LAKE WHATCOM WATER AND SEWER DISTRICT
DIVISION 7 WATER RESERVOIR SEISMIC UPGRADE &
SHAKE ALERT IMPLEMENTATION
REQUEST FOR QUALIFICATIONS

I. INTRODUCTION

A. This Request for Qualifications ("RFQ") outlines the information necessary to understand the consultant selection process and the required documentation a Consultant must submit. After reviewing this RFQ, any firm that determines it has the necessary expertise and experience and could successfully perform the required services may submit its Submittal, addressing the items set forth herein. A general overview of the selection process is as follows:

1. Consultants shall deliver the Submittal to the District no later than **4:00 p.m. on September 30, 2021**, after which time they will be reviewed and evaluated. The Submittal shall be delivered to:

   Lake Whatcom Water and Sewer District
   1220 Lakeway Drive
   Bellingham, WA 98229
   Attn: Bill Hunter, District Engineer

2. The District may, at its option, contact a Consultant and ask clarifying questions concerning the Consultant's Submittal.

3. At the District's option, the District may conduct interviews with Consultants qualifying as finalists.

B. The purpose of this RFQ is to obtain a qualified consultant team to provide professional services to design replacement and/or improvements for the Rocky Ridge and Lakewood Sewer Pump Stations. The scope of work includes professional services for topographic surveying, pre-design, permitting, design, bidding, inspection, and construction contract administration. The District intends to select the most qualified firm for the project.

C. It is anticipated that Consultant services will be separated into three phases of work. The initial contract and first phase of work will cover topographic surveying, pre-design, and permitting. Phase two includes detailed design, specifications, cost estimates, and bidding. Phase three includes services during construction.

II. DISTRICT SUMMARY

A. The Lake Whatcom Water and Sewer District is a special purpose district operating under Title 57 Revised Code of Washington. Originally formed in 1968 as Whatcom County Water District No. 10, the District provides water service to approximately 4,100 equivalent residential units

(ERUs) and sewer service to approximately 4,400 ERUs in an 18-square mile area encompassing Lake Whatcom. The District is operated by 18 full-time professionals, governed by a five-member board of commissioners elected from within the District, and has an annual budget of approximately $8 million.

1. Water System Summary. The District owns and operates three Group A water systems and one Group B water system. In total, the District operates two water treatment plants, six pump stations, seven reservoirs, and approximately 70 miles of transmission and distribution mains. Additional information specific to the District's water system may be found in the 2018 Water System Comprehensive Plan, available on the District's website at https://lwwsd.org/resources/water-system-comprehensive-plan/.

2. Sewer System Summary. The District owns and operates 28 sewer lift stations and over 75 miles of sewage collection and conveyance lines. The District does not treat the sewage it collects, instead delivering its wastewater to the city of Bellingham's treatment plant for treatment and disposal under terms of an interlocal agreement that expires in 2034. Additional information specific to the District's sewer system may be found in the 2020 Comprehensive Sewer Plan, available on the District's website at https://lwwsd.org/resources/comprehensive-sewer-plan/.

III. PROJECT BACKGROUND

A structural analysis of the Lake Whatcom Water and Sewer District Division 7 Water Reservoir has found significant deficiencies in its ability to meet existing earthquake code requirements (BHC report, December 2016). The recent Water System Plan also analyzed the capacity of the Division 7 reservoir and found it to be significantly oversized at a volume of one million gallons. The Water System Plan recommended an alternatives analysis for this reservoir to compare the cost of making seismic upgrades and replacing the interior and exterior coatings that are beyond their useful life against the alternative of replacing the Division 7 reservoir with a more appropriate (~half a million gallons) amount of storage volume. Wilson Engineering LLC prepared a technical memoranda dated February 8, 2018 and December 28, 2020 which document the analysis of these alternatives. The memo considered 3 alternatives:

- Alternative 1 - Make Seismic Upgrades and Replace Coatings (Cost Estimate $1.72M)
- Alternative 2 – Replace Division 7 Reservoir with Two 185,000 Gallon Reservoirs (Cost Estimate $1.43M)
- Alternative 3 – Do Nothing

Alternative 2 was recommended as the preferred alternative that replaces 1-millon gallon Division 7 reservoir with two smaller 185,000 gallon reservoirs. Alternative 2 advantages are discussed in the tech memo.

In 2018, the District submitted a FEMA Hazard Mitigation Grant application to replace the Division 7 Reservoir with two new reservoirs constructed to meet seismic standards, and to implement ShakeAlert (earthquake early warning system) on reservoirs, water pumps and water treatment plants District-wide.

The grant application was developed in conjunction with Washington State Emergency Management Division (WA-EMD) and the Federal Emergency Management Agency (FEMA) as a Hazard Mitigation project. The cost share would be as follows: FEMA 75%, WA-EMD 12.5%, and LWWSD 12.5%. The application is still under consideration by the federal and state governments.

The District has been in communication with the WA-EMD and it appears the project will be funded, but no official notice has been received to date. The project has been split into two phases: Phase 1 – Design/Permitting and Phase 2 – Construction. Phase 1 is in progress with the goal to complete in 2022. Phase 2 targets construction for summer 2023.

Attachment A includes project and grant application information.

IV. PROCUREMENT PROCESS

A. General Information

1. Compliance with Legal Requirements.

    a. The procurement of these consultant services will be in accordance with applicable District, federal, state and local laws, regulations and procedures. The District reserves the right to reject any and all Submittals received. Any Consultant failing to submit information in accordance with the procedures set forth herein may not be considered responsive and may therefore be subject to disqualification by the District.

    b. In accordance with the provisions of this RFQ, the District will evaluate the Submittals. The final selection, if any, will be that Consultant which, in the opinion of the District, best meets the requirements set forth in the RFQ and is determined to be the most highly qualified for the services requested.

2. Costs borne by Consultants. All costs incurred in the preparation of a Submittal and participation in this RFQ and negotiation process shall be borne by the proposing firms.

3. Public Disclosure. Once in the District's possession, Submittals shall become property of the District and considered public documents under applicable Washington State laws. All documentation that is provided to the District may be subject to disclosure in accordance with Washington State public disclosure laws.

B. Protests

1. Time to File a Protest.

    a. Any prospective Consultant may file a protest challenging the requirements identified in the RFQ provided such protest is received no later than ten (10) calendar days prior to the date established for responding to this solicitation.

    b. A financially interested Consultant may file a protest based on evaluation of

Submittals provided such protest is received no later than five (5) calendar days after the protesting party knows or should have known of the facts and circumstances upon which the protest is based.

c. In no event shall a protest be considered if all Submittals are rejected or after execution of this contract.

2. Form of Protest. A protest shall be in writing and addressed to: Lake Whatcom Water & Sewer District, 1220 Lakeway Drive, Bellingham, WA 98229, Attention: General Manager. The protest shall include the following:

   a. The name, address and telephone number of the party protesting or their representative;

   b. The RFQ number and contract title under which the protest is submitted;

   c. A detailed description of the specific grounds for protest and any supporting documentation; and

   d. The specific ruling or relief requested.

3. Determination of Protest. Upon receipt of a timely written protest, the District General Manager shall investigate the protest and shall prior to execution of the contract respond in writing to the protest. The District General Manager's decision shall be considered the final action by the District.

4. Compliance with Protest Process. Failure to comply with these protest procedures will render a protest untimely and inadequate and may result in rejection thereof by the District.

5. Exhaustion of Administrative Remedies: As a mandatory condition precedent to initiating a lawsuit against the District, a prospective Consultant or a Consultant shall comply with the Protest Procedures defined herein.

6. Venue: By responding to this RFQ and for the convenience of the parties, the prospective Consultant or a Consultant acknowledges and agrees that a lawsuit or action related to or arising out of this procurement shall be brought in the Superior Court of Whatcom County, Washington.

C. Schedule

1. Anticipated Schedule. The selection process is anticipated to proceed as outlined below and is subject to change:

Date	**Selection Process**
September 13, 2021	**Public Announcement of the RFQ**
September 30, 2021	**Submittals Due**
October 13, 2021	**Recommendation to Board**

October/November 2021 Contract Execution

2. Notification. The District will notify appropriate firms of changes in the RFQ and Notice of Selection.

3. Addenda. In the event it becomes necessary to revise any part of the RFQ, addenda will be provided to all firms still under consideration at the time the addendum is issued. If any firm has reason to doubt whether the District is aware of the firm's interest, it is the responsibility of the firm to notify the District to be sure that addenda are received. Mail or call such notice to Bill Hunter, 360-734-9224, Lake Whatcom Water and Sewer District, 1220 Lakeway Drive, Bellingham, WA 98229.

D. Negotiations

1. At the completion of the selection process, the selected Consultant will enter into contract negotiations with the District. Negotiation of a contract will be in conformance with applicable federal, state and local laws, regulations and procedures. The negotiated cost and pricing data, once agreed to by the District and the Consultant, shall form the basis for a billing/payment provision.

2. At the beginning of negotiations the selected Consultant and District shall establish a Negotiation Schedule. Negotiations shall begin with the Work Plan identified in the Qualifications Statement submitted by the selected Consultant.

3. If the District and selected Consultant cannot come to terms on level of effort (LOE) and a scope of work (SOW) after three (3) revisions to the SOW and LOE, the District may discontinue negotiations and go to next highest ranked Consultant. Failure to reach agreement after three (3) revisions demonstrates an inability to reach agreement within a reasonable timeframe.

4. If the District and selected Consultant cannot come to terms on cost and pricing data after three (3) revisions, the District may discontinue negotiations and go to the next highest ranked Consultant. Failure to reach an agreement after three (3) revisions demonstrates an inability to reach agreement within a reasonable timeframe.

E. Contract Terms and Conditions

1. A copy of the draft agreement(s) for A/E professional services is included as an Attachment.

2. By submitting qualifications, the Consultant represents that it has carefully read the terms and conditions of the Request for Qualifications and agrees to be bound by them. Agreement to be negotiated.

F. Cost and Pricing Data

1. The selected consultant shall provide the following information within five (5) business days after Notice of Selection has been received. Failure to provide such information in a timely manner may result in the District discontinuing negotiations with the selected Consultant

and starting negotiations with the next highest ranked Consultant.

a. Direct Salaries. Selected consultant and its subconsultants shall submit the following information:

    (1) List of employees, in alphabetical order (last name first), with job classification, rate of pay, and salary review date.

b. Overhead Rates. Selected consultant and its subconsultants shall provide the following information:

    (1) Provide current audited overhead schedule, audit report, and cost detail by general ledger account.

    (2) Provide a listing of all personnel who will perform work on this Project whose salaries, in full or in part, are included in overhead for the current and previous year. For each person identify his or her title, classification, position in company and salary rate.

c. Billing Rates. Submit only for certain qualifying small firms.

    (1) Small firms that do not have an accounting system in place, that identifies direct and indirect costs separately, generally use billing rates. Fully burdened billing rates, which include labor, overhead costs and profit are allowed on a case-by-case basis for those firms that typically use this method for billing purposes.

d. Other Direct Cost(s).

    (1) Identify all Other Direct Cost(s) (ODC) for this project and the rationale used as a basis for this cost.

    (2) For each ODC, provide the unit prices and/or rates with supporting rationale, historical data and estimating methodology used to validate these rates.

    (3) Failure to identify ODC results in a presumption that there are no ODC.

e. Profit. Selected consultant and its subconsultants shall provide the following:

    (1) Proposed profit;

    (2) Rationale and justification for the proposed profit rate.

f. Markup on Subconsultant Costs and ODC. Selected consultant and its subconsultants shall provide the following:

    (1) Proposed markup on subconsultant costs and ODC;

(2) Rationale and justification for the proposed markups.

V. INSURANCE REQUIREMENTS

A. Prior to execution of the Agreement, the Selected Consultant shall file with the District certificates of insurance and endorsements from the insurer(s) certifying to the coverage of all insurance required in accordance with the District's standard agreement. All evidences of insurance must be certified by a properly authorized officer, agent, general agent or qualified representative of the insurer(s) and shall certify the name of the insured, the type and amount of insurance, the location and operations to which the insurance applies, the expiration date, and provides that the District receives notice at least thirty (30) calendar days prior to the effective date of any policy limit or cancellation of required coverages. The Consultant shall notify the District at least thirty (30) calendar days prior to the effective date of any cancellation or reduction in coverage in the policy. The Consultant shall maintain during the entire Contract period, insurance coverage at least as broad as the limits and coverage outlined in the District's standard agreement. The Consultant shall, upon demand of the District, make available to the District at Consultant's local office in all such policies of insurance and the receipts of payment of premiums thereon. Failure to provide such policies of insurance within a time acceptable to the District shall entitle the District to suspend or terminate the Consultant's work hereunder. Suspension or termination of the Consultant Agreement shall not relieve the Consultant from its insurance obligation hereunder.

B. The Consultant shall obtain and maintain at a minimum the limits of insurance set forth in the Consultant Agreement. By requiring such minimum insurance, the District shall not be deemed or construed to have assessed the risks that may be applicable to the Consultant under the Agreement. The Consultant shall assess its own risks and, if it deems appropriate and/or prudent, maintain greater limits and/or broader coverage.

C. Each insurance policy shall be written on an "occurrence" form; excepting that insurance for professional liability, errors and omissions when required, is acceptable on a "claims made" form.

D. If coverage is approved and purchased on a "claims made" basis, the Consultant shall continue coverage either through (1) policy renewals for not less than three years from the date of completion of the work which is the subject of this Agreement or (2) the purchase of an extended discovery period for not less than three years from the date of completion of the work which is the subject of this Agreement, if such extended coverage is available.

E. If, in order to meet the insurance requirements the Consultant must rely on the insurance to be provided by one or more subconsultant, then such subconsultant(s) shall be required to meet all of the requirements herein applicable to the insurance they are providing, and shall include District and Consultant as additional insureds on all liability policies except Professional Liability/Errors & Omissions and Workers Compensation. The District will not make any payments on work performed by subconsultants until all insurance documentation from such subconsultants have been received and accepted by the District.

F. Provided the affected insurance policies permit the following waiver, without voiding coverage,

Consultant and District waive all rights against each other to subrogation for damages covered by property insurance.

VI. EVALUATION AND SELECTION CRITERIA

A. All Submittals will be evaluated by a Consultant Selection Panel ("Panel"), which will be responsible for ranking of the Submittals. The criteria outlined below will be used in evaluating the Submittals and determining the most qualified Consultant. A total of 100 points (excluding a potential interview) has been assigned to the Evaluation Criteria. The maximum points possible will follow each criterion listed. The points indicate relative weight or importance given to each criterion.

B. The District may determine that the ranking is close and an interview with the top ranked firms is necessary. Interviews will have a maximum of 50 points. The number of Consultants to participate in interviews, if any, will be determined by the District based on the recommendation of the evaluation. The District may choose to use different criteria for the interview, in which case the finalists will be so notified in writing. The interview process may or may not include a Consultant presentation and the Consultants will not be given questions to prepare for in advance of the interview.

C. Following the review of the submittals and the interviews (if conducted) the evaluators will use the points to score each Submittal. Each evaluator will put the scores in rank order, with the highest scored Consultant 1st, the second-highest scored Consultant 2nd, etc. This ranking will then be totaled. From the ranking, the District intends to recommend the most qualified Consultant to the Board of Commissioners for approval to begin negotiations.

VII. DOCUMENTATION

A. The prime Consultant shall submit five (5) bound copies and a USB or CD with the electronic PDF file of the Submittal.

B. Consultants are discouraged from submitting lengthy Submittals. The District requests that Submittals be concise and clearly written containing only essential information. Submittals should be 25 pages or less, including any resumes and cover letter.

- Submittals should be minimum of 11 font.
- Sheets with double sided printing will be counted as 2 pages.
- Sketches, maps and charts printed on 11x17 count as 1 page.

The Submittal shall consist of the following parts:

1. Letter of Interest: The Letter of Interest shall contain the following information:
   - RFQ Title: **Division 7 Water Reservoir Seismic Upgrade & Shake Alert Implementation;**
   - Consultant's name, mailing address, contact person, telephone and fax numbers;
   - UBI and federal tax ID numbers; and
   - Stipulation that Consultant accepts all terms of the RFQ, especially the terms and conditions of the attached sample contract(s).

2. Qualifications Statement. The submittal shall include Key Personnel's:
    - General statement of the understanding of the scope of services.
    - Project Team including proposed subconsultants.
    - The Project Team's experience with wastewater facility operations, maintenance, design, construction management and inspection services.
    - Experience with District's sewer infrastructure.
    - Permitting experience with Whatcom County, including experience in the County's shoreline permitting process and requirements.
    - Approach to managing and completing projects.
    - Approach to communicating with the District.
    - Approach to ensure cost efficient execution and quality control.
    - Experience with FEMA Hazard Mitigation Grant projects and associated federal and state funding requirements.

    The submittal shall be presented in a clear, comprehensive and concise manner and shall be submitted in a complete package by the prime Consultant.

VIII. EVALUATION CRITERIA AND SUBMITTAL INFORMATION

A. **Experience and Technical Competence - 40 Points**.

The District will evaluate the experience and technical competence of the Consultant's Key Personnel to complete the project. Emphasis will be placed on recent experience and expertise in performing the required services on projects with a scope of work similar in size and complexity to this Project.

B. **Work Plan - 30 points.**

The District will evaluate the proposed Work Plan to determine the Consultant's understanding of the scope of work, allocation of skilled personnel to specified tasks, appropriate utilization of subconsultants, and overall project approach.

1. The Work Plan is an opportunity for the Consultant to demonstrate its understanding of scope and propose ideas for the Project.

C. **Record of Past Performance & References - 30 Points**.

1. The District will evaluate the project team's record of performance and references on previous and/or ongoing projects with consideration given to quality of work, ability to meet schedules and budgets, cooperation, responsiveness, performance on other District projects and other managerial considerations.

2. The District will evaluate the project examples provided with respect to Key Personnel's experience with similar projects and the amount of involvement they had with the project examples. The project examples provided should demonstrate Key Personnel's experience in providing services similar in scope to this Project.

D. **Interviews - 50 Points (if conducted)**

1. The District may or may not conduct interviews. If the District determines that interviews are necessary, the District will conduct interviews with the short listed Consultants (finalists).

2. Consultants will be notified in writing of the request and provided the date, place, and time of the interview. The interview process may or may not include a Consultant presentation and the Consultants will not be given questions to prepare for in advance of the interview. The District may choose to use different criteria for the interview, in which case the Finalists will be so notified in writing.

3. Failure to participate in the interview process shall result in a Consultant's disqualification from further consideration.

AGREEMENT FOR A/E PROFESSIONAL SERVICES
FOR
DIVISION 7 WATER RESERVOIR SEISMIC UPGRADE &
SHAKE ALERT IMPLEMENTATION

THIS AGREEMENT, made and entered into by and between Lake Whatcom Water and Sewer District, Whatcom County, Washington, hereinafter referred to as "District", and **[[[FIRM NAME]]]** ("Consultant"), a corporation with a place of business at **[[[FIRM ADDRESS]]]**, collectively referred to as "Parties", shall be effective upon the authorized signatures of both Parties to this Agreement ("Effective Date").

WHEREAS, the District, a special purpose municipal corporation, provides water and sewer service to its constituents; and

WHEREAS, the District desires to retain the Consultant to perform certain professional services, including engineering services necessary to perform **Division 7 Water Reservoir Seismic Upgrade & Shake Alert Implementation** ("Project"); and

WHEREAS, the District solicited for professional services as required by RCW 39.80; and

WHEREAS, the Consultant represents it has available and offers to provide qualified personnel and facilities necessary to accomplish such services required for the Project within the required time.

The Parties enter into this Agreement. The term Agreement and Contract shall be used interchangeably and refer to this Agreement.

SECTION 1: PERIOD OF PERFORMANCE

1.1. All required work and services specified in the terms and conditions of this Agreement for **Phase 1, Design and Permitting Services per Exhibit A – SCOPE OF WORK**, shall be completed by **[[[December 31, 2023]]]** unless extended or terminated earlier by the District pursuant to the terms and conditions of this Agreement. The District reserves the right to amend this Agreement to add **Phase 2, Services During Construction per Exhibit A – SCOPE OF WORK**. The District also reserves the right to let the Agreement expire at the completion of Phase 1 and to select another consultant to perform the additional study and/or phases.

1.2. Time is a material consideration in the performance by the Consultant under this Agreement. The Consultant shall complete its work and services within the Project schedule, including any established milestones and task completion dates, and the Period of Performance, set forth in the Scope of Work. The completion dates for tasks may be modified by a written directive; however, the Period of Performance for the Agreement may only be modified through an amendment. No completion dates shall be extended because of any unwarranted delays attributable to the Consultant. Completion dates may be extended in the event of a delay caused by the District which results in a delay in the performance of an affected task, or because of unavoidable delay caused by any governmental action or other conditions beyond the control of the Consultant, which could not be reasonably anticipated and which results in a delay in the performance of an affected task.

1.3. Time Extensions. The Total Price, Period of Performance and task budgets shall not be increased because of any unwarranted delays or costs attributable to the Consultant. In the event of a delay not attributable to the Consultant which (1) delay could not be reasonably anticipated and (2) results in an increase in costs to perform the work, the District may, through the execution of an amendment, increase the Total Price, Period of Performance and/or task budget.

SECTION 2: ADMINISTRATION AND SUPERVISION

2.1. **DISTRICT**. An employee of the District, hereinafter called the "Project Manager," who shall be designated in writing by the District, shall perform day-to-day management of this Contract. Unless otherwise indicated in writing by the General Manager or its designee, the Project Manager will issue notices to proceed, approve all requests for payment, authorize termination or modification of tasks, and approve in writing changes to the task budgets outlined in the Cost Summary, Exhibit B attached hereto and incorporated by reference, provided the changes do not impact the Total Price, Period of Performance, and the Fixed Professional Fee. The Project Manager will also be responsible for determining when the Consultant has satisfactorily performed all work and for ensuring that the Consultant complies with all provisions of this Agreement.

2.2. **CONSULTANT**. The Consultant represents that it has, or will obtain, all personnel necessary to perform the services required under this Agreement and that such personnel shall be qualified, experienced and licensed as may be necessary or required by laws and regulations to perform such services. All services required under this Agreement shall be performed by the Consultant, its employees, or by subconsultants whose selection has been authorized by the District; provided, that the District's authorization shall not relieve the Consultant or its subconsultants from any duties or obligations under this Agreement or at law to perform in a satisfactory and competent manner. All contractual duties, requirements and obligations that the Consultant owes to the District shall also be owed to the District by the Consultant's subconsultants retained to perform the work pursuant to this Agreement. The term "Consultant" shall refer to **[[[FIRM NAME]]].** and all of its subconsultants.

A. Authorized Subconsultants. The Contract shall identify in the Cost Summary, Exhibit B, the subconsultants who are authorized to perform work under this Contract.

B. Process for Adding or Removing Subconsultants. If during the term of this Contract, the Consultant wishes to add or remove a subconsultant, the Consultant shall provide the Project Manager with a written request identifying the proposed change. The written request shall include the following information:
   1. Identity of the subconsultant and the work to be performed;
   2. Resumes and documentation outlining the subconsultant's experience;
   3. If the subconsultant is to perform work of the consultant or another subconsultant already identified in Exhibit B, an explanation of why the work is going to be transferred to a new subconsultant.

C. District Approval of Subconsultants. The District has sole discretion in approving or rejecting proposed subconsultants. Each subcontract shall be available for review and the cost summary subject to review by the Project Manager prior to

the subconsultant proceeding with the work. Before any subconsultant not already identified in the Contract can perform any work under this Contract, the District shall provide written authorization to the Consultant.

D. Substitution of Personnel. The Consultant recognizes and agrees that if a change is made substituting or changing assigned key personnel, the Consultant shall be responsible for any and all costs associated with "Transfer of Knowledge and Information". The Transfer of Knowledge and Information shall be defined to include the labor hours spent reviewing project documentation, participating in meetings with Project personnel, and participating in site visits to familiarize oneself with the Project and project location(s). The District shall not pay for any time spent for the "Transfer of Knowledge and Information".

1. The Consultant shall provide sufficient advance notice of any intention to remove or reassign key personnel. The Consultant shall not remove or reassign the key personnel assigned to this Project without written consent from the District. Exhibit F, Key Personnel, is a listing of key individuals for this work. Notice for the substitution of individuals and positions identified as Key Personnel shall include the following:

   a. An explanation of the reason for the reassignment or removal;
   b. The name of the person proposed to replace the individual; and
   c. Identification of the experience and qualifications of the individual proposed.

2. For individuals who are not identified as "Key Personnel" in Exhibit F, the Consultant shall provide documentation supporting the labor rate for the substituted personnel prior to submitting an invoice and the labor rate shall not exceed 110 percent of the originally assigned personnel's labor rate.

3. District Request Removal Personnel. The Consultant shall remove from the Project any personnel or subconsultant if, after the matter has been thoroughly considered by the District and the Consultant, the District considers such removal necessary and in the best interests of the Project and so advises the Consultant in writing. In this case, the District will compensate the consultant for Transfer of Knowledge costs associated with the removal of any personnel or subconsultant.

SECTION 3: SCOPE OF WORK

3.1. The District hereby retains the Consultant upon the terms and conditions contained herein to perform certain work and services on the Project. The work and services for the Project to be performed by the Consultant are set forth in Exhibit A, Scope of Work, attached hereto, and incorporated herein by this reference. The general Project Schedule is set forth in Exhibit C, attached hereto and incorporated herein by reference.

3.2. The District shall make available to the Consultant, without cost, copies of as-built plans, drawings, survey notes, studies, soil reports, maintenance and performance records, and other relevant data, and property descriptions of various District facilities related to the Project, which are readily available, and on file at the District. These documents are available solely as additional Information to the Consultant and do not relieve the

Consultant of its duties and obligations under this Agreement nor constitute any representation or warranty by the District as to conditions or other matters related to the Project.

3.3. It shall be the responsibility of the Consultant to gather and become familiar with all site information including existing improvements.

SECTION 4: CHANGES IN WORK

4.1. Any direction from the District to perform work that results in an increase or decrease in scope, changes to the Total Price or Period of Performance, or changes impacting the Scope and Budget for the project shall be made only by an amendment prior to the work being performed. A member of the Board of Commissioners for the District is the only authorized District representative who may sign amendments.

4.2. In the event the Consultant identifies something that may impact the scope of work, Project Schedule and/or cost, Consultant shall inform the Project Manager within five (5) business days of the event and possible impacts to scope, schedule and cost. If appropriate, the parties shall execute an amendment.

4.3. The District may, at any time, by written amendment direct the Consultant to make additions within the general scope of the services or work to be performed under this Agreement, delete portions of the Project, or revise portions of the work. Any changes within the general scope of work, which result in an increase or decrease in time of performance or cost, shall only be made by amendment.

SECTION 5: RESPONSIBILITY OF THE CONSULTANT

5.1. Standard of Care

A. The Consultant shall be responsible for the professional quality, technical adequacy and accuracy, timely completion and coordination of all plans, designs, drawings, specifications, reports and other services prepared or performed pursuant to this Agreement. The Consultant shall perform its work to conform to generally accepted professional standards applicable to the types of services and work provided hereunder. The Consultant shall be responsible for the professional standards, performance and actions of all persons and firms performing work pursuant to this Agreement. The Consultant shall, without additional compensation, correct or revise any errors, omissions or specific breaches of a contractual obligation in such plans, designs, drawings, specifications, reports and other services.

B. The District's approval of plans, drawings, designs, specifications, reports and other products of the professional services rendered hereunder shall not in any way relieve the Consultant of responsibility for the technical adequacy or accuracy thereof. Neither the District's review, approval or acceptance of, nor payment for, any of the services shall be construed to operate as a waiver of any rights under this Agreement or of any cause of action arising out of the performance of this Agreement.

C. The Consultant shall be knowledgeable and familiar with the District's Construction General Conditions and any District provided Division 0 (which includes General and Supplemental conditions and Bidding Provisions) and Division 1 (General Construction Requirements). Any technical specifications drafted by the Consultant shall be consistent with these Divisions and such technical specifications should not create any ambiguity or conflict with these Divisions.

D. Consistent with generally accepted professional standards, the Consultant shall promptly bring to the District's attention any concerns that the Consultant has regarding the design, or any finding, conclusions, or final decisions made by the District. The Consultant shall, at the District's request, provide the District with a written evaluation of its concerns, along with proposed solutions to any identified problems.

5.2. Maintenance of Project Documentation

A. Upon written request by the Project Manager, the Consultant shall provide the District with access to all documents and correspondence, including e-mail communications, memoranda, and all other written materials prepared or used in performance of work on this Project.

B. The Consultant is cautioned that information and documentation submitted to the District may become a public record in accordance with the Revised Code of Washington and may not be exempt from disclosure under the Washington State Public Disclosure Act.

C. The Consultant acknowledges that unauthorized disclosure of information or documentation concerning this Project may cause substantial economic loss or harm to the District. Except as otherwise required by Court Order or subpoena, the Consultant shall not without prior written authorization by the Project Manager allow the release, dissemination, distribution, sharing, or otherwise publication or disclosure of information or documentation obtained, discovered, shared or produced pursuant to this Agreement.

SECTION 6: PRODUCTS

6.1. In the performance of this Agreement, the Consultant shall, to the extent practicable, design and draft specifications that provide for maximum use of structures, machines, products, materials, construction methods, and equipment which are readily available through competitive procurement, or through standard or proven production techniques, methods and processes.

6.2. The Consultant shall not, in the performance of the work under this Agreement, produce a design or specification which would require the use of structures, machines, products, materials, construction methods, equipment, or processes which the Consultant knows to be available only from a single source, unless the Consultant has provided a written justification for the use of a single source in writing and the District concurs.

6.3. The Consultant shall not, in the performance of the work under this Agreement, produce a design or specification which would be restrictive or written in such a manner as to

contain proprietary, exclusionary, or discriminatory requirements other than those based upon performance, unless such requirements are necessary to test or demonstrate a specific thing, or to provide for necessary interchangeability of parts and equipment. The Consultant shall report to the District any single source or restrictive design or specification giving the reason(s) why, in the Consultant's professional judgment, it is necessary to restrict the design or a particular specification. The Consultant shall substantiate in writing, and to the District's satisfaction, the basis for the single source or restrictive design or specification.

6.4. When one or more brand names or trade names of comparable quality or utility are listed, the words "or approved equal" shall follow the brand name(s) and the salient characteristics shall be identified.

SECTION 7: COMMENCEMENT AND MONTHLY REPORTS

7.1. Notice to Proceed. After execution of this Agreement by the District and the Consultant, the District will issue a written notice to proceed on the Project or specific tasks thereof. Such notices to proceed will be provided for specific tasks identified as necessary to produce specified work products and shall set forth the date of commencement of the work, a description of the work to be performed, the schedule for the work authorized, and the budgets for such tasks. Upon receipt of a notice to proceed, the Consultant shall promptly commence work.

7.2. Monthly Reports. Unless otherwise stated in the Scope of Work, not later than the 10th day of each calendar month during the performance of the Project, the Consultant shall submit to the Project Manager, a monthly report, in a format approved by the Project Manager, sufficient to show the activities completed and the Project progress as measured against the Project Schedule and Exhibit B, Cost Summary. At a minimum the monthly report shall identify work completed, costs incurred, budget status (budget vs. estimated balance to complete), amendments, project schedule, any variance between planned vs. actual project performance, all issues that may result in completion of any task beyond the established schedule or task budget, and all issues that may result in an increase in Total Price.

SECTION 8: COMPENSATION

8.1. Subject to the provisions set forth in this Agreement, the District will pay the **[[[FIRM NAME]]].** for authorized and satisfactorily completed work and services rendered under this Agreement. No more than monthly progress payments shall be full compensation for work performed and services rendered, for all supervision, labor, supplies, materials, equipment or use thereof, taxes, and for all other necessary incidentals, but in no case shall the total progress payment exceed the Total Price as defined herein. The amount to be paid to the Consultant shall be computed as hereinafter set forth; provided, that such payment shall not exceed a maximum amount of **[[[CONTRACT AMOUNT]]]** DOLLARS (**$??????**) ("Total Price"). In the event the Consultant incurs costs in excess of the Total Price, the Consultant shall pay such excess from its own funds and the District shall not be required to pay any part of such excess and the Consultant shall have no claim against the District on account thereof.

8.2. Compensation for work and services shall be on a cost plus fixed fee basis but not to exceed the Total Price. Compensation and the Total Price shall be the sum of Direct

Labor Costs, Indirect Costs, a Fixed Professional Fee, and Other Direct Costs as described and defined below. Costs to be paid are identified in the Cost Summary, which is attached hereto as Exhibit B and incorporated herein by this reference, and comprise the following:

A. **Direct Labor Costs**. Direct Labor Costs shall be the total number of allowable hours worked on the Project by each individual multiplied by the Labor Rate identified in the Costs Summary (Exhibit B) for such individual.

1. A Labor Rate shall not exceed $65.00 per hour, except in exceptional and rare circumstances when the District, in its sole discretion, agrees to pay over $65.00 per hour.

2. The District shall only pay the Labor Rate and shall not pay any premium associated with overtime.

3. The parties agree to the Labor Rates as set forth in Exhibit B, which rates shall be used during the entire term of this Agreement, including all amendments; provided however, Labor Rates may be subject to reasonable adjustments but only in accordance with paragraph 8.4 below.

B. **Indirect Costs**. Indirect Costs shall be calculated as follows:

1. Indirect Costs shall be the Overhead Rate identified in the Cost Summary (Exhibit B) multiplied by the Direct Labor Rates for every allowable hour worked on the Project and billed by the individual.

2. The Consultant agrees to the Overhead Rates as set forth in Exhibit B, which rates shall be used during the term of this Agreement, including all amendments.

C. **Fixed Professional Fee (Profit).** The District shall pay a Professional Fee which shall be calculated as set forth below.

1. The Professional Fee shall be **?.?%**, or otherwise represented as a multiplier of **0.???**, of the total of the Direct Labor Costs plus the Indirect Costs, as identified in the Cost Summary (Exhibit B).

2. The Consultant acknowledges and agrees that the Fixed Professional Fee is only due and payable for Project work for which the District has given notice to proceed and which the Consultant has satisfactorily completed. The Fixed Professional Fee will not be paid for any tasks in the Scope of Work and Cost Summary that the District does not authorize the Consultant to perform. The District is entitled to a deductive amendment for any unperformed tasks.

3. The Consultant acknowledges and agrees that the amount of the Fixed Professional Fee may be adjusted by the District to:

   a. Reduce the Fixed Professional Fee associated with Scope of Work that was not authorized, or was not performed by the Consultant;

b. Reduce the Fixed Professional Fee associated with deletions in the Scope of Work;

c. Increase the Fixed Professional Fee for additional work included in the Scope of Work through an amendment.

4. The Fixed Professional Fee shall be paid as follows:

a. The Fixed Professional Fee will be paid monthly in proportion to the Project work satisfactorily completed. The proportion of work completed shall be determined by earned value of the Project work satisfactorily completed. The Cost Summary shall identify the Project work for payment of the Fixed Professional Fee.

b. A payment for an individual month shall include that portion of the Fixed Professional Fee allocable to the Project work satisfactorily completed during said month and not previously paid; and

c. Any portion of the Fixed Professional Fee not previously paid in the monthly payments shall be included in the final payment provided that the Consultant satisfactorily completed the entire scope of work subject to the limitations set forth above.

d. The Consultant acknowledges and agrees that the Fixed Professional Fee does not and shall not include any profit or other markup on subconsulting costs or Other Direct Costs.

D. **Other Direct Costs**. Other Direct Costs ("ODC") are those costs which can be specifically identified with the Contract objectives, are required for performance of the Contract, are approved in advance in writing by the Project Manager, and are actually incurred. Markup on ODC's shall be billed at **???% for subconsultants and at fixed rates as listed in Exhibit E – ALLOWABLE ODC'S**.

8.3. Unallowable Costs. The District shall not pay for any costs or direct charges associated with or relating to the following activities:

A. Any resubmission, changes to or adjustments in the invoices, and fixing improper invoices and the preparation and submission of monthly invoices if this cost is not included In the Consultant's overhead.

B. Preparation of, discussion and/or negotiation of a request for adjustments in any Labor Rate, Overhead Rate and/or Labor Escalation percentage; and

C. Changing or reassigning personnel or subconsultants, including but not limited to preparing requests concerning Transfer of Knowledge for Key Personnel. Exception, the District will pay for costs associated with the change or reassignment resulting from a written request from the District requesting the specific personnel or subconsultant change.

D. Preparation of any documentation related to, discussion of, or negotiation of equitable adjustment, disputes, claims or Section 16, Disputes and Remedies.

E. Meals, except when in Travel Status.

8.4. Limitations on Changes to Labor Rates.

A. Any changes Labor Rates shall have no impact on the Total Price.

B. Overhead Rates.

C. The Overhead Rates are identified in the Cost Summary, Exhibit B. The Overhead Rates shall not be subject to modification.

D. Labor Rates

1. The Consultant agrees that all Labor Rates identified in this Agreement (Exhibit B) shall be effective for the entire Contract duration, including all amendments; provided however, Labor Rates may be increased at the sole discretion of the District on an annual basis.

2. A Labor Rate shall not exceed $65.00 per hour except in exceptional and rare circumstances when the District, in its sole discretion, agrees to a Labor Rate over $65.00.

3. Labor rate increases must be based on actual and verifiable increases in labor costs.

4. Should the Consultant seek an adjustment in Labor Rate(s), Consultant must notify the District in writing of its request to modify the existing labor rate. Consultant shall submit only one request per year that must include all individual rate increase requests. This request shall include the amount of the increase in the rate for each rate increase.

E. Other Direct Costs. Other Direct Costs ("ODC") are those costs which can be specifically identified with the Contract objectives, are required for performance of the Contract, are approved in advance in writing by the Project Manager, and are actually incurred. Allowable ODC are as included in Exhibit E to this Contract.

8.5. Approval of Increases by District; Adjustments in Labor Rates, and the amount of any rate increase require the approval of the Project Manager. The Consultant shall provide additional information as requested by the District. The District shall review the Consultant's request for a rate increase and respond in writing to the request within sixty (60) calendar days of receipt of such request.

8.6. Effective Period. Any change to the Labor shall not be effective until the date the Project Manager approves, in writing, the increase. Labor rates shall not be retroactive. Only services performed after the date the Project Representative approves the rate increase shall be billed at the new labor Rate. The written approval is considered a part of the Contract documents and shall be incorporated into the Contract in the next amendment.

8.7. Invoice Process. The Consultant shall submit to the Project Manager an invoice for payment for Project work completed to the end of the previous month. Such invoices

shall be for work performed subsequent to that work covered by all previously submitted invoices and shall be computed pursuant to the rates and limitations set forth hereinabove.

A. Invoices shall detail the work by task, hours and employee name and level for which payment is being requested; include copies of all invoices from authorized subconsultants for which payment is being requested; and shall itemize, and include copies of, receipts and invoices for the Other Direct Costs.

B. At no time shall the total cumulative amounts paid for Project work exceed the total which would be due upon the completion of all Project work multiplied by the percentage of the required work satisfactorily completed, as determined by the District.

C. In the event of a disputed invoice, the District shall pay the undisputed amounts and withhold from payment the disputed portion of the invoice.

8.8. Prompt Payment of Subconsultants. Within ten (10) business calendar days of receipt of a progress payment from the District that includes dollars for work performed by subconsultants, Consultant shall pay such subconsultants out of such amounts as are paid by the District, for all work satisfactorily completed by the subconsultant.

8.9. Final Payment. Final payment of any balance earned by and payment to the Consultant for Project work will be made within sixty (60) calendar days after all of the following:

A. Satisfactory completion of all work required by this Agreement;

B. Receipt by the District of the plans, studies, surveys, photographs, maps, calculations, notes, reports and all other documents and/or deliverables which are required to be prepared and submitted by the Consultant under this Agreement;

C. Delivery of all equipment/materials purchased specifically for the Project where the District has reimbursed the Consultant for such costs;

D. Receipt by the District of a fully executed final statement of amounts Invoiced by and paid to each subconsultant under this Agreement; and,

E. Execution and delivery by the Consultant of a release of all claims against the District arising under or by virtue of this Agreement, other than such claims, if any, as may be specifically exempted by the Consultant from the operation of the release in stated amounts to be set forth therein.

F. No payment, whether monthly or final, to the Consultant for any Project work shall constitute a waiver or release by the District of any claims, right or remedy it may have against the Consultant under this Agreement or by law; nor shall such payment constitute a waiver, remission or discharge by the District of any failure or fault of the Consultant to satisfactorily perform the Project work as required under this Agreement.

SECTION 9: TERMINATION OF AGREEMENT

9.1. Termination for Default

A. The District may terminate this Agreement, in whole or in part, in writing if the Consultant substantially fails to fulfill any or all of its material obligations under this Agreement through no fault of the District.

B. If the District terminates all or part of this Contract for default, the District shall determine the amount of work satisfactorily performed to the date of termination and the amount owing to the Consultant using the criteria set forth below; provided, that (a) no amount shall be allowed for anticipated profit on unperformed services or other work and (b) any payment due to the Consultant at the time of termination may be adjusted to the extent of any additional costs the District incurs because of the Consultant's default. In such event, the District shall consider the actual costs incurred by the Consultant in performing the Project work to the date of termination, the amount of work originally required which was satisfactorily completed to the date of termination, whether that work is in a form or of a type which is usable and suitable to the District at the date of termination, the cost to the District of completing the work itself or of employing another firm to complete it and the inconvenience and time which may be required to do so, and other factors which affect the value to the District of the Project work performed to the date of termination. Under no circumstances shall payments made under this provision exceed the Total Price set forth in this Agreement. This provision shall not preclude the District from filing claims and/or commencing litigation to secure compensation for damages incurred beyond that covered by withheld payments.

C. Upon receipt of a termination notice the Consultant shall at no additional cost to the District:

1. Promptly discontinue all services affected (unless the notice directs otherwise);

2. Terminate all subcontracts to the extent they relate to the work terminated; and

3. No later than thirty (30) calendar days after receipt of termination, promptly deliver or otherwise make available to the District all data, drawings, electronic drawing files, specifications, calculations, reports, estimates, summaries, Official Project Documentation and other Project documentation, such other information and materials as the Consultant or subconsultants may have accumulated in performing this Agreement, whether completed or in progress and all equipment/materials purchased specifically for the Project where the District has paid the Consultant for such items.

D. Termination for Convenience.

1. The District may terminate this Agreement, in whole or in part, for the convenience of the District. The District shall terminate by delivery to the Consultant a Notice of Termination specifying the extent of the termination and the effective date.

2. If the District terminates this Contract for convenience, the District shall pay the Consultant only for the following items:

    a. An amount for Direct Labor Costs and Indirect Costs in accordance with the Contract and Exhibit B for services satisfactorily performed to the date of termination;

    b. Actual and reasonable Other Direct Costs incurred before the termination; and

    c. Actual and Reasonable termination settlement costs the Consultant reasonably incurs relating to commitments which had become firm before the termination, unless the District determines to assume said commitments. Reasonable termination settlement costs include settlement costs for subconsultants and actual reasonable accounting and clerical costs related to preparing Termination Settlement Proposal.

3. Upon receipt of a termination notice the Consultant shall at no additional cost to the District:

    a. Promptly discontinue all services affected (unless the notice directs otherwise);

    b. Terminate all subcontracts to the extent they relate to the work terminated;

    c. No later than thirty (30) calendar days after receipt of termination, promptly deliver or otherwise make available to the District all data, drawings, specifications, calculations, reports, estimates, summaries, Official Project Documentation, other Project documentation, and such other information and materials as the Consultant may have accumulated in performing this Agreement, whether completed or in progress and all equipment/materials purchased specifically for the Project where the District has reimbursed the Consultant for such costs;

    d. Take any action necessary, or that the District may direct, for the protection and preservation of property related to this Agreement that is in the possession of the Consultant and in which the District has or may acquire an interest.

SECTION 10: OWNERSHIP AND USE OF DOCUMENTS

10.1. Reports, studies, drawings, specifications, calculations or other information developed under the terms of this Agreement shall become the property of the District after full payment to Consultant for their preparation. Any reuse of drawings/plans, specifications and/or calculations for another project without written verification or adaptation by Consultant will be at the District's sole risk and without liability or legal exposure to Consultant. District shall defend, indemnify and hold Consultant harmless from all claims, damages, losses, and expenses, including attorney's fees, arising out of or resulting therefor. The District further acknowledges that it may receive certain materials from Consultant by way of electronic file and agrees that should it modify such materials

in connection with their subsequent use, that Consultant shall bear no responsibility for the contents thereof.

SECTION 11: THIRD-PARTY CLAIMS AND DISPUTES

11.1. At the District's request, Consultant will assist the District in review and evaluation claims and disputes, preparing information for the District's legal counsel, providing services as witness in litigation or arbitration to which the District is a party and providing other services in connection with actual or potential claims or disputes arising out of the work, regardless of whether or not consultant is named in such legal action. The parties shall cooperate to agree on the compensation for such services. If Consultant is determined to be responsible for the claim, dispute or litigation due to its negligence or breach of the contract herein, it shall remit back to the District the amounts paid under this section to the extent of such negligence or breach.

SECTION 12: AUDIT AND ACCESS TO RECORDS

12.1. The Consultant, including its subconsultants, shall maintain books, records, documents, and other evidence directly pertinent to performance of the work under this Agreement in accordance with generally accepted accounting principles and practices consistently applied. The District, or any of its duly authorized representatives, shall, for the purpose of audit and examination, have access to and be permitted to inspect such books, records, documents, and other evidence for inspection, audit and copying for a period of six years after completion of the Project. The District shall also have access to such books, overhead data, records and documents during the performance of Project work if deemed necessary by the District to verify work performed and Invoices, to assist in negotiations for amendments to the Agreement or modifications to tasks, and to resolve claims and disputes.

12.2. Audits conducted under this Section shall be in accordance with generally accepted auditing standards and established procedures and guidelines of the reviewing or audit agency(ies).

SECTION 13: LEGAL RELATIONS

13.1. The Consultant shall comply, and shall ensure its subconsultants comply, with all the terms of this Agreement and the District resolutions and federal, state and local laws, regulations and ordinances applicable to the work and services to be performed under this Agreement.

13.2. In performing work and services hereunder, the Consultant and its subconsultants, employees, agents and representatives shall be acting as independent contractors and shall not be deemed or construed to be employees or agents of the District in any manner whatsoever. The Consultant shall not hold itself out as, nor claim to be, an officer or employee of the District by reason hereof and will not make any claim, demand or application to or for any right or privilege applicable to an officer or employee of the District. The Consultant shall be solely responsible for any claims/costs and/or losses arising from the Consultant's failure to pay wages, compensation, benefits or taxes and/or pay for services, supplies and/or materials provided by Consultant employees, agents and representatives, including subconsultants, and will protect, defend, indemnify and hold the District harmless there from.

13.3. To the maximum extent permitted by law, the Consultant agrees to indemnify and save harmless the District, its officers, agents and employees, from and against any and all suits, claims, actions, losses, costs, reasonable attorney fees and expenses, penalties, judgments, settlements and damages of whatsoever kind or nature arising out of, in connection with, or incident to errors or omissions in the performance of contractual obligations, and/or the negligent performance of work or services provided by or on behalf of the Consultant, except to the extent caused by the negligence of the District. The Consultant's Indemnity obligation includes an obligation to (a) satisfy any judgment or other final decision of a court or other tribunal; (b) pay any reasonable settlement negotiated by the District with respect to claims that are within the scope of the indemnity obligation; and (c) pay all claims against the District by an employee or former employee of the Consultant or its subconsultants, and for this purpose, by mutual negotiation, the Consultant expressly waives, as respects the District only, all Immunity and limitation on liability under any industrial insurance act, including Title 51 RCW, other worker's compensation act, disability benefit act, or other employee benefit act of any jurisdiction which would otherwise be applicable in the case of such claim, The Consultant further agrees to defend all claims against the District and its officers, agents, and employees which, if proven, could result in liability of the District, its officers, agents, or employees for loss or damage caused by any such errors, omissions, or negligent work or services performed by the Consultant. The Consultant's obligation to defend shall include timely payment of all reasonable attorney fees, costs and expenses incurred in the defense of such claims. In the event of litigation between the parties to enforce the rights under this paragraph, reasonable attorney fees and expenses shall be allowed to the prevailing party.

13.4. The District's rights and remedies in this Agreement are in addition to any other rights and remedies provided by law.

13.5. The indemnification, protection, defense and save harmless obligations contained herein shall survive the expiration, abandonment or termination of this Agreement.

SECTION 14: INSURANCE

14.1. Prior to execution of the Agreement, the Consultant shall file with the District certificates of insurance and endorsements from the insurer(s) certifying to the coverage of all insurance required herein. All evidences of insurance must be certified by a properly authorized officer, agent, general agent or qualified representative of the insurer(s) and shall certify the name of the insured, the type and amount of insurance, the location and operations to which the insurance applies, the expiration date, and provides that the District receives notice at least thirty (30) calendar days prior to the effective date of any policy limit or cancellation of required coverages. The Consultant shall notify the District at least thirty (30) calendar days prior to the effective date of any cancellation or reduction in coverage in the policy. Documentation of coverage shall be provided on each insurance renewal date. The Consultant shall, upon demand of The District, make available to The District at Consultant's local office in The District all such policies of insurance and the receipts of payment of premiums thereon. Failure to provide such policies of insurance within a time acceptable to The District shall entitle The District to suspend or terminate the Consultant's work hereunder, Suspension or termination of this Agreement shall not relieve the Consultant from its insurance obligation hereunder.

14.2. The Consultant shall obtain and maintain at a minimum the limits of insurance set forth below. By requiring such minimum insurance, the District shall not be deemed or construed to have assessed the risks that may be applicable to the Consultant under this Agreement. The Consultant shall assess its own risks and, if it deems appropriate and/or prudent, maintain greater limits and/or broader coverage.

14.3. Each insurance policy shall be written on an "occurrence" form; excepting that insurance for professional liability, errors and omissions when required, is acceptable on a "claims made" form.

14.4. If coverage is approved and purchased on a "claims made" basis, the Consultant shall continue coverage either through (1) policy renewals for not less than seven years from the date of completion of the work which is the subject of this Agreement or (2) the purchase of an extended discovery period for not less than seven years from the date of completion of the work which is the subject of this Agreement, if such extended coverage is available.

14.5. If, in order to meet the requirements of this Section, the Consultant must rely on the insurance to be provided by one or more subconsultant, then such subconsultant(s) shall be required to meet all of the requirements herein applicable to the insurance they are providing, and shall include District and Consultant as additional insureds on all liability policies except Professional Liability/Errors & Omissions and Workers Compensation. The District will not make any payments on work performed by subconsultants until all insurance documentation from such subconsultants have been received and accepted by the District.

14.6. Provided the affected insurance policies permit the following waiver, without voiding coverage, Consultant and District waive all rights against each other to subrogation for damages covered by property insurance.

14.7. The Consultant shall maintain limits no less than, for:

A. General Liability. $1,000,000 combined single limit per occurrence for bodily injury, personal injury and property damage, and for those policies with aggregate limits, a $1,000,000 aggregate limit. Coverage shall be at least as broad as Insurance Services Office form number (CG 00 01) covering COMMERCIAL GENERAL LIABILITY.

B. Professional Liability Errors and Omissions. $2,000,000 per claim and in the aggregate.

C. Automobile Liability. $1,000,000 combined single limit per accident for bodily injury and property damage. Coverage shall be at least as broad as Insurance Services Office form number (CA 00 01) covering BUSINESS AUTO COVERAGE, symbol 1 "any auto"; or the combination of symbols 2, 8, and 9.

D. Workers' Compensation. Statutory requirements of the State of residency. Coverage shall be at least as broad as Workers' Compensation coverage, as required by the Industrial Insurance Act of the State of Washington, as well as any similar coverage required for this work by applicable Federal or "other States" State Law.

E. Employer's Liability or "Stop Gap". Coverage shall be at least as broad as the protection provided by the Workers Compensation policy Part 2 (Employers Liability) or, in states with monopolistic state funds, the protection provided by the "Stop Gap" endorsement to the general liability policy.

14.8. Any deductibles or self-insured retentions must be declared to, and approved by, the District. The deductible and/or self-insured retention of the policies shall not limit or apply to the Consultant's liability to the District and shall be the sole responsibility of the Consultant.

14.9. The insurance policies required in this Agreement are to contain, or be endorsed to contain the following provisions:

A. Liability Policies except Professional Liability & Errors and Omissions and Workers Compensation:

1. The District, its officers, officials, employees and agents are to be covered as additional insured as respects liability arising out of activities performed by or on behalf of the Consultant in connection with this Agreement. Such additional insured status shall include Products-Completed Operations.
2. To the extent of the Consultant's negligence, the Consultant's insurance coverage shall be primary insurance as respects the District, its officers, officials, employees and agents. Any insurance and/or self-insurance maintained by the District, its officers, officials, employees or agents shall not contribute with the Consultant's insurance or benefit the Consultant in any way.

3. The Consultant's insurance shall apply separately to each insured against whom a claim is made and/or lawsuit is brought, except with respect to the limits of the insurer's liability.

4. The Consultant's Protection and Indemnity (to include Jones Act) policy shall waive rights of subrogation against the District.

14.10. If at any time of the foregoing policies shall fail to meet the minimum standards above, the Consultant shall, upon notice to that effect from the District, promptly obtain a new policy, and shall submit the same to the District, with the appropriate certificates and endorsements, for approval.

SECTION 15: DISPUTES AND REMEDIES

15.1. Choice of Law. This Agreement and all provisions hereof shall be interpreted in accordance with the laws of the State of Washington in effect on the Effective Date.

15.2. General Manager Review. All claims, counter-claims, disputes and other matters in question between the District and the Consultant arising out of or relating to this Agreement or the breach of it shall be referred to the General Manager or a designee for determination, together with all facts, data, contentions and so forth which relate thereto. The General Manager shall make a determination within thirty (30) calendar days of such referral.

15.3. Mediation and Arbitration. The parties will first attempt to mediate any dispute arising under or in connection with this Agreement, in accordance with the provisions of the Washington Uniform Mediation Act, Ch. 7.07 RCW. In the event such mediation is unsuccessful, any such dispute will be settled by arbitration as set forth in this Section 15.3. No legal right of action may arise out of any such dispute until arbitration has been completed. Each party, however, will have full access to the courts to compel compliance with these arbitration provisions, to enforce an arbitration award or to seek injunctive relief, whether or not arbitration is available or under way. The arbitration will take place as follows:

A. Notice. The party demanding arbitration must give the other parties a written notice. The written notice must contain, in addition to the demand for arbitration, a clear statement of the issue or issues to be resolved by arbitration, an appropriate reference to the provision of the Agreement which is involved, the relief the party requests through arbitration, and the name and address of the arbitrator requested by the demanding party.

B. Response. The party receiving the notice of the demand for arbitration must provide a written response to the demand within fifteen (15) days following receipt of the notice. The response must contain a clear statement of the respondent's position concerning the issue or issues in dispute and the name and address of the arbitrator it selects as the arbitrator to hear the dispute. If the parties fail to agree upon an arbitrator within five (5) days following the time allowed for this response to the demand for arbitration, the demanding party may apply to the presiding department of the Superior Court for Whatcom County, Washington to designate the arbitrator.

C. Arbitration. The arbitrator will meet in Bellingham, Washington, within twenty (20) days after the selection of the arbitrator and will allow each party an opportunity to submit oral and written evidence and argument concerning the issue in dispute. The arbitrator may resolve only the question or questions submitted to arbitration and must include as part of his consideration a full review of the Agreement and all material incorporated in the Agreement by reference.

D. Decision. The decision of the arbitrator will be final and will bind the parties.

E. Consent to Change. By consent of all parties to any dispute under this Agreement, the method of selection of an arbitrator or arbitrators, or even the arbitrator(s) selected, may be changed at any time.

F. Payment of Costs. Subject to the provisions of Section 13.3, in any arbitration, each party will pay its own costs, witness fees and attorneys' fees. The fees charged by the arbitrator and the costs of the proceeding shall be borne equally.

G. State Law. Except to the extent inconsistent with the terms of this Agreement, the terms and provisions of Chapter 7.04A RCW are incorporated in and made a part of this Agreement.

15.4. Exhaustion of Administrative Remedies. Referral to and determination by the General Manager or a designee and mediation and arbitration shall be a condition precedent to the commencement of a civil action to adjudicate such dispute.

15.5. Jurisdiction & Venue. Subject to these provisions herein, the Superior Court of Whatcom County, Washington, shall have exclusive jurisdiction and venue over any legal action arising under this Agreement and the laws of the state of Washington shall apply.

SECTION 16: NOTICE

16.1. Any notice required to be given under the terms of this Agreement shall be in writing and directed to the party at the address set forth below. Notice shall be considered issued and effective upon receipt thereof by the addressee-party. Facsimile notice shall be considered effective with proof of confirmation that the addressee has received the facsimile. Such proof would be a confirmation sheet evidencing such receipt at the fax number listed below.

[[[NAME OF FIRM]]]	Lake Whatcom Water and Sewer District
Attn: ?????????	Attn: Justin Clary PE, General Manager
[[[ADDRESS]]]	1220 Lakeway Drive
	Bellingham, WA 98229
Fax No.: ??????????	Fax No.: 360-738-8250
Phone: ??????????	Phone: 360-734-9224

SECTION 17: ENTIRETY, AMENDMENT AND EXECUTION OF AGREEMENT

17.1. This Agreement merges and supersedes all prior negotiations, representations and agreements between the Parties relating to the subject matter hereof and constitutes the entire agreement between the Parties.

17.2. The Contract documents included in the Agreement are identified below. Any inconsistency or conflict between the Contract documents shall be resolved by giving precedence in the following descending order of importance:

A. Agreement for Professional Services for **Division 7 Water Reservoir Seismic Upgrade & Shake Alert Implementation**, as modified by the latest amendment;
B. Exhibit A, Scope of Work, as modified by the latest amendment;
C. Exhibit B, Cost Summary, as modified by the latest amendment;
D. Exhibit C, Project Schedule, as modified by the latest amendment;
E. Exhibit D, Insurance;
F. Exhibit E, Allowable ODC's;
G. Exhibit F, Key Personnel List; and
H. Other

17.3. This Agreement shall be executed in two (2) counterpart copies, any of which shall be considered for all purposes as the original.

IN WITNESS WHEREOF, the Parties hereto have caused this Agreement to be executed by their respective authorized officers or representatives as of the day and year written below.

Lake Whatcom Water and Sewer District	Consultant
By:_____ (Justin Clary, General Manager)	By:_____ Printed Name:_____ Title:_____
Dated:_____	Dated:_____

APPROVED AS TO FORM:

By:_____
(Robert Carmichael, Attorney for Lake Whatcom Water and Sewer District)

Dated: _____

EXHIBIT A

SCOPE OF SERVICES
Lake Whatcom Water and Sewer District
Division 7 Water Reservoir Seismic Upgrade
Shake Alert Implementation

Funding for this project is through a FEMA Hazard Mitigation Grant. The Consultant and its subconsultants agree to include clauses and conditions into the contract scope of work as required by the FEMA Hazard Mitigation Grant.

A1. Project Management

1. Organize, manage, and coordinate the disciplines required to accomplish the services required for this project. Perform quality assurance/quality control of all final documents. Maintain and enforce the project schedule and budget. Consultant will provide backup documentation of work products as appropriate to adequately record the Consultant's work, including assumptions made, regulation interpretations, methodology used, calculations, rationale supporting recommendations, and meeting or conversation records. Standards for the design deliverables will be provided to the selected consultant during negotiations.

A2. Permitting

The Consultant shall:

1. Identify all temporary and permanent permits for required construction,
2. Prepare permit applications,
3. Schedule and conduct meetings with permitting agencies, and
4. Assist District with discussions and negotiations with permitting agencies.

A3. Design and Bidding

The Consultant shall:

1. Develop the design into detailed construction contract documents consisting of plans, specifications, and engineer's cost estimate.
2. The Consultant shall maintain a Plan Holder's List,
3. Conduct a pre-bid conference,
4. Respond to bidder inquiries,
5. Prepare and distribute addenda, and
6. Attend bid opening.

A4. Services During Construction

The Consultant shall fully perform or assist with:

1. Construction support services including providing an experienced and qualified project representative to monitor the on-site progress and quality of the executed work,
2. Attend progress meetings,
3. Prepare agenda and meeting notes,
4. Review contractor submittals and shop drawings for conformance to the contract documents,
5. Review and respond to contractor's requests for information and issue design clarifications as necessary,
6. Prepare change orders,
7. Review and approve contractor's payment requests,
8. Coordinate and evaluate specialized testing,
9. Prepare record drawings, and
10. Prepare project close-out documentation.

EXHIBIT B

BILLING RATES
Lake Whatcom Water and Sewer District
Division 7 Water Reservoir Seismic Upgrade & Shake Alert Implementation

All work shall be billed per the attached Billing Rate schedule.

EXHIBIT C

PROJECT SCHEDULE
Division 7 Water Reservoir Seismic Upgrade
Shake Alert Implementation

Project Schedule

Permitting and Design	Completion by December 31, 2022
Bidding	Completion by March 1, 2023
Services During Construction	Completion by December 31, 2023

EXHIBIT D

INSURANCE
Lake Whatcom Water and Sewer District
Division 7 Water Reservoir Seismic Upgrade & Shake Alert Implementation

[Attach Insurance Certificate and Endorsements]

EXHIBIT E

ALLOWABLE OTHER DIRECT COSTS (ODC's)
Lake Whatcom Water and Sewer District
Division 7 Water Reservoir Seismic Upgrade & Shake Alert Implementation

Allowable ODC's include Subconsultants and Reimbursables as listed in Exhibit B – Billing Rates:

Subconsultants:

- List Subconsultants.

Reimbursables:

- Publication charges
- Project application fees, project permit fees
- Reproduction of drawings and construction documents
- Direct expenses for travel, meal and lodging outside of Whatcom and Skagit Counties
- Mileage at project-current IRS mileage rates
- Specialized equipment rental, at rental rate

EXHIBIT F

KEY PERSONNEL LIST
Lake Whatcom Water and Sewer District
Division 7 Water Reservoir Seismic Upgrade & Shake Alert Implementation

Key Personnel List

- Name?
- Name?
- Name?
- Name?

DIVISION 7 RESERVOIR SEISMIC UPGRADE & SHAKE ALERT IMPLEMENTATION

ATTACHMENT A
PROJECT INFORMATION

WILSON ENGINEERING
805 Dupont Street, Ste. #7, Bellingham, Washington 98225
Telephone: (360) 733-6100 • Facsimile: (360) 647-9061

MEMORANDUM

TO: LWWSD – Bill Hunter, PE, Rich Munson, and Kristin Hemenway, PE

FROM: Brian Smith, PE and Melanie Mankamyer, PE

SUBJECT: Division 7 Reservoir – Seismic Upgrades and Maintenance vs. Replacement

DATE: February 8, 2018

Introduction

A structural analysis of the Lake Whatcom Water and Sewer District Division 7 water reservoir has found significant deficiencies in its ability to meet existing earthquake code requirements (BHC report, December 2016). The recent Water System Plan also analyzed the capacity of the Division 7 reservoir and found it to be significantly oversized at a volume of one million gallons. The Water System Plan recommended an alternatives analysis for this reservoir to compare the cost of making seismic upgrades and replacing the interior and exterior coatings that are beyond their useful life against the alternative of replacing the Division 7 reservoir with a more appropriate (~half a million gallons) amount of storage volume. This memorandum contains a preliminary analysis of these alternatives.

Alternative 1 – Make Seismic Upgrades and Replace Coatings

Alternative 1 is to make the needed repairs to the Division 7 reservoir and continue to use it for the foreseeable future. There are four major pieces of work that are required to allow the Division 7 reservoir to continue to provide reliable service for the more than 2,000 people that depend on it for their water service:

1. Seismic retrofits as detailed in the December 2016 BHC report.
2. Structural roof support header repair as detailed in the December 13, 2012 Wilson Engineering assessment.
3. Replacement of interior and exterior steel coating systems.
4. Addition of reservoir outlet valve that can respond to earthquake event. This portion of the work would be part of the ShakeAlert Project scope and is not included in the cost estimates in this memo.

Coatings

The existing interior and exterior steel coating systems for the welded steel reservoir are original from its construction in 1971. The Division 7 reservoir had no cathodic protection system from 1971 to 2015. In 2015, a cathodic protection system was installed. In 2014, the coatings were inspected by a qualified professional. The coatings were overall found to be in reasonable condition, although the interior ceiling and roof supports showed visible corrosion and the coatings in that area need to be removed and replaced to prevent further steel corrosion.
It is uncertain if the existing coatings contain lead-based primers. Based on the time of construction (1971), it is possible that they may have lead-based primers. Samples would need to be taken to know for sure, but that has not yet occurred.

The opinion of steel coatings professionals is that the entire interior coating should be removed and replaced. The exterior coating is likely a vinyl coating and is in reasonable condition. With some coatings in reasonable condition, they could be pressure washed and a new coating applied on top of the existing. But vinyl coatings do not work well with standard epoxy overcoats because of the solvent in the epoxy. There are new technologies that may work well with overcoating on top of the vinyl coating, but they are not necessarily time-tested to demonstrate longevity. The District could choose to try a system like this, and there would be substantial initial cost savings, especially if the exterior existing coating was found to contain lead. But because these new technologies have not been time-proven yet and there would be some risk associated with using it, a cost estimate for this option was not included.

Temporary Water Storage

In order to perform the coating work, structural roof repair, and addition of reservoir outlet valve that can respond to an earthquake, the tank would need to be taken out of service and drained. Because there is no alternate storage that could serve this area, temporary storage would need to be installed for the duration of the work. There is no feasible way to temporarily provide the full storage volume. Even to provide a fraction of the full storage volume will be very challenging and expensive. In order to perform the work, the reservoir will likely need to be out of service for a number of months, and this will need to occur in the summer months in order to achieve desirable coating outcomes (hot and dry surfaces). The summer months are also the highest water demand months, which adds to the operational challenge.

One temporary storage solution can be rented from a company called ModuTank. It consists of steel support walls and a water tight, NSF approved liner (with a cover) to contain the water. Based on the design, it is limited to a maximum water height of 4.5 ft. Because of the limited flat space adjacent to the reservoir, the maximum estimated footprint of a temporary storage tank would be approximately 46 ft by 46 ft. Considering that the tank needs 4 ft of framing around the perimeter, this leaves the water tank size at 38 ft by 38 ft for a water volume of 48,600 gallons. Any storage solution to provide more volume than this would likely require a permanent storage solution and would cost significantly more than the temporary tank.

It would be quite challenging to operate the water system with such little water storage at Division 7 (48,600 gallons). An average day demand for the area served by Division 7 (which includes serving Division 30) is approximately 200,000 gallons. If half of the 48,600 gallons was saved for fire suppression / standby storage, this means that there would be 24,000 gallons of operating storage, and it would need to be refilled, on average, every 3 hours. At a fill rate of 700 gpm and with average demand, it would take about 43 minutes to fill the tank. Because the transmission pump is only operated when the treatment plant is running, it makes operation of the whole system challenging, although theoretically possible. Moving forward with this project would require coordination with and approval of the fire department and the Department of Health. It is uncertain if this kind of solution would be acceptable to either of these entities. If it was not, a permanent storage tank would need to be installed next to the Division 7 reservoir that had a more reasonable storage volume, perhaps 100,000 to 200,000 gallons to be able to serve the system temporarily while the Division 7 reservoir is out of service. A permanent storage solution would be significantly more expensive than the temporary tank. A cost estimate for this option was not prepared but may be necessary based on input from the water treatment plant operator, the fire department, and the Department of Health.

Cost Estimate

A cost estimate is shown below for Alternative 1 based on the conservative approach of removing and replacing the exterior as well as the interior coating. As shown, there is an item for containment if the exterior coating is found to contain lead. If it is not, then this item would not be needed. The Alternative 1 cost estimate is shown for the temporary storage of 48,600 gallons. As described above, this may not be adequate. If it is not adequate, the temporary storage item would be much more expensive.

LAKE WHATCOM WATER AND SEWER DISTRICT **2/8/2018**
Division 7 Reservoir Rehabilitation (Alternative 1)
Preliminary Cost Estimates

Prepared by: **Brian Smith, PE and Melanie Mankamyer, PE, Wilson Engineering LLC**

Wilson Job No.: **2018-001**

Preliminary Cost Estimates - Rehabilitate Div 7 (Seismic Retrofits, Re-coatings, Repairs)

Item Description	Quantity	Unit	Unit Price	Amount
CONSTRUCTION				
a. Mobilization (10%)	1	LS	$ 63,210	**$ 63,300**
b. Coating work				
If lead is present on exterior coating, need containment for abrasive blasting	1	LS	$ 90,000	$ 90,000
Remove existing coating from interior and exterior and replace coating	29,385	SF	$ 15	$ 440,800
Subtotal				**$ 530,800**
c. Structural repair of roof support header as detailed in December 13, 2012 assessment	1	LS	$ 15,000	**$ 15,000**
d. Provisions for providing temporary water storage while tank is out of service				
Rental of temporary potable water storage tank assembly (48,600 gallons) for 5 months with freight	1	LS	$ 24,255	$ 24,300
Temporary Erosion and Sediment Control	1	LS	$ 5,000	$ 5,000
Tree removal, clearing and grubbing, and earthwork to provide 46 ft by 46 ft level pad for temporary tank	1	LS	$ 35,000	$ 35,000
Labor to assemble temporary tank, fill, disinfect, and disassemble temporary tank	1	LS	$ 12,000	$ 12,000
Temporary piping to temporary tank (install, test, disinfect appprox 100 ft, 8 inch)	1	LS	$ 10,000	$ 10,000
Subtotal				**$ 86,300**
SUMMARY				
Subtotal				$ 695,400
Contingencies	15%			$ 104,310
Sales Tax	8.5%			$ 67,975
Preliminary Estimated Construction Costs				**$ 868,000**
Complete Estimated Project Costs of Seismic Retrofits from BHC (includes construction, tax, engineering)				$ 721,000
Engineering Design	5%			$ 43,400
Construction Phase Engineering/Inspection	10%			$ 86,800
GRAND TOTAL				**$ 1,720,000**

As described previously, this cost estimate does not include the necessary addition of a reservoir outlet valve that can respond to earthquake event. This portion of the work would be part of the ShakeAlert Project scope.

One piece of information to keep in mind is that the current NSF61 approved interior coating systems have a shorter expected life than previous coating systems because of more stringent requirements for materials in contact with potable water. Current interior coating systems have an expected life of roughly 15 years, at which point they would either need to be coated over or replaced again.

Alternative 2 – Replace Division 7 Reservoir

Alternative 2 entails replacing the existing Division 7 reservoir. The 2016 BHC report performed a quick alternatives analysis of replacing the reservoir instead of retrofitting the existing, but their analysis was based on replacing it with a reservoir of the same size. That analysis also did not account for the need for coatings replacement, structural work, and installation of a new seismic outlet valve, all of which will require the reservoir to be taken out of service and temporary storage put in place.

As the recent Water System Plan points out, the 1,000,000 gallons of storage is roughly twice the storage that is required for build-out. Replacing the Division 7 reservoir with new storage with half the volume is more likely to be a realistic alternative and is analyzed here.

A downside to having an oversupply of treated water storage is that it increases water age and can negatively impact water quality. The American Water Works Association (AWWA) recommends that the hydraulic residence time of water storage reservoirs should not exceed 2.5 days under average demand to maintain water quality. The hydraulic residence time in the existing 1 million gallon Division 7 reservoir under average day demand in a build-out scenario is 4.6 days. Appropriately sized replacement storage for Division 7 would have an average hydraulic residence time within the AWWA recommendation of less than 2.5 days. This lower residence time would help improve water quality in terms of less formation of disinfection by-products and better maintenance of chlorine residual in the distribution system.

One Vs. Two Reservoirs

The Division 7 reservoir could be replaced with one storage reservoir of the appropriate size, or could be replaced with two storage reservoirs that contain an appropriate total volume. Having two reservoirs instead of one offers three major advantages:

1. One reservoir can be taken out of service for maintenance or repairs at any time and the other reservoir is capable of providing sufficient storage for these temporary periods.
2. If one tank happens to have an unexpected leak or failure, the other can be used. If there was only one tank and there was a failure, it would cause a public health emergency until temporary storage was able to be put in place.
3. In a major earthquake, there will likely be both water main breaks that cause major leaks and fires that need fire suppression water. This leads to a situation where if there is only one storage tank it will either be drained quickly by the leaks and fire suppression activities or the outlet valve will be closed to maintain water for the longer-term response but water will not be available for initial fire suppression. With two reservoirs in place, the system can have the best of both because one tank outlet can be left open for immediate fire suppression needs and the other can be closed to maintain a supply of treated water for the days and weeks of response to the emergency.

At the volume being considered (~half a million gallons), the cost of a single reservoir vs two smaller reservoirs will be similar. Because of this and the advantages listed above, this analysis continues with the two reservoir option.

Storage Volume Analysis

The needed storage volume for the Division 7 service area was analyzed in detail. A first step of this was to refine the ERU distribution shown in the Water System Plan to reflect the current status of restricted lots in Sudden Valley and the impact this has on the distribution of ERUs (and subsequent storage needs) throughout the system.

In order to assess ERU distribution throughout the system's water reservoirs, two maps were analyzed. Figure A-1 from the Water System Plan was analyzed to determine the geographic distribution of the service areas of each reservoir. This was cross-referenced with the Sudden Valley Land Use Map (updated August 2015) to determine the number of developed and vacant single-family lots in each of the Division 30 and Division 7 reservoir service areas.

Division 30 serves only single-family lots, so the number of build-out ERUs served by it was easily determined to be 364 ERUs. This is lower than the number of build-out ERUs shown in the Water System Plan (474) because many lots in the Division 30 service area have been converted to SVCA common area and restricted from development.

With the decreased number of ERUs in the Division 30 service area, the Division 30 reservoir can now provide its own standby storage (in the Water System Plan, Div 30 standby storage was provided by Div 7). This change is reflected in Table 1.

The number of ERUs served by Division 7 was determined by counting the number of single-family lots in the service area and adding the numbers of ERUs of the condominiums and commercial areas in the service area from the District's database. The total number of ERUs in the Division 7 service area as defined by Figure A-1 from the Water System plan is 1076 ERUs. This is higher than the number shown in the Water System plan. The total number of build-out ERUs for the water system remains what was shown in the Water System Plan, so the Division 22 ERUs was updated appropriately. An analysis of this distribution of ERUs yielded a required storage volume for the Division 7 service area of 423,000 gallons.

But the service areas shown in Figure A-1 of the water system plan do not fully utilize the existing available storage from Division 22 and Geneva reservoirs. In order to more fully utilize the existing storage of those reservoirs, The Division 22 reservoir could serve a portion (about half) of the lowest pressure zone between Division 22 and Division 7. This would lower the number of ERUs served by Division 7 from 1076 to 654 ERUs. In order for Division 22 to be able to serve this area of the system, the system operation would need to shift so that Geneva reservoir served a portion of the lower pressure zone in Geneva. These shifts in ERU distribution are represented in Table 1 as well as their impact to required storage in each service area. This more efficiently utilizes existing resources and minimizes the required storage volume for the replacement Division 7 reservoirs to about 317,000 gallons.

Note that the Supply Capacity to Division 7 shown in Table 1 is 196 gpm. This is based on the methodology described in the Water System Plan, Appendix A, in that the needed transmission flow rate to Division 7 should be based on the proportional service area and the total needed supply flow. In the Water System Plan, Appendix A, this was 246 gpm, but this was adjusted to 196 based on the updated ERU distribution determined as described above. This means that

the new Division 7 reservoirs are sized based on a supply capacity of 196 gpm so that a future project to replace the transmission pumps can use this design flow rate.

Table 1 shows a reservoir height for the Proposed Division 7 reservoirs of 35 feet, but the intent at this early stage in design is that the top 5 ft will be maintained as freeboard to allow for sloshing in an earthquake event. The amount of freeboard needed will be further refined in a detailed design, but 5 ft should be conservative at this point.

Table 1: Reservoir sizing requirements to meet anticipated build-out based on treatment/pumping capacity appropriate for anticipated build-out - sizing new Div 7 reservoirs - if close valve and have Div 22 serve some of lowest zone instead of Div 7 plus shift some demand from Div 22 to Geneva

					Operating Storage		MDD (gpd/ERU)		ERUs		PHD for Reservoir (gpm)					Equalizing Storage		ADD (gpd/ERU)		Standby Storage		Fire Suppression Storage		Dead Storage	
Reservoir	Base Elevation (ft NAVD88)	Reservoir Height (ft)	Reservoir Diameter (ft)	Reservoir storage per foot (gal/ft)	Storage Volume (gallons)	Level with Storage Depleted (ft)	Geneva	Sudden Valley	Geneva	Sudden Valley	Geneva Contribution	Sudden Valley Contribution	Flow out to other reservoirs (gpm)	Total PHD for Reservoir (gpm)	Supply Capacities (gpm)	Storage Volume (gallons)	Level with Storage Depleted (ft)	Geneva	Sudden Valley	Storage Volume (gallons)	Level with Storage Depleted (ft)	Storage Volume (gallons)	Level with Storage Depleted (ft)	Storage Volume (gallons)	Level with Storage Depleted (ft)
Proposed Division 7A	697	35	30	5,287	42,298	22		250		654		239	165	404	196	31,101	19.06		150	196,200	0.50	45,000	14.80	2,644	0.00
Proposed Division 7B	697	35	30	5,287	42,298	22											19.06				0.50		14.80	2,644	0.00
Division 22	804.65	35	50	14,687	117,496	27	370	250	250	2249	166	682	250	1098	788	46,487	25.60	175	150	762,200	2.58	45,000	24.24	7,343	2.08
Division 22 New	805	35	56	18,423	147,386	27											25.60				2.58		24.24	9,212	2.08
Division 30	1027.98	40	25	3,672	18,359	35		250		364		153	0	153	165	0	35.00		150	109,200	5.26	30,000	26.83	1,836	4.76
Geneva	661.12	32	52	15,885	31,771	30	370		989		482		0	482	250	34,860	27.81	175		346,150	6.02	45,000	24.97	7,943	5.52

Summary:

		Build-out ERUs			
Reservoir	Existing capacity (gallons)	Geneva	Sudden Valley	Sum of required storage (gallons)	
Proposed Division 7A	1,000,000		654	317,186	Two reservoirs, each 30 ft diameter and 35 ft tall, provides this storage with 5 ft freeboard for sloshing
Proposed Division 7B					
Division 22	1,158,859	250	2249	1,090,124	
Division 22 New					
Division 30	146,869		364	129,395	
Geneva	508,333	989		420,724	

Note: Fire Suppression Storage is nested within Standby Storage for all reservoirs

New Reservoir Layout and Elevation

In addition to the existing Division 7 reservoir being vastly oversized for build-out, its base elevation and water elevation do not provide the current required minimum pressure to the residences nearest to the reservoir. The replacement reservoirs can be located at a higher elevation to improve water pressure for these highest residences.

Based on the nearby topography, there is a “bench” further up the ridge to the north with an elevation approximately 25 feet higher than the existing Division 7 reservoir base. Locating the new reservoirs on this bench will provide more pressure to the system served directly from the reservoir but will not increase the pressure so much that there are negative impacts. Increasing the pressure by 25 feet will provide the minimum required pressure to all houses in the service area except for the two highest houses that are adjacent to the existing reservoir. But installing the new reservoirs at a higher location that would provide sufficient pressure to these two houses would increase the maximum pressure in the zone to 130 psi, which is higher than desirable. We propose that installing the new reservoirs on the “bench” with a base elevation of approximately 25 ft higher than the existing Division 7 reservoir is a good balance between improving the pressure for houses at the higher points in the system but not increasing the zone pressure so much that there are detrimental effects. This is a needed balance when modifying an existing system that was not originally designed with this in mind.

Raising the base elevation by about 25 feet will increase the maximum head by about 11 psi. The highest pressure in the area served by the reservoir is at the upstream side of PRV 17-20, which is currently approximately 111 psi. This would increase this pressure to 122 psi. This pressure is slightly higher than desirable, but there are many locations in the water system that have higher pressure because of the topography of the area. The other impact the pressure increase has is on the operating point of the transmission pumps. Based on the existing pump curve and operating pressure, the current transmission pump flow rate is approximately 830 gpm at 405 ft head gain. The increase in system pressure would shift the operating point to approximately 430 ft head gain at a flow rate of 780 gpm. This will not negatively impact operation of the system, as a flow rate of 780 gpm is still well more than what is required. In fact, this flow rate may help ease operation of the system because it is closer to the current treatment plant flow rate of 700 gpm, so it may make it easier to balance the flows.

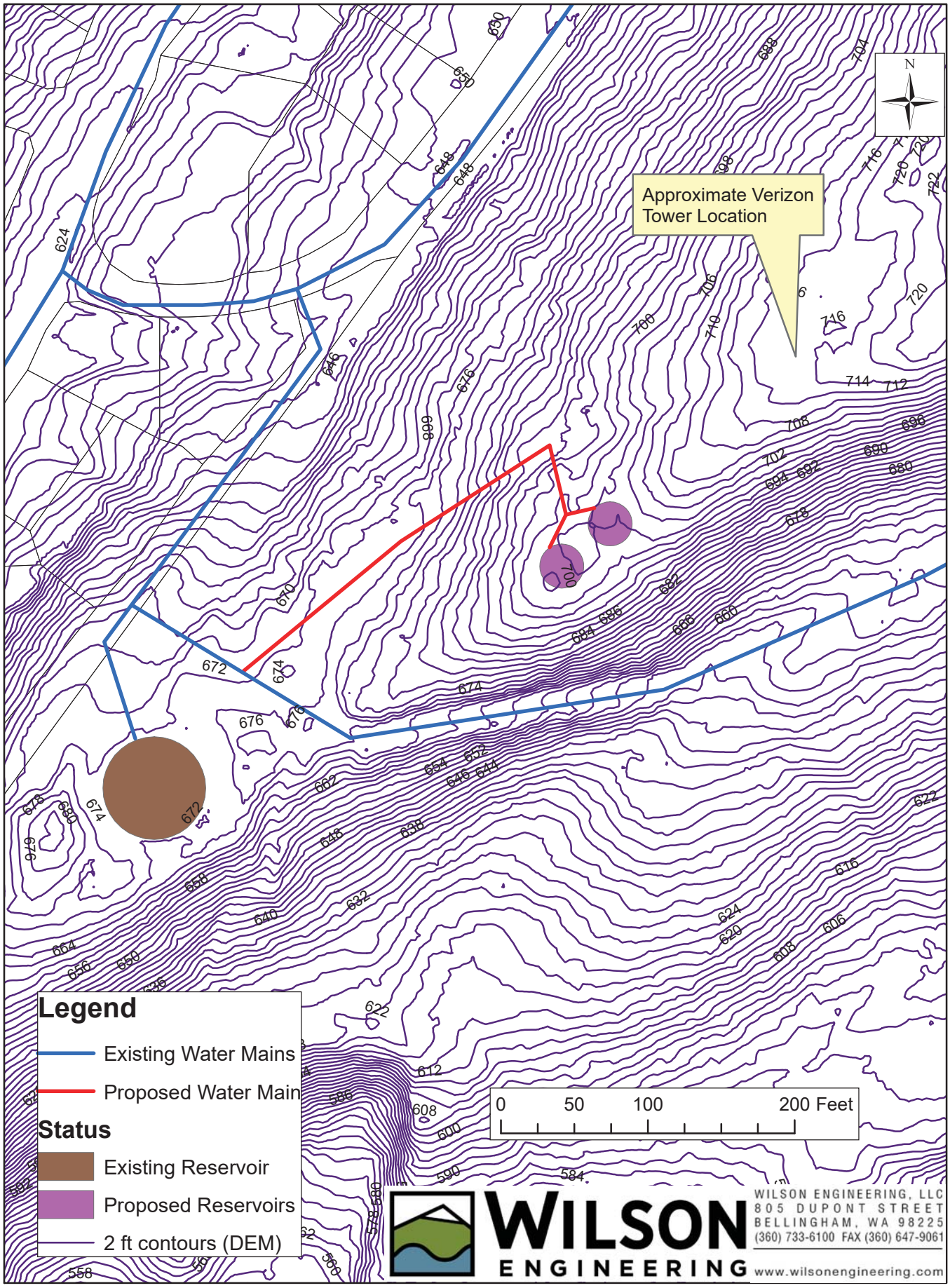
The layout of the proposed location of the new reservoirs is shown in Figure 1. The District has received plans from Verizon for a new cell phone tower in the vicinity of this project. We have confirmed that the proposed reservoir location does not interfere with the Verizon tower.

Cost Estimate

A preliminary cost estimate for Alternative 2 is shown on page 13. Note that demolition of the existing Division 7 reservoir is shown at the bottom. This work could be postponed until a later date depending on funding availability.

As described previously, this cost estimate does not include the necessary addition of a reservoir outlet valve that can respond to earthquake event. This portion of the work would be part of the ShakeAlert Project scope.

Figure 1 - Division 7 Reservoir - Proposed Replacement with 2 Reservoirs



LAKE WHATCOM WATER AND SEWER DISTRICT **2/8/2018**
Division 7 Reservoir Replacement (Alternative 2)
Preliminary Cost Estimates

Prepared by: **Brian Smith, PE and Melanie Mankamyer, PE, Wilson Engineering LLC**

Wilson Job No.: **2018-001**

Preliminary Cost Estimates - Replace Div 7 Reservoir with Two Concrete Reservoirs

Item Description	Quantity	Unit	Unit Price	Amount
CONSTRUCTION				
a. Mobilization (10%)	1	LS	$ 72,200	**$ 73,000**
b. Temporary Erosion and Sediment Control (1%)	1	LS	$ 7,220	**$ 7,300**
c. Storage Improvements				
Concrete storage tank 185,000 Gallon 30 ft dia x 35 ft height (installed by supplier, prevailing wages)	2	EA	$ 171,000	$ 342,000
Reservoir railing	2	EA	$ 10,000	$ 20,000
Tree removal	1	LS	$ 30,000	$ 30,000
Clearing and grubbing	1	LS	$ 10,000	$ 10,000
Site earthwork	1	LS	$ 90,000	$ 90,000
Overflow piping	500	LF	$ 100	$ 50,000
Piping from new tank to existing, 12" diameter	500	LF	$ 100	$ 50,000
Manual valve on one tank outlet (other tank to have seismic valve installed as separate scope of work)	1	EA	$ 2,000	$ 2,000
Surface restoration	1	LS	$ 20,000	$ 20,000
Stormwater management	1	LS	$ 8,000	$ 8,000
Electrical, telemetry and instrumentation	1	LS	$ 100,000	$ 100,000
Subtotal				**$ 722,000**
SUMMARY				
Subtotal				$ 802,300
Contingencies	15%			$ 120,300
Sales Tax	8.5%			$ 78,421
Preliminary Estimated Construction Costs				**$ 1,002,000**
Permit Fees	2.2%			$ 22,000
Easement Acquisition				$ 5,000
Topographic Survey	2%			$ 20,040
Engineering Design	10%			$ 100,200
Construction Phase Engineering/Inspection	10%			$ 100,200
Construction Phase Surveying	1%			$ 10,020
NEW CONSTRUCTION TOTAL PROJECT ESTIMATED COST				**$ 1,260,000**
Demolition of Existing Division 7 Steel Reservoir (including permit fee and sales tax)				$ 167,000
NEW CONSTRUCTION PLUS DEMO TOTAL PROJECT ESTIMATED COST				**$ 1,427,000**

Alternative 3 – Do Nothing

The “do nothing” alternative in this case would be to leave the Division 7 reservoir as-is and in operation and not perform the seismic retrofits. This would leave the water system quite vulnerable to significant and perhaps catastrophic damage if/when a large earthquake occurs. The expected failure modes are described in the BHC December 2016 report.

A “do nothing” alternative in terms of maintenance would mean that the coatings and structural roof support header that needs repair are left as-is. Leaving the roof support unrepaired will lead to further corrosion of the structural steel and eventual roof failure under a snow load, as detailed in the December 2012 assessment. This would leave the system very vulnerable to contamination until repairs were able to be made. This would likely require the tank to be taken out of service, which would put the entire area served by the Division 7 and Division 30 reservoirs out of water until either repairs were made or temporary water storage was put in place.

Leaving the coatings as-is leaves the reservoir vulnerable to corrosion. The frequency of needed inspections and potentially spot repairs would increase. If corrosion was not caught early, it could lead to damage to the structural steel and the need to replace portions of the reservoir. This would require the reservoir to be taken out of service and a temporary tank installed. At this point, it would be an emergency situation and the costs for the expedited delivery and assembly of a temporary tank would increase significantly. More importantly, depending on the severity of the damage/failure, the portion of the water system served by the Division 7 reservoir may not have any storage and would therefore not be able to operate until storage was in-place. This would be a major public health emergency.

Summary and Conclusions

The Do Nothing, Alternative 3 is not recommended because it leaves the entire portion of the water system served by the Division 7 reservoir very vulnerable to both seismic risks as well as the inevitable damage caused by corrosion of structural steel. The Division 7 reservoir is an essential piece of the water system, and it cannot function without the reservoir in service.

There are many advantages Alternative 2 (replace reservoir) has over Alternative 1 (rehabilitate reservoir):

1. Capital Cost – the estimated capital cost of Alternative 2 is significantly lower than Alternative 1.
2. Water Quality – The existing Division 7 reservoir is significantly oversized and results in an excessive average water age of 4.6 days. The hydraulic residence time in the reservoirs proposed in Alternative 2 would be 2.1 days under average day demand in a build-out scenario. This would be within the AWWA recommendation of less than 2.5 days average hydraulic residence time and would help improve water quality in terms of less formation of disinfection by-products and better maintenance of chlorine residual in the distribution system.
3. Improved Water Pressure – Installing new storage 25 feet higher than the existing reservoir will improve water pressure for those houses immediately adjacent to the reservoir. The increased pressure will not negatively impact the system in terms of over pressurizing or decreasing pumped flow excessively.
4. Resiliency – Having two parallel water storage reservoirs provides substantially improved system resiliency in case of emergency (earthquake or unexpected failure of one tank) or typical maintenance. Having the ability to keep one reservoir in service while taking the other out of service will improve the District's ability to serve their customers efficiently.
5. Maintenance – Replacing a steel reservoir with concrete reservoirs decreases maintenance efforts and costs. The corrosion protection systems (interior and exterior coatings, cathodic protection) that are required for steel reservoirs are not needed for concrete reservoirs. Current interior coatings for a steel reservoir need to be replaced/refurbished at least every 15 years. This requires the tank to be taken out of service for the work, and this is significantly challenging with only one tank.
6. Construction/Operation Feasibility – Alternative 1 would require temporary storage during construction that would either be prohibitively expensive or would make operation of the system during construction very challenging. It is unknown if the limited temporary storage proposed as part of this alternative would be acceptable to the water system operator, the fire department, or the Department of Health. Alternative 2 allows the existing tank to remain in service during construction and does not impose the operational challenges of Alternative 1.

Alternative 2 has these six significant advantages over Alternative 1. There are no meaningful advantages Alternative 1 has over Alternative 2. Based on this, we recommend Alternative 2 (replacing Division 7 reservoir with two reservoirs) as the preferred alternative.

WILSON ENGINEERING
805 Dupont Street, Ste. #7, Bellingham, Washington 98225
Telephone: (360) 733-6100 • Facsimile: (360) 647-9061

MEMORANDUM

TO: LWWSD – Justin Clary, PE, Bill Hunter, PE, and Rich Munson

FROM: Brian Smith, PE and Melanie Mankamyer, PE

SUBJECT: Division 7 Reservoir – Additional Items for FEMA Funding Application

DATE: December 28, 2020

Introduction

LWWSD has requested assistance with a number of items related to the FEMA Funding Application for replacement of the Division 7 Water Reservoir. This current memorandum builds and expands on the previously issued memorandum titled "Division 7 Reservoir – Seismic Upgrades and Maintenance vs. Replacement" dated February 8, 2018. Additional items addressed in the current memorandum include:

- Analysis of the expected duration of a reservoir outage in the case of a severe earthquake that would impact the existing seismically vulnerable Division 7 reservoir
- Analysis of the population that would be impacted by an unexpected outage of Division 7 reservoir
- Capital cost estimate of two welded steel water reservoirs (an alternative to the two concrete reservoirs as detailed in the previous memorandum)
- Life cycle cost analysis of new concrete reservoirs and new welded steel reservoirs – comparing capital and maintenance costs to achieve 100 year life of reservoirs

Reservoir Outage Duration

Although a seismic event could have a range of impacts on the existing Division 7 reservoir depending on the severity of the seismic event, we can categorize potential damage as either allowing the reservoir to remain in service (even if perhaps water level needs to be decreased to decrease risk) or catastrophic damage that causes complete failure of the reservoir that renders it useless for water storage. For this analysis, we will only address complete failure of the reservoir. The Reservoir Seismic Vulnerability Assessment (December 2016 by BHC Consultants) concluded that catastrophic failure of the reservoir is a possibility in a seismic event.

If a seismic event results in catastrophic failure of the Division 7 reservoir, the portions of the water system that rely on this water storage (as discussed in the next section of this memorandum) will have no water available until either temporary or permanent storage can be constructed, tested, and brought online. This is because the existing Division 7 reservoir is a single reservoir with no backup storage in place to serve its service area.

The length of time it would take to construct permanent water storage sufficient to replace the failed Division 7 reservoir is significant. It is expected that if a seismic event were to occur and the existing reservoir failed, the only feasible action to take would be to put temporary water storage facilities in place to replace the Division 7 reservoir so that water could be delivered to customers. The pressure for some customers may be sub-standard and storage volume would be less than required for the interim period until permanent storage could be constructed. Therefore, when we talk about an "outage duration", it is important to acknowledge that there is likely to be several stages of outage, as illustrated in Figure 1.

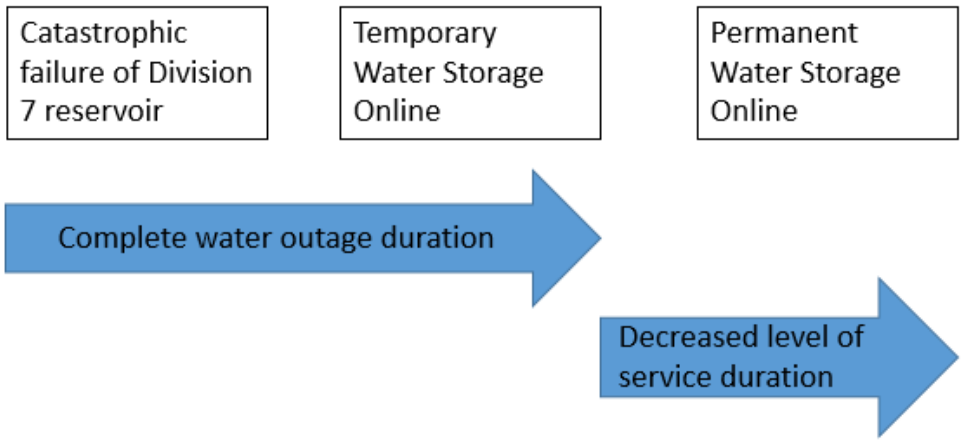


Figure 1: Anticipated stages of "outages" following catastrophic failure of Division 7 reservoir

Temporary water storage was discussed in the 2018 memorandum with respect to erecting temporary storage to serve the system while the existing Division 7 reservoir was out of service for seismic retrofits and re-coating. That discussion focused on a temporary storage solution that would be erected in place and included a NSF 61 certified liner with a storage volume of about 48,000 gallons that was 4.5 ft tall. This was the solution that was discussed because it appeared to be the most acceptable overall solution for a planned outage. But in the current scenario of an unexpected catastrophic failure of the Division 7 reservoir, the priorities would likely be different than for a planned outage. The first priority would be getting temporary

storage in place as quickly as possible in a safe manner. The most likely temporary storage solution in this scenario would be to bring in one or more portable steel tanks, each approximately 10,000 gallons, and connect them to the existing tank piping. This solution was not discussed in the previous memo because conversations with the companies that rent these tanks (Baker Corp, etc.) indicated that they do not typically have tanks that have NSF 61 certified liners, and they are used for a variety of liquid storage purposes. To use them for potable water would require a thorough cleaning and disinfection. In the current scenario with the focus on getting water flowing to customers who need it, it is expected that the lack of NSF 61 certification on the tank interior would be acceptable for the interim period. The temporary storage solution discussed in the 2018 memorandum would require clearing a 46 x 46 ft level pad, time to ship the materials from the east coast, and time to erect the temporary tank. These items would take, at best, weeks to complete. Assuming that one or more of the portable steel tanks are available (they may be in high demand following a seismic event), it could be installed and operational in as little as 3 days (given the time to clean, disinfect, and receive satisfactory bacteriological results).

Based on the above discussion, the “complete water outage duration” shown in Figure 1 could be as short as 3 days if everything worked out optimally. A more realistic complete water outage duration is likely more like one week considering logistics of acquiring a suitable tank and getting it to the site.

The temporary storage solution discussed with one or more portable steel tanks results in a decreased level of service for the customers until permanent storage can be constructed. This decreased level of service is discussed in the 2018 memorandum and includes substandard water pressure for the customers served in the gravity pressure zone of the reservoir (because the tank would have a height of 10 ft or less, compared with the current tank height of 35 ft) and the operational challenge for operators to start up and shut down the water treatment plant frequently to avoid overflowing the small temporary storage volume or having it go dry. If five 10,000 gallon tanks were in place for the temporary solution, it would take approximately 45 minutes to fill the storage. If only one 10,000 gallon tank could be sourced, it would take 9 minutes to fill the tank – the water treatment plant is not optimized to run for such a short duration. This increases the risk of a treatment violation.

Because of the decrease in level of service during a temporary storage solution, the reservoir "outage duration" could be considered to be the time from failure of the Division 7 reservoir until permanent storage was constructed and operational. This also could occur if a suitable temporary storage solution could not be sourced.

Time to construct permanent storage replacement for a failed Division 7 reservoir is estimated in Table 1, given that minimum timelines for each step are accelerated compared to normal because of the emergency nature of the situation. Maximum durations are shown based on the concept that construction resources will likely be in very high demand following a large seismic event, and this could result in significant delays in construction timelines.

Table 1: Anticipated Duration of outage until permanent water storage constructed and operational

Step	**Anticipated Duration**	
	Minimum	**Maximum**
Design of permanent storage solution	4 weeks	6 weeks
Regulatory review and approval of design	2 weeks	4 weeks
Contractor pricing for permanent storage solution	1 week	3 weeks
Construction of permanent storage solution	• Submittals and material procurement: 4 weeks • Site prep: 1 week • Yard piping: 3 days • Foundation: 2 days • Structure: 1 week • Disinfection and testing: 3 days • Piping connections: 1 day	• Submittals and material procurement: 16 weeks • Site prep: 2 weeks • Yard piping: 1 week • Foundation: 1 week • Structure: 2 weeks • Disinfection and testing: 3 days • Piping connections: 2 days
Total Outage Duration until permanent storage operational	**14 weeks, 2 days (100 days)**	**35 weeks, 5 days (250 days)**

The range of 100 days to 250 days is a wide range because of the significant unknowns regarding resource availability following a seismic event. To give a single number for the estimated outage duration, the average of this range, 175 days, is likely a reasonable estimate.

Population Impacted by Reservoir Outage

In order to analyze the population that would be impacted by an outage of the Division 7 reservoir, two figures are helpful. One is the Hydraulic Profile that shows system connectivity in Figure 3.3 of the current Water System Plan. This shows connectivity and which pressure zones can be fed from the various sources. The pressure zone map can be seen in Figure E-1 (Appendix E) of the current Water System Plan. Figure 3.3 shows that two pressure zones, PZ-15-SV and PZ-19-SV, can only be fed from the Division 7 reservoir. A complete outage of the reservoir means that there is no way to feed water to these portions of the water system, since the supply pumps (WPD7) are constant speed pumps and cannot be operated like a booster pump system. Typical system operation is such that PZ-2-SV is fed from the Division 7 reservoir, but this pressure zone could be fed from PZ-3-SV which is supplied by the Division 22 reservoirs.

But an outage of the Division 7 reservoir means that large portions of the distribution system (PZ-2-SV, the Division 30 reservoir and all portions of the system fed from that reservoir) would need to be supplied from the Division 22 reservoir instead of the Division 7 reservoir. This means that the Division 22 storage volume would be insufficient for the population it was serving (not enough standby storage to be prepared for additional potential issues with the water supply). Operations should shift so that the Geneva reservoir fed PZ-4-G, which would mean that the Geneva reservoir is feeding more connections than it has capacity for, but that lessens the stress on the Division 22 reservoirs. In this way, the entirety of the South Shore water system would be impacted by an outage of the Division 7 reservoir. Because 370,000 gallons of storage are needed at Division 7, and overall system storage capacity needs are approximately 2,000,000 gallons, this means that the overall south shore system would lose 19% of its required storage volume capacity.

The entirety of the South Shore water system would also be impacted in other ways as well. Once temporary storage was in place to serve those portions of the system that can only be fed from the Division 7 reservoir (temporary storage discussed in the previous section of this memorandum), it will make operations at the treatment plant significantly more difficult because

of the frequent and short duration fill cycles for the temporary storage. This would mean frequent and short run cycles at the water treatment plant, which it is not optimized for, unless other physical changes were made to the system facilitate this emergency operation scheme (such as installing a bypass pipe and valve around the Div 22 transmission line check valve so that Div 22 could provide flow back to CT tank which could be pumped to Div 7 temporary storage). These impacts to the treatment system could increase risk of treatment upsets if the treatment plant is starting up and shutting down more frequently than it is intended to do, and would stress overall operations, requiring significant additional operator's labor time to operate the system in this emergency manner. These items, and the costs of the emergency response and fixes, would negatively impact the whole District financially in a more significant way than proactively replacing the reservoir would do.

In all these ways, the entire south shore system with a population served of 10,028 would be impacted by a loss of the Division 7 reservoir due to a seismic event.

Capital Cost Estimate of Two New Welded Steel Reservoirs

The estimated capital cost to replace the existing Division 7 water reservoir with two appropriately sized concrete water reservoirs was presented in the February 8, 2018 memorandum, and this estimate has been updated and included as Table 2 in this current memorandum.

As requested, we also compiled a capital cost estimate if the two appropriately sized reservoirs were constructed of welded steel instead of concrete. This is shown in Table 3.

Estimates indicate that constructing the two reservoirs out of welded steel would require a capital investment of roughly 50% more than constructing the reservoirs out of concrete. Life expectancy and maintenance needs of concrete vs. welded steel reservoirs are discussed in the subsequent section of this memorandum.

Table 2

LAKE WHATCOM WATER AND SEWER DISTRICT **12/21/2020**
Division 7 Reservoir Replacement
Preliminary Cost Estimates

Prepared by: **Brian Smith, PE and Melanie Mankamyer, PE, Wilson Engineering LLC**

Wilson Job No.: **2019-104**

Preliminary Cost Estimates - Replace Div 7 Reservoir with Two Concrete Reservoirs

Construction Year **2021**

Item Description	Quantity	Unit	2020 Unit Price	Amount
CONSTRUCTION				
a. Mobilization (10%)	1	LS	$ 83,426	**$ 93,000**
b. Temporary Erosion and Sediment Control (1%)	1	LS	$ 8,260	**$ 9,200**
c. Storage Improvements				
Concrete storage tank 185,000 Gallon 30 ft dia x 35 ft height (installed by supplier, prevailing wages)	2	EA	$ 223,000	$ 427,064
Reservoir railing	2	EA	$ 10,000	$ 23,485
Tree removal	1	LS	$ 30,000	$ 35,227
Clearing and grubbing	1	LS	$ 10,000	$ 11,742
Site earthwork	1	LS	$ 90,000	$ 105,682
Overflow piping	500	LF	$ 100	$ 58,712
Piping from new tank to existing, 12" diameter	500	LF	$ 100	$ 58,712
Manual valve on one tank outlet (other tank to have isolation valve with electronic actuator, priced with ShakeAlert Integration)	1	EA	$ 2,000	$ 2,348
Surface restoration / planting mitigation	1	LS	$ 20,000	$ 23,485
Stormwater management	1	LS	$ 8,000	$ 9,394
Electrical, telemetry and instrumentation	1	LS	$ 100,000	$ 117,424
Subtotal				**$ 873,276**
d. Access Road Improvements				
Clearing / grubbing / grading	1	LS	$ 15,000	$ 17,614
Base Course (6-in)	180	Ton	$ 40	$ 8,455
Top Course (3-in)	90	Ton	$ 50	$ 5,284
Geotextile (triax grid)	700	SY	$ 3	$ 2,466
Stormwater management	1	LS	$ 5,000	$ 5,871
Subtotal				**$ 39,689**
SUMMARY				
Subtotal				$ 1,015,165
Contingencies	15%			$ 152,300
Sales Tax	8.5%			$ 99,235
Preliminary Estimated Construction Costs				**$ 1,267,000**
Permit Fees	2.2%			$ 28,000
Easement Acquisition				$ 5,500
DOH Project Report				$ 20,000
Topographic Survey	2%			$ 24,400
Geotechnical Investigation				$ 10,700
Engineering Design	10%			$ 121,700
Construction Phase Engineering/Inspection	10%			$ 125,300
Construction Phase Surveying	1%			$ 12,600
NEW CONSTRUCTION TOTAL PROJECT ESTIMATED COST				**$ 1,616,000**
Demolition of Existing Division 7 Steel Reservoir (including permit fee and sales tax)				$ 172,000
NEW CONSTRUCTION PLUS DEMO TOTAL PROJECT ESTIMATED COST				**$ 1,788,000**

Year when maintenance task anticipated to be needed

Item Description	Quantity	Unit	2020 Unit Price	2071 Amount	2091 Amount	2111 Amount
MAINTENANCE TO PROVIDE 100 YEAR SERVICE LIFE						
Assumed annual inflation rate for maintenance tasks	3%					
a. Concrete Reservoir Interior Lining	8,011	Sq FT	$66.66	**$ 2,411,314**		
b. Concrete Reservoir Interior Lining Maintenance	1	EA	$50,000		**$ 407,768**	**$ 736,474**
c. Concrete Reservoir Leak Repair	1	EA	$30,000	**$ 135,463**	**$ 244,661**	**$ 441,884**

TOTAL ESTIMATED MAINTENANCE COSTS OVER 100 YEAR SERVICE LIFE	**$ 4,377,564**

TOTAL ESTIMATED CONSTRUCTION AND MAINTENANCE COSTS OVER 100 YEAR SERVICE LIFE	**$ 6,165,564**

Table 3

LAKE WHATCOM WATER AND SEWER DISTRICT **12/21/2020**
Division 7 Reservoir Replacement
Preliminary Cost Estimates

Prepared by: **Brian Smith, PE and Melanie Mankamyer, PE, Wilson Engineering LLC**

Wilson Job No.: **2019-104**

Preliminary Cost Estimates - Replace Div 7 Reservoir with Two Welded Steel Reservoirs

Construction Year **2021**

Item Description	Quantity	Unit	2020 Unit Price	Amount
CONSTRUCTION				
a. Mobilization (10%)	1	LS	$ 132,426	**$ 144,000**
b. Temporary Erosion and Sediment Control (1%)	1	LS	$ 8,260	**$ 9,200**
c. Storage Improvements				
Welded steel storage tank 185,000 Gallon 30 ft dia x 35 ft height (installed by supplier, prevailing wages)	2	EA	$ 468,000	$ 936,000
Reservoir railing	2	EA	$ 10,000	$ 23,485
Tree removal	1	LS	$ 30,000	$ 35,227
Clearing and grubbing	1	LS	$ 10,000	$ 11,742
Site earthwork	1	LS	$ 90,000	$ 105,682
Overflow piping	500	LF	$ 100	$ 58,712
Piping from new tank to existing, 12" diameter	500	LF	$ 100	$ 58,712
Manual valve on one tank outlet (other tank to have isolation valve with electronic actuator, priced with ShakeAlert Integration)	1	EA	$ 2,000	$ 2,348
Surface restoration / planting mitigation	1	LS	$ 20,000	$ 23,485
Stormwater management	1	LS	$ 8,000	$ 9,394
Electrical, telemetry and instrumentation	1	LS	$ 100,000	$ 117,424
Subtotal				**$ 1,382,212**
d. Access Road Improvements				
Clearing / grubbing / grading	1	LS	$ 15,000	$ 17,614
Base Course (6-in)	180	Ton	$ 40	$ 8,455
Top Course (3-in)	90	Ton	$ 50	$ 5,284
Geotextile (triax grid)	700	SY	$ 3	$ 2,466
Stormwater management	1	LS	$ 5,000	$ 5,871
Subtotal				**$ 39,689**
SUMMARY				
Subtotal				$ 1,575,101
Contingencies	15%			$ 236,300
Sales Tax	8.5%			$ 153,969
Preliminary Estimated Construction Costs				**$ 1,966,000**
Permit Fees	2.2%			$ 28,000
Easement Acquisition				$ 5,500
DOH Project Report				$ 20,000
Topographic Survey	2%			$ 24,400
Geotechnical Investigation				$ 10,700
Engineering Design	10%			$ 193,100
Construction Phase Engineering/Inspection	10%			$ 198,800
Construction Phase Surveying	1%			$ 12,600
NEW CONSTRUCTION TOTAL PROJECT ESTIMATED COST				**$ 2,460,000**
Demolition of Existing Division 7 Steel Reservoir (including permit fee and sales tax)				$ 172,000
NEW CONSTRUCTION PLUS DEMO TOTAL PROJECT ESTIMATED COST				**$ 2,632,000**

Year when maintenance task anticipated to be needed

Item Description	Quantity	Unit	2020 Unit Price	2041 Amount	2061 Amount	2081 Amount	2101 Amount
MAINTENANCE TO PROVIDE 100 YEAR SERVICE LIFE							
Assumed annual inflation rate for maintenance tasks	3%						
a. Welded Steel Reservoir Re-coating, interior	10,207	Sq FT	$15.00	**$ 284,822**	**$ 514,420**	**$ 929,100**	**$ 1,678,059**
b. Welded Steel Reservoir Re-coating, exterior	8,011	Sq FT	$15.00	**$ 223,544**	**$ 403,745**	**$ 729,209**	**$ 1,317,033**

TOTAL ESTIMATED MAINTENANCE COSTS OVER 100 YEAR SERVICE LIFE	**$ 6,079,933**
TOTAL ESTIMATED CONSTRUCTION AND MAINTENANCE COSTS OVER 100 YEAR SERVICE LIFE	**$ 8,711,933**

Useful Life and Life Cycle Cost Analysis – Concrete Vs. Welded Steel Reservoirs

In order to compare the alternatives of constructing the two replacement water reservoirs out of concrete or welded steel, we analyzed the expected life of each and expected maintenance tasks and costs over that life span.

Please see Attachment 1 for an opinion on the expected life of a concrete water reservoir from a structural engineer with significant experience in concrete structures. In summary, his opinion is that with crack injection and/or tank lining as needed throughout the life of the structure, a 100 year life expectancy is reasonable to assume for a concrete potable water reservoir.

In line with this opinion, we developed cost estimates for maintenance tasks that are expected to result in a 100 year service life for the two concrete reservoirs. In this way, we are able to appropriately compare capital and maintenance costs for concrete reservoirs against the equivalent capital and maintenance costs for welded steel reservoirs over a 100 year timeframe.

The maintenance costs are summarized at the bottom of Tables 2 and 3 and include an inflation factor of 3% per year. For the concrete reservoirs, we included both a complete tank lining at 50 years and subsequent lining maintenance as well as crack injection for leak repair starting at year 50 and every 20 years after that in order to remain conservative with regards to required maintenance to achieve a 100 year life. The interior lining cost is based on a NSF61 certified, 120 mil thickness 100% solids epoxy coating. Steel reservoirs' primary preventative maintenance cost consists of re-coating the interior and exterior of the tanks to prevent corrosion. The frequency of this re-coating is estimated at 15 to 20 years (based on current coating systems, as discussed in the 2018 memorandum), and the cost analysis is based on the upper end of this range at 20 years.

Table 4 is also included and shows the applicable anticipated costs if the District were to leave the existing Division 7 reservoir in place and perform the recommended seismic upgrades and coating work.

Table 4

LAKE WHATCOM WATER AND SEWER DISTRICT **12/22/2020**
Division 7 Reservoir Rehabilitation
Preliminary Cost Estimates

Prepared by: **Brian Smith, PE and Melanie Mankamyer, PE, Wilson Engineering LLC**

Wilson Job No.: **2019-104**

Preliminary Cost Estimates - Rehabilitate Div 7 (Seismic Retrofits, Re-coatings, Repairs)

Item Description	Quantity	Unit	Unit Price	2020 Amount
CONSTRUCTION				
a. Mobilization (10%)	1	LS	$ 63,999	**$ 64,000**
b. Coating work				
If lead is present on exterior coating, need containment for abrasive blasting	1	LS	$ 95,481	$ 95,481
Remove existing coating from interior and exterior and replace coating	29,385	SF	$ 15	$ 440,800
Subtotal				**$ 536,281**
c. Structural repair of roof support header as detailed in December 13, 2012 assessment	1	LS	$ 15,914	**$ 15,914**
d. Provisions for providing temporary water storage while tank is out of service				
Rental of temporary potable water storage tank assembly (48,600 gallons) for 5 months with freight	1	LS	$ 25,732	$ 25,800
Temporary Erosion and Sediment Control	1	LS	$ 5,000	$ 5,000
Tree removal, clearing and grubbing, and earthwork to provide 46 ft by 46 ft level pad for temporary tank	1	LS	$ 35,000	$ 35,000
Labor to assemble temporary tank, fill, disinfect, and disassemble temporary tank	1	LS	$ 12,000	$ 12,000
Temporary piping to temporary tank (install, test, disinfect appprox 100 ft, 8 inch)	1	LS	$ 10,000	$ 10,000
Subtotal				**$ 87,800**
SUMMARY				
Subtotal				$ 703,995
Contingencies	15%			$ 105,599
Sales Tax	8.5%			$ 68,815
Preliminary Estimated Construction Costs				**$ 879,000**
ted Project Costs of Seismic Retrofits from BHC (includes construction, tax, engineering)				$ 721,000
Engineering Design	5%			$ 43,950
Construction Phase Engineering/Inspection	10%			$ 87,900
GRAND TOTAL				**$ 1,732,000**

Year when maintenance task anticipated to be needed

Item Description	Quantity	Unit	2020 Unit Price	2041 Amount	2061 Amount	2081 Amount	2101 Amount
MAINTENANCE TO PROVIDE 100 YEAR SERVICE LIFE							
Assumed annual inflation rate for maintenance tasks	3%						
a. Welded Steel Reservoir Re-coating, interior	17,523	Sq FT	$15.00	**$ 488,979**	**$ 883,150**	**$ 1,595,068**	**$ 2,880,870**
b. Welded Steel Reservoir Re-coating, exterior	11,545	Sq FT	$15.00	**$ 322,166**	**$ 581,868**	**$ 1,050,919**	**$ 1,898,076**

TOTAL ESTIMATED MAINTENANCE COSTS OVER 100 YEAR SERVICE LIFE	**$ 9,701,097**

TOTAL ESTIMATED REPAIR AND MAINTENANCE COSTS OVER 100 YEAR SERVICE LIFE	**$ 11,433,097**

As indicated in Tables 2, 3, and 4, the option to replace the existing Division 7 reservoir with two appropriately sized concrete reservoirs (Table 2) has the lowest capital costs as well as the lowest maintenance costs over a 100 year life span of the reservoirs. In addition to cost, there are five other distinct advantages that replacing the Division 7 reservoir with two new reservoirs has over rehabilitating it that are discussed in the 2018 memorandum. They are reiterated here:

1. Water Quality – The existing Division 7 reservoir is significantly oversized and results in an excessive average water age of 4.6 days. The hydraulic residence time in the reservoirs proposed (2 appropriately sized reservoirs) would be 2.1 days under average day demand in a build-out scenario. This would be within the AWWA recommendation of less than 2.5 days average hydraulic residence time and would help improve water quality in terms of less formation of disinfection by-products and better maintenance of chlorine residual in the distribution system.
2. Improved Water Pressure – Installing new storage 25 feet higher than the existing reservoir will improve water pressure for those houses immediately adjacent to the reservoir. The increased pressure will not negatively impact the system in terms of over pressurizing or decreasing pumped flow excessively.
3. Resiliency – Having two parallel water storage reservoirs provides substantially improved system resiliency in case of emergency (earthquake or unexpected failure of one tank) or typical maintenance. Having the ability to keep one reservoir in service while taking the other out of service will improve the District's ability to serve their customers efficiently.
4. Maintenance Logistics – Current interior coatings for a steel reservoir need to be replaced/refurbished every 15-20 years. This requires the tank to be taken out of service for the work, and this is significantly challenging with only one tank.
5. Construction/Operation Feasibility – Refurbishing the existing Division 7 reservoir would require temporary storage during construction that would either be prohibitively expensive or would make operation of the system during construction very challenging. It is unknown if the limited temporary storage proposed (48,000 gallons, lower height) would be acceptable to the water system operator, the fire department, or the Department of Health. Constructing two new reservoirs allows the existing tank to remain in service during construction.

Therefore, replacing the existing Division 7 reservoir with two appropriately sized concrete reservoirs remains the recommended alternative.

Attachment 1

A well designed concrete water storage tank should have a useful service life of at least fifty years. As noted in American Concrete Institute A350-01, Code Requirements for Environmental Engineering Structures

> When all relevant loading conditions are considered, the design should provide adequate safety and serviceability, with a life expectancy of 50 to 60 years for the structural concrete….

That appears to be a conservative estimate, in line with most design standards which are promulgated to reduce risk to a very minimum. Materials (notably admixtures) are improving, as are procedures for design that better take account of shrinkage and other effects that would impact life.

Note that A350 is generally used for wastewater, not fresh water. Again, the implication is that 50 – 60 years is a conservative service life. When deterioration is noted (by leaking or regular inspection) crack injection and/or tank lining can further extend the service life. 100 years is a reasonable life to consider in such a case.

For example, The Granary redevelopment on the shoreline in Bellingham has a basement that sits approximately 15' below salt water. The building was built in 1928, and according to records publicly available from the County Assessor, the expected remaining life is 50 years. Having been the structural engineer who worked on the redevelopment, I believe that to be accurate.

To sum up, my recommendations are as follows:

(1) Expect a service life of 50 years without major maintenance to structure
(2) At times of cleaning, watch for signs of deterioration
(3) At some point (50 – 60 years on) the tank can be repaired to extend the life to 100 years total

12-11-2020

DR-4309 HMGP PROJECT SUBAPPLICATION

LAKE WHATCOM WATER AND SEWER DISTRICT

DIVISION 7 WATER RESERVOIR SEISMIC UPGRADE & SHAKE ALERT IMPLEMENTATION (EARTHQUAKE EARLY WARNING SYSTEM)

APPLICATION PREPARED BY:
PHONE:
E-MAIL: rich.munson@lwwsd.org

Project Application

DR-4309 HMGP

Contents

Application Summary

NOTE: THIS SECTION OF THE APPLICATION REVIEWS BASIC ELIGIBILITY REQUIREMENTS. FOR MORE INFORMATION ON ELIGIBILITY PLEASE SEE HMA Unified Guidance Part III (PAGE 25).

Applicant Information

Applicant Organization/Agency: Lake Whatcom Water and Sewer District
Type of Organization/Agency: Special Governmental District
If Private Non-Profit, describe legal status and function: NA
County: Whatcom - 073
Congressional District: 1st Legislative District: 42nd
Federal Tax ID#: 20-4196340 UBI #: 600151207 DON'T KNOW YOUR UBI? LOOK IT UP here.
DUNS#: 169164845 WHAT IS A DUNS Number?

Primary Contact for this application (The individual directly involved in overseeing the grant)
Name: Rich Munson Title: Engineer Tech / Safety Officer Phone: 360-734-9224
Email Address: rich.munson@lwwsd.org
Mailing Address: 1220 Lakeway Drive
City: Bellingham State: WA Zip: 98226

Application Prepared by-
Name: Rich Munson Title: Engineer Tech / Safety Office Phone: 360-734-9224
Email Address: rich.munson@lwwsd.org

Mitigation Plan Information

Does the jurisdiction have a current FEMA-Approved multi-hazard mitigation plan?

☒ Yes ☐ No ☐

Pending Approval – Please explain status: NA
If yes, what is the title of the plan? Whatcom County Hazard Mitigation Plan
FEMA Approval Date: 12/15/2016 Expiration Date: 12/14/2021

Project Funding Information

Was any version of this application previously submitted under another FEMA Program or Funding Opportunity? ☐ Yes ☒ No If yes, explain status: Click to enter
Does another Federal entity have primary funding authority for this project?

No

Project Summary

Project Title: Division 7 Water Reservoir Seismic Upgrade & ShakeAlert Implementation
Project Cost Estimate: $ 1,700,000
Primary hazard the project will mitigate: Earthquake
Benefit-Cost Ratio (from FEMA's required BCA Tool): 1.59

Project Synopsis (summary):
Division 7 Reservoir Seismic Upgrade:
A structural analysis was performed on five Lake Whatcom Water and Sewer District water storage reservoirs to determine their ability to withstand seismic impacts based on existing earthquake code requirements. The foundations and/or anchorages were found to be inadequate in all five tanks. Shells of two of the tanks, including that of the Division 7 Reservoir, were also found to be inadequate. The Division 7 Reservoir, constructed in 1971, is the largest in the system, has the most serious deficiencies, would have the worst adverse impact from an earthquake, and was determined to have the highest priority for retrofit work.
This work will improve the ability of LWWSD to maintain crucial water services to ~10000 customers and will reduce the potential for downstream/downslope flooding in the aftermath of an earthquake.
LWWSD current plan to minimize losses and maintain functionality following a large earthquake (manually close valves, stop pumps, de-energize electrical systems, stop chemical feed processes, etc.).

ShakeAlert – Earthquake Early Warning System
Specifically, the project includes:
1) Completing the USGS pilot application,
2) Developing policies and procedures that detail the actions that will be taken following an early-warning activation,
3) Purchasing the hardware and software necessary to automatically access the ShakeAlert system, and
4) Integrating the ShakeAlert signal into the existing control system and municipal facilities.
5) Installing seismic valves and hardware for auto shutoff to water reservoirs

Scope of Work

Project Q&A

What problem will be mitigated and what are the current conditions and/or history of the problem?

Division 7 Water Reservoir:

(1)The bottom half of the tank shell has excessive hoop tensile stress under both ordinary hydrostatic load as well as seismic conditions. (2)Without anchors, tank uplift may be on the order of 50 times the bottom plate thickness, or roughly 16 inches. (3)Piping connections are at risk of failure in an earthquake. (4)The failing header connection should be repaired before it fails, resulting in roof damage. (5)The anchorage and foundation are inadequate. (6) As a result, the tank will not be stable under the earthquake loads assumed and could fail catastrophically.

ShakeAlert – Earthquake Early Warning System

Municipal water systems are damaged by large earthquakes. Pump stations burn, water mains rupture and reservoirs empty.

The ShakeAlert device will be installed at our Operations and Maintenance building. Once there is an earthquake the devices electric signal will be sent to a PLC on our SCADA system. Once SCADA gets the signal it will then activate the seismic valves that will be installed on Division 7 Reservoir, the completed seismic valve on Division 22 Reservoir #2, and the to be installed seismic valve on Geneva Reservoir.

In addition to the water reservoirs SCADA will shut down the Sudden Valley Water Treatment Plant including all the pumps.

SCADA will shut down water pump stations: Division 30, Beecher, and Opal.

What is the intended outcome of the proposed project and how will it reduce or eliminate the long-term risk of future damage, hardship, loss, or suffering resulting from natural hazards?

The 1 million gallon Division 7 water reservoir will be will be replaced with 2 smaller reservoirs that contain an appropriate total volume.

Having two reservoirs instead of one offers three major advantages:

1. One reservoir can be taken out of service for maintenance or repairs at any time and the other reservoir is capable of providing sufficient storage for these temporary periods.

2. If one tank happens to have an unexpected leak or failure, the other can be used. If there was only one tank and there was a failure, it would cause a public health emergency until temporary storage was able to be put in place.

3. In a major earthquake, there will likely be both water main breaks that cause major leaks and fires that need fire suppression water. This leads to a situation where if there is only one storage tank it will either be drained quickly by the leaks and fire suppression activities or the outlet valve will be closed to maintain water for the longer-term response but water will not be available for initial fire suppression. With two reservoirs in place, the system can have the best of both because one tank outlet can be left open for immediate fire suppression needs and the other can be closed to maintain a supply of treated water for the days and weeks of response to the emergency. At the volume being considered (~half a million gallons), the cost of a single reservoir vs two smaller reservoirs will be similar.

4. The second reservoir will be used for fire flow during and emergency. With the 2 reservoirs built at a higher elevation will provide the required fire protection flow to fire hydrants in there service area. These hydrants currently do not meet required flows.

ShakeAlert will reduce the losses associated with post-earthquake damage by closing strategically located valves on water mains (to prevent water loss and facility wash-outs), closing isolation valves on storage reservoirs (to prevent loss of contents through ruptured mains) and stopping pump stations before the shaking occurs to minimize damage by large seismic motions on rotating machinery

What members of the community will benefit from the proposed project?

The District has an estimated population of approximately 10000. The reservoir, in a seismic event, would rupture and cause flooding and possible cause severe structural damage to 10+ homes downhill of the reservoir. Saving water reservoirs to preserve potable water for first responders and for longer-term potable health and safety needs following a damaging seismic event

Sudden Valley Community Association (SVCA) was built in 1969 and is the largest Home Owners Association in Washington State and is located in an urban forest. Sudden Valley has approximately 40 plus miles of roads as well as numerous foot trails and neighborhood and community parks.
Sudden Valley is adjacent to Lake Whatcom and maintains a low head dam as a reservoir for a 18 hole golf course and has a number of streams and creeks that are inside the association. Sudden Valley has a several reservoirs that are maintained by Lake Whatcom Water and Sewer District and a water treatment plant located at AM/PM beach.

What specific work activities or components are involved in the proposed project, how will each one be implemented, and who will be responsible for completing them?

Division 7 Reservoirs:

- Permitting and easement acquisition; completed by District Staff and consulting engineering firm
- Engineering and design; completed by District Staff and consulting engineering firm
- Construction; completed by contractor determined by competitive bid
    - Tree removal
    - Cleaning and grubbing
    - Construction of reservoir
    - Installation of piping
    - Installation of seismic valve
- Integration to SCADA and ShakeAlert; completed by RH2 engineering

Geneva Reservoir

Construction

- Installation of seismic valve; completed by contractor determined by competitive bid
- Integration into SCADA and ShakeAlert; completed by RH2 engineering

ShakeAlert

- Pilot Project Application; completed by District Staff and RH2 Engineering
- Policies and Planning; completed by District Staff and Commission.
- ShakeAlert warning access. Includes acquisition of programmable logic controllers with custom software and integrated into the Pacific Northwest Seismic Network.
- System Integration. Includes connecting the ShakeAlert waring signal to field-located valves, pump controllers, and Automatic transfer switches; completed by District Staff and Commission

Which tasks will contractors be responsible for, if any? Please explain their expected products and/or deliverables.

The District will contract with a qualified engineer for construction plans, bidding and construction inspection for the Division 7 Reservoir. The selected contractor will do the site work, construct reservoirs and restoration of site

Tasks will be accomplished by District Staff and RH2 Engineering, a private consulting engineering company who is an authorized Pilot Project Participant with the ability to access the ShakeAlert signal.

Has the proposed project's construction or implementation phase already started?

No

Will the proposed project use unproven technology? ☐ Yes ☒ No If yes, please explain:

Click to enter

How will the proposed project be coordinated with neighboring entities (including counties, cities, states, tribal nations, fire, police, public works, utilities, etc.)?

Division 7 reservoir: the District will need to complete permitting through Whatcom County Planning and Development Services

Shake Alert: Much of the planning and policy development will be conducted in public forums. The system will be in compliance with the Whatcom County Hazard Mitigation Plan. All implementation with be in accordance with the existing Pilot Project agreement between RH2 Engineering and the USGS and PNSN.

How is the proposed project related to or consistent with the jurisdiction's FEMA-approved Hazard Mitigation Plan?

Lake Whatcom Water and Sewer District's mitigation measures as defined in the Whatcom County Hazard Mitigation Plan are: (1) EQ-5 Protect Critical Facilities and Infrastructure as a High priority (2) EQ-6 Implement Structural Mitigation Techniques as a Medium priority (3) EQ-7 Retrofit Water Reservoirs as a High priority

Budget and Funding Sources

Estimated Total Costs

Total Project Costs	**$ Estimate**
Pre-Award Costs (4/21/2017 through grant award date)	$0
Project Management Costs, Legal Expenses, etc.	$55000
Land, Structures, Rights-of-way, appraisals, etc.	$5000
Relocation Expenses and Payments	$0
Architectural, Engineering, Geotechnical, etc.	$130260
Project Inspection Fees	$100200
Site Work	$186616
Demolition and Removal	$167000
Construction	$896127
Equipment *(trackable assets costing $5,000 or more)*	0
Miscellaneous *(Personnel, Fringe Benefits, Travel, Supplies, etc.)*	$174578
Total Project Costs	$1,714,781.00 *

*To update total of all categories, right click the cell above and select Update Field

Attach backup documentation to explain how the cost estimates were determined (spreadsheets, vendor quotes, engineer/design estimates, in-house worksheets, correspondence, etc.)

Describe the expenses included in each of the above budget categories:

Division 7 Reservoir:

Engineering – Includes staff and consultants time to design the 2 new reservoirs. Including plans, easement acquisition, topographic survey, construction inspection, construction survey

Land & easements- the new reservoirs will be uphill from the existing reservoir on private property

Site Work – Removal of trees, cleaning and grubbing of site, and earthwork for reservoirs foundations

Demolition and Removal- remove and dispose of old steel reservoir

Construction - The existing reservoir will be replaced with 2 smaller reservoirs. One will have a seismic valve which will be connected to the ShakeAlert system and the other will be used for fire suppression when there is an earthquake. The reservoir will be concrete and located at a higher elevation for pressure and flow purposes. There will be an easement with the local landowner for the land. Engineering, permitting, site work for the reservoirs, demolition of the existing reservoir are costs associated with this part of the project.

Geneva Reservoir: A seismic valve will be installed.

ShakeAlert:

Project Management Costs – Includes staff time and consultant time to apply for Pilot Program participation and develop policies that detail the actions that will be taken and under which circumstances based on the amount of advance warning and expected magnitude of an early warning alarm. This step culminates in a report and policy documents.

Engineering – Includes development of the programmable logic controller software that accesses the ShakeAlert warning signal at the Pacific Northwest Seismic Network and details the connections and equipment necessary to integrate the warning signal into the existing control network.

Equipment – Includes isolation valves, power supplies, interface relays, solenoids and other miscellaneous equipment needed to connect the early warning alarm to the required valves, pumps and equipment.

Construction – Includes installation of the equipment.

Funding Source – Non-Federal Match

The Hazard Mitigation Grant Program offers cost-share grants payable on a reimbursement basis. Jurisdictions must have sufficient resources to provide the required non-federal match and cover any cost overruns related to completing the proposed Scope of Work.

The maximum federal share is 75% of the total, eligible costs. The minimum non-federal cost share is 25%. In some instances, the state will split the non-federal share between the state (12.5%) and the applicant (12.5%). If this state match is available, applicants will be notified during the Pre-Application step of the HMGP round.
13806

Source of Funds	**Estimates**
Federal 75%	$ 1286086.00
State 12.5%	$ 214347.50
Local 12.5%	$ 214347.50
Total:	$1,714,781.00 *

*To update the total, right-click the cell above and select Update Field

Local (applicant) Cash Match	$ 214347.50
Other Eligible Local (applicant) Non-Cash Match Sources:	
Local (applicant) Staff Time	$ 15000
Local (applicant) Materials and/or Supplies	$ Click to enter
Local (applicant) Equipment Use	$ Click to enter
Third Party In-Kind Donations*	$ Click to enter
Other Eligible non-federal match sources	$ Click to enter
Total applicant Cost Share (at least 12.5% of project budget):	$229,347.50 *

*To update the total, right-click the cell above and select Update Field

*Third Party In-Kind Contributions: The applicant's required cost share can include another entity's donations of staff time and/or volunteers, equipment use, materials, etc. These *Third Party In-Kind Contributions* must be identified in this table to be eligible for consideration as a cost-share match source.

Schedule of Work

List the major milestones in the proposed project and provide an estimated timeline for each activity. Projects must be completed within the established period of performance.

MILESTONE **Description of Activity/Task**	**# of Months to Complete**
ShakeAlert Pilot Application	.5
ShakeAlert Planning and Policies	.5
ShakeAlert Implementation	1
Advertise and select Engineering firm to design Division 7 Reservoirs and Geneva Reservoir seismic valve	2
Design of new reservoirs and seismic valve	9
Permitting	6
Construction of reservoirs and seismic valve: The District is in a small construction window in the Lake Whatcom watershed (June 1st to Sept 30th)	18
Implementation of ShakeAlert into new reservoirs and seismic valve	.2
Click to enter milestone	Enter #
Click to enter milestone	Enter #
Click to enter milestone	Enter #
Click to enter milestone	Enter #
Click to enter milestone	Enter #
Click to enter milestone	Enter #
Click to enter milestone	Enter #
Click to enter milestone	Enter #
Click to enter milestone	Enter #
Click to enter milestone	Enter #
Click to enter milestone	Enter #
Total Months Required to Complete This Project:	37.20 *

*To update the total, right-click the cell above and select Update Field

Project Alternatives

Alternative Project

This section is intended to demonstrate that project alternatives were seriously considered and that the proposed project is the most beneficial, cost-effective mitigation activity reasonably available to the applicant. The questions below ask for information regarding the next best mitigation action that was considered during the process of developing the proposed mitigation activity.

Scope of Work – Summarize an alternative course of action considered by your organization that would mitigate the same hazard. Include any appropriate diagrams, sketch maps, materials and equipment quantities, scale of the project, amount of time required to complete, etc.
As an alternate to retrofit, the existing tank could be demolished and replaced for a cost on the order of $1.8 million, not counting any temporary cost associated with providing water service with the tank off-line. Alternately, a new tank in the same pressure zone could be constructed at an adjacent site, but would involve additional permitting and property acquisition costs.
ShakeAlert will cost an additional $277,000

Hazard Mitigation – How would the alternate project reduce or eliminate the hazard's effects and risks, and the need for future state or federal disaster assistance?
The new tank would be constructed to withstand seismic events

Environmental Considerations – How would the alternate project positively and/or negatively affect the surrounding environment? Include information regarding both natural (fish, wildlife, streams, soils, plant life) and social (public services, utilities, land/shoreline use, population density) environments.
NA

Total Estimated Cost for Alternate Project: $ 2.1 Million

Additional Comments: Click to enter

No Action Alternative

What are the potential impacts if no action is taken? The reservoir will continue to be still be susceptible to any moderate to large seismic event with resulting loss of water & potential flooding

Is there a potential for degradation of already poor environmental conditions? ☐ Yes ☒ No

If Yes, please describe:

Additional Comments: Click to enter

Environmental Data

Is there potential to violate any federal, state, local, or tribal law or code to protect the environment?

☐ Yes ☒ No If yes, please explain: Click to enter

State Q&A

Growth Management Act Compliance – WA Dept. of Commerce and WA Dept. of Ecology

1. Is the jurisdiction in compliance with state Growth Management Act Requirements?
    a. ☐ Yes ☐ No ☒ Not Applicable (Tribes, Non-Profits)
    b. If yes, provide the date the jurisdiction's Comprehensive Land Use Plan (if required) and the Critical Areas Ordinances (CAOs) were approved and adopted.
        i. Land Use Click to enter CAOs Click to enter
    c. If no, explain the identified non-compliance issues and how the jurisdiction is resolving them. Click to enter
2. Is the proposed project in any Critical Area classifications identified in Washington State's Growth Management Act? *These areas include but are not limited to: Wetlands, Aquifer Recharge Areas, Frequently Flooded Areas, Geologically Hazardous Areas, and Fish and Wildlife Habitat Areas.* ☐ Yes ☒ No
    a. If yes, please identify the Critical Area categories: Click to enter
    b. If yes, how will this project comply with protection requirements of these areas? Click to enter

National Flood Insurance Program (NFIP) Compliance – WA Dept. of Ecology

1. Is the project located in a Special Flood Hazard Area (SFHA) as defined by the NFIP? ☐ Yes ☒ No
2. The date of your most recent NFIP Community Assistance Visit (CAV) Click to enter
3. Did your community have any CAV/NFIP issues or violations from this visit? ☐ Yes ☐ No
    a. If yes, please explain: Click to enter

Federal Q&A

National Historic Preservation Act

Historic Buildings and Structures

Does your project affect or is it near any buildings or structures 49 years or more in age?

☐ Yes ☒ No ☐ Unknown

If yes, explain how the project design will minimize adverse effects on known or potential historic buildings or structures. Please address and note associated costs in your project budget.

Click to enter

Archeological Resources

Does your project involve disturbance of ground? ☒ Yes ☐ No ☐ Unknown

If yes, describe the ground disturbance by giving the dimensions (area, volume, depth, etc.) and location. The 2 new reservoirs will need a 35 foot in diameter footing. The volume will be ~23 cubic yard. The trench for the new water pipe to connect the new reservoirs will be ~140 cubic yards

Describe the past use of the area to be disturbed, noting the extent of previously disturbed ground.
The existing Division 7 reservoir was installed in 1971. The District has no records of what type of soil was discovered.

Additional Information: Click to enter

Endangered Species Act and Fish and Wildlife Coordination Act

Are federally listed threatened or endangered species or their critical habitat present in the area affected by the project? ☐ Yes ☒ No ☐ Unknown

Does your project remove or affect vegetation? ☐ Yes ☒ No ☐ Unknown

If yes, describe the amount (area and type of vegetation to be removed or affected. Click to enter

Is your project in, near (within 200 feet), or likely to affect any type of waterway or body of water?

☐ Yes ☒ No ☐ Unknown

Clean Water Act, Rivers and Harbors Act, and Executive Order 11990 (Protection of Wetlands)

1. Will the project involve dredging or disposal of dredged material, excavation, adding fill material, or result in any modification to water bodies or wetlands designated as "waters of the U.S." as identified by the US Army Corps of Engineers or on the National Wetland Inventory? ☐ Yes ☒ No ☐ Unknown

If yes, include USACE correspondence in Environmental Review Attachments.

Executive Order 11988 (Floodplain Management)

1. Does a Flood Insurance Rate Map (FIRM), Flood Hazard Boundary Map (FHBM), hydrologic study or some other source indicate that the project is located in or will affect a 100-year floodplain, a 500 year floodplain is a critical facility, an identified regulatory floodway, or an area prone to flooding? ☐ Yes ☒ No ☐ Unknown

If yes, complete the 8 Step Process.

2. Does the project alter a watercourse, water flow patterns, or a drainage way, regardless of its floodplain designation? ☐ Yes ☒ No ☐ Unknown

Coastal Zone Management Act

1. Is the project located in the State's designated Coastal Zone? Note: the Coastal Zone includes projects located anywhere within a county that has a shoreline, regardless of whether or not the project itself is located on that shoreline. ☐ Yes ☒ No ☐ Unknown

Farmland Protection Policy Act

1. Will the project convert more than 5 acres of "prime or unique" farmland outside city limits to a non-agricultural use? ☐ Yes ☒ No ☐ Unknown
2. Additional Information: Click to enter

RCRA and CERCLA (Hazardous and Toxic Materials)

1. Is there a reason to suspect there are contaminants from a current or past use on the property associated with the proposed project? ☐ Yes ☒ No ☐ Unknown
2. Are there any studies, investigations, or enforcement actions related to the property associated with the proposed project? ☐ Yes ☒ No ☐ Unknown
3. Does any project construction or operation activities involve the use of hazardous or toxic materials? ☐ Yes ☒ No ☐ Unknown
4. Do you know if any of the current or past land uses of the property affected by the proposed project or of the adjacent properties are associated with hazardous or toxic materials? ☐ Yes ☒ No ☐ Unknown
5. Additional Information: Click to enter

Executive Order 12898, Environmental Justice for Low Income and Minority Populations

1. Are there low income or minority populations in the project's area of effect or adjacent to the project area? ☐ Yes ☐ No ☒ Unknown
2. If yes, describe any disproportionate or adverse effects to these populations. Click to enter
3. If yes, describe the affected population and the portion of the population that would be disproportionately and adversely affected. Please include specific efforts to address the adverse impacts. Click to enter

Other Environmental/Historic Preservation Laws or Issues

1. Are there other environmental/historic preservation requirements that are associated with this project that you are aware of? ☐ Yes ☒ No ☐ Unknown
    a. If yes, please explain: Click to enter
2. Are there controversial issues associated with this project? ☐ Yes ☒ No ☐ Unknown
    a. If yes, please explain: Click to enter
3. Have you conducted any public meeting or solicited public input or comments on your specific proposed mitigation project? ☐ Yes ☒ No ☐ Unknown
    a. If yes, please explain: Click to enter

If you answered yes to any of the above questions in the Environmental Review, additional documentation will be required as listed in Environmental Review Attachments.

Summary and Cost of Potential Impacts

Having answered the above questions, have you identified any aspects of your proposed project that have the potential to impact environmental or historic properties? ☐ Yes ☒ No ☐

If yes, confirm that you have completed the following:

☐ Evaluated these potential effects and provided the required materials in attachments that identify the nature and extent of potential impacts to environmental resources and/or historic properties.

☐ Consulted with appropriate parties to identify any measures needed to avoid or minimize these impacts.

☐ Considered alternatives that could minimize both the impacts and the cost of the project.

☐ Made certain that the costs of any measures to treat adverse effects are realistically reflected in the project budget estimate.

Additional information: Click to enter

End of Main Application-See Attachments and Supplemental Sections Below

Environmental Review Attachments

State Environmental Review	
☐	SEPA Compliance Checklist
NFIP	
☐	Documentation from Washington State Department of Ecology NFIP State Coordinator that you are currently in compliance
National Historic Preservation Act	
☐	State historic preservation Officer (SHPO) concurrence letter
☐	Correspondence from State or Tribal Historic Preservation Officer regarding any structures or buildings that are eligible for listing on the National Register of Historic Places or within or near a National Historic Register listed or eligible historic district
☐	Explanation of how project design will minimize adverse effects on known or potential historic buildings or structures, and any alternatives considered or implemented to avoid or minimize effects on historic buildings or structures
☐	For acquisition/demolition projects affecting historic buildings or structures, any data regarding the consideration and feasibility of elevation, relocation, or flood proofing as alternatives to demolition
Archeological Resources	
☐	Dept. of Archeological and Historic Preservation (DAHP) concurrence letter
☐	A description of the ground disturbance by giving the dimensions (area, volume, depth, etc.) and location
☐	The past use of the area to be disturbed, noting the extent of ground disturbance
☐	A USGS 1:24,000 scale sale or other site map showing the location and extent of ground disturbance
☐	Any information about potential historic properties, including archeological sites in the project area
Endangered Species Act and Fish and Wildlife Coordination Act	
☐	Q1. Any information obtained to identify species in or near the project area. Provide the source and date of the information cited.
☐	Q1. Any request for information and associated response from the USFWS, the National Marine Fisheries Services (NMFS) (for affected ocean-going fish), or State Wildlife Agencies, regarding potential listed species present and potential of the project to impact those species
☐	Q2. A description of the amount (area) and type of vegetation to be removed or affected
☐	Q2. A site map showing the project area and the extent of vegetation affected
☐	Q2. Photographs or digital images that show both the vegetation affected and the vegetation in context of its surroundings
☐	Q3. Evidence of any discussions with the USFWS, and/or State Wildlife Agencies concerning any potential impacts if there is the potential for the project to affect any water body

☐	Q3. A photograph or digital image of the site showing both the body of water and the project area
☐	Q3. Any information about the type of water body nearby including: its dimensions, the proximity of the project activity to the water body, and the expected and possible changes to the water body, if any. Identify all water bodies regardless whether you think there may be an effect/
☐	Q3. A 1:24,000 scale quadrangle map showing the project activities in relation to all nearby water bodies (within 200 feet).
Clean Water Act, Rivers and Harbors Act, Executive Order 11990	
☐	Documentation of the project location on a USGS 1:24,000 scale topographic map or image and a copy of the National Wetlands Inventory map or other available wetlands mapping information
☐	Request for information and response letter from the USACE and/or State resource agencies regarding the potential for wetlands, and applicability of permitting requirements
☐	Evidence of alternatives considered to eliminate or minimize impacts to wetlands
Executive Order 11988 (Floodplain Management)	
☐	Q1. 8 Step Process
☐	Q2. Hydrologic/hydraulic information from a qualified engineer to demonstrate how drainage and flood flow patterns will be changed and to identify down and upstream effects
☐	Evidence of any consultation with the USACE if not already included elsewhere
☐	Request for information and response letter from the State water resource agency, if applicable, with jurisdiction over modification of waterways
Coastal Zone Management Act	
☐	Information resulting from contact with the appropriate State agency that implements the coastal zone management program regarding the likelihood of the project's consistency with the State's coastal zone plan and any potential requirements affecting the cost or design of the proposed activity
	Coastal Zone Management Form
RCRA and CERCLA (Hazardous and Toxic Materials)	
☐	Results of any consultations with State or local agencies to obtain permit with requirements for handling, disposing of or addressing the effects of hazardous or toxic materials related to project implementation
☐	Any studies, investigations, or enforcement actions related to the properties associated with the project
Other	
☐	Documentation of Public Notices and/or public meetings related to the proposed project
☐	Any available Agency consultations and correspondence not previously included
	Any available Environmental Assessments or Biological Opinions related to the project

Required Attachments

General	
	Signed Certificate of Assurances –please print and sign
	Resolution Designating Applicant Agent -please print and sign
	Cost Estimate Summary Spreadsheet
	Map of area with project site limits clearly identified
	FIRM and/or FIRMETTE of Project Site(s)
	Pictures of existing conditions at Project site(s)- at least 3 different sides or angles
	Copy of FEMA Approval Letter for the reference Hazard Mitigation Plan
	BCA Report (exported PDF from FEMA-Approved BCA software)
	Local Funds Commitment Letter
	BCA .zip file-includes full access to the project's BCA inputs and assumptions
Acquisition	
	List of Properties and their addresses (include Lat & Long and total square footage)
	Documentation of the Valuation Estimate of the Property
	Signed assurances that the subapplicant will implement the project grant award in compliance 44 CFR Part 80 Property Acquisition and Relocation for Open Space
	If applicable: Documentation that verifies that Structure Relocation Costs Identify the Value of the Land to be Acquired in Addition to other Eligible Costs
	Signed Voluntary Interest form from all Property Owners
Elevation	
	List of Properties and their addresses (include Lat & Long, structure type, foundation type, original date of construction, elevation of lowest finished floor and total square footage)
	List of first floor elevation of the proposed elevation, proposed foundation type, proposed elevation methodology and standard, and Base Flood Elevation (BFE) or Advisory BFE (ABFE).
	Signed statement from the Appropriate Local Official or qualified professional that the Structure Appears to be Capable of Elevation and a Model Acknowledgement of Conditions for Mitigation of Property in a Special Flood Hazard Area
Equipment Purchases	
	Vendor Quotes
	Manufacturer's Product Data
Wildfire Mitigation	
	Defensible Space: Maps clearly showing targeted properties (include square footage) and an approximation of the total vegetation to be removed
	Map clearly showing that the wildfire project activity will fall within a Wildland Urban Interface Area
	Building Replacement Value (BRV) and Project Useful Life/Projected Lifespan for structures to be protected
	A draft operations and maintenance plan
	Signed agreement from the property owner to maintain the defensible space for a structural protection project

Seismic Retrofits	
	Seismic studies and/or reports establishing existing conditions, needed retrofits, and post-mitigation seismic performance goal (target seismic code level)
	List of Properties and their addresses (include Lat & Long, soil type, construction type, original date of construction, building type, number of stories, use, occupancy, and total square footage)
	Assessment of the vulnerabilities (seismic) of the existing building conditions
	A Model Acknowledgement of Conditions for Mitigation of Property in a Special Flood Hazard Area
	Proposed Structural Retrofit Methodology and Applicable Engineering Standard
	Building replacement value (BRV) ($/square foot) and supporting documentation
Flood Control	
	Excerpts of flood studies and hydrology reports
Optional, but encouraged	
	Recent aerial image of the project site via Google, MapQuest, ArcGIS or similar
	NFIP-CAV Letter confirming community is in good standing per CRS
	Project relevant excerpts from the Local Hazard Mitigation Plan

Open Space Acquisition Project Supplemental

1. Will the intended use of the property comply with 44 CFR Part 80, FEMA Property Acquisition and Relocation for Open Space and the current Hazard Mitigation Assistance Unified Guidance, February 27, 2015. ☐ Yes ☐ No
2. Upon consultation with the US Army Corps of Engineers (USACE), are any of the proposed properties under consideration for the use of the construction of a levee system (including berms, floodwalls, and dikes)? ☐ Yes ☐ No
3. Upon consultation with the Washington State Department of Transportation (WSDOT), are any of the proposed properties under consideration for use for future, planned improvements or enhancements to the Federal Aid Systems, or other State transportation projects? ☐ Yes ☐ No
*If yes, the affected property will not be eligible for this grant
4. Is the pre-event market value being used in the proposed property valuations? ☐ Yes ☐ No

Additional Acquisition Attachments

☐ Copies of any relevant letters/emails concerning consultation with USACE regarding consideration of levee systems, berms floodwalls, and dikes

☐ Copies of any relevant letters/emails concerning consultation with WSDOT regarding planned improvements of federal aid systems or state transportation projects.

☐ A completed Property Site Inventory. Template provided by WA EMD.

For each property to be acquired include the following:

☐ Signed copy of the Statement of Assurances

☐ Copy of the sample deed restriction that will be recorded at closing. The sample must be consistent with FEMA's model.

☐ Documentation of voluntary interest signed by each homeowner using either individual signed statements or through a group sign-up sheet.

☐ Certification on FEMA Form 009-0-3 (formerly 90-69B) that the property owners are Nationals of the United States or qualified aliens.

☐ For each property that has been substantially damaged also include documentation provided to the property owner from the appropriate local official

☐Property owner's NFIP Policy Documentation

Elevation Project Supplemental

For each structure to be elevated include the following:

☐ Documentation of voluntary interest signed by each homeowner using either individual signed statements or through a group sign-up sheet.

☐Elevation certificate (FEMA Form 81-31) or equivalent information/data used to determine the first floor elevation

☐A completed Property Site Inventory. Template provided by WA EMD.

☐Property owner's NFIP Policy Documentation

Resolution Designating Applicant Agent

Subapplicants must provide a completed copy of the Resolution Designating Applicant Agent form found on the HMA grants website mil.wa.gov/HMAgrants.

LAKE WHATCOM WATER AND SEWER DISTRICT
Division 7 Reservoir Replacement
Preliminary Cost Estimates

Prepared by: Brian Smith, PE and Melanie Mankamyer, PE, Wilson Engineering LLC

Wilson Job No.: 2019-104

Preliminary Cost Estimates - Replace Div 7 Reservoir with Two Concrete Reservoirs

Item Description	Quantity	Unit	2020 Unit Price	2022 Unit Prices	Construction Year 2022 Amount
CONSTRUCTION					
a. Mobilization	1	LS	$83,426.00	$114,000.00	$114,000.00
b. Temporary Erosion and Sediment Control	1	LS	$8,260.00	$11,500.00	$11,500.00
c. Storage Improvements					
Concrete storage tank 185,000 Gallon 30 ft dia x 35 ft height (installed by supplier, prevailing wages)	2	EA	$223,000.00	$268,500.00	$537,000.00
Reservoir railing	2	EA	$10,000.00	$24,678.20	$49,356.03
Tree removal	1	LS	$30,000.00	$44,034.05	$44,034.05
Clearing and grubbing	1	LS	$10,000.00	$14,678.02	$14,678.02
Site earthwork	1	LS	$90,000.00	$192,102.15	$192,102.15
Overflow piping	500	LF	$100.00	$186.78	$93,390.09
Piping from new tank to existing, 12" diameter	500	LF	$100.00	$186.78	$93,390.09
Manual valve on one tank outlet (other tank to have isolation valve with electronic actuator, priced with ShakeAlert Integration)	1	EA	$2,000.00	$2,935.60	$2,935.60
Isolation valve with electronic actuator	1	EA	$81,000.00	$91,000.00	$91,000.00
Surface restoration / planting mitigation	1	LS	$20,000.00	$39,356.03	$39,356.03
Stormwater management	1	LS	$8,000.00	$11,742.41	$11,742.41
Electrical, telemetry and instrumentation	1	LS	$100,000.00	$156,780.17	$156,780.17
Subtotal					**$1,325,764.64**
d. Access Road Improvements					
Clearing / grubbing / grading	1	LS	$15,000.00	$32,017.03	$32,017.03
Base Course (6-in)	180	Ton	$40.00	$114.26	$20,568.17
Top Course (3-in)	90	Ton	$50.00	$73.39	$6,605.11
Geotextile (triax grid)	700	SY	$3.00	$4.41	$3,082.38
Stormwater management	1	LS	$5,000.00	$7,339.01	$7,339.01
Subtotal					**$69,611.70**
SUMMARY					
Subtotal					$1,520,876.34
Sales Tax	0.085				$129,274.49
Preliminary Estimated Construction Costs					**$1,650,150.83**
e. Engineering / Inspection / Permitting					
Permit Fees					$37,300.00
Easement Acquisition					$5,750.00
Archeological Survey (Pre-Award)					$5,500.00
DOH Project Report					$28,700.00
Topographic Survey (Pre-Award)					$25,250.00
Geotechnical Investigation					$17,100.00
Engineering Design					$153,629.51
Construction Phase Engineering/Inspection					$129,100.00
Construction Phase Surveying					$13,000.00
Subtotal					**$415,329.51**
NEW CONSTRUCTION TOTAL PROJECT ESTIMATED COST					**$2,065,480.34**
Demolition of Existing Division 7 Steel Reservoir (including permit fee and sales tax)					$215,519.66
NEW CONSTRUCTION PLUS DEMO TOTAL PROJECT ESTIMATED COST					**$2,281,000.00**

1220 Lakeway Drive
Bellingham, WA 98229
(360) 734-9224

September 1, 2021

Hazard Mitigation Grant Program Coordinator
Washington State Emergency Management
MS: TA-20 Building 20
Camp Murray, WA 98430

Re: Commitment of District Funds

Dear Hazard Mitigation Grant Program Coordinator:

The Lake Whatcom Water and Sewer District recognizes that as part of the Hazard Mitigation Grant process, a local funding match is required. Please accept this letter committing the Lake Whatcom Water and Sewer District to meet the matching fund requirements for the Project No. DR-4309 HMGP project application.

Name of funding source: District Water Utility Fund (Fund 401)

Funding type: Rates and Charges

The local matching funding requirement is $285,125.00 with an available date of January 1, 2022.

Please contact Rich Munson at rich.munson@lwwsd.org or 360.734.9224 if you have any questions or concerns.

Sincerely,

Lake Whatcom Water and Sewer District

Justin L. Clary
General Manager

cc: District Project No. C2111 file

Cleaning and Inspection Report

Lake Whatcom Water & Sewer District

Division 7 Reservoir

H2O SOLUTIONS,LLC

Date : July 10, 2012

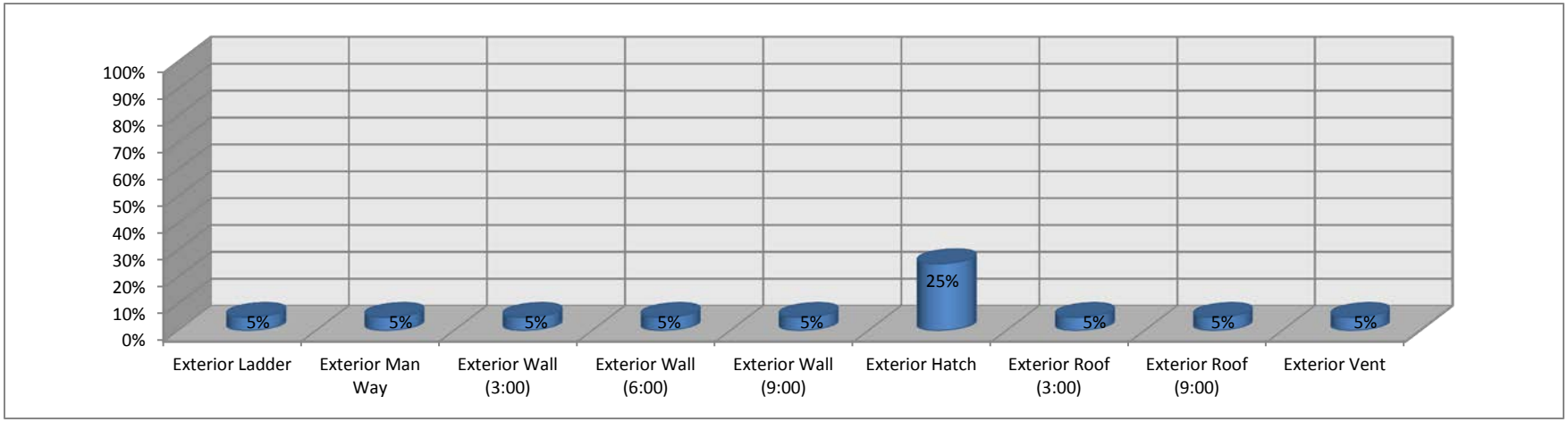
Division 7 Reservoir

Customer Name:	Lake Whatcom Water & Sewer District	**Reservoir Name:**	Division 7
Manager:	Bill Hunter	**Contstruction:**	OG Steel
Invoice Number:	1278	**Capacity (gal):**	1,007,084
Date of Inspection:	July 10, 2012	**Diameter or L x W:**	70'
Dive Control:	John Williams	**Height:**	35'
Diver:	Richard Peterson	**Floor Square FT:**	3,846'
Tender:	Brett Williams	**Date Built:**	1979
		Estimated Water Loss from Cleaning:	**18,750 gallons**

Rust Grades : Division 7

Grades	% of Surface Rusted	Description
10	0.00% - 0.01%	No rusting or Less than 0.01% of surface rusted
9	0.01% - 0.03%	Minute rusting, Less than 0.03% of surface rusted
8	0.03% - 0.10%	Few isolated rust spots, Less than 0.10% of surface rusted
7	0.10% - 0.30%	Less than 0.3% of surface rusted
6	0.30% - 1.00%	Extensive rust spots, but Less than 1.00% of surface rusted
5	1.00% - 3.00%	Rusting to the extent of 3.00% of surface rusted
4	3.00% - 10.0%	Rusting to the extent of 10.0% of surface rusted
3	10.0% - 16.0%	Approximately one sixth of the surface rusted (16.0%)
2	16.0% - 33.0%	Approximately one sixth of the surface rusted (33.0%)
1	33.0% - 50.0%	Approximately one half of the surface rusted (50.0%)
0	50.0% - 100%	Approximately 100% of the surface rusted

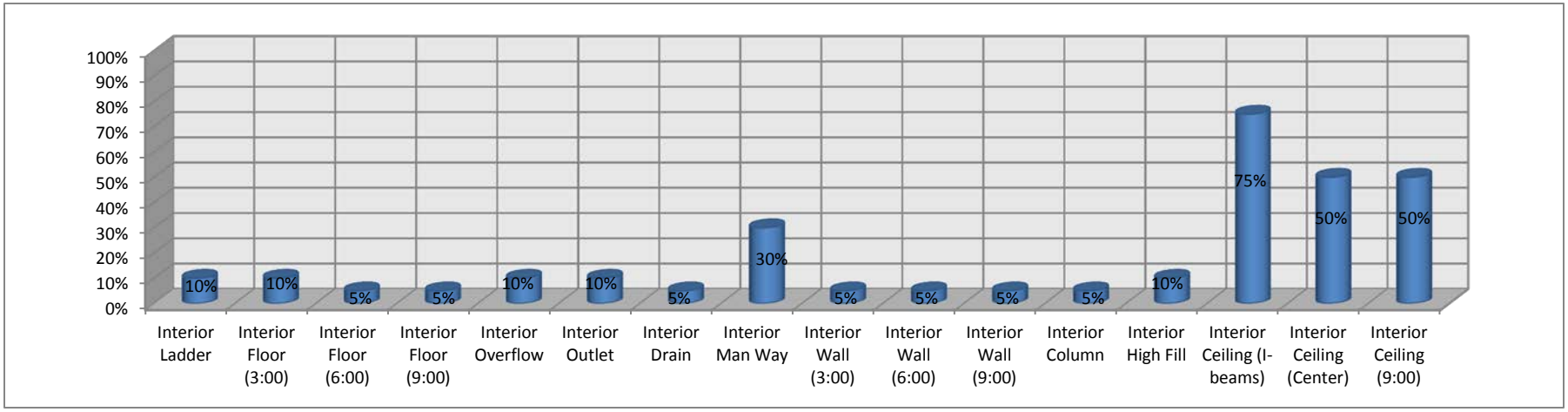
Graph of Corrosion Present



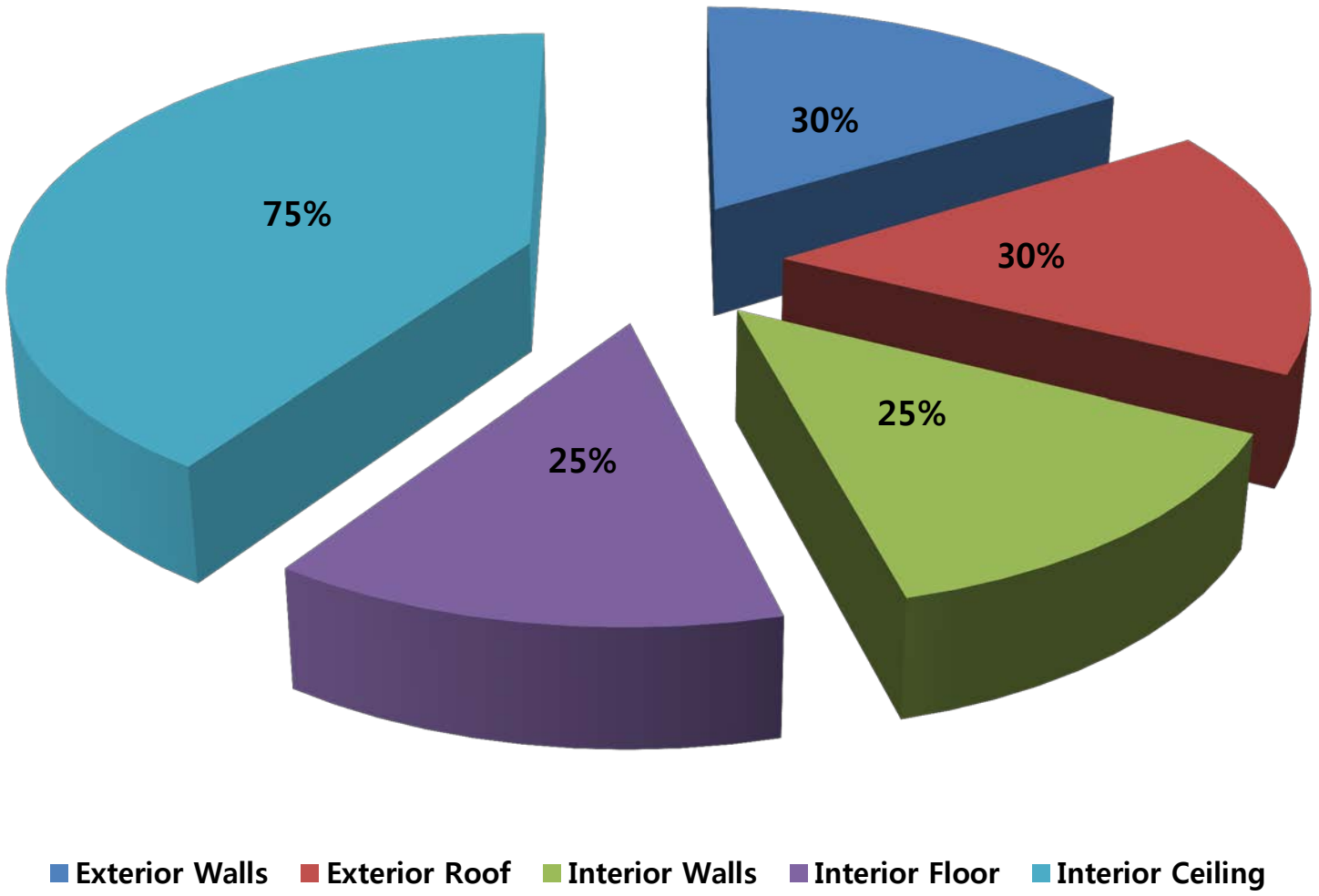
Rust Grades : Division 7

Grades	% of Surface Rusted	Description
10	0.00% - 0.01%	No rusting or Less than 0.01% of surface rusted
9	0.01% - 0.03%	Minute rusting, Less than 0.03% of surface rusted
8	0.03% - 0.10%	Few isolated rust spots, Less than 0.10% of surface rusted
7	0.10% - 0.30%	Less than 0.3% of surface rusted
6	0.30% - 1.00%	Extensive rust spots, but Less than 1.00% of surface rusted
5	1.00% - 3.00%	Rusting to the extent of 3.00% of surface rusted
4	3.00% - 10.0%	Rusting to the extent of 10.0% of surface rusted
3	10.0% - 16.0%	Approximately one sixth of the surface rusted (16.0%)
2	16.0% - 33.0%	Approximately one sixth of the surface rusted (33.0%)
1	33.0% - 50.0%	Approximately one half of the surface rusted (50.0%)
0	50.0% - 100%	Approximately 100% of the surface rusted

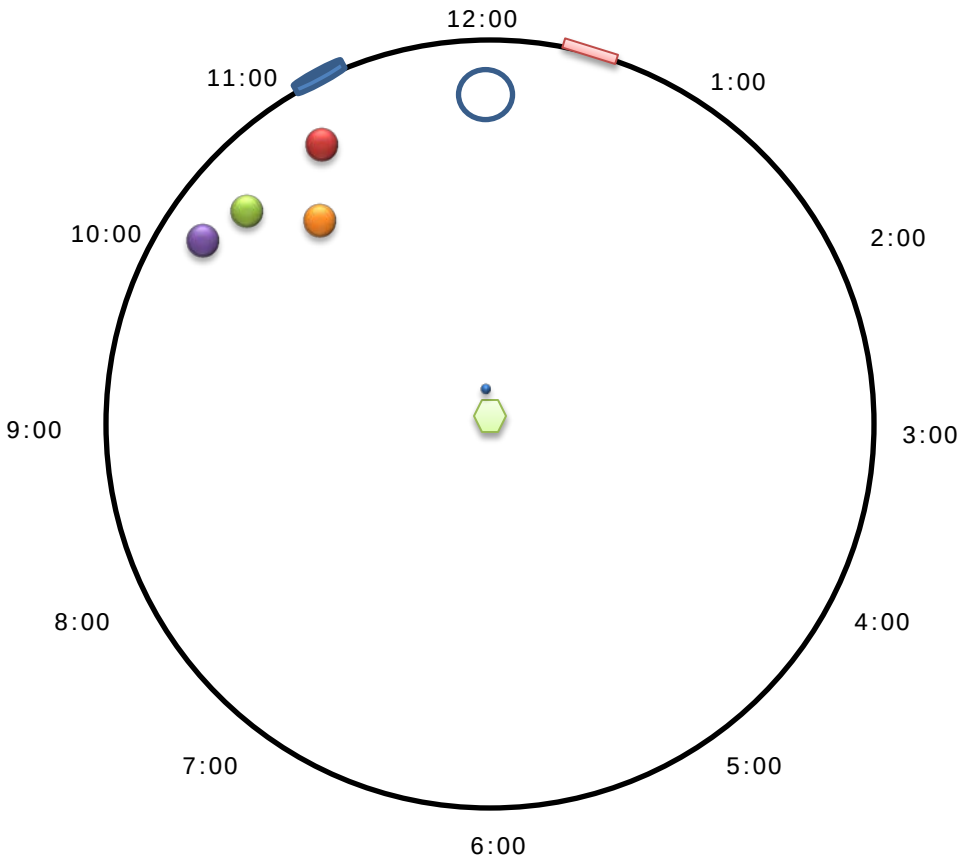
Graph of Corrosion Present



Coating Failure



Division 7 Diagram



Hatch

Overflow

Column

Inlet

Man Way

Vent

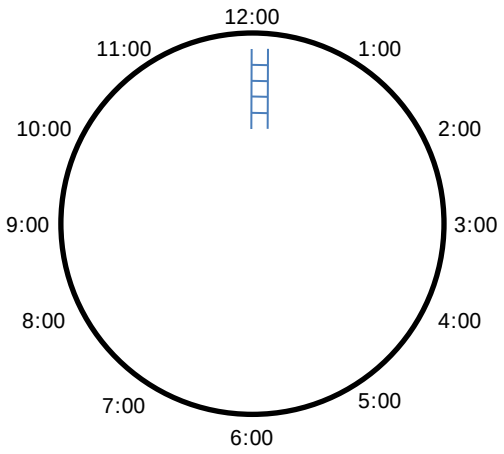
Outlet

Drain

Water Level Indicator

Picture Image : No.1

Exterior Ladder : 12:00 O'clock Position

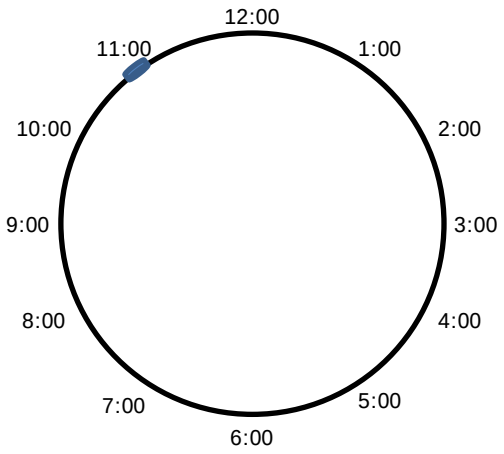


Structural Integrity :	Good
Coating :	Minor delamination and organic growth
Coating Failure % :	Less than 5%
Corrosion :	A few isolated spots of minor surface corrosion
Corrosion % :	Less than 5%

Rust Grade :	7
Stand Off :	Good condition
Gasket :	N/A
Hard Ware :	N/A
Screen :	N/A

Picture Image : No.2

Exterior Man Way : 11:00 O'clock Position

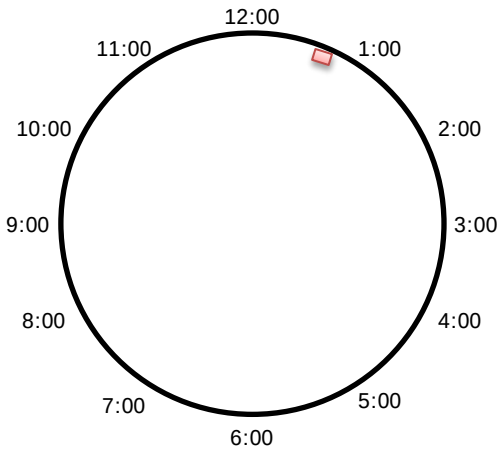


Structural Integrity :	Good
Coating :	Organic growth
Coating Failure % :	Less than 5%
Corrosion :	A few spots of minor surface corrosion.
Corrosion % :	Less than 5%

Rust Grade :	7
Stand Off :	N/A
Gasket :	Fair condition
Hard Ware :	Minor surface corrosion
Screen :	N/A

Picture Image : No.3 & No.4

Exterior Water Level Indicator : 1:00 O'clock Position

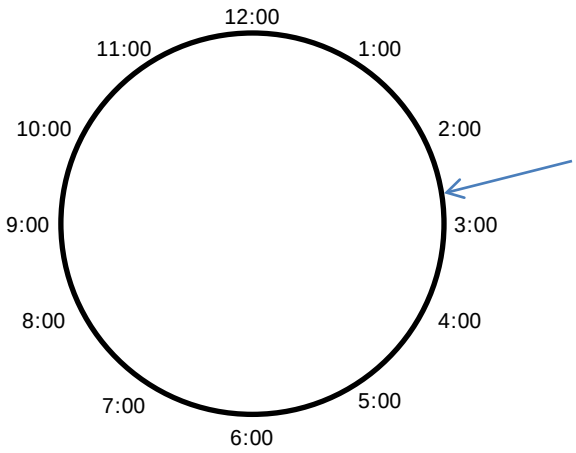


Structural Integrity :	Good
Coating :	N/A
Coating Failure % :	N/A
Corrosion :	Areas of minor surface corrosion
Corrosion % :	10%

Rust Grade :	4
Stand Off :	N/A
Gasket :	N/A
Hard Ware :	Minor surface condition
Condition :	Appeared to be in good working order

Picture Image : No.5

Exterior Wall : 3:00 O'clock Position

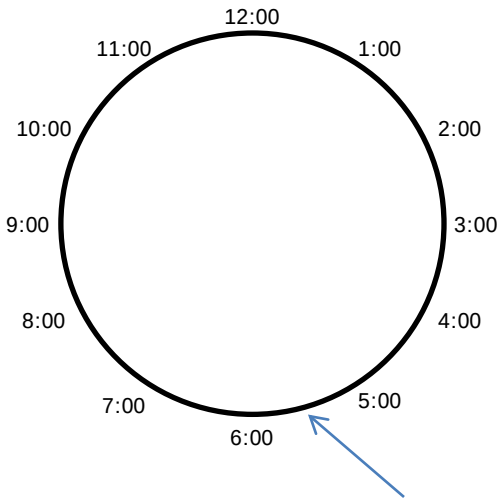


Structural Integrity :	Good
Coating :	Minor chalking and a few spots of minor delamination.
Coating Failure % :	5%
Corrosion :	A few isolated spots of minor surface corrosion
Corrosion % :	5%

Rust Grade :	4
Stand Off :	N/A
Gasket :	N/A
Hard Ware :	N/A
Screen :	N/A

Picture Image : No.6

Exterior Wall : 6:00 O'clock Position

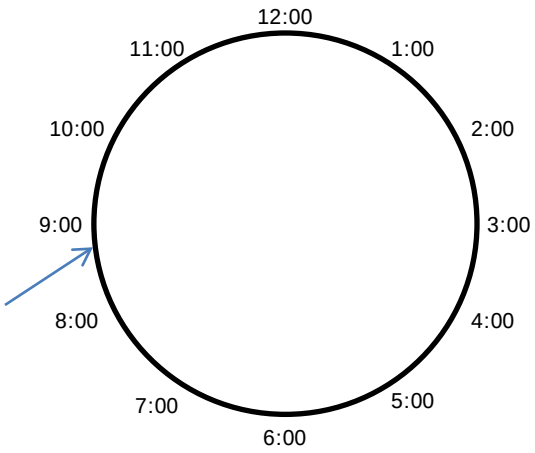


Structural Integrity :	Good
Coating :	Minor chalking and a few spots of minor delamination.
Coating Failure % :	5%
Corrosion :	A few isolated spots of minor surface corrosion
Corrosion % :	5%

Rust Grade :	4
Stand Off :	N/A
Gasket :	N/A
Hard Ware :	N/A
Screen :	N/A

Picture Image : No.7

Exterior Wall : 9:00 O'clock Position

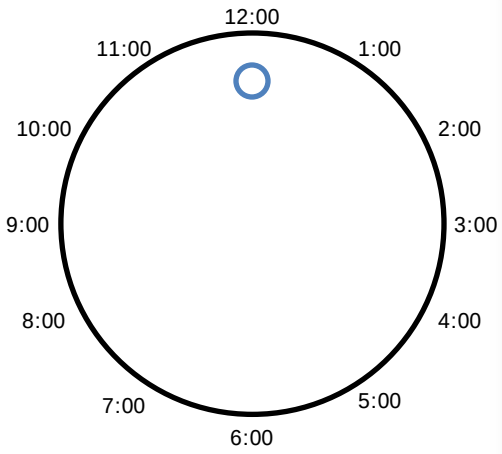


Structural Integrity :	Good
Coating :	Minor chalking and a few spots of minor delamination.
Coating Failure % :	5%
Corrosion :	A few isolated spots of minor surface corrosion
Corrosion % :	5%

Rust Grade :	4
Stand Off :	N/A
Gasket :	N/A
Hard Ware :	N/A
Screen :	N/A

Picture Image : No.8 & No.9

Exterior Hatch : 12:00 O'clock Position

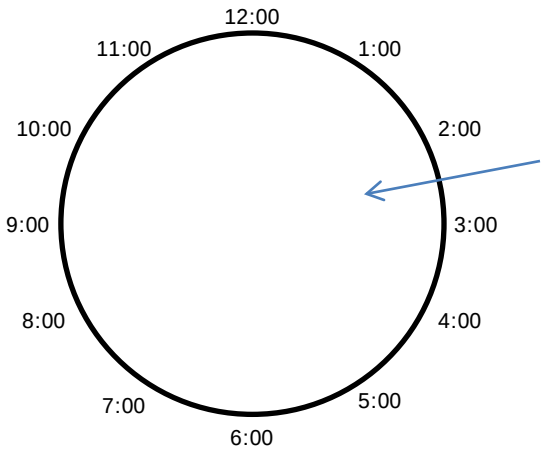


Structural Integrity :	Good
Coating :	Areas of delamination
Coating Failure % :	10%
Corrosion :	Moderate surface corrosion
Corrosion % :	25%

Rust Grade :	2
Stand Off :	N/A
Gasket :	Weather stripping present and in good condition
Hard Ware :	Surface corrosion
Screen :	N/A

Picture Image : No.10

Exterior Roof : 3:00 O'clock Position

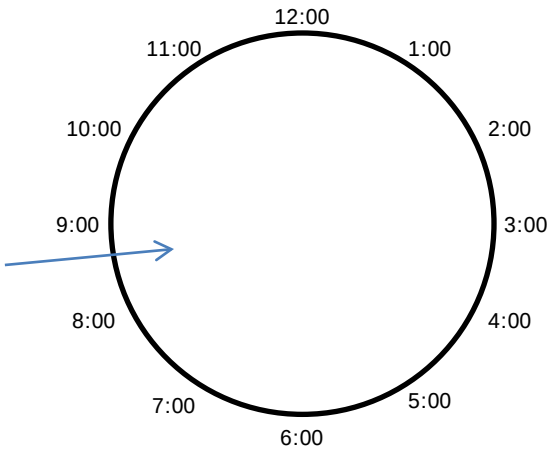


Structural Integrity :	Good
Coating :	A few isolated area of minor delamination. Organic growth
Coating Failure % :	5%
Corrosion :	A few isolated spots of minor surface corrosion
Corrosion % :	5%

Rust Grade :	4
Stand Off :	N/A
Gasket :	N/A
Hard Ware :	N/A
Screen :	N/A

Picture Image : No.11

Exterior Roof : 9:00 O'clock Position

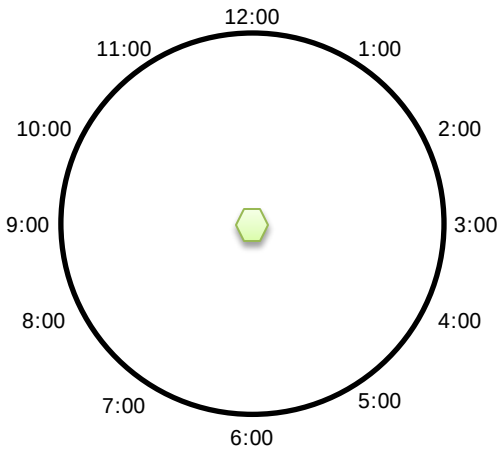


Structural Integrity :	Good
Coating :	A few isolated area of minor delamination. Organic growth
Coating Failure % :	5%
Corrosion :	A few isolated spots of minor surface corrosion
Corrosion % :	5%

Rust Grade :	4
Stand Off :	N/A
Gasket :	N/A
Hard Ware :	N/A
Screen :	N/A

Picture Image : No.12

Exterior Vent : Center

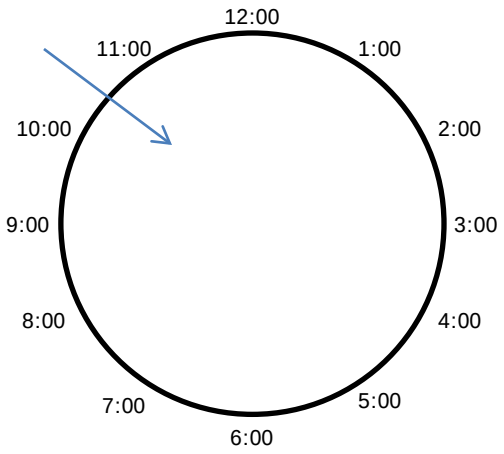


Structural Integrity :	Good
Coating :	A few isolated areas of minor delamination. Organic growth
Coating Failure % :	5%
Corrosion :	A few isolated spots of minor surface corrosion
Corrosion % :	5%

Rust Grade :	4
Stand Off :	N/A
Gasket :	N/A
Hard Ware :	Minor surface corrosion
Screen :	Fine mesh present and in good condition

Picture Image : No.13

Interior Sediment : 10:00 O'clock Position

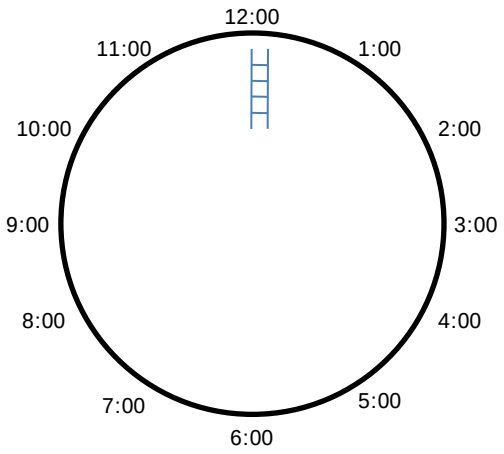


Structural Integrity :	N/A
Coating :	N/A
Coating Failure % :	N/A
Corrosion :	N/A
Corrosion % :	N/A

Rust Grade :	N/A
Stand Off :	N/A
Gasket :	N/A
Hard Ware :	N/A
Sediment depth :	1/8"

Picture Image : No.14

Interior Ladder : 12:00 O'clock Position

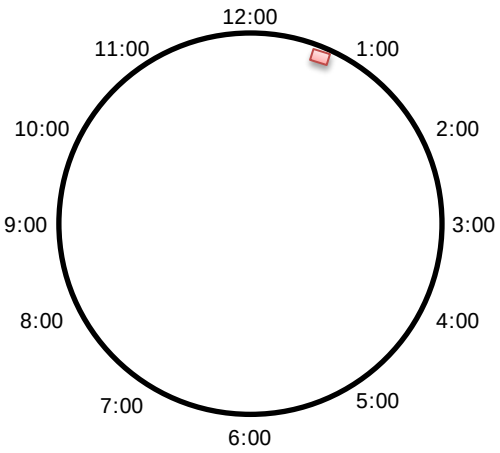


Structural Integrity :	Good
Coating :	Areas of minor delamination
Coating Failure % :	10%
Corrosion :	Minor to moderate surface corrosion
Corrosion % :	10%

Rust Grade :	3
Stand Off :	Surface corrosion
Gasket :	N/A
Hard Ware :	Surface corrosion
Screen :	N/A

Picture Image : No.15 & No.16

Interior Water Level Indicator : 1:00 O'clock Position

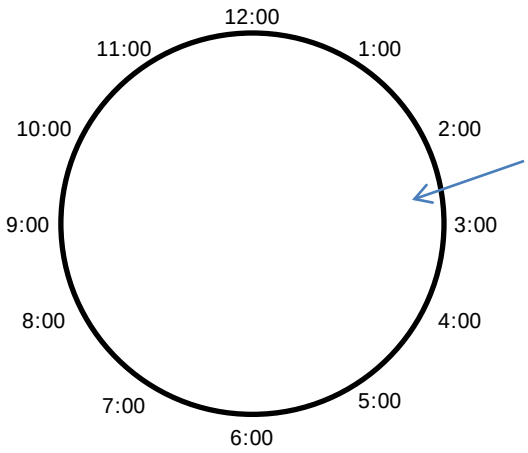


Float Condition :	Good condition with areas of staining
Coating :	N/A
Coating Failure % :	N/A
Corrosion :	Moderate uniform surface corrosion on the base
Corrosion % :	10%

Rust Grade :	3
Stand Off :	N/A
Gasket :	N/A
Hard Ware :	Surface corrosion
Condition :	In working order, however guide wires need repair

Picture Image : No.17

Interior Floor : 3:00 O'clock Position

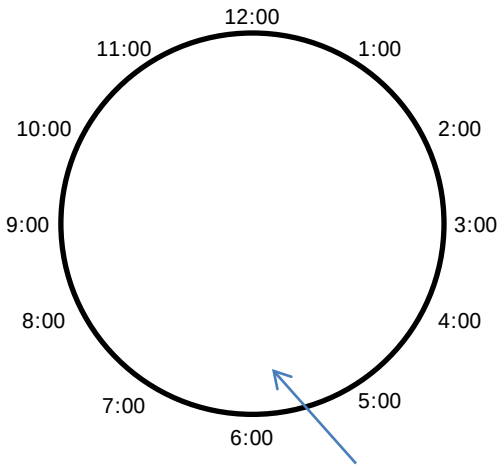


Structural Integrity :	Good
Coating :	Moderate blistering
Coating Failure % :	20%
Corrosion :	Surface corrosion on the wield seam
Corrosion % :	10%

Rust Grade :	3
Stand Off :	N/A
Gasket :	N/A
Hard Ware :	N/A
Screen :	N/A

Picture Image : No.18

Interior Floor : 6:00 O'clock Position

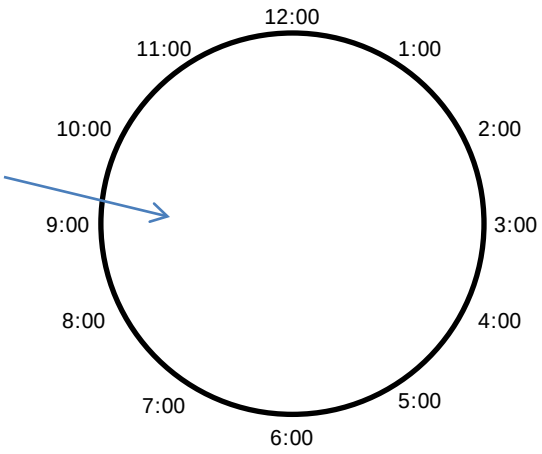


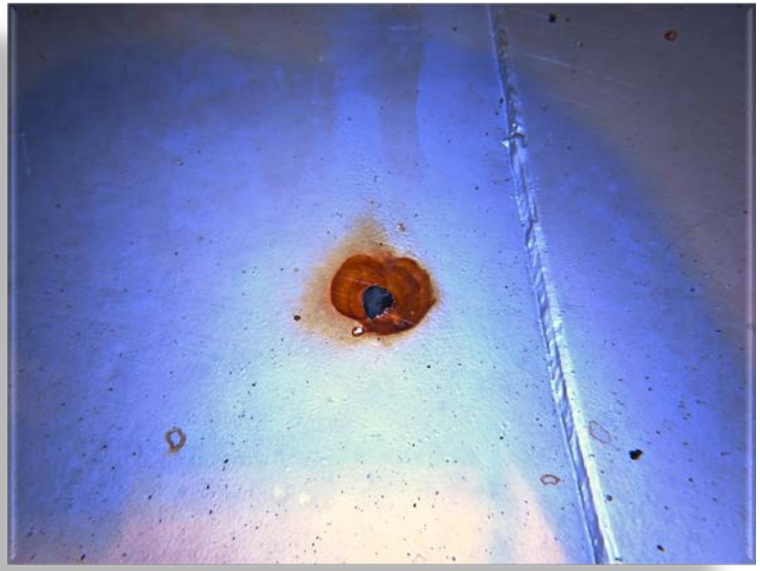
Structural Integrity :	Good
Coating :	Moderate blistering
Coating Failure % :	20%
Corrosion :	A few isolated spots of concentration cell corrosion
Corrosion % :	5%

Rust Grade :	4
Stand Off :	N/A
Gasket :	N/A
Hard Ware :	N/A
Screen :	N/A

Picture Image : No.19

Interior Floor : 9:00 O'clock Position



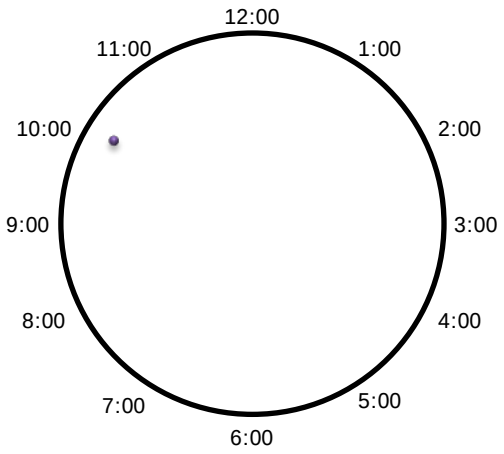


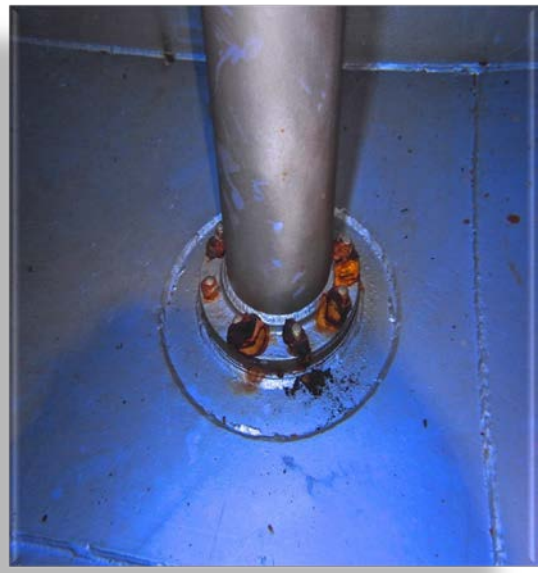
Structural Integrity :	Good
Coating :	Moderate blistering
Coating Failure % :	20%
Corrosion :	A few isolated spots of concentration cell corrosion
Corrosion % :	5%

Rust Grade :	4
Stand Off :	N/A
Gasket :	N/A
Hard Ware :	N/A
Screen :	N/A

Picture Image : No.20 & No.21

Interior Overflow : 10:00 O'clock Position



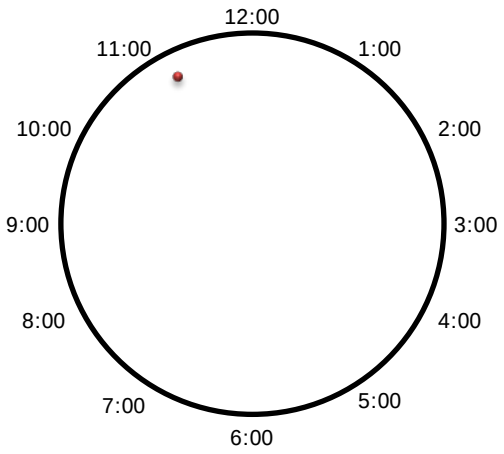


Structural Integrity :	Good
Coating :	Moderate blistering
Coating Failure % :	20%
Corrosion :	A few spots on minor surface corrosion
Corrosion % :	10%

Rust Grade :	3
Stand Off :	N/A
Gasket :	N/A
Hard Ware :	Moderate surface corrosion
Screen :	N/A

Picture Image : No.22

Interior Outlet : 11:00 O'clock Position

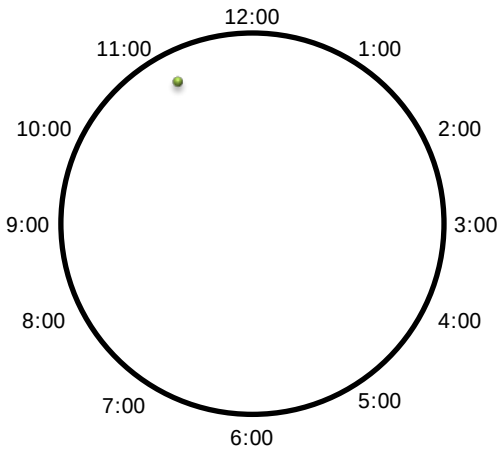


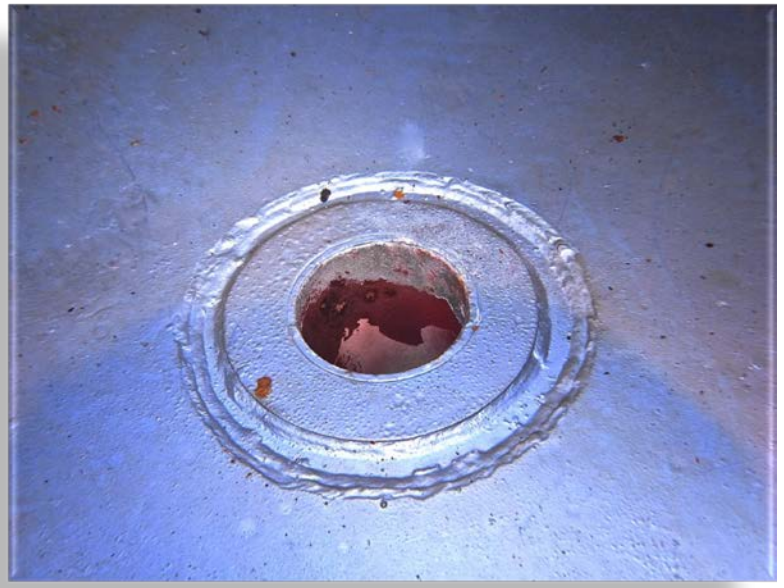
Structural Integrity :	Good
Coating :	Minor blistering and staining
Coating Failure % :	20%
Corrosion :	Minor to Moderate surface corrosion
Corrosion % :	10%

Rust Grade :	3
Stand Off :	N/A
Gasket :	N/A
Hard Ware :	N/A
Pipe :	Minor surface corrosion

Picture Image : No.23

Interior Drain : 11:00 O'clock Position



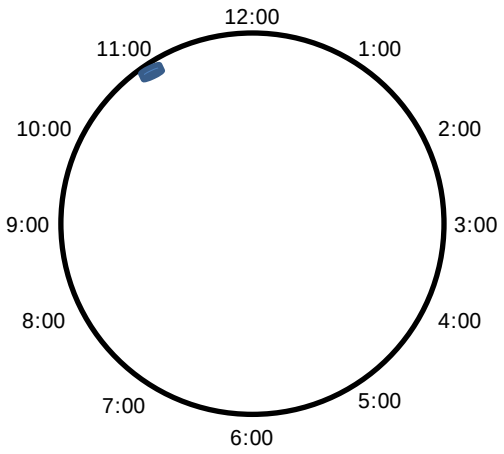


Structural Integrity :	Good
Coating :	Moderate blistering
Coating Failure % :	20%
Corrosion :	A few spots of minor surface corrosion
Corrosion % :	5%

Rust Grade :	4
Stand Off :	N/A
Gasket :	N/A
Hard Ware :	N/A
Pipe :	Minor surface corrosion

Picture Image : No.24

Interior Man Way : 11:00 O'clock Position

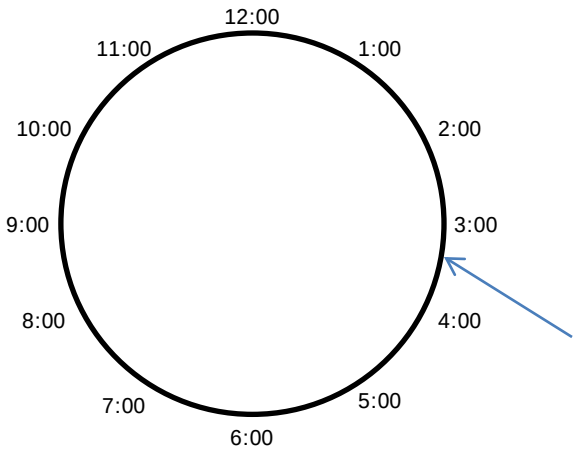


Structural Integrity :	Good
Coating :	Moderate surface corrosion
Coating Failure % :	50%
Corrosion :	Areas of heavy concentration cell corrosion
Corrosion % :	30%

Rust Grade :	2
Stand Off :	N/A
Gasket :	Fair
Hard Ware :	N/A
Screen :	N/A

Picture Image : No.25

Interior Wall : 3:00 O'clock Position

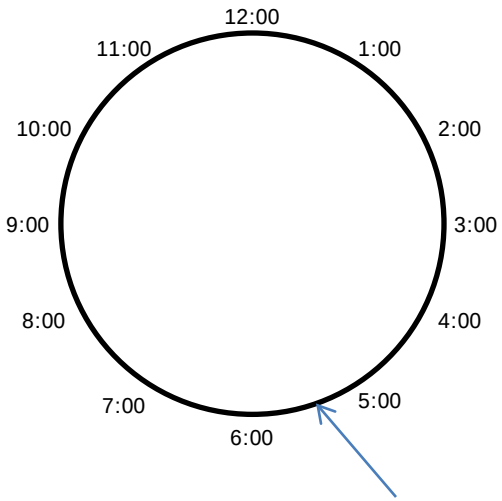


Structural Integrity :	Good
Coating :	Moderate blistering
Coating Failure % :	25%
Corrosion :	A few isolated spots on minor concentration cell corrosion
Corrosion % :	5%

Rust Grade :	4
Stand Off :	N/A
Gasket :	N/A
Hard Ware :	N/A
Screen :	N/A

Picture Image : No.26

Interior Wall : 6:00 O'clock Position

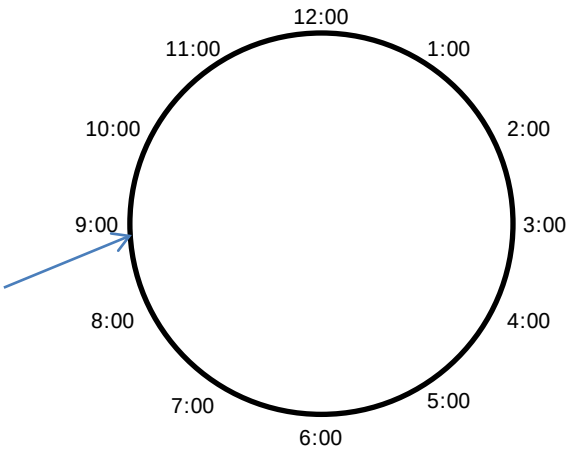


Structural Integrity :	Good
Coating :	Moderate blistering
Coating Failure % :	25%
Corrosion :	A few isolated spots on minor concentration cell corrosion
Corrosion % :	5%

Rust Grade :	4
Stand Off :	N/A
Gasket :	N/A
Hard Ware :	N/A
Screen :	N/A

Picture Image : No.27

Interior Wall : 9:00 O'clock Position

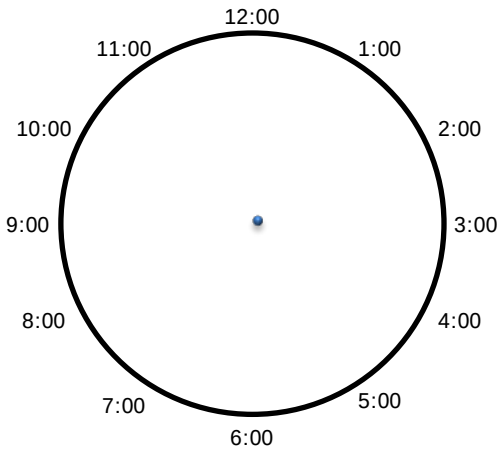


Structural Integrity :	Good
Coating :	Moderate blistering
Coating Failure % :	25%
Corrosion :	A few isolated spots on minor concentration cell corrosion
Corrosion % :	5%

Rust Grade :	4
Stand Off :	N/A
Gasket :	N/A
Hard Ware :	N/A
Screen :	N/A

Picture Image : No.28 & No.29

Interior Column : Center

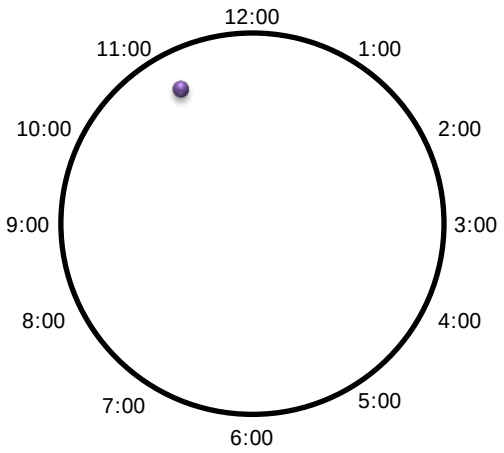


Structural Integrity :	Good
Coating :	Moderate blistering
Coating Failure % :	25%
Corrosion :	A few spots of minor surface corrosion
Corrosion % :	5%

Rust Grade :	4
Stand Off :	N/A
Gasket :	N/A
Hard Ware :	N/A
Screen :	N/A

Picture Image : No.30

Interior High Fill : 11:00 O'clock Position

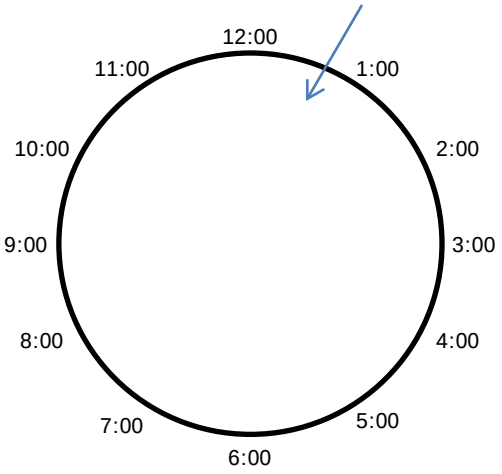


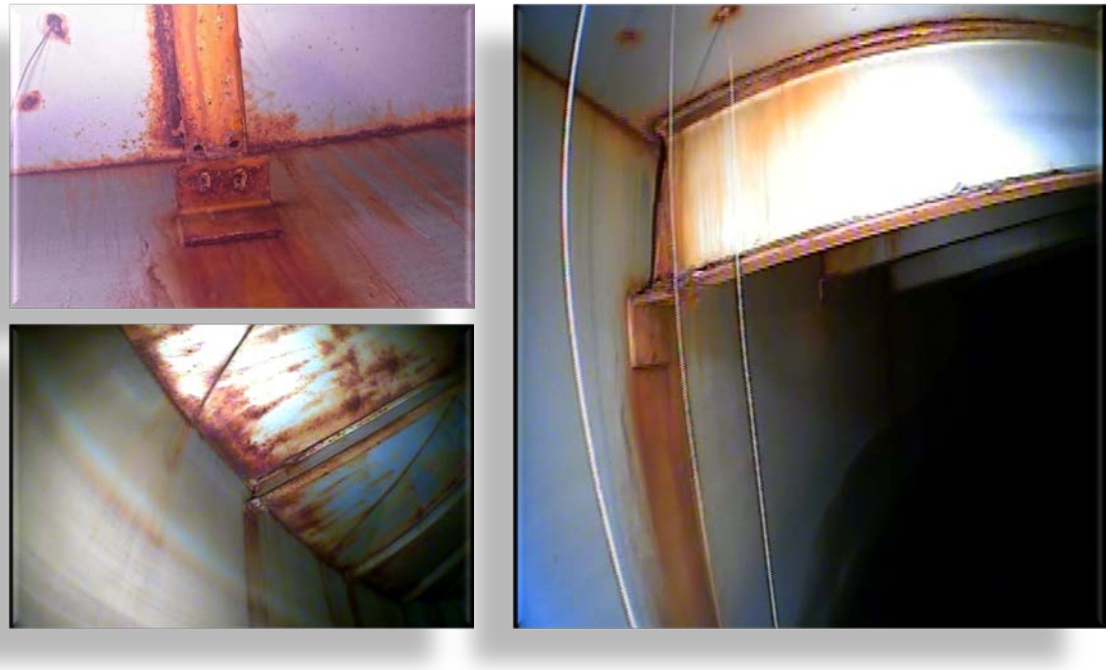
Structural Integrity :	Good
Coating :	Moderate blistering
Coating Failure % :	25%
Corrosion :	A few isolated spots on minor concentration cell corrosion
Corrosion % :	10%

Rust Grade :	4
Stand Off :	Areas of surface corrosion
Gasket :	N/A
Hard Ware :	Moderate surface corrosion
Pipe :	Appeared to be in good working order

Picture Image : No.31, No.32 & No.33

Interior Ceiling I-beams : 12:00 O'clock Position



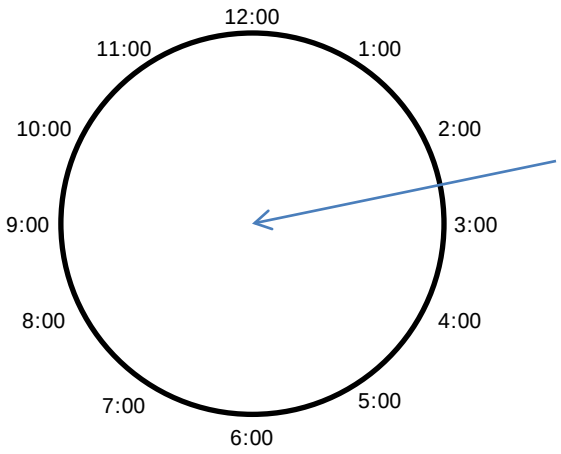


Structural Integrity :	Poor
Coating :	Heavy delamination as well heavy staining
Coating Failure % :	75%
Corrosion :	Heavy uniform surface corrosion
Corrosion % :	75%

Rust Grade :	0
Stand Off :	Heavy surface corrosion
Gasket :	N/A
Hard Ware :	Heavy surface corrosion
Screen :	N/A

Picture Image : No.34

Interior Celling : Center

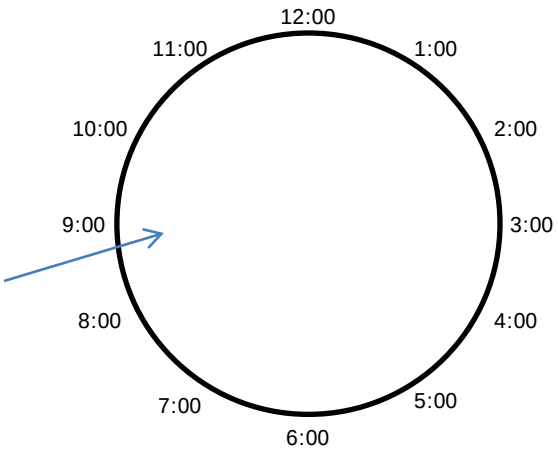


Structural Integrity :	Good
Coating :	Heavy delamination as well heavy staining
Coating Failure % :	50%
Corrosion :	Moderate to heavy uniform surface corrosion
Corrosion % :	50%

Rust Grade :	0
Stand Off :	N/A
Gasket :	N/A
Hard Ware :	Heavy surface corrosion
Screen :	N/A

Picture Image : No.35

Interior Celling : 9:00 O'clock Position



Structural Integrity :	Good
Coating :	Heavy delamination as well heavy staining
Coating Failure % :	50%
Corrosion :	Moderate to heavy uniform surface corrosion
Corrosion % :	50%

Rust Grade :	0
Stand Off :	N/A
Gasket :	N/A
Hard Ware :	Heavy surface corrosion
Screen :	N/A

Recommendations From H_2O Solutions

Division 7 Reservoir

1. Perform a regular cleaning and inspection every 3-5 years to reduce sediment build up.
2. Repair the Water Level Indicator.
3. Ceiling I-beams have heavy corrosion, need structural assessment.
4. Pressure wash the exterior of the tank.

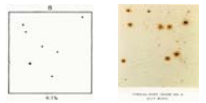
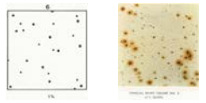
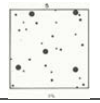
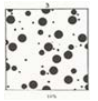
References

Standard Method of Evaluating Degree of Rusting on Painted Steel Surfaces – SSPC-Vis 2-82 & ASTM D 610-85 (1989)

The graphical representations show examples of area percentages, which may be helpful in rust grading. The use of photographical reference standards requires the following precautions:

- Some finishes are stained by rust. This staining must not be confused with the actual rusting involved.
- Accumulated dirt or other material may make accurate determination of the degree of rusting difficult.
- Certain types of deposited dirt that contain iron or iron compounds may cause surface discoloration that should not be mistaken for corrosion.
- It must be realized that failure may vary over a given area and discretion must therefore be used in applying these reference standards.
- In evaluating surfaces, consideration shall be given to the color of the finish coating, since failures will be more apparent on a finish that shows color contrast with rust, such as white, than on a similar color, such as iron oxide finish.
- The photographic reference standards are not required for use of the rust-grade scale since the scale is based upon the percent of the area rusted and any method of assessing area rusted may be used to determine the rust grade.

A	Similar to European Scale of Degree of rusting for Anti-Corrosive Paints (1961) (Black & White)
B	Corresponds to SSPC Initial Surface Conditions E (0 - 0.1%) and BISRA (British Iron and Steel Research Association) 0.1%
C	Corresponds to SSPC Initial Surface Conditions F (0.1%-1%) and BISRA 1%
D	Corresponds to SSPC Initial Surface Conditions G (1 - 10%)
E	Rust grades below 4 are of no practical importance in grading performance of paints
F	Corresponds to SSPC Initial Surface Condition H (50 - 100%)

Rust Grades [A]	Description	Graphical Representation
10	No rusting or less than 0.01% of surface rusted	Unnecessary
9	Minute rusting less than 0.03% of surface rusted	
8[B]	Few isolated rust spots less than 0.1% of surface rusted	
7	Less than 0.3% of surface rusted	
6[C]	Extensive rust spots but less than 1% of surface rusted	
5	Rusting to the extent of 3% of surface rusted	
4[D]	Rusting to the extent of 10% of surface rusted	
3[E]	Approximately on sixth of the surface rusted 16%	
2	Approximately one third of the surface rusted 33%	
1	Approximately one half of the surface rusted 50%	

THANK YOU FOR YOUR BUSINESS

CULTURAL RESOURCES REPORT COVER SHEET

Author: Ed Arthur

Title of Report: Cultural Resources Survey for the Lake Whatcom Water and Sewer District 7 Reservoir Replacement Project, Sudden Valley, Whatcom County, Washington

Date of Report: June 8, 2021

County: Whatcom Section: 8 Township: 37N Range: 4E

Quad: Lake Whatcom Acres: ~ 0.5 acre

PDF of report submitted (REQUIRED) ☒ Yes

Historic Property Inventory Forms to be Approved Online? ☒ Yes ☐ No

Archaeological Site(s)/Isolate(s) Found or Amended? ☐ Yes ☒ No

TCP(s) found? ☐ Yes ☒ No

Replace a draft? ☐ Yes ☒ No

Satisfy a DAHP Archaeological Excavation Permit requirement? ☐ Yes ☒ No

Were Human Remains Found? ☐ Yes ☒ No

DAHP Archaeological Site #: N/A

Cultural Resources Survey for the Lake Whatcom Water and Sewer District 7 Reservoir Replacement Project, Sudden Valley, Whatcom County, Washington

By: Ed P. Arthur

Report Prepared For:

Lake Whatcom Water and Sewer District 7
1220 Lakeway Drive
Bellingham, Washington
98229

DAHP Project #2021-06-03367

Caldera Archaeology Short Report 0521C

June 8, 2021

1155 North State Street, Suite 428 – Post Office Box 944 – Bellingham, WA 98227-0944
61841 Ward Road – Bend, OR 97702-9752
(360) 332.2600 – (541) 668.6121 – www.calderaarchaeology.com

Management Summary

Caldera Archaeology conducted a cultural resources assessment for the Lake Whatcom Water and Sewer District 7 ("the District) Reservoir Replacement Project at the request of the District to assist the project proponent's compliance with the regulatory requirements of Section 106 of the National Historic Preservation Act (NHPA). The District has received a grant from the U.S. Federal Emergency Management Agency ("FEMA") that will finance a significant portion of the costs to permit, design, and construct two new reservoirs.

The District owns and operates a one million gallon capacity water reservoir located at an elevation of approximately 675 feet above sea level on Whatcom County Parcel No. 370408 490372 0000 along the western shoreline of Lake Whatcom in Sudden Valley. The existing reservoir, constructed in 1971, is reaching the end of its useful life and requires replacement with reservoirs meeting current seismic design standards. The District is proposing to construct two new 30 to 35-foot diameter tanks upslope of the existing tank and connect the new tanks to the existing water main with a new segment of main that will be installed along or within an existing cell tower access road. The existing reservoir will be removed when the new reservoirs are operable.

No historic properties, cultural materials, or isolated artifacts were identified within the APE during the course of this investigation. Caldera Archaeology recommends that FEMA assert a Determination of No Historic Properties Affected to the State Historic Preservation Officer (SHPO), the Tribal Historic Preservation Officers (THPO), and any other consulting or affected parties.

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Cultural Resources Survey for the Lake Whatcom Water and Sewer District 7 Reservoir Replacement Project, Sudden Valley, Whatcom County, Washington

Location:	Sudden Valley, Whatcom County, Washington
USGS Quad:	Lake Whatcom, Washington 7.5' (1994)
Township, Range, Sec.:	T. 37 N, R. 4 E, Section 8, Willamette Meridian

Regulatory Context

Caldera Archaeology conducted a cultural resources assessment for the Lake Whatcom Water and Sewer District 7 ("the District) Reservoir Replacement Project at the request of the District to assist the project proponent's compliance with the regulatory requirements of Section 106 of the National Historic Preservation Act (NHPA). The District has received a grant from the U.S. Federal Emergency Management Agency ("FEMA") that will finance a significant portion of the costs to permit, design, and construct two new reservoirs.

FEMA is the lead federal agency and must comply with the regulations of Section 106 of the National Historic Preservation Act of 1966. Section 106 mandates all federal agencies involved in an undertaking with the potential to affect historic properties must consider the effects of those actions and consult with affected parties. A historic property is defined at 36 CFR part 800.16(l)(1), as follows:

> Historic property means any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria.

FEMA is obligated to carry out a good faith effort to identify historic properties (36 CFR part 800.04). The pedestrian survey, subsurface testing, and report preparation by Caldera Archaeology was a concerted effort to identify and report surface and/or buried historic properties within the APE.

Project Background, Description, and Area of Potential Effects (APE)

The District owns and operates a one million gallon capacity water reservoir located at an elevation of approximately 675 feet above sea level on Whatcom County Parcel No. 370408 490372 0000 along the western shoreline of Lake Whatcom within the northeast quarter of Section 8, Township 37 North, Range 4 East, Willamette Meridian (WM) (Figure 1).

The existing reservoir, constructed in 1971, is reaching the end of its useful life and requires replacement with reservoirs meeting current seismic design standards. The District is proposing to construct two new 30 to 35-foot diameter tanks upslope of the

existing tank and connect the new tanks to the existing water main with a new segment of main that will be installed along or within an existing cell tower access road. The existing reservoir will be removed when the new reservoirs are operable.

For the purposes of our investigation the APE is considered to be the area around the existing reservoir, a 10 meter (32.8 feet) linear corridor extending along the cell tower access road for a distance of approximately 100 meters (328 feet), and a 35 to 40 meter (114.8 to 131.2 feet) diameter area where the new reservoirs will be constructed (see Figure 1 and Figure 2).

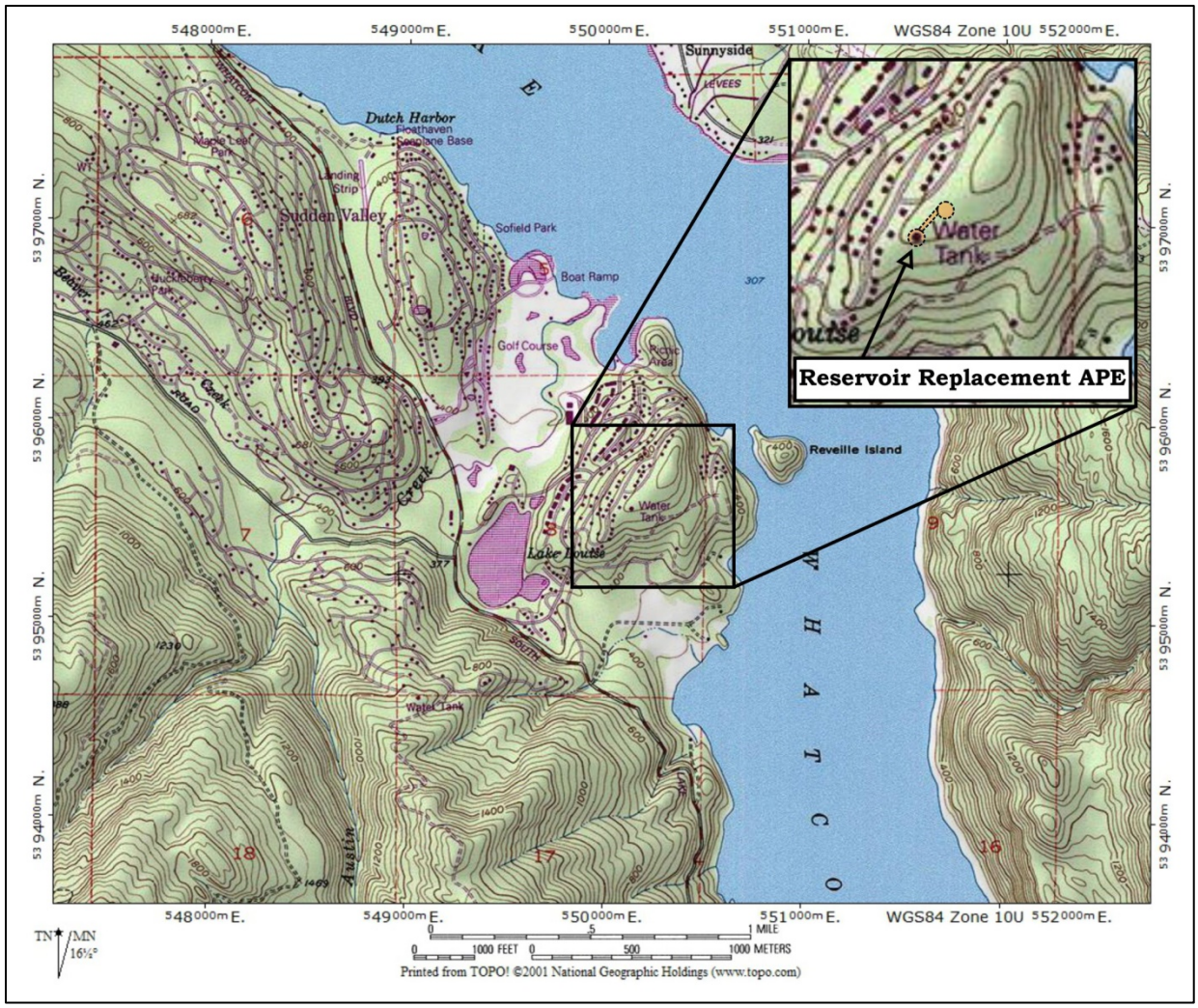

Figure 1. The location of the APE shown on a portion of the Lake Whatcom, WA USGS 7.5" Quadrangle map.

Geomorphologic Context

Pleistocene glaciation of the region was a significant factor in shaping the present day Whatcom County landscape. The Fraser Glaciation was the last major phase of glacier growth in Whatcom County and was marked by three separate stades occurring from

18,000 to 10,000 ^{14}C yr BP (Easterbrook 2010:190). The oldest of these was the Vashon Stade from 18,000 to 13,000 years ago. Continental ice flowed south into the Puget lowland from source areas in Canada. The ice sheet split into two lobes in the vicinity of the San Juan Islands and continued to flow south and west. The Juan de Fuca lobe terminated in the waters west of Vancouver Island and north of the Olympic Peninsula while the Puget lobe continued south, reaching its maximum extent approximately 140 miles south of the Canadian border between 14,500 and 15,000 years ago (Easterbrook 2010).

The second phase of the Fraser Glaciation is the Everson Interstade, characterized by retreat of the ice-sheet across the eastern Strait of Juan de Fuca and collapse of the ice across Admiralty Inlet allowing sea water to enter ice-free areas that were below relative paleo-sea levels. As marine water in Puget Sound floated the remaining ice it melted and the rock debris suspended in the ice was released and settled to the seafloor where it accumulated as glaciomarine stony clay (Easterbrook 2010:170). The final ice advance occurred during the Sumas Stade, 11,500 to 10,000 years ago when the ice sheet readvanced from the Fraser Valley near Sumas over the Whatcom County lowland as a piedmont lobe (Easterbrook 2010:170, 192).

The APE is located above the western shore of Lake Whatcom on a hillslope along a ridgeline at an elevation of between approximately 675 feet and 725 feet above sea level. The ridge is composed of sandstone, mudstone, and conglomerate bedrock (Bellingham Bay Member of the Chuckanut Formation) that was deposited during the Eocene (Lapen 2000). Lower elevation slopes along the west shoreline of Lake Whatcom appear to be covered by undifferentiated glacial deposits.

Paleoenvironmental Background

Pollen data recovered from sediment cores in lakes and wetlands throughout the Puget Sound exhibit marked shifts in the composition and distribution of regional vegetation since the end of the Pleistocene (Whitlock 1992). Retreat of the Puget and Juan de Fuca lobes left a large volume of sand and gravels that was rapidly colonized by lodgepole pine, the major tree species between approximately 14,000 to 12,000 years ago (Whitlock 1992). Between 12,000 and 10,000 years ago lodgepole pine was joined by Sitka spruce, Douglas fir, western hemlock, and red alder forming a more closed forest environment. As the climate continued to warm during the early Holocene, periods of summer drought intensified and a higher frequency of fires appears to have increased the ranges of prairies in the Puget Lowland. Forests throughout the Puget Trough contained abundant Douglas fir, red alder, and bracken fern between approximately 10,000 and 8,000-6,000 years ago (Whitlock 1992). After approximately 6,000 years ago temperatures lowered and precipitation increased. Pollen data suggests that forest communities very similar to those of the historic period have probably been present since the mid-Holocene (~ 5,000 yr BP) with the widespread

appearance of cedar and an increase in Sitka spruce and western hemlock (Whitlock 1992).

Cultural Background

Prehistoric Summary

Settlement of the region appears to have begun sometime around the transition from the late Pleistocene to early Holocene. People living along the Northwest Coast at that time are believed to have been highly mobile foragers whose economy focused on exploiting a wide variety of terrestrial and littoral resources including megafauna, such as mammoth, mastodons and bison that became extinct soon after the end of the last glaciation. Artifact assemblages are dominated by foliate bifaces and bone and antler tools.

In western Washington, the regional archaeological manifestation of early to mid-Holocene populations has been termed the Olcott Phase (Kidd 1964). The Olcott Phase is characterized by sites that are generally in upland settings containing a distinctive lithic artifact assemblage dominated by scrapers, cobble tools, and stemmed and leaf-shaped projectile points (Matson and Coupland 1995; Nelson 1990).

The Olcott artifact assemblages are usually interpreted as evidence of an early, highly mobile hunting and gathering adaptation. Indisputable radiocarbon dates from Olcott components are rare; age estimates of Olcott sites have generally been inferred from the similarity of the assemblages to dated components from British Columbia sites (Carlson and Dalla Bona 1996). Thermoluminescence dating of fire-modified rock from three Olcott Phase sites near Granite Falls has produced dates ranging between approximately 9690 and 7130 years ago: 45SN303, Locus D – approximately 9690 to 7810 years ago; 45SN28 – approximately 8520 to 7660 years ago; 45SN303, Locus B – approximately 8390 to 7130 years ago (Chatters et al. 2011:242); and 45SN417 – approximately 9314 to 7884 years ago ([7300±430 BC and 5870±430 BC] Baldwin and Chambers 2014:32).

The period between approximately 9,000 BP and 4,000 BP marks an emergence of economies centered on the utilization of resources from a broadening range of environments (Matson and Coupland 1995). By the end of this period, an increasing reliance on marine and riverine resources becomes apparent.

Full-scale development of marine and riverine-oriented cultures, essentially identical to those described in the ethnographic record, are apparent after approximately 2,500 BP (Ames and Maschner 1999). A change to a semi-sedentary settlement pattern focused on movement between a central village and dispersed highly specialized seasonal camps appears to have occurred by approximately 2,500 BP. The period between approximately 2,500 BP and 250 BP is marked by an increasingly sophisticated use of storage technology and facilities, population increase and marked

seasonal aggregation, and the emergence of ranked societies (Matson and Coupland 1995; Ames and Maschner 1999).

Ethnohistoric Summary

The 1348 S. Lake Whatcom Blvd. project area is located within the traditional territory of the Nooksack Tribe. At the time of Euro-American contact the Nooksack lived in 13 or more winter villages along the Nooksack River and its tributaries, the Sumas River, and Lake Whatcom (Richardson and Galloway 2011:17). The village of Kaw-tchaa-hamuk, located at the head of Lake Whatcom where the Lake Whatcom trout hatchery is presently situated, was an important fishing site and the starting point of a trail to the upper valley of the South Fork Nooksack River and one heading south to Skagit Valley (Jeffcott 1949; Zobrist 2002).

The Nooksack had direct access to resources within territory that extended south into Skagit County along the South Fork of the Nooksack River, east to the area around Mount Baker and the headwaters of the North Fork of the Nooksack River, north into British Columbia, and west to Bellingham Bay (Richardson and Galloway 2011:17-18). Joint use areas occurred at the margins of Nooksack territory; the upper North Fork of the Nooksack River was shared with the Chilliwack, the upper South Fork of the Nooksack River was shared with the Upper Skagit, and the saltwater areas were also used by several neighboring groups.

Similar to other nearby tribal groups, the Nooksack subsistence base was focused on harvesting seasonally available plant and animal resources that were present across the various environmental zones within and around their territory, moving from temporary camp to temporary camp until winter when they returned to permanent winter villages.

Many different factors influenced Nooksack settlement after destructive smallpox epidemics in the late 1700s and the arrival of white settlers in Whatcom County in the 1850s. The Point Elliot Treaty was signed January 22, 1855, and was an attempt by the American government to limit Indian territories and to open Washington for free settlement. The Point Elliot Treaty led to modification of existing settlement patterns and restriction of Indian movement, and influenced all future settlement (Tremaine 1975:33; Richardson 2012).

After signing of the Point Elliot Treaty the Nooksack were not granted a reservation but instead were expected to move to the Lummi Reservation. Few Nooksack chose to relocate. In the early 1870s efforts were made to move the Nooksack to the reservation but it became apparent that relocation would not occur without military force and it was recommended that the Nooksack be allowed to remain in the valley (Richardson and Galloway 2011:20) and members of the tribe began to take out homestead claims

on small portions of their traditional lands. The Nooksack did not gain full federal recognition until 1973.

Historic Settlement

In 1852, William R. Pattle, one of the first pioneers to reach the area, discovered coal outcroppings along the shore of Bellingham Bay (Edson 1968:21). The year following Pattle's discovery, Russell Peabody and Henry Roeder, with the help of the Lummi Indians, built a lumber mill on the waterfall at the mouth of Whatcom Creek. The mill never proved to be very profitable; however, two of Roeder's employees discovered coal under the roots of a fallen tree along the shores of Bellingham Bay (Edson 1968). Several investors from California bought the coal vein and established the Bellingham Bay Coal Company, which for a time became the area's largest employer. The towns of Whatcom, Sehome, Bellingham, and Fairhaven, which would eventually consolidate into the City of Bellingham in 1903, were established along the shore of Bellingham Bay during the rapid industrialization of the area in the mid-1800s.

Settlement at the southern end of Lake Whatcom during the late-1800s was tied to mining and logging. C. W. Carter and J. Bloedel each held approximately 160 acres of land along the northeastern shoreline of Lake Whatcom in the area of Blue Canyon in the late-1800s; these parcels soon came under ownership of the Blue Canyon Coal Company (Zobrist 2002:7). The first wagon load of coal was transported to New Whatcom in March 1891. Prior to completion of the rail line along the north shore of the lake between New Whatcom and Wickersham the coal was barged up the lake to tracks at Silver Beach where it was loaded into cars and taken to bunkers on Bellingham Bay. The Blue Canyon mine operated until 1907 when it was reorganized as the Whatcom County Mining Company; the mine finally closed in 1919 after having removed 280,000 tons of coal (Zobrist 2002:11). Blue Canyon City, populated by the families of the men who worked in the mine sprang up and grew quickly, reaching almost 1000 inhabitants during its heyday before an explosion in the mine in spring of 1895 and economic recession around 1898 hastened its demise (Zobrist 2002:14-27). At its height the city had a store, post office, school, hotel, and workers houses.

Archaeological Background

Recorded Archaeological Sites

Table 1. Archaeological Sites near the Reservoir Replacement APE.

Site #	Site Type	Location	Reference
45WH88	Petroglyph	Along western shoreline of Lake Whatcom	McClure (1978)
45WH921	Culturally-modified cedar trees	On hillslope above eastern shoreline of Lake Whatcom	Major (2011)

Table 1 lists the only previously recorded archaeological sites within 1.5 miles of the APE; both sites are located in excess of 1 mile away. Archaeological site 45WH88 consists of two petroglyphs on a sandstone boulder on the north side of Ravenswood Point; a stone pendant / amulet was also found near the petroglyph boulder (McClure 1978).

Archaeological site 45WH921 consists of several bark-peeled cedar trees on a hillslope above the eastern shoreline of Lake Whatcom (Major 2011).

Previous Archaeological Investigations

Table 2. Cultural Resource Investigations near the Reservoir Replacement APE

Reference	Type of Investigation	Location	Resources Identified
Reid (2004)	Archaeological monitoring	Bridge at Austin Creek in Sudden Valley	None
Reid and Smith (2004)	Archaeological survey	Linear corridor along Lake Louise Road	None
Baker (2014)	Archaeological survey	1740 S. Lake Whatcom Blvd.	None

There are three cultural resource reports on file with the Department of Archaeology and Historic Preservation (DAHP) from within approximately one mile of the APE; they are summarized in Table 2.

Replacement of the bridge crossing Austin Creek was monitored by Alfred Reid (2004); no cultural resources were identified.

Reid and Smith (2004) conducted a survey prior to improvements along Lake Louise Road; no cultural resources were identified.

Baker (2014) carried out a survey prior to construction of the cellular telecommunication tower and tower access road adjacent and within the current APE. No cultural resources were identified during the survey.

Research Design

Objectives and Practical Expectations

The objectives of our field investigation were to identify any historic properties that may be present within the APE, to document them if present, and to provide an assessment and recommendations regarding their eligibility for listing in the NRHP.

The APE is located on a hillslope along a southwest trending ridgeline at an elevation of between approximately 675 feet and 725 feet above sea level above the western shoreline of Lake Whatcom.

The setting of the APE suggests a low probability for the possibility of pre-contact cultural resources to be discovered during our investigation.

Methods

Prior to conducting our field investigation, background research was completed to assess the likelihood of encountering buried historic or precontact cultural resources within the APE. Our background research included review of archaeological site forms and cultural resource assessment reports archived at DAHP, inspection of historic aerial images and maps of the project area, and a review of LiDAR imagery of the Deception Pass area.

The in-field portion of our investigation consisted of a pedestrian survey of the entire APE, examination of mature trees for any signs of cultural modification, excavation of twelve shovel probes, and cleaning of one road cut profile.

Details regarding the location, depth, and sediments encountered were recorded for each shovel probe and the road cut profile. Digital photographs were taken of representative sediment sequences. The location of all test holes and profiles was plotted on an aerial image of the project area (Figure 2).

The existing reservoir is 50 years old as of the date of our investigation. The tank was photographed and details of its construction and materials were recorded in a field notebook. The information was then added to DAHP's WISAARD database and a Historic Property Inventory form was generated.

Results

The field investigation of the reservoir replacement APE was conducted by the author on June 1, 2021.

The APE is generally forested with an overstory composed primarily of second growth Douglas fir with scattered western red cedar; red alder and big leaf maple are growing

along the northern side of the cell tower access road. The understory is generally open; sword fern is dominant with lesser amounts of Oregon grape, Indian plum, and red huckleberry present (see Figure 3 and Figure 4). None of the mature trees exhibited any evidence of cultural modification.

Shovel testing revealed fairly uniform profiles throughout the APE. Typical profiles consisted of a 10 cm to 15 cm thick surface layer of forest duff atop dark brown (10YR 3/3) to brown (10YR 4/3) loam overlying brownish yellow (10YR 6/8) loamy fine sand with common angular fragments of decomposing sandstone bedrock transitioning to pale brown (10YR 6/3) and light yellowish brown (10YR 6/4) loamy fine sand with common angular fragments of decomposing sandstone bedrock.

The sequence of deposits encountered in the shovel probes is summarized in more detail in Table 3. Examples of the typical deposits exposed in shovel probe 1, shovel probe 3, and cell tower access road cut are provided as Figure 5, Figure 6, and Figure 7 respectively.

No cultural materials were recovered from the shovel probes and no anthropogenic soils were observed in any of the profiles that we examined.

Existing Reservoir

The existing reservoir was built in 1971. It is circular in plan measuring approximately 68 feet in diameter and 36.8 feet in height. The tank is built of welded steel plate and rests on a circular concrete pad. A level gauge, ladder, and access hatch are located on its north side (see Figure 8). No other features are present on the exterior of the tank.

Evaluation and Recommendations

Undertakings involving federal agencies are required by the National Historic Preservation Act (NHPA) of 1966, as amended, to evaluate the historic significance of properties identified within the project APE. Significance is considered present in properties that possess integrity of location, design, setting, materials, workmanship, feeling, and association and:

> (A) That are associated with events that have made a significant contribution to the broad patterns of our history; or
>
> (B) That are associated with the lives of persons significant in our past; or
>
> (C) That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
>
> (D) That have yielded, or may be likely to yield, information important in prehistory or history (36 CFR 60.4).

Properties that meet one or more of the National Register of Historic Places (NRHP) criteria and retain necessary integrity are considered historic properties.

The existing reservoir was constructed in 1971. The tank is potentially eligible for the NRHP for its direct connection to late-20th century commercial water conveyance that allowed for residential growth around Lake Whatcom (Criterion A). Preliminary research did not reveal that the tank is directly associated with the lives of significant persons in our past (Criterion B). The tank does not possess distinctive characteristics of its type or period, is not the work of a master, nor does it possess artistic value (Criterion C). The tank was built following standard construction methods and using materials common to storage tank construction. The tank does not possess research potential (Criterion D).

The tank retains integrity of location, design, materials, and workmanship. However as a stand-alone industrial structure the tank does not convey feeling in our opinion and it is not associated with any other visible above ground structures. For the above reasons the tank is recommended not eligible for listing in the NRHP under any of the four NR criteria.

No historic properties, cultural materials, or isolated artifacts were identified within the APE during the course of this investigation. Caldera Archaeology recommends that FEMA assert a Determination of No Historic Properties Affected to the State Historic

Preservation Officer (SHPO), the Tribal Historic Preservation Officers (THPO), and any other consulting or affected parties.

Table 3. Shovel Probe Data.

Shovel Probe 1

CM Depth	Sediments/contents	Comments
0-10	Dark brown (10YR 3/3) loam	No cultural materials
10-35	Brownish yellow (10YR 6/8) loamy fine sand with common angular fragments of decomposing sandstone	No cultural materials
35-50	Light yellowish brown (10YR 6/4) loamy fine sand with common angular fragments of decomposing sandstone bedrock	No cultural materials

Shovel Probe 2

CM Depth	Sediments/contents	Comments
0-15	Brown (10YR 4/3) loam	No cultural materials
15-35	Brownish yellow (10YR 6/8) loamy fine sand with common angular fragments of decomposing sandstone	No cultural materials
35-40	Pale brown (10YR 6/3) loamy fine sand with common angular fragments of decomposing sandstone bedrock	No cultural materials

Shovel Probe 3

CM Depth	Sediments/contents	Comments
0-10	Brown (10YR 4/3) loam	No cultural materials
10-25	Brownish yellow (10YR 6/8) loamy fine sand with common angular fragments of decomposing sandstone	No cultural materials
25-35	Light yellowish brown (10YR 6/4) loamy fine sand with common angular fragments of decomposing sandstone bedrock	No cultural materials

Shovel Probe 4

CM Depth	Sediments/contents	Comments
0-20	Decomposing wood	No cultural materials
20-35	Dark brown (10YR 3/3) loam	No cultural materials
35-50	Brownish yellow (10YR 6/8) loamy fine sand with common angular fragments of decomposing sandstone	No cultural materials
50-55	Light yellowish brown (10YR 6/4) loamy fine sand with common angular fragments of decomposing sandstone bedrock	No cultural materials

Shovel Probe 5

CM Depth	Sediments/contents	Comments
0-10	Dark brown (10YR 3/3) loam	No cultural materials
10-35	Brownish yellow (10YR 6/8) loamy fine sand with common angular fragments of decomposing sandstone	No cultural materials
35-50	Light yellowish brown (10YR 6/4) loamy fine sand with common angular fragments of decomposing sandstone bedrock	No cultural materials

Shovel Probe 6

CM Depth	Sediments/contents	Comments
0-10	Brown (10YR 4/3) loam	No cultural materials
10-30	Light yellowish brown (10YR 6/4) loamy fine sand with common angular fragments of decomposing sandstone bedrock	No cultural materials – truncated by cell tower access road construction

Shovel Probe 7

CM Depth	Sediments/contents	Comments
0-15	Brown (10YR 4/3) loam	No cultural materials
15-35	Brownish yellow (10YR 6/8) loamy fine sand with common angular fragments of decomposing sandstone	No cultural materials
35-40	Pale brown (10YR 6/3) loamy fine sand with common angular fragments of decomposing sandstone bedrock	No cultural materials

Shovel Probe 8

CM Depth	Sediments/contents	Comments
0-20	Brown (10YR 4/3) loam	No cultural materials
20-35	Brownish yellow (10YR 6/8) loamy fine sand with common angular fragments of decomposing sandstone	No cultural materials
35-40	Pale brown (10YR 6/3) loamy fine sand with common angular fragments of decomposing sandstone bedrock	No cultural materials

Shovel Probe 9

CM Depth	Sediments/contents	Comments
0-10	Brown (10YR 4/3) loam	No cultural materials
10-30	Light yellowish brown (10YR 6/4) loamy fine sand with common angular fragments of decomposing sandstone bedrock	No cultural materials – truncated by cell tower access road construction

Shovel Probe 10

CM Depth	Sediments/contents	Comments
0-15	Dark brown (10YR 3/3) loam	No cultural materials
15-35	Brownish yellow (10YR 6/8) loamy fine sand with common angular fragments of decomposing sandstone	No cultural materials
35-50	Light yellowish brown (10YR 6/4) loamy fine sand with common angular fragments of decomposing sandstone bedrock	No cultural materials

Shovel Probe 11

CM Depth	Sediments/contents	Comments
0-15	Brown (10YR 4/3) loam	No cultural materials
15-35	Brownish yellow (10YR 6/8) loamy fine sand with common angular fragments of decomposing sandstone	No cultural materials
35-40	Pale brown (10YR 6/3) loamy fine sand with common angular fragments of decomposing sandstone bedrock	No cultural materials

Shovel Probe 12

CM Depth	Sediments/contents	Comments
0-15	Brown (10YR 4/3) loam	No cultural materials
15-30	Brownish yellow (10YR 6/8) loamy fine sand with common angular fragments of decomposing sandstone	No cultural materials
30-50	Pale brown (10YR 6/3) loamy fine sand with common angular fragments of decomposing sandstone bedrock	No cultural materials

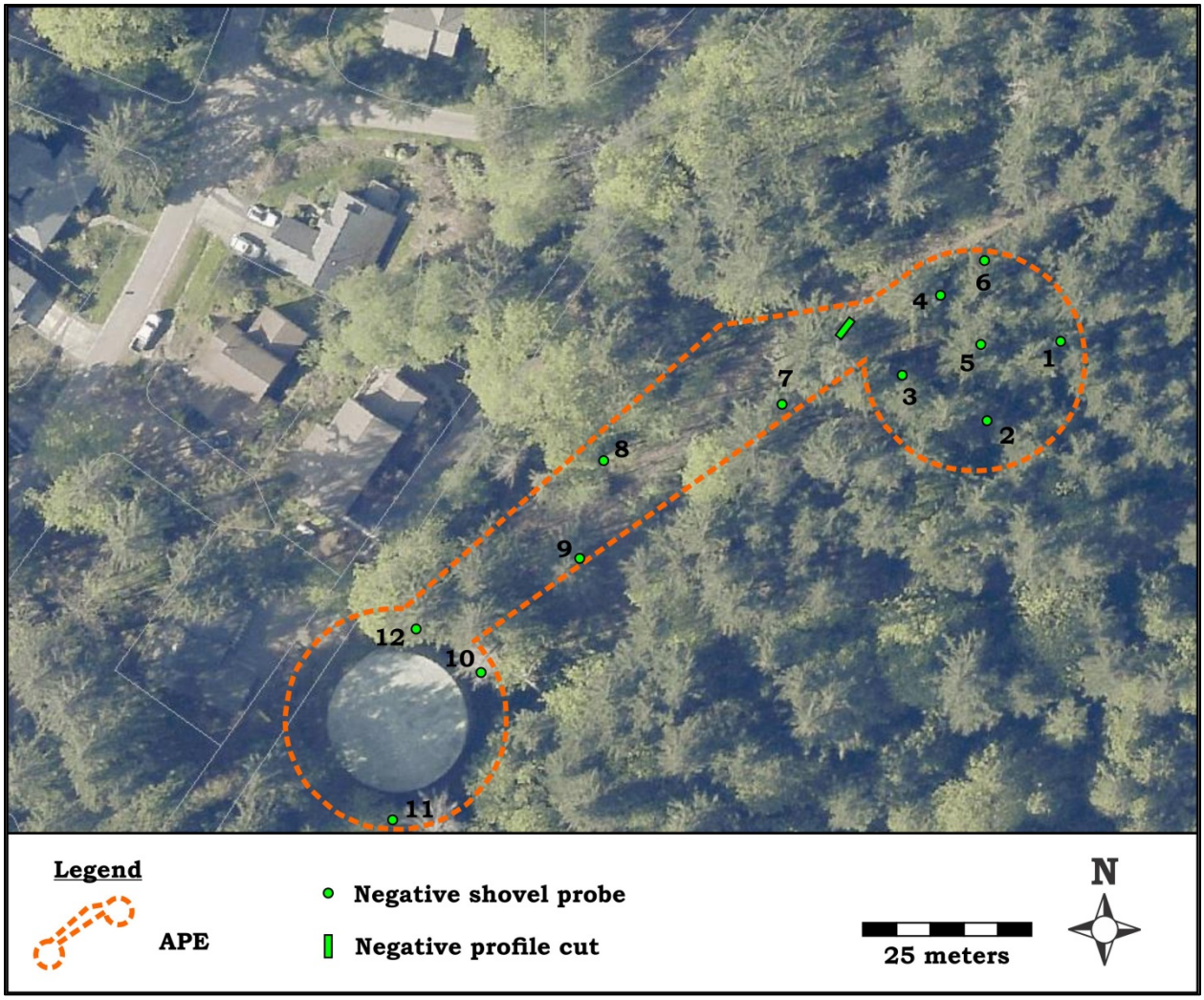

Figure 2. Aerial image of the reservoir replacement APE showing the locations of excavated shovel probes.

Figure 3. Overview of existing conditions where new tanks are proposed to be located. View to southeast.

Figure 4. View down existing cell tower access road cut toward existing tank (at center of image in distance). View to southwest.

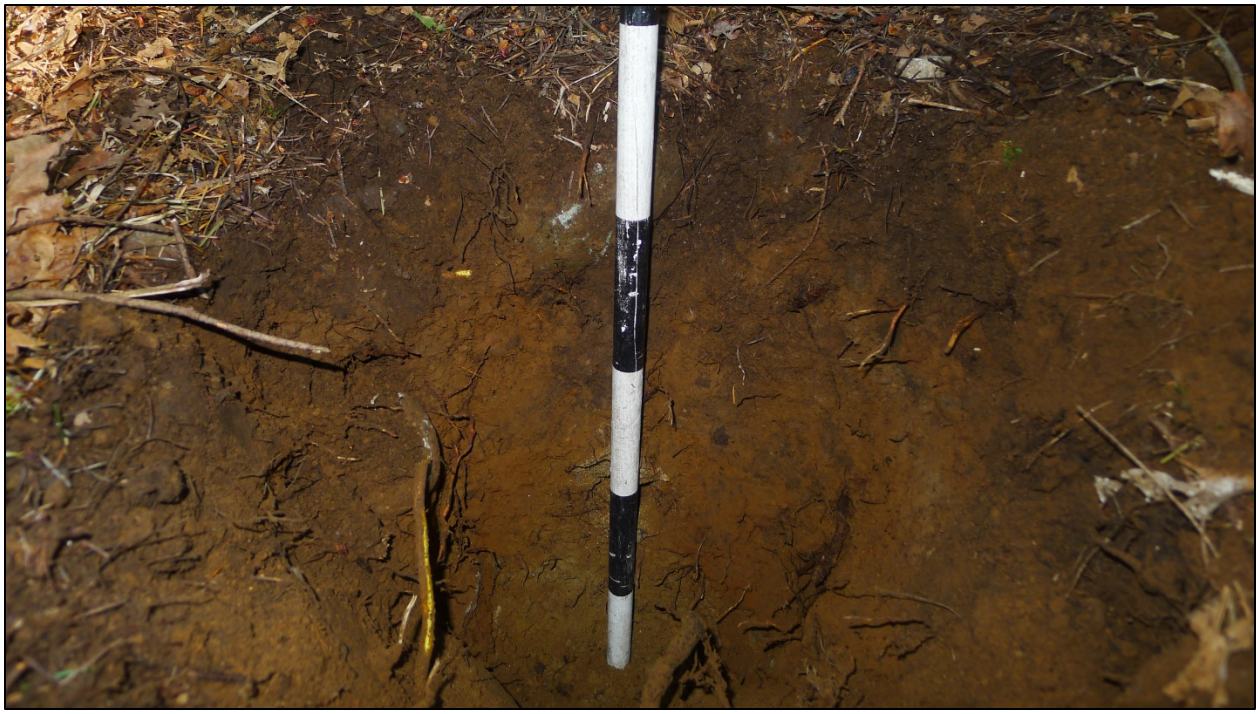

Figure 5. Typical profile exposed in the sidewall of shovel probe 1; flash used for photograph.

Figure 6. Typical profile exposed in the sidewall of shovel probe 3; flash used for photograph.

Figure 7. Profile exposed in cell tower access road cut.

Figure 8. North side of existing reservoir showing level gauge, ladder, and access hatch. View to south.

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Appendix A: Historic Property Inventory Form

Historic Property Report

Resource Name:

Property ID: 724878

Location

Geographic Areas: Whatcom County, T37R04E08, LAKE WHATCOM Quadrangle

Information

Number of stories: N/A

Construction Dates:

Construction Type	Year	Circa
Built Date	1971	☐

Historic Use:

Category	Subcategory
Industry/Processing/Extraction	Industry/Processing/Extraction - Waterworks
Industry/Processing/Extraction	Industry/Processing/Extraction - Waterworks

Historic Context:

Category

Architect/Engineer:

Category	Name or Company

Historic Property Report

Resource Name:

Property ID: 724878

Thematics:

Local Registers and Districts

Name	Date Listed	Notes

Project History

Project Number, Organization, Project Name	Resource Inventory	SHPO Determination	SHPO Determined By, Determined Date
2021-06-03367, FEMA, Lake Whatcom Water and Sewer District 7 Reservoir Replacement	6/8/2021	Survey/Inventory	

Historic Property Report

Resource Name:

Property ID: 724878

Photos

North side of water storage resevoir

Historic Property Report

Resource Name: Property ID: 724878

Inventory Details - 6/8/2021

Common name:

Date recorded: 6/8/2021

Field Recorder: Ed Arthur

Field Site number:

SHPO Determination

Detail Information

Characteristics:

Category	Item
Foundation	Concrete - Poured
Cladding	Metal
Structural System	Metal - Steel
Plan	Round

Surveyor Opinion

Significance narrative: The reservoir was constructed in 1971. The tank is potentially eligible for the NRHP for its direct connection to late-20th century commercial water conveyance that allowed for residential growth around Lake Whatcom (Criterion A). Preliminary research did not reveal that the tank is directly associated with the lives of significant persons in our past (Criterion B). The tank does not possess distinctive characteristics of its type or period, is not the work of a master, nor does it possess artistic value (Criterion C). The tank was built following standard construction methods and using materials common to storage tank construction. The tank does not possess research potential (Criterion D).

The tank retains integrity of location, design, materials, and workmanship. However as a stand-alone industrial structure the tank does not convey feeling in our opinion and it is not associated with any other visible above ground structures. For the above reasons the tank is recommended not eligible for listing in the NRHP under any of the four NR criteria.

Physical description: The reservoir was built in 1971. It is circular in plan measuring approximately 68 feet in diameter and 36.8 feet in height. The tank is built of welded steel plate and rests on a circular concrete pad. A level gauge, access ladder, and hatch are located on its north side. No other features are present on the exterior of the tank.

1106257

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EASEMENT AGREEMENT

THE GRANTORS, FIRS BIBLE MISSIONARY CONFERENCE, INC., for and in consideration of the good and valuable consideration as set out below by SUDDEN VALLEY, INC. and THE SANWICK CORPORATION, Grantees herein, do here now sell, transfer, grant and convey unto the Grantees an Easement for purposes of constructing, improving, repairing and maintaining a water reservoir tank and access road thereto over, across, under and upon the following described real estate, situate in Whatcom County, Washington, to-wit:

A circular tract of land in Section 8, Township 37 North, Range 4 East, W. M., described as follows:

Commencing at the easterly plat boundary corner, adjacent to Lots 116 and 117 of Sudden Valley Division 7 as recorded in Volume 10 of plats, pages 63-65, inclusive, records of Whatcom County, Washington; thence North 34° 25' 19" East along the easterly boundary of said plat 346.34 feet to the True Point of Beginning; thence continuing North 34° 25' 19" East along said Easterly boundary 35.80 feet to the intersection with a curve from whence the center bears South 36° 35' 11" East 55.00 feet; thence to the right along said curve, through a central angle of 322° 01' 06" an arc distance of 309.12 feet more or less to the True Point of BEginning, situate in Whatcom County, Washington.

~~Containing 0.22 acres more or less.~~

TOGETHER with an easement for road and utility purposes to hereinbefore described circular tract of land, said easement being over and across the following described parcel of land:

BEginning at the most northerly corner of said circular tract, common with the easterly boundary of said plat of Sudden Valley Division 7; thence North 34° 25' 19" East along said easterly boundary 279.74 feet; thence south 19° 01' 44" East 21.39 feet; thence South 35° 55' 00" West 228.90 feet; thence South 54° 05' 00" East 42.24 feet to a point on the northerly boundary of said circular tract, said point being on a curve from whence the center bears South 35° 55' 00" West 55.00 feet; thence westerly along said curve and said northerly boundary 69.60 feet more or less to the Point of BEginning.

VOL 154 PAGE 679

GIVING AND GRANTING unto Grantees the perpetual (subject to the right of defeasance and reverter hereinafter set forth) right, subject to the terms and conditions herein set forth to enter in and upon said land for the purposes of constructing, repairing, maintaining and replacing a water reservoir tank and road and water line access to and from said tank site for utility purposes over, under and across said tract of land. Permission is hereby given to assign this easement and all rights therein to Whatcom County Water District No. 10, on their taking over the operation of the water facilities now contemplated; provided however, that this permission and the right to assign this easement or transfer of use of any facilities on easement property is expressly subject to the requirement that before any such assignment or transfer is effective, Whatcom County Water District No. 10 must enter into an agreement with Grantor providing for water and sewer service to Grantor and Grantor's property on terms and at prices which are satisfactory to the Grantor.

Grantor is entitled to use water and sewer facilities constructed, in whole or in part, by Grantees for itself to a limit of 500 people. It is agreed that the construction now under way and immediately contemplated by Grantees, with respect to both water and sewer systems, shall be designed to accommodate Grantor's needs up to the maximum of 500 persons. It is further agreed that with respect to all construction of both water and sewer systems now under way or planned in the near future by Grantees, that the Grantor will never pay directly or indirectly any part of the capital or installation costs thereof or of any portion thereof. It is further contemplated that, as indicated above, this easement may be assigned to Whatcom County Water District No. 10. In the event that Whatcom County Water District No. 10 should ever lawfully

levy or assess the Grantor for any portion of the construction costs or capital improvement costs of the facilities, lines, etc. now under construction or planned for the immediate future by the Grantees, then Grantees will pay such levy, assessment or charge for capital improvements. It is further agreed, however, that as to capital improvemets in water or sewer systems used by the Grantor which are in addition to those now under construction or planned for the immediate future by the Grantees, the Grantor may be assessed and will pay its lawful proportion of its share thereof as determined by law or otherwise. Water or sewer improvements now under construction or planned for the immediate future by the Grantees shall exclude trunk sewer system now planned by Water District No. 10.

In addition to all of the obligations hereunder and before this Easement is effective permanently, Grantees shall construct a road from the parking area now maintained by the Grantor near the entrance to its property to the peak of the hill on which the tract of land first above described on Page 1 is located, and being in total length approximately 1,000 feet. Such road shall be constructed on grades which are usable by ordinary passenger automobiles and shall be cleared, graded, gravelled and made suitable for year around use in accordance with the standards of the better roads now maintained on Grantor's property surrounding the property on which the foregoing easements are given.

In consideration of the granting of this easement as indicated above, Grantor shall have the right to hook up to said water supply system with a line size to serve up to 500 people without charge from Grantees for the construction costs of said water system. After a hook-up occurs, Grantor, if/Grantees are operating the water system agrees to pay regular water charges for the use of

water at rates to be established for all water users in the area pursuant to a fair and reasonable schedule which is appropriate to the type and size of water users.

Grantor shall also have the right to connect to the Sudden Valley sewer system and use of the sewer transmission lines within Sudden Valley development for the same 500 people at no charge to Grantor for the construction of said lines as above set forth. The Grantees shall furnish pipe in place and reasonable additional facilities enabling Grantor to hook up to Sudden Valley sewer system at two places to be determined by negotiation. This right to use the Sudden Valley sewer transmission lines does not relieve Grantor of its obligation to pay its fair share of the trunk line facilities built by Whatcom County Water District No. 10 between Sudden Valley and the City of Bellingham and that obligation must be met by Grantor prior to hooking into Sudden Valley lines. Grantor will not be charged a hook-up fee by Sudden Valley, but will be obligated to pay the regular sewer charges, if any, as established by Whatcom County Water District No. 10 and the City of Bellingham sewer hook-up fee, if any is charged.

The Grantees and its successors and assigns agree to save Grantor harmless from any liability to third parties and any loss to itself or its property arising from or connected with construction maintenance, repair and reconstruction and operation of said water reservoir tank and all facilities relating thereto constructed by Grantees; and shall carry liability insurance in such sum as is satisfactory to Grantor and shall provide that the Grantor shall be an additional insured in all such insurance.

It is further agreed that should the Grantees or its successors or assigns not use said property for a water reservoir tank site, or having used it for said purpose give up its use at a future date, said property, said tank and all other improvements

placed thereon by the Grantor will revert to Grantor free and clear of any easement rights granted hereunder.

Grantees, by the acceptance of this agreement, agree with the Grantor to cause no more damage in such entry or entries than is necessary in the exercise of careful and prudent work.

All rights of Grantor respecting water and sewer service are transferable by Grantor in the event of conveyance of all or any part of its land.

IN WITNESS WHEREOF, the Grantors have hereunto set their hands this _____ day of September, 1971.

FIRS BIBLE AND MISSIONARY CONFERENCE, INC.

By _____
Its _____

By _____
Its _____

GRANTORS

ACCEPTED AND AGREED TO:

SAMWICK CORPORATION

By _____
Its _____

By _____
Its _____

SUDDEN VALLEY, INC.

By _____
Its _____

By _____
Its _____

STATE OF WASHINGTON :
: ss.
COUNTY OF WHATCOM :

On this 2nd day of September, 1971, before me, the undersigned, a Notary Public in and for the State of Washington, duly commissioned and sworn, personally appeared Arnold Magnuson and _____ to me known to be the President and ~~Secretary~~, respectively, of FIRS BIBLE AND MISSIONARY CONFERENCE, INC., the corporation that

executed the foregoing instrument, and acknowledged the said instrument to be the free and voluntary act and deed of said corporation, for the uses and purposes therein mentioned, and on oath stated that they are authorized to execute the said instrument and that the seal affixed is the corporate seal of said corporation.

Witness my hand and official seal hereto affixed the day and year first above written.

NOTARY PUBLIC in and for the State of Washington, residing at Bellingham.

STATE OF WASHINGTON :
: ss.
COUNTY OF KING :

ON THIS 23rd day of September, 1971, before me, the undersigned, a Notary Public in and for the State of Washington, duly commissioned and sworn, personally appeared E. C. Mower and F. Robert Lee to me known to be the President and/~~Secretary~~ Exec. Vice President, respectively, of SANWICK CORPORATION, the corporation that executed the foregoing instrument, and acknowledged the said instrument to be the free and voluntary act and deed of said corporation, for the uses and purposes therein mentioned, and on oath stated that they are authorized to execute the said instrument and that the seal affixed is the corporate seal of said corporation.

WITNESS my hand and official seal hereto affixed the day and year first above written.

NOTARY PUBLIC in and for the State of Washington, residing at Seattle

STATE OF WASHINGTON :
: ss.
COUNTY OF KING :

ON THIS 23rd day of September, 1971, before me, the undersigned, a Notary Public in and for the State of Washington, duly commissioned and sworn, personally appeared E. C. Mower and F. Robert Lee ~~and~~ to me known to be the President and ~~Secretary~~ Exec. Vice President, respectively, of SUDDEN VALLEY, INC. the corporation that executed the foregoing instrument, and acknowledged the said instrument to be the free and voluntary act and deed of said corporation, for the uses and purposes therein mentioned, and on oath stated that they are authorized to execute the said instrument and that the seal affixed is the corporate seal of said corporation.

WITNESS my hand and official seal hereto affixed the day and year first above written.

NOTARY PUBLIC in and for the State of Washington, residing at Seattle.

DEC 10 1971

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EASEMENT AGREEMENT

THE GRANTORS, FIRS BIBLE MISSIONARY CONFERENCE, INC., for and in consideration of the good and valuable consideration as set out below by SUDDEN VALLEY, INC. and THE SANWICK CORPORATION, Grantees herein, do here now sell, transfer, grant and convey unto the Grantees an Easement for purposes of constructing, improving, repairing and maintaining a water reservoir tank and access road thereto over, across, under and upon the following described real estate, situate in Whatcom County, Washington, to-wit:

A circular tract of land in Section 8, Township 37 North, Range 4 East, W. M., described as follows:

Commencing at the easterly plat boundary corner, adjacent to Lots 116 and 117 of Sudden Valley Division 7 as recorded in Volume 10 of plats, pages 63-65, inclusive, records of Whatcom County, Washington; thence North 34° 25' 19" East along the easterly boundary of said plat 346.34 feet to the True Point of Beginning; thence continuing North 34° 25' 19" East along said Easterly boundary 35.80 feet to the intersection with a curve from whence the center bears South 36° 35' 11" East 55.00 feet; thence to the right along said curve, through a central angle of 322° 01' 06" an arc distance of 309.12 feet more or less to the True Point of BEginning, situate in Whatcom County, Washington.

Containing 0.22 acres more or less.

TOGETHER with an easement for road and utility purposes to hereinbefore described circular tract of land, said easement being over and across the following described parcel of land:

BEginning at the most northerly corner of said circular tract, common with the easterly boundary of said plat of Sudden Valley Division 7; thence North 34° 25' 19" East along said easterly boundary 279.74 feet; thence south 19° 01' 44" East 21.39 feet; thence South 35° 55' 00" West 228.00 feet; thence South 54° 05' 00" East 42.24 feet to a point on the northerly boundary of said circular tract, said point being on a curve from whence the center bears South 35° 55' 00" West 55.00 feet; thence westerly along said curve and said northerly boundary 69.60 feet more or less to the Point of BEginning.

-1-

GIVING AND GRANTING unto Grantees the perpetual (subject to the right of defeasance and reverter hereinafter set forth) right, subject to the terms and conditions herein set forth to enter in and upon said land for the purposes of constructing, repairing, maintaining and replacing a water reservoir tank and road and water line access to and from said tank site for utility purposes over, under and across said tract of land. Permission is hereby given to assign this easement and all rights therein to Whatcom County Water District No. 10, on their taking over the operation of the water facilities now contemplated; provided however, that this permission and the right to assign this easement or transfer of use of any facilities on easement property is expressly subject to the requirement that before any such assignment or transfer is effective, Whatcom County Water District No. 10 must enter into an agreement with Grantor providing for water and sewer service to Grantor and Grantor's property on terms and at prices which are satisfactory to the Grantor.

Grantor is entitled to use water and sewer facilities constructed, in whole or in part, by Grantees for itself to a limit of 500 people. It is agreed that the construction now under way and immediately contemplated by Grantees, with respect to both water and sewer systems, shall be designed to accommodate Grantor's needs up to the maximum of 500 persons. It is further agreed that with respect to all construction of both water and sewer systems now under way or planned in the near future by Grantees, that the Grantor will never pay directly or indirectly any part of the capital or installation costs thereof or of any portion thereof. It is further contemplated that, as indicated above, this easement may be assigned to Whatcom County Water District No. 10. In the event that Whatcom County Water District No. 10 should ever lawfully

levy or assess the Grantor for any portion of the construction costs or capital improvement costs of the facilities, lines, etc. now under construction or planned for the immediate future by the Grantees, then Grantees will pay such levy, assessment or charge for capital improvements. It is further agreed, however, that as to capital improvemets in water or sewer systems used by the Grantor which are in addition to those now under construction or planned for the immediate future by the Grantees, the Grantor may be assessed and will pay its lawful proportion of its share thereof as determined by law or otherwise. Water or sewer improvements now under construction or planned for the immediate future by the Grantees shall exclude trunk sewer system now planned by Water District No. 10.

In addition to all of the obligations hereunder and before this Easement is effective permanently, Grantees shall construct a road from the parking area now maintained by the Grantor near the entrance to its property to the peak of the hill on which the tract of land first above described on Page 1 is located, and being in total length approximately 1,000 feet. Such road shall be constructed on grades which are usable by ordinary passenger automobiles and shall be cleared, graded, gravelled and made suitable for year around use in accordance with the standards of the better roads now maintained on Grantor's property surrounding the property on which the foregoing easements are given.

In consideration of the granting of this easement as indicated above, Grantor shall have the right to hook up to said water supply system with a line size to serve up to 500 people without charge from Grantees for the construction costs of said water system. After a hook-up occurs, Grantor, if/operating the water system agrees to pay regular water charges for the use of Grantees are

water at rates to be established for all water users in the area pursuant to a fair and reasonable schedule which is appropriate to the type and size of water users.

Grantor shall also have the right to connect to the Sudden Valley sewer system and use of the sewer transmission lines within Sudden Valley development for the same 500 people at no charge to Grantor for the construction of said lines as above set forth. The Grantees shall furnish pipe in place and reasonable additional facilities enabling Grantor to hook up to Sudden Valley sewer system at two places to be determined by negotiation. This right to use the Sudden Valley sewer transmission lines does not relieve Grantor of its obligation to pay its fair share of the trunk line facilities built by Whatcom County Water District No. 10 between Sudden Valley and the City of Bellingham and that obligation must be met by Grantor prior to hooking into Sudden Valley lines. Grantor will not be charged a hook-up fee by Sudden Valley, but will be obligated to pay the regular sewer charges, if any, as established by Whatcom County Water District No. 10 and the City of Bellingham sewer hook-up fee, if any is charged.

The Grantees and its successors and assigns agree to save Grantor harmless from any liability to third parties and any loss to itself or its property arising from or connected with construction maintenance, repair and reconstruction and operation of said water reservoir tank and all facilities relating thereto constructed by Grantees; and shall carry liability insurance in such sum as is satisfactory to Grantor and shall provide that the Grantor shall be an additional insured in all such insurance.

It is further agreed that should the Grantees or its successors or assigns not use said property for a water reservoir tank site, or having used it for said purpose give up its use at a future date, said property, said tank and all other improvements

placed thereon by the Grantor will revert to Grantor free and clear of any easement rights granted hereunder.

Grantees, by the acceptance of this agreement, agree with the Grantor to cause no more damage in such entry or entries than is necessary in the exercise of careful and prudent work.

All rights of Grantor respecting water and sewer service are transferable by Grantor in the event of conveyance of all or any part of its land.

IN WITNESS WHEREOF, the Grantors have hereunto set their hands this_____day of September, 1971.

FIRS BIBLE AND MISSIONARY CONFERENCE, INC.

By _____
Its President

By _____
Its Executive Director

GRANTORS

ACCEPTED AND AGREED TO:

SAMMICK CORPORATION

By _____
Its _____

By _____
Its _____

SUDDEN VALLEY, INC.

By _____
Its _____

By _____
Its _____

STATE OF WASHINGTON :
: ss.
COUNTY OF WHATCOM :

ON THIS 20 day of September, 1971, before me, the undersigned, a Notary Public in and for the State of Washington, duly commissioned and sworn, personally appeared _____ and _____ to me known to be the President and ~~Secretary~~, respectively, of FIRS BIBLE AND MISSIONARY CONFERENCE, INC., the corporation that

executed the foregoing instrument, and acknowledged the said instrument to be the free and voluntary act and deed of said corporation, for the uses and purposes therein mentioned, and on oath stated that they are authorized to execute the said instrument and that the seal affixed is the corporate seal of said corporation.

Witness my hand and official seal hereto affixed the day and year first above written.

NOTARY PUBLIC in and for the State of Washington, residing at Bellingham.

STATE OF WASHINGTON :
: ss.
COUNTY OF KING :

ON THIS 23rd day of September, 1971, before me, the undersigned, a Notary Public in and for the State of Washington, duly commissioned and sworn, personally appeared E. C. Mower and F. Robert Lee to me known to be the President and/~~Secretary~~ Exec. Vice President, respectively, of SANWICK CORPORATION, the corporation that executed the foregoing instrument, and acknowledged the said instrument to be the free and voluntary act and deed of said corporation, for the uses and purposes therein mentioned, and on oath stated that they are authorized to execute the said instrument and that the seal affixed is the corporate seal of said corporation.

WITNESS my hand and official seal hereto affixed the day and year first above written.

NOTARY PUBLIC in and for the State of Washington, residing at Seattle

STATE OF WASHINGTON :
: ss.
COUNTY OF KING :

ON THIS 23rd day of September, 1971, before me, the undersigned, a Notary Public in and for the State of Washington, duly commissioned and sworn, personally appeared E. C. Mower and F. Robert Lee ~~and~~ to me known to be the President and ~~Secretary~~ Exec. Vice President, respectively, of SUDDEN VALLEY, INC. the corporation that executed the foregoing instrument, and acknowledged the said instrument to be the free and voluntary act and deed of said corporation, for the uses and purposes therein mentioned, and on oath stated that they are authorized to execute the said instrument and that the seal affixed is the corporate seal of said corporation.

WITNESS my hand and official seal hereto affixed the day and year first above written.

NOTARY PUBLIC in and for the State of Washington, residing at Seattle.

... RECORD AT 4:22 PM DEC 10 1971
... WHATCOM CO. WASH

VOL 154 PAGE 644

WATER EASEMENT

For and in consideration of one dollar ($1.00) in hand paid, the benefits derived and to be derived by the Grantors herein, and other good and valuable consideration, receipt whereof is hereby acknowledged, the Grantors, The Firs Bible and Missionary Conference, a Washington non-profit corporation, hereby convey and warrant to the Grantee, Whatcom County Water District No. 10, its successors and assigns, a perpetual, nonexclusive easement 15 feet in width under, over, through and across the property described in Exhibit "A", attached hereto and by this reference incorporated herein, for the purpose of maintaining a water line benefiting the property described in Exhibit "B", attached hereto and by this reference incorporated herein:

SUBJECT TO THE FOLLOWING:

1. Grantee shall have the right at all times to enter the premises described in Exhibit "A" hereto for the purpose of inspecting, maintaining, improving, repairing constructing, reconstructing, locating and relocating the water lines.
2. The cost of any inspection, maintenance, improvement, repair, construction, reconstruction, locating or relocating of the water lines, improvements thereto or relocation there of shall be borne by Grantee.
3. Upon completion of any work by the Grantee under this Easement, Grantee shall restore the servient property to its prior condition consistent with Grantee's use of the property.
4. Grantor shall construct no improvements on the portion of the property subject to this easement without the express written consent of the Grantee.
5. Grantee is granted an easement over the roads located within the real property described in Exhibit "B" for the purposes of gaining access to the property described in Exhibit "A".

IN WITNESS WHEREOF this easement is executed this 14th day of February, 1992.

The Firs Bible and Missionary Conference

GREGORY J. KINLOCH
Executive Director

KENNETH I. JERNBERG
Chairman of the Board

WHATCOM COUNTY
BELLINGHAM, WA
04/14/92 3:04 PM
REQUEST OF: WATER DIS
Shirley Forslof, AUDITOR
BY: MRT, DEPUTY
$12.00 EASE
Vol: 246 Page: 398
File No: 9204141201

BARBARA J. COREY
PAID
EXEMPT
REAL ESTATE
EXCISE TAX
TREASURER OF WHATCOM COUNTY, WASHINGTON

STATE OF WASHINGTON)
) ss.
COUNTY OF WHATCOM)

I certify that I know or have satisfactory evidence that GREGORY J. KINLOCH and KENNETH I. JERNBERG are the persons who appeared before me, and said persons acknowledged that they signed this instrument and acknowledged it as the Executive Director and Chairman of the Board of The Firs Bible & Missionary Conference, a Washington non-profit corporation, to be the free and voluntary act of such party for the uses and purposes mentioned in the instrument.

Dated: February 14, 1992

Janice Stone Rutgers
NOTARY PUBLIC
My appointment expires 12-08-93

c:1/agree/3749

Vol: 246 Page: 399
File No: 9204141201

"EXHIBIT A"

(Firwood/Water District No. 10)

An easement 20 feet in width for waterline under, over, and across a portion of the Northeast Quarter of Section 8, Township 37 North, Range 4 East and a portion of the Northwest Quarter of Section 9, Township 37 North, Range 4 East of W.M., the centerline of which is described as follows:

Commencing at the Northeast corner of Lot 125 in the plat of Sudden Valley, Division No. 7, as per the map thereof recorded in Volume 10 of Plats, Page 63, records of Whatcom County, Washington;
Thence South 35°55'00" West, along the Southeasterly line of said Lot 125, for a distance of 123.00 feet to the Southeast corner of said Lot 125;
Thence North 48°14'01" East 80.80 feet to the Point of Beginning of herein described centerline, said point being on the Southeasterly line of said Division 7;
Thence South 40°27'17" East 93.07 feet;
Thence South 63°37'39" East 37.75 feet;
Thence North 81°05'20" East 119.87 feet;
Thence North 79°58'40" East 98.53 feet;
Thence North 75°19'26" East 56.74 feet;
Thence North 65°12'58" East 91.01 feet;
Thence North 62°47'27" East 82.35 feet;
Thence North 62°04'17" East 86.81 feet;
Thence North 51°00'14" East 50.25 feet;
Thence North 61°24'17" East 40.63 feet;
Thence South 87°43'25" East 35.58 feet;
Thence South 50°47'43" East 35.61 feet;
Thence South 19°29'21' East 43.04 feet;
Thence South 16°36'43" West 82.17 feet;
Thence South 27°31'17" West 32.91 feet;
Thence South 47°32'53" West 170.20 feet;
Thence South 24°05'00" West 98.19 feet;
Thence South 51°16'32" West 42.90 feet;
Thence South 38°15'26" East 26.52 feet;
Thence North 81°49'59" East 72.72 feet;
Thence North 78°40'03" East 120.08 feet;
Thence North 60°16'35" East 142.49 feet;
Thence North 54°54'21" East 183.77 feet;

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FILE # 9204142301

Thence North 49°34'29" East 37.95 feet to a point hereinafter referred to as Point "A";
Thence North 49°34'29" East 90.19 feet;
Thence North 45°47'56" East 68.01 feet;
Thence North 70°23'53" East 191.74 feet;
Thence South 61°25'10" East 36.18 feet;
Thence South 69°41'38" East 55.92 feet;
Thence North 20°51'07" East 90.99 feet;
Thence North 18°44'03" West 181.61 feet;
Thence North 07°06'50" West 109.22 feet
Thence North 02°49'40" East 48.41 feet
Thence North 17°23'51" East 75.06 feet;
Thence North 09°50'43" East 129.83 feet;
Thence North 01°34'29" East 20.00 feet;
Thence North 05°12'59" West 104.32 feet;
Thence North 03°08'03" East 82.14 feet;
Thence North 29°27'13" East 14.87 feet;
Thence North 33°46'05" East 59.14 feet
Thence South 48°24'45" East 9.12 feet;
Thence North 41°35'15" East 20.00 feet to a terminus of herein described centerline;
ALSO beginning at aforesaid Point "A";
Thence South 40°25'31" East 32.00 feet to a terminus of herein described centerline.
Situate in Whatcom County, Washington.

9/6/90
#14987.2

"EXHIBIT B"
LEGAL DESCRIPTION
D-64432

PARCEL "A":

A TRACT OF LAND SITUATED IN GOVERNMENT LOTS 2 AND 5, SECTION 9 AND IN THE NORTH-EAST QUARTER OF THE SOUTHEAST QUARTER OF SECTION 8, TOWNSHIP 37 NORTH, RANGE 4 EAST OF W.M., MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT THE EAST QUARTER CORNER BETWEEN SECTION 8 AND 9, SAID TOWNSHIP AND RANGE (AS RE-EASTABLISHED TO THE MUTUAL CONSENT OF ALL PROPERTY OWNERS INVOLVED); THENCE NORTH ALONG THE SAID SECTION LINE 200 FEET; THENCE EAST TO THE SHORE OF LAKE WHATCOM, BEING THE NORTH LINE OF THIS DESCRIPTION; THENCE SOUTHERLY ALONG THE SHORE OF LAKE WHATCOM TO A POINT 825.73 FEET SOUTH OF THE ABOVE NORTH LINE; THENCE WEST TO THE WEST LINE OF SAID SECTION, TOWNSHIP AND RANGE TO A POINT 625.73 FEET SOUTH OF THE POINT OF BEGINNING; THENCE WEST 1,042.01 FEET TO A POINT; THENCE NORTH 625.73 FEET TO A POINT; THENCE EAST 1,042.01 FEET TO THE POINT OF BEGINNING, TOGETHER WITH ALL LAND LYING EASTERLY OF AND ABUTTING THE ABOVE DESCRIBED TRACT.

PARCEL "B":

BEGINNING AT THE SOUTHEAST 1/16 CORNER BETWEEN SECTION 8 AND SECTION 17, ALL IN TOWNSHIP 37 NORTH, RANGE 4 EAST OF W.M., THENCE 39.05 FEET SOUTH 89° 00' WEST; THENCE 688.1 FEET NORTH 66° 30' WEST; THENCE 342.2 FEET NORTH 9° 01' WEST; THENCE 73.3 FEET NORTH 86° 31' WEST; THENCE 44.25 FEET NORTH 60° 23' EAST TO THE TRUE POINT OF BEGINNING, WHICH POINT IS 633.95 FEET NORTH AND 758.41 FEET WEST OF THE ABOVE DESCRIBED 1/16 CORNER AND ON THE EAST SIDE OF THE LAKE WHATCOM BOULEVARD.

FROM THIS TRUE POINT OF BEGINNING, A STRIP OF LAND 30 FEET WIDE, 15 FEET ON EACH SIDE OF THE FOLLOWING DESCRIBED CENTER LINE:

BEGINNING AT TRUE POINT OF BEGINNING; THENCE 243.6 FEET NORTH 0° 08' EAST; THENCE 307.7 FEET NORTH 31° 05' WEST; THENCE 175.7 FEET NORTH 25° 47' WEST; THENCE 191.3 FEET NORTH 6° 51' WEST; THENCE 187.5 FEET NORTH 5° 40' EAST; THENCE 81.3 FEET NORTH 23° 39' EAST; THENCE 151.2 FEET NORTH 19° 04' EAST; THENCE 139.2 FEET NORTH 33° 08' EAST; THENCE 191.0 FEET NORTH 55° 41' EAST; THENCE 250.2 FEET NORTH 68° 19' EAST; THENCE 375.2 FEET SOUTH 84° 14' EAST; THENCE 249.8 FEET NORTH 77° 43' EAST; THENCE 119.7 FEET SOUTH 76° 35' EAST TO A POINT ON THE WEST LINE OF THE TRACT OF LAND NOW OWNED BY GRANTEES IN SECTION 8, TOWNSHIP AND RANGE AFORESAID, WHICH POINT IS 307.7 FEET NORTH OF THE SOUTHWEST CORNER OF SAID TRACT.,
SUBJECT to an easement for electric pole line per Auditor's file No. 760722 and SUBJECT to an easement for electric transmission and distributio line per Auditor's file No. 890431 and SUBJECT to easement for an electric line per Auditor's file No. 1042559 and SUBJECT to road easement per Auditor's file No. 603864 and this latter reservation affects Parcel "B" only.

Exhibit "B"

A tract of land in Sections 8 and 9, Township 37 north, Range 4 east of the W.M., and described as follows, to-wit:

Beginning at a point on the north edge of the right of way of the Gaasland Road which lies 278.8 feet south and 1863.3 feet west of the quarter corner between Sections 8 and 9, Township 37 north, Range 4 east, of the W.M.; thence easterly along the north edge of the right of way to the west line of the Gaasland property; thence due north to a point on the east and west center line of Section 8; thence south 88° 13' east 1042.01 feet to the quarter corner between Sections 8 and 9; thence north 200 feet; thence due east to the shore of Lake Whatcom; thence northerly along the shore of Lake Whatcom to a point on a high rock directly over the edge of Lake Whatcom; thence south 33° west 2510 feet; thence south 17° west 2510 feet; thence south 17° west 680 feet to the point of the beginning.

Return Document To:
WHATCOM COUNTY PLANNING + DEV. SERVICES
5280 NORTHWEST DRIVE
BELLINGHAM, WA 98226

Declaration of Covenant and Grant of Easement For Existing Parcel Sited Private Party Operated and Maintained Stormwater Management Facilities That Serve Development on the Existing Parcel

Grantor:	The Firs Bible & Missionary Conference
Grantee(s):	Whatcom County
☑ *Full Legal Description;* OR ☐ *Abbreviated Legal Description:* (Insert Lot, Block, & Plat; OR Quarter/Quarter, Section, Township, & Range; OR Unit, Building, Phase, & Condo Name)	SEE ATTACHED
Assessor's 16-digit parcel number(s):	3704084903720000

Full Legal Description (complete only if cover page reflects abbreviated legal description, otherwise leave blank):

1. Declaration Effective Date: _____ (Month, Day, Year)

2. Declaration Expiration Date: Indefinite.

3. Parties: The Parties to this Declaration are:

   (1) The Grantor and Grantor's subsequent successors, heirs, and/or assigns, and

   (2) The Grantee and any jurisdiction that annexes said parcel in the future.

WHEREAS, the 2012 Washington State Department of Ecology *Stormwater Management Manual for Western Washington* (2012 WSDOE SWMMWW) Volume I on page 3-16 states, in part, the following:

> "**Declaration of Covenant for Privately Maintained Flow Control and Treatment Facilities**
> To ensure future maintenance and allow access for inspection by the local government, any flow control [and/or conveyance per 2012 WSDOE SWMMWW Minimum Requirement No. 7] and treatment [per 2012 WSDOE SWMMWW Minimum Requirement No. 6] facilities for which the applicant identifies operation and maintenance to be the responsibility of a private party must have a declaration of covenant and grant of easement. After approval by the local government, the declaration of covenant and grant of easement must be signed and recorded at the appropriate records office of the local government.
>
> **Declaration of Covenant for Privately Maintained On-site Stormwater Management BMPs [OSBMPs]**
> To ensure future maintenance and allow access for inspection by the local government, any On-site Stormwater Management BMPs [per 2012 WSDOE SWMMWW Volume I Glossary definition and 2012 WSDOE SWMMWW Minimum Requirement No. 5] for which the applicant identifies operation and maintenance to be the responsibility of a private party must have a declaration of covenant and grant of easement. Design details, figures, and maintenance instructions for each On-site Stormwater Management BMP shall be attached. A map showing the location of newly planted and retained trees claimed as flow reduction credits shall also be attached.

This applies to every lot within a subdivision on which an On-site Stormwater Management BMP is proposed. After approval by the local government, the declaration of covenant and grant of easement must be signed and recorded at the appropriate records office of the local government."; and

WHEREAS, as of the Declaration Effective Date above, the following 2012 WSDOE SWMMWW-designed stormwater management facilities exist on subject parcel (check all that apply):

- ☑ Flow control and/or conveyance,
- ☑ Treatment,
- ☑ On-site best management practices (OSBMP),

to serve development on subject parcel; and

WHEREAS, Grantee has approved said facilities; and

WHEREAS, this Declaration does not apply to any existing non-2012 WSDOE SWMMWW-designed stormwater management facilities that exist on said parcel; and

WHEREAS, for the purposes of this Declaration, 2012 WSDOE SWMMWW Minimum Requirement No. 5 applies to OSBMPs; and

WHEREAS, for the purposes of this Declaration, 2012 WSDOE SWMMWW Minimum Requirement No. 6 applies to stormwater "treatment" facilities; and

WHEREAS, for the purposes of this Declaration, 2012 WSDOE SWMMWW Minimum Requirement No. 7 applies to stormwater "flow control and/or conveyance" facilities; and

WHEREAS, if OSBMPs exist on subject parcel, Exhibit A to this Declaration reflects the design details, figures, and maintenance instructions for each OSBMP; and

WHEREAS, if Grantee has claimed OSBMP-related flow reduction credits for newly planted and/or retained trees, Exhibit B map to this Declaration shows the location of all newly planted and/or retained trees that Grantee has claimed as OSBMP-related flow reduction credits;

NOW THEREFORE,

1. Grantor hereby declares as follows:
   1.1. The routine operation and maintenance of said facilities will be the responsibility of a private party.
   1.2. For on-parcel stormwater flow control and/or conveyance facilities, and/or stormwater treatment facilities, Grantor or Grantor's duly appointed agent shall operate and maintain said facilities in accordance with the CG Engineering _____ (firm name) prepared *Operations and Maintenance Manual* for BEL-Sudden Valley _____(project name)

1.3. For OSBMPs, Grantor or Grantor's duly appointed agent shall operate and maintain said facilities in accordance with Exhibit A.

1.4. Grantor authorizes Grantee or Grantee's duly appointed agent(s) to periodically enter onto said parcel to inspect and assess said facilities' physical condition and functionality, and to determine if Grantor or Grantor's duly appointed agent has accomplished any Grantee or Grantee's duly appointed agent(s)' directed maintenance and/or repair of said facilities as determined per paragraph no. 1.5 below. Paragraph no. 2.1 advance visitation notice provisions below also apply.

1.5. If, after conducting physical condition inspection and assessment of said facilities, Grantee or Grantee's duly appointed agent(s) determines that said facilities' maintenance and/or repair is necessary, Grantor or Grantor's duly appointed agent will accomplish same within thirty (30) calendar days after receipt of a formal corrective action notice from Grantee or Grantee's duly appointed agent(s) Grantee may, in its sole discretion, extend said thirty day time period upon receipt of Grantor's or Grantor's duly appointed agent's written formal request for same, given good cause.

1.6. If Grantor or Grantor's duly appointed agent fails to timely accomplish said facility maintenance and/or repair in accordance with said formal corrective action notice, or any Grantee-approved time extensions thereto, Grantor authorizes Grantee or Grantee's duly appointed agent(s) to access onto said parcel to accomplish said facility maintenance and/or repair. Paragraph no. 2.1 advance visitation notice provisions below also apply.

1.7. If at any time that Grantee or Grantee's duly appointed agent(s) reasonably determines that said facilities pose an immediate hazard to life and limb, or endanger property, or adversely affect the safety and operations of a public way, due to failure of, damage to, or non-maintenance of said facilities, and that the situation is so adverse as to preclude advance visitation notice to Grantor, Grantor authorizes Grantee or Grantee's duly appointed agent(s), without prior advance visitation notice to Grantor by Grantee or by Grantee's duly appointed agent(s), to access onto said parcel to take any mitigation or preservative actions that Grantee or Grantee's duly appointed agent(s) determines necessary.

1.8. Grantor will reimburse Grantee for Grantee's costs to accomplish maintenance and/or repair of said facilities per paragraph no. 1.6 above, and for emergency response mitigation or preservation actions per paragraph no. 1.7 above.

2. Grantee hereby declares as follows:

2.1. Unless the circumstances described in paragraph no. 1.7 above exist, Grantee or Grantee's duly appointed agent(s) shall provide to Grantor a minimum of two work days advance notice of any visit.

3. The Parties further agree that this Declaration:

3.1. Shall run with said parcel and be binding upon the Parties, and

3.2. May not be amended or abrogated, in part or entirely, without the express written consent of the Parties, and

3.3. Shall survive and apply to any subsequent divisions of subject parcel.

Approved as to form:

Daniel L. Gibson
Chief Civil Deputy Prosecutor

GRANTOR(S)

Tom Beaumer (Exec. Director)
Signature

Signature

State of Washington)
) ss
County of Whatcom)

I certify that I know or have satisfactory evidence that THOMAS BEAUMONT is/are the person(s) who appeared before me, and said person(s) acknowledged it to be his/her free and voluntary act for the uses and purposes mentioned in this instrument.

Dated 3/8/18

KALYNDA BOATMAN NOTARY PUBLIC STATE OF WASHINGTON COMMISSION EXPIRES 07-16-2018

Notary Signature:
Printed Name: Kalynda Boatman
Residing at: WestEdge Credit Union
My appointment expires: 7, 16, 18

Reviewed and approved by:

Whatcom County Technical Administration

Date

Permit #: _____

Yearly Inspection Required ☐ Yes ☐ No

VERIZON WIRELESS - BEL-SUDDEN VALLEY - 1740 LAKE WHATCOM BLVD.

Legal Description:

PARCEL A:

A TRACT OF LAND IN SECITONS 8 AND 9, TOWNSHIP 37 NORTH, RANGE 4 EAST OF THE W.M., DESCRIBED AS FOLLOWS, TO-WIT:

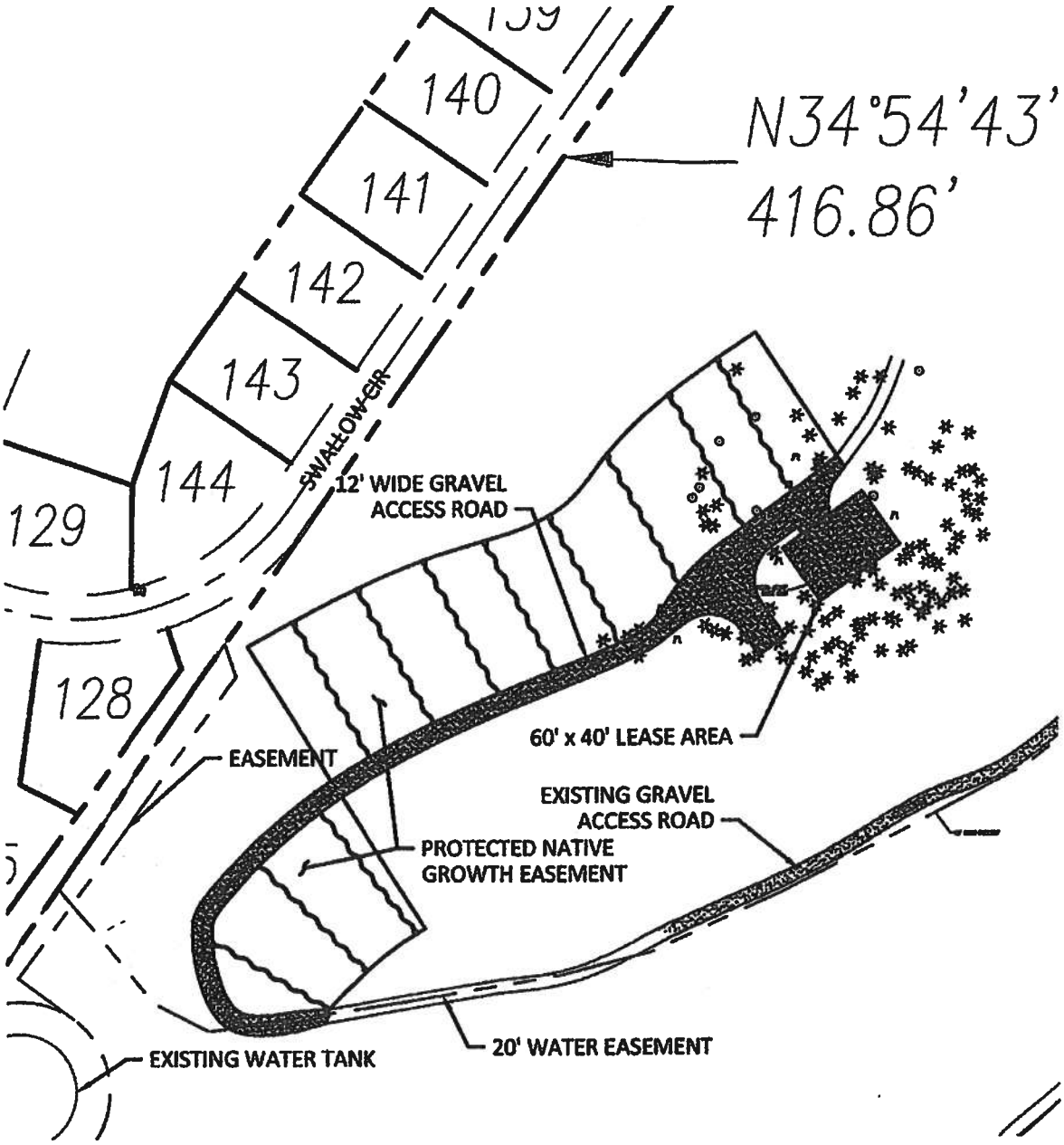
BEGINNING AT A POINT ON THE NORTH EDGE OF THE RIGHT-OF-WAY OF THE GAASLAND ROAD WHICH LIES 278.8 FEET SOUTH AND 1863.3 FEET WEST OF THE QUARTER CORNER BETWEEN SECTIONS 8 AND 9, TOWNSHIP 37 NORTH, RANGE 4 EAST OF THE W.M.; THENCE EASTERLY ALONG THE NORTH EDGE OF THE RIGHT-OF-WAY TO THE WEST LINE OF THE GAASLAND PROPERTY; THENCE DUE ORTH TO A POINT ON THE EAST AND WEST CENTER LINE OF SECTON 8; THENCE SOUTH 88°13' EAST, 1042.01 FEET TO THE QUARTER CORNER BETWEEN SECTIONS 8 AND 9; THENCE NORTH 200 FEET; THENCE DUE EAST TO THE SHORE OF LAKE WHATCOM; THENCE NORTHERLY ALONG THE SHORE OF LAKE WHATCOM TO A POINT ON A HIGH ROCK DIRECTLY OVER THE EDGE OF LAKE WHATCOM; THENCE SOUTH 33° WEST 2510 FEET; THENCE SOUTH 17' WEST 680 FEET TO THE POINT OF BEGINNING.

SITUATED IN WHATCOM COUNTY, WASHINGTON.

PARCEL A-1:

A PERPETUAL EASEMENT FOR INGRESS AND EGREE OVER A STRIP OF LAND 60 FEET IN WIDTH, FROM THE SOUTHWEST CORNER OF THE ABOVE-DESCRIBED PROPERTY, SOUTHERLY AND WESTERLY TO LAKE WHATCOM BOULEVARD ADJOINING THE SAID GAASLAND ROAD ON THE NORTHERLY AND WESTERLY SIDES THEREOF AS NOW SURVEYED AND LAID OUT.

SITEUATED IN WHATCOM COUNTY, WASHINGTON.



1 SITE MAP EXHIBIT

SCALE: 1" = 100'

CG ENGINEERING	BEL SUDDEN VALLEY 1740 LAKE WHATCOM BLVD BELLINGHAM, WA 98229	DATE 11/17/17 PROJECT NO. 17015.288 SCALE 1"=100' DRAWN BY ASD CHECKED BY JPU APPROVED BY JPU	SHEET PAGE 1
	TITLE SITE MAP EXHIBIT		

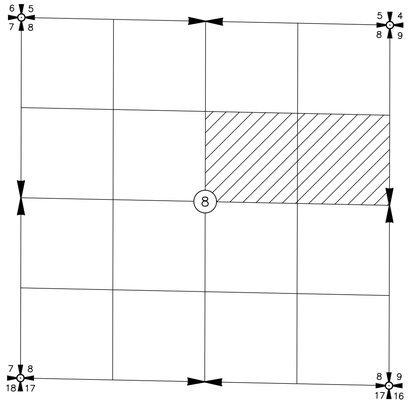
PLOT DATE: 11/17/17 FILE NAME: Site Map Exhibit

LAKE WHATCOM WATER AND SEWER DISTRICT

NEW TANK SITE TOPOGRAPHIC SURVEY
W.A.C. 332-130 COMPLIANCE SHEET

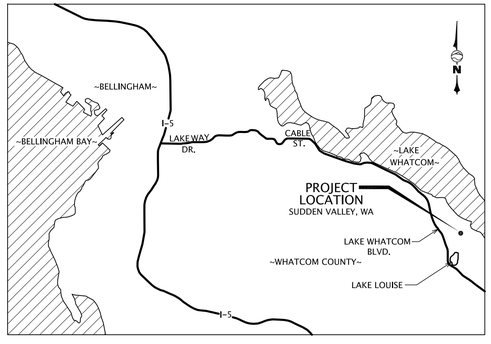
NO.	REVISIONS	BY	DATE

SECTIONAL INDEX DATA

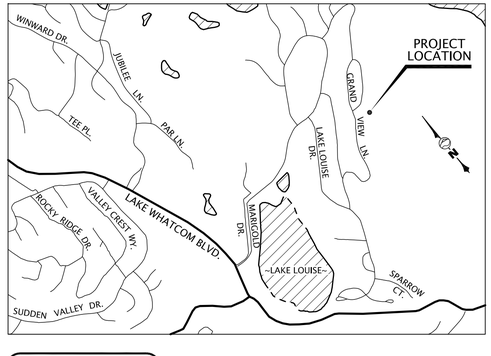


SW QTR - NE QTR, SEC. 8, TWNSHP 37 NORTH, R 4 EAST, W.M.
SE QTR - NE QTR, SEC. 8, TWNSHP 37 NORTH, R 4 EAST, W.M.

AREA MAP - NOT TO SCALE



VICINITY MAP - NOT TO SCALE



811 Call 811 two business days before you dig

NOTICE TO USER

EFFECTIVE JANUARY 13, 2019, ALL TOPOGRAPHIC MAPS PREPARED BY A LICENSED SURVEYOR IN THE STATE OF WASHINGTON, AND SUBJECT TO THE LICENSURE AND PRACTICE REQUIREMENTS ESTABLISHED BY THE WASHINGTON STATE BOARD OF REGISTRATION FOR ENGINEERS AND LAND SURVEYORS, MUST INCLUDE THE DESCRIPTIVE NOTES AND METADATA ENUMERATED UNDER W.A.C 332-130-145 AND ITS APPURTENANT SECTIONS OF 332-130. THIS EXHIBIT IS INTENDED TO ADDRESS THE STATUTORY REQUIREMENTS STIPULATED BY THIS W.A.C DIRECTIVE.

W.A.C. 332-130-145 REQUIRED DATA

1.E: THIS SURVEY WAS PREPARED UNDER THE DIRECT SUPERVISION OF:

PAUL J. DARROW, WA PLS #50697
SR. PROJECT SURVEYOR
WILSON ENGINEERING LLC
805 DUPONT STREET, SUITE 7
BELLINGHAM, WA 98225
360-733-6100 (EXT. 1243)
pdarrow@wilsonengineering.com

2.A: BASIS OF ELEVATIONS: ELEVATION VALUES AND CONTOURS DEPICTED ON THIS SURVEY ARE BASED UPON HOLDING AS FIXED THE NAVD88 DATUM, DERIVED FROM NETWORK ADJUSTED VRS RTK OBSERVATIONS BASED UPON THE WASHINGTON STATE REFERENCE NETWORK "NWWA".

2.B: PURPOSE OF SURVEY: WILSON ENGINEERING PERFORMED THIS SURVEY DURING JUNE OF 2021, AT THE REQUEST OF LAKE WHATCOM WATER AND SEWER DISTRICT PURSUANT TO NEW RESERVOIR TANK DESIGN. THIS SURVEY WAS PREPARED WITHOUT THE BENEFIT OF A TITLE REPORT, AND THE DEPICTED PARCEL BOUNDARY SHOULD NOT BE CONSIDERED AUTHORITATIVE.

2.C: SOURCE OF CONTOURS: THE CONTOURS DEPICTED ON THIS SURVEY WERE DERIVED BASED ON FIELD OBSERVATIONS.

2.D: CONTOUR INTERVAL LABELING: CONTOURS AT 1-FOOT INTERVALS HAVE BEEN EXPLICITLY LABELED.

2.E: DESCRIPTION OF BENCHMARKS SET PURSUANT TO THIS SURVEY: REFER TO THE ACCOMPANYING "CONTROL TABLE" FOR COORDINATES, ELEVATION, AND DESCRIPTION OF ON-SITE CONTROL SET PURSUANT TO THIS SURVEY.

2.F: ELEVATION AND/OR CONTOUR ACCURACY: IF CONTOURS HAVE BEEN DEPICTED ON THE FACE OF THIS SURVEY, IT IS ANTICIPATED THAT 90% OF ANY MEASURED ELEVATION VALUE, IF OBSERVED RELATIVE TO THE CONTROL POINTS SPECIFICALLY ENUMERATED IN THE ACCOMPANYING CONTROL TABLE, WILL BE, IN FACT, WITHIN ONE-HALF OF THE MINOR-CONTOUR INTERVAL DEPICTED HEREON. SPECIFIC ELEVATIONS DEPICTED HEREON, IF ANY, ARE EXPECTED TO BE WITHIN ONE INTEGRAL VALUE OF THE FINAL DEPICTED SIGNIFICANT FIGURE. THAT IS, 90% OF ELEVATIONS EXPRESSED TO THE TENTH-FOOT, SHOULD BE WITHIN 0.1 FEET OF THAT VALUE, IF OBSERVED RELATIVE TO THE SURVEY CONTROL SPECIFICALLY ENUMERATED IN THE ACCOMPANYING CONTROL TABLE. IF OFF-SITE CONTROL IS EMPLOYED, EVEN CONTROL PURPORTING TO BE ON THE SAME DATUM OR BASED ON THE SAME OFF-SITE BENCHMARK, THEN NO ABSOLUTE STATEMENT REGARDING THE ACCURACY OF THE DEPICTED POINTS CAN BE MADE, AND VALUES SO OBSERVED ARE OUTSIDE OF THIS SURVEY'S AUTHORITY OR INTEREST.

2.G: STATEMENT OF USE: AS NOTED IN SECTION 2.B, THIS SURVEY WAS PREPARED FOR THE SPECIFIC PURPOSE OF NEW RESERVOIR TANK DESIGN. IN THE COURSE OF PREPARING THIS SURVEY, PURSUANT TO THIS PURPOSE, ANCILLARY DATA NECESSARY TO ACCOMPLISH THIS SURVEYS INTENDED PURPOSE MAY HAVE BEEN CAPTURED. IN THE CASE OF THIS SURVEY, BOUNDARY INFORMATION AND BUILDING ENVELOPES WERE CAPTURED, BUT THE DEPICTION OF SAME SHOULD NOT BE CONSIDERED AUTHORITATIVE.

2.H: SOURCE OF CONTROLLING BOUNDARY INFORMATION: THE OWNERSHIP BOUNDARIES DEPICTED ON THIS SURVEY ARE BASED UPON SOME, OR ALL, OF THE DOCUMENTS ENUMERATED IN THE ACCOMPANYING "REFERENCE DOCUMENTS" AS THEREIN CHARACTERIZED. BEARINGS HAVE BEEN TRANSLATED AND/OR ROTATED FROM THE RECORD VALUES IN ORDER TO CONFORM TO FOUND MONUMENTATION MEASURED IN THIS SURVEY'S COORDINATE SYSTEM.

3.A: SOURCE OF DEPICTED UTILITY INFORMATION: UTILITY LINES DEPICTED ON THIS SURVEY ARE BASED UPON PAINT MARKS SET BY APPLIED PROFESSIONAL SERVICES ON JUNE 16, 2021.

3.B: ACCURACY OF DEPICTED UTILITY INFORMATION: WILSON ENGINEERING DOES NOT PROVIDE FOR-HIRE UTILITY LOCATION AND/OR MARKING SERVICES, AND CAN NOT INDEPENDENTLY ASCERTAIN THE ACCURACY OF ANY DEPICTED UTILITY THAT WAS NOT DIRECTLY OBSERVED IN THE COURSE OF THIS SURVEY.

3.C: STATEMENT OF LIMITATIONS REGARDING UTILITY-DEPICTION ACCURACY: LAKE WHATCOM WATER AND SEWER DISTRICT HAS BEEN NOTIFIED THAT WILSON CAN NOT, AND DOES NOT, GUARANTEE THE ACCURACY, AT ANY LEVEL, OF DEPICTED UTILITIES BASED ON THIRD-PARTY PAINT MARKS OR RECORD INFORMATION.

INDEX TO DRAWINGS

CONTROL NOTES

HORIZONTAL DATUM:
NAD83(2011) WASHINGTON STATE PLANE (NORTH ZONE)

BASIS OF COORDINATES: COORDINATION AND MENSURATION ARE LOCAL GROUND VALUES, DERIVED FROM NETWORK ADJUSTED VRS RTK OBSERVATIONS BASED UPON THE WASHINGTON STATE REFERENCE NETWORK "NWWA". WSE CONTROL POINT #101 , A MAG NAIL IN ASPHALT AT THE INTERSECTION OF GRAND VIEW LANE AND SWALLOW CIRCLE, IS HELD AS THE BASIS OF COORDINATES. SAID MONUMENT HAS THE FOLLOWING POSITION:

NORTHING = 627,972.37 USFT
EASTING = 1,281,682.73 USFT

BASIS OF BEARINGS: BEARINGS ARE NAD83(2011) WASHINGTON STATE PLANE (NORTH ZONE), DERIVED FROM NETWORK ADJUSTED VRS RTK OBSERVATIONS BASED UPON THE WASHINGTON STATE REFERENCE NETWORK "NWWA".

THE DERIVED INVERSE BETWEEN MONUMENTS #101 AND #100, A REBAR AND CAP SET IN THE NORTHWESTERLY SHOULDER IN FRONT OF #50 GRAND VIEW LANE, IS **SOUTH 35° 25' 18" WEST**, AT A DISTANCE OF **374.35 USFT**. THE POSITION FOR #100 IS:

NORTHING = 627,667.31 USFT
EASTING = 1,281,465.76 USFT

VERTICAL DATUM:
NAVD88 DATUM

PROJECT BENCHMARK: PROJECT BENCHMARK IS A REBAR AND CAP, WSE CONTROL POINT #103 AS SHOWN HEREON, HAVING AN ELEVATION OF 669.14 (NAVD88).

ON-SITE SURVEY CONTROL TABLE

POINT	NORTHING	EASTING	ELEVATION	DESCRIPTION
100	627,667.31	1,281,465.76	621.47	Z RPC 905
101	627,972.37	1,281,682.73	625.93	Z MAG NAVD88
103	627,728.52	1,281,751.80	669.14	REBAR AND CAP
104	627,643.27	1,281,809.66	672.88	HUB AND NAIL
105	627,628.37	1,281,681.70	679.53	HUB AND TACK
106	627,723.10	1,281,908.67	680.70	REBAR AND CAP
107	627,886.92	1,282,032.45	692.52	REBAR AND CAP

SURVEYOR'S NOTES

1. THIS TOPOGRAPHIC SURVEY BASEMAP IS INTENDED TO BE USED FOR PLANNING AND DESIGN PURPOSES. BOUNDARY AND RIGHT-OF-WAY LINES SHOWN ARE DERIVED FROM MAPS OF RECORD AND DO NOT PURPORT TO DEFINE OWNERSHIPS. ALL MONUMENTS SHOWN HEREON WERE VISITED DURING THE COURSE OF THIS SURVEY UNLESS OTHERWISE NOTED.

2. ANGULAR AND LINEAR MEASUREMENTS WERE COLLECTED USING A COMBINATION OF GPS AND CONVENTIONAL METHODOLOGIES. PRIMARY CONTROL WAS COLLECTED USING A TRIMBLE R10-2 SURVEY-GRADE GPS RECEIVER OPERATING IN NETWORKED RTK MODE. FROM GPS CONTROL, A TRIMBLE S-6 ROBOTIC TOTAL STATION WAS USED TO TIE SECONDARY CONTROL POINTS AND COLLECT TOPOGRAPHIC DATA.

REFERENCE DOCUMENTS

1. PLAT OF SUDDEN VALLEY, DIVISION 7 - VOL. 10 OF PLATS, PG. 63
2. PLAT OF SUDDEN VALLEY, DIVISION 20 - VOL. 11 OF PLATS, PG. 39
3. WATER TANK AND ACCESS ROAD EASEMENT, AFN 1971-1106257
4. WATER AND SEWER EASEMENT, AFN 2100301393
5. PUGET SOUND ENERGY EASEMENT, AFN 2019-0903798

SURVEYOR'S CERTIFICATE

I HEREBY CERTIFY THAT I AM A LICENSED LAND SURVEYOR IN THE STATE OF WASHINGTON, THAT THIS MAP IS BASED ON AN ACTUAL FIELD SURVEY DONE BY ME OR UNDER MY DIRECT SUPERVISION AND THAT ALL DATA SHOWN HEREON ACTUALLY EXISTS IN THE LOCATIONS SHOWN AT THE TIME OF THIS SURVEY. THIS TOPOGRAPHIC MAP WAS DONE AT THE REQUEST OF LAKE WHATCOM WATER AND SEWER DISTRICT IN 2021.

PAUL JONATHAN DARROW, P.L.S. NO. 50697 DATE

8/16/21

ABBREVIATIONS USED

AFN	=	AUDITOR'S FILE NUMBER
℄	=	CENTERLINE
CONC	=	CONCRETE
CPP	=	CORRUGATED POLYETHYLENE PIPE
E	=	EAST
ELEV	=	ELEVATION
INV	=	INVERT
MON	=	MONUMENT
N	=	NORTH
NE	=	NORTHEAST
NW	=	NORTHWEST
R/W	=	RIGHT-OF-WAY
S	=	SOUTH
SE	=	SOUTHEAST
SW	=	SOUTHWEST
TYP	=	TYPICAL
W	=	WEST
WAC	=	WASHINGTON CODE
WSE	=	WILSON SURVEY/ENGINEERING

LEGEND - SIZE & SCALE MAY VARY

- 100 = MAJOR CONTOUR
- = MINOR CONTOUR
- = EXISTING PROPERTY LINE
- = EXISTING R/W CENTERLINE
- = EXISTING EASEMENT
- = EXISTING GRAVEL EDGE
- = EXISTING ASPHALT EDGE
- = EXISTING CONCRETE EDGE
- = EXISTING BUILDING
- = EXISTING CONC. BLOCK WALL
- = EXISTING ROCK WALL
- W W = EXISTING WATER LINE
- P P = EXISTING BURIED POWER LINE
- T T = EXISTING BURIED TELEPHONE/COMM
- S S = EXISTING BURIED SANITARY SEWER
- = FOUND REBAR
- = TRAVERSE POINT
- (P) = POWER METER
- P = EXISTING POWER VAULT
- = EXISTING POWER JUNCTION BOX
- = EXISTING TELE/COMM PEDESTAL
- = EXISTING WATER VALVE
- = EXISTING WATER METER
- (W) = EXISTING WATER MANHOLE
- W = EXISTING WATER VAULT
- = EXISTING WATER BLOWOFF
- = EXISTING SANITARY SEWER MANHOLE
- 2" = EXISTING 2" (ETC) CONIFEROUS TREE
- 2" = EXISTING 2" (ETC) DECIDUOUS TREE
- = EXISTING BOLLARD
- = EXISTING GATE POST

WILSON ENGINEERING
WILSONENGINEERING.COM

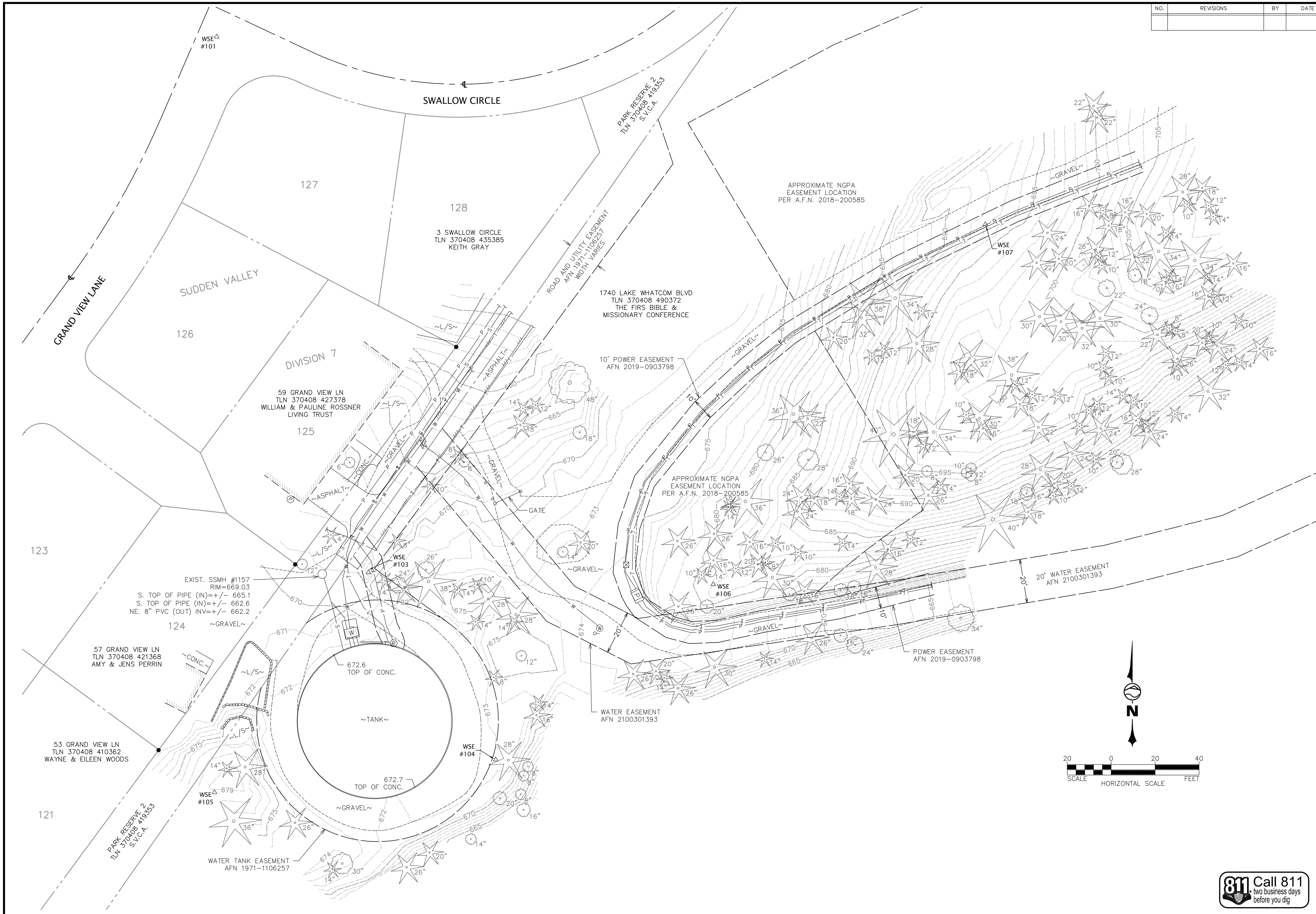
JONATHAN DARROW — WASHINGTON — 50697 — REGISTERED PROFESSIONAL LAND SURVEYOR — 8/16/21

DESIGNED BY	DRAWN BY	CHECKED BY
	AKM	PJD

LAKE WHATCOM WATER AND SEWER DISTRICT
WASHINGTON
BELLINGHAM
NEW TANK SITE TOPOGRAPHIC SURVEY
W.A.C. 332-130 COMPLIANCE SHEET

DATE	SCALE	JOB NUMBER
8-16-2021	AS SHOWN	2019-104

SHEET 1 PAGE 1 OF 2



WILSON ENGINEERING

WILSONENGINEERING.COM

8/16/21

DESIGNED BY

DRAWN BY CLM/AKM

CHECKED BY PJD

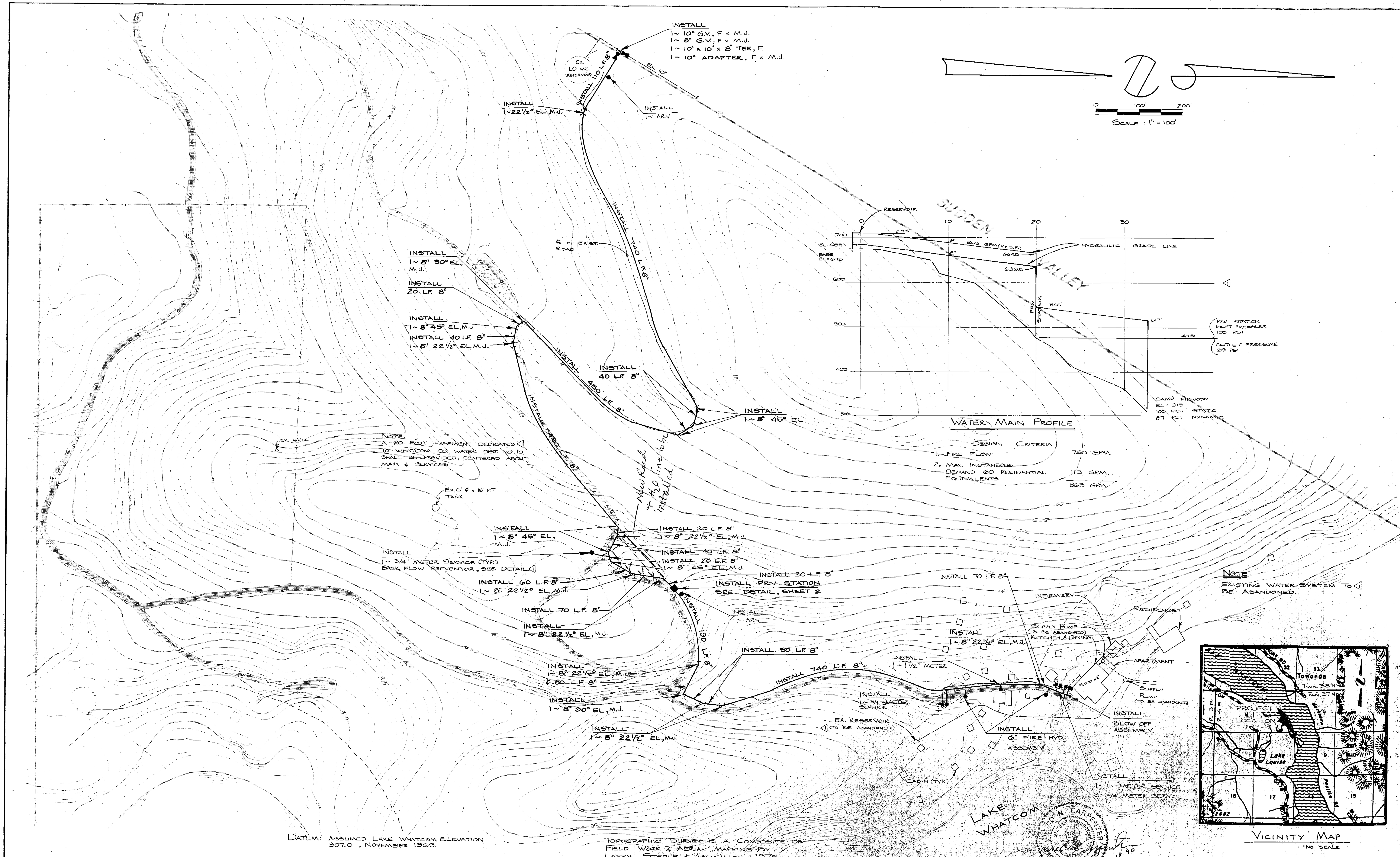
LAKE WHATCOM WATER AND SEWER DISTRICT

BELLINGHAM, WASHINGTON

NEW TANK SITE TOPOGRAPHIC SURVEY

TOPOGRAPHIC BASE MAP

DATE	8-16-2021
SCALE	AS SHOWN
JOB NUMBER	2019-104
SHEET	2
PAGE	2 OF 2



NO.	REVISION	BY	DATE
1	Additions & Revisions as noted	TRH	4/27/90

DNC
DESIGNED BY
TRH
DRAWN BY
CHECKED BY

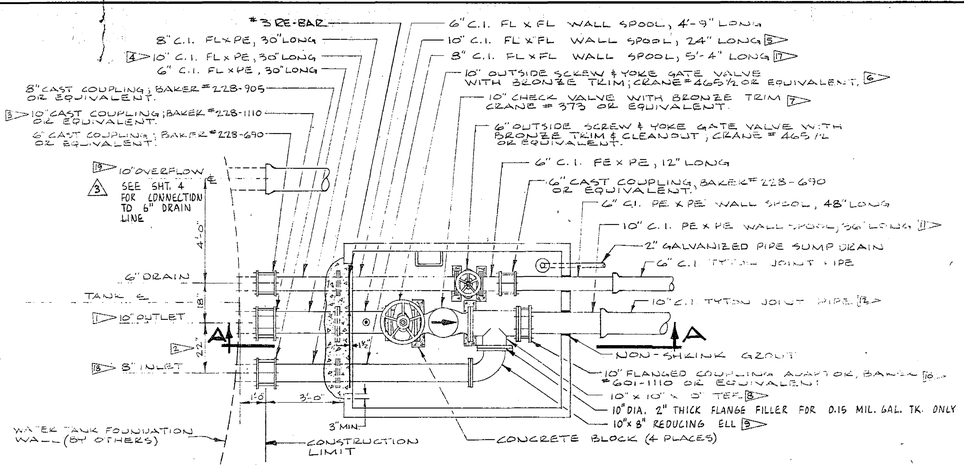
THE FIRS
CAMP FIRWOOD
WATER MAIN EXTENSION
FOR WATER DISTRICT NO. 10

JAMES E. WILSON & ASSOCIATES
CONSULTING ENGINEERS
BELLINGHAM

DATE: March 1990
SCALE: 1" = 100'
JOB NO. 02688
SHEET 1 OF 3

0820

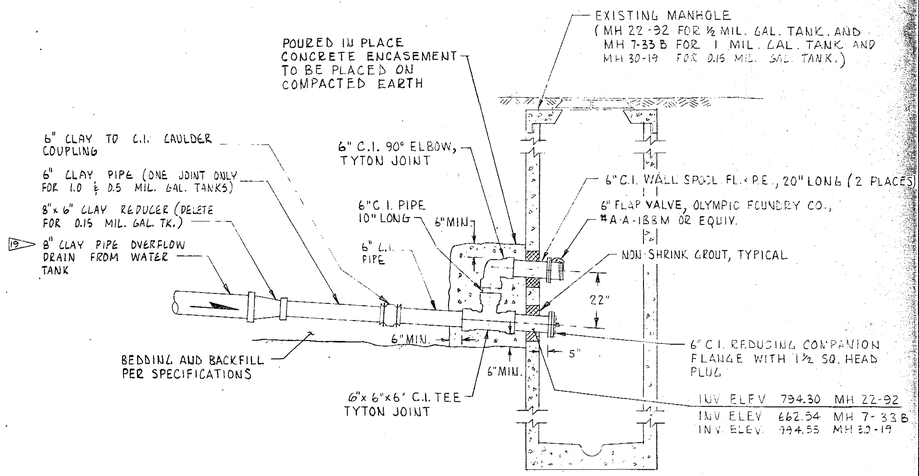
MAY 14 1990



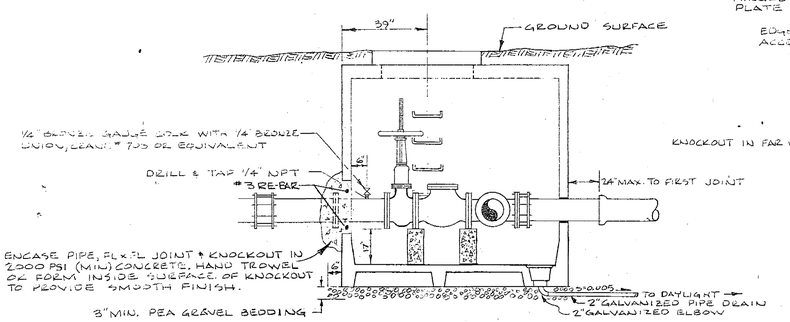
PLAN VIEW
SCALE: 3/8" = 1'-0"

ONE-HALF MILLION GALLON TANK MATERIAL LIST

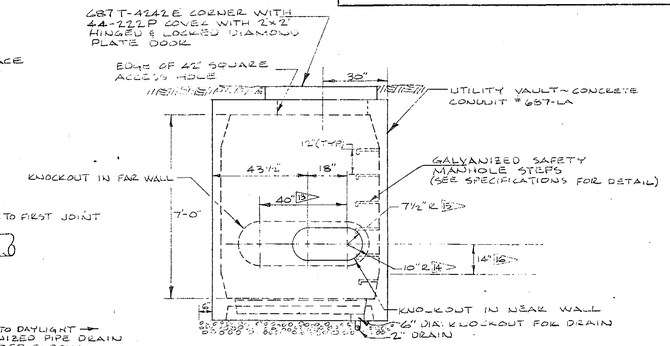
SYMBOL	DESCRIPTION
1	12" Outlet
2	24"
3	12" Cast Coupling; Baker #228-1320 or Equivalent
4	12" C.I. FL x PE, 30" Long
5	12" C.I. FL x FL Wall Spool, 21" Long
6	12" Outside Screw & Yoke Gate Valve with Bronze Trim; Crane #465½ or Equivalent
7	12" Check Valve with Bronze Trim; Crane #373 or Equivalent
8	12" x 12" x 12" Tee
9	12" x 8" Reducing Ell
10	12" Flanged Coupling Adaptor; Baker #601-1320 or Equivalent
11	12" C.I. PE x PE Wall Spool, 36" Long
12	12" C.I. Tyton Joint Pipe
13	42"
14	11-1/2" R.
15	8-1/2" R.
16	15-1/2"
17	8" C.I. FL x FL Wall Spool, 5'-2" Long



WATER TANK OVERFLOW AND DRAIN LINE SEWER CONNECTION DETAIL ⚠3
SCALE = 3/8" = 1'-0"



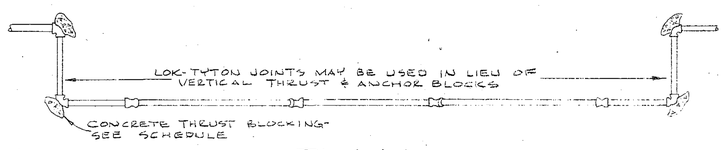
SECTION A-A
SCALE: 3/8" = 1'-0"



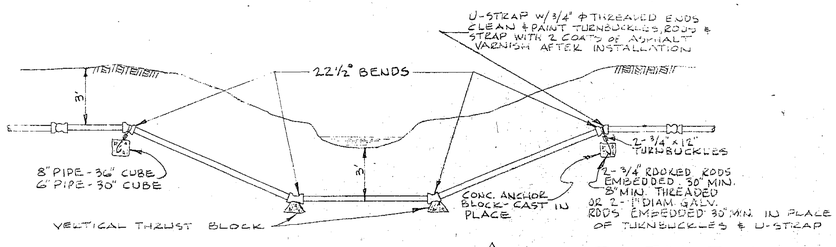
RIGHT SIDE VIEW
SCALE: 3/8" = 1'-0"

WATER TANK VAULT PIPING DETAILS ⚠2

NOTE: ONE MILLION GALLON TANK VAULT SHOWN. 0.5 & 0.15 MILLION GAL. TANKS IDENTICAL EXCEPT FOR FLAGGED ITEMS. SEE MATERIAL LISTS.



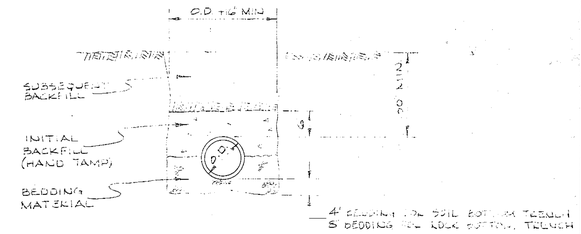
PLAN



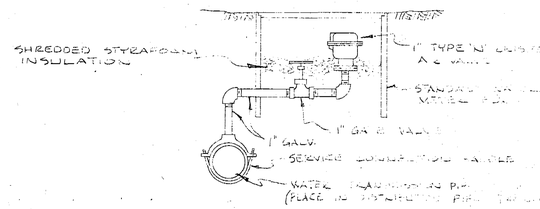
TYPICAL CREEK CROSSING ⚠1 - PROFILE

⚠4 0.15 MILLION GALLON TANK MATERIAL LIST

SYMBOL	DESCRIPTION
1	10" Outlet
2	24"
3	10" Cast Coupling; Baker #228-1110 or Equivalent
4	10" C.I. FL x PE, 30" Long
5	10" FL x FL Wall Spool, 24" Long
6	10" Outside Screw and Yoke Gate Valve with Bronze Trim; Crane #465 1/2 or Equivalent
7	10" Check Valve with Bronze Trim Crane #373 or Equivalent
8	10" x 10" x 10" Tee
9	10" x 6" Reducing Ell
10	10" Flanged Coupling Adaptor; Baker #601-1110 or Equivalent
11	10" C.I. PE x PE Wall Spool, 36" Long
12	10" C.I. Tyton Joint Pipe
13	40"
14	10" R
15	7 1/2" R
16	14"
17	6" C.I. FL x FL Wall Spool, 5'4" Long
18	6" Inlet
19	6" Overflow



TYPICAL TRENCH SECTION



AIR RELIEF VALVE
INSTALL AT EACH HIGH POINT ON TRANSMISSION LINE

DATE OF PRINT
APR 10 1978

SYMBOL	REVISION	BY	APPROVED	DATE
⚠4	ADD 0.15 MILLION GAL. TANK SPECIFICATIONS	SAW	MLP	2-1-74
⚠3	ADD TANK OVERFLOW SEWER CONNECTION DETAIL	SAW	RVM	12-10-71
⚠2	ADD TANK VAULT PIPING DETAILS	TMA	RIA	1-27-71
⚠1	ADD TYPICAL CREEK CROSSING	TMA		1-8-71

DESIGNED RIA
DRAWN TMA
CHECKED MLP

CONSULTING ENGINEERS, PLANNING CONSULTANTS, GOLF COURSE ARCHITECT, GOLF COURSE ENGINEERING, SOIL MECHANICS ENGINEERS, ARCHITECTS & LANDSCAPE ARCHITECTS
HORTON DENNIS & ASSOCIATES, INC.
DAVID JENSEN ASSOCIATES
THEODORE G. ROBINSON
D. A. HOGAN & ASSOCIATES
DAMES & MOORE
MILES YANICK & CO.

Sudden Valley
the undevelopment of the THE SANWICK CORPORATION
SUITE 1200 DENNY BUILDING SEATTLE, WASHINGTON 98121

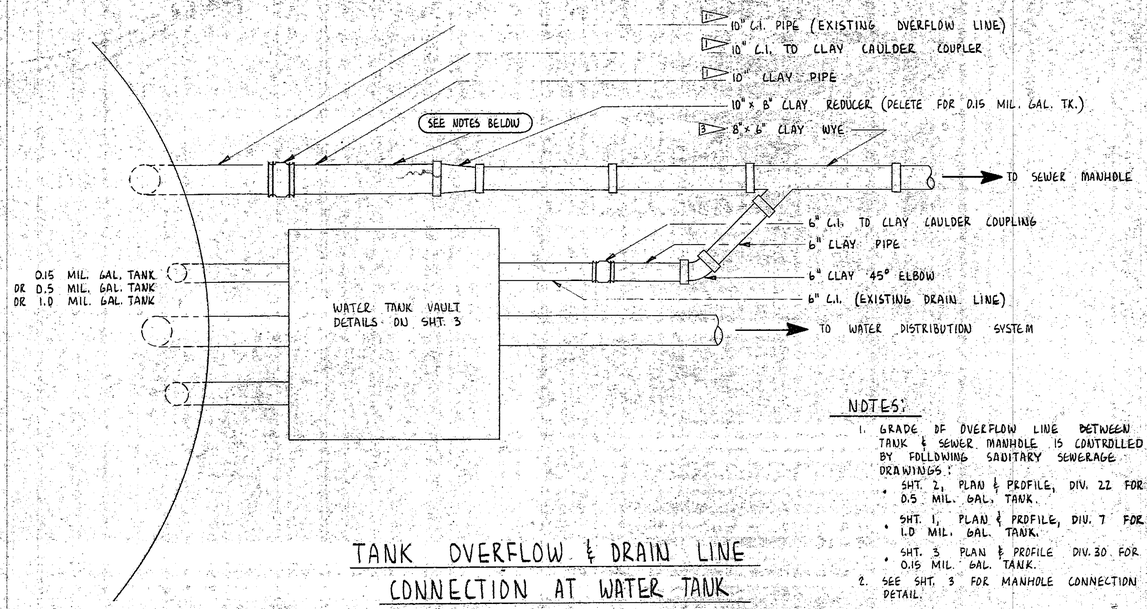
APPROVED

DATE 1-71
SCALE NONE
F. B. NO.

SUDDEN VALLEY
WATER SYSTEM DETAILS

JOB NO. 2234
SHEET NO. 3 OF 5

0878

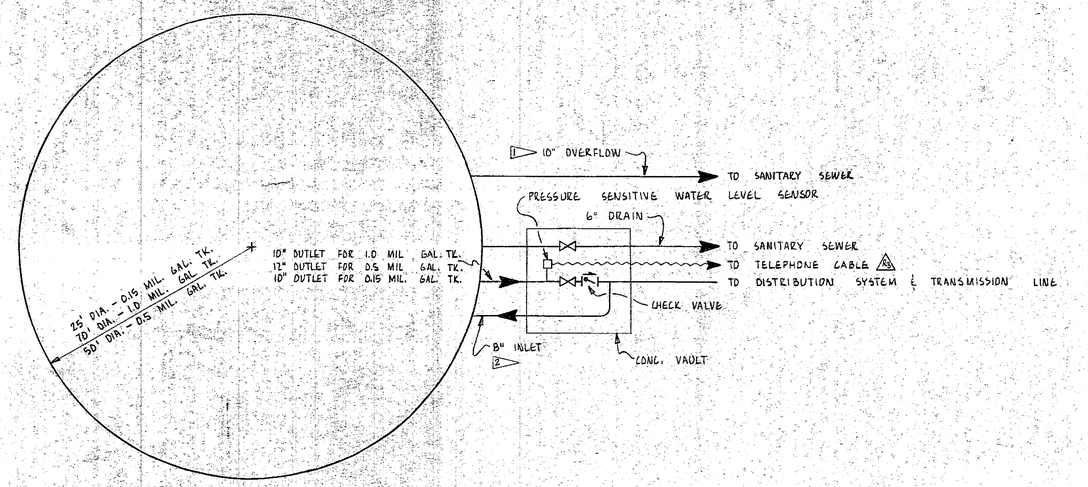


TANK OVERFLOW & DRAIN LINE CONNECTION AT WATER TANK DETAIL

NO SCALE

NOTES:

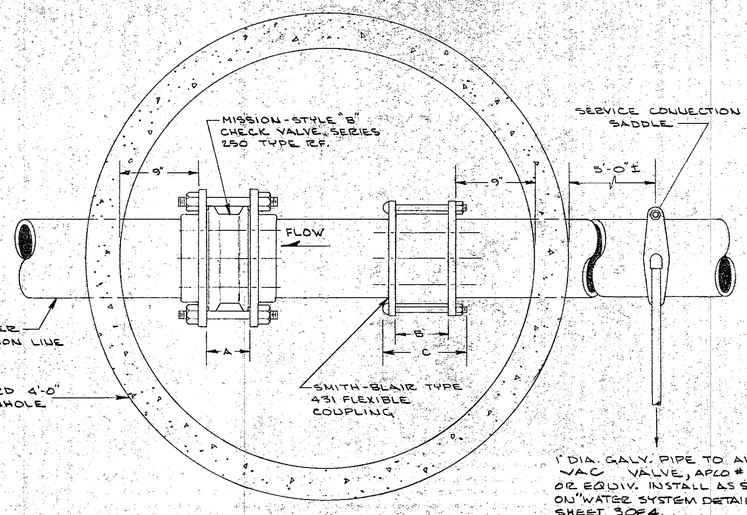
1. GRADE OF OVERFLOW LINE BETWEEN TANK & SEWER MANHOLE IS CONTROLLED BY FOLLOWING SANITARY SEWERAGE DRAWINGS:
   - SHT. 2, PLAN & PROFILE, DIV. 22 FOR 0.5 MIL. GAL. TANK.
   - SHT. 1, PLAN & PROFILE, DIV. 7 FOR 1.0 MIL. GAL. TANK.
   - SHT. 3 PLAN & PROFILE DIV. 30 FOR 0.15 MIL. GAL. TANK.
2. SEE SHT. 3 FOR MANHOLE CONNECTION DETAIL.



PLAN VIEW

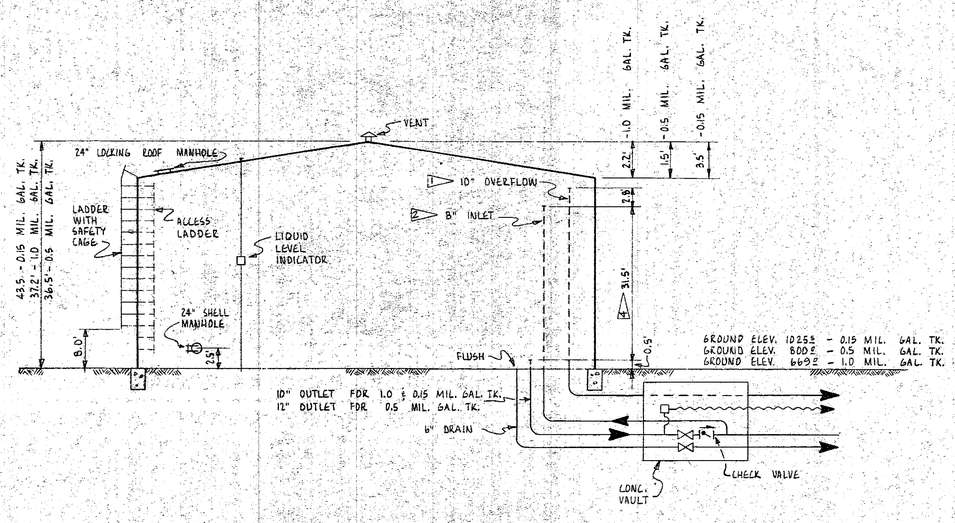
NO SCALE

MK.	6" LINE	8" LINE
A	3 3/4"	5"
B	6"	9 1/2"
C	6"	9 1/2"



WATER TRANSMISSION LINE CHECK VALVE VAULT DETAIL

SCALE: 1½" = 1'-0"



ELEVATION VIEW

NO SCALE

WATER TANK SCHEMATIC

1.0, 0.5, & 0.15 MILLION GALLON TANKS ARE IDENTICAL EXCEPT AS NOTED AND AS SHOWN BY FLAGGED ITEMS.

THE FLAGGED ITEMS APPLY TO THE 0.15 MIL. GAL. TK. ONLY:

1. 6"
2. 6" INLET
3. 6" x 6"
4. 41'-6"

SYMBOL	REVISION	BY	APPROVED	DATE
3	CHANGE DIRECT BURIED CABLE TO TELE. CABLE &			
2	ADD 0.15 MILLION GALLON TANK SPECIFICATIONS	SAW	MLP	2-1-74
1	ADD APCO #143C VALVE	RIA	RIA	8-20-73
0	ADD TANK OVERFLOW CONNECTION DETAIL	SAW	RVM	12-13-71

DESIGNED R.I.A.
DRAWN S.A.W.
CHECKED M.L.P.

CONSULTING ENGINEERS
PLANNING CONSULTANTS
GOLF COURSE ARCHITECT
GOLF COURSE ENGINEERING
SOIL MECHANICS ENGINEERS
ARCHITECTS & LANDSCAPE ARCHITECTS

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DAMES & MOORE
MILES TANICK & CO.

Sudden Valley

the undevelopment of the
THE SANWICK CORPORATION
SUITE 1200 DENNY BUILDING SEATTLE, WASHINGTON 98121

APPROVED

DATE 3-71
SCALE NONE
F. B. NO.

SUDDEN VALLEY WATER SYSTEM DETAILS

JOB NO. 2234
SHEET NO. 4 OF 4

0881

DwgSerial#: 881