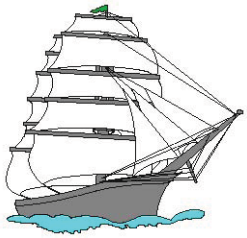
CITY OF MANZANITA

EMERGENCY WELL FEASIBILITY STUDY

Project No. 16846 | May 2017 - Final

PACE ENGINEERS, INC.
5000 Meadows Road | Suite 345
Lake Oswego, OR 97035



CITY OF MANZANITA

EMERGENCY WELL FEASIBILITY STUDY

Project No. 16846 | May 2017 - Final

PACE
An Engineering Services Company

Completed By:

PACE ENGINEERS, INC.

5000 Meadows Road | Suite 345

Lake Oswego, OR 97035

Tel. 503.597.3222

www.paceengrs.com

TABLE OF CONTENTS

EXECUTIVE SUMMARY

The proposed project consists of constructing an emergency water supply well near the City's Water Treatment Plant, transferring one of the City's water rights to the well, and connecting the well to the treatment plant.

Based on our study, the proposed well appears to be feasible with good potential for success; but there is still a chance that facts or findings that will be established during the course of project development could adversely impact the project. Because of this, as well as the complexity of the project, we are recommending that the project be implemented as a series of sequential tasks. This will minimize potential cost risks associated with an adverse finding. (Discussions related to these concerns are included in the Feasibility Study.)

The first series of tasks include: City review of the Feasibility Study and concurrence in moving forward, OHA plan review of materials developed to date, easement acquisition, hydrogeological evaluation, and water right transfer application/approval. Our opinion of probable cost (OPC) for these tasks is $24,000. Estimated time for completion is 8 months. The OHA submittal is incomplete at this time, but it starts the process and could provide valuable agency feedback. A hydrogeological evaluation is necessary because of the nature of the water right transfer; and it is a required attachment for the water right transfer application. The timeline assumes an expedited water right process. Information and regulatory findings associated with this series of tasks should provide a much more solid basis for deciding whether or not to move forward with well construction.

Well design, bid, construction, and testing will take an estimated 4-5 months to complete. The OPC is $160,000.

Conceivably, the above discussed work can be completed in a year; therefore, we recommend budgeting $184,000 for the upcoming budget year.

The next task will be to design the improvements to install the well pump, pipelines, and other infrastructure needed to connect the well to the WTP; and to construct the improvements and finalize the water right transfer. The OPC is $131,000. Estimated time for completion is 3 months, assuming that City staff are doing much of the work with assistance from specialty contractors as needed. The OPC cost is based on typical bid costs; consequently the City should see significant savings to the extent that it is able to complete the work in-house.

OPC for the whole project is $315,000. We recommend that the City budget an additional $5,000 as an allowance for miscellaneous legal and/or administrative costs.

SECTION 1 | INTRODUCTION

1.1 Background

The City of Manzanita is located off U.S. Highway 101 in Tillamook County approximately 27 miles north of the City of Tillamook. Resident population in 2016 was estimated at 625 persons (source: PSU Population Research Center). Manzanita is a popular tourist stop and approximately 75 percent of the housing stock is associated with second homes and vacation use; consequently, water demands are considerably higher at times than the resident population would suggest.

Manzanita owns and operates a water system. It is also part of the Joint Water System with the City of Wheeler. Manzanita has several water sources (three forks of Anderson Creek) and a membrane microfiltration water treatment plant (WTP), but currently obtains all its water from the Joint Water System wells located near the Nehalem River. The two wells are separated from the WTP by 40,300 lineal feet of transmission main that includes a bored crossing of the Nehalem River.

Over 20,000 lineal feet of transmission main separates the City's surface water sources from the WTP. This line is predominantly constructed of asbestos cement pipe and is in extremely poor condition and is no longer utilized.

Manzanita does have an emergency intertie with the Neah-Kah-Nie Water District; however, the District constructed the intertie because of dwindling water supplies from its own sources (associated with late summer effects of the recent drought) and the anticipated need for supplemental water from Manzanita. Neah-Kah-Nie has very limited ability to provide water to Manzanita.

The City is concerned about water system reliability and emergency preparedness in general. Located on the coast, the City could bear the full force of a Cascadia Subduction Zone Earthquake as well as impacts from local or distantly generated tsunamis. The Oregon Resilience Plan (2013) estimated that after a major Cascadia earthquake, it could take 3-6 months to restore electricity and 1-3 years to restore water service in areas affected by the earthquake.

City staff developed the idea to construct a well near the WTP with several purposes in mind:

- Provide water in the event of a major disaster that affects the ability of the Joint Water System wells to provide water to the City.
- Provide water that could be treated and provided for local distribution in the event of major damage to the City's distribution system.
- Provide water for periodic WTP operation to maintain its functionality until such time as the Anderson creek sources are restored or a decision is made to decommission the WTP and to not restore the Anderson creek sources.

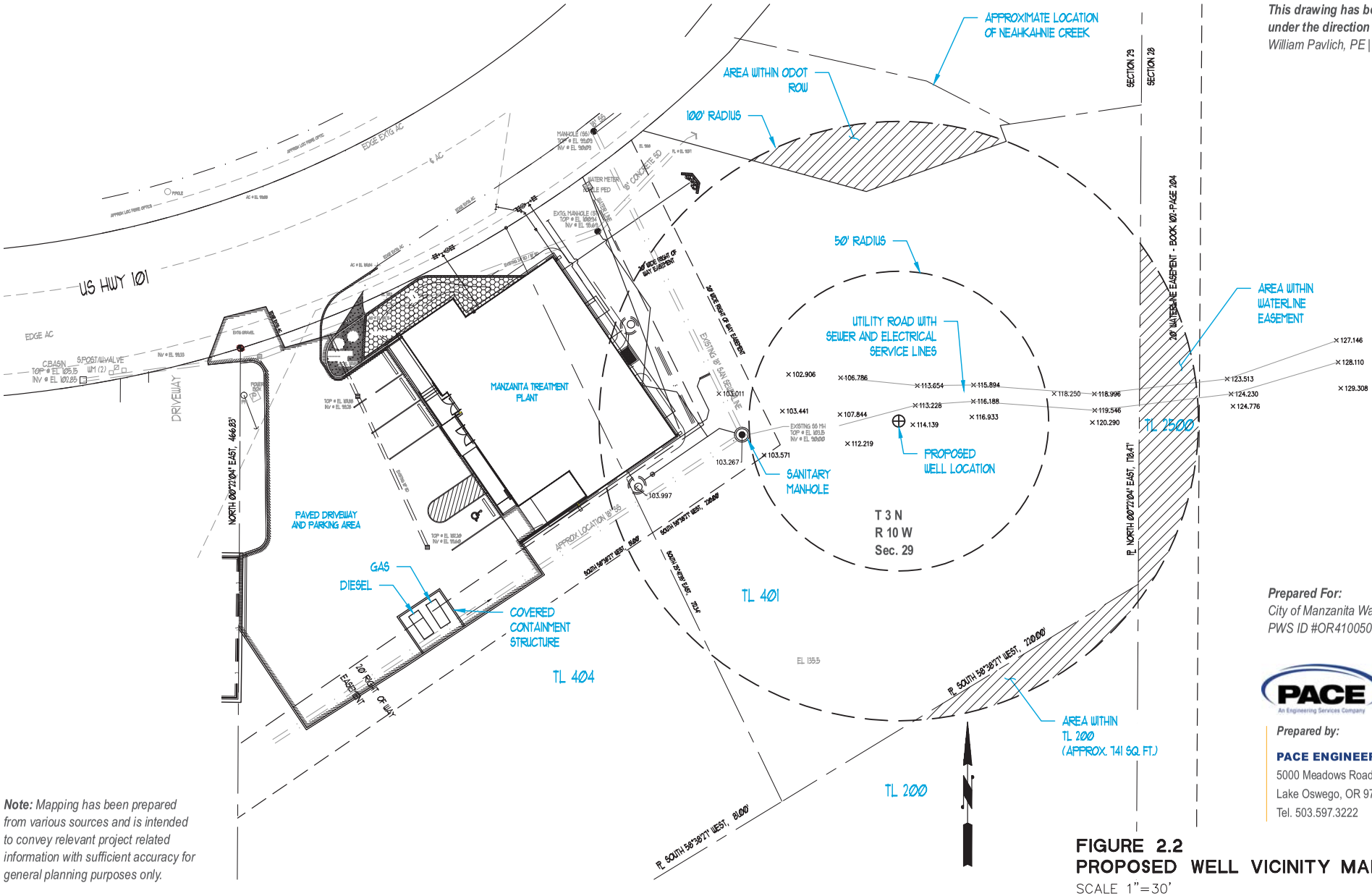
In addition to the above considerations, it should be noted that the City has been pursuing a water permit extension of time (from the Oregon Water Resources Department) for the Joint Water System wells. The extension may be conditioned to provide for fish and wildlife protection that could, at times, result in reductions in water availability. Under these conditions, an emergency well near the WTP could provide additional water for the system, thereby lessening the impact of the reduced withdrawals from the Joint Water System well.

Figure 2.1 - Area Map

Base Map: USGS Nehalem Quadrangle 2014

Scale: 1" = 1,600'

Contour Interval: 40'



This drawing has been prepared under the direction of:
William Pavlich, PE | 503.597.3222

FIGURE 2.2
PROPOSED WELL VICINITY MAP
SCALE 1"=30'

Prepared For:
City of Manzanita Water Department
PWS ID #OR4100505

Prepared by:
PACE ENGINEERS, INC.
5000 Meadows Road | Suite 345
Lake Oswego, OR 97035
Tel. 503.597.3222

Note: *Mapping has been prepared from various sources and is intended to convey relevant project related information with sufficient accuracy for general planning purposes only.*

City staff would like to develop a well of approximately 80 gallons per minute (gpm) capacity. Discussions with a hydrogeologist and a well driller with local experience during the initial scoping of this project suggest that while 80 gpm may be achievable in the area, it is by no means certain. Actual capacity will be determined based on testing after the well is drilled.

The Joint Water System wells produce approximately 500 gpm; consequently, 80 gpm would not provide a true backup to the current well supply. 80 gpm (or even less) could supplement local water needs in such a way as to reduce the use of stored water in the City's reservoirs, thereby extending the period (days) of feasible water system operation in the event of water not being available from the Joint Water System wells. After a major event, depending on the size of the service population, the extent of the functional portion of the water system, and the efficacy of conservation efforts, it may be possible to provide service to part of the system for an extended period of time until restoration of normal service has been achieved.

Planning for an Emergency Drinking Water Supply (EPA 600/R-11/054) notes that 1 gallon per person per day is a plausible planning figure and consistent with FEMA, EPA, and Red Cross estimates for drinking, food preparation, and hygiene. This is under true emergency conditions when distribution is likely direct via jugs or other containers from a local supply site. 80 gpm is over 100,000 gallons a day; consequently, a well of this capacity could provide much more than minimum needed – provided electrical service or emergency power generation is available and functional.

Manzanita's WTP is located approximately 80 feet from Neahkahnie Creek. The City has a municipal water right certificate for Neahkahnie Creek and the intent is to transfer the surface water right to the proposed well that would be located near the WTP (and Neahkahnie Creek). The well will be connected to the WTP's raw water tank and filtered and disinfected prior to use.

1.2 Purpose and Scope

The purpose of this study is to evaluate the feasibility of the project and the probable costs in order to provide the City with information that can be used as a basis for their decision on whether or not to move forward with the project.

1.3 Authorization and Funding

The City authorized PACE Engineers, Inc. on July 8, 2016 to complete the Feasibility study. This study has been funded in its entirety by the City of Manzanita.

SECTION 2 | PROPOSED PROJECT LOCATION AND SITE CHARACTERISTICS

2.1 Proposed Project Location

The general project location is shown in Figure 2.1. Neahkahnie Creek was called Classic Lake Creek in the past and this is the name that appears on the water right that will be transferred to the well. The point of diversion associated with the water right (certificate #21707) is also shown. The proposed well site is located on the hill behind the WTP and is also near Neahkahnie Creek. Neahkahnie Creek at this point flows eastward to Alder Creek (formerly known as Lange Creek). Alder Creek discharges to the Nehalem River (Nehalem Bay).

Figure 2.1: General Location Map

The well site is shown in more detail on Figure 2.2. The map is largely based on January 2004 record drawings for the WTP with newer details (covered containment structure) and recent survey data added.

Figure 2.2: Proposed Well – Vicinity Map

2.2 Site Characteristics

This section focuses on basic descriptions and characterizations of the well site and surrounding area. Site characteristics are also discussed in Section 4 with regard to regulatory concerns and design considerations.

Proximity. The proposed well location is near the Water Treatment Plant (WTP) on City owned property. This reduces overall costs and complexities of the project and facilitates operation under emergency conditions as well as minimizes the length of main connecting the well to the plant.

Property. (See Figure 2.2 and Appendix 2.1 for referenced tax lot locations.) The City owns tax lots 404 and 401. Tax lot 200 is undeveloped and owned by a private party. Tax lot 2500 is also owned by a private party; the property is developed with a single family home on 1.68 acres; however the part adjacent to tax lot 401 is designated as a 20 foot waterline easement. ODOT right-of-way borders the north side of the City owned property (see Appendix 2.2).

Access. The site is adjacent to U.S. Highway 101. Presumably, as a major transportation route, restoration of functionality would be given high priority following a major event. The WTP parking area and area surrounding the plant is open and relatively flat thereby facilitating access for construction or O&M activities.

Existing Utilities. Electrical service, including backup power generation, is available via the WTP. There is an 18-inch sanitary sewer, 13 feet deep, that passes behind the WTP. At its nearest point it is 50-feet away from the proposed well. The proposed well is off to the side of an overgrown service "road" (see Figure 2.2) that contains an electrical service and what is understood to be a sewer lateral from an on-site treatment system (associated with a home located south of the well site) that discharges to the municipal system off the southeast corner of the WTP. The sewer service lateral is likely within 10 feet of the proposed well. There are also drain, storm, and water (raw and finished) lines in the general vicinity of the WTP.

Topography. The WTP, parking area, and area around the WTP extending outward approximately 30 feet is relatively flat and cleared. Southeast of the area described above is a wooded hillside that extends upward with moderate slope. To the northeast, the site drops sharply to Neahkahnie Creek. The proposed well location is located off the edge of the utility road where the hillside rises to the south. Some excavation of the hillside and construction of a retaining structure will likely be needed to keep the well out of the road and to provide access and drainage around the wellhead. Based on recent survey data it appears that the well location is approximately 10 feet higher than the area around the WTP. Approximate site elevations that characterize the site are: Neahkahnie Creek 60 feet, area near WTP 103 feet, and proposed well location 114 feet.

Geology. The WTP area was reviewed in *Geotechnical Report, Proposed Water Treatment Plant, City of Manzanita* prepared by Wright/Deacon & Associates, March 3, 2000. The report included logs for two borings (Appendix 2.3) that were drilled to a depth of 41.5 feet. Results indicate sand to the full depth and no groundwater encountered. The authors speculate that groundwater is at a depth of approximately 50 feet based on the elevation of Neahkahnie Lake. The report characterizes the hillside south of the WTP (where the proposed well will be constructed) as a stabilized sand dune of moderate slope.

The *Geologic Map of the Tillamook Highlands, Northwest Oregon Coast Range,* USGS Open File Report 94-21, Wells et al, 1994 shows the WTP site and areas west and south as Holocene beach and dune deposits.

Based on the boring logs and the estimated depth to groundwater, it is likely that the aquifer is unconfined.

Natural Hazards. A review of Oregon Department of Geology and Mineral Industries (DOGAMI) Statewide Geohazards Mapping indicate no potential for flooding or tsunami inundation. This is consistent with the general location and elevation of the site. Landslide hazard potential is characterized as moderate. This is consistent with the "stabilized dune" characterization noted in the Wright/Deacon report discussed above. Shaking in the vicinity of the site from a Cascadia Earthquake is characterized as very strong – which is less than the map categories of violent or severe.

Other Hazards. The State of Oregon Department of Environmental Quality (DEQ) Underground Storage Tank Cleanup List was checked for potential hazards in the vicinity. Only two listing were found in the area: northwest of where Neahkahnie Creek crosses U.S. Highway 101(36725 N Highway 101), and west of the WTP site (868 Laneda Avenue). The listing for the first was for a heating oil tank with cleanup work completed on April 12, 2004; for the second, it was for the Manzanita underground storage tank with cleanup work completed January 28, 2009.

Gas and diesel above ground storage tanks are located on the south side of the WTP parking area (see Figure 2.2). The structure has a concrete basin for spill containment, and is covered. The tanks are heavy duty with double-wall construction. The installation was designed to minimize the risk of a spill.

A chemical spill on U.S. Highway 101 could result in contamination of Neahkahnie Creek and the local aquifer.

Neahkahnie Creek. Neahkahnie Creek is adjacent to the project site and below the rip-rapped hillside included in ODOT's right-of-way (Appendix 2.2). The creek originates on Neahkahnie Mountain and flows through forest and prime Coho spawning habitat above Neahkahnie Lake. A dam on the south end of Neahkahnie Lake and a perched culvert on the south side of U.S. Highway 101 effectively blocked fish passage for over 80 years. ODOT recently removed the barriers and installed a fish friendly culvert that will allow salmon and steelhead to reach the prime spawning habitat upstream. Just downstream of the ODOT right-of-way, The Lower Nehalem Community Trust (LNCT) acquired 2,100 lineal feet of stream on 7.27 acres with the intent of restoring and preserving the creek in this area. Neahkahnie Creek is tributary to Alder Creek which is tributary to the Nehalem River. Neahkahnie Creek and Alder Creek are shown on Figure 2.1.

Wetlands. The entire site is characterized by sandy soils; there are no identified wetlands present. Wetlands are present northeast of the project site, in the riparian areas surrounding Neahkahnie Creek.

SECTION 3 | WATER RIGHT TRANSFER

3.1 Existing Water Rights

The proposed well requires a water right. Manzanita has a certificated water right (#21707) for withdrawals from Neahkahnie Creek (named Classic Lake Creek in the certificate and, noted as "formerly known as Ettenberger Creek" in the permit application). Copies of the certificate, map, and permit application are included in Appendix 3.1. The water right is for 1.3 cubic feet per second (cfs) of which 0.867 cfs is from Neahkahnie Creek and 0.433 cfs is from Alder Creek (named Lange Creek in the certificate). The intent (see map, Appendix 3.1) was to divert water from Neahkahnie Creek to Alder Creek where it would flow to the City's point of withdrawal on Alder Creek. The water right is unusual in naming two different points of diversion on two different streams in one water right; nevertheless, the intent and logic is clear.

The water right is for municipal use and has a priority date of August 14, 1950.

Oregon Water Resources Department (OWRD) records were reviewed for water rights on Neahkahnie Creek upstream of the WTP site. There was one notable water right (certificate #4956) with a December 3, 1920 priority date for 2.0 cfs for purposes of a fish hatchery on Neahkahnie Creek immediately upstream of Neahkahnie Lake (named Classic Lake in the certificate).

There are no instream water rights on Neahkahnie Creek.

3.2 Transfer Feasibility

Manzanita's water right certificate (#21707) is for municipal use and therefore valid even though it hasn't been used in many years. It can be transferred; however, to do so the transfer must be in accordance with state laws and OWRD's requirements. The transfer is for a new point of diversion (a new well) and a change from surface water to groundwater. The rules governing this are largely covered by ORS 540.531 and OAR 690-380-2130. Relevant details are discussed below; copies of the referenced sections are included in Appendix 3.2.

The new point of diversion must be hydraulically connected to the stream for which the water right was issued. The well is a little over 100 feet from Neahkahnie Creek and available geological data suggests a strong likelihood of a hydraulic connection. Only part (0.867 cfs) of the certificate is for Neahkahnie Creek, so the transfer would have to be for this amount or less.

The new point of diversion must not enlarge the water right or harm other water right holders. One water right was located upstream of the proposed well (see Section 3.1 for description). It is an old water right for a privately owned fish hatchery. City staff were not aware of any hatchery and it is presumed that the water right has not been used in the past five years and is therefore no longer valid. There is no instream water right that would be affected by the change in point of diversion. The proposed well is targeted for 80 gpm (0.1738 cfs); this is approximately 20% of the original water right.

The new point of diversion must have a similar impact on Neahkahnie Creek as the original point of diversion. "Similar" means that the well would draw 50% or more of its water from Neahkahnie Creek if pumping of the well were maintained continuously for 10 days. This is something that may be difficult to determine prior to constructing

and testing the well. Proximity is one factor that suggests an adequate hydraulic connection, but ultimately geology and groundwater depth will be the determining factors. Some wells can be very close to a stream and yet not be hydraulically connected.

The proposed well is less than 500 feet from Neahkahnie Creek but farther than 1,000 feet from the original point of diversion. The proposed well is approximately 7,600 feet from the original point of diversion in terms of straight line measurement; it is much longer if the measurement follows the creek's path. Because the proposed well is farther than 1,000 feet from the original point of diversion, the state requires that a licensed geologist demonstrate that the well is hydraulically connected to the creek and will have a "similar" impact on the stream.

As part of the transfer process, the City will be required to retain a certified water rights examiner (CWRE) to complete claim of beneficial use to establish how much of the original water right is being used. The new certificate will retain the original priority date but the flowrate will reflect actual use. The balance of the water right will be lost. The loss includes the original point of diversion, and in this case, the portion of the water right applicable to Alder Creek.

The transfer application should also be prepared by a CWRE. OWRD's review and approval process for the application is estimated by staff at 1-2 years. OWRD has an expedited process option that can shorten the time to 6 months to one year – or even less. The expedited process does cost extra and that cost is determined by OWRD staff after a request by the applicant and an initial review of the application by OWRD to determine the work involved. The applicant's request for an expedited process consists of a simple one page form and a $125 check to cover OWRD's cost of putting together the estimate.

Consideration had been given to designating the balance of the water right for instream use. This is not feasible without additional cost to the City and some complication of the overall process. The City cannot transfer part of the certificate to a well and part to instream in one transfer application. To do so would require two simultaneous applications. In addition, instream rights are typically granted to agencies rather than municipalities or private parties. From a practical standpoint, there is probably very little benefit in having an instream right, since any new water right applications on Neahkahnie Creek would be so heavily conditioned for fish and wildlife protection that water may be unavailable for withdrawal during part of the summer and fall (if the application is even approvable).

In summary, the proposed water right transfer appears to be feasible with the notable qualification that the licensed geologist's findings support the transfer. Discussions with OWRD staff early in the development of this study indicated that the agency may be amenable to approving the transfer even if the geologist's findings do not strictly match the rule requirement. Under this scenario, the City would have to provide mitigation, the exact nature of which is not entirely clear at this time. Giving up some of the water right is a possible option. Since in this case most of the original water right will be lost, the mitigation, if acceptable to OWRD, would have no additional financial impact on the City. Recent discussions with other OWRD staff suggest that this may not be a realistic possibility, so getting around the 50% requirement should not be overly relied on as a basis for moving forward.

SECTION 4 | WELL CONSTRUCTION AND CONNECTION TO WATER TREATMENT PLANT

4.1 Site Considerations

The proposed well site was selected based on proximity to the City's Water Treatment Plant (WTP) and Neahkahnie Creek. The latter consideration reflects the City's desire to transfer a surface water right for the creek to a groundwater point of appropriation much further downstream. The City also owns the site where the proposed well is to be located. Ownership of the site and proximity to the WTP will reduce overall costs and enhance reliability (since the relatively short main that connects the well to the WTP could be more easily repaired, if damaged, and put back online, than if the well were more distantly located).

For the site itself, setback requirements are a major consideration. Setback requirements are described in OAR 333-061-0050 "Construction Standards" (Appendix 4.1).

Figure 2.2 shows key features of the site; elements discussed in the following paragraphs can be located on the figure.

The City is required to demonstrate ownership and control of the area within a 100-foot radius of the well. The City must have perpetual restrictive easements for any property not owned by the City with the exception of public right-of-ways. Most of the required area is owned by the City. There is a small area located within ODOT right-of-way on the north side of the circumscribed area. ODOT has stabilized this area for bank protection above Neahkahnie Creek. This is public right-of-way with no other conceivable use; consequently, an easement should not be required. There is a small area located on the east side of the circumscribed area that is fully within a 20-foot waterline easement on Tax Lot 2500. Protections for the water line should be sufficient for the well. There is a small area on the southeast side of the circumscribed area that extends on to Tax Lot 200. This is uphill of the proposed well and on private property. A restrictive easement will be required for this area.

The proposed well is located 50-feet from the sanitary sewer as required; however, OHA can determine that aquifer sensitivity and the degree of hazard is such as to require a greater setback. The aquifer is likely unconfined and could raise some concerns; however the plan is to treat the water at the WTP prior to use, which could mitigate any concerns. Setbacks were discussed with OHA prior to developing this document, but no conclusions were forthcoming at that time.

Pressure sewer lines are not allowed within 100 feet of the well. The sewer service lateral that passes near the proposed well is believed by staff to be a drain line from an on-site wastewater system associated with the house located approximately 250 feet southeast of the proposed well. The proposed plan is to replace the line (gravity or pressure) with a new line of seamless HDPE that will be cased in a larger diameter seamless HDPE pipe. Agency rules (OARs) allow for the Authority (OHA) to waive the 100 foot requirement. The proposed solution should be adequate to address any concerns for potential contamination of the well based on proximity to the service lateral.

The rules include a lengthy list of items that cannot be within 100 feet of the proposed well. For the record, **the following items are not located within the 100 foot circumscribed area** (they are also not located anywhere within the larger surrounding area unless noted):

- Subsurface sewage disposal drain field.
- Existing or proposed pit privy.
- Cesspool.
- Buried fuel tanks (see Section 2.2 for additional discussion).
- Fuel transfer or storage (see Section 2.2 for additional discussion).
- Animal yard, feedlot, or animal waste storage.
- Untreated storm or grey water disposal.
- Chemical storage, usage, or application.
- Junk/ auto/ storage yard.
- Cemetery.
- Unapproved well.
- A well that was not properly abandoned, or of unknown or suspect construction.
- Source of pathogenic organisms or other similar health hazard.
- Vehicle or machinery maintenance or long-term storage.
- Mineral resource extraction.

OAR 690-210-0030 also addresses placement of water supply wells. Setbacks for some items noted above are more stringent. There is a 50-foot limit for: confined animal feeding area, holding area, or animal waste holding area; closed sewage or storm drainage system; and underground or above ground petroleum storage tanks used for commercial purposes. There is a 5-foot limit for overhanging roof or eaves of a permanent structure, and a 500-foot limit for hazardous waste storage, disposal, or treatment facility. None of these requirements impact the proposed well site.

The site is well above the creek and its associated 100-year floodplain. It is also well above the tsunami inundation zone (see Section 2.2 for additional discussion).

There is easy access to the proposed well location for drilling equipment and future maintenance needs.

4.2 Well Capacity and Water Quality

The City would like to have a well of approximately 80 gpm (see Section 1.1 for discussion of this quantity and adequacy for the intended purpose). Preliminary reviews of wells in the area suggest that this may be possible provided the water bearing layer is sand rather than bedrock. As noted in Section 2.2, sand is very likely the case. Proximity to the creek should also contribute to this goal – assuming there is a direct hydraulic connection. Preliminary discussions with a well driller familiar with the area suggest an 8-inch diameter well is likely needed to achieve the 80 gpm capacity. Actual capacity cannot be determined until after the well is drilled and pump testing of the well completed. *There is no guarantee that the target capacity of 80 gpm will be achieved.*

Dunal water sources are often relatively high in iron and manganese. Proximity to Neahkahnie Creek should reduce the potential for iron and manganese issues through dilution. Water quality testing, after the well is constructed, will indicate whether or not iron and manganese are issues that need to be addressed. The City intends to run the well water through the membrane microfiltration units; additional testing and analysis may be needed to determine if the membranes can handle the raw water without some additional pre-filtration step being necessary. Initial water quality testing includes many parameters; however, iron and manganese are typically the most prevalent issue with dunal sources. Elevated sodium levels are also common with dunal sources, but not typically at levels that would require special actions to address. Again the potential dilution provided by the proximity to Neahkahnie Creek should reduce the potential for sodium levels to be an issue. The broad range of water quality testing required reflects the fact that until test results have been obtained there is no way to know if a contaminant is present in sufficient quantity so as to require adequate treatment or abandonment of the source. *There is no guarantee that water quality will be adequate for the intended purpose without additional, and potentially costly, treatment requirements.*

4.3 Well Construction and Connection to the Water Treatment Plant

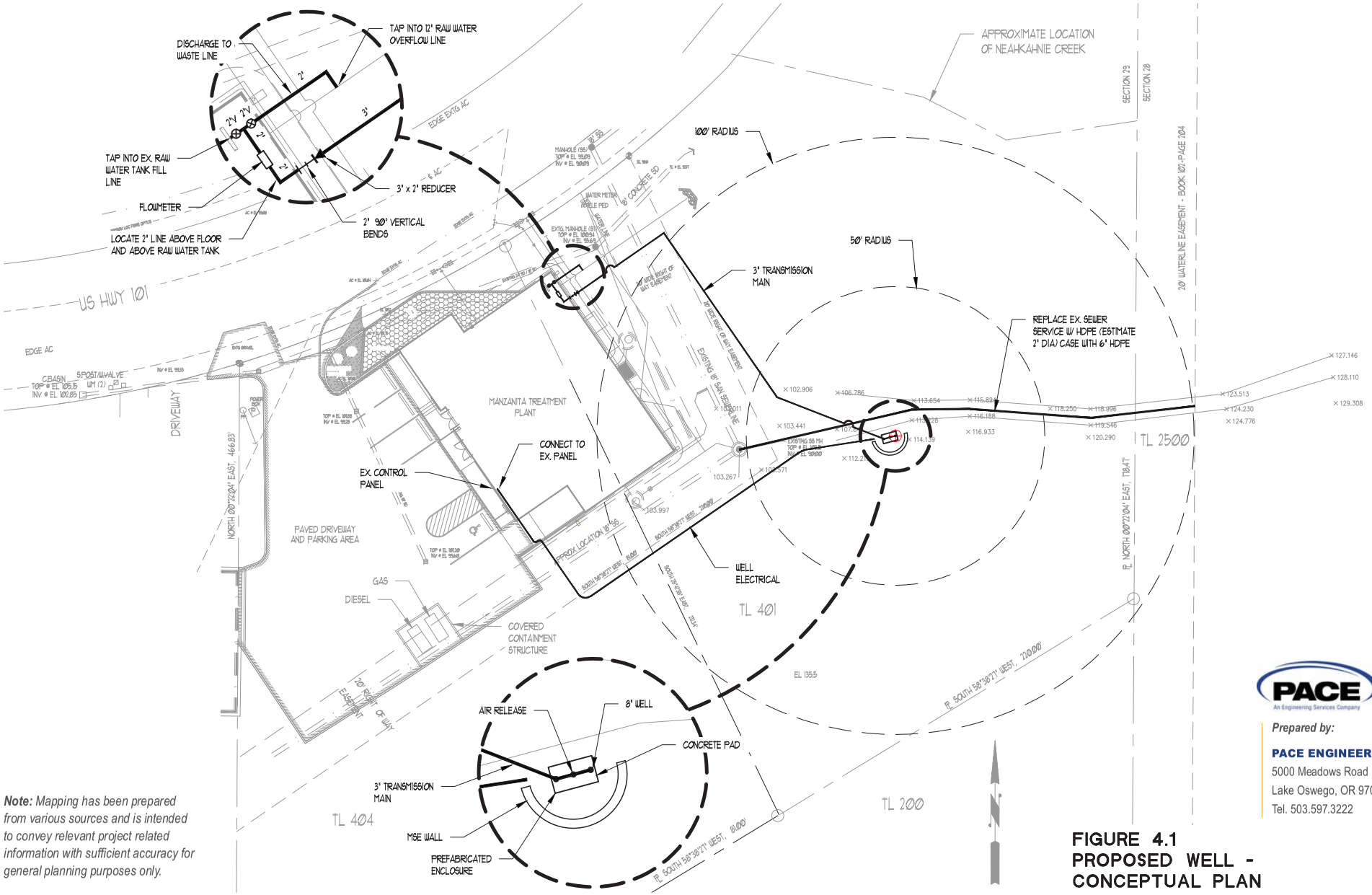
This section describes the proposed well and project to connect it to the existing Manzanita Water Treatment Plant (WTP). Much of the design specifics that follow are based on limited information and will be refined once the well has been drilled and the evaluation of the strata, water levels (static and pumping), capacity, and water quality has been completed. The function of what follows is primarily to describe the project in enough detail to demonstrate intended compliance with state requirements and to establish a reasonable estimate of the work, facilities, and costs for planning and budgeting purposes. A conceptual plan of the proposed improvements is included in Figure 4.1.

General well construction standards are addressed in OAR 333-061-0050, OAR 690-200, and OAR 690-210.

Wells constructed in sand require special construction per OAR 690-210-0130: from the surface and extending down at least 18 feet, construction includes an oversized drill hole (at least 4 inches larger in diameter than the casing), at least 18 feet of unperforated permanent casing, at least 18 feet of temporary casing sized to fit the oversized drill hole, and grout filling the annular space between the two casings, and the temporary casing removed as the grout is placed.

Since the well is in sand, screen selection will need to be based on a sieve analysis conducted during the drilling operation. An alternative design using a filter pack may be recommended by the hydrogeologist and/or driller involved. The concern is in minimizing the passage of fine particles that can reduce pump life and accumulate in the raw water basin.

As noted in Section 4.2, target capacity is 80 gpm and recommended well casing diameter is 8 inches. Depth at this time is roughly estimated at 120 feet for preliminary budget estimates; actual depth will determined as drilling progresses and strata and water levels are evaluated. Depth to ground water is estimated at 40 – 60 feet based geological work noted in Section 2.2 and the well elevation of 114 feet minus the water surface of Neahkahnie Creek of approximately 60 feet. Well operation creates a drawdown of the water levels adjacent to the well; consequently, well pumps are located well below the static water level. Proposed 3-inch piping from the pump to the WTP is approximately 200+ lineal feet. At 80 gpm, this represents a pipe velocity of 3.6 fps and a headloss of 3.3 feet for smooth bore pipe such as PVC or HDPE. Static head is the largest headloss component. For rough pump sizing, we are estimating a total dynamic head (TDH) of 80 feet (includes static head and dynamic headlosses associated with pipe, fittings, and appurtenances). For preliminary planning and cost estimating purposes, a submersible Grundfos SP 85S pump was selected. The pump is 3 Hp and uses 3-phase power; capacity is 80 gpm at 80 feet TDH. Final pump selection will be made after the initial well construction is complete and the capacity of the well determined.



Note: *Mapping has been prepared from various sources and is intended to convey relevant project related information with sufficient accuracy for general planning purposes only.*

FIGURE 4.1
PROPOSED WELL - CONCEPTUAL PLAN
SCALE 1"=30'

Prepared by:

PACE ENGINEERS, INC.
5000 Meadows Road | Suite 345
Lake Oswego, OR 97035
Tel. 503.597.3222

The proposed well location is on the edge of the hillside where it meets the overgrown service road. This location will necessitate some excavation of the hillside and construction of a retaining wall. At this time the wall is envisioned as a semi-circle with a radius of approximately 5 feet, a center height of 5 feet tapering on either end to a height of approximately 1 foot. The well casing will project 1 foot above the surrounding reinforced concrete slab. The slab and ground around it will be graded to facilitate drainage away from the well.

The well will include: a screened casing vent, a 1/2-inch access port for water level measurement, a dedicated ¾-inch diameter schedule 40 PVC measuring tube that extends below the pump setting, and a sample tap on the pump discharge line. The well head is higher in elevation than the discharge location at the WTP; consequently, an air release valve (ARV) is recommended and should be located at the well head. The well head, ARV, and flowmeter will be surrounded by a small prefabricated enclosure.

Pipe from the well head to the WTP will likely be 3-inch HDPE – assuming it's available. Alternative diameters and materials will be considered based on actual pump sizing and availability as determined at that time. (Note: odd sizes of HDPE are often not available except by special order in very large quantities.) HDPE is preferable because it is a welded, continuous pipe and it is less subject to damage during earthquakes than most other commonly used pipe materials.

Near the WTP the 3-inch line will be reduced to 2-inch and angle upwards to enter the WTP above the floor that is above the raw water tank. Reducing the pipe diameter to two inch will accelerate the flow and eliminate the need for an air release valve. It will also reduce the size of the core-drill (and Link-seals) required to penetrate the wall. Inside the WTP, the line will be directed horizontally to a flowmeter followed by a tee with one branch connected to the existing raw water line that enters the raw water tank, and the other branch (the pump-to-waste line) will be directed back through the wall and down to connect to the treatment plant's raw water tank overflow line that discharges to the rip-rapped hillside. Gate valves will be provided on each branch. The water will be treated at the WTP prior to consumption.

Key OWRD guideline requirements for a suitable flowmeter for sources with flows of greater than 0.01 cfs (4.5 gpm) include: an accuracy of plus or minus 2% of the actual flow for the full range of permitted flows, an instantaneous flow readout and a totalizer, and that it be located upstream of any diversions.

The WTP's control panel is located on the west wall of the plant. The panel has space for adding controls. Discussions with City staff indicate they intend to work with the consultant that designed the system on connecting the pump and controls. Approximately 140 feet of trench and conduit will be needed between the well and the south wall of the WTP. Inside the plant, the electrical can be run along the wall to the control panel. Controls will be simple and manual. The panel is already connected to the facilities emergency power.

SECTION 5 | IMPLEMENTATION AND OPINION OF PROBABLE COSTS

5.1 Implementation Plan

The implementation approach described herein reflects both the complexity of the project and the goal of reducing losses (primarily monetary losses) if new data or regulatory determinations adversely affect the viability of the project – to the extent that the City decides to terminate the project. Key project tasks, milestones, timing, and opinions of probable costs are outlined below. Each task assumes that the City has been apprised of new information or regulatory findings, and is in agreement with moving forward to the next task.

Implementation Plan

1. City Review of the Feasibility Study and Concurrence on Moving Forward

   The first task is the City's review of the Feasibility Study and concurrence with moving forward with the project. Also, the City will need to decide how it would like to finance the project and budget for work likely to occur in the next budget cycle. An engineering contract should be negotiated for the anticipated work with the understanding that the City can terminate the contract if the City decides to terminate the project at some point during its development.

   Objective: Feasibility Study review and concurrence; budget; and engineering contract.

   Who: City staff and officials

   Timing: at City's discretion

   OPC: not applicable

2. OHA Plan Review

   The second task is to submit the Feasibility Study to OHA for plan review and comment. At this point, the submittal will not be complete but should be sufficient to receive an indication of concerns and/or a provisional determination of project viability. The plan review fee of $3,300 needs to accompany the submittal. This applies to the whole project, not just to this step in the process. Engineering involvement for the initial submittal is limited to submittal preparation, follow up to OHA questions, and coordination with the City. A Land Use Compatibility Statement (LUCS) is also needed (OHA provides the form) and this will require coordination with local planning officials.

   Objective: Preliminary OHA Plan Review submittal and preliminary findings

   Who: Engineer; City staff assistance with LUCS

   Timing: at completion of task #1 above

   OPC: budget $2,000 engineering; $3,300 review fee

3. Begin Easement Acquisition

   The City must have ownership or control of the area within a 100-foot radius of the well for source protection. An easement is needed for a small area on tax lot 200, south of the City owned parcels (see Figure 2.2). The City should initiate conversations with the owner and follow up with preparation of an easement. The easement is required by OWRD as part of task #5 and by OHA prior to task #9 below.

   Objective: obtain easement.

   Who: City staff, surveyor, and attorney

   Timing: after initial OHA plan review comments are obtained and prior to task #5 below.

   OPC: budget $2,000 for easement preparation, legal, and recording.

4. Hydrogeological Technical Memo

   The Technical memo is needed to establish that the well complies with regulatory requirements that 50% or more of the water from the well, after 10 days of continuous pumping originates from the creek, as a condition for transfer of the City's water right to the well. A positive determination is required prior to, and as a basis for, submitting the water right transfer application. An analytic model is used with data being limited to what is available through various sources or otherwise inferable from the information reviewed. Results of the modelling are only as good as the data available; consequently, the results are not guaranteed to be sufficient for OWRD approval. Note, however, that OWRD staff suggested this approach, and it is similar to approaches that they have used to determine well influences on nearby streams for fish persistence considerations relative to water permit extensions.

   Objective: Complete Hydrogeological Technical memo

   Who: Engineer for project management and support; hydrogeological sub-consultant for memo development

   Timing: at completion of task #2 above

   OPC: budget $8,500 engineering and hydrogeological memo preparation

5. Water Right Transfer Application

   This task involves the preparation and submittal of a water right transfer application, plus the hydrogeological technical memo, to OWRD. The submittal requires a fee of $390. The review/approval process can take 1-2 years; the expedited review process can be completed in significantly less time, possible 3-4 months. The expedited review requires the City to first request an estimate for the cost to expedite the process from OWRD. This request, plus a fee of $125 for preparing the estimate, is sent to OWRD along with the transfer application. Costs for expediting the process vary based on OWRD's estimate of the work involved.

   Objective: Prepare and submit water right transfer application

   Who: Engineer/Certified Water Rights Examiner (CWRE)

   Timing: after completion of the hydrogeological technical memo.

   OPC: budget $6,000 for completion of the application and required mapping; $390 for OWRD fee; budget $2,000 for expediting the application review.

6. Funding Application

   See Section 6.1 for a brief discussion of funding alternatives. This step can be skipped if the project is self-funded by the City. Agency funding would likely be loan only and could add six months to two years to the project timeline. Costs for funding application preparation, agency coordination, required environmental reporting can vary greatly depending on the level of consultant involvement and the specific program requirements.

7. Well Design/Bid/Construction/Testing

   This step focuses on the design and construction of the well itself plus the follow up testing to establish capacity and water quality. Complete plans and specifications for the well design will be prepared and sent to OHA for final plan review and approval. Most of this task will be completed by the geological sub-consultant: develop technical specifications; assist with bid review; onsite observation of drilling, construction, and development; bore sample collection and lab testing; well design; well log preparation; pump testing and hydrogeological data collecting; ground water level, temperature, and water quality samples; data analysis; and preparation of a report with findings, conclusions, and recommendations for use in Task #8 below. Civil engineering services include overall project management and coordination; development of bid ready plans and specification (incorporate sub-consultant's technical specifications); assist with bid; general construction administration services; and record drawings. Note: this task does not include the pump, pipe, and other infrastructure needed to connect the well to the WTP.

   Objective: Well Design/Bid/Construction/Testing

   Who: Engineer, Geological Sub-consultant

   Timing: after approval of water rights transfer application and project funding.

   OPC: budget $60,000 for engineering and geological work; budget $100,000 for well construction and development (and water quality testing). Note wells are typically bid on a per unit basis; actual well depth and final design is determined while the project is under construction.

8. Connection to Water Treatment Plant

   Capacity and water quality information, actual well construction, water levels, and other data available after completion of task #7 above will be used to size the pump, pipe, and other system components. Plans and specifications will be prepared. The project may be bid or, more likely, constructed by City staff supplemented by contractors for specific tasks as needed and coordinated by the City. Engineering and construction costs will vary considerably based on how the City proceeds. Construction costs included below assume all the work will be completed by a contractor; the cost are conservative since the City is actually planning to complete much of the work in-house as noted above. Engineering work, in addition to development of plans and specifications for completion of the well, site, and connection to the WTP, will include limited construction management, limited construction observation, and preparation of record drawings, and closeout. The City plans to retain the electrical engineer that designed the existing WTP controls for all electrical design and related work associated with the well project. The civil engineer will provide the pump specifications to the City's electrical engineer who will develop the electrical plans and specifications for City use. Additional engineering costs will be required if the City opts for a conventional bid/award/construction approach.

   Objective: Connection to Water Treatment Plant

   Who: Engineer, Electrical Engineer, City staff, contractors

Timing: after well construction is complete.

OPC: budget $25,000 for civil engineering; budget $10,000 for electrical engineering; and budget $94,000 for construction

9. Finalize Water Right

   Prepare and submit information to OWRD that confirms completion of the well, well design, capacity, use, etc. to complete the transfer and obtain a certificate for the new well.

   Objective: Prepare and submit water right transfer completion information to OWRD

   Who: Engineer/Certified Water Rights Examiner (CWRE)

   Timing: after completion of the project.

   OPC: budget $2,000 for finalization of the water right transfer.

5.2 Budget Summary

Budgets described in detail in Section 5.1 are summarized in Table 5.1.

Table 5.1: Emergency Well Implementation Budget Summary

TASK	TASK BUDGET	ESTIMATED TIME (MONTHS)	
		TASK	CUMULATIVE
1. Feasibility Review/Engineering Contract	NA	2	2
2. OHA Plan Review	$5,300	1	3
3. Easement Acquisition[1]	$2,000	1	3
4. Hydrogeological Tech Memo	$8,500	1	4
5. Water Right Transfer	$8,500	5	9
6. Funding Application[2]	-	-	-
7. Well Design/Bid/Construct/Test	$160,000	5	14
8. Connect to WTP	$129,000	3	17
9. Finalize Water Right	$2,000	1	18
Task Subtotal	**$315,300**	**-**	**18**
Recommended allowance for legal and administrative costs	$4,700	-	-
PROJECT TOTAL	**$320,000**	**-**	**18**

[1]*Easement acquisition conducted in parallel with Task 2 and Task 4 and, therefore, does not add to the cumulative time.*

[2]*The City intends to self-fund the project, so no budget or time is included here. If the City decides to pursue funding: anticipate additional costs associated with funding application preparation ($5,000) plus environmental reporting ($10,000 - $20,000); anticipate additional time of 6 months - 2 years.*

SECTION 6 | PROJECT FINANCING

6.1 Financing the Project – General Discussion

Discussions with City staff indicate a likelihood for self-funding of the proposed well project. Assuming that the City has sufficient funds and is amenable to undertaking the costs, self-funding could greatly expedite completion of the project and may result in lower overall costs to the City.

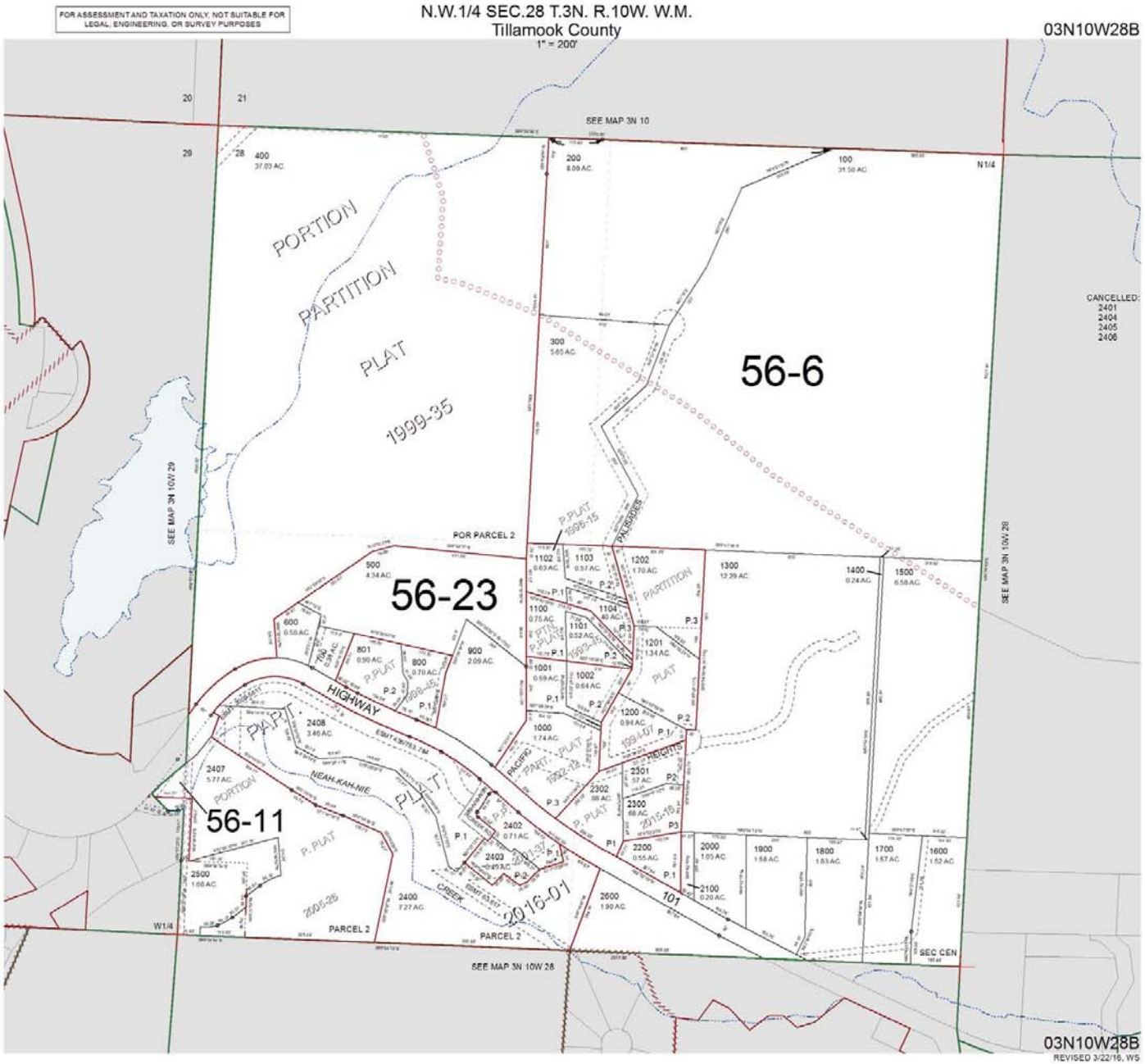
Many of the state and federal funding programs typically used for municipal water infrastructure are not applicable: the City does not qualify for Community Development Block Grant (CDBG) funding based on income status; there is no regulatory deficiency being addressed therefore Infrastructure Finance Authority's (IFA) Water/Wastewater (W/WW) program is not applicable; and there is no job creation associated with the project, therefore IFA's Special Public Works Fund (SPWF) is not applicable. Both the USDA Rural Development Funding (RD) and the Safe Drinking Water Revolving Loan Fund (SDWRLF) are applicable, but have notable drawbacks. SDWRLF applications are evaluated, given point scores in accordance with the agency priorities, and ranked competitively according to scores. Since there are no water quality or other regulatory deficiencies associated with the well project, the resulting project score is not likely to be high enough to be funded through SDWRLF. RD funding is a potential source, but the RD application can be relatively costly and time consuming to assemble. In addition, submittal will require an environmental report. Costs vary according to the issues involved, $10,000 - $20,000 are lower-end estimates for the environmental report. RD does have relatively low interest rates and a very long term (40 years for municipalities). Agency funding can be complicated with delays associated with timing of the applications, availability of funds, complications associated with environmental issues or concerns. Also, state or federal funding typically adds six months to two years to the overall project timeline.

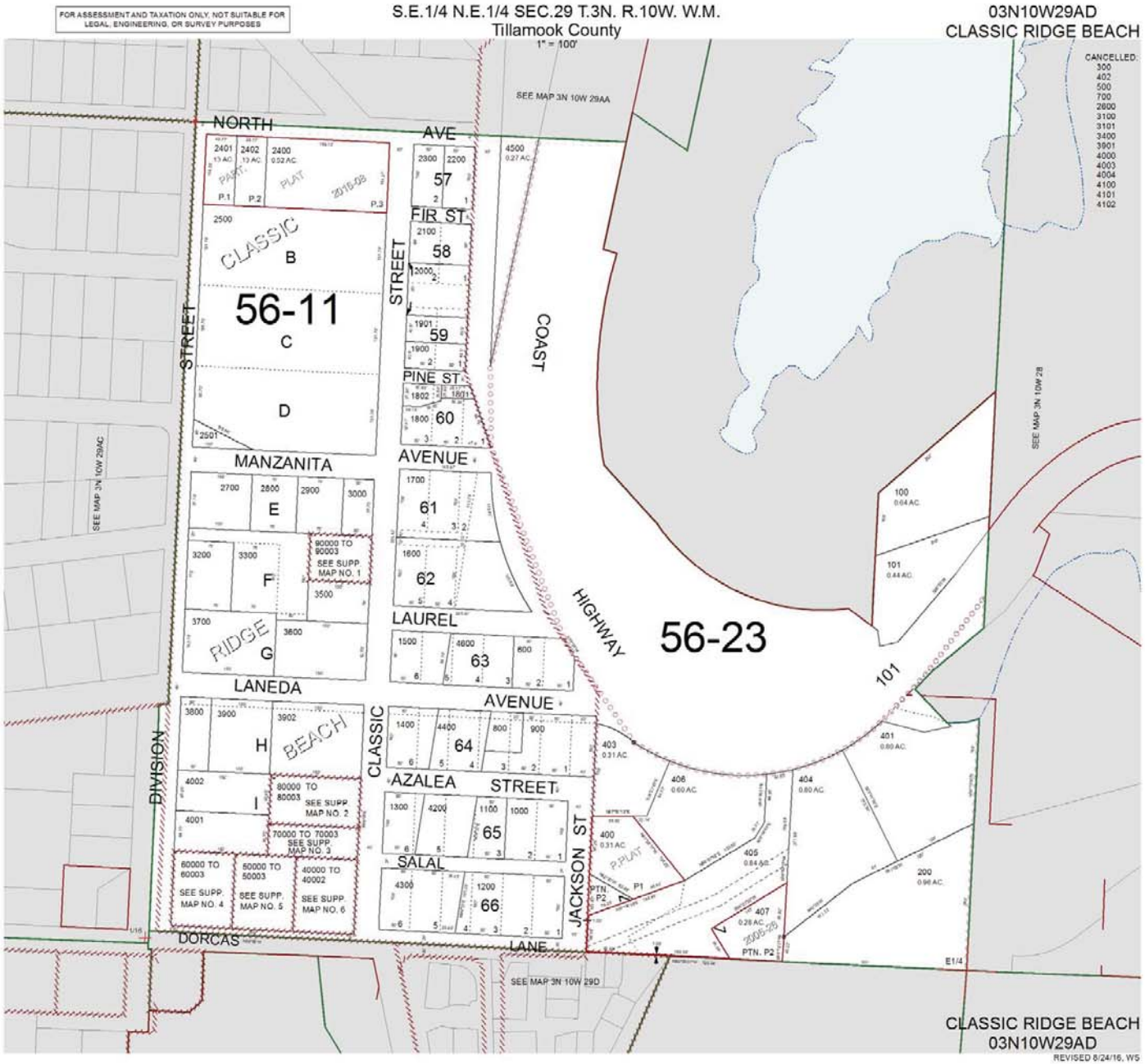
The discussion above focuses on the more commonly used programs and is not intended to be exhaustive. If the City is interested in pursuing agency based funding, the first should be contact with the local IFA representative to set up a One-Stop Meeting in Salem to discuss potential project funding. Representatives of potential funding agencies attend the meeting and can assist in developing an appropriate funding package. Funding for this project would likely be loan only, based on the nature of the project and the City's income status.

Self-funding eliminates the need for application preparation, environmental reporting, and the wage-rate and other requirements specific to any given program.

APPENDIX

2.1 Tax Lot Maps

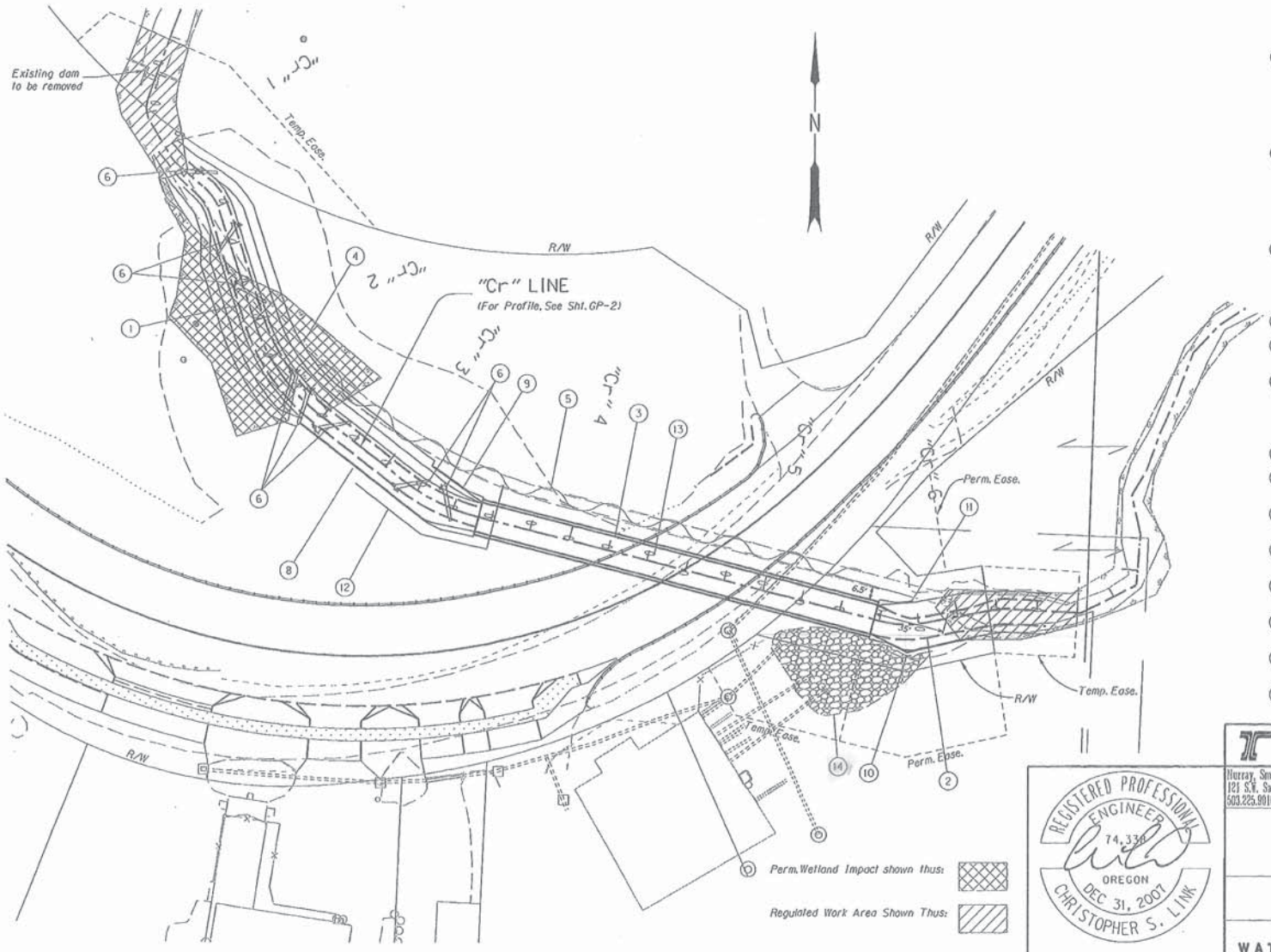

FOR ASSESSMENT AND TAXATION ONLY, NOT SUITABLE FOR LEGAL, ENGINEERING, OR SURVEY PURPOSES
N.W.1/4 SEC.28 T.3N. R.10W. W.M.
Tillamook County
1" = 200'
03N10W28B
SEE MAP 3N 10
SEE MAP 3N 10W 29
SEE MAP 3N 10W 28
56-6
56-23
56-11
PORTION PARTITION PLAT 1999-35
HIGHWAY
101
NEAH-KAH-NIE
CREEK
POR PARCEL 2
PARCEL 2
CANCELLED:
2401
2404
2405
2406
03N10W28B
REVISED 3/22/16, WS


FOR ASSESSMENT AND TAXATION ONLY, NOT SUITABLE FOR LEGAL, ENGINEERING, OR SURVEY PURPOSES
S.E.1/4 N.E.1/4 SEC.29 T.3N. R.10W. W.M.
Tillamook County
1" = 100'
03N10W29AD
CLASSIC RIDGE BEACH
CANCELLED
300
402
500
700
2600
3100
3101
3400
3901
4000
4003
4004
4100
4101
4102
SEE MAP 3N 10W 29AA
NORTH
AVE
CLASSIC
STREET
56-11
B
C
D
FIR ST
PINE ST
MANZANITA
AVENUE
COAST
HIGHWAY
56-23
101
LAUREL
RIDGE
E
F
G
LANEDA
AVENUE
BEACH
H
I
DIVISION
CLASSIC
AZALEA
STREET
SALAL
JACKSON ST
DORCAS
LANE
SEE MAP 3N 10W 29AC
SEE MAP 3N 10W 28
SEE MAP 3N 10W 29D
P.PLAT
PTN. P2
CLASSIC RIDGE BEACH
03N10W29AD
REVISED 8/24/16, WS

APPENDIX

2.2 ODOT ROW Map

47V-052



(1) Sta. "Cr" 1+00 to Sta. "Cr" 3+53.50
Const. channel
Loose riprap (Class 200) - 577 cu. yd.
Streambed gravel - 192 cu. yd.
Riprap geotextile (Type 2) - 911 sq.yd.
Gen. exc. - 8200 cu. yd.
(For details, see shts. GP-3 and GP-4)

(2) Sta. "Cr" 5+57.50 to Sta. "Cr" 6+45
Const. channel
Loose riprap (Class 200) - 138 cu. yd.
Streambed gravel - 46 cu. yd.
Riprap geotextile (Type 2) - 220 sq.yd.
Gen. exc. - 294 cu. yd.
(For details, see shts. GP-3 and GP-4)

(3) Sta. "Cr" 3+53.5 to Sta. "Cr" 5+57.50
Const. culvert
Loose riprap (Class 200) - 363 cu. yd
Streambed gravel - 121 cu. yd.
(For details, see shts. GE-5 thru GE-13)

(4) Remove exfg. pipe - 131'

(5) Plug, abandon and fill exfg. pipe with CLSM - 335'

(6) Inst. Fish Log- 8
32' min. length
18" min. diameter
Inst. Fish Rocks - 24
(For details, see sht. GP-5)

(7) Not used

(8) Wall W1
(For details, see sht. GE-13)

(9) Wall W2
(For details, see sht. GE-14)

(10) Wall W3
(For details, see sht. GE-16)

(11) Wall W4
(For details, see sht. GE-17)

(12) Wall W5
(For details, see sht. GC)

(13) Inst. Fish Rocks - 30
(For details, see sht. GP-5)

(14) Regrade and place riprap rock armor
(For detail, see shts GE-8 & GE-20)

REGISTERED PROFESSIONAL ENGINEER
74,330
OREGON
DEC 31, 2007
CHRISTOPHER S. LINK
RENEWS: 12-31-2014

OREGON DEPARTMENT OF TRANSPORTATION

Murray, Smith & Associates, Inc.
121 S.W. Salmon, Suite 900, Portland, Oregon 97204-2919
503.225.9010

MSA

FFO - US101: MANZANITA AVE. - NEAHKAHNIE CREEK SEC.
OREGON COAST HIGHWAY
TILLAMOOK COUNTY

Reviewed By - William K. Hollings
Designed By - Chris S. Link
Drafted By - Harry C. Marx

WATERWAY ENHANCEMENT

SHEET NO. GP

G:\PDX_Projects\12\1381\CAD\Sheets\11258.gpl :: Default 8/27/2014 4:35:23 PM CSL

Rotation: 0° Scale: 1"=50'

APPENDIX

2.3 Geotechnical Report for Water Treatment Plant

March 2000

J00-735

WRIGHT / DEACON & ASSOC., INC.
Geotechnical Consultants
19 N.W. 5th Avenue, Suite 208 • Portland, Oregon 97209 • Telephone (503) 227-5102

March 3, 2000

Bryan C. Balfour, P.E.
HGE, Inc.
19 Northwest 5th, Suite 300
Portland, Oregon 97209

RE: **GEOTECHNICAL REPORT**
PROPOSED WATER TREATMENT PLANT
CITY OF MANZANITA
MANZANITA, OREGON

Dear Mr. Balfour:

In accordance with our proposal of February 18, 2000, we have conducted a geotechnical investigation and study at the above-referenced site for a water treatment plant. The investigation was conducted to determine subsurface conditions at the site and to provide recommendations for the design of the foundation system for the proposed building. This report presents the results of our investigations including our recommendations.

LOCATION AND TOPOGRAPHY

The site is located along U.S. Highway 101 about ½ mile southeast of the Manzanita business district. The site is on relatively flat, cleared land with dimensions of approximately 110 by 200 feet that previously contained a one-story office building. The moderate slope of a stabilized sand dune forms the southeast boundary of the property. The site elevation is approximately 100 feet (msl, U.S. Geologic Survey). The concrete stem walls and spread footings of the previous building are still present on the site. A City of Manzanita sewage pipe is present along the south and east boundaries of the site. We understand that the pipe is about 12 feet below the present grade. The site location and topography are shown on Figure 1.

PLANS FOR DEVELOPMENT

Present plans call for a single-story structure on the site that will house offices, storage, the pumping equipment, and an underground storage tank. The building will be sited within the area indicated by the concrete stem wall of the former building, as shown on Figure 1.

METHODS OF INVESTIGATION

Subsurface investigations consisted of drilling two borings at the northeast and southwest corners of the proposed structure. The borings were drilled to depths of about 40 feet below the ground surface by a soil auger drill rig owned and operated by the Vandehey Drilling Company of Banks, Oregon. Samples were taken at 2.5-foot intervals to 20 feet and at 5-foot intervals to the

bottom of the borings by means of a 2-inch O.D. split-spoon sampler used in the performance of the Standard Penetration Test (SPT). The borings were logged by a geologist from our firm, who placed the samples in sealed containers and transported them to a commercial laboratory for testing. The locations of the borings are shown on Figure 1 and the Logs of the Borings on Figures 2 and 3.

Laboratory Tests. Laboratory tests consisted of water content determinations and classifications on each sample. The water content determinations are plotted with the boring logs, Figures 2 and 3.

GEOLOGIC AND SUBSURFACE CONDITIONS

Information on geologic conditions in the site area is available from Wells and others, 1994, *Geologic Map of the Tillamook Highlands, Northwest Oregon Coast Range*, U.S. Geologic Survey, Open File Report 94-21. This information indicates that the site and adjacent areas are underlain by Pleistocene dune sand over Oligocene Marine mudstone.

SUBSURFACE CONDITIONS

Subsurface investigations were conducted by drilling two soil auger borings to depths of about 40 feet. Detailed boring logs are shown on Figures 2 and 3. The soil units penetrated are summarized below:

Unit 1 - FILL. Loose sand and manmade fill were penetrated in Boring B-1 from the ground surface to a depth of approximately 13 feet. The fill consisted of very loose, light-brown, fine sand. SPT blow counts ranged from 2 to 4 blows per foot. The fill appears to be backfill from the sewer trench pipe that is about 5 feet east of the boring location. We understand that the trench was excavated to a depth of about 13 feet and backfilled with the excavated sand.

Unit 2 - Loose SAND. Loose sand was penetrated only in Boring B-1 from depths ranging from 13 feet to about 20 feet. It consisted of loose, light-brown, fine SAND with zones of horizontal to cross-bedded laminations. SPT blow counts ranged from 7 to 10 blows per foot.

Unit 3 - Medium-Dense SAND. The unit was penetrated in Boring B-1 from a depth of 14 feet approximately to the bottom of the boring at 41.5 feet and in Boring B-2 from the ground surface to the bottom of the boring at 41.5 feet. The unit consisted of light-brown, fine sand with zones of horizontal to cross-bedded laminations. SPT blow counts ranged from 10 to 20 blows per foot. A zone in Boring B-2 at 15 to 19 feet was loose, with SPT blow counts of 7 to 9 blows per foot.

GROUNDWATER

Groundwater was not penetrated in the borings. We estimate that groundwater is probably present in the sand at a depth of about 50 feet, near the depth of Neahkahnie Lake to the north of the site at an elevation of about 50 feet.

ENGINEERING STUDIES

Subsurface investigations indicate that the site is underlain by manmade fill to a depth of 13 to 15 feet along the east side of the proposed structure. Loose to medium-dense dune sand is present throughout the location of the building except for the fill area along the east side, where the existing 18-inch sewer is located. SPTs in the medium-dense sand ranged from 10 to 20 blows per foot to the explored depth of 41.5 feet. Groundwater was not present to depths of 41.5 feet. We estimate groundwater to be at a depth of approximately 50 feet below the site (Elev. ±50 feet) at the approximate level of Neahkahnie Lake north of the site.

We understand that the proposed structure will be a single-story building with a high ceiling (12 feet), 55 by 65 feet in dimensions to house the treatment tank and pumping equipment. The structure will house a concrete storage tank of approximate dimensions of 36 by 55 feet that will be placed in an excavation beneath part of the building to a depth of 6 to 8 feet below grade level. The water level in the tank is planned for 6 to 8 feet. This will result in the tank footings being approximately10 feet below the existing site grade.

Site Grading

Site preparation may be accomplished by a number of methods, depending on the actual grade desired. However, all building areas should be stripped of sod, surficial fill, and loose or unsuitable materials, including old foundations. We anticipate general site stripping to a depth of 6 to possibly 9 inches below the existing ground surface will suffice in most areas except adjacent to the existing sewer line, where much deeper uncompacted fill was encountered.

Following the removal of old fill in the proposed building area, as well as the existing footings and topsoil to expose the site for grading, the site should be cut or filled to the desired grades and slopes. It is recommended that the exposed subgrade be proof-rolled using a loaded 12-yard dump truck (or equivalent) and the soft areas removed and backfilled with clean, well-graded crushed rock prior to placement of the compacted supporting fills, base course, and drainage facilities. In areas where actual foundations are to be placed, a minimum of 12 inches of clean, crushed, well-graded 3/4-inch-minus rock should be placed and compacted in 6-inch lifts to a minimum dry density of at least 95 percent of the maximum standard Proctor dry density for the material.

We point out that favorable dry weather will be required for operations in which any fine-grained materials are being placed and compacted. Consequently, it is recommended that site preparation be conducted prior to the onset of the rain and/or snow season. In the event that wet weather is encountered during site preparation, it may be necessary to suspend operations or use a clean, granular material (i.e., sand, gravel, or crushed rock with less than 5 percent passing the No. 200 sieve on a wet-sieve basis). Clean granular fills can be constructed in any kind of weather and can be compacted to support heavy structures using adequate compactive effort.

Structural fills should be spread in uniform lifts not exceeding 9 inches of loose thickness, with each lift thoroughly compacted by repeated coverages of loaded hauling equipment, heavy crawler tractors, or vibratory rollers. Any material in excess of 6inches in maximum dimension must be excluded from the fill. Fills should be compacted to 95 percent of the maximum dry density, as determined by laboratory compaction test method AASHTO T-90-70. In addition,

the site should be visually reviewed by a geotechnical engineer (or his representative) to determine whether the subgrade materials exposed are those anticipated and that the proper cut and/or fill slopes have been made in the various materials.

It is important that the old fill and overburden on the downslope or east side of the facility be properly excavated to the subgrade prior to the placement of the required fill. In footing areas, the critical excavation line is defined as 1 foot outside of the footings for each 2 feet of depth below the footing (all sides). It is recommended that drainage be seriously considered under the tank structure, and the sides should be designed as a basement or retaining wall, assuming the tank is empty. Drainage of the bottom of the tank may be difficult if natural gravity flow is not available. Groundwater is not anticipated for several feet below the base of the tank.

Backfilling of the excavation will be critical and should consist of 9-inch lifts of loose material compacted to a minimum dry density of no less than 95 percent of the maximum standard (T-99) dry density for the material. The backfill may consist of the clean, excavated dune sand or a dense, clean, hard, well-graded 1½-inch-minus granular material with no more than 5 percent fines passing the 200-mesh screen, using the wet-sieve method. It is very important that the fines in the backfill be carefully controlled under the prevailing conditions and that the specified minimum density be well controlled using frequent in-place density tests.

A considerable amount of material will need to be excavated on the east side of the facility adjacent to the existing sewer line. It is in this area where the unsatisfactory fill is located that will need to be removed to near the depth of the 18-inch sewer and extended westward for the width of the proposed tank. If the excavated material is clean dune sand, it may be stockpiled and used for backfill, assuming the moisture content is at or below the optimum moisture content for the material. The slopes of the excavation will need to be no steeper than 1.5 horizontal (H) on 1 vertical (V) and may need to be flattened to 1.7 H on 1 V. The cut slopes will be very sensitive to erosion and, in our opinion, protection of cut/fill slopes should be provided in the form of jute matting. This protection will be required until such time as the tank excavation is backfilled (see Figure 4). We anticipate erosion and sloughing problems on any permanent cut or fill slopes until such time as adequate groundcover can be established.

As a part of the excavation, construction, and backfill of the tank adjacent to the sewer, we recommend the establishment of a barrier between the sewer and the tank below the tank footings. In our opinion, this is necessary to preclude infiltration erosion below the footings in the event of a sewer line break. The barrier, in our opinion, should consist of a low-strength (750 to 1,000 psi) fill concrete. This barrier should be placed so as to protect the east tank foundations from potential erosion resulting to a possible break in the adjacent 18-inch sewer line.

Retaining Structure

At the present time, it is our understanding that the buried tank walls on the east half of the proposed facility will be the only units that will act as a retaining structure. Lateral loads will be controlled by the dune sand backfill (ϕ = 32 degrees) with an equivalent fluid pressure (EFP) of 45 lbs/ft^3 and an EFP from the water of 64 lbs/ft^3. The exterior walls should, in our opinion, be designed for an EFP of 65 lbs/ft^3 in the event of a loss of backfill due to a sewer line failure

as well as 45 lbs/ft^3 in the event the tank is drained. Full drainage of the backfill is also recommended, as show on the attached Figure 4.

Foundation Recommendations

Based on the results of the field explorations, SPTs, and our knowledge of the engineering characteristics of the subsurface materials in the site area, is it our opinion that placement of the controlled fill for the tank subgrade may continue between the recommended low-strength fill concrete barrier and the east side of the tank subgrade following the excavation for the tank and placement of the barrier of low-strength concrete (750 to 1,000 psi) between the sewer and the tank footing. Because of the horizontal loads on the stem walls, it is recommended that the base of the tank be a single reinforced-concrete pour with water stops for the walls. The recommended allowable bearing pressure for the base "pad" is 1,000 lbs per sq ft, assuming the subgrade is compacted to a minimum dry density that is 95 percent of the maximum standard Proctor (T-99) dry density for the subgrade material. Following the backfilling of the tank stem walls, the surficial subgrade should be compacted to 95 percent of the maximum standard Proctor dry density (T-99) and the footings prepared for the balance of the building. The minimum footing width recommended is 18 inches for continuous footings and 24 inches for isolated footings. The recommended allowable bearing pressure for the footings that do not exceed a width of 65 feet is 1,800 lbs per sq ft. In our opinion, all footings should be buried at least 18 inches below the lowest adjacent exterior grade.

The total maximum settlements of the footings are estimated to be 1.25 inches, with maximum differential settlements estimated to be of the order of 3/4 inch. The estimate of settlements assumes that no disturbance to the foundation soils would be permitted following their placement during excavation, backfill, and construction. Because of the susceptibility of the dune sands to deterioration in the presence of water at the site, it is recommended that the floor slab and footing excavations be covered with 2 to 3 inches of clean, 3/4-inch crushed rock to provide protection from water and workers. All slabs should be placed on 6 inches of clean, well-graded, 3/4-inch crushed rock compacted to a minimum density of 95 percent of the maximum standard Proctor dry density (T-99). If floor slabs are to be finished for office use, underdrains should be used (4-inch ADS with filter fabric) within a thickened section of crushed rock on a spacing of 20 feet and drained to daylight.

It is our understanding that the buried tank floor loads will not exceed 1,000 lbs per sq ft. All concrete floor slabs on grade should be placed on a minimum 6-inch layer of free-draining, well-graded crushed rock, with a maximum particle size of 3/4 inch and not more than 5 percent passing the No. 200 sieve (based on a wet-sieve analysis). This underslab granular material should be placed on a good grade of filter fabric and compacted to a dry density of at least 95 percent of the standard Proctor maximum dry density (T-99). Although no groundwater is anticipated, consideration should be given to the possible development of uplift pressure when the basin is de-watered. To insure that this would not take, a subdrain system should be considered at a maximum spacing of the order of 25 feet (the actual width of the structure is less).

Pavements

A study was conducted for the pavement section for the parking area and main drive for heavy delivery trucks (48,000 gross vehicle weight). Based on the design analyses and assumptions used as well as our experience with similar projects, we recommend a flexible pavement section that consists of 3 inches of asphaltic concrete over 10 inches of compacted aggregate base over 4 inches of sand subbase for the main drive lane. As an alternative, a filter fabric may be substituted for the sand subbase. We recommend that Class B asphaltic concrete conforming to the standard specifications for Highway Construction (Oregon State Highway Division - 1984) be used.

For the parking lot, we recommend a section that consists of 2 inches of asphaltic concrete over 6 inches of compacted aggregate base over 2 inches of sand subbase or filter fabric. Where an occasional garbage truck or fire truck may travel in the parking area, the asphalt should be thickened to 3 inches.

The base material should consist of a clean, well-graded crushed rock or gravel conforming to the Oregon State Highway Division Standard Specifications, with not more than 5 percent passing the No. 200 sieve (wet sieve). The base material should be graded fro 0 to 1½ inches except for the top 2 inches, which should consist of 0 to 3/4 inch of crushed rock. The material should be compacted to a dry density of at least 95 percent of the standard Proctor maximum density (T-99).

At your request, we will review those portions of the plans and specifications that pertain to foundations to determine if they are consistent with our recommendations. To insure that all foundations are supported by undisturbed natural soils or properly compacted backfill, it is recommended that we be retained to observe the preparation of the foundations.

CLOSURE

The analyses, conclusions, opinions, and recommendations contained in this report are based on site conditions as they presently exist and further assume that the exploratory borings are representative of the subsurface conditions throughout the site; i.e., the subsurface conditions everywhere are not significantly different from those disclosed by the investigation. The opinions and recommendations within this report are not intended as a warranty but are professional opinions derived in accordance with current professional practice. If during construction subsurface conditions different from those encountered in the exploratory borings are observed or encountered or appear to be present beneath or beyond any excavations, we should be advised at once so that we can observe and review these conditions and reconsider our recommendations, where necessary. If there is a substantial lapse of time between submission of this report and the start of work at the site or if conditions have changed due to natural causes or construction operations at or adjacent to the site, it is recommended that the report be reviewed to determine the applicability of the conclusions and recommendations considering the changed conditions and time lapse.

Our investigation and study were based upon available published geologic and seismic information, and on subsurface and geotechnical studies at the sites. The data, conclusions, and recommendations presented in this report are believed to be representative of the site. The

conclusions and recommendations herein are professional opinions derived in accordance with current standards of professional practice, and no warranty is expressed or implied.

It has been our pleasure to serve you, and if you have any questions concerning this report, please contact us at your convenience.

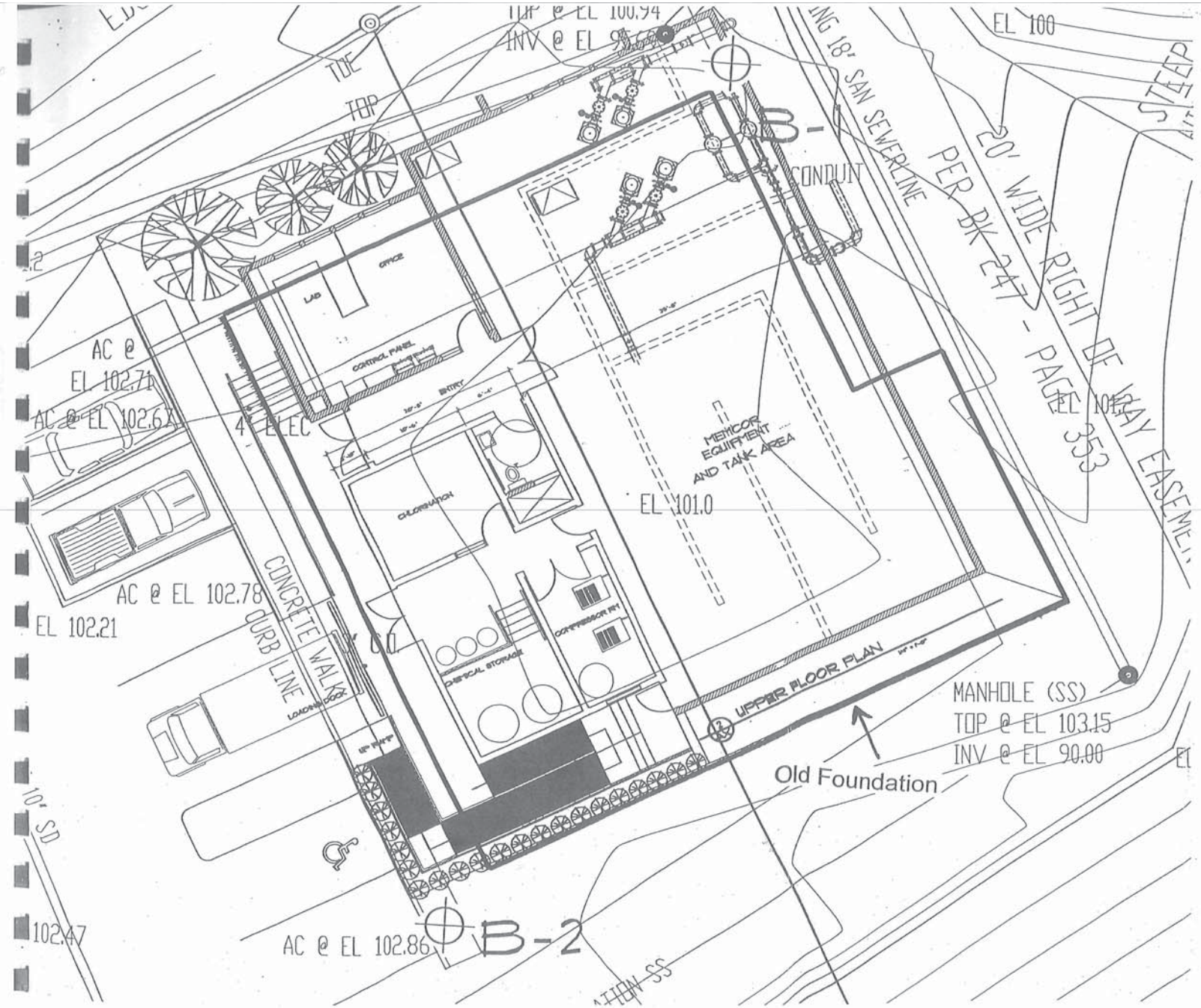
Very truly yours,

WRIGHT/DEACON & ASSOC., INC.

By _____
Walter L. Wright, P.E.

WLW:ejs
Enclosures

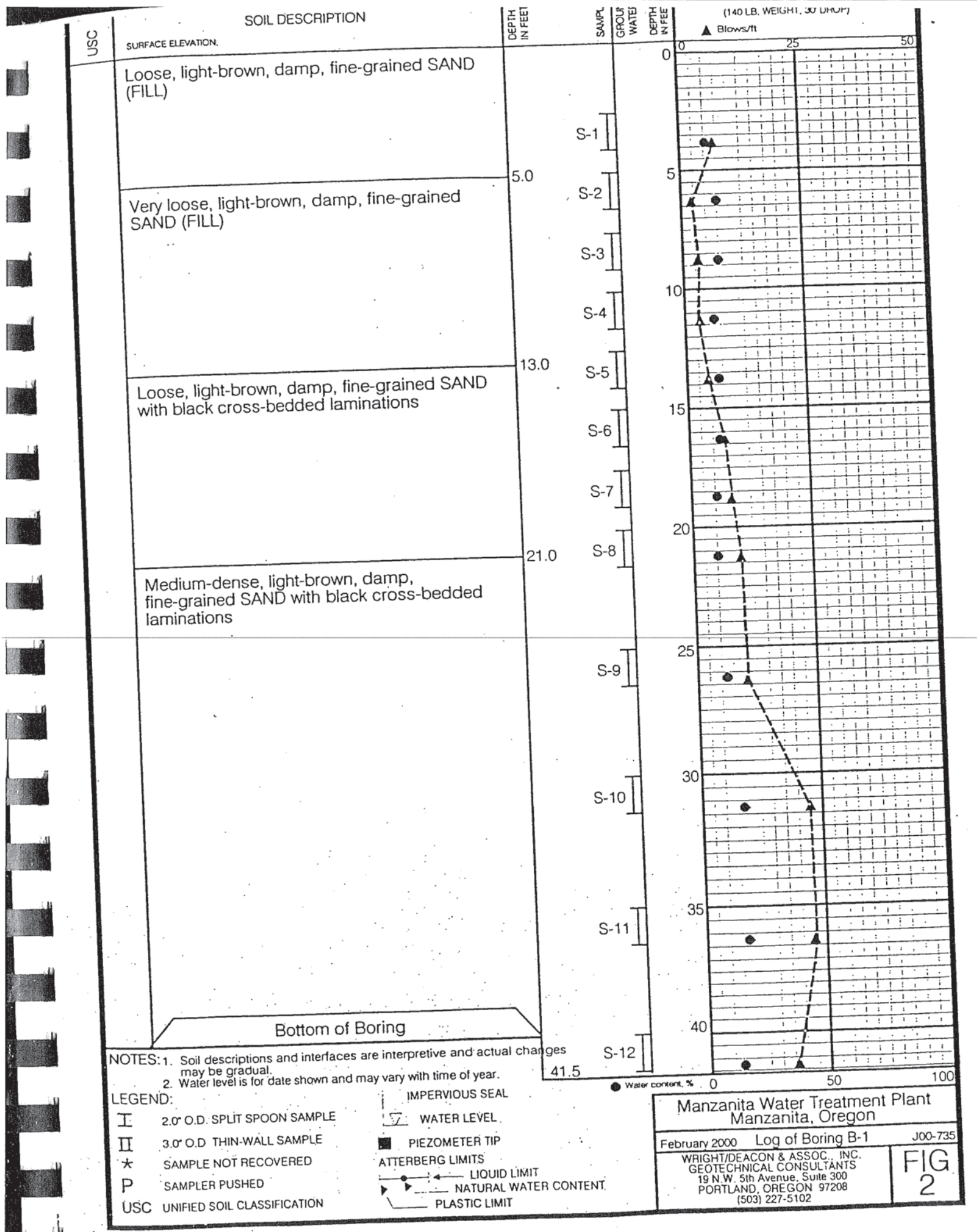
Expires: 6/30/00

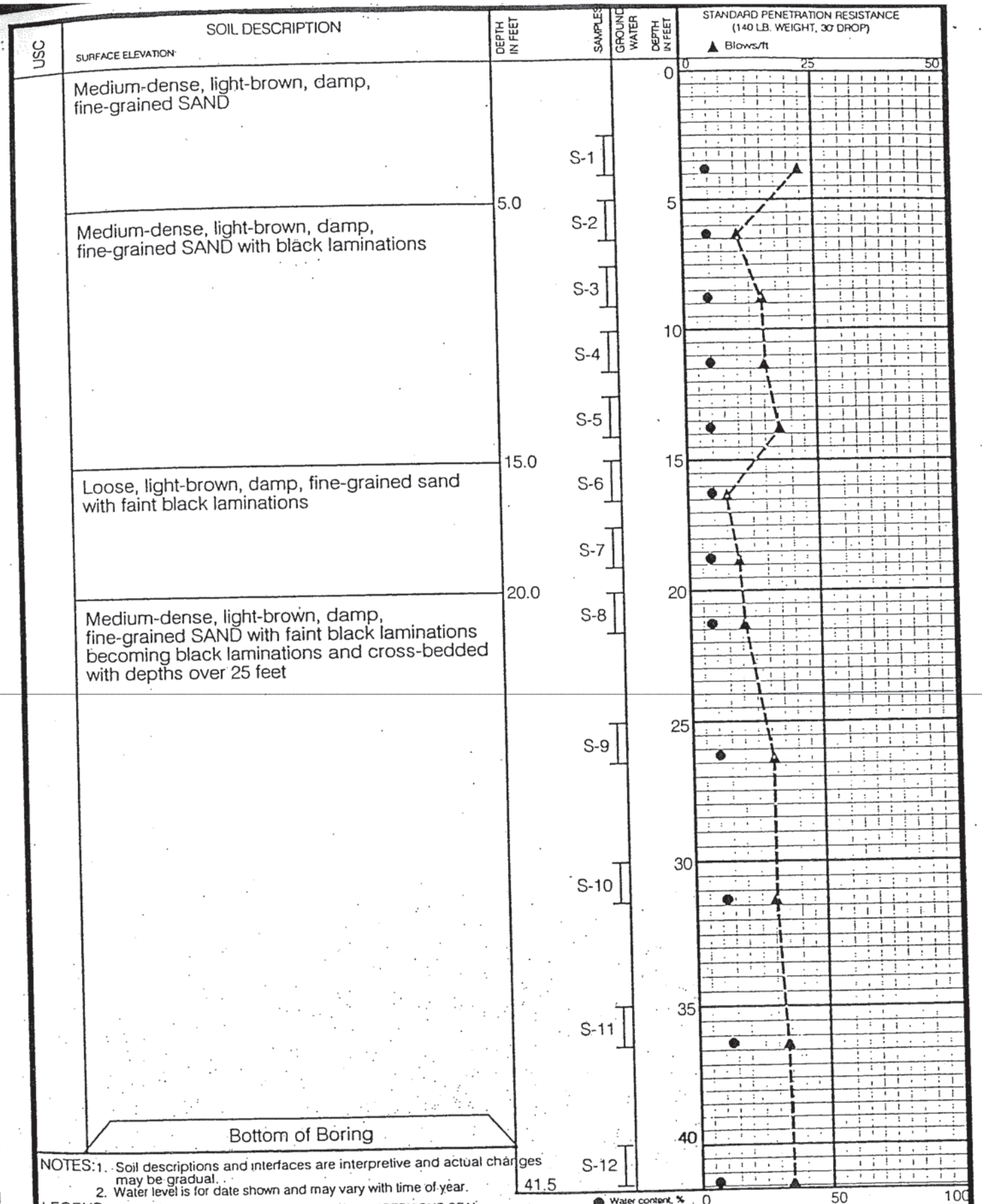


⊕ Boring Location

Scale: 1" = 10'

HGE, Inc. Manzanita Water Treatment Plant Manzanita, Oregon	
Plan	
February 2000	J00-73
WRIGHT/DEACON & ASSOC. INC. GEOTECHNICAL CONSULTANTS 19 N.W. 5th Avenue, Suite 300 PORTLAND, OREGON 97209 (503)227-5102	Fig. 1


USC
SOIL DESCRIPTION
SURFACE ELEVATION.
DEPTH IN FEET
SAMPL
GROUN WATEI
DEPTH IN FEE
(140 LB. WEIGHT, 30" DROP)
Blows/ft
0
25
50
Loose, light-brown, damp, fine-grained SAND (FILL)
5.0
Very loose, light-brown, damp, fine-grained SAND (FILL)
13.0
Loose, light-brown, damp, fine-grained SAND with black cross-bedded laminations
21.0
Medium-dense, light-brown, damp, fine-grained SAND with black cross-bedded laminations
Bottom of Boring
41.5
S-1
S-2
S-3
S-4
S-5
S-6
S-7
S-8
S-9
S-10
S-11
S-12
0
5
10
15
20
25
30
35
40
Water content, %
0
50
100
NOTES: 1. Soil descriptions and interfaces are interpretive and actual changes may be gradual.
2. Water level is for date shown and may vary with time of year.
LEGEND:
2.0" O.D. SPLIT SPOON SAMPLE
3.0" O.D THIN-WALL SAMPLE
SAMPLE NOT RECOVERED
P SAMPLER PUSHED
USC UNIFIED SOIL CLASSIFICATION
IMPERVIOUS SEAL
WATER LEVEL
PIEZOMETER TIP
ATTERBERG LIMITS
LIQUID LIMIT
NATURAL WATER CONTENT
PLASTIC LIMIT
Manzanita Water Treatment Plant
Manzanita, Oregon
February 2000 Log of Boring B-1 J00-735
WRIGHT/DEACON & ASSOC., INC.
GEOTECHNICAL CONSULTANTS
19 N.W. 5th Avenue, Suite 300
PORTLAND, OREGON 97208
(503) 227-5102
FIG 2



NOTES: 1. Soil descriptions and interfaces are interpretive and actual changes may be gradual.
2. Water level is for date shown and may vary with time of year.

LEGEND:

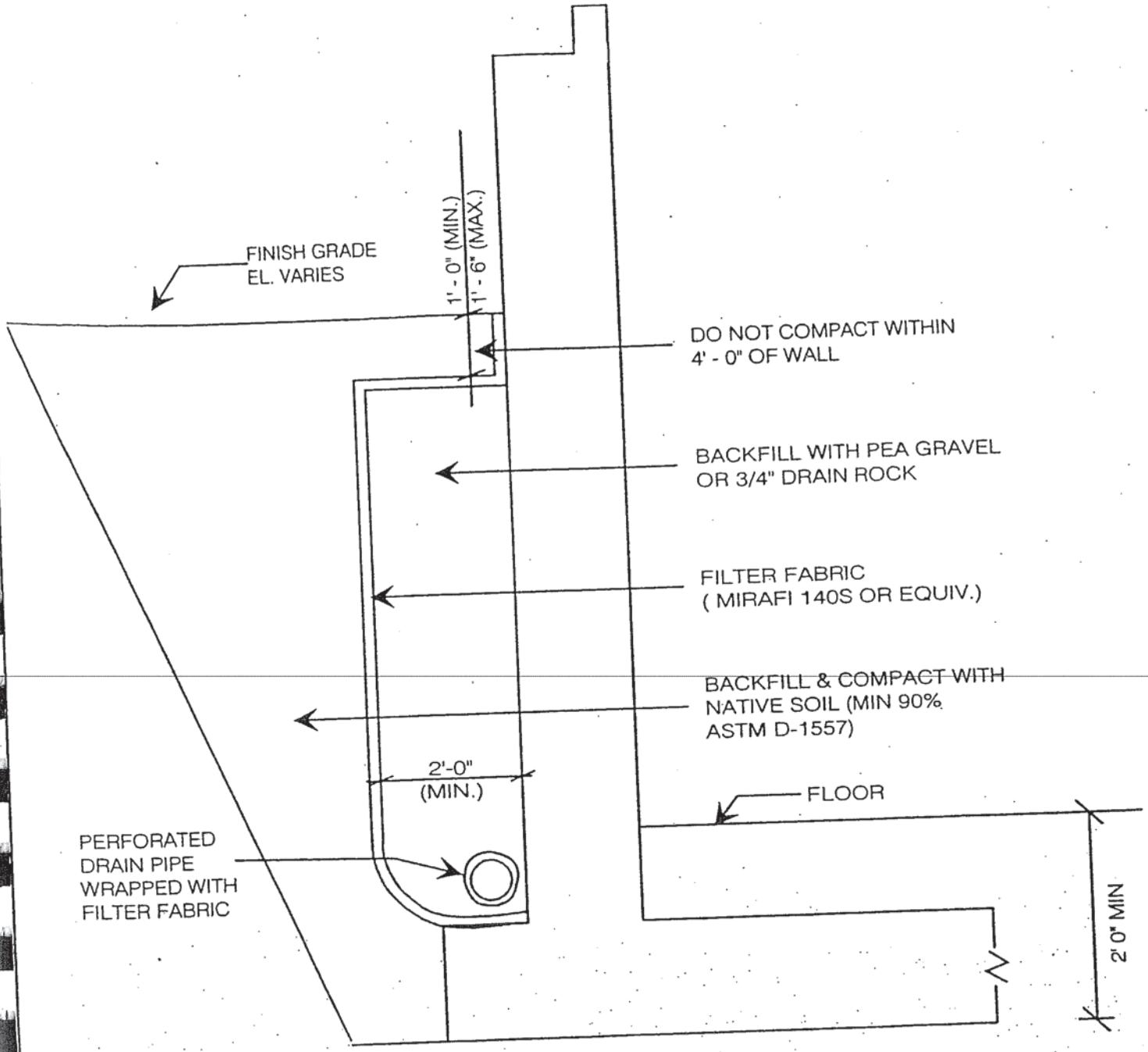
- I — 2.0" O.D. SPLIT SPOON SAMPLE
- II — 3.0" O.D. THIN-WALL SAMPLE
- ✶ — SAMPLE NOT RECOVERED
- P — SAMPLER PUSHED
- USC — UNIFIED SOIL CLASSIFICATION
- IMPERVIOUS SEAL
- WATER LEVEL
- PIEZOMETER TIP
- ATTERBERG LIMITS
  - LIQUID LIMIT
  - NATURAL WATER CONTENT
  - PLASTIC LIMIT

Manzanita Water Treatment Plant
Manzanita, Oregon

February 2000 Log of Boring B-2 J00-735

WRIGHT/DEACON & ASSOC., INC.
GEOTECHNICAL CONSULTANTS
19 N.W. 5th Avenue, Suite 300
PORTLAND, OREGON 97208
(503) 227-5102

FIG 3



HGE, Inc. Manzanita Water Treatment Plant Manzanita, Oregon	
March 2000 — Retaining Wall Backfill — J00-7	
Wright/Deacon & Assoc., Inc. 19 N.W. Fifth Ave., Suite 300 Portland, Oregon 97208	FIGURE 4

APPENDIX

3.1 Water Right

STATE OF OREGON

COUNTY OF TILLAMOOK

CERTIFICATE OF WATER RIGHT

This Is to Certify, That CITY OF MANZANITA

of Manzanita, State of Oregon, has made proof to the satisfaction of the STATE ENGINEER of Oregon, of a right to the use of the waters of Classic Lake Creek and Lange Creek & reservoir constructed under App. No. R-26028, Perm. No. R-1455 a tributary of Nehalem River for the purpose of municipal under Permit No. 21913 of the State Engineer, and that said right to the use of said waters has been perfected in accordance with the laws of Oregon; that the priority of the right hereby confirmed dates from August 14, 1950;

that the amount of water to which such right is entitled and hereby confirmed, for the purposes aforesaid, is limited to an amount actually beneficially used for said purposes, and shall not exceed 1.3 cubic feet per second, being 0.433 c.f.s. from Lange Creek and 0.867 c.f.s. from Classic Lake Creek,

or its equivalent in case of rotation, measured at the point of diversion from the stream. The point of diversion is located in the $NW\frac{1}{4}SW\frac{1}{4}$, Section 16 on Classic Lake Creek, and $NW\frac{1}{4}SE\frac{1}{4}$, Section 21 on Lange Creek, Township 3 North, Range 10 West, W. M.

The amount of water used for irrigation, together with the amount secured under any other right existing for the same lands, shall be limited to - - - - - - - - of one cubic foot per second per acre,

and shall conform to such reasonable rotation system as may be ordered by the proper state officer.

A description of the place of use under the right hereby confirmed, and to which such right is appurtenant, is as follows:

$S\frac{1}{2}NE\frac{1}{4}$
Lot #2 - $(SE\frac{1}{4}NW\frac{1}{4})$
Lot #3 - $(NE\frac{1}{4}SW\frac{1}{4})$
Lot #4 - $(SE\frac{1}{4}SW\frac{1}{4})$
$SE\frac{1}{4}$
Section 29
$N\frac{1}{2}NE\frac{1}{4}$
Lot #1 - $(NE\frac{1}{4}NW\frac{1}{4})$
Section 32
Township 3 North, Range 10 West, W. M.

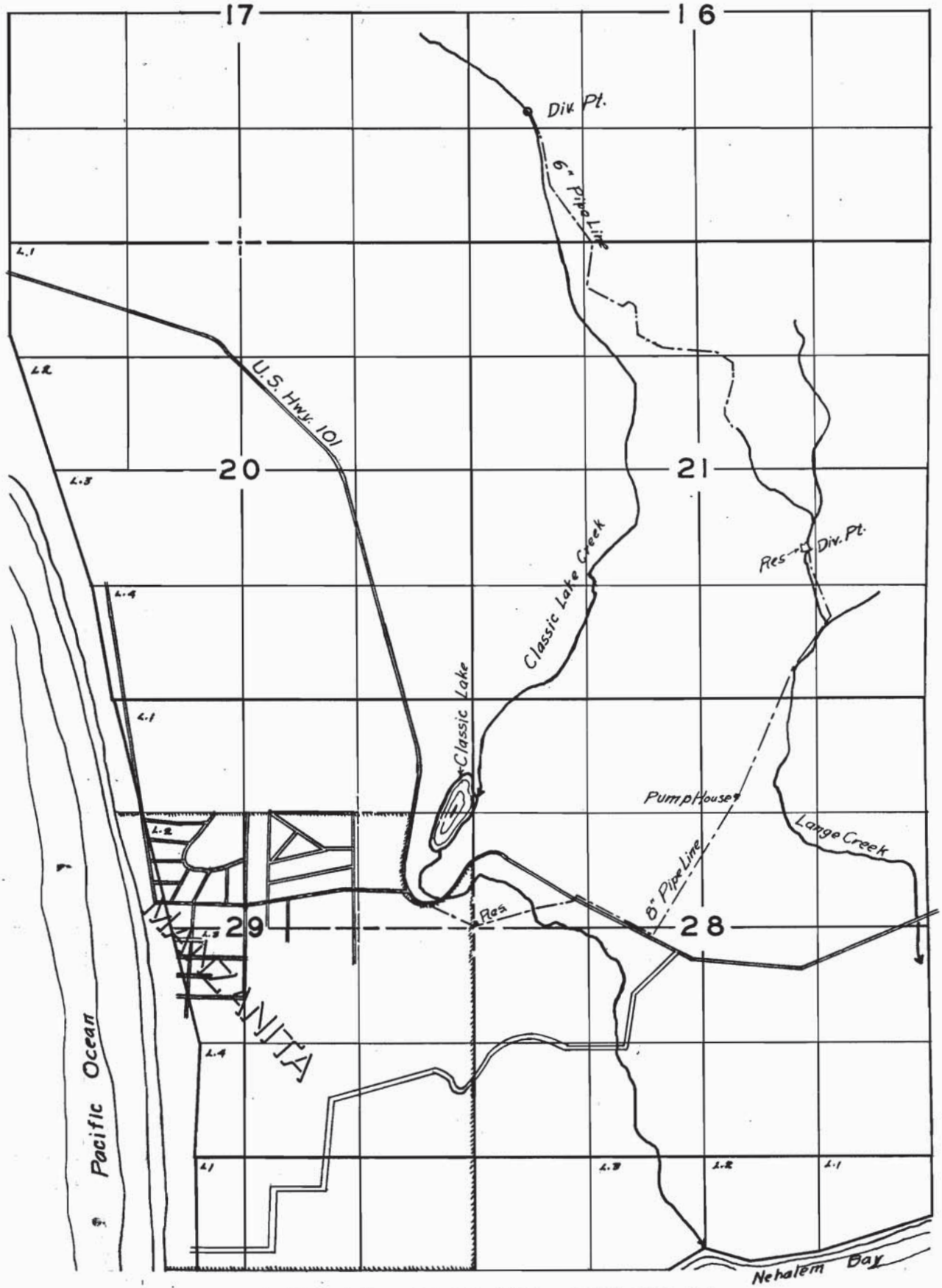
The right to the use of the water for the purposes aforesaid is restricted to the lands or place of use herein described.

WITNESS the signature of the State Engineer, affixed this 28th day of November, 1956.

LEWIS A. STANLEY
State Engineer

Recorded in State Record of Water Right Certificates, Volume 16, page 21707.

T. 3 N. R. 10 W. W. M.



FINAL PROOF SURVEY

UNDER

APPLICATION NO. 23417, 25124, & R-26028 PERMIT NO. 18634, 21913 & R-1455

IN NAME OF

CITY OF MANZANITA

SURVEYED 5 AUGUST 1955, BY Robert W. Burk

See No. R-26113

Permit No. 21913

*APPLICATION FOR PERMIT

To Appropriate the Public Waters of the State of Oregon

I, City of Manzanita
(Name of applicant)

of _____
(Mailing address)

State of _____, do hereby make application for a permit to appropriate the following described public waters of the State of Oregon, SUBJECT TO EXISTING RIGHTS:

If the applicant is a corporation, give date and place of incorporation _____

1. The source of the proposed appropriation is Classic Lake Creek formerly known as Ettenberger Crk. & Lange Crk. and reservoir (app. No. R-25806), a tributary of Nehalem River
(Name of stream)

2. The amount of water which the applicant intends to apply to beneficial use is 1.3 cubic feet per second.
(If water is to be used from more than one source, give quantity from each)

**3. The use to which the water is to be applied is Municipal
(Irrigation, power, mining, manufacturing, domestic supplies, etc.)

4. The point of diversion is located 800 ft. N. (N. or S.) and 850 ft. E. (E. or W.) from the SW corner of Sec. 16 being within the SW¼ SW¼ Sec. 16 (Section or subdivision)
Classic Lake Cr.
Lange Cr. diversion is located 760 ft. S. & 1040 ft. E of the center of Sec. 21

(If preferable, give distance and bearing to section corner)

(If there is more than one point of diversion, each must be described. Use separate sheet if necessary)

being within the NW¼ SE¼ (Give smallest legal subdivision) of Sec. 21, Tp. 3 N (N or S.), R. 10 W (E. or W.), W. M., in the county of Tillamook.

5. The _____ (Main ditch, canal or pipe line) to be _____ (Miles or feet) in length, terminating in the _____ (Smallest legal subdivision) of Sec. _____, Tp. _____ (N. or S.), R. _____ (E. or W.) W. M., the proposed location being shown throughout on the accompanying map.

DESCRIPTION OF WORKS

Diversion Works—

6. (a) Height of dam 9.6 feet, length on top 60 feet, length at bottom 35 feet; material to be used and character of construction timber crib
(Loose rock, concrete, masonry, rock and brush, timber crib, etc., wasteway over or around dam)

(b) Description of headgate _____
(Timber, concrete, etc., number and size of openings)

(c) If water is to be pumped give general description Gravity flow
(Size and type of pump)

(Size and type of engine or motor to be used, total head water is to be lifted, etc.)

*A different form of application is provided where storage works are contemplated.

**Application for permits to appropriate water for the generation of electricity, with the exception of municipalities, must be made to the Hydroelectric Commission. Either of the above forms may be secured, without cost, together with instructions by addressing the State Engineer, Salem, Oregon.

21913

Canal System or Pipe Line—

7. (a) Give dimensions at each point of canal where materially changed in size, stating miles from headgate. At headgate: width on top (at water line) ..... feet; width on bottom ..... feet; depth of water ..... feet; grade ..... feet fall per one thousand feet.

(b) At ..... miles from headgate: width on top (at water line) .....

..... feet; width on bottom ..... feet; depth of water ..... feet;

grade ..... feet fall per one thousand feet.

(c) Length of pipe, ~~660~~ 3300 ft.; size at intake, 6 in.; size at ..... ft. from intake ..... in.; size at place of use 6 in.; difference in elevation between intake and place of use, ~~60~~ 66 ft. Is grade uniform? ..... Estimated capacity, 1.16 sec. ft.

8. Location of area to be irrigated, or place of use City of Manzanita

Township	Range WILLAMETTE MERIDIAN	Section	Forty-acre Tract	Number Acres To Be Irrigated
3 N	10 W	29		

(If more space required, attach separate sheet)

(a) Character of soil .....

(b) Kind of crops raised .....

Power or Mining Purposes—

9. (a) Total amount of power to be developed ..... theoretical horsepower.

(b) Quantity of water to be used for power ..... sec. ft.

(c) Total fall to be utilized ..... (Head) feet.

(d) The nature of the works by means of which the power is to be developed

.....

(e) Such works to be located in ..... (Legal subdivision) of Sec. ,

Tp. ..... (No. N. or S.), R. ..... (No. E. or W.), W. M.

(f) Is water to be returned to any stream? ..... (Yes or No)

(g) If so, name stream and locate point of return .....

....., Sec. ....., Tp. ..... (No. N or S.), R. ..... (No E. or W.), W. M.

(h) The use to which power is to be applied is .....

.....

(i) The nature of the mines to be served .....

.....

21913

Municipal or Domestic Supply—

10. (a) To supply the city of Manzanati

..... County, having a present population of 300

and an estimated population of 1000 in 1960

(b) If for domestic use state number of families to be supplied .....

(Answer questions 11, 12, 13, and 14 in all cases)

11. Estimated cost of proposed works, $ 11000.00

12. Construction work will begin on or before In a few days

13. Construction work will be completed on or before 2 yrs after approval

14. The water will be completely applied to the proposed use on or before 3 yrs

Ben S. Lane Mayor
(Signature of applicant)

Remarks: Under this application it is proposed to divert water from Classic Lake Creek through about 3300 ft. of 6 in. pipe to Lange Creek. The Classic Lake Creek water will pass down Lange Creek about 1800 ft. where it will be diverted for use in the City of Manzanita through the system described in permit No. 18634

Approximately 1/3 of the water to be obtained from Lange Cr. & 2/3 from Classic Lake Cr.

STATE OF OREGON,
County of Marion, } ss.

This is to certify that I have examined the foregoing application, together with the accompanying maps and data, and return the same for .....

In order to retain its priority, this application must be returned to the State Engineer with corrections on or before ....., 19 .....

WITNESS my hand this ..... day of ..... 19 .....

STATE ENGINEER

PERMIT

STATE OF OREGON, } ss.
County of Marion, }

This is to certify that I have examined the foregoing application and do hereby grant the same, SUBJECT TO EXISTING RIGHTS and the following limitations and conditions:

The right herein granted is limited to the amount of water which can be applied to beneficial use and shall not exceed 1.3 cubic feet per second measured at the point of diversion from the stream, or its equivalent in case of rotation with other water users, from Classic Lake Cr. formerly known as Effenberger Creek and Lange Creek, being 0.433 cfs from Lange Creek and 0.867 cfs from Classic Lake Creek and reservoir to be constructed under Application No. R-26028,

The use to which this water is to be applied is municipal Permit No. R-1455.

If for irrigation, this appropriation shall be limited to ------ of one cubic foot per second

and shall be subject to such reasonable rotation system as may be ordered by the proper state officer.

The priority date of this permit is August 14, 1950

Actual construction work shall begin on or before June 30, 1954 and shall thereafter be prosecuted with reasonable diligence and be completed on or before October 1, 195[illegible]

Complete application of the water to the proposed use shall be made on or before October 1, 1956

WITNESS my hand this 30th day of June, 1953.

Chas. E. Stricklin
STATE ENGINEER

Permits for power development are subject to the payment of annual fees as provided in sections 1 and 2, chapter 74, Oregon Laws 1933.

Application No. [illegible]24
Permit No. 21913

PERMIT
TO APPROPRIATE THE PUBLIC WATERS OF THE STATE OF OREGON

Division No. ..... District No. .....

This instrument was first received in the office of the State Engineer at Salem, Oregon, on the 14th day of August, 1950, at 11:30 o'clock A. M.

Returned to applicant:

Corrected application received:

Approved:
June 30, 1953

Recorded in book No. 55 of Permits on page 21913

CHAS. E. STRICKLIN
STATE ENGINEER

Drainage Basin No. 4 Page 1 of 3

Fees Paid 22.00

APPENDIX

3.2 ORS 540.531

2015 Oregon Revised Statutes
Volume : 13 - Water Resources, Agriculture and Food
Chapter 540 - Distribution of Water; Watermasters; Change in Use; Transfer or Forfeiture of Water Rights
Section 540.531 - Transfer of surface water point of diversion to ground water; requirements; priority; mitigation measures; return to surface water diversion; rules.

Universal Citation: OR Rev Stat § 540.531 (2015)

(1) Notwithstanding ORS 537.515 and 537.535, an owner of a surface water use subject to transfer may apply for a transfer of the point of diversion to allow the appropriation of ground water if the proposed transfer complies with the requirements of subsection (2) or (3) of this section and with the requirements for a transfer in point of diversion specified in ORS 540.520 and 540.530.

(2) The Water Resources Department may allow a transfer of the point of diversion under subsection (1) of this section if:

(a)(A) The new point of diversion appropriates ground water from an aquifer that is hydraulically connected to the authorized surface water source;

(B) The proposed change in point of diversion will not result in enlargement of the original water right or in injury to other water right holders;

(C) The use of the new point of diversion will affect the surface water source similarly to the authorized point of diversion specified in the water use subject to transfer; and

(D) The withdrawal of ground water at the new point of diversion is located within 500 feet of the surface water source and, when the surface water source is a stream, is also located within 1,000 feet upstream or downstream of the original point of diversion as specified in the water use subject to transfer; or

(b) The new point of diversion is not located within the distance requirements set forth in paragraph (a)(D) of this subsection, the holder of the water use subject to transfer submits to the department evidence prepared by a licensed geologist that demonstrates that the use of the ground water at the new point of diversion will meet the criteria set forth in paragraph (a)(A) to (C) of this subsection.

(3) Notwithstanding subsection (2) of this section, the department shall allow a transfer of the point of diversion under subsection (1) of this section in the Deschutes Basin ground water study area if:

(a) The new point of diversion appropriates ground water from an aquifer that is hydraulically connected to the authorized surface water source;

(b) The proposed change in the point of diversion will not result in enlargement of the original water right or in injury to other water right holders; and

(c) The use of the new point of diversion will affect the surface water source hydraulically connected to the authorized point of diversion specified in the water use subject to transfer. The department may not require that the use of the new point of diversion affect the surface water source similarly to the authorized point of diversion specified in the water use subject to transfer under this subsection.

(4) All applicable restrictions that existed at the original point of diversion shall apply at the new point of diversion allowed under this section.

(5) The new point of diversion shall retain the original date of priority. However, if within five years after approving the transfer, the department finds that the transfer results in substantial interference with existing ground water rights that would not have occurred in the absence of the transfer, the new point of diversion shall be subordinate to any existing right injured by the transferred water right or permit.

(6)(a) The department shall approve an application to return to the last authorized surface water point of diversion if a holder of a water use subject to transfer submits an application to the department within five years after the department approves a transfer under this section.

(b) The department shall approve an application to return to the last authorized surface water point of diversion after five years of the date the department allows a transfer under subsection (3) of this section if a holder of a water use subject to transfer submits an application to the department, and the return will not result in injury to an existing water right.

(7) For transfers allowed under this section, the department shall require mitigation measures to prevent depletion from any surface water source not specified in the permit or certificated or decreed water right, except that the department may not require mitigation measures if the transfer complies with subsection (3) of this section.

(8) The Water Resources Commission shall adopt rules that prescribe:

(a) The process for reviewing applications submitted under this section;

(b) The persons to whom the department shall provide notice of the receipt of an application submitted under this section; and

(c) The persons who may participate in the process of reviewing applications submitted under this section.

(9) As used in this section:

(a) "Deschutes Basin ground water study area" means the part of the Deschutes River Basin that is designated by the Water Resources Commission by rule.

(b) "Similarly" means that the use of ground water at the new point of diversion affects the surface water source specified in the permit or certificated or decreed water right and would result in stream depletion of at least 50 percent of the rate of appropriation within 10 days of continuous pumping.

[1995 c.274 §4; 1999 c.555 §5; 2003 c.705 §1; subsection (9) of 2003 Edition enacted as 2003 c.705 §3; 2005 c.614 §2]

690-380-2130

Change from a Surface Water Point of Diversion to a Ground Water Appropriation

(1) As provided in ORS 540.531, an owner of a surface water use subject to transfer may apply for a transfer of the point of diversion to allow the appropriation of ground water, subject to the requirements for a transfer in point of diversion under this Division and the requirements under section (2) or (3) of this rule.

(2) The Department may allow the transfer of the point of diversion under section (1) of this rule if:

(a) The criteria in OAR 690-380-5000 are met;

(b) The new point of diversion appropriates ground water from an aquifer that is hydraulically connected to the authorized surface source; and

(c) The proposed change in point of diversion will affect the surface water source similarly to the authorized point of diversion specified in the water use subject to transfer; and

(d) The withdrawal of groundwater at the new point of diversion is located within 500 feet of the surface water source and, when the surface water source is a stream, is also located within 1000 feet upstream or downstream of the original point of diversion as specified in the water use subject to transfer; or

(e) If the distance requirements in subsection (2)(d) of this rule are not met, the holder of a water use subject to transfer shall submit to the Department evidence prepared by a licensed geologist that demonstrates that the use of the groundwater at the new point of diversion will meet the criteria set forth in subsections (2)(a) to (c) of this rule.

(3) Notwithstanding section (2) of this rule, the Department shall allow a transfer of the point of diversion under section (1) of this rule in the Deschutes basin ground water study area if:

(a) The proposed transfer would not result in injury to an existing water right or enlargement of the water right proposed for transfer;

(b) The criteria in OAR 690-380-5000 are met;

(c) The new point of diversion appropriates ground water from an aquifer that is hydraulically connected to the authorized surface water source; and

(d) The use of the new point of diversion will affect the surface water source hydraulically connected to the authorized point of diversion specified in the water use subject to transfer. The Department may not require that the use of the new point of diversion affect the surface water source similarly to the authorized point of diversion specified in the water use subject to transfer under this subsection.

(4) A transfer application requesting to change the point of diversion from a surface water diversion to a groundwater appropriation for which evidence prepared by a licensed geologist is required under subsection (2)(e) of this rule shall be evaluated by the Department in the following manner:

(a) The change in point of diversion request shall be examined to determine the potential for injury as if the change is to be from the authorized point of diversion to a point on the stream nearest the proposed well;

(b) If potential injury is not found, the evidence prepared by a licensed geologist and submitted by the applicant shall be evaluated to determine whether the application meets the other requirements of subsection (2)(a) to (c) of this rule. The geologist's report shall examine the effect on the surface water source in the vicinity of the point on the stream nearest the proposed new point of diversion.

(5) The new point of diversion shall retain the original date of priority and all other applicable conditions and restrictions that existed at the original point of diversion shall apply at the new point of diversion authorized under the transfer.

(6) If within five years after approving a transfer under this rule, the Department finds that the transfer results in substantial or undue interference with an existing ground water right that would not have occurred in the absence of the transfer, the new point of diversion shall be subordinate to the existing right injured by the transfer. This section applies only to wells with rights existing at the time the transfer was approved.

(7) The original point of diversion of surface water shall not be retained as an additional or supplemental point of diversion.

(8) The Department shall approve a transfer application to return to the last authorized surface water point of diversion if the required transfer application is received within five years after the Department approves a transfer under this rule. It shall be presumed, for transfers under this subsection, that there is no injury, including injury to rights obtained or transferred after the approval of the first transfer.

(9) The Department shall approve an application to return to the last authorized surface water point of diversion after five years of the date the Department allows the transfer under section (3) of this rule if the Department receives the required application, and the return will not result in injury.

(10) For transfers allowed under this rule, the Department shall require mitigation measures to prevent depletion from any surface water source not specified in the permit or certificated or decreed water right pursuant to ORS 540.531(6), except that the Department may not require mitigation measures if the transfer complies with section (3) of this rule.

(11) As used in this rule:

(a) "Existing ground water right" means a right that existed at the time a transfer was approved under sections (1) to (5) of this rule and does not include a right established after the transfer whether by permit or a change in point of appropriation regardless of priority date.

(b) "Similarly" means that the use of groundwater at the new point of diversion affects the surface water source specified in the permit or certificated or decreed water right and would result in stream depletion of at least 50 percent of the rate of appropriation within 10 days of continuous pumping.

(c) "Deschutes basin ground water study area" means the Deschutes River Basin drainage area indicated in OAR 690, division 505, Exhibit 1.

(12) The Department shall provide notice and review of transfer applications under section (3) of this rule pursuant to OAR 690-380-4000 through 690-380-4200.

(13) Opportunities to protest a transfer under section (3) of this rule shall be pursuant to OAR 690-380-4030.

(14) The Department shall issue final orders on transfer applications under section (3) of this rule pursuant to OAR 690-380-5000.

Stat. Auth.: ORS 536.025 & 536.027
Stats. Implemented: ORS 540.520, 540.530 & 540.531
Hist.: WRD 5-1996, f. & cert. ef. 7-11-96; WRD 2-2003, f. & cert. ef. 5-1-03, Renumbered from 690-015-0210; WRD 1-2004, f. & cert. ef. 3-17-04; WRD 5-2006, f. & cert. ef. 10-6-06