Eugene Millrace

A Report to Inform Future Use

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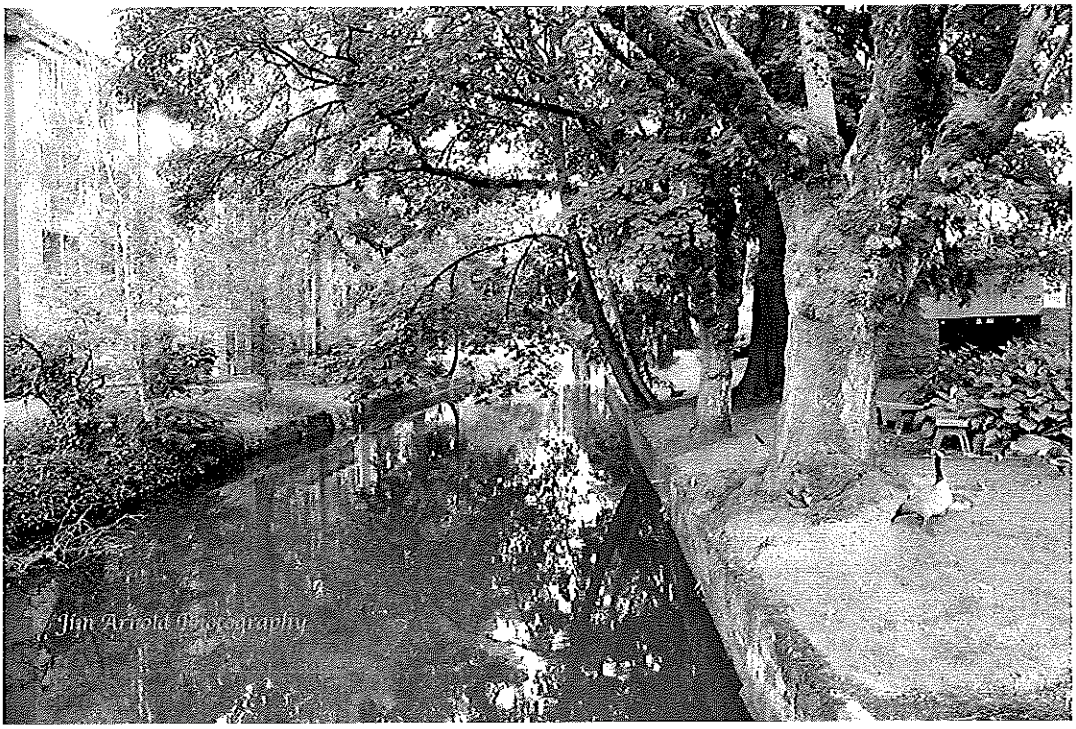
6/10/2013



Eugene Millrace | A Report to Inform Future Use

Report Date: 6/10/13

Site: The City of Eugene's Historic Millrace

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Table of Contents

1 Introduction 3
1.1 Background 3
1.2 Problem Statement 4
1.3 Purpose 5
1.4 Methods 6
1.4.1 Document, literature, and historical map review 6
1.4.2 Visual observations 7
1.4.3 Schedule 7
2 Findings 8
2.1 Site History 8
2.2 Site Analysis 9
2.2.1 Site Visit 9
2.2.2 Map | Photo tour of Millrace 0
2.2.3 Geology and Hydrology 11
2.2.4 Millrace Adjacent Property Ownership 12
2.2.5 Contamination Sites 13
2.2.6 Environmental Quality Environmental Cleanup Site Information 13
2.2.7 Leaky Underground Storage Tank Database 13
2.2.8 Resource Conservation and Recovery Information System 14
2.2.9 Potential Contamination Sites 14
2.3 Water Rights 16
2.4 Millrace Discharge Permits 16
2.5 Interviews 17
2.5.1 Interview #1 17
2.6 Case Studies 18
2.6.1 Springfield Millrace 18
2.6.2 Architecture Design Studio 19
3 Conclusion and Recommendations 20
4 References 22
5 Appendix A 24
6 Appendix B 28

1 INTRODUCTION

1.1 BACKGROUND

Since the mid-19th century, Eugene's Millrace helped to satisfy many needs of the University of Oregon and the City of Eugene through running water for the mills, recreational activities, and an aesthetic waterway for businesses, residences, and institutions. In its most recent use, the water in the Millrace was used to cool discharge from the campus heating system. The University invested $100,000 to switch over to a new Combined Heat Plant (CHP) in 2012, which allowed for greater efficiency to reduce greenhouse gas emissions, but also abandoned the need for water coolant in the natural gas system at the Central Power Station (Hinkle, Sewell, Stilwell, & Wiebush, 2012).To keep the Millrace from running dry during the summer months, water was often pumped into it from the Willamette River (Kramer, Minor, & Toepel, 2007).

In 2010, the University of Oregon changed their heating system into the form of cooling towers, which do not require the cooling of discharge. With a new heating system in place on campus, the Millrace can now be looked at in new light (Brooke, 2013). The University of Oregon and City of Eugene now have the opportunity to move the existing drainage system into a more sustainable stormwater drainage system built on the principles of integrated watershed management. The vision of integrated watershed management includes; achieving sustainable urban water, energy reclamation, drainage and transportation infrastructures connected to receiving waters that will be resilient to natural and anthropogenic stresses; implementing water conservation; providing good quality of reclaimed water for diverse uses; reducing carbon emissions when compared to the current situation; and creating urban infrastructure, resilient and hydrologically and ecologically functioning landscape, and water resources that constitute one system (Novotny, Ahern, & Brown, 2010).

Currently, the University pumps water into the Millrace to keep up a minimum aesthetic value to the Millrace, keep mosquito larvae and other nuisances associated with stagnant water to a minimum, and appease the private and public landowners that are proximal to the Millrace. Pumping water into the Millrace is unsustainable due to the excessive use of energy and need of constant human maintenance. Furthermore, the Millrace has multiple dams and floodgates to control the water height and to keep the water from overflowing into the built environment. Headgates and dams also require human

maintenance and contribute to the general unattractive quality of the Millrace (Brooke, 2013; Grape, 2013; Turner, 2013).

The University of Oregon, the City of Eugene, and other property owners have rights to different sides of the Millrace, which gives the waterway potential to connect the distinct sides of the city and to contribute to the Eugene community as a whole. University staff members believe it is worthwhile to explore alternatives for the three-quarter mile section of the Millrace that dissects the University campus (Brooke, 2013; Grape, 2013).

University staff currently suggests turning the Millrace into not only an aesthetically pleasing area, but also a feature that functions to filter runoff from campus, and one that avoids energy and monetary expenditures to pump water from the Willamette River. Furthermore, the area could help to educate the students about the importance, potential, and implementation of bioswales and serve as a research model (Brooke, 2013; Grape, 2013).

The Millrace has potential to become a beautiful representation of integrated urban watershed management. With the waterway's existing mimicry of a natural surface water body, the help of forward thinking students, the University of Oregon faculty, and the City of Eugene, the Millrace could become a precedent for a new perception of water.

1.2 Problem Statement

The University and the City of Eugene have both conducted studies on the Millrace and surrounding areas but there is still a lack of cohesive knowledge about the feasibility of modifying the University managed portion of the Millrace.

Abatement of nonpoint pollution caused mainly by urban runoff has been slow compared to the progressive point source controls laid out by the Environmental Protection Agency (EPA). Without strict regulation, large amounts of urban runoff are in violation of water quality standards and may contain dangerous pathogens and coliform bacteria. *Water Centric Sustainable Communities* informs us "urban runoff has been found responsible for more than half of the remaining water quality problems in the U.S." (Novotny, Ahern, & Brown, 2010). To handle this large source of water quality issues, Best Management Practices (BMPs) have been a staple of the fast conveyance end of pipe control mechanisms that have dominated waste and stormwater management for the past few decades (Novotny, Ahern, & Brown, 2010). Best management practices are methods that through their

application, address the adverse impacts of development and redevelopment on the natural ecosystems ability to sequester water and various pollutants. Best management practices aim to successfully handle and minimize the exposure between water and pollutants from development and urban growth. Best Management practices use a variety of different tactics such as prevention, source controls, hydrologic modification and reduction of delivery (Novotny, Ahern, & Brown, 2010).

Attributable to the fact that the University of Oregon is a major contributor of the environmental quality of the Millrace, they are in a unique situation to incorporate large scale BMPs. The Millrace conveys over 80 percent of the University's stormwater, various the city stormwater pipes, and various other out falls and is therefore a strong candidate for environmental improvement (Brooke, 2013). As stormwater management gains popularity in the United States, addressing the various contributors to water quality is a key to obtaining a sustainable outlook of water management (Novotny, Ahern, & Brown, 2010).

Stormwater runoff creates various causes of pollution including erosion, decreases in groundwater recharge, conveyance of pollutants, and increases in river temps. An emerging stormwater management tool in pollution prevention and resource protection of water resources from such incidents is bioswales (Novotny, Ahern, & Brown, 2010).

Bioswales, a form of BMP, are specifically landscaped areas that are designed to increase the saturation time of water bodies. Through the use of slope, vegetation, gravel and humus, the various pollutants and silts are sequestered through biological process or settling. This allows for the discharged surface water or recharged ground water to be less polluted. Bioswales not only decrease the pollutants in water bodies but also increase the water holding capacity of the landscaped area (Novotny, Ahern, & Brown, 2010).

Considering the opportunity, there is a timely need to gather as much historical information about the Millrace as possible and compile the evidence to determine if the Millrace in its current state can feasibly function as an integrated urban water management bioswale (Brooke, 2013).

1.3 PURPOSE

The purpose of this report is to determine if the University managed portion of Eugene's Millrace has potential for redevelopment into a bioswale to treat stormwater before it enters the Willamette River. The goal is to bring together existing studies, local knowledge of the area, ownership data, and contamination information to create a cohesive understanding of the current issues relating to the

University owned portions of the Millrace. This data along with case study information will lead to potential alternatives for the University Millrace site, recommendations for further research, and an outline of next steps the University should consider to pursue modifications to their portion of the Millrace.

1.4 METHODS

Methods for the Millrace report includes document and literature reviews, aerial photographs and maps, report reviews, visual observations, and interviews.

1.4.1 Document, literature, and historical map review

Document, literature, historical map, and photograph reviews are intended to create a comprehensive history of the Millrace, an understanding of the current and past issues relating to the Millrace that may affect future projects in the area, and potential case studies of similar projects that have been completed. Literature relating to the history of the Millrace is mostly public record and can be obtained from published books and other literature as well as government maintained websites.

Documents and reports of past University and City of Eugene projects were obtained from City and University staff; these include but are not limited to reports and documents relating to the Matthew Knight Arena construction, the Global Scholars Hall construction project, and City of Eugene Basin Master Plan. Aerial photographs and Sanborn maps are available through the University of Oregon map library.

Water right information was obtained from City of Eugene staff and requested from Oregon Water Resources Department. Ownership information and historical business information was obtained from publicly available data from the City of Eugene online directory, Lane County Regional Land Information Database, and county tax lot information.

Contamination information was obtained from EPA and Oregon Department of Environmental Quality (DEQ) maintained websites.

Literature and information for case studies was obtained through literature searches and recommendations from interviewees.

1.4.2 Visual observations

Visual observations were conducted through physically walking and investigating the current conditions of the Millrace. This included documenting current stormwater pipes that drain into the Millrace, above ground storage tanks, oil heating tanks, or other potential contamination sites. Physical documentation consisted of taking photographs of unique elements or apparent problem areas and taking note of areas of high use or litter.

1.4.3 Schedule

Tasks	April				May				June			
	Week				Week				Week			
	1	2	3	4	1	2	3	4	1	2	3	4
Phase I: Project initiation and research												
Task 1: Project definition												
1.1 Kick-off meeting with Doug												
1.2 Problem statement, purpose, methods, and schedule												
1.3 Initial document review												
1.4 Draft outline final report												
1.5 Refined work program, methods, and schedule												
Task 2: Familiarization with site												
2.1 Millrace walking tour with Doug												
2.2 Initial meeting with Eric												
Phase II: Site analysis and history												
Task 1: Visual site analysis - Shelby												
Task 2: Map and photograph review – Alex and Ashley												
Task 1: Document review - all												
Task 2: Literature review – all												
2.1 Historical summary - Ashley												
Task 3: Interviews - all												
Task 4: Ownership regime - Angela												
Task 5: Water rights and stormwater permits - Torrent												
Task 6: Findings to date												
Phase III: Developing recommendations												
Task 1: Case study(ies) - Shelby												
Task 2: Revisions and additions to findings												
Task 9: Final draft												

2 FINDINGS

2.1 SITE HISTORY

In the mid-1850s, initial development of the Eugene Millrace began when Hilyard Shaw built a ditch which diverted water from the Willamette River and was used to power saw mills. The Millrace began to develop and grow with the City of Eugene. In the nineteenth century, water-powered mills along the Millrace played a key role in Eugene's economic development. In the 1870s, the Willamette River experienced massive floods that caused severe damage to the Millrace. The upkeep of the Millrace began to be too expensive for the city, and thoughts of abandoning the waterway were being talked about around town. In 1913 the Millrace Protective Association was formed and had 100 members. This association was formed during World War I when the Millrace started to be used less and less for industrial uses and used more for recreational purposes, especially by the students attending the University of Oregon. The Millraces' scenic beauty had made it a source of pride for the community.

According to Tweedell's book Millrace History University of Oregon adopted the Millrace from the City of Eugene in 1957 and agreed to:

- Maintain to extent that was economically feasible recreational use and scenic appeal
- Maintain functional use as an integrated part of the stormwater system of Eugene
- Provide cooling water for the University's heating and power plant
- Takeover full responsibility for filling Millrace with water, operating the pumps and other control equipment, including replacement of component parts in order to maintain the channel within the banks
- Pay for power for pumps according to the Eugene Water and Electrical Board
- Maintain the Millrace channel including cleaning the brush and debris to maintain proper flow
- Maintain bridges (not serving a public street)

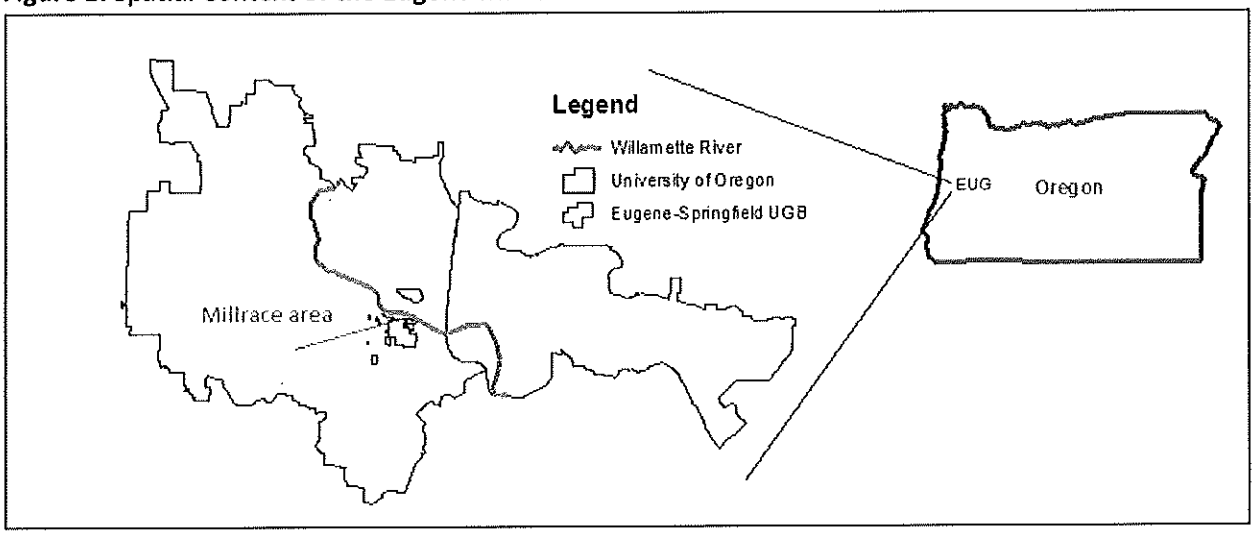
As the University became more involved in the uses of the Millrace, fraternity houses were built along the waterway and the recreational use by students increased dramatically. People used the Millrace as a place to store their canoes that they used to paddle up and down the Willamette River (Tweedell, 2010). 1949 ?

Today, the University of Oregon is still in control of the amount of water that is pumped from the Willamette River into the Millrace. The amount of water pumped into the Millrace depends on the season and how much rainfall and stormwater runoff is discharged into the waterway. The Millrace is an important piece of the history of Eugene and efforts to create a Millrace that reflects the city of Eugene in a positive way are being explored (Brooke, 2013).

2.2 Site Analysis

The following map provides context of where the Eugene Millrace in relation to the State of Oregon, the Eugene-Springfield urban growth boundary, and the University of Oregon campus.

Figure 1: Spatial Context of the Eugene Millrace



2.2.1 Site Visit

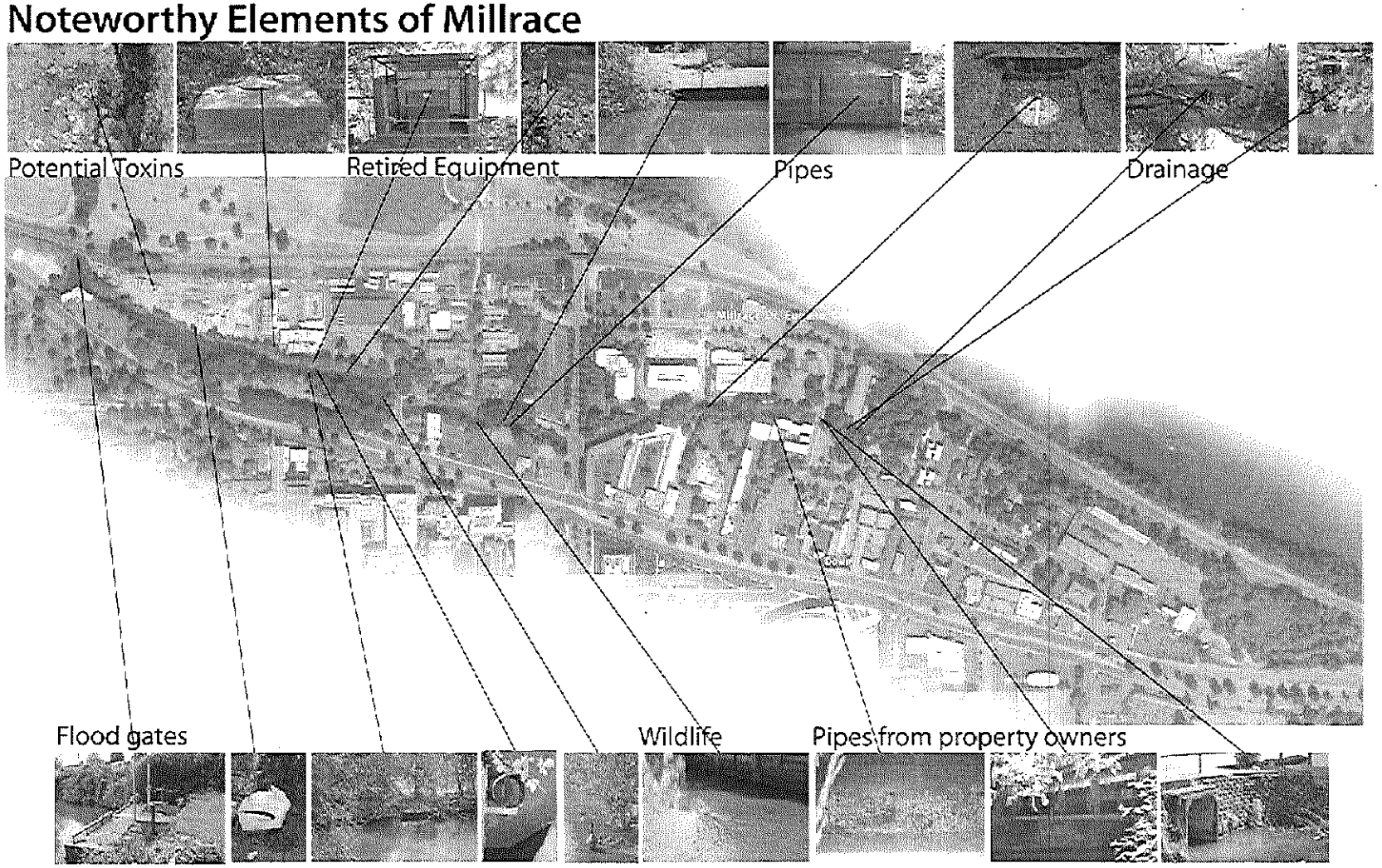
The Millrace has many layers of natural and human history. To demonstrate the history that is still on the surface, the map below shows a number of photos that demonstrate the multiple elements of the land. Amongst the manmade features found are pipes, manholes, catchment basins, bridges, floodgates, and retaining walls.

One of the more interesting findings are the many different stormwater outfalls that dot the Millrace. While some pipes seem to be functioning, others seem to be remnants from the Millrace's past. There are some that appear half decayed, others emerge from individual homes, and still others could possibly carry the runoff from a large percentage of the Fairmount neighborhood and University of Oregon campus.

Further, there are a couple sources of potential pollutants on the water's edge that showed how easy it is for harmful toxins to reach the Millrace. These pollutants include burned trash, piles of carbon material, and oil from parking lot runoff. This source of local pollution is noteworthy as a visible element to the site itself, although pollution within the Millrace comes from the large amounts of urban runoff. The outfalls that pepper the sides of the Millrace drains 80 percent of the University of Oregon campus and much of the Fairmount and West Eugene neighborhoods bordering the university (Brooke, 2013).

Lastly, there is a surprising amount of wildlife that use the Millrace. Geese, ducks, and nutria are common sights along the waterway. While the water level of the Millrace currently fluctuates, it maintains a high amount of wildlife. It is clear that the natural and manmade aspects of the Millrace have lived through many changes since the 1850s, and will continue to be a fixture of human and animal habitat.

2.2.2 Map | Photo tour of Millrace



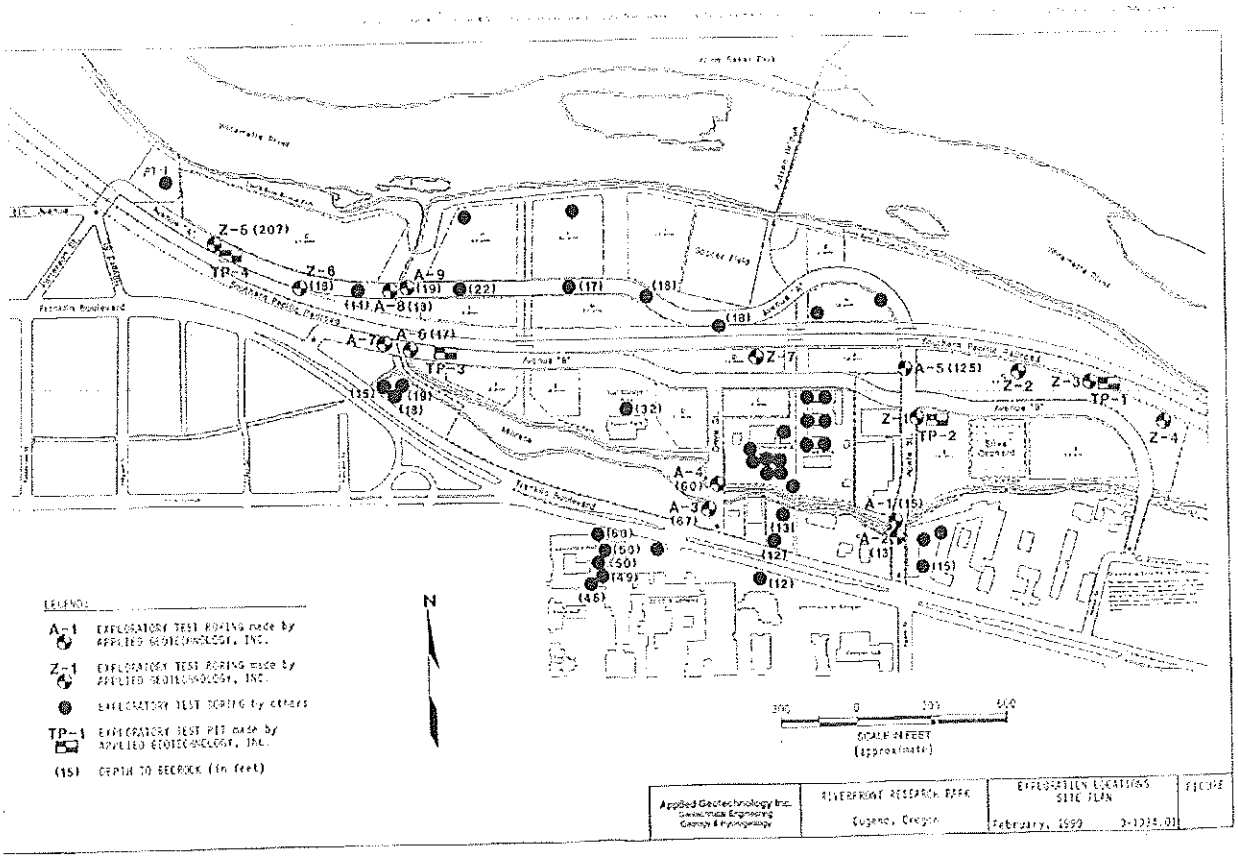
2.2.3 Geology and Hydrology

Eugene Oregon's unique geological history allows it to have a corresponding unique hydrological system as well. According to the United States Geological Survey (USGS) Water Supply Paper 2018, "Ground Water in the Eugene-Springfield area, Southern Willamette Valley, Oregon (1973)", the Eugene-Springfield area covers about 450 squares miles and is made up of the lower foothills of the Coast and Cascade Mountain Ranges and a large tracked of valley plain, the southern Willamette Valley. The exposed volcanic and sedimentary rock in the foothills allows deep alluvial deposit from the Pleistocene and Holocene to be recharged through direct infiltration and hold tremendous amounts of groundwater. These deposits are then overlaying with sedimentary soils consisting of fine grained and poorly permeable soils, which yield water to local wells slowly. This distinct sedimentary structure creates two types of hydrological water zones in Eugene-Springfield, a near surface aquifer that has limited yields and a much deeper aquifer that due to its geological structure and direct infiltration of precipitation in the foothills allows it to hold tremendous amounts of water.

The Millrace sits on this unique geological and hydrological topography. In 1990 the University of Oregon composed an Environmental Site Assessment of a Silva area located near Franklin Boulevard and Moss Street in Eugene, Oregon. Part of this assessment was some on –site and off site Exploratory Test Boring contracted out to Applied Geotechnology Inc. These borings span the length of the Millrace and allow for a detailed geological sedimentary structure of the area. Applied Geotechnology bored approximately seven exploratory wells to varying depths, **A-1, Z-1** (see Figure below). These explorations discovered that silt and sand compose the ground surface to a depth ranging from 5 to 15 feet. Moving deeper into the soil structure cobble gravel begins to dominate the sediment to depths of about 9 to 25 feet. Below this structure to a depth to about 125 feet, the extent of the boring depth is the Eugene Formation (weathered siltstone and bedrock) (Hartford, and Rippe).

The Millrace lies on the top soil structure from the ground surface to a depth of about 15 feet composed of silt and sand. This makes it geological isolated from the groundwater aquifer. According to Ralph Christensen of Russ Fetrow Engineering Inc., "the Millrace....appears to be well sealed and isolated from the groundwater aquifer". In this context the Millrace combined with the geological history and hydrological cycle is most likely susceptible to surface and subsurface contamination threats.

Figure 2: Historic Soil Samples Proximal to the Eugene Millrace



2.2.4 Millrace Adjacent Property Ownership

From where Eugene's Millrace begins in Franklin City Park to where it crosses under Franklin Boulevard it is maintained by the University of Oregon. Along this University maintained section of the Millrace there are multiple property owners. In addition to the City of Eugene and the University of Oregon, there are another 22 property owners that own property bordering the Millrace. Eight of these property owners own the property on either side of the Millrace (See Appendix A, Table 1). All of these property owners have a vested interest in the Millrace because while their tax lots extend to the edge of the Millrace (Lane County Oregon, 2013) their property rights extend to the centerline or all the way across for those that own the property on either side (City of Eugene interview). The property owners include local businesses, living trusts, corporations, private individuals, the City of Eugene, and the Oregon Board of Higher Education. The City of Eugene and Oregon Board of Education are the largest holders of property in this area but all adjacent property owners have a vested interest and property rights that extend into the Millrace (Lane County Oregon, 2013).

2.2.5 Contamination Sites

The student research team identified potential contamination sites through searching Oregon Department of Environmental Quality's (DEQ) Environmental Cleanup Site Information, Leaky Underground Storage Tank database, and underground storage facility sites; and Environmental Protection Agency's (EPA) Resources Conservation and Recovery Act (RCRA) sites. The sites identified range from underground storage tanks, heating oil tanks, old gas stations, residences, and unknown industrial sites.

2.2.6 Environmental Quality Environmental Cleanup Site Information

A DEQ cleanup sites include sites with known, suspected, or cleaned up hazardous contamination. Oregon Department of Environmental Quality categorizes current site status as either 1) under investigation, 2) on the confirmed release list or inventory of facilities needing further action, or 3) cleaned up to DEQ standards (no further action). The amount of data available for each site varies greatly and depends on the nature of site issues, how long the site has been active in DEQ's cleanup program, and the priority that DEQ has assigned to the site. All sites have documented, suspected, or remediated hazardous substance contamination in groundwater, surface water, soil, or sediments. Sites range from industrial complexes to isolated rural facilities contaminated by disposals or spills. Most sites are either industrial or commercial, but the cleanup program sometimes adds highly contaminated residential properties to the list. A site is added to the cleanup site list when DEQ learns that the site is contaminated or potentially contaminated with hazardous substances. Site information can come from a variety of sources: investigative efforts by DEQ; referrals from other DEQ programs or from other agencies; reports of chemical spills; citizen reports/complaints; or data submitted voluntarily by site owners or operators. Once a site is added to the list the site remains in the database to provide tracking and historical information. The fact that a site is included in the cleanup list has no regulatory significance. When remediated sites no longer pose a risk to human health or the environment the site shows a "No Further Action" status. More details on site history and activities can be obtained from the corresponding regional office under a file review (Oregon Department of Environmental Quality).

2.2.7 Leaky Underground Storage Tank Database

The Leaky Underground Storage Tank Database is a separate from cleanup site information and includes only sites with reported petroleum releases from underground storage tank systems. Sometimes the Environmental Cleanup Section takes the lead at sites with leaking underground storage tanks and will

add them to the cleanup site information database. Depending on the priority of the site, when the latest report was submitted, if a project manager is assigned to the site, and other factors database information may not be completely up to date. The most current information can be obtained through the appropriate regional office and a file review (Oregon Department of Environmental Quality).

Department of Environmental Quality makes a No Further Action determination after determining that a site or part of a site poses no unacceptable risks to human health or the environment. This determination usually follows investigation or cleanup under DEQ oversight or review. It means that DEQ will not require additional remedial action. A No Further Action (NFA) determination for a leaky underground storage tank may not apply to any other spills and releases that are not associated with the tanks. A cleanup site NFA usually applies to the entire facility and all suspected sources of contamination. The underground storage tank facilities were included to provide precautionary information (Oregon Department of Environmental Quality, 2007).

2.2.8 Resource Conservation and Recovery Information System

The EPA's RCRA information system is a single point of access to several EPA databases to obtain environmental information pertaining to activities that may affect the environment and human health. Some of the data has been converted from older data systems and is not always accurate. Information can be verified by directly contacting the state agency. In general all generators, transporters, treaters, storers, and disposers of hazardous waste are required to provide information about their activities to state environmental agencies. These agencies pass the information to regional and national EPA offices. Information obtained from this database does not include status or required actions (United States Environmental Protection Agency, 2013).

2.2.9 Potential Contamination Sites

In areas adjacent and upland to the Millrace that have stormwater flows that are expected to drain to the section of the Millrace maintained by the University of Oregon there are 31 sites that have the potential for contamination, all 31 sites are described in Tables 2 – 5 in Appendix A. Only four of these sites directly border the Millrace. The four sites that are adjacent to the Millrace are listed in Table 1 below.

Table 1: Potential Contamination Sites Adjacent to University Maintained Millrace

Site ID	Site Name	Permittee/Owner	Map and taxlot	Site Location	Status	Site Type
217	Lane Electric Co-op	1715 Associates Inc: Michael Henry	17033214-00500	1715 Franklin	No further action	DEQ environmental clean-up site
n/a	Not available	City of Eugene	17033224-00102	933 Franklin	Not available	DEQ environmental clean-up site
1018	Riverfront Research Park	OR Board of Higher Education	17033214-01800	1295/1155 Franklin	Partial no further action	DEQ environmental clean-up site
ORQ000016113	Marker Gene Technologies	OR Board of Higher Education	17033214-02300	1850 MILLRACE	Not available	RCRA site

The first site, the Lane Electric Co-op is located at 1715 Franklin Boulevard and according to Oregon Department of Environmental Quality (ODEQ) no further state action is required. The second site is located at 933 Franklin Boulevard and is owned by the City of Eugene. This site is a DEQ environmental cleanup site and its status is unavailable. The third site located at 1295 Franklin Boulevard and part of the Riverfront Research Park, is owned by the Oregon Board of Higher Education and according to ODEQ a partial no further action was issued (Oregon Department of Environmental Quality). The fourth site is located at 1850 Millrace Drive is also part of the Riverfront Research Park and owned by the Oregon Board of Higher Education. This site is a Resource Conservation and Recovery Act (RCRA) site (United States Environmental Protection Agency, 2013).

See Appendix A for complete tables of possible contamination sites in the study area. See Appendix B for maps of the potential contamination sites. The sites owned by the Oregon Board of Higher Education and the City of Eugene are on the north side of the Millrace and even though they are adjacent to the Millrace the stormwater and any soil contamination may be more likely to travel to the Willamette River that is located to the north at a lower elevation than the Millrace.

2.3 WATER RIGHTS

The State of Oregon has a documented Certificate of Water Right with the State Board of Higher Education of Eugene. As of September 30, 1957 the state engineer of Oregon granted the University of Oregon a right to divert the waters of the Willamette River, a tributary of the Columbia River, at lot number 4, section 33, Township 17 south, Range 3 west. This permit number 25234, stated that the water being diverted were for recreational use only such as boating, swimming and scenic enhancement. The Certificate also had certain stipulations. Proper screening at the intake sight needed to be done in accordance with fishery agencies to prevent entry of fish into the pumps. Also, a barrier where the Millrace discharges into the Willamette River needed to be implemented to deter fish from migrating up into the water body (Stanley, 1962).

The most notable development of this water right certificate is the fact that it allows the University of Oregon to use the water of the Willamette River for scenic enhancement. As the University of Oregon continues to pump water into the Millrace for purely aesthetic reasons, there is room for action in accordance with the Certificate to enhance the quality of the Millrace (Stanley, 1962).

2.4 MILLRACE DISCHARGE PERMITS

The Department of Environmental Quality (DEQ) regulates the amount of pollutants a water body can handle by implementing a Total Maximum Daily Load (TMDL) plan. The DEQ controls the amount of pollutants entering the waters by issuing National Pollution Discharge Elimination System (NPDES) permits to point source polluters. Since the Millrace is connected to the Willamette, NPDES permits are issued to polluters who discharge into the Millrace. Currently, there is only one permit issued for point source discharge into this water body. The University of Oregon holds this permit, which is still active, for the cooling of Central Heat Plant on the north side of the Millrace at Campus Operations, near Onyx Street. The discharge is considered of minor class by the EPA, a permit type NPDES-IW-B16, defined as "all facilities not elsewhere classified which dispose of non-process wastewaters". Although, the University no longer uses the permit for this purpose after switching their heating system, it is important to note that the lone permitted polluter is no longer using the Millrace for this function and seeks study on the possible variant uses of the Millrace as a conveyance system (Grape, 2013)

2.5 INTERVIEWS

There is a great deal of local knowledge that is not documented in any studies or past project information. The following interviews were performed to gain a better sense of local and intimate knowledge of the Millrace from multiple perspectives.

2.5.1 Interview #1

Alice Moffitt grew up in Eugene and remembers renting canoes to paddle up and down the Millrace as a child. In 2003 she opened her dentist office, which is located on the Millrace. One of the main reasons Dr. Moffitt chose to practice dentistry in this location was because it was located right on the Millrace and gave her patients a view to enjoy while sitting in her office. According to Moffitt when the University of Oregon doesn't pump enough water through the Millrace, the water level drops exposing the trash and silt that has built up over the years. "Everybody enjoys looking at the water, not the mud and trash on the bottom," states Moffitt. The Millrace has not changed much over the years according to Moffitt, but she would like to see it be cleaned up, not just the quality of the water should be improved, but the environmental quality. Moffitt and her patients enjoy the different species of birds that swim up and down the Millrace, such as ducks and geese. Moffitt states:

> *"The University should have more of an interest in it since they used it for so long [for cooling purposes] and because it goes through much of their property in the first place. They've used it for so long that they owe it to Eugene to keep it nice. They need to have their part in the Millrace too. I know it's expensive, but it's to their benefit too."*

She would like to see the University make a bigger effort in cleaning up the Millrace. Moffitt also believes the fraternities and sororities whose properties back up to the Millrace should also make an effort to keep their trash out of the Millrace. Moffitt would love to see the Millrace cleaned up and thinks that the citizens of Eugene would be happy to help in an annual Millrace clean-up day (Moffitt, 2013).

2.6 Case Studies

2.6.1 Springfield Millrace

The Millrace has the potential to become a beautifully vegetated and healthy waterway. To give hope to the future of the project, we look to other similar cases that have been restored, or that are in the process of restoration. Most directly, the Millrace in Springfield is nearing completion in their restoration project.

This quote from the blog demonstrates one of the biggest goals of Springfield: "After the 2010 construction season, the mill pond will be rejuvenated as a habitat-rich meandering stream with off-channel backwaters and wetlands. As the wildlife benefits from this resource and increases in population, the site promises to emerge as a premier nature watching location."

The blog tracks the great progress that Springfield has made in restoring the natural ecosystems in the Millrace. Below is a list of projects that were undertaken to improve the land.

- Wetland creation for wildlife and storm water retention and treatment
- Addition of recreational trails
- Connecting new inlet to channel
- Native plants plantings an invasive plant removal
- Addition of park and boat ramp
- Removal of three underground storage tanks
- Removal of dam and old concrete, steel, and dirt to fill the Millrace with Willamette River water
- Installation of storm water pipes

Like Springfield, Eugene has the potential to restore the Eugene Millrace to a beautiful condition that can help promote healthy ecosystems and human activities (Springfield Mill Race Restoration Project, 2012).

2.6.2 Architecture Design Studio

There is great interest in the Eugene Millrace and the surrounding riparian and river habitats. People from a variety of fields have studied and prepared solutions for this critical area of Eugene. During the Winter and Spring 2013 terms at University of Oregon, Brook Muller's terminal architecture studio, Performance of an Urban Nature, produced about fifteen different potential designs for the site of EWEB's new building. These undergraduate and graduate students studied the area of the Willamette River that has connection to the outfall of the Millrace. The architecture and landscape architecture students creatively delved into the site to understand the ecological conditions. Mimicking this studio to maximize the potential of the site would be a great inspiration to jumpstart the restoration of the Millrace.

3 CONCLUSION AND RECOMMENDATIONS

Conclusions

Through a careful document acquisition and analysis, the project team concludes that the University is merely providing aesthetically pleasing scenery by pumping water into the Millrace, but limits the natural hydrology potential of this stormwater conveyance system by maintaining it at a minimum level. Enhancing the water body by creating a bioswale or creating large riparian areas would be advantageous to the University and community, while also staying in accordance with the water rights permit. Additionally, the University is wasting energy and resources to maintain a minimum level of water within the Millrace. There ~~maintains~~ continues to be a high-level of interest in the Millrace, as indicated by interviews with University and City of Eugene staff, existing University classes and projects, and opinion of owners adjacent to the Millrace. It is and will continue to be seen as an asset to the community, as it has been for over 150 years.

Furthermore, the University of Oregon is eager to find a new use for the Millrace after disassociating from the Millrace's last remaining industrial use. University classes and service learning projects on campus could create high student involvement, potential research projects, and symbiotic partnerships between students and potential University and City of Eugene clients.

Recommendations

The team recommends a formal partnership between the City of Eugene and the University of Oregon to explore engineering and design functions for a stormwater bioswale. A potential partnership opportunity with Eugene Water & Electric Board (EWEB) should also be considered.

Before moving forward, further investigation into the four adjacent contamination sites and additional soil samples similar to the methods used by Exploratory Applied Geotechnology Inc. should be performed to supplement the existing engineering and environmental studies to date.

Finally, the University and eager partners may explore funding sources, including University general funds, DEQ 319 grants, Oregon Watershed Enhancement Board, Ecotrust's Whole Watershed Restoration Initiative, and potential partnerships and matching dollars from City of Eugene and EWEB.

4 REFERENCES

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5 APPENDIX A

Table 1: Property Owners along University of Oregon Maintained Millrace

Map	tax lot	Site address	Owner	Address	City	State	Zipcode	Side
1703324	200	947 Franklin Blvd	Van A Louie and Shu Ping	947 Franklin Blvd	Eugene	OR	97403	south
17033214	103	1600 Millrace Dr	OR Board of Higher Education	423 Wakara Way Ste 212	Salt Lake City	UT	84108	north
17033214	300	unknown	1715 Associates	P.O. Box 18	Eugene	OR	97440	south
17033214	500	1715 Franklin Blvd	1715 Associates	P.O. Box 18	Eugene	OR	97440	south
17033214	600	unknown	1715 Associates	P.O. Box 18	Eugene	OR	97440	south
17033214	900	1655 Franklin Blvd	Connor Enterprises Inc	P.O. Box 18	Eugene	OR	97440	south
17033214	1000	unknown	Connor Enterprises Inc	P.O. Box 18	Eugene	OR	97440	south
17033214	1100	1565 Franklin Blvd	City of Eugene	72 W Broadway	Eugene	OR	97401	north
17033214	1200	unknown	Franklin Blvd Properties LLC	2646 Marmol Ct	Carlsbad	CA	92009	south
17033214	1300	1525 Franklin Blvd	Oregon Future Expansion Franklin LLC	1720 E 13th Ave Ste 410	Eugene	OR	97403	south
17033214	1400	unknown	OR Board of Higher Education	P.O. Box 3237	Eugene	OR	97403	north
17033214	1600	1405 Franklin Blvd	OR Board of Higher Education	P.O. Box 3237	Eugene	OR	97403	north
17033214	1700	1475 Franklin Blvd	Oregon Future Expansion Franklin LLC	1720 E 13th Ave Ste 410	Eugene	OR	97403	south
17033214	1800	1155 Franklin Blvd	OR Board of Higher Education	P.O. Box 3237	Eugene	OR	97403	both
17033214	1900	1399 Franklin Blvd	Robert E McNutt LLC	1630 Stoney Ridge Rd	Eugene	OR	97405	south
17033214	2000	1301 Franklin Blvd	OR Board of Higher Education	P.O. Box 3237	Eugene	OR	97403	both
17033214	2100	1395 Franklin Blvd	OR Board of Higher Education	P.O. Box 3237	Eugene	OR	97403	south
17033214	2200	1776 Millrace Dr	OR Board of Higher Education	P.O. Box 3237	Eugene	OR	97403	north
17033214	2300	1850 Millrace Dr Ste A	Campbell Commercial Real Estate	P.O. Box 10066	Eugene	OR	97403	north
17033214	2400	1900 Millrace Dr	OR Board of Higher Education	P.O. Box 3237	Eugene	OR	97403	north
17033214	2200-901	1776 Millrace Dr	OR Board of Higher Education	P.O. Box 3237	Eugene	OR	97403	north
17033214	2200-901	1776 Millrace Dr	OR Board of Higher Education	P.O. Box 3237	Eugene	OR	97403	north
17033214	2300-901	1800 Millrace Dr	Agate Properties LLC	1800 Millrace Dr	Eugene	OR	97403	north
17033224	102	933 Franklin Blvd	City of Eugene	99 W 10th Ave Attn	Eugene	OR	97401	north
17033323	200	1923 Garden Ave	Gregory Gray and Maralee R	2572 Chambers St	Eugene	OR	97405	south
17033323	301	unknown	David Cole	12838 Lacresta Dr	Los Altos	CA	94022	north
17033323	400	1907 Garden Ave	David Cole	12838 Lacresta Dr	Los Altos	CA	94022	south
17033323	500	1893 Garden Ave	George and Mary Hansen Fam Trust	303 Overlook Dr	Boulder Creek	CA	95006	both
17033323	600	1883 Garden Ave	Don G Knight	1883 Garden Ave	Eugene	OR	97403	both
17033323	800	1873 Garden Ave	Daphne D Ruff	1521 Magnolia St	Oakland	CA	94607	both
17033323	900	1853 Garden Ave	Don G Knight	1883 Garden Ave	Eugene	OR	97403	south
17033323	1000	1857 Garden Ave	Don G Knight	1883 Garden Ave	Eugene	OR	97403	both
17033323	1100	1839 Garden Ave	McKenzie River Motors	101 E Brooadway Ste 103	Eugene	OR	97401	both
17033323	1200	1811 Garden Ave	Chambers Management Corp	101 E Brooadway Ste 103	Eugene	OR	97401	south
17033323	2200	1933 Garden Ave	Degeneault and Anslow Inc	1953 Garden Ave	Eugene	OR	97403	south
17033331	100	2133 Franklin Blvd	City of Eugene	City Hall	Eugene	OR	97401	both
17033331	600	2085 Garden Ave	Tedron Properties	2123 Franklin Blvd unit 101	Eugene	OR	97403	both
17033331	600	2121 Franklin Blvd	Robert G Dickinson	2121 Franklin Blvd Ste 2	Eugene	OR	97403	both
17033332	10100	unknown	City of Eugene	City Hall	Eugene	OR	97401	south
17033332	10200	1953 Garden Ave	Degeneault and Anslow Inc	1953 Garden Ave	Eugene	OR	97403	south
17033332	10300	1973 Garden Ave	Howard A Hall Living Trust	132 E Broadway Ste 800	Eugene	OR	97401	south
17033332	10400	1991 Garden Ave	Howard A Hall Living Trust	240 W 102nd St #62	New York	NY	10025	south
17033332	10400	1200 Executive Parkway #450	Young J.R. PC	1200 Executive Parkway #450	Eugene	OR	97401	south
17033332	10500	2001 Garden Ave	Mattson LLC	9521 SE Winsor Dr	Milwaukie	OR	97222	south
17033332	10501	1997 Garden Ave	Minor Rick and Toepel Kathryn	1992 Fairmount Blvd	Eugene	OR	97403	south

Table 2: Oregon Department of Environmental Quality Cleanup Sites

Site ID	Site Name	Permittee/Owner	Map and taxlot	Site Location	Status	Distance
217	Lane Electric Co-op	1715 Associates Inc: Michael Henry	17033214-00500	1715 Franklin Blvd	No further action	adjacent
1455	Laurita Ruth	City of Eugene	17033224-00101	901-933 Franklin Blvd	No further action	1/8 mile
n/a	Not available	City of Eugene	17033224-00102	933 Franklin Blvd	Not available	adjacent
1018	Riverfront Research Park	OR Board of Higher Education	17033214-01800	1295/1155 FRANKLIN BLVD	Partial no further action	adjacent
1523	University Service Center	Buckridge family trust	18030511-06500	1905 Agate St	No further action	1/2 mile
2041	UPRR-Eugene Sabotage II	Not available	Not available	Hilyard St & Franklin Blvd	Other recommendation	1/8 mile

Table 3: Facility Sites – Underground Storage Tanks

Site ID	Site Name	Owner/Permittee	Map and taxlot	Site Location	# All Tanks	# Active Tanks	# Decomm Tanks	# Permit Tanks	Distance
7708	CAMPUS SERVICE CENTER	Northwest Dearlerco Holdings LLC: Shane Nolan	17033332-02700	2091 FRANKLIN BLVD	10	3	7	3	1/8 mile
3887	HENDRICKS PARK	MICHAEL ROBERT	Not available	SKYLINE DR & SUMMIT AVE	2		2		1 mile
5050	JOE ROMANIA CHEVROLET	U of O: RICHARD HAZEL	17033332-02800	2020 FRANKLIN BLVD	23		22		1/4 mile
6561	LANE ELECTRIC CO-OP INC	1715 Associates: MICHAEL T HENRY	17033214-00500	1715 FRANKLIN BLVD	2		2		adjacent
3905	LAURELWOOD GOLF COURSE	City fo Eugene: GARY DUTELL	18030544-00115	2700 COLUMBIA ST	1		1		1 mile
1210	OR STATE HWY 3-5 EUGENE	OR Future Expansion III LLC: DON WILSEN	17033331-01000	2141 E 15TH AVE/1401 Walnut St	6		6		1/8 mile
7027	PHILLIPS 66 COMPANY #070971	EDM & J Investment Co: RONALD K SMOLLER	17033332-08600	1895 FRANKLIN	3				1/4 mile
3168	PHYSICAL PLANT	OR Board of Higher Education: THOMAS HICKS	17033214-01800	1295/1155 FRANKLIN BLVD	5		5		adjacent
7865	RODES WRENCH INC	George Rode Trust: GEORGE RODE	17033332-01500	1917 FRANKLIN BLVD	1		1		1/4 mile
582	UNIVERSITY OF OREGON	Silverstar Video and Tanning: Kay Coots	Not available	1888 FRANKLIN BLVD	3		3		1/4 mile
1277	UNIVERSITY OF OREGON	U of O: Kay Coots	17033241-01000	1760 EAST 13TH AVENUE	5		5		1/4 mile
11305	UNIVERSITY OF OREGON PHYSICAL PLANT	Paul Blancher	17033214-01800	1295 FRANKLIN BLVD	5	5		5	adjacent
5519	UNIVERSITY SERVICE CENTER	Buckridge Family Trust: MICHAEL BUCKRIDGE	18030511-06500	1905 AGATE ST	4		4		1/2 mile
974	UNOCAL 4140	Dutch Brothers: STANLEY OTTINGER	17033331-00700	2115 FRANKLIN	6		6		1/8 mile

Table 4: Leaky Underground Storage Tanks

Log number	Site ID	Site Name	Owner/Permittee	Map and taxlot	Site Location	Tank type	Status	File Status	Distance
20-08-0276	1277	Former Williams Bakery	University of Oregon	17033241-01000	1760 E 13th Ave	Regulated	Closed	No further action	1/4 mile
20-98-7059	582	Formerly University Texaco	State of Oregon	17033332-05800	1880 Franklin Blvd	Regulated	Closed	No further action	1/4 mile
20-08-1156	582	Formerly University Texaco II	Silverstar Video and Tanning	unavailable	1880/1888 Franklin Blvd	Non-regulated	Closed	No further action	1/4 mile
20-06-0224		Gena Hutton Residence		18030432-05202	2747 Central Blvd	Non-regulated	Closed	No further action	over 1 mile
20-88-4080	5050	Joe Romania Chev	University of Oregon	17033332-02800	2020 Franklin	Regulated	Closed	No further action	1/4 mile
20-88-4081	6561	Lane Electric Coop	1715 Associates Inc	17033214-00500	1715 Franklin	Regulated	Closed	No further action	adjacent
20-89-4029	1210	ODOT Eugene	Oregon Future Expansion III LLC	17033331-01000	2141 E 15TH / 1401 Walnut	Regulated	Closed	No further action	1/8 mile
20-92-4087	7708	Panoco #7	Northwest Dealerco Holdings LLC	17033332-02700	2091 Franklin	Regulated	Active	n/a	1/8 mile
20-94-7026	3168	U of O Physical Plant	OR Board of Higher Education	17033214-01800	1295/1155 FRANKLIN	Regulated	Closed	No further action	adjacent
20-94-4280	3168	University of Oregon	OR Board of Higher Education	17033214-01800	1295/1155 FRANKLIN	Regulated	Closed	No further action	adjacent
20-91-4280	5519	University Services Station	Buckridge family trust	18030511-06500	1905 Agate	Regulated	Closed	No further action	1/4 mile
20-90-4095	974	Unocal 4140	Dutch Brothers	17033331-00700	2115 Franklin	Regulated	Unassigned	n/a	1/8 mile
20-06-1079	7027	Wendy's (Phillips 66 Co #070971)	EDM & J Investments LLC	17033332-08600	1895 Franklin	Regulated	Closed	No further action	1/4 mile
20-10-1219		Heating oil tank	1417 Villard St LLC	17033332-05000	1425/1417 Villard	Home heating oil tank	Closed	Certification	1/4 mile
20-99-7005		Heating oil tank	Carolyn Stein	17033343-06700	1661 Skyline	Home heating oil tank	Closed	No further action	1/2 mile
20-09-0550		Heating oil tank	Mini Me LLC	18030422-09300	2160 Fairmount	Home heating oil tank	Closed	Certification	1/2 mile
20-13-0129		Heating oil tank	Florence Barnhart V	18030421-04700	182 Sunset Drive	Home heating oil tank	Closed	Certification	1/2 mile
20-07-1524		Heating oil tank	Catherine M Bolster	18030541-01100	2561 Chula Vista	Home heating oil tank	Closed	Certification	over a mile

Table 5: Resource Conservation and Recovery Act (RCRA) Sites

Site ID	Site Name	Owner/Permittee	Map and taxlot	Site Location	Distance
ORD027642024	KENDALL CHEVROLET	University of Oregon	17033332-02800	2020 FRANKLIN	1/4 mile
ORQ000016113	MARKER GENE TECHNOLOGIES INC	OR Board of Higher Education	17033214-02300	1850 MILLRACE	Adjacent
ORD987189479	ODOT EUGENE MAINTENANCE STATION	Oregon Future Expansion III LLC	17033331-01000	2141 E 15TH/ 1401 Walnut	1/8 mile
ORD980981450	ODOT HWY DIV EUGENE		not available	1849-1/2 GARDEN	1/8 mile
ORSTATE04365	RAMSEY-WAITE CO.		not available	2458 FRANKLIN	1/8 mile
ORD987196870	UNOCAL SERVICE STATION 4140	Dutch Brothers	17033331-00700	2115 FRANKLIN	1/8 mile

6 APPENDIX B

Legend for Contamination Site Maps


DEQ No Further Action


DEQ Partial No Further Action

DEQ Other Recommendation


RCRA Site


Underground Storage Tank


Leaky Underground Storage Tank – Active

Leaky Underground Storage Tank – Certified


Leaky Underground Storage Tank - Unassessed

FOR ASSESSMENT AND TAXATION ONLY

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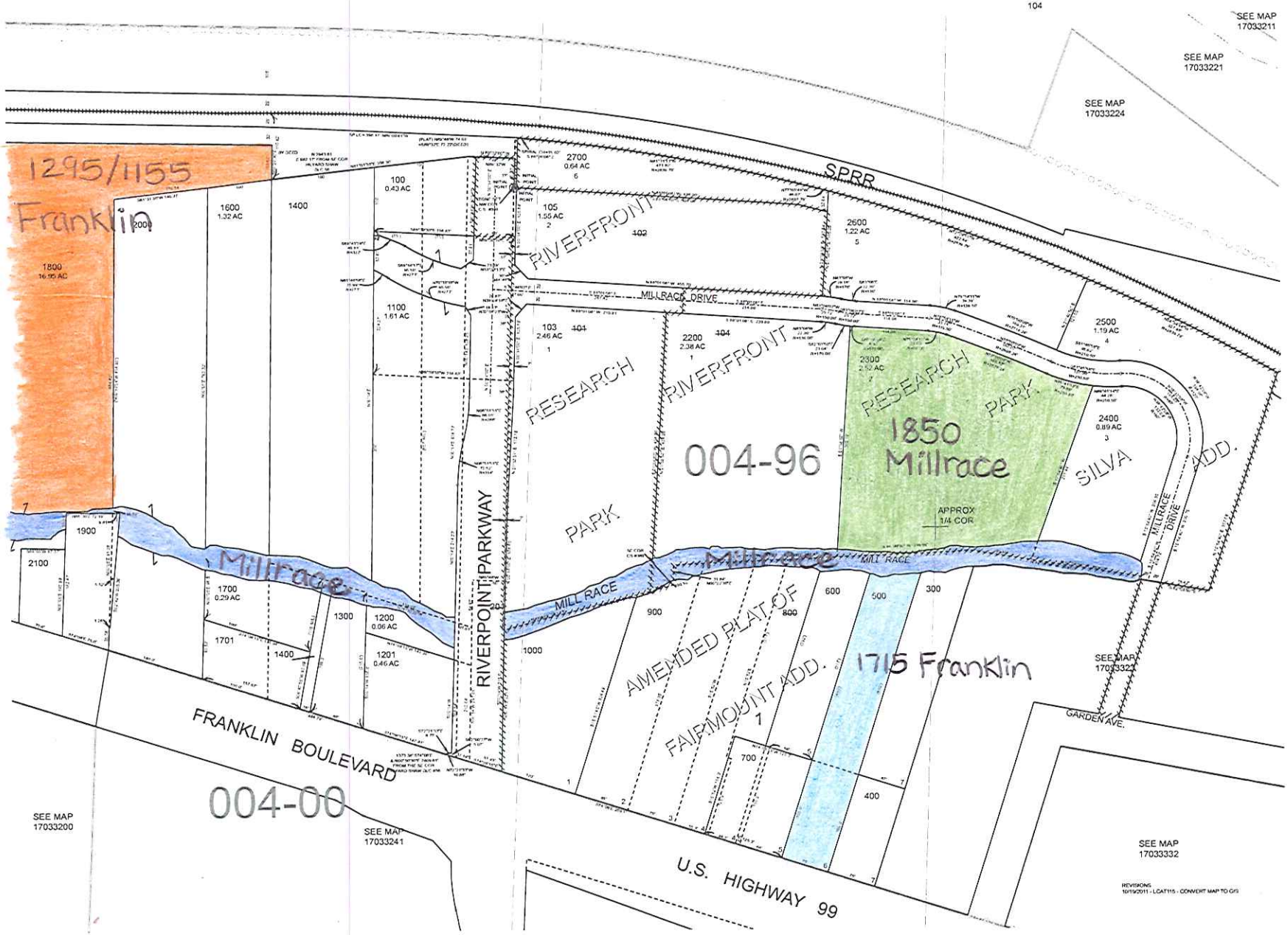

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FOR ASSESSMENT AND TAXATION ONLY

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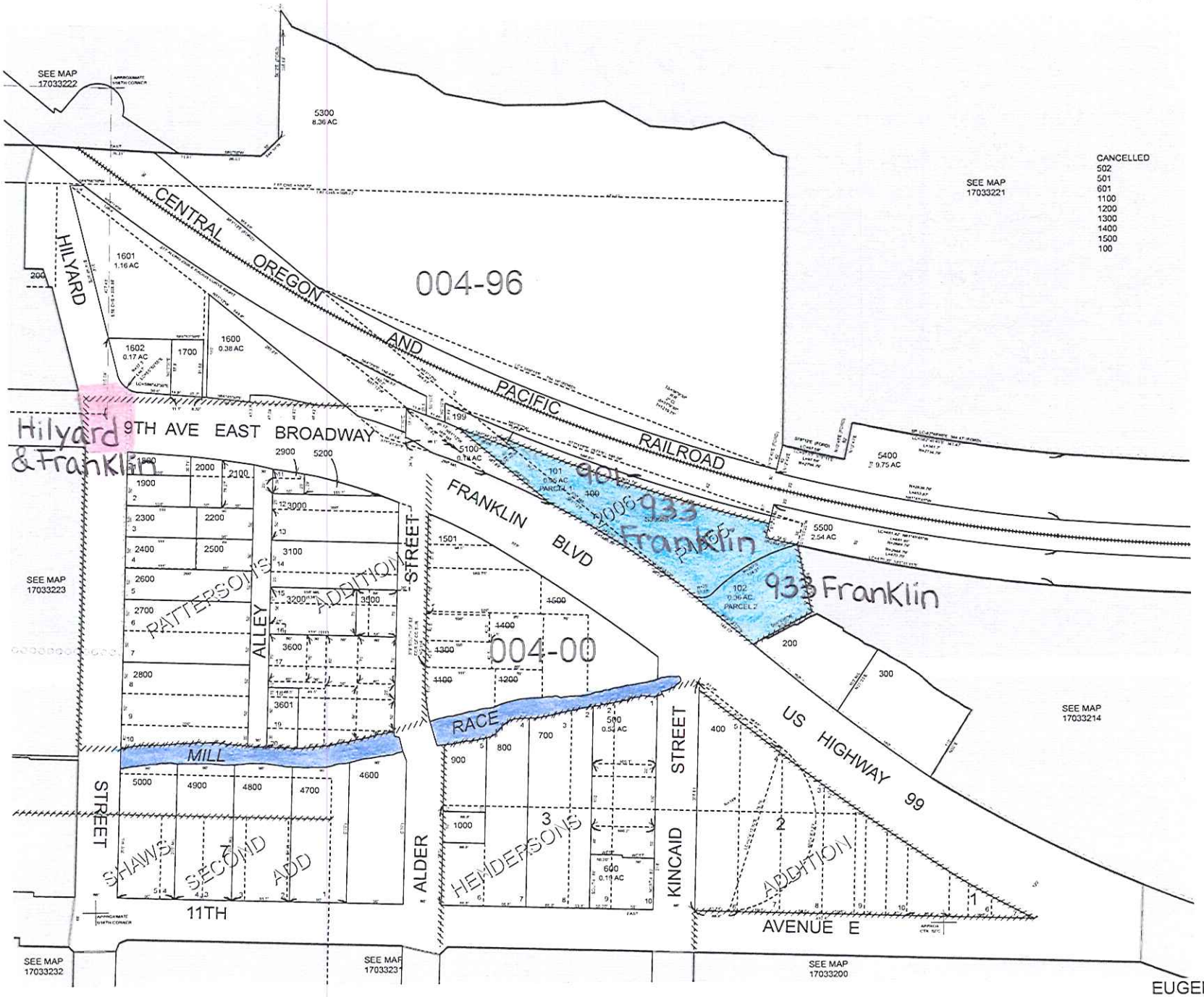

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FOR ASSESSMENT AND TAXATION ONLY

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EUGENE
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FOR ASSESSMENT AND TAXATION ONLY

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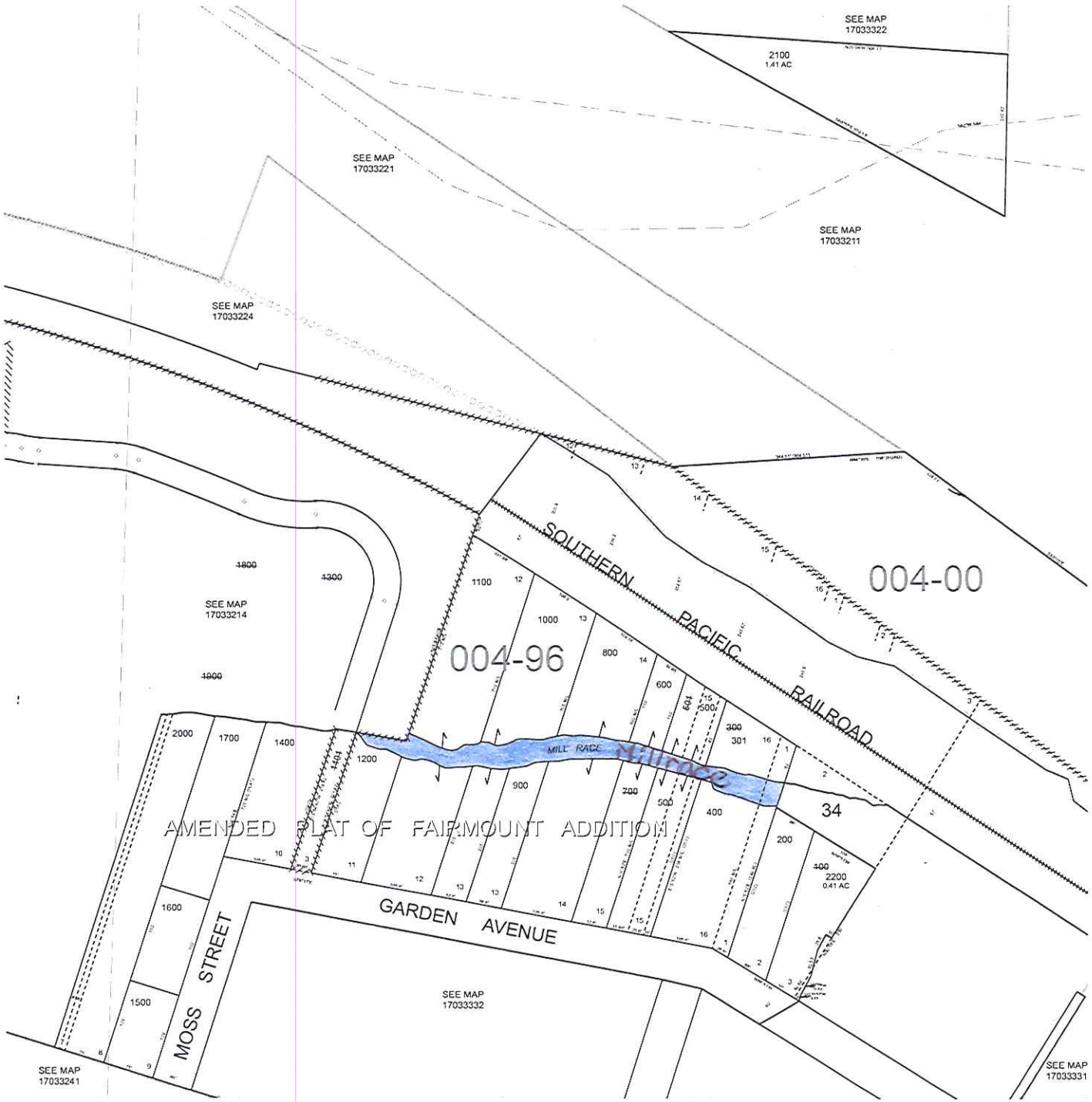

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FOR ASSESSMENT AND TAXATION ONLY

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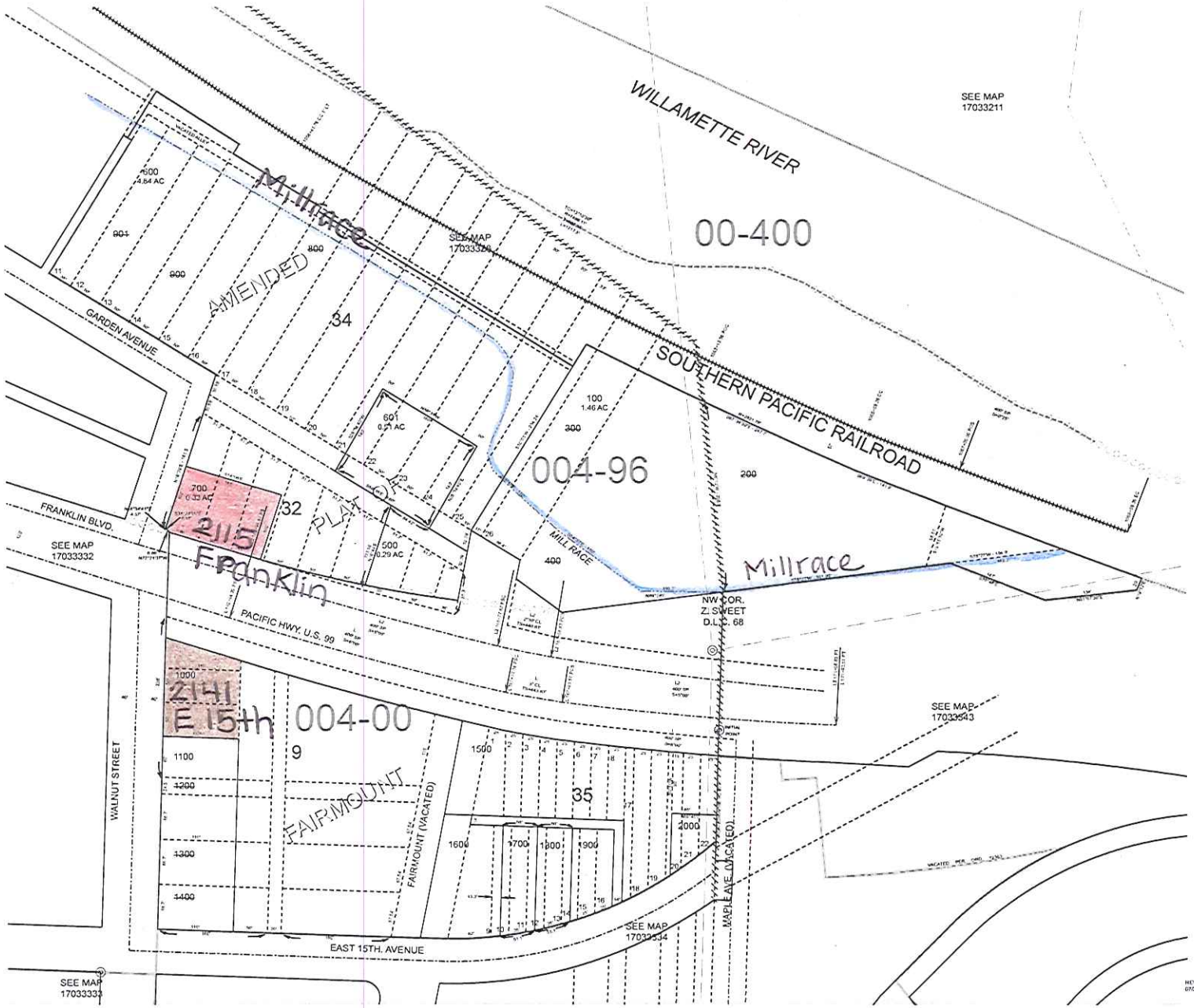

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REVISIONS
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FOR ASSESSMENT AND TAXATION ONLY

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Lane County
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6001
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6700
6800
6900
700
7900
8000
8801
9900

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EUGENE
17033332

FOR ASSESSMENT AND TAXATION ONLY

REVISION
09/27/2019 - LCAT167 - CONVERT MAP TO GIS

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Lane County
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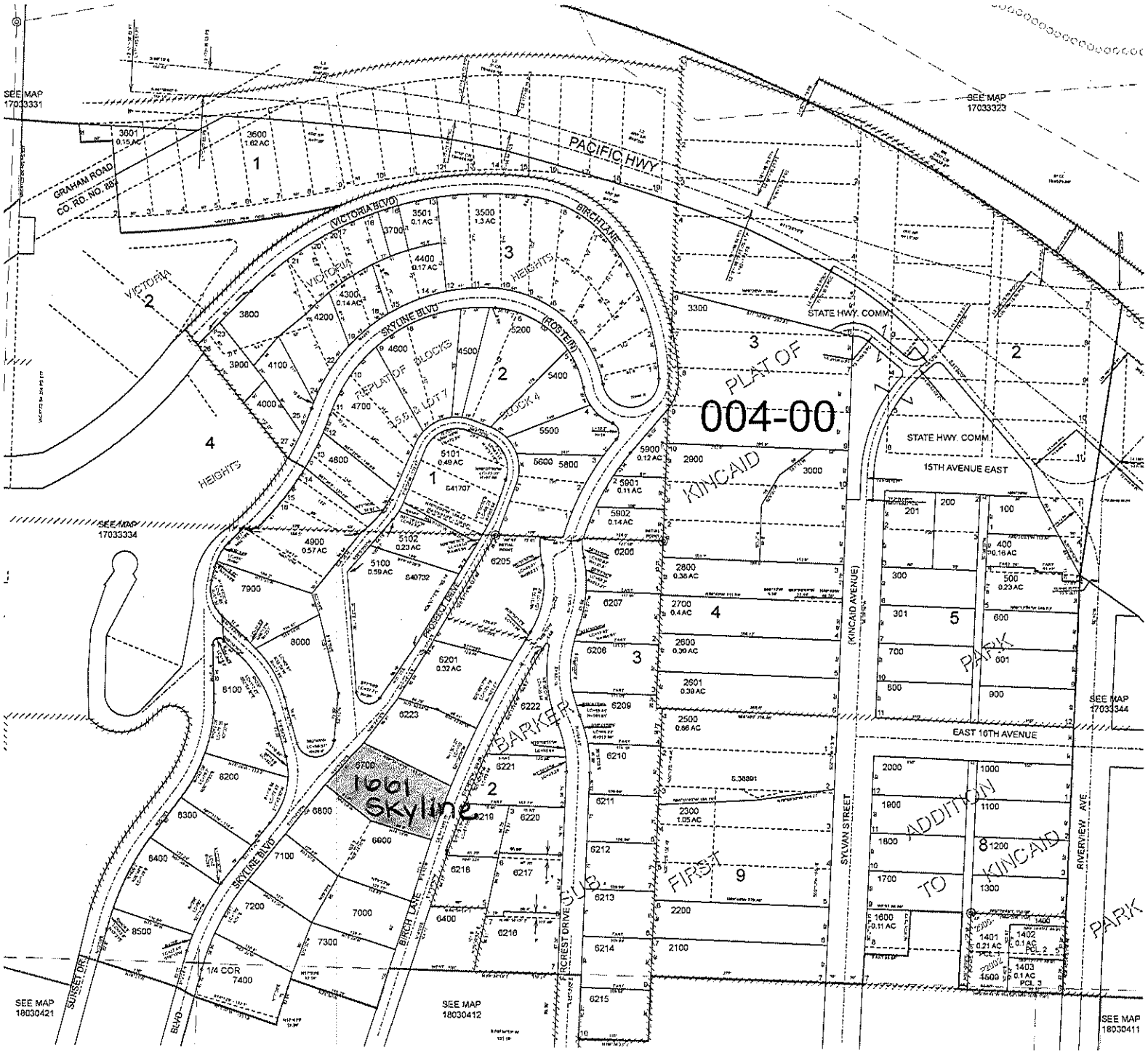

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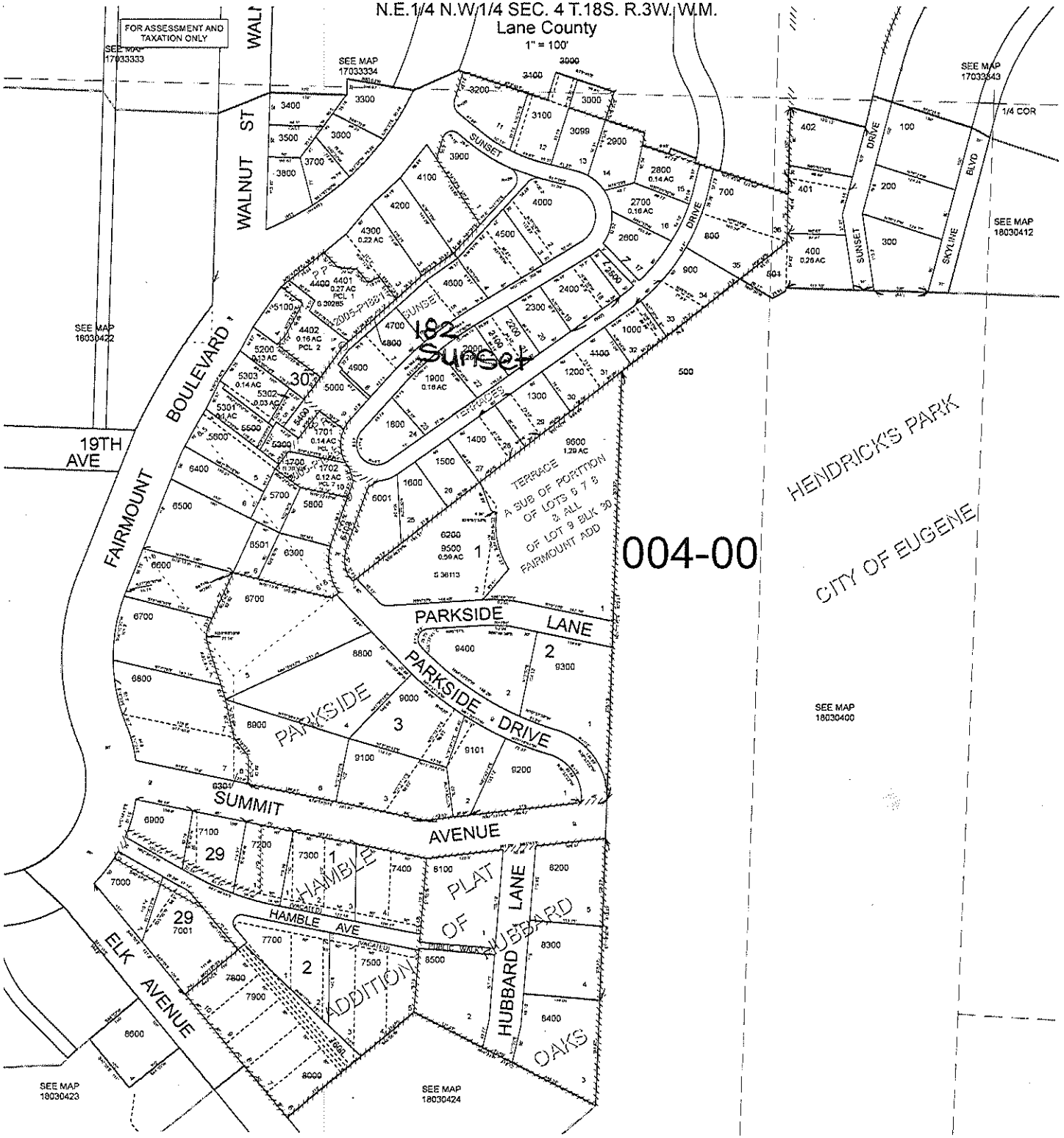
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1" = 100'
FOR ASSESSMENT AND TAXATION ONLY
SEE MAP 17033333
SEE MAP 17033334
SEE MAP 17033343
SEE MAP 18030412
SEE MAP 18030422
SEE MAP 18030400
SEE MAP 18030423
SEE MAP 18030424
WALNUT ST
FAIRMOUNT BOULEVARD
19TH AVE
SUNSET DRIVE
SUNSET TERRACE
182 Sunset
TERRACE A SUB OF PORTION OF LOTS 6 7 & ALL OF LOT 9 BLK 30 FAIRMOUNT ADD
PARKSIDE LANE
PARKSIDE DRIVE
SUMMIT AVENUE
HAMBLE AVE
HAMBLE PLAT ADDITION
HUBBARD LANE
HUBBARD OAKS
ELK AVENUE
SKYLINE BLVD
1/4 COR
HENDRICKS PARK
CITY OF EUGENE
004-00
18030421
lcalbhh - 2012-12-04 06:27
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2500
4400
4800
501
5300
5400
5500
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FOR ASSESSMENT AND TAXATION ONLY

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Lane County
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EUGENE
18030422

FOR ASSESSMENT AND TAXATION ONLY

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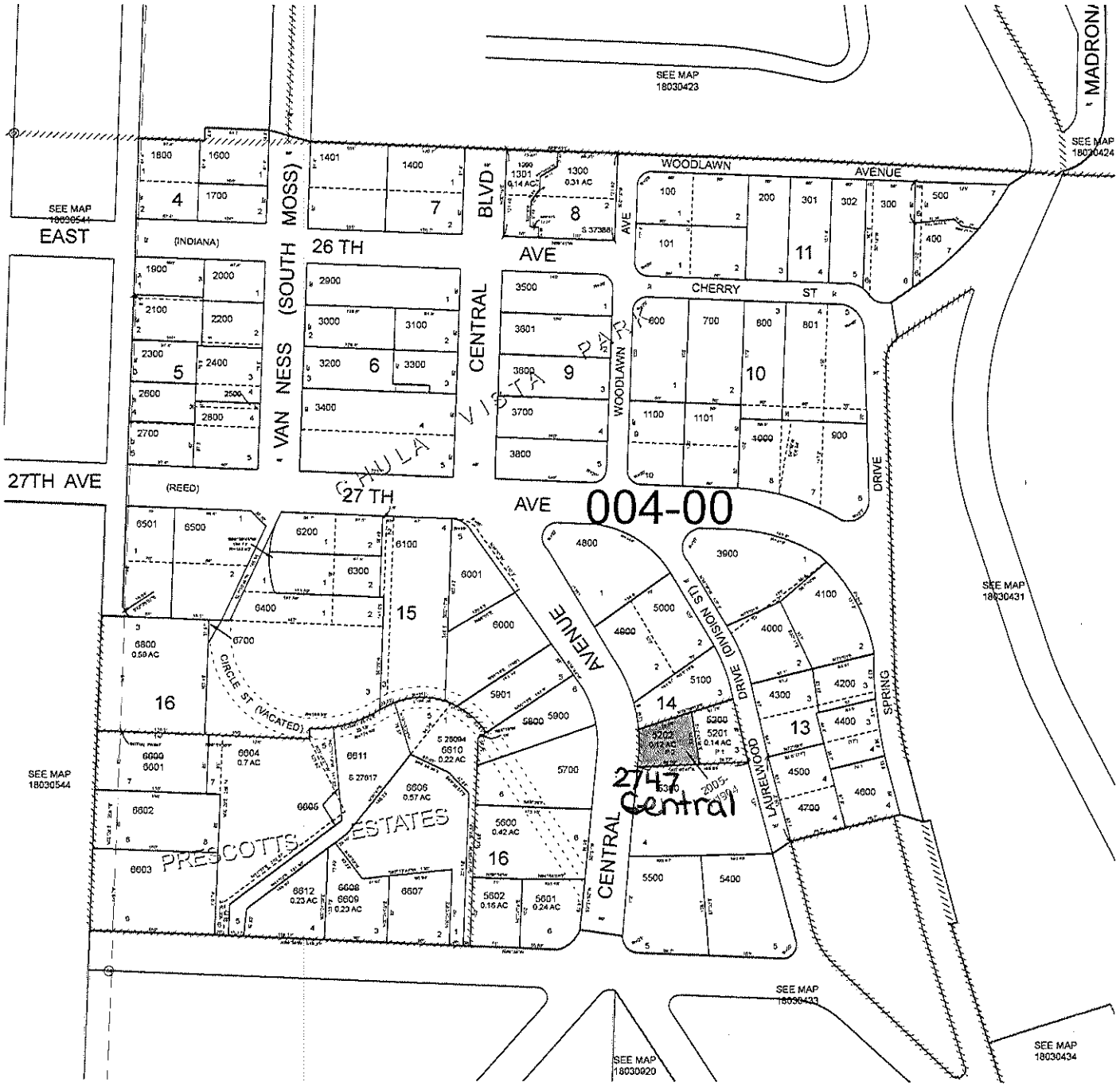

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EUGENE
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FOR ASSESSMENT AND TAXATION ONLY

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Lane County
1" = 100'

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800

Chula Vista

REVISIONS
06/03/2009 - LCAT155 - LLA RETWEEN 5100 & 5200
06/01/2009 - LCAT174 - CONVERT MAP TO CIT
07/14/2009 - LCAT174 - CANCEL TL 800 INTO TL 900
09/29/2010 - LCAT174 - MISC MAP CORRECTION
05/01/2012 - LCAT174 - LLA RETWEEN TL 10200 & 10301

EUGENE
18030541

18030511
EUGENE

GIS DATA
12/29/2009 3:50:56 PM : lcatbhh

CANCELLED:
10100
7000
10200
10300
7700
7800
7900
11000
11100
11200
1200
1500
9500
500
5500
9600
6301
6700
12000
6900
700
8800
8900
9200
9400

REVISIONS
12/29/2009 - LCAT142 - CONVERT MAP TO GIS

EUGENE
18030511

FOR ASSESSMENT AND TAXATION ONLY

S.E.1/4 S.E.1/4 SEC. 5 T.18S. R.3W. W.M.
Lane County
1" = 100'

18030544
EUGENE

lcatljcg - 2012-07-20 08:30

CANCELLED
200
115
100
110
112
114
700

REVISIONS
03/03/2010 - LCAT115 - CONVERT MAP TO GIS
07/20/2012 - LCAT174 - CANC TL 200 INTO 2012-P2541

EUGENE
18030544