Signed

Initials of Drill Rig Operator (Mandatory unless same as above)

Date Signed

Additional Comments?

Variance Issued?

Owner Sent Label?

Y

More Geology?

Batch

77777777

APPENDIX F



Streets, Parks &
Forestry
Department

Forestry Division

Ted Johnson,
Director

Rebecca Lane,
City Forester

April 6, 2017

Water Department Reservoir Removal Project

Forestry Report & Specifications for Tree Preservation

On Friday March 31, 2017, City Forester conducted a site visit and tree inspection of trees bordering the water reservoir removal construction zone. Below are the findings of site evaluation and recommended tree preservation and removal plan. Please see attached map and photos for reference.

Site Background

The mature, native shagbark hickory and white oak trees identified and proposed for protection in this report are valuable (upwards of \$15,000). They represent a shrinking fraction of trees that are dependent on environmental conditions/site factors for their regeneration. These hickories and surrounding white oak predate the reservoir installation. Most of these trees can be traced back to approximately the Civil War.

Miller Park is the only park of its kind in Oak Creek. This savanna-like canopy provides a pleasant neighborhood respite.

The Miller Park stand is declining due to park disturbances and has thinned by approximately 1/3 since a 1996 inventory performed by myself for the then Park Dept.

Under-plantings of native white oak and shagbark hickory, as well as other native companion species, have been and will continue to be, the tree replacement strategy for this site. Maintaining native heritage trees is an aspect of City Forestry's Mission Statement.

We should do all that we can to preserve existing, high quality, native trees and tree stands that are highly unlikely to be replaced or replaceable. According to one research finding, the likelihood of an urban tree to reach maturity is one in 22.

Note overhead utilities along the park on Knights Way.

Present Tree Cover

Please see map. A red X denotes acceptable removals. Important trees to be preserved are obviously on the park side of the Tree Protection Fence, delineated by a red dashed line. Salvageable targets are denoted as SBH for shagbark hickory, OW for white oak and OR for red oak.



We would prefer to keep the honeylocusts (HL) near the north parking lot, and the street tree pin oak (OP) and Norway maple (MN) along Knights Way. However, these trees are less important if access should require removal.

Tree Protection Plan

Trees that are affected by unintended or careless construction practices, such as root disturbance or soil compaction near roots, slowly decline. Weakened trees are further predisposed to invasion of insects and diseases.

City Forestry will erect Tree Protection Fencing (TPF) before construction set-up and remove after project completion.

The Tree Protection zone is a no-entry zone. No construction equipment, materials, sand, soil or any other materials shall be placed, parked or stored on the surface of any unpaved area within the tree protection zone. No chemicals, rinsates or petroleum products shall be deposited within the TPF of trees. Care shall be taken not to damage tree branches near the fencing.

No driving is allowed in the understory of any of the park canopy trees outside the construction work zone.

Contact City Forestry if any problems develop during the course of construction such broken branches or other unintentional tree damage. City Forestry will be solely responsible for any tree related corrections.

Grade Changes

Removing, raising or filling grades around trees reduces oxygen in the root zone. No grade changes should occur on the park side of the TPF.

Recommendation: preserve existing grade around high quality trees; propose circular, gentle plateau blended with existing grade.

Tree Damage Liability or Replacement Formula

The removal of street tree pin oaks, Norway maple or parking lot honeylocust will require a two-for-one tree replacement.

Removal of shagbark hickory or white oak will require a five-for-one tree replacement.

Tree replacements will be selected, purchased and planted by City Forestry at \$250 each for an average 2-inch caliper sized tree of City Forestry's choice.