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A. HISTORY OF APPLICATION PROPERTY

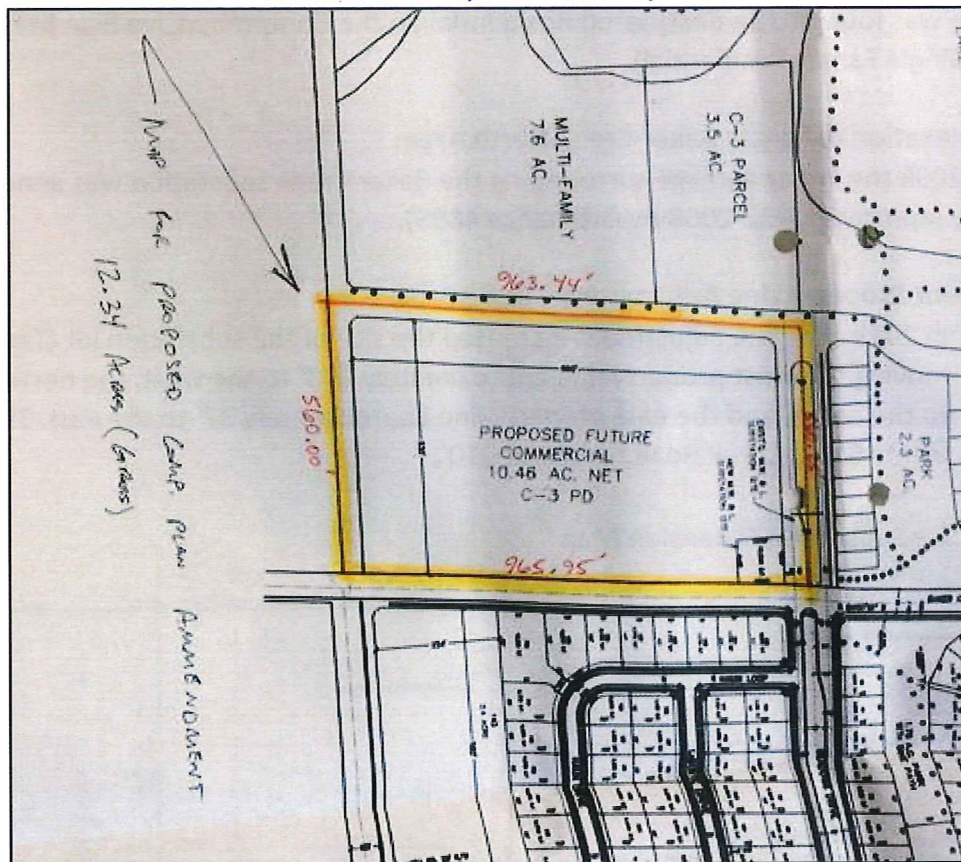
1. Annexation into City of McMinnville:

- The original substation lot, Tax Lot R4418-00101, was annexed into the City on 9-10-1977 by Ordinance 3881. The lot was approximately 0.26 acres and was co-located on the existing BPA high-voltage transmission easement.
- The Comprehensive Plan Map and Zoning Map from the early 1980s identified the site as being in a Residential Comprehensive Plan Map designation and zoned R-1 (Single Family Residential)

2. Comp Plan Amendment - CPA 2-96:

- In 1996, Ordinance 4633 amended a 12.34 acre portion of a parcel on the Comprehensive Plan Map on the north side of Baker Creek Road from residential to commercial. This amendment split the original substation lot in half for comprehensive plan map purposes between Commercial and Residential.
 - Ordinance 4633 also created a Planned Development overlay on the same property, with some conditions related to the form of development and uses.
 - Ordinance 4633 did not change the zoning of the site, and the acreage property still retains the county EF-80 zoning (eventually annexed in 2008 – see more below).
 - A map showing dimensions of the area proposed to be designated as commercial was included in the 1996 land use application file submitted by the applicant at the time. Part of that map is depicted below in **Figure No. 1**.

Figure No. 1 – 1996 Commercial – Planned Development Overlay



- The southern boundary of the new commercial area (965.95' dimension) extended from the Tax Lot R4418-00100's western boundary to a point that is within and near the center of substation lot (Tax Lot 101 as it existed).
- It is noteworthy that at the time of the 1996 Comp Plan Amendment, Figure No. 1 shows plans for an expanded substation site. (See figure No. 1, above). The expanded substation use was shown within the commercial overlay designation.

3. Conditional Use Permit for Baker Creek Substation – CU 7-99:

- In 1999, the city granted MW&L a conditional use permit for the Baker Creek Substation (approval letter with original conditions attached here as **Attachment 6**).
- Findings of fact for that application stated that the subject site was designated Residential on the Comprehensive Plan Map and zoned R-1 (Single Family Residential).
- The substation use was reviewed as a conditional use, as a "Utility transmission station" is a conditional use in a residential zone. Section 17.12.020 (a section of the R-1 chapter).
- Construction of the new Baker Creek substation took place in 2000. Electric load was first placed on the substation in January 2001.

4. Lot Line Adjustment

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In summary, simultaneous applications are made for the following land use actions:

- 1) **Comprehensive Plan Map Amendment** – Amendment from the current mix of Residential and Commercial designations to Residential, only. Applicable review criteria for a Comprehensive Plan Map Amendment are found in Section 17.74.020 of the MMC. Findings for Comprehensive Plan Goals and Policies are provided (Per Section 17.74.020(A)) below in Section C of this Exhibit.
- 2) **Zone Change** – Simultaneously with the plan amendment change to Residential, application is made for Zone Change of the entire parcel from a mix of R-1 and EF-80 to **ALL** R-1 (Single Family Residential). Applicable review criteria for a Zone Change are the same as those for the Comprehensive Plan Map Amendment, which are in Section 17.74.020 of the MMC. Findings for Comprehensive Plan Goals and Policies are also provided (Per Section 17.74.020(A)) in the application narrative, Section C, below.
- 3) **Planned Development Amendment** – Simultaneously application is made to amend the Planned Development overlay created by Ordinance 4633 to remove the subject site from the overlay and reduce the size of the overlay to remove the substation lot (existing tax lot 4418-00101). Applicable review criteria for a Planned Development Amendment are in Section 17.74.070 of the MMC. The criteria are addressed below in section D.2 of this exhibit.
- 4) **Conditional Use Permit** – Simultaneously with the other applications, application is made for a conditional use permit to expand the substation facility. Section 17.12.020(L) of the MMC identifies “Electrical power substation” as a conditional use¹ in a R-1 zone. The level of review and compatibility of the substation with the future commercial, residential and park uses that will surround this site will be based on the conditional use review criteria in Section 17.74.030 and 17.74.040 of the MMC. The criteria are addressed in section D.3 of this exhibit.

B. INTENDED USE OF THE PROPERTY.

1. PROJECT DESCRIPTION SUMMARY

This section addresses the application question: What, in detail, are you asking for? State the reason(s) for the request and the intended use(s) of the property.

1.1 Baker Creek Substation Facilities and Expansion

This section describes the intended construction, operation, and maintenance of an expanded substation, the associated transmission and distribution lines, and the telecommunication system for the Proposed Project.

¹ Electric Substations are only a permitted use in McMinnville’s Industrial zones. Strictly limiting substations to industrial zones would create inefficiencies in delivery of electric service to residential and commercial zones.

1.1.1 Substation Description

Currently, MW&L's Baker Creek substation consists of electrical equipment needed to operate the substation, underground distribution circuits leaving the substation, a perimeter fence surrounding the substation equipment with a gate(s) to provide access in and out of the substation. As currently configured, the substation footprint within the fence is approximately 0.26 acres. As expanded, the substation footprint (area contained within the substation perimeter fence) is approximately 0.87 acres. The total area of the expanded substation including a buffer area (area outside the substation perimeter fence) is approximately 1.22 acres.

1.1.1.1 Reasons/Intended use. The substation will be used to transform high voltage electricity to medium voltage electricity, prior to the current being switched onto electric lines for transmission in neighborhoods. The expanded site is needed to host a second transformer and related switchgear to serve the expanding residential and commercial development in northern and western McMinnville.

1.1.2 Substation Equipment

The expansion essentially doubles the existing substation facility. As expanded, the substation will be an unmanned, automated, 115/12 kV substation containing a 115 kV switchrack, **two** 20 MVA 115/12 kV transformers, and **two** 12 kV metalclad switchgears. The substation will be served from two 115 kV transmission source lines. There are four existing 12kV distribution circuits and **four additional** 12 kV distribution circuits will be constructed. The exact location and routing of these proposed circuits have yet to be determined, but will be in a utility easement. These circuits will be designed to meet future electrical demand.

The 115 kV switchrack will be an operating and transfer bus configuration with two line breakers and two sets of group disconnects. The bus-tie position will have one circuit switcher and one set of group disconnects. There is one existing 12 kV metalclad switchgear and there will be one additional new 12 kV metalclad switchgear. The two 12 kV metalclad switchgears will be prefabricated metal buildings measuring approximately 12 feet high, 35 feet long, and 15 feet wide to house an operating and transfer bus configuration each with four breakers supplying the underground 12 kV distribution circuits, a bus tie breaker, as well as relay panels, battery and battery charger, AC and DC distribution switchboards, and telecommunications equipment. The substation will be equipped with a substation automation system which includes two remote terminal unit (RTU) racks and equipment panels with system protection and control equipment.

All equipment and structures at the substation will be electrically grounded in accordance with the National Electric Safety Code "NESC" (as adopted by the Oregon Public Utility Commission) and industry standards.

1.1.3 Substation Lighting

The proposed substation will have access and maintenance lighting. The access light will be low-intensity and controlled by photo sensors. Maintenance lights will consist of LED lights located in the switchracks, around the transformer banks, and in areas of the substation where maintenance activity may take place. Maintenance lights will be used only when required for maintenance outages or emergency repairs occurring at night. Maintenance lights will be controlled by a manual switch and will normally be in the off position. The lights will be directed downward and shielded to reduce glare outside the facility.

1.1.4 Substation Landscaping

The substation site will be landscaped following construction. Approximately 25% of the site is designed to be outside the screen fencing and will be available for landscaping. A portion of this includes area in the R.O.W., anticipated for sidewalk and planting strip (~8% of total area). As the surrounding area develops, the substation landscaping in a form as attached as **Attachment 2** ("landscape plan") will be implemented consistent with community and city standards, consistent with NESC/OPUC/MW&L safety standard, and as required with approval of the Landscape Review Committee.

1.1.5 Substation Perimeter Features

To screen the substation from the public and to secure the facility, the substation will be enclosed on all four sides by a minimum 6 foot high perimeter fence (with one-foot barbed wire atop), with inserted colored slats consistent with the landscape plan. The metal access gate(s) will be approximately 20 feet wide and also a minimum of 6 feet high. All perimeter fences and gates will be fitted with barbed wire for increased security. See Attachment 12 (OPUC substation fencing requirement). Landscape trees will be placed at NESC/OPUC required distances from the fencing.

1.1.6 Site Access

The substation will be accessed by two 20-foot wide asphalt concrete paved driveways connecting to Baker Creek Road. The substation entrance will have locked gates for two-way traffic access to the substation.

C. GOALS AND POLICIES

Show in detail, by citing specific goals and policies, how your request is consistent with applicable goals and policies of the McMinnville Comprehensive Plan (Vol. 2).

PROPOSED CONCLUSORY FINDINGS:

1. COMMERCIAL DEVELOPMENT

GOAL IV 2: TO ENCOURAGE THE CONTINUED GROWTH OF McMINNVILLE AS THE COMMERCIAL CENTER OF YAMHILL COUNTY IN ORDER TO PROVIDE EMPLOYMENT OPPORTUNITIES, GOODS, AND SERVICES FOR THE CITY AND COUNTY RESIDENTS.

21.01 The City shall periodically update its economic opportunities analysis to ensure that it has within its urban growth boundary (UGB) a 20-year supply of lands designated for commercial and industrial uses. The City shall provide an adequate number of suitable, serviceable sites in appropriate locations within its UGB. If it should find that it does not have an adequate supply of lands designated for commercial or industrial use it shall take corrective actions which may include, but are not limited to, re-designation of lands for such purposes, or amending the UGB to include lands appropriate for industrial or commercial use. (Ord.4796, October 14, 2003) (emphasis added).

*FINDING: The application approval and proposed substation use is consistent with Policy 21.01 in that the application facilitates suitable and serviceable sites for commercial uses in the north and west of McMinnville. While approval of this application(s) would arguably move ~.8 acres of land on the Comprehensive Plan Map and in the applicable zone to residential use from commercial use, the applied-for conditional use (electric substation) would also function to facilitate commercial uses by providing additional electric capacity. Note the Electric System Study, 2015, that indicates fully loaded electric feeders and a need for another substation to serve the north and west of the city. **Attachment 4** at page 15, (Table 2-1; 2-7).*

*Even if the proposal reduces commercial land on the comprehensive plan map by increasing residential land, it has no net effect on available commercial land for actual development. The 1996 Comp Plan amendment establishing the commercial area, also anticipates the expanded substation site. See Diagram on page 2, *infra*. The substation use serves and enhances adjacent commercial use by providing electric load capacity for development.*

While the conclusions of the City's adopted Economic Opportunities Analysis, indicates that there is a need for approximately 36 additional acres of commercial land during the planning period (2013-2033) the proposed substation, even under a residential plan map designation, is consistent with fulfillment of that need. Whether the property is zoned commercial or

residential the space will be needed for the utility use. The plan map divides the lot between commercial and residential. The buildable lands inventory identifies both types of land (Comm. and Residential) in short supply. However, the actual use of the property, as an expanded substation will support both commercial and residential development. Consolidating the entire lot to residential plan map designation will allow for uniform planning while supplying utility (electric) needs for both types of use. The Residential designation and zone is more restrictive for land use purposes and is the better choice. The proposed conditional use (utility substation) of the property in a residential zone supports the immediate area for suitable and serviceable commercial sites. (See map of substation facilities Attachment 1, site plan {surrounding area currently undeveloped}).

GOAL IV 3: TO ENSURE COMMERCIAL DEVELOPMENT THAT MAXIMIZES EFFICIENCY OF LAND USE THROUGH UTILIZATION OF EXISTING COMMERCIALLY DESIGNATED LANDS, THROUGH APPROPRIATELY LOCATING FUTURE COMMERCIAL LANDS, AND DISCOURAGING STRIP DEVELOPMENT.

Locational Policies:

24.50 *The location, type, and amount of commercial activity within the urban growth boundary shall be based on community needs as identified in the Economic Opportunities Analysis. (Ord.4796, October 14, 2003)*

FINDING: The proposed application is consistent with Goal IV 3 and policy 24.50 in addressing the 2013 Economic needs analysis which describes the need for commercial uses by providing additional electric transmission and distribution infrastructure to allow higher density of site utilization. The Economic needs analysis provides as follows:

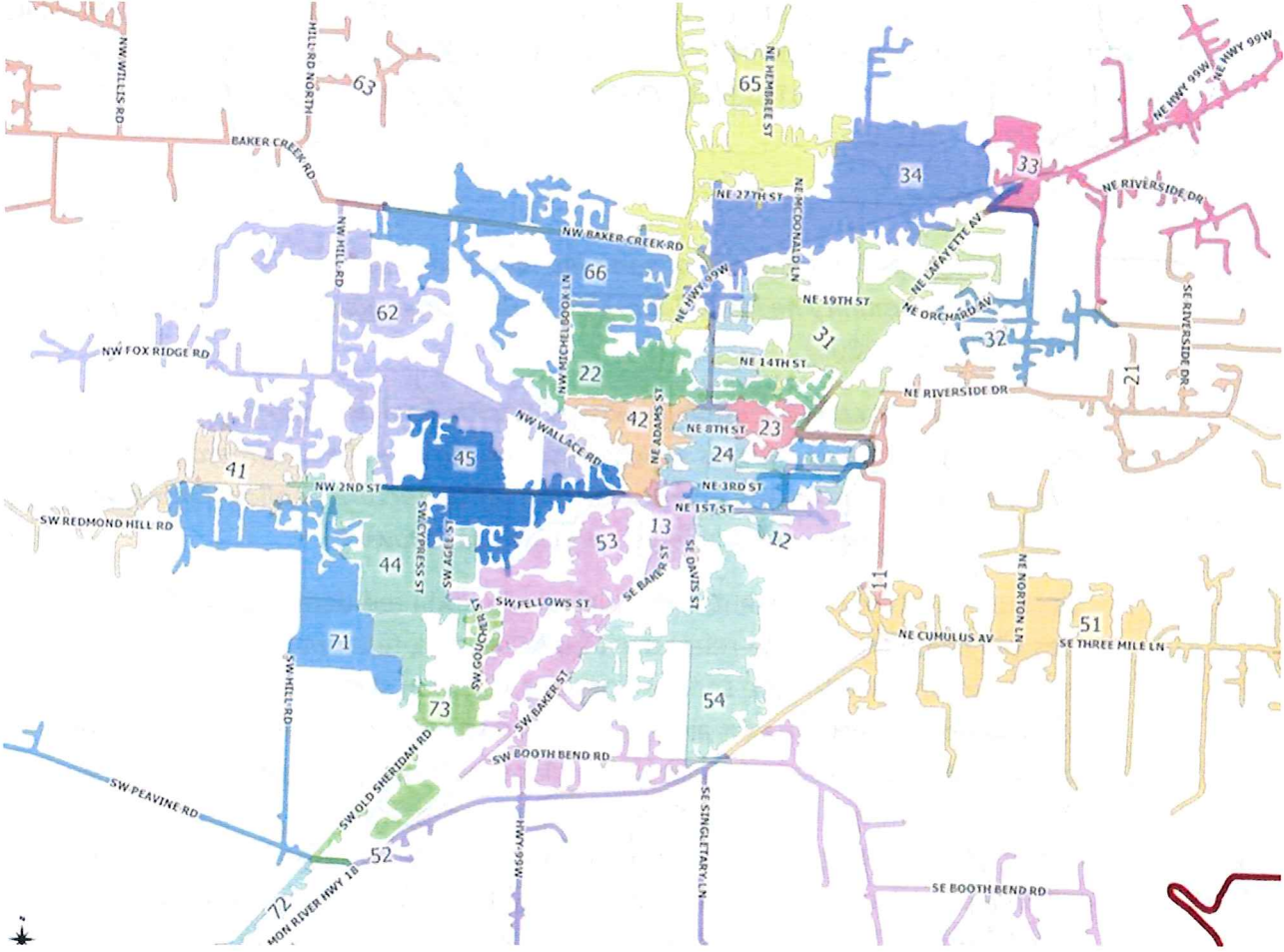
*“Because much of the recent and anticipated continued demand for commercial uses will come from office-related uses including professional, financial, consumer, and health care service activities, the goal statement and/or implementing policies might also be modified to more explicitly address needs for a broad range of service-related functions including professional, business, financial and medical services. Due to the increasing shortage of commercial land, it can be anticipated that future development may begin to involve more redevelopment sites at **higher densities of site utilization** than has occurred in the past – as reflected in revised forecasts for higher overall commercial employment densities than previously targeted.” McMinnville Economic Opportunities Analysis (Final Draft), 2013, page 72.*

The proposed application and substation facility provide for the anticipated higher demand on the electric system in the north and west part of the City and will thereby allow a higher density of site utilization for commercial development.

25.00 Commercial uses will be located in areas where conflicts with adjacent land uses can be minimized and where city services commensurate with the scale of development are or can be made available prior to development.

FINDINGS: The proposed plan amendment, zone change, and conditional use within a residential zone (electric substation) is consistent with this policy as providing for electric services prior to the subsequent commercial development and being supportive of nearby commercial development in areas served by Baker Creek Substation feeders (60's).

Figure No. 3 – Baker Creek Substation Feeder circuits (60's)



“Based on the best available growth forecasts and information on growth areas, feeders 31, 34, 62, and 65 are all likely to see load growth. These are heavily loaded feeders served by heavily loaded substation transformers with limited or no ability to transfer existing load to lightly loaded substations. A majority of the available MW&L transformer and circuit capacity is at East McMinnville #2 and Gormley substations; without major circuit reconfigurations, this capacity cannot be utilized for load growth on the north and west sides of town. If load develops in these areas as expected, single contingency criteria may not be met during peak events for transformer outages at these locations. It is recommended that MW&L be prepared for one of the following options as load growth occurs: * * * * Expand Baker Creek Substation and add new transformer.”

Electric System Planning Study 2015, Triaxis Engineering Written: Michael Antonishen. Attachment 4, page 15 (Table 2-1; 2-7).

Locating the substation prior to build out of commercial development is orderly and advantageous to the commercial development. The new substation will provide a reliable base of power for development of various sizes. The placement now, prior to other development, allows surrounding future commercial development to place and scale itself in light of the known substation use.

*The predicted need for additional substation capacity to serve commercial growth is further supported factually by **figure No. 6** (below), showing anticipated housing units within the effected “feeder” areas on the north and west sides of town.*

According to the 2015 study, expansion of the Baker Creek Substation is one of three alternatives available to MW&L to provide for increase electric load in the north and west McMinnville and will not require the cost of “major circuit reconfigurations” and is the only alternative not involving constructing an entirely new substation facility to support both anticipated commercial and high-density residential development.

2. HOUSING OPPORTUNITIES.

GOAL V 1: TO PROMOTE DEVELOPMENT OF AFFORDABLE, QUALITY HOUSING FOR ALL CITY RESIDENTS.

General Housing Policies:

58.00 City land development ordinances shall provide opportunities for development of a variety of housing types and densities.

FINDINGS: The most recent Buildable Land Inventory indicates a shortage of residential land. The Residential Buildable Lands Inventory, 2001, identified a need for additional land for housing uses. That inventory, which was titled the McMinnville Residential Land Needs

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Analysis and Growth Management Plan, identified a deficit of ~860 acres of land for housing in Table 6-3. More specifically, the analysis identified a need of 129 acres of R-1 (Low Density) zoned land. See below Figure No. 4. This application and related applications (Comp Plan Amendment, Zone Change), is consistent with this policy in that it seeks to add residential land to the inventory.

Figure No. 4 - Table 6-2 – Additional Land for Housing; Table 6-3 Total Acres needed.

Table 6-2. Additional land needed for housing in the McMinnville UGB, 2000-2020

Zone	Additional Dwelling Unit Need	Gross Density	Needed Gross Acres	Net Density	Needed Net Acres
R-1	348	2.7	129.0	3.6	95.6
R-2	588	4.9	120.0	6.5	90.4
R-3	653	4.8	136.1	5.5	119.7
R-4	588	9.2	63.9	10.7	55.1
All Other Zones	0	na	na	na	na
Total	2,178	4.8	449.0	5.9	369.1

Source: ECONorthwest, 2000

Table 6-3 shows total residential land need from 2000 to 2020. Including parks and schools, we estimate total need for land designated for residential uses at 861 gross acres.

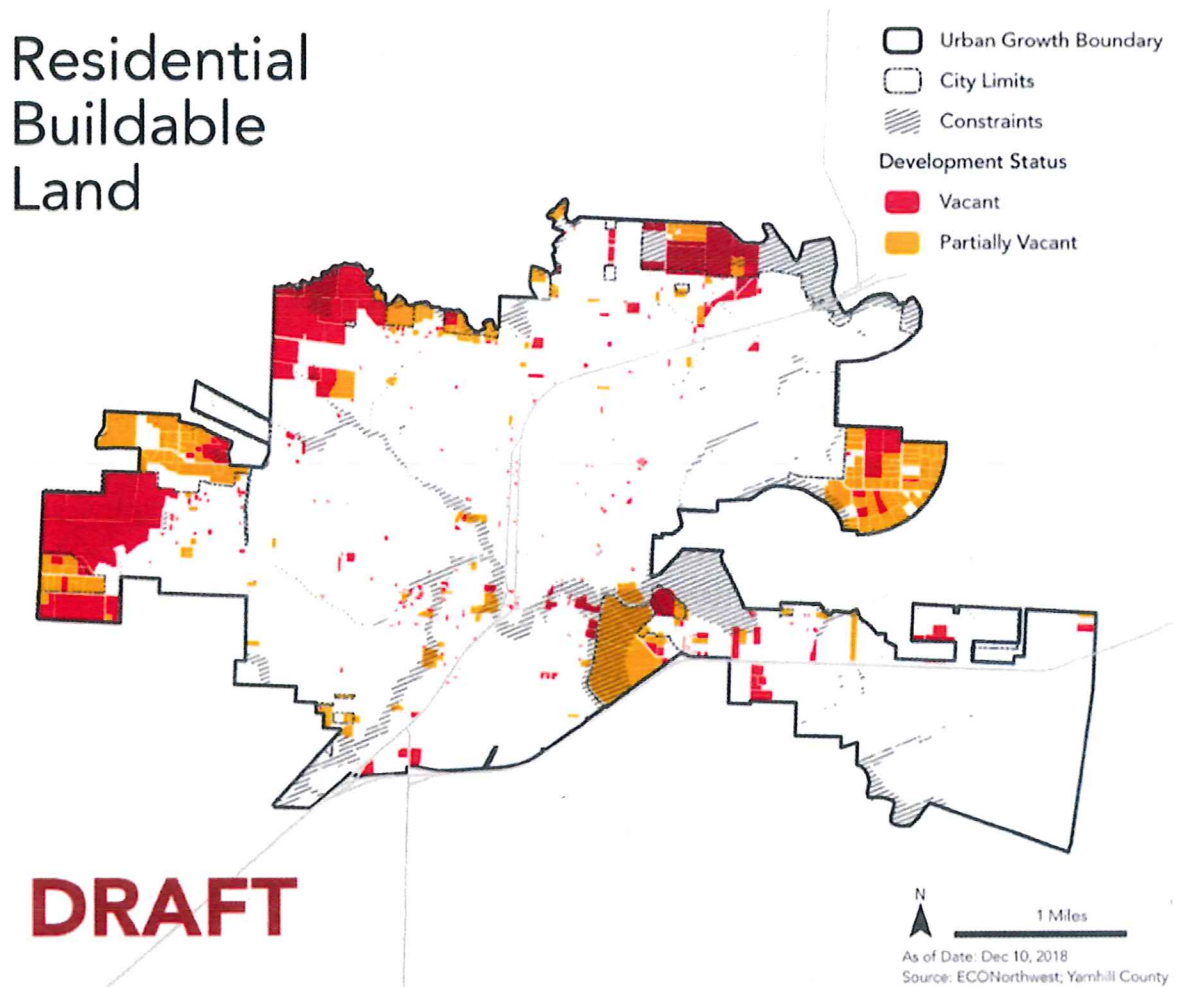
Table 6-3. Total additional acres needed in the McMinnville UGB, 2000-2020

Category	Needed Gross Acres
New housing	449.0
Parks	250.0
Schools	96.0
Private Schools	1.3
Religious	41.6
Government	0.8
Semi-Public Services	19.6
Infrastructure	2.3
Total	860.6

Source: City of McMinnville, ECONorthwest

FINDING: As demonstrated by Figure No. 5 (below), the available residential land is located in the north and west parts of the city. Note that much of the available residential land in the north-east, is under “constraints.”

Figure No. 5 – Map – Residential Buildable Land 2018



Applicant’s Comprehensive Plan Map amendment and other applications are consistent with this policy, because the slight reduction in commercial land will not meaningfully impact the deficit of commercial land identified in the 2013 Economic Opportunities Analysis and the additional residential land will result in a reduction in the deficit of residential land identified in the 2001 McMinnville Buildable Land Needs Analysis and Growth Management Plan. Therefore, on balance the Comprehensive Plan goals and policies related to the provision of opportunities for the development of a variety of housing types and densities (Policy 58.00) and opportunities for multiple-family

developments to encourage lower-cost housing (Policy 59.00) would be satisfied by the proposed Comprehensive Plan Map amendment.

*The application(s) is consistent with policy 58.00 in that it(they) provides for the expansion of an existing substation which will provide capacity for a wide range of housing types and densities. The current substation is at near capacity and if no action is taken, variety and expanse of development may be limited. See, Attachment 4, page 15 (Table 2-1; 2-7). (Electric System Study, 2015); See also Memo of Jaime Phillips, Senior Power Analyst, **Attachment 5** (Baker Creek substation is at operational load capacity).*

59.00 Opportunities for multiple-family and mobile home developments shall be provided in McMinnville to encourage lower-cost renter and owner-occupied housing. Such housing shall be located and developed according to the residential policies in this plan and the land development regulations of the City.

FINDING: The application is consistent with this policy 59 for the following reasons:

The McMinnville Buildable Lands and Housing Needs Analysis (Housing Needs Analysis) recognizes that housing costs include utilities (as a cost). See the EconNorthwest Housing Needs Analysis at page 12 (Nov. 2018). Households that spend more than 30% of their income on housing and certain utilities are considered to experience cost burden. Cost burden is a concept used by HUD. Utilities included with housing cost include electricity. Reduced electricity costs makes housing more affordable.

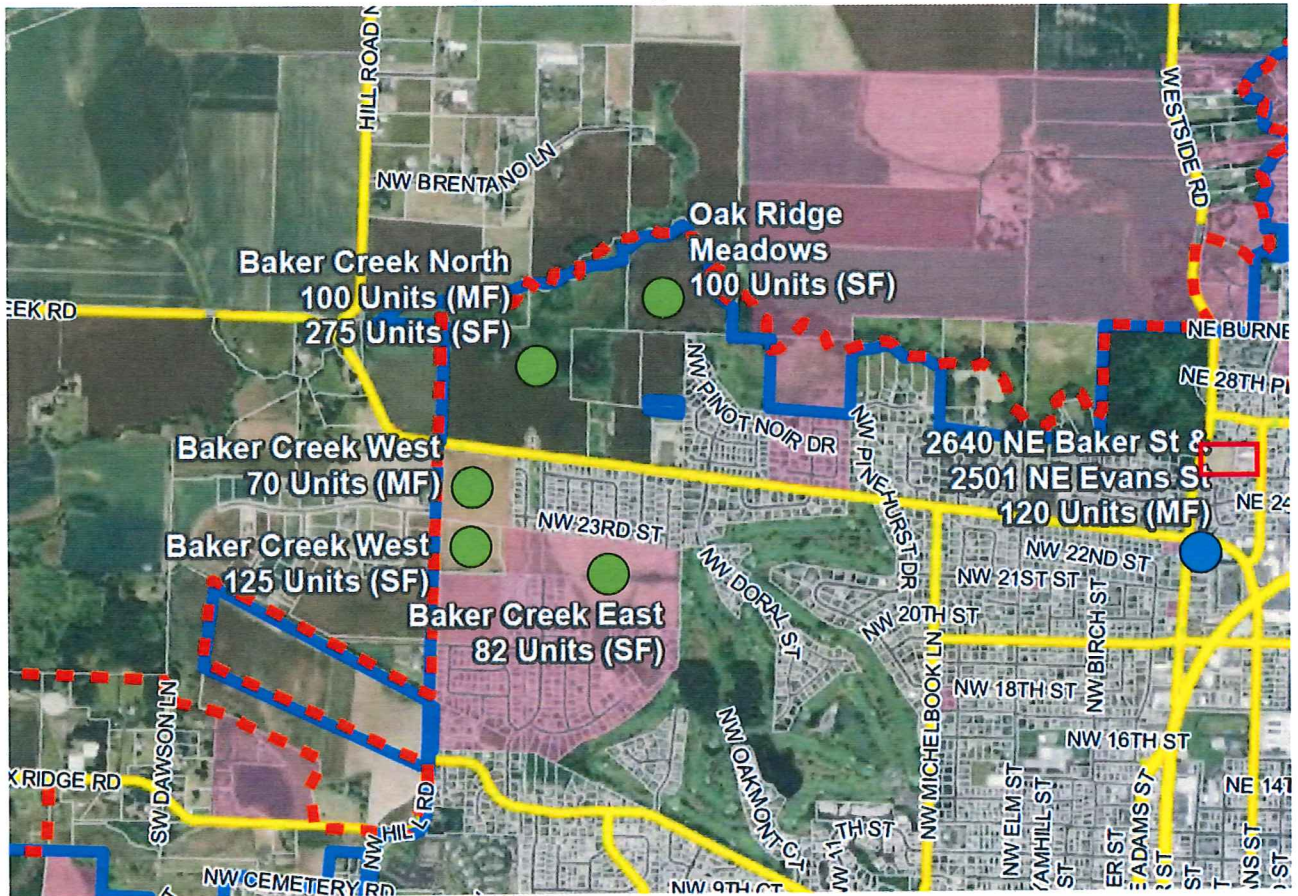
“For housing to be considered affordable, a household should pay up to one-third of their income toward rent, leaving money left over for food, utilities, transportation, medicine, and other basic necessities.” McMinnville Buildable Land Inventory and Housing Needs Analysis (BLI and Needs), page 28.

Current MW&L electric infrastructure in the north and west of McMinnville is at or near load capacity. See Electric System Planning Study (2015), Attachment 4, page 15; Figure 2-1; 2-7 (recommending expansion of Baker Creek Substation) and at Attachment 4, page 53; See also, Memo of Jaime Phillips, Senior Power Analyst (Attachment 5). The figure above (map showing Residential Buildable Land) shows that a large portion of residential buildable land is on the north and west side of town.

Expansion of an existing substation as proposed by the application is consistent with providing lower cost renter and owner-occupied housing across the McMinnville rate base (all rate payers). Expansion of the existing substation, takes advantage of existing electric transmission lines, and existing feeder lines. An expansion of an existing facility can be

done at lower cost than construction of new substation. See Electric System Planning Study 2015 (three alternatives showing estimate costs). The proposed Baker Creek Substation expansion is the least-cost alternative. MW&L provides electricity to customers at rates established on a cost-of-service. See Memo of Jamie Phillips, Attachment 5. Lower cost of electric infrastructure will mean lower electric utility rates as a cost of housing for all rate payers.

Figure No. 6 – Substation and Feeders – Projected Housing Growth – North and West



68.00: The City of McMinnville shall encourage a compact form of urban development by directing residential growth close to the city center and to those areas where urban services are already available before committing alternate areas to residential use

FINDING: Approval of the applications meets policy 68.00. Expansion of an existing substation adjacent to existing residential areas, avoids the need to site a new substation in a location not already devoted to the electric energy use. This site makes good use of existing infrastructure and reduces the footprint per transformer. A new transformer in a new location would require additional set back, security fencing and shielding. The amount of land devoted to each transformer can be reduced by siting two transformers side by side.

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Urban Policies:

99.00 *An adequate level of urban services shall be provided prior to or concurrent with all proposed residential development, as specified in the acknowledged Public Facilities Plan.*

FINDING: Approval of these applications (for substation expansion) is consistent with Policy 99.00 because, according to the 2015 Electric System Planning Study, the expansion will provide a more adequate level of electric utility services to the growing residential areas in the northern and western parts of McMinnville. The expansion is an example of the Water and Light Commission's timely and orderly steps to meet the Commission's organic responsibilities as set forth in the City Charter of 1971. Those responsibilities, in part, are as follows:

*[to provide] electric generating plants and system with all necessary plants or facilities of a character and capacity sufficient to furnish to the City of McMinnville * * * electric energy as may be called for, or required by any consumer, * * * **

Section 51, McMinnville Charter, 1971, as amended 1978.

3. TRANSPORTATION

GOAL VI 1: TO ENCOURAGE DEVELOPMENT OF A TRANSPORTATION SYSTEM THAT PROVIDES FOR THE COORDINATED MOVEMENT OF PEOPLE AND FREIGHT IN A SAFE AND EFFICIENT MANNER.

REGIONAL MOBILITY

132.28.00 *A balanced system of transportation facilities and services shall be designed for the McMinnville planning area to accommodate the mobility needs of residents, businesses, and industry. (Ord. 4922, February 23, 2010)*

FINDING: Expansion of the proposed substation (as result of this application) is consistent with policy 132.28.00 in accommodating the mobility needs of McMinnville residents through electric vehicles.

The Oregon Governor's EO 17-21 (Attachment 3) directs state agencies to use available state funds "to develop and maintain electric vehicle charging stations with a focus on connecting rural communities, low-income communities, and Oregonians living in multi-family homes, " McMinnville's planned densification of housing, when combined with increased electric demand from electric vehicles will be served by the expanded substation facilities. Expanded electric substation capacity is consistent with low cost residential/energy/utility policies. The proposed plan amendment, zone change, conditional use permit, and amendment to Planned Development overlay will all promote the Governor's EO, and transportation plan supporting development of electric vehicles by providing for sufficient electric load capacity.

TRANSPORTATION SUSTAINABILITY

132.37.00 Through implementation of the TSP and the Comprehensive Plan, the City of McMinnville will, to the extent possible, seek measures that simultaneously help reduce traffic congestion, pollution, crashes and consumer costs, while increasing mobility options for non-drivers, and encouraging a more efficient land use pattern. (Ord. 4922, February 23, 2010)

FINDING: Approval of the application is consistent with policy 132.37.00 by expanding electric capacity and facilitating the use of electric vehicles which will reduce carbon emission by encouraging use of electric energy in all sectors, including transportation.

A 2018 University of Michigan study (RELATIVE COSTS OF DRIVING ELECTRIC AND GASOLINE VEHICLES IN THE INDIVIDUAL U.S. STATES MICHAEL SIVAK BRANDON SCHOETTLE) indicates that currently battery electric vehicles (BEVs) are relatively cost effective in Oregon, and may be expected to be an ever-increasing percentage of the transportation sector in Oregon.

Attachment 14 (at 2018 prices in Oregon, gas vehicles would need to get 76 mph to compete with cost of electricity as fuel).

ENVIRONMENTAL PRESERVATION

132.46.10 Clean Burning Fuels – The City should support the use of clean burning and/or renewable fuels through regional organizations (see U.S. Environmental Protection Agency guides). (Ord. 4922, February 23, 2010)

FINDING: Approval of this application is consistent with policy 132.46.10 by expanding electric substation facility which will facilitate the use of renewable electric fuel for transportation and other uses.

The substation expansion approval is consistent with cleaning burning and renewable fuels. Oregon DEQ notes on its website that “[e]lectrically powered lawn and garden tools produce essentially no pollution from exhaust emissions or through fuel evaporation.” See <https://www.oregon.gov/deq/aaq/Pages/for-Cleaner-Air.aspx>

4. ENERGY

GOAL VIII 1: TO PROVIDE ADEQUATE ENERGY SUPPLIES, AND THE SYSTEMS NECESSARY TO DISTRIBUTE THAT ENERGY, TO SERVICE THE COMMUNITY AS IT EXPANDS.

Policies:

171.00 The City of McMinnville shall continue to examine land use decisions in the light of present and projected supplies of electrical, fossil fuel, and other sources of energy.

FINDING: This application approval is consistent with policy 171.00 in providing additional transformer capacity to move the anticipated demand for electrical energy to neighborhoods and commercial areas in the city. The Electric System Planning Study, 2015, specifically

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recommends the expansion of the Baker Creek Substation. Electric System Planning Study 2015, Triaxis Engineering Written: Michael Antonishen. Attachment 4, page 15-7 (Figure 2-1; 2-7; Recommendations). This study further explains that McMinnville is experiencing levels of electric load at the current Baker Creek Substation that currently requires shifting load to other facilities. Electric System Planning Study, Attachment 4, at page 53; Table 6-2. Application approval is consistent with an examination of land use decisions in light of future electrical supply as described in the 2015 study.

Current projections indicate that peak load residential load is expected to grow with additional housing being developed on the west side of the City. See Memo, Jaime Phillips, Senior Power Analyst, McMinnville Water and Light (Attachment 5).

Application approval and resulting substation expansion will not impact the supply of electricity or other sources of energy. Until 2028, MW&L's supply is primarily provided by contract with the Bonneville Power Administration. However, approval of the substation expansion will increase the localized ability of MW&L to transmit available electric energy into the growing west and north sections of the city.

173.00 The City of McMinnville shall coordinate with **McMinnville Water and Light** and the various private suppliers of energy in this area in making future land use decisions.

*FINDING: Review for approval of this application, and the required neighborhood meeting, and the public hearing process demonstrates coordination between the City and MW&L that is consistent with policy 173.00. The City routinely seeks comment from MW&L prior to land use decisions. MW&L comments on land use applications that appear to impact its utility purposes and facilities. The City's approval of these application demonstrate an effort to coordinate with MW&L. Applicant foresaw the need of the City in its related lot line adjustment (BLA 10-18) transaction, and dedicated real property to widen Baker Creek Road in front of the substation (**Attachment 8**) and also granted a public utility easement (**Attachment 9**) during that process. These preemptory conveyances by applicant in anticipation of the City's needs is also consistent with coordination between the City and applicant (Water and Light).*

174.00 The City of McMinnville shall continue to support the long-range planning efforts of McMinnville Water and Light to supply the electrical energy needs of the community.

FINDING: Approval of this application is consistent with support of MW&L's long-range planning efforts as expressed in Applicant's Electric System Planning Study 2015, Triaxis Engineering Written: Michael Antonishen ("the Study"). See Attachment 4, page 15; Figure 2-1, 2-7 (Recommendations).

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*The 2015 Electric Systems Planning Study and the MW&L capital plan (as set forth in the MW&L “Light” budget. **Attachment 13**, p. 15-16) are indicators of long-range planning efforts by MW&L on behalf of the City of McMinnville to supply electrical energy needs of McMinnville. The Study indicates that expansion of the Baker Creek Substation is a recommended alternative to supply needed electrical energy to the north and west part of the city.*

The City’s extension of public utility easements adjacent to Baker Creek Road (when this is done as a requirement for adjacent development), creating transmission access to the substation, is also evidence of the City’s continuing support MW&L long range planning.

Approval of this application will fulfill this policy as the expansion of the Baker Creek Substation follows MW&L’s long-range planning efforts to serve the community’s energy needs. Serving the community’s electric energy needs is also one of Water and Light’s primary responsibilities to the City of McMinnville as expressed in the City Charter.

*The University of Michigan study (**Attachment 14**) indicates that consumer demand for electricity to fuel electric vehicles is also likely to increase. The City’s approval of these applications is also supportive of serving the long-term needs of the community for electricity as a transportation fuel.*

175.00 The City of McMinnville, recognizing McMinnville Water and Light, Northwest Natural Gas, and other private suppliers as the agencies or groups responsible for energy distribution, encourages the extension of energy distribution services within the framework outlined below:

Proposal 1. Sufficient supplies of energy as determined by McMinnville Water and Light, Northwest Natural Gas, and other groups are available to meet the demands of existing residential, commercial, and industrial consumers.

*FINDING: This application is consistent with policy 175.00 and proposal No. 1 and the most recent Electric System Planning Study (2015) which study indicates that there is a need in the north and west of the city for additional substation capacity, and that the least cost option is the expansion of the Baker Creek substation. See Electric System Planning Study, **Attachment 4**, page 15, (Figure 2-1;,2-7). The Memo of Jaime Phillips, Attachment 5, indicates that the expanded substation is needed to serve the localized growing electric load in the west side of McMinnville.*

By Executive Order (EO) the Oregon Governor has directed state agencies to make electric vehicle charging stations available in newly constructed commercial and residential areas. This EV requirement will increase the electric load in these areas of new construction. The expanded substation facility will serve this expanded load. In part the EO reads:

“The appropriate advisory board(s) and the Department of Business and Consumer Services Building Codes Divisions (BCD) are directed to conduct code amendment of the state building code to require that parking structures for all newly constructed residential and commercial buildings are ready to support the installation of at least a level 2 EV charger by October 1, 2022. . . .” Gov. Brown, EO 17-21, November 6, 2017,
Attachment 3.

Additional electric load capacity provided by the expanded substation is consistent with support of providing sufficient supplies of electric energy as demanded by consumers. See Section 51, City Charter of McMinnville (Water and Light Commission specific responsibility includes “electric energy as may be called for, or required by any consumer”).

Proposal 2. Facilities are planned in such a manner as to insure compatibility with surrounding land uses.

FINDING: Approval of the application is consistent with policy 175.00 and proposal No. 2, in that the planned additional facilities are similar to the existing substation facilities, and along an existing high-voltage electricity transmission easement corridor. Current land use around the substation is agricultural, park, and residential. A BPA high voltage 60-foot-wide electric transmission easement runs north to south through the substation parcel. See Map.

Attachment 1. *The expanded substation use is consistent with the current uses.*

MW&L has also developed a landscape plan to make the facility more compatible with the anticipated surrounding park, commercial and residential uses. See MW&L Landscape plan,
ATTACHMENT 2.

The surrounding residential and commercial land uses, to an ever increasing degree, rely on electric energy. The electric substation is integral to the MW&L electric system supplying energy to the customers that work and live in the surrounding areas. Electric energy is both compatible and integral to both commercial and residential uses.

176.00 The City of McMinnville shall carefully consider the environmental impacts of the location and design of energy system facilities to minimize or eliminate adverse effects on residential, farm, and natural areas.

*FINDING: This application and approval is consistent with this goal in that the application is supported by the site plan (**Attachment 1**) and landscape plan (**Attachment 2**) by TriaAxis Engineering. Design standards of the expanded facility take into account state of the art environmental protections for the expanded facility.*

The expanded facility will include environmental protections. The protection (relating to the proposed new equipment) will include a secondary containment structure to catch oil that might leak from the new transformer. MW&L also maintains a current engineer-certified Spill, Prevention, Control and Countermeasures Plan. It is also noted that the Baker Creek substation is at a significant and safe distance from the nearest stream (Baker Creek), some 1,300 feet.

The applicant has identified four hazardous conditions that can occur at a power substation. The first one is the release of mineral oil from electrical equipment. To ensure that equipment failure does not occur due to the release of oil, the equipment has automatic monitoring systems to notify MW&L 24 hours a day if mineral oil is released. In addition, MW&L has designed the new substation with an oil catch basin. Any spills will be cleaned up and reported to appropriate agencies. The second identified hazard is called an arc flash. An arc flash is an electrical explosion or discharge that results from a low impedance connection through the air to ground or another piece of equipment in an electrical system. The applicant proposes to install equipment to minimize the hazards with potential arc flashes. The third hazard is catastrophic failure, which is caused when an electrical power transformer fails and the mineral oil is ignited. The system is designed to allow the transformer to burn until it self-extinguishes. The substation is designed with separation between equipment to ensure that if a transformer ignites, neighboring pieces of equipment should not be involved in the fire. The final hazard is the potential for individuals trespassing on the property. The substation is high-voltage. The proposed substation will upgrade the security measures at the site to preclude trespass. These measures include:

- 1) A new security fence with mini-mesh (small chain link) metal and topped with barbed wire.
- 2) Landscaping which reduces areas where intruders may hide behind screening from MW&L personnel or patrolling law enforcement. See **Attachment 2**, (“landscape plan”); See OPUC, Substation Security, **Attachment 12**.
- 3) Locks on all gates.
- 4) Future installation of onsite closed circuit television to monitor unauthorized access and theft related incidents from offsite.
- 5) The control enclosure will also have an electronic card credential reader and a monitored alarm.
- 6) Animal guarding will be installed at key locations around the station to prevent electrocution of small animals and birds that might come near the medium and high voltage equipment.

The applicant has considered the hazardous conditions that can be created by the proposed facility and has designed the substation to limit or prevent hazardous conditions that could affect the surrounding property owners. The required criterion to approve the application are met.

Proposals:

31.00 The City of McMinnville should require energy system facility sites to be compatible in appearance with surrounding land uses either through **landscaping or other screening** methods.

FINDING: Applicant's landscape plan (**Attachment 2**) and review by Landscape Review Committee is consistent with Proposal 31.00. Applicant will also site the facility in a safe manner consistent with NESC(National Electric Safety Code) and Oregon Public Utility Commission rules that provide for the safety and security of substations, also making the facility compatible with neighboring uses.

32.00 The City of McMinnville should zone, or otherwise regulate, **land uses around future energy system-related sites to ensure compatibility** with the site.

FINDING: The surrounding uses are currently zoned EF-80, but are anticipated to be zoned residential and commercial. An expanded substation has been evident at this site since the 1996 Comprehensive Plan Amendment (above at page 3). Because the substation is being placed prior to other development, the City may also regulate the incoming surrounding uses to make them compatible with the substation use. This may be done through the use of additional screening, placement of streets, drainage swales, and parking lots.

34.00 Proposed extensions of energy system facilities should be coordinated with the extension of other facilities (sewer and water, telephone lines, storm drainage, etc.) where necessary to ensure provision of full urban services to developable areas within the urban growth boundary.

FINDING: This approval is consistent with Proposal 34.00 in that the application is taking place prior to, or concurrently with surrounding development. The land for the expansion of the substation was purchased from the adjacent developer, Baker Creek Development, LLC (BCD). An expanded substation was foreseen in the 1996 Planned Development Overlay. As part of the recent transaction, BCD contracted with the applicant to require the applicant to dedicate additional R.O.W. to the City of McMinnville, and to grant a 10-foot-wide Public Utility Easement across the applicant's frontage on Baker Creek Road for public utility use (by Applicant and other utilities) (**Appendices 8 & 9**). In addition, as part of the transaction, BCD granted to Applicant additional "bump out" utility easements (**Attachment 7**) on the adjacent property west of the Applicant's parcel-electric substation for electric utility vaults. These

“bump out” easements were acquired by Applicant (MW&L) in addition to the PUE spaces in part to allow more intensive electric utility development on the parcel without conflict with other utilities using the PUE space.

5. CITIZEN INVOLVEMENT

GOAL X1 TO PROVIDE OPPORTUNITIES FOR CITIZEN INVOLVEMENT IN THE LAND USE DECISION MAKING PROCESS ESTABLISHED BY THE CITY OF McMINNVILLE.

Policy 188.00 The City of McMinnville shall continue to provide opportunities for citizen involvement in all phases of the planning process. The opportunities will allow for review and comment by community residents and will be supplemented by the availability of information on planning requests and the provision of feedback mechanisms to evaluate decisions and keep citizens informed.

Finding: Goal X1 and Policy 188.00 are satisfied in that McMinnville continues to provide opportunities for the public to review and obtain copies of the application materials and completed staff report prior to the holding of advertised public hearing(s). All members of the public have access to provide testimony and ask questions during the public review and hearing process.

Applicant solicited input from neighbors (direct mail **Attachment 15**; Public Notice **Attachment 17**) and conducted a neighborhood meeting on March 27, 2019 (See attendee list as **Attachment 18**). No neighbors attended the meeting and no public comment was gathered.

D. CODE CRITERIA: The following Sections of the McMinnville Zoning Ordinance (Ord. No. 3380) are applicable to the request:

1. COMP PLAN MAP AND ZONE CHANGE CRITERIA

17.74.020 Comprehensive Plan Map Amendment and Zone Change - Review Criteria.

An amendment to the official zoning map may be authorized, provided that the proposal satisfies all relevant requirements of this ordinance, and also provided that the applicant demonstrates the following:

Question No. 1: Intended use (addressed above in detail).

Question No. 2: Consistent with the **goals and policies** of the Comprehensive Plan;

FINDING: As discussed in the conclusory findings, the application is consistent with facilitating both commercial and residential development in the north and west of McMinnville at higher densities anticipated to come with future development. Expansion of the existing substation was recommended by the 2015 Electric System Planning Study to address growth in the north

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and west sectors of the City. The substation expansion is consistent with the city's support of a reliable supply of electric energy, renewable energy, less pollution, and a healthy environment. Expanding the current Baker Creek Substation will be at a lower cost than other alternative. Utility costs are part of housing costs. The lower cost of the proposed expanded substation (relative to other options) will promote the goal of affordable housing. The expansion is compatible with surrounding uses as it takes advantage of the existing 60-foot wide BPA easement and the expansion will occur before neighboring development which will allow those neighboring uses to deploy effective buffering strategies. Applicant has proposed a landscaping plan that provides for screening and compatibility with the existing uses and future neighboring use, while minimizing the footprint and providing for the safety and security of this high-voltage facility.

Question No. 3: Subject to Planned Overlay?

Finding: The combined application seeks to remove the existing planned development overlay. The proposed use will not be subject to a Planned Development overlay.

Question No. 4: Requesting Planned Overlay?

Finding: The applicant does not seek a planned overlay. The applicant seeks removal of existing planned development overlay, by contemporaneous application.

Question No. 5: The proposed amendment is **orderly and timely**, * * * *

FINDING: This plan amendment and zone change is orderly and timely in addressing the pattern of current and anticipated residential and commercial growth in the area surrounding the substation as evidenced by the Residential Buildable Lands map and as recommended by the Electric System Planning Study (2015).

Question No. 6: * * * changes in the neighborhood * * * which * * * support * * * request.

Finding: Consolidation of the parcel under one Comprehensive Plan Map designation will allow the parcel to be rezoned to R1 and allow an electric substation by conditional use permit. The surrounding neighborhoods are currently under large scale residential development. The consolidation of the plan map designation and related zone change and conditional use permit will facilitate the construction of the needed electric facility infrastructure to support the anticipated residential development.

Question No. 7: * * * site can be efficiently provided with public utilities * * *.

Finding: *The site will not require sewer, or natural gas to operate. Applicant currently serves the site with water and electricity and will continue to serve the site.*

Question No. 8: Describe, * * * proposed use will affect traffic * * * *?

Finding: *The proposed expansion will have a negligible effect on traffic in the area, as the site is already in use as an electric substation. Visits for the expanded facility will take advantage of visits to the site that would otherwise be made and the expansion should not perceptibly increase traffic volume. The applicant has dedicated additional street width to Baker Creek Road to facilitate traffic flow. See Attachment 8, Dedication Deed.*

2. PLANNED DEVELOPMENT AMENDMENT CRITERIA

The following six sections answer questions contained on the Application for the Planned Development Amendment application:

1) Show in detail how your request seeks to amend the existing planned development overlay. State the reason for the request and the intended uses of the property:

Finding: *The application seeks to remove the planned Development Plan Overlay from the 1.22 acre expanded substation site. The overlay will otherwise remain. Currently, about 2/3 (0.8 acres) of the site is subject to the overlay and will create inconsistent development requirements where the overlay was intended for commercial development and the site is being rezoned to residential, with the substation expansion as a conditional use. Removal of the overlay will allow a single standard for review across the entire parcel.*

2) Consistent with Goals and Policies of Comprehensive Plan:

See Exhibit 1, Section C, above, for discussion of Goals and Policies.

3) Considering the pattern of development in the area and surrounding land uses, show, in detail, how the proposed amendment is orderly and timely.

Finding. *The pattern of development is orderly and timely in that the area is largely already residential. An amendment of the Comprehensive Plan Map to residential, from commercial, is consistent with the actual development in the immediate area of the parcel. The area, adjacent to the east (along with half of the existing parcel) and north is residential. The area on the south side of Baker Creek Road is currently under residential development. The area to the west will remain commercial. The substation is also needed to serve the expected commercial uses.*

4) Describe any changes in the neighborhood or surrounding area which might support or warrant the request

Finding. Consolidation of the parcel under one Comprehensive Plan Map designation will allow the parcel to be rezoned to R1 and for application for a conditional use permit to allow an electric substation. The surrounding neighborhoods are currently under large scale residential development. The consolidation of the plan map designation and related zone change and conditional use permit will facilitate the construction of the needed electric facility infrastructure to support the anticipated changes in the neighborhood, those changes being large-scale residential development together with commercial development.

5) Document how the site can be efficiently provided with public utilities, including water, sewer, electricity, and natural gas, if needed, and that there is sufficient capacity to serve the proposed use.

Finding. The site will not require sewer, or natural gas to operate. The facility is currently served with electricity and water by MW&L and MW&L will continue to serve the site in a like manner. The north and west of the City of McMinnville has the bulk of the buildable land for residential development. MW&L's 2015 Electric System Planning Study recommends expansion of the Baker Creek Substation as the least cost option to address the expansion of the electric system in this area of the City.

6) Describe, in detail, how the proposed use will affect traffic in the area. What is the expected trip generation?

Finding. The proposed use will have a negligible effect on traffic in the area, as the site is already in use as an electric substation. Visits and maintenance at the expanded facility will take advantage of economies of scale in combination with the existing facility. The expansion should not perceptibly increase traffic volume.

17.74.070 Planned Development Amendment - Review Criteria.

An amendment to an existing planned development may be either major or minor. Minor changes to an adopted site plan may be approved by the Planning Director. Major changes to an adopted site plan shall be processed in accordance with Section 17.72.120, and include the following:

- * An increase in the amount of land within the subject site;
- * An increase in density including the number of housing units;
- * A reduction in the amount of open space; or
- * Changes to the vehicular system which results in a significant change to the location of streets, shared driveways, parking areas and access.

FINDING: *The proposed amendment of the Planned Development does not meet any of the above criteria and is not a major change.*

An amendment to an existing planned development may be authorized, provided that the proposal satisfies all relevant requirements of this ordinance, and also provided that the applicant demonstrates the following:

- A. There are special physical conditions or objectives of a development which the proposal will satisfy to warrant a departure from the standard regulation requirements;
Finding: *Not applicable.*

- B. Resulting development will not be inconsistent with the Comprehensive Plan objectives of the area;

Finding: *With the concurrent Comprehensive Plan Map amendment, the new substation will be consistent with serving the utility needs of the densely growing and expanding residential use planned for the area surrounding the expanded substation.*

- C. The development shall be designed so as to provide for adequate access to and efficient provision of services to adjoining parcels;

Finding: *Not applicable.*

- D. The plan can be completed within a reasonable period of time;

Finding: *The expansion has been planned and needed equipment is already on order and the expansion is in the current MW&L "Light" Budget for Water and Light. Attachment 13, pages 1-2 (pages 15-16 to plan).*

- E. The streets are adequate to support the anticipated traffic, and the development will not overload the streets outside the planned area;

Finding: *The substation site is adjacent to Baker Creek Road and easily accessible.*

- F. Proposed utility and drainage facilities are adequate for the population densities and type of development proposed;

Finding: *The development will serve utility need for proposed growing population densities in the surrounding neighborhoods. The site will use a combination of gravel, paved and landscape surfaces that will minimally impact drainage.*

- G. The noise, air, and water pollutants caused by the development do not have an adverse effect upon surrounding areas, public utilities, or the city as a whole.

Finding: The expanded substation will have a noise impact of a like-kind to the existing substation facility, which will be partially mitigated by screening (plant and man-made). The expanded facility will be built with additional environmental safety features to protect against water pollutants.

3. CONDITIONAL USE CRITERIA:

17.74.030 Authorization to Grant or Deny Conditional Use.

A conditional use listed in this ordinance shall be permitted, altered or denied in accordance with the standards and procedures of this chapter. In the case of a use existing prior to the effective date of this ordinance and classified in this ordinance as a conditional use, a change in the use or in lot area, or an alteration of any structure shall conform to the requirements for conditional uses. In judging whether or not a conditional use proposal shall be approved or denied, the Planning Commission shall weigh its appropriateness and desirability or the public convenience or necessity to be served against any adverse conditions that would result from authorizing the particular development at the location proposed and, to approve such use, shall find that the following criteria are either met, can be met by observance of conditions, or are not applicable:

Question No. 1: See this Exhibit 1, Section B, above (Intended Use), for nature of request in detail.

Question No. 2: The proposal will be consistent with the Comprehensive Plan and the objectives of the zoning ordinance and other applicable policies of the City;

Finding: See this Exhibit 1, Section C above (Goals and Policies) for findings.

Question No. 3: That the location, size, design, and operating characteristics of the proposed development are such that it can be made reasonably compatible with and have minimal impact on the livability or appropriate development of abutting properties and the surrounding neighborhood, with consideration to be given to harmony in scale, bulk, coverage, and density; to the availability of public facilities and utilities; to the generation of traffic and the capacity of surrounding streets; and to any other relative impact of the development;

FINDING: The location and size of the expanded substation is reasonably suited to the development of abutting properties. The footprint is large enough to accommodate the safety AND maintenance needs of this high-voltage facility, while at the same time providing for the required buffering to adjacent uses. The expanded facility will cause an imperceptible increase in maintenance traffic compared to the existing facility. The relative small size of the site footprint will preserve ground for needed residential development in the neighborhood. The

design allows for the continuation of NW Meadows across Baker Creek Road, from south to north along the eastern side of the substation. The facility takes advantage of, and abuts the existing BPA electric easement. The expanded facility meets this criteria.

Question No. 4: That the development will cause no significant adverse impact on the livability, value, or appropriate development of abutting properties of the surrounding area when compared to the impact of permitted development that is not classified as conditional;

FINDING: The electric substation will positively impact livability, value and appropriate development of abutting properties of the surrounding area, as compared to other permitted development, by facilitating the expanded electric load demand caused by dense residential development and expected commercial development. As explained by the Memo of Jaime Phillips, Attachment 5, failure to expand the substation in light of the growth of permitted residential and commercial uses would likely lead to degraded electric service in the west McMinnville electric service areas.

Question No. 5: The location and design of the site and structures for the proposal will be as attractive as the nature of the use and its setting warrants;

FINDING: By its nature, an electric substation is of a utilitarian design. However, the design of the expanded substation will be symmetrical and otherwise geometrically pleasing. Landscaping will be created to buffer and screen the facility, if not entirely obscuring the facility from outside view. In fact, Water and Light being a consumer-owned utility, the neighbors and passers-by may take some pleasure in seeing the fruits of their investment in this consumer-owned facility.

Question No. 6: The proposal will preserve environmental assets of particular interest to the community.

FINDING: No particular environmental assets appear on the site.

Question No. 7: The applicant has a bona fide intent and capability to develop and use the land as proposed and has no inappropriate purpose for submitting the proposal, such as to artificially alter property values for speculative purposes.

FINDING: The intended expansion is described in the Electric System Planning Study of 2015 and in the MW&L "Light" Budget (Attachment 13, p. 1-2 {p. 15-16}). The applicant has a well-established municipal utility purpose as described in the McMinnville Charter of 1971, as amended in 1978. The activities of the applicant are directed by the City of McMinnville, acting by and through its Water and Light Commission, a five-member board made up of the mayor and four appointed commissioners. The utility sets rates on a cost-of-service basis at

public hearings and is prohibited by state law and its own policies from acting for speculative investment purposes.

DEFINITIONS: Landscaping

17.06.035 Landscaping Related Definitions.

For the purpose of Landscaping (Chapter 17.57), the following definitions shall apply.

Landscaping – The preservation, planting, and maintenance of trees, shrubs, groundcover, and lawn that are compatible with Chapter 17.57 (Landscaping) and Section 17.03.020 of this ordinance. Landscaping shall be encouraged that considers energy conservation through effective planting and ground contouring. Courts, plazas, walkways, fountains, benches, sculptures, fences, or decks may be included within the landscaping percentage required in Section 17.57.070 if they are designed in conjunction with substantial plantings of trees, shrubs, groundcovers, or lawns, and the review committee finds they are consistent with the purpose and intent set forth in Section 17.57.010 and factors set forth in Section 17.57.070(B) of this ordinance.

17.57.040 Specific uses requiring landscaping.

A.. Utility substations, subject to the landscaping requirements of commercial uses.

FINDING: Applicant has provided a landscaping plan (Attachment 2) that is capable of review by landscaping committee. The approval and the individual applications can be made subject to required Landscape Review Committee approval for issuance of required building permits.

17.57.070 Area Determination—Planning factors.

A. Landscaping shall be accomplished within the following ranges:

1. **** [N/A]
2. Commercial, at least **seven percent of the gross area**. This may be reduced to not less than **five percent** upon approval of the review committee. (The gross area to be landscaped may only be reduced by the review committee if there is a showing by the applicant that the intent and purpose of this chapter and subsection B of this section are met.)

FINDING: As indicated by the map showing the substation landscape plan (Attachment 2) there is at least 7% of the gross surface area outside of the facility fencing available for landscaping. As a utility substation, the development will be subject to commercial landscape requirements, as reviewed by the Landscape Review Committee.

B. The following factors shall be considered by the applicant when planning the landscaping in order to accomplish the purpose set out in Section 17.57.010. The Landscape Review Committee

shall have the authority to deny an application for failure to comply with any or all of these conditions:

1. **Compatibility** with the proposed project and the surrounding and abutting properties and the uses occurring thereon.

FINDING: The proposed utility use is of a character that currently exists on the site adjacent to residential uses. The proposed expansion and planned improvements to landscaping will make the facility more compatible with surrounding and abutting properties (than it would be without the expansion) and will be of a nature and character that is appropriate to support affordable housing.

1. Screening the proposed use by **sight-obscuring**, evergreen plantings, shade trees, fences, or combinations of plantings and screens.

*FINDING: The approval will give consideration to sight-obscuring features. These features may utilize continuous fence, colored slats, wall, evergreen planting or combination thereof, constructed and/or planted so as to effectively screen the particular use from view. Complete **obscurification** of the facility is not practical where overhead transmission lines rise above adjacent park facilities and connect to the facility by way of towers. Security of the facility also requires line of sight into the facility grounds. Switching gear is also of a height that cannot be practically, completely obscured. However, a combination of street trees, shrubs, decorative and slat-filled-fencing (**Attachment 2**) can visually temper the appearance and adequately blend the facility into the landscape of the neighborhood.*

3. The retention of existing trees and natural areas that may be incorporated in the development of the project. The existing grade should be preserved to the maximum practical degree. Existing trees shall be provided with a watering area equal to at least one-half the crown area.

FINDING: There are no existing trees and the grade of the overall property will not be altered by the expansion.

7) The development and use of islands and plantings therein to break up parking areas.

*FINDING: Parking for intermittent visits to the facility can easily be accommodated by parking along the 96-foot wide right of way. The facility will also provide (See **Attachment 1**, site plan) for ample onsite parking within the gates for service vehicles. The design has room for vehicles inside the fence around the perimeter of the facility.*

8) The use of suitable street trees in the development of new subdivisions, shopping centers and like developments. Certain trees shall be prohibited in parking areas: poplar, willow, fruit, nut, birch, conifer, and ailanthus.

FINDING: Applicant will provide suitable trees in planting strip consistent with City standards and OPUC rules.

- 9) Suitable watering facilities or irrigation systems must be included in or near all planted areas;

FINDING: *Irrigation facilities will be provided under the terms of approval to facilitate required landscaping.*

C. All landscaping approved through the Landscape Review Committee shall be continually maintained, including necessary watering, weeding, pruning, mowing, and replacement. Minor changes in the landscape plan, such as like-for-like replacement of plants, shall be allowed, as long as they do not alter the character and aesthetics of the original plan. It shall be the Planning

FINDING: *Applicant's landscape plan demonstrates that applicant is fully capable of complying with this proposal. The site is currently served with water for irrigation.*

17.57.090 Credit for work in public right-of-way.

The review committee may grant an applicant credit for landscaping done in the public right-of-way provided that if at any time in the future the right-of-way is needed for public use, any landscaping removed from the right-of-way must be replaced on the subject site. The review committee shall consider the need for future use of the right-of-way for street or utility purposes before granting credit under this section. (Ord. 4128 {part}, 1981; Ord. 3380 {part}, 1968).

FINDING: *No such credit is required, but the applicant will take into the account the development of future right-of-way along the boundaries of the substation and will stage the landscaping development in coordination with the surrounding development.*

17.58.080 Street Tree Planting—When Required.

All new multi-family development, commercial or industrial development, subdivisions, partitions, or parking lots fronting on a public roadway which has a designated curb-side planting strip or planting island shall be required to plant street trees in accordance with the standards listed in Section 17.58.090. (Ord. 4654B §1, 1997)

FINDING: *MW&L will comply with tree planting requirement in planting strip along street frontage.*

PROPOSED ORDER LANGUAGE ON C.U.P. See attached **Attachment 6(Conditional Use Permit for Baker Creek Substation – CU 7-99, for similar findings)**

That the applicant submit to the McMinnville Landscape Review Committee for review and approval a detailed landscape and irrigation plan prior to issuance of any building

permits for the proposed facility (in the form of **Attachment 2**, Landscape Plan). The plan will include a planting strip with trees to city standard within the R.O.W. between the traveled surface and the sidewalk. A vegetative screening in the form of a evergreen hedge or similar planting material, white decorative fencing (similar to neighborhood design) in combination with green-slatted security fencing, shall be placed along the site's southern perimeter within a landscape strip a minimum of **five feet** in width. For security, a clear line of sight to the fence will be maintained as visually broken with trees, shrubs, plants, decorative fencing, and planting strip trees. The security fencing will be **six-foot high cyclone fencing**, with barbed wire 1-foot top (by OPUC rule) and secured access gates shall be installed so as to prohibit direct public access from all sides. Such fencing shall be set back a minimum of **10 feet** from the Baker Creek Road right-of-way. Tree setbacks from fencing will comply with National Electric Safety Code and OPUC safety rules. At the time of development by neighboring uses, landscaping to include trees and screening (combination of plants and green slatted fencing) shall be provided along the site's eastern, western and northern perimeter. A clear line of sight to security fencing will be maintained, visually broken up with trees, shrubs, decorative fencing, and planting strip trees. All trees to be planted along the site's Baker Creek Road frontage, planting strip shall have a two-inch minimum caliper, exhibit size and growing characteristics appropriate for a particular planting area, and be spaced as appropriate for the selected species and as may be required for the location of under-ground utilities, above-ground utility vaults, transformers, light poles, and hydrants. All required landscaping and irrigation shall be installed on Baker Creek Road prior to use of the substation. Other landscaping, on the other boundaries will be installed concurrently with neighboring development.

2. That all outside lighting shall have hoods or shall be "shoebox" type fixtures that will direct light beams both downward and away from neighboring residentially planned property.

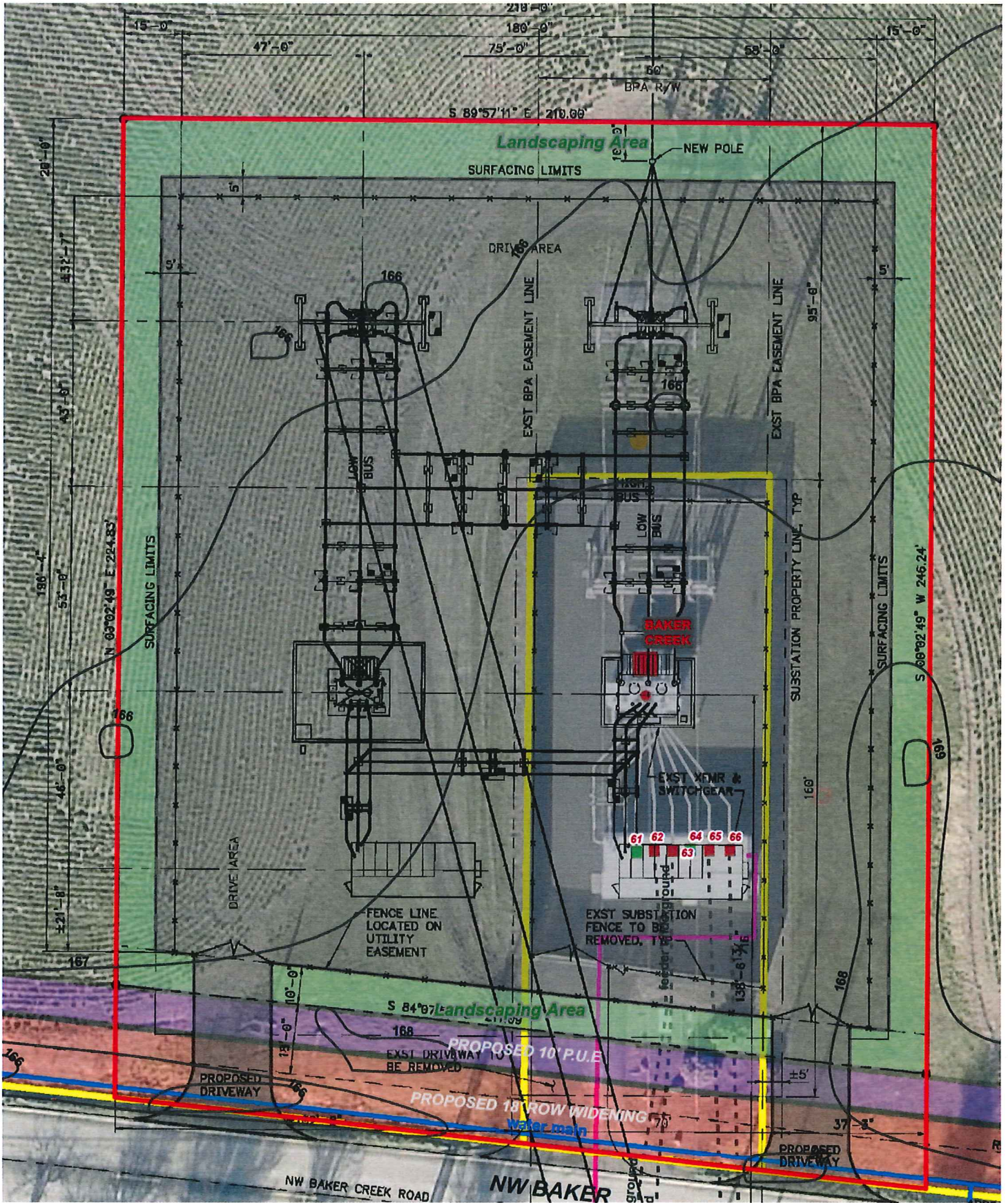
3. That signage shall be limited to a maximum of one free-standing sign not more than two square feet in area. The sign, if illuminated, must be indirectly illuminated and non-flashing.

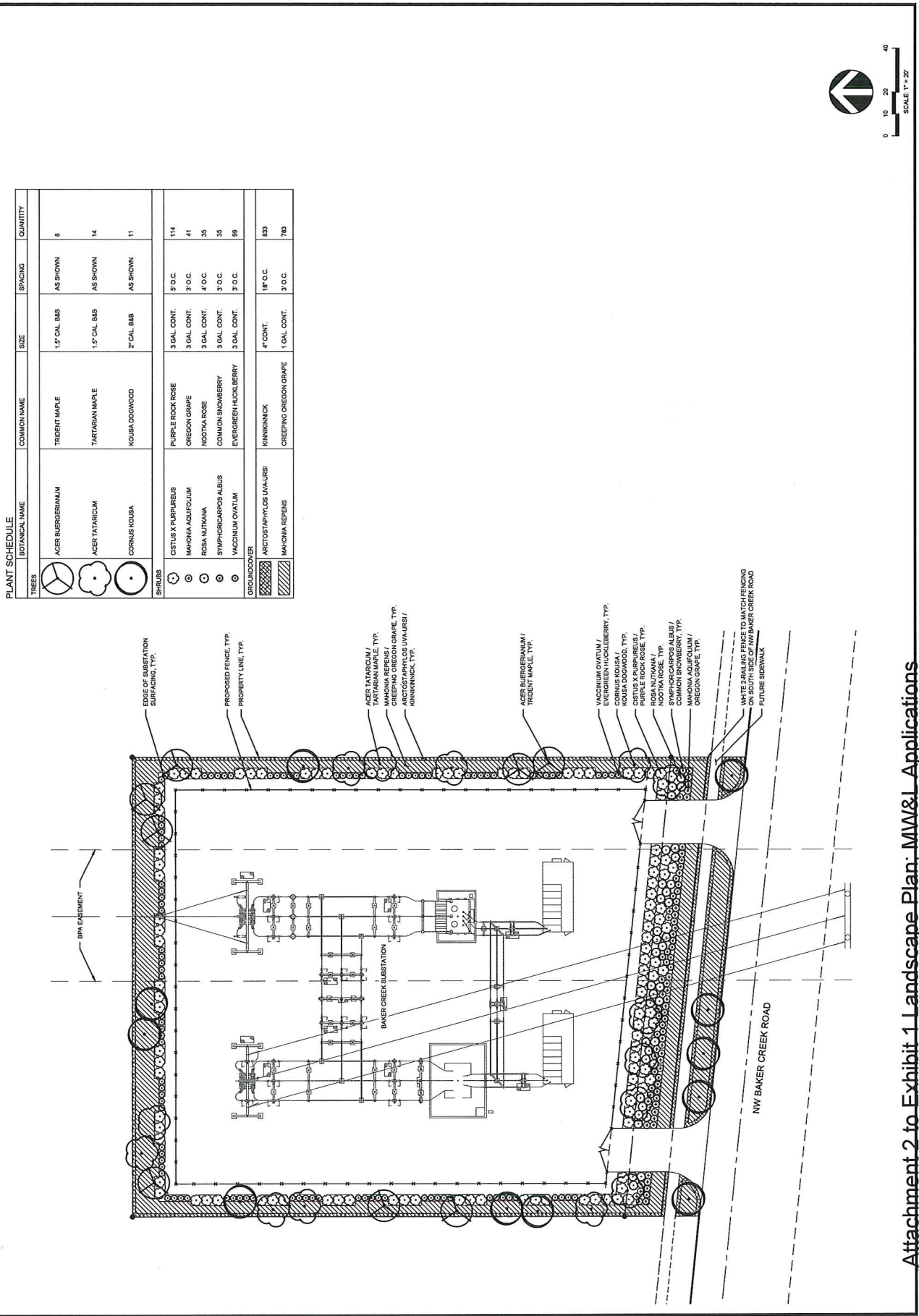
4. Construction of the proposed substation will require the applicant to gain a fill and grading permit from the City Building Division. All fill placed in the areas where building sites are expected shall be engineered and shall meet with the approval of the City Building Division and the City Engineering Department.

5. That the proposed entry drives (two) to the facility from Baker Creek Road shall be paved.

E. ATTACHMENTS TO THIS EXHIBIT

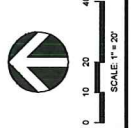
- 1) Site Plan; Map of proposed substation expansion
- 2) Landscape Plan (landscape plan and potentially elevation drawings showing how you intend to blend and screen the substation from adjacent properties).
- 3) Gov. Kate Brown's Executive Order 17-21, November 6, 2017
- 4) *Electric System Planning Study 2015, Triaxis Engineering; written by: Michael Antonishen*
- 5) Memorandum of Jaime Phillips, MW&L Senior Power Analyst
- 6) Conditional Use Permit for Baker Creek Substation – CU 7-99
- 7) "Bump Out" Easement, 01-15-19
- 8) Dedication Deed to City of McMinnville, 01-15-19
- 9) Public Utility Easement, 01-15-19
- 10) Lot Map (showing larger surrounding area)
- 11) Vesting Deed, January 15, 2019
- 12) Oregon Public Utility Commission, Substation Security, 12/29/2000
- 13) MW&L "Light" Budget Document
- 14) RELATIVE COSTS OF DRIVING ELECTRIC AND GASOLINE VEHICLES IN THE INDIVIDUAL U.S. STATES, MICHAEL SIVAK BRANDON, SCHOETTLE, University of Michigan Study - 2018
- 15) Copy of mailed notice of Neighborhood meeting
- 16) Mailing List for Neighborhood meeting
- 17) Photo of sign posted announcing neighborhood meeting Copies of materials presented at neighborhood meeting
- 18) Sign In List; Neighborhood meeting; March 27, 2019
- 19) Notes of Neighborhood meeting; and comments – NONE - (Meeting open 3-27-19, 6PM, to 6:30PM, 855 NE March Lane, McMinnville, OR; No public attendees; No public input).
- 20) Materials Available at Neighborhood meeting, March 27, 2019
- 21) Ordinance 4633, Planned Development, 1996





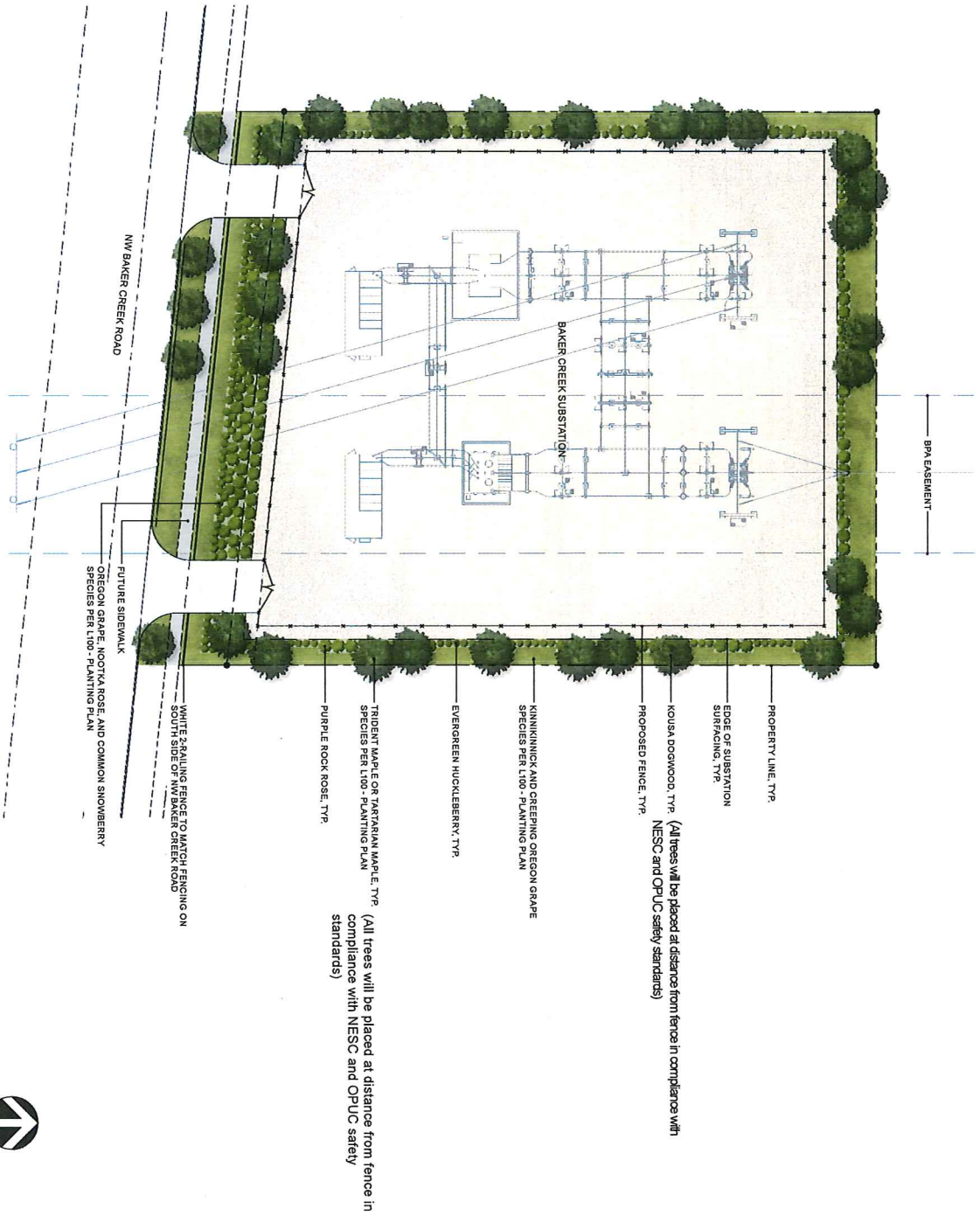
PLANT SCHEDULE

TREES	BOTANICAL NAME	COMMON NAME	SIZE	SPACING	QUANTITY
☉	ACER BUERGERIANUM	TRENT MAPLE	1.5" CAL. BB	AS SHOWN	8
☉	ACER TATARICUM	TARTARIAN MAPLE	1.5" CAL. BB	AS SHOWN	14
☉	CORNUS KOUSA	KOUSA DOGWOOD	2" CAL. BB	AS SHOWN	11
SHRUBS					
☉	CISTUS X PURPUREUS	PURPLE ROCK ROSE	3 GAL. CONT.	3' O.C.	114
☉	MAHONIA AQUIFOLIUM	OREGON GRAPE	3 GAL. CONT.	3' O.C.	41
☉	ROSA NUTKANIA	NOOTKA ROSE	3 GAL. CONT.	4' O.C.	35
☉	SYMPHORICARPOS ALBUS	COMMON SNOWBERRY	3 GAL. CONT.	3' O.C.	35
☉	VACCINIUM OVATUM	EVERGREEN HUCKLEBERRY	3 GAL. CONT.	3' O.C.	99
GROUNDCOVER					
▨	ARCTOSTAPHYLOS UVA-URSI	KINKKINCK	4" CONT.	18" O.C.	633
▨	MAHONIA REPENS	CREeping OREGON GRAPE	1 GAL. CONT.	3' O.C.	783



Attachment 2 to Exhibit 1 Landscape Plan: MW&L Applications

Attachment 2 to Exhibit 1; Landscape Plan; MW&L Applications (page 2 of 2)



- PROPERTY LINE, TYP.
- EDGE OF SUBSTATION SURFACING, TYP.
- NUSA DOGWOOD, TYP. (All trees will be placed at distance from fence in compliance with NESC and OPUC safety standards)
- PROPOSED FENCE, TYP.
- EVERGREEN HUCKLEBERRY, TYP.
- KINKINICK AND CREEPING OREGON GRAPE SPECIES PER L100 - PLANTING PLAN
- PURPLE ROCK ROSE, TYP.
- TRIDENT MAPLE OR TARTAGAN MAPLE, TYP. (All trees will be placed at distance from fence in compliance with NESC and OPUC safety standards)



EXECUTIVE ORDER NO. 17-21

**ACCELERATING ZERO EMISSION VEHICLE ADOPTION IN OREGON
TO REDUCE GREENHOUSE GAS EMISSIONS AND ADDRESS
CLIMATE CHANGE**

WHEREAS, climate change presents a significant threat to our livelihoods, economic security, environment, health, and well-being.

WHEREAS, there has been an increase in extreme weather events, including more frequent and intense heat waves and wildfires. According to the Oregon Climate Change Research Institute and other regional studies, the best available science indicates Oregon is at risk of serious impacts to its natural resources due to climate change.

- Water resources are being affected by decreased winter snowpack, changes to seasonal runoff patterns, decreased precipitation in Eastern Oregon, and increased intensity and occurrence of flooding.
- Agricultural resources are being affected by increases in temperatures.
- Ocean acidification is increasing and there are changes in ocean currents.
- Significant parts of the Oregon coastal region, stretching 363 miles, will be impacted by an expected rise in sea level up to 1 to 4 feet by 2100, incurring billions of dollars of damages and losses to roadways and structures.
- Climate change impacts threaten the State's agricultural, fishing, timber, recreation, and tourism industries, thereby threatening the livelihood of the State's residents and an important source of Gross State Product for the state.

WHEREAS, climate-related pollution from transportation and other emissions is projected to create \$1.1 billion in health costs for Oregon families to bear by 2040, including asthma, heart disease, stroke, and cancer; and internal combustion engines burning fossil-based fuels are the largest contributor of greenhouse gas emissions in Oregon, with the transportation sector accounting for 37 percent of greenhouse gas emissions and light-duty vehicles alone accounting for 25 percent of greenhouse gas emissions, all while the state's transportation sector related greenhouse gas emissions continue to grow.

WHEREAS, Oregon is committed to meeting the international Paris Agreement targets to reduce greenhouse gas emissions by 26 to 28 percent below 2005 levels by 2025.





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WHEREAS, Oregon has adopted goals to reduce greenhouse gas emissions to 10 percent below 1990 levels by 2020 and at least 75 percent below 1990 levels by 2050 as described in ORS 468A.20.

WHEREAS, greater transition of internal combustion engines to zero emission vehicles, like electric cars, buses, and trucks, play a key role in helping Oregon achieve its climate change goals, improving the health of Oregon communities, and encouraging clean energy job development.

WHEREAS, zero emission vehicles provide multiple benefits to Oregonians, including operating quietly and cleanly; allowing home refueling; lowering operating, maintenance, and fuel costs; and reducing pollutants such as carbon dioxide and black carbon emitted through diesel combustion.

WHEREAS, emissions associated with the combustion of fossil fuels have a negative health impact for Oregonians and, in particular, communities located close to major highways, and the use of zero emission vehicles can have immediate positive impacts on local air quality and public health.

WHEREAS, the median Oregon household spends four to five percent of its income on transportation fuel costs, and Oregon businesses and residents could benefit from the lower costs of zero emission vehicle operation and maintenance and the diversification of our transportation fuels, including electricity, which can help offset price volatility and political instability associated with petroleum fuels.

WHEREAS, the development of a robust clean energy economy includes the sales of electric vehicles, chargers, and other equipment as well as the installation and maintenance of charging equipment that will encourage clean energy job development at a local level.

WHEREAS, Oregon is a member of the following organizations and coalitions that have zero emission vehicle goals and commitments:

- The International Zero Emission Vehicle Alliance has committed that all new light-duty vehicle sales will have an electric powertrain as soon as possible and no later than 2050.





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- The Pacific Coast Collaborative established and supports the West Coast Electric Fleets initiative to expand the use of electric vehicles in fleets and the West Coast Green Highway to provide resources for zero emission vehicles on Interstate-5.
- The Zero Emission Vehicle Multi-State Memorandum of Understanding has an Action Plan Goal of a minimum of 25 percent of new light-duty state fleet purchases and leases for applicable uses, to the extent available, will be zero emission vehicles by 2025.

NOW, THEREFORE, IT IS HEREBY DIRECTED AND ORDERED:

1. **Definition.** For purposes of this Executive Order, “state agency” shall be defined as any agency within the Executive Department as defined in ORS 174.112, other than the Oregon Secretary of State, Oregon State Treasury, Oregon Department of Justice, and Oregon Bureau of Labor and Industries.
2. **Statement of Policy and Establishing Statewide Goal.** It is the policy of the State of Oregon to establish an aggressive timeline to achieve a *statewide goal of 50,000 or more registered and operating electric vehicles by 2020*. This short-term goal will ensure the state is on track to meet ambitious long-term goals described above. There are currently approximately 16,000 electric vehicles registered in Oregon and establishing this new state goal will focus state agencies and partners in transitioning public and private fleets to electric vehicles to achieve multiple climate change goals and commitments. Strategies outlined in this executive order will close cost gaps, infrastructure gaps, and information gaps to help accelerate the transition toward electric vehicles.
3. **Oregon State Agencies Leading by Example with Increased Use of Electric Vehicles.**
 - A. **State Electric Vehicle Chargers to Support the State Goal.** The Department of Administrative Services (DAS) and the Oregon Department of Energy (ODOE) are directed to develop a plan and estimated budget through 2025 to install electric vehicle chargers for the operation of state agency owned electric vehicles, public charging at





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state facilities, and state employee charging. The number and placement of electric vehicle chargers will be designed to provide sufficient charging infrastructure necessary for the state to achieve the fleet conversion goals of the Pacific Coast Collaborative West Coast Electric Fleet initiative described above.

- B. Electric Vehicle Policy for State Parking Lots to Support the State Goal. DAS is directed to add electric vehicle charging as a priority criteria for parking lot waitlists, add electric vehicle charging capacity for employee and public visitor parking lots, develop contracts for the procurement and installation of charging infrastructure, and incorporate electric vehicle charging as a tenant improvement for state-leased buildings.
- C. Long-term Return on Investment of Electric Vehicles to Support the State Goal. DAS, in cooperation with ODOE, is directed to develop a tool to calculate the long-term return on investment and life-cycle costs of electric vehicles using costs and savings including but not limited to vehicles purchase, fuel, and maintenance. This tool will inform state agencies of potential cost savings for greater state agency fleet conversion toward zero emission vehicles to achieve the state goal established in Section 2. In addition, DAS is directed to develop a “Low-Emission Vehicle First” policy, to encourage state employees to first use electric vehicles or other low-emission vehicles in the state fleet.
- D. Bulk Electric Vehicle Purchases to Support the State Goal. DAS and ODOE are directed to improve the use of the West Coast Electric Fleets initiative for electric vehicle bulk procurement to reduce costs for electric vehicle purchases.
- E. Enabling Electric Vehicle Purchases and Infrastructure to Support the State Goal. DAS, in cooperation with all state agencies, is directed to inform and support legislative changes that would enable increased charging infrastructure and state agency electric vehicle purchases.

4. Increasing Oregonians’ Access to Electric Vehicles.

- A. Electric Vehicle Rebate Programs Designed to Achieve the State Goal. The Oregon Department of Environmental Quality (DEQ) is directed to





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conduct rulemaking for the electric vehicle rebate programs, established in HB 2017 (2017), to encourage Oregonians to purchase or lease electric vehicles such that these rebate programs are designed to achieve the state goal established in Section 2. As part of the rulemaking, DEQ is directed to develop strategies to help ensure Oregonians are informed about the opportunities to reduce the costs of electric vehicle purchases and leases through the Electric Vehicle Rebate program, in addition to robust outreach to low-income communities and organizations through the Charge Ahead Rebate program.

- B. Clean Fuels Program Designed to Achieve the State Goal. DEQ is directed to conduct rulemaking for the Clean Fuels Program to support greater electric vehicle adoption, in cooperation with the Oregon Public Utility Commission (PUC), such that the program is designed to support innovative solutions in the evolving electric vehicle market and achieve the state goal established in Section 2. DEQ is directed to develop a method to aggregate and monetize all eligible electric vehicle credits in the Clean Fuels Program to assist in achieving the state goal.
- C. Zero Emission Vehicle Regulation Designed to Achieve State Goal. Today, DEQ's zero emission vehicle regulation requires car manufacturers to sell six to eight percent electric vehicles for new light-duty sales by 2025. DEQ is directed to work with the Environmental Quality Commission to maintain consistency with California's zero emission vehicle regulation, including efforts to ramp up regulatory requirements. DEQ is directed to participate in federal assessments of vehicle emissions standards and work with the Department of Justice to take appropriate steps to retain California's exemption for vehicle standards that are more protective of air quality under the federal Clean Air Act Section 209.
- D. Consumer Engagement in Transportation Electrification Plans to Achieve the State Goal. PUC, with input from interested stakeholders, is directed to implement the transportation electrification program, established in SB 1547 (2015), to support consumer engagement in the investor-owned utilities' transportation electrification plans such that the transportation electrification program is designed to achieve the state goal established in Section 2. Wherever possible, the PUC is directed to





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encourage programs that support greater electric vehicle adoption in moderate- and low-income communities.

5. Increasing Oregonians' Access to Electric Vehicle Charging Infrastructure.

- A. Leveraging Volkswagen Mitigation Fund to Support the State Goal. DEQ, in cooperation with Oregon Department of Transportation (ODOT), ODOE, and Oregon Health Authority Public Health Division, is directed to engage interested stakeholders and receive public comments to inform development of a plan to leverage up to 15 percent of the Volkswagen Mitigation Fund to support vehicle electrification. This plan will use part of Oregon's share of the Volkswagen Diesel Settlement (Appendix D), consistent with the limitations on the use of such funds, to develop and maintain electric vehicle charging stations with a focus on connecting rural communities, low-income communities, and Oregonians living in multi-family homes, while complementing the Electric Vehicle Rebate Program and Charge Ahead Rebate Program that were established in HB 2017 (2017).
- B. Leveraging Volkswagen Zero Emission Vehicle Fund to Support the State Goal. ODOT, in cooperation with ODOE, DEQ, PUC, and local governments, is directed to facilitate the application process for fund deployment of the Volkswagen "Electrify America" investments and projects under the Zero Emission Vehicle Fund, which are developed in accordance with the Volkswagen Diesel Settlement (Appendix C). In addition, these agencies will develop proposals for future 30-month investment periods for the Volkswagen "Electrify America" Zero Emission Vehicle Investment Plans to achieve the state goal established in Section 2.
- C. Charging Infrastructure in Transportation Electrification Plans to Achieve the State Goal. PUC, with input from interested stakeholders, is directed to implement the transportation electrification program, established in SB 1547 (2015), to support electric vehicle charging in the investor-owned utilities' transportation electrification plans such that the transportation electrification program is designed to achieve the state goal established in Section 2. Wherever possible, the PUC is directed to





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encourage programs that support greater electric vehicle adoption in moderate- and low-income communities.

- D. Electric Vehicle Ready Building Construction to Achieve the State Goal. The appropriate advisory board(s) and the Department of Business and Consumer Services Building Codes Divisions (BCD) are directed to conduct code amendment of the state building code to require that parking structures for all newly constructed residential and commercial buildings are ready to support the installation of at least a level 2 EV charger by October 1, 2022. BCD may establish limited specific exemptions related to types of parking lots, such as temporary parking lots.

6. Providing Partners with Information on Electric Vehicle Use and Functionality.

- A. Assisting School Districts to Support the State Goal. ODOE, working with ODOT, PUC, DEQ, and the Department of Education, is directed to develop tools and provide information to assist school districts in making decisions about zero emission vehicle bus options when replacing school buses.
- B. Assisting Transit Agencies to Support the State Goal. ODOT, working with ODOE, PUC, and DEQ, is directed to develop tools, information, and best practices to assist transit agencies when making decisions about zero emission vehicle bus technology adoption in transit fleets for their transit districts. In addition, ODOT, working with ODOE, DEQ, and Oregon Health Authority Public Health Division, is directed to engage with transit agencies and interested stakeholders to assess how zero emission vehicle technologies can help to reduce lifecycle emissions, improve public health, and save costs in the heavy-duty sector, including through the accelerated transition to zero-emission buses.
- C. Assisting Consumer Owned Utilities to Support the State EV Goal. ODOE is directed to engage with consumer and public-owned utilities to enable increased electric vehicle adoption in their service territories and provide technical assistance on strategies to accommodate increased





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loads on their electric systems in order to achieve the state goal established in Section 2.

- D. Assisting Investor Owned Utilities to Support the State EV Goal. PUC, in collaboration with utilities and stakeholders, is directed to oversee development of strategies to encourage continuous improvement of the investor-owned utilities' transportation electrification plans, established pursuant to SB 1547 (2015), to achieve the state goal established in Section 2.

7. Celebrating Achievements by Recognizing Businesses and Organizations that Lead Oregon in Electric Vehicle Adoption.

- A. Establishing Governor's Awards for Automobile Dealerships. ODOE is directed to design and establish "Governor's Awards" for automobile dealerships to encourage sales of electric vehicles, such as highest annual electric vehicle sales and highest percentage per capita of electric vehicle sales in a year.

- B. Establishing Governor's Awards for Businesses or Organizations. ODOE is directed to design and establish "Governor's Awards" that recognize businesses and organizations which support increased electric vehicle adoption, such as through installing charging infrastructure and converting fleets to electric vehicles.

- 8. Implementation.** The implementation of this Executive Order shall be coordinated through a Zero Emission Vehicle Working Group, which will also identify any structural barriers or barriers to information sharing that may slow the progress of any directive in this Executive Order. The Zero Emission Vehicle Working Group will review directives in this Executive Order, seek input from interested stakeholders, and recommend opportunities to provide equitable access to clean energy by removing barriers to electric vehicles and electric vehicle chargers to the Governor and state agencies. The Zero-Emission Vehicle Agency Working Group shall include the following agencies: DAS, ODOE, OPUC, ODOT, and DEQ. ODOE will lead a collaborative effort through this interagency working group to develop goals, metrics, and other indicators of progress and will establish a website to share information about the directives in this Executive Order with the public. Agencies shall implement each directive in





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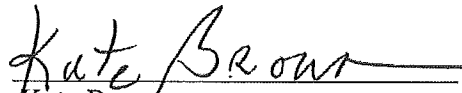
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this Executive Order using their existing internal processes and established rulemaking procedures, including recommendations from any boards. This Executive Order is intended to be consistent with obligations under federal and state law and shall be interpreted as to not violate any requirement of federal or state law.

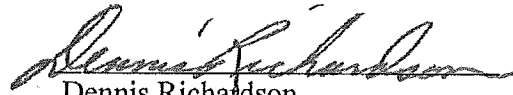
9. The Governor encourages the Secretary of State, the State Treasurer, the Attorney General, and the Commissioner of the Bureau of Labor and Industries to adopt policies and practices to accelerate zero emission vehicle adoption consistent with measures in this Executive Order. DAS and ODOE are directed to assist the above-mentioned officials and entities of state government in accomplishing these objectives as they may request.

Done at Portland, Oregon, this 6th day of November, 2017.




Kate Brown
GOVERNOR

ATTEST:


Dennis Richardson
SECRETARY OF STATE



BLANK

ELECTRIC SYSTEM PLANNING STUDY

for

MCMINNVILLE WATER AND LIGHT

McMinnville, Oregon

July 2015

Report



TriAxis Engineering, Inc.
1600 SW Western Blvd., Suite 100
Corvallis, OR 97333

ELECTRIC SYSTEM PLANNING STUDY

for

MCMINNVILLE WATER AND LIGHT

McMinnville, Oregon

July 2015

Prepared by:

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CHAPTER 1

INTRODUCTION

A. PURPOSE

This report presents the results of a planning study of the McMinnville Water and Light (MW&L) electric system; it is intended to be used as a management and planning tool for capital spending over the next ten years. The primary goal is to provide realistic recommendations for the most practical and economic means of serving existing and future loads, while maintaining high quality service to customers with timely implementation of necessary equipment replacements and system improvements. The study evaluates the electric system strengths and weaknesses and identifies needed improvements based on service quality, anticipated system changes, growth and recessionary effects, compliance, obsolescence, and reliability

This report provides recommendations with detailed descriptions, schedules, and cost estimates for replacement and improvement of infrastructure to meet future loads and/or replace and upgrade aging equipment. System improvements are suggested based on projected system load growth and changing electrical industry conditions with the aim of improving service quality and reliability while complying with construction, operating, and safety standards.

This study was conducted based on the best available information at the time. Some assumptions were necessary and are noted in the report. Any changes in equipment or system configuration may require a change in recommendations. Except where noted, this study evaluated the system as it was configured at the time the study was performed.

With the passage of time, conditions generally change, and these changes can affect the feasibility or practicality of making some of the recommended improvements. This report should be reviewed and updated periodically since changing system conditions may affect the economic viability or integrity of the recommended plan.

B. SCOPE OF WORK

LOAD REVIEW & LOAD GROWTH FORECAST

Available historical load data was reviewed with a primary focus on peak demand loads occurring during winter cold weather events and summer hot weather events. A ten year projected peak demand forecast was prepared using several data sources such as land use plans, local and governmental comprehensive plans, proposed expansions and annexations, density and zoning, potential commercial and industrial development, weather impacts, and Bonneville Power Administration (BPA) planning forecasts.

This forecast is intended to provide estimated future feeder and substation peak loading, load balance, and help guide system improvement needs and timing.

SYSTEM MODELING, POWER FLOW & CONTINGENCY ANALYSIS

The MW&L system was analyzed using an existing model, developed by MW&L staff, in the *Windmil* software package. The following cases were examined for power flow, voltage levels, and equipment and conductor loading.

1. Base Case – normal system configuration modeled under peak load
2. Five-Year Growth Case – modeled under projected peak load and cold weather conditions
3. Ten-Year Growth Case – modeled under projected peak load and cold weather conditions
4. Contingency Cases – separately modeled the loss of every distribution substation and every distribution feeder with load appropriately sectionalized to the other sources to serve all customers under peak conditions

PROTECTIVE DEVICE COORDINATION

Using the *EasyPower* software to generate time-current curves, the system coordination and protection was evaluated. A time-current curve coordination plot, containing the information listed below, is provided for each substation and distribution feeder.

- Transformer damage curve
- Conductor or insulation damage curve
- Maximum available short circuit symmetrical and asymmetrical fault current
- Time-current curves of primary protection devices
- Time-current curves of secondary protection devices
- Time-current curves of major backbone protection devices

The report provides tables of existing settings and recommended settings changes for system protective devices.

SYSTEM PLANNING, DESIGN, & RELIABILITY CRITERIA

Recommended planning criteria and objectives, upon which short-term and long-term planning action should be based, were identified. Criteria and recommendations include practical conductor sizing, conductor and feeder load capacities under normal conditions, loading guidelines for backup and emergency conditions, acceptable voltage drop levels, acceptable phase imbalance, and other operating guidelines. These criteria are intended to establish uniform planning, operating, and construction practices.

ANALYSIS OF EXISTING SYSTEM

TRANSMISSION SYSTEM ANALYSIS

The existing transmission system facilities serving MW&L, both BPA and MW&L-owned, were evaluated to determine interconnection and switching flexibility, looping capabilities, isolated segments, and overall performance of transmission service to the MW&L electric system. The transmission system reliability, protection components, protective philosophy, and operational schemes were also considered to evaluate power availability, interruption frequency, and emergency operating conditions.

SUBSTATION AND FEEDER EVALUATION

The substations and distribution system were evaluated on the basis of equipment ratings, operating configurations, reliability, maintenance programs, vintage, condition, and equipment capacities compared with projected load forecasts. Balance of load between feeders and phase imbalance of each feeder was also investigated.

SERVICE RELIABILITY

Service reliability was evaluated based on available outage data from MW&L and BPA using IEEE and industry standard methodology.

SYSTEM AGING ANALYSIS

The age of major system equipment was evaluated and used to help develop the recommendations for specific equipment replacements. The data presented can be used by MW&L to help plan future replacements.

NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION (NERC) COMPLIANCE

Existing compliance documentation and records were reviewed to assess the need for improvements related to requirements of the NERC reliability standards.

SPILL PREVENTION CONTROL AND COUNTERMEASURES (SPCC) PLAN REVIEW

SPCC plans for six of the seven substations and the operations yard were reviewed, revised, and documented.

SYSTEM IMPROVEMENT RECOMMENDATIONS & COST ESTIMATION

Results from the approach outlined above were compiled into a list of recommendations, solutions, and system improvements (immediate, intermediate, and long-term). A prioritized ten year work plan, with estimated dates of necessary improvements and budgetary-level cost estimates, is provided. The work plan addresses violations of the planning criteria under existing and projected future loading and contingency scenarios.

CHAPTER 2

SUMMARY & RECOMMENDATIONS

A. GENERAL

McMinnville Water and Light (MW&L) owns and operates electric distribution facilities presently serving approximately 15,842 customers (meters). All electric power sold by MW&L is provided by BPA and transformed at seven MW&L-owned substations. MW&L also owns a portion of a 115 kV transmission loop serving Baker Creek, Walnut City, Gormley, and Booth Bend substations with a normally open point at switch B-77.

MW&L is a winter peaking system, with peak demand events predominantly caused by cold temperatures and residential load. There is a strong correlation between extreme cold temperatures and winter peak loading on the MW&L electric system.

Evaluation of MW&L distribution system historical load data (not including industrial substations) indicates maximum winter peak demands in the last ten years of 113.5 MW in December of 2009 and 106.3 MW in December of 2013. Evaluation of historical distribution energy sales data shows an annual average growth rate of 2.2% from 2001 through 2008, followed by a 10% drop from 2008 to 2010 according to BPA and MW&L data sources. Distribution energy sales between 2011 and 2014 are higher than sales in 2010 but show no significant continued trend of growth, however this could be partially attributed to milder winter weather in recent years. Historical data, weather trends, and future system growth are further discussed in Chapter 3. For privacy reasons, detailed industrial system load data will not be included in this report.

Based on the data and assumptions used for this study, the MW&L system has enough transmission, transformer, and distribution system capacity to serve the historical MW&L peak demand under normal operating conditions. While MW&L does have overall system capacity available for considerable load growth according to the planning criteria, many areas of expected load growth are already served by heavily loaded circuits and transformers. Planning Criteria are discussed in Chapter 4, and power flow results for growth and contingency scenarios are discussed in Chapter 6.

Table 2-1 provides recommendations for improvements and upgrades during the next ten years. These are organized by the following categories:

- General
- Transmission
- Substations
- Distribution

These recommendations are based on the overall goals of providing adequate substation capacity and a flexible distribution system that can reliably serve existing and future projected load. A separate Construction Plan based on these recommendations is provided in Table 2-2 and suggests a

prioritized sequence of improvements over the next ten years. The estimated spending required for improvements listed in each year is also provided.

TABLE 2-1 - Recommendations

	Description	Estimated Cost (\$2015)
General		
G-1	Begin to address “low hanging fruit” related to critical equipment and consider system improvements or policies that allow for better system survival of seismic events. See Chapter 5 section on Seismic Considerations for more details.	In-house
G-2	Continue to update GIS system with component age and other applicable data. A properly updated database is a powerful tool that can help direct future system improvements.	In-house
Transmission System		
T-1	Begin planning re-conductoring improvements to MW&L owned transmission loop when summer peak loading of the MW&L owned loop loads (Baker Creek, Walnut City, Gormley, and Booth Bend substations) reaches 80 MW. Request that BPA re-conductor BPA-owned 266.8 ACSR from BPA B1292 to Walnut City. Cost estimate low end assumes only replacing conductor, high end assumes 50% of poles needing replacement.	\$375,000 to \$1,250,000
T-2	If MW&L desires to operate the MW&L owned 115 kV loop without a normally open point, a differential relaying scheme should be implemented.	\$50,000-\$100,000 per line segment
T-3	MW&L needs to replace 3 transmission poles each year to achieve a targeted average transmission pole life of 55 years. Due to the large number of poles installed between 1975 and 1979, MW&L should be prepared to replace up to 10 poles each year after 2030.	\$12,000 per pole
T-4	Move approximately 1800 feet of 115 kV transmission line (from Walnut City Substation along 2 nd Street to Hill Road) from the south side of the street to the north side of the street. Cost estimate includes design and construction for 115 kV transmission circuit with shield wire, double circuit distribution underbuild, and assumes hot-line construction for distribution circuits.	\$600,000

TABLE 2-1 - Recommendations		
	Description	Estimated Cost (\$2015)
Substations		
S-1	Replace aging East McMinnville #1 12/16/20 MVA transformer with new 20/27/33/38 transformer with LTC. At the time of replacement, update old TPU and MSOC relays with new SEL devices to match other substations.	\$785,000
S-2	Replace 35-year-old GE vacuum circuit breakers on Feeder 11, 12, 13, and 14 at East McMinnville Substation.	\$22,500 each \$90,000 total
S-3	Replace the 35-to 37-year-old GE vacuum circuit breakers at Windishar #1 Substation Feeders 31, 32, 33, and 34.	\$22,500 each \$90,000 total
S-4	<p>Due to age, testing requirements, software and hardware access requirements, and availability of spares, it is recommend that the following protective devices be replaced:</p> <ul style="list-style-type: none"> ▪ Basler BE1-51 relays (2) at Cascade 230 substation ▪ TPU and MSOC transformer protection at East McMinnville #2 Substation ▪ TPU and MSOC transformer protection at Baker Creek Substation ▪ PCD2000 feeder protection relays at Baker Creek Substation <p>MW&L has standardized on SEL relays as the system has been updated in recent years and should continue to follow this standard. New digital relays have useful features such as self-testing of hardware and software, event capture, additional SCADA and communications abilities, and additional protective capabilities. Cost estimate includes hardware, installation, and integration of new SEL relays.</p>	\$9,000 each \$108,000 total
S-5	Substation power transformer overcurrent protection is similar throughout the MW&L system, but also appears to vary slightly at some substations. It is recommended that MW&L standardize transformer overcurrent protection practices according to the criteria laid out in section B of Chapter 7.	In-house
S-6	Review the high-side backup and instantaneous transformer overcurrent protection at East McMinnville Substation #2.	In-house

TABLE 2-1 - Recommendations

	Description	Estimated Cost (\$2015)
S-7	On feeders 11-14 and 21-24 at East McMinnville Substation, update relaying to implement two-shot reclosing with a three-second open interval. The reclosing function on these relays is currently set for four operations to lockout and was never configured to match the reclosing at other MW&L distribution substations. MW&L reclosing philosophy is outlined in Part B of Chapter 7.	In-house
S-8	On feeders 11, 12, 13, and 14, consider implementation of a high-current instantaneous trip similar to other feeder relays. Consider increasing instantaneous phase and ground pickup levels on feeders 21, 22, 23, and 24 for better coordination with downstream devices.	In-house
S-9	At Walnut City Substation, there is currently no low side phase protection element configured in the SEL-787. It is recommended that one be set to match the high side phase protection to provide better protection for the transformer 12.47 kV windings.	In-house
S-10	<p>Baker Creek Substation Protection:</p> <ol style="list-style-type: none"> 1. Transformer phase protection at Baker Creek Substation is not adequately protecting the transformer from thermal and mechanical damage during faults. It is recommended that this be changed immediately and set according to the criteria laid out in section B of Chapter 7. 2. There is presently an instantaneous overcurrent element configured on the low side of the transformer for both phase and ground. It is recommended that this low side instantaneous element be disabled, for both phase and ground, due to the lack of selectivity between a close in high magnitude feeder fault and a bus fault. 3. It is recommended that a residual ground overcurrent element is turned on in the TPU for the transformer high winding CT, it could be implemented similar to McMinnville #1 and #2 transformer protection. 	In-house
S-11	At Gormley Substation, the neutral overcurrent element in the SEL 551 relay presently does not coordinate with the main breaker SEL 751A ground curve. It is recommended that the SEL 551 curve is changed immediately to match the SEL 587 low side ground curve.	In-house
S-12	At Baker Creek Substation, MW&L should consider using bus differential protection, fast bus tripping, optical arc-sensing, or other arc-flash mitigation techniques to reduce incident energy levels at metal clad switchgear. Cost estimate includes relay, fiber, engineering, and install.	\$25,000-\$50,000

TABLE 2-1 - Recommendations		
	Description	Estimated Cost (\$2015)
S-13	Based on the results of the power flow base case analysis and the criteria in Chapter 4, the following load transfers are recommended to reduce peak demand at Booth Bend and Baker Creek substations. Load transfer amounts are given in terms of what they would be measured at peak load. <ul style="list-style-type: none"> ▪ Move approximately 3 MW of Feeder 62 load to feeders 41 and 45 ▪ Move approximately 1 MW of Feeder 66 load to Feeder 22 ▪ Move approximately 2 MW of Feeder 65 load to Feeder 23 ▪ Move approximately 4.5 MW of Feeder 51 load to Feeders 11 and 21 	In-house
S-14	Within the next four years, replace 31-year-old GE PVD circuit breakers and GE IAC 77 relays at Booth Bend Substation Feeders 51, 52, 53, and 54.	\$30,000 each \$120,000 total
S-15	Within the next five years, replace the 30-year-old GE PVD circuit breakers on Feeders 95 and 96 at Windishar Substation.	Completed during study
S-16	Within the next seven years, replace the 38-year-old 15/20/25 MVA Windishar #3 transformer. Estimated cost is based on a new 15/20/25 MVA transformer.	\$425,000
S-17	Within the next ten years, replace the 35-year-old 15/20/25 MVA Windishar #4 transformer. Estimated cost is based on a new 15/20/25 MVA transformer.	\$425,000
S-18	Within the next ten years, replace the 25-year-old GE PVD circuit breaker on Feeder 98 at Windishar Substation, Feeder 97 was replaced during study.	\$22,500
S-19	As load growth develops, construct a new 1.5 mile main feeder along Meadows Drive from spare Baker Creek breaker 64 and transfer load from Walnut City Substation feeders. This recommendation was carried over from the previous study.	\$630,000

TABLE 2-1 - Recommendations		
	Description	Estimated Cost (\$2015)
S-20	Based on the best available growth forecasts and information on growth areas, feeders 31, 34, 62, and 65 are all likely to see load growth. These are heavily loaded feeders served by heavily loaded substation transformers with limited or no ability to transfer existing load to lightly loaded substations. A majority of the available MW&L transformer and circuit capacity is at East McMinnville #2 and Gormley substations; without major circuit reconfigurations, this capacity cannot be utilized for load growth on the north and west sides of town. If load develops in these areas as expected, single contingency criteria may not be met during peak events for transformer outages at these locations. It is recommended that MW&L be prepared for one of the following options as load growth occurs:	
	▪ Construct the previously planned Grand Haven substation	\$1,900,000 (Sub) \$2,000,000 (Feeders & Transmission)
	▪ Construct the previously planned 3-Mile Lane substation	\$2,040,000 (Sub & land) \$2,000,000 (Feeders & Transmission)
	▪ Expand Baker Creek Substation and add new transformer	\$2,000,000
S-21	With aging substation yards and changing conditions, the IEEE 80 standard for substation grounding recommends periodic ground grid integrity checks or grid resistance measurements. Ground grids should be tested and reviewed every 10-15 years or as factors change that affect ground grid safety, such as increases in available fault current. Continue the practice of installing additional ground conductors in substation yards as new equipment is installed.	\$7,500 per site
Distribution System		
D-1	The limited data available on underground (UG) primary cable age shows approximately 31.5 miles installed before 1987 with potentially problematic unjacketed concentric neutral and older XPLE insulation. MW&L should plan to replace at least one mile of cable annually.	\$350,000 per mile (average) \$11,025,000 total

TABLE 2-1 - Recommendations		
	Description	Estimated Cost (\$2015)
D-2	Replace approximately 112 distribution transformers per year to maintain a system-wide average transformer life of 40 years.	\$3,500 each \$392,000 per year
D-3	Adopt operations and maintenance practices related to voltage regulators that include quarterly control checks and logging of number of operations. Maintenance should be performed based on number of operations and annual oil testing.	In-house
D-4	MW&L needs to replace 97 distribution poles each year to achieve a targeted average pole life of 55 years. However, due to the large amount of poles installed between 1965 and 1985, MW&L should be prepared to replace up to 194 poles each year starting in 2020.	\$2,500 per pole
D-5	Monitor phase imbalance on all feeders during peak load conditions. If imbalance on any feeder exceeds 15% with more than 150 amps flowing, action should be taken to shift load and reduce imbalance to below 10%. The following feeders violated the 15% threshold according to data presented in Chapter 5, Table 5-4: <ul style="list-style-type: none"> ▪ Feeder 12 (lightly loaded) ▪ Feeder 14 (lightly loaded) ▪ Feeder 21 (lightly loaded) ▪ Feeder 22 ▪ Feeder 24 ▪ Feeder 52 (lightly loaded) ▪ Feeder 63 	In-house
D-6	Based on the results of the power flow base case analysis and the criteria in Chapter 4, the following load transfers are recommended to reduce peak demand on feeders 34 and 53. Load transfer amounts are given in terms of what they would be measured at peak load. <ul style="list-style-type: none"> ▪ Move approximately 0.5 MW of Feeder 34 load to Feeder 31. ▪ Move approximately 3 MW of Feeder 53 load to feeders 52 and 73. 	In-house

TABLE 2-2

Ref #	Projects	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Growth Dep.
S-1	Replace East McMinnville #1 12/16/20 MVA transformer	\$ 785,000										
S-2	Replace GE VIB breakers on Feeder 11, 12, 13, and 14	\$ 90,000										
S-3	Replace GE VIB breakers on Feeder 31, 32, 33, and 34	\$ 90,000										
S-4	Replace Basler, TPU, MSOC, and PCD3000 relays	\$ 108,000										
S-5	Review and standardize transformer overcurrent protection	\$ -										
S-6	Review East McMinnville #2 transformer overcurrent settings for backup and instantaneous	\$ -										
S-7	Implement two-shot reclosing for all East McMinnville feeders	\$ -										
S-8	Review instantaneous pickup levels & implementation on East McMinnville #1 and #3 feeders	\$ -										
S-9	Activate and set low side CT phase protection element on Walnut City SEL 787	\$ -										
S-10	Review and correct transformer protection at Baker Creek Substation	\$ -										
S-11	Correct mis-coordination between SEL 551 and main breaker SEL 751A at Gormley Substation	\$ -										
D-5	Correct phase imbalance on all indicated feeders with high enough load	\$ -										
D-6	Shift load from feeders 34 and 53	\$ -										
D-1	Replace 1 mile of aging UG primary cable per year	\$ 350,000	\$ 350,000	\$ 350,000	\$ 350,000	\$ 350,000	\$ 350,000	\$ 350,000	\$ 350,000	\$ 350,000	\$ 350,000	
D-2	Replace 112 distribution transformers per year	\$ 392,000	\$ 392,000	\$ 392,000	\$ 392,000	\$ 392,000	\$ 392,000	\$ 392,000	\$ 392,000	\$ 392,000	\$ 392,000	
D-4	Replace 97 distribution poles per year through 2020, 194 per year 2021-2025	\$ 242,500	\$ 242,500	\$ 242,500	\$ 242,500	\$ 242,500	\$ 485,000	\$ 485,000	\$ 485,000	\$ 485,000	\$ 485,000	
T-3	Replace 3 transmission poles per year	\$ 36,000	\$ 36,000	\$ 36,000	\$ 36,000	\$ 36,000	\$ 36,000	\$ 36,000	\$ 36,000	\$ 36,000	\$ 36,000	
T-4	Move 115 kV transmission line west of Walnut City Substation		\$ 300,000	\$ 300,000								
S-12	Implement arc-flash hazard reduction techniques at Baker Creek Substation	\$ 50,000										
S-13	Shift load from Booth Bend and Baker Creek Substations	\$ -										
S-14	Replace GE PVD breakers and GE IAC 77 relays on feeders 51, 52, 53, and 54				\$ 60,000	\$ 60,000						
S-21	Ground grid integrity checks and/or resistance measurements				\$ 7,500	\$ 7,500	\$ 7,500	\$ 7,500	\$ 7,500			
S-16	Replace the 15/20/25 MVA Windihar #3 transformer							\$ 425,000				
S-17	Replace the 15/20/25 MVA Windihar #4 transformer										\$ 425,000	
S-18	Replace GE PVD breakers on feeders 97 and 98										\$ 22,500	
T-1	Reconductor MW&L owned portion of 5.7 mile transmission loop with 356.5 AAC											\$ 1,250,000
S-19	Construct 1.5 mile main feeder from breaker 64 along Meadows Drive											\$ 630,000
S-20a	Construct Grand Haven Substation											\$ 3,900,000
S-20b	Construct 3-Mile Lane Substation											\$ 4,040,000
S-20c	Expand Baker Creek Substation											\$ 2,000,000
	Yearly Totals	\$2,093,500.00	\$ 1,370,500.00	\$ 1,320,500.00	\$ 1,088,000.00	\$ 1,088,000.00	\$ 1,270,500.00	\$ 1,695,500.00	\$ 1,270,500.00	\$ 1,263,000.00	\$ 1,710,500.00	\$ 11,820,000.00

CHAPTER 3

LOAD FORECAST

This chapter presents a load forecast developed for the seven McMinnville Water and Light (MW&L) distribution substations. The goal of this forecast is to estimate the coincident peak system demand expected for a one in ten year peak demand event. Included are five-year and ten-year projections covering the period from 2015 to 2025. The load forecast projections are based on information from the following sources:

- MW&L SCADA data, customer data, and forecast projections
- BPA MDMR2 point of delivery data
- BPA load forecast projections
- City of McMinnville Economic Opportunities Analysis (EOA) (2013)
- Northwest Power and Conservation Council (NPCC)
- Weather data from the Western Regional Climate Center (1927-2014)
- Portland State University Population Research Center
- Oregon Office of Economic Analysis
- United States Census
- Oregon Public Utility Commission (PUC)

For the two industrial substations (four transformers), we will rely upon the load forecast prepared by MW&L staff in conjunction with the major industrial customers. For privacy reasons, detailed industrial system load data will not be included in this report.

A. ANALYSIS OF HISTORICAL DATA

HISTORIC WEATHER

In order to examine the effect of weather on system peak demand and energy use, yearly and monthly extreme and average temperature data were obtained from the Western Regional Climate Center (WRCC) McMinnville weather station for the period from 1927 to 2015. MW&L must be able to reliably serve maximum coincident peak demand load under any condition that can reasonably be expected. For localized systems such as the MW&L system, it is common practice to plan around a one in ten year peak event. In the case of MW&L this would likely be caused by a one in ten year cold weather event.

In order to determine the statistical one in ten year cold weather event for McMinnville, the return period method (also known as recurrence interval) was used. The return period is a statistical measurement calculated from historic data using the following equation:

$$\frac{(\text{Number of Years on record}) + 1}{\text{Number of Occurrences}}$$

Analysis using this method yields cold and warm weather events of approximately 8° F and 105° F, respectively, that have return periods of ten years. In terms of probability, this means that in any

given year, there is a 10% chance that an event with a ten year return period will happen or be exceeded. Figures 3-1 and 3-2 show the number of occurrences, based on monthly data, of extreme warm and cold temperature events in this time period.

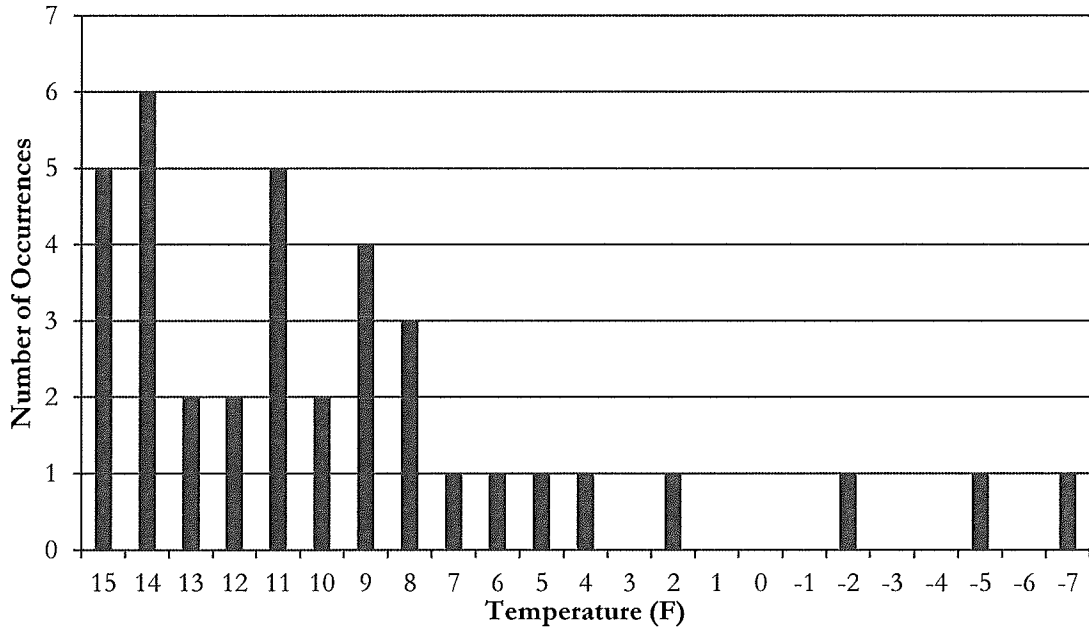


Figure 3-1: Number of occurrences for each extreme cold temperature listed, based on monthly data.

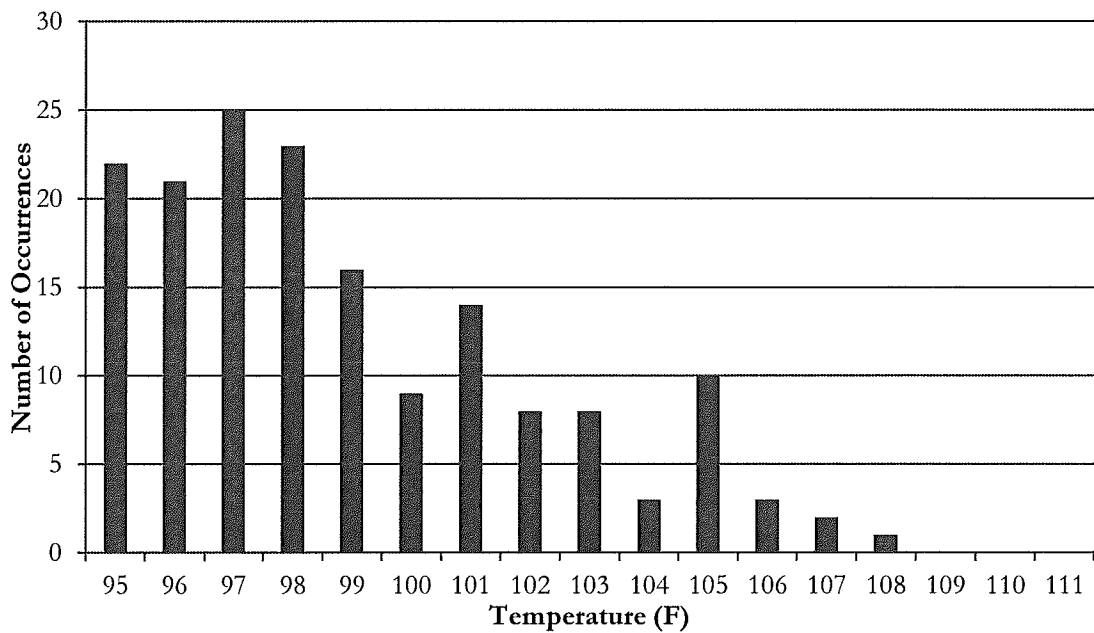


Figure 3-2: Number of occurrences for each extreme warm temperature listed, based on monthly data.

PEAK DEMAND AND TEMPERATURE

Figure 3-3 shows combined scatter plots that depict the relationship between winter (November-March) low temperatures and summer (May-September) high temperatures vs. peak demand. From observation of the data, it is clear that colder temperatures in winter and warmer temperatures in summer correlate with higher distribution system peak demand.

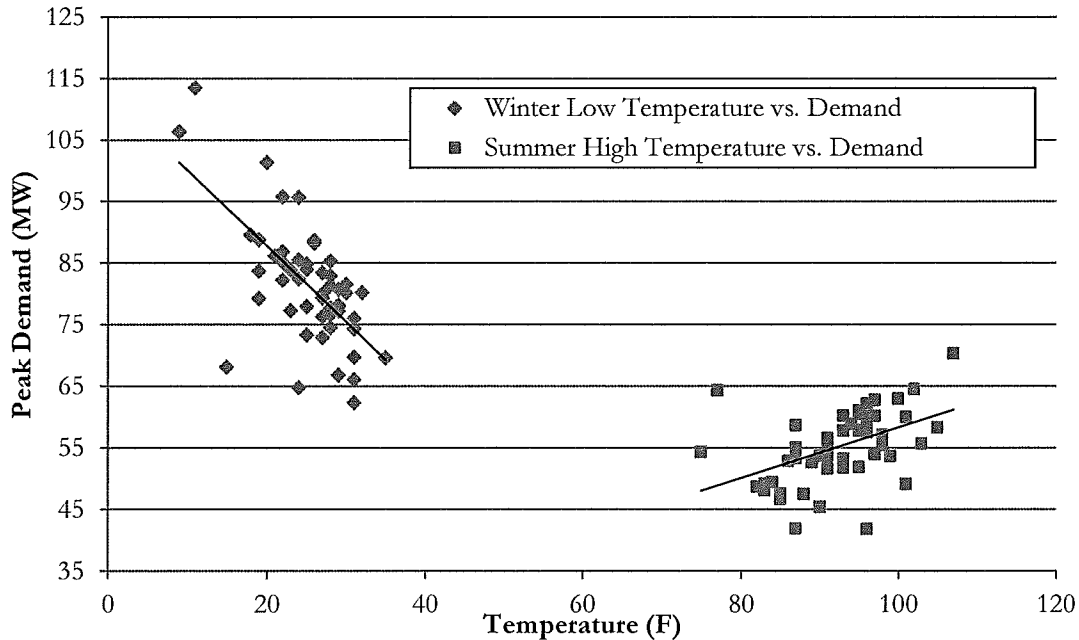


Figure 3-3: Winter low and summer high temperatures vs. peak coincident distribution system demand.

In the most recent ten year period, 2005-2014, the MW&L distribution system experienced its highest peak coincident loading during extreme cold weather events. The two largest coincident peaks on the MW&L distribution system in the last ten years occurred in December of 2009 (113.5 MW, 11° F) and December 2013 (106.4 MW, 9° F). These peak load events correspond with the two coldest weather events in the last ten years. Monthly coincident peak demand for all distribution substations (2005-2014) is shown in Figure 3-4.

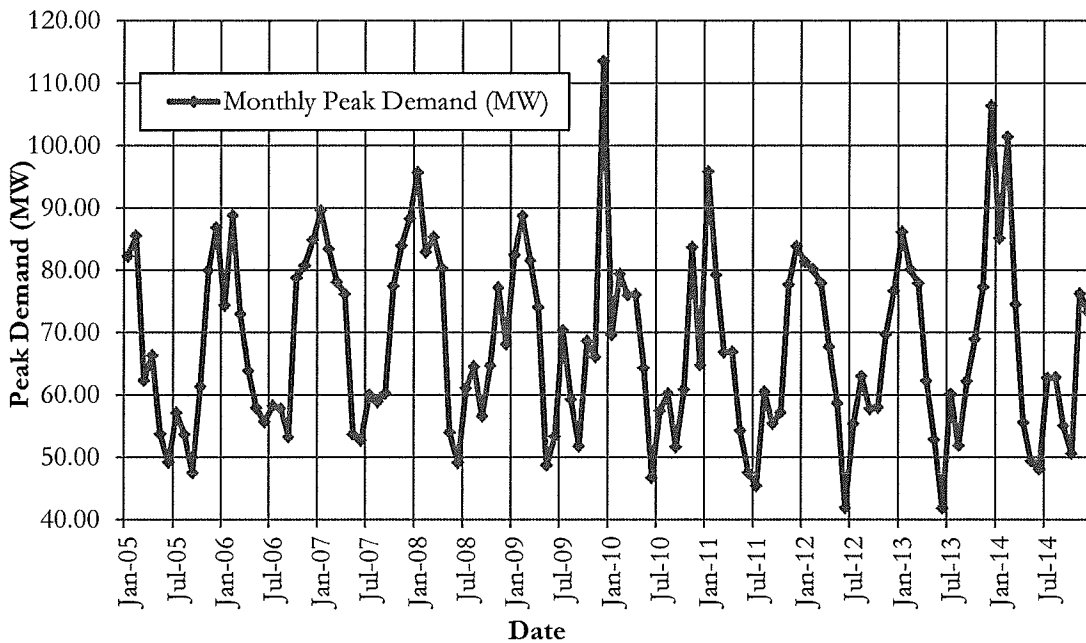


Figure 3-4: Monthly coincident peak demand for distribution substations.

Peak demand during extreme warm weather events is growing, but remains significantly lower than that experienced for cold weather events. The maximum summer coincident peak demand in the period studied was 70.3 MW in July 2009, this is 43.2 MW lower than the maximum winter peak. Figure 3-5 shows the summer peak demand generally growing between 2005 and 2014 despite milder weather in recent years.

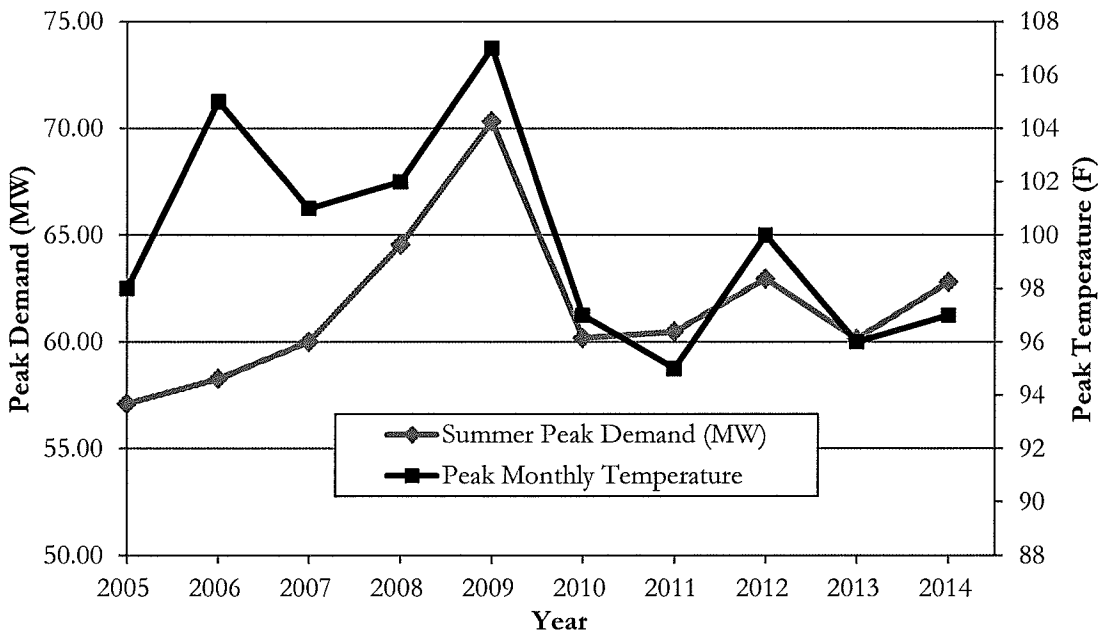


Figure 3-5: Summer peak coincident demand vs. peak temperature in the same month.

POPULATION, CUSTOMERS, AND ENERGY SALES

Table 3-1 shows the MW&L distribution system energy use, the population of the City of McMinnville, the number of residential customers served by MW&L, and the energy sales per customer for each year.

Table 3-1
Energy Use, Population, and Customer Count

Year	Energy ¹ (kWh)	Population ²	Customers ³	Energy Sales per Customer (kWh/Customer)
2001	362,585,872	27,500	13,461 ⁺	26,936
2002	367,292,442	28,200	14,045	26,151
2003	366,049,709	28,890	14,306	25,587
2004	378,968,207	29,200	14,639	25,887
2005	387,591,080	30,020	14,967	25,896
2006	400,976,800	30,950	15,289	26,226
2007	409,242,883	31,665	15,527	26,356
2008	422,433,599	32,400	15,711	26,887
2009	408,480,526	32,760	15,794	25,863
2010	380,583,831	32,240	15,730	24,194
2011	401,287,513	32,270	15,599	25,725
2012	392,208,289	32,435	15,690	24,997
2013	398,304,882	32,510	15,757	25,277
2014	383,491,409	32,705	15,842	24,207

1. Distribution system energy use, industrial not included
2. Population data and estimates provided by PSU Population Research Center
3. Customer data provided by MW&L and is number of billed customers
4. Customer data estimated for 2001 using PUC Statbook data and the average reporting error between actual MW&L and PUC data from surrounding years

During the last sustained growth period from 2001 to 2008, energy sales grew by 16.45%, population grew by approximately 17.8%, and customer count by 16.7%. While several factors affect energy use on the McMinnville system, a simple linear regression analysis shows that the growth rate of energy use has historically been approximately equal to the growth rate of the MW&L customer count. Figure 3-6 shows the relationship between MW&L customer count and yearly distribution system energy sales for the 2001-2008 period. The trend-line slope suggests with high confidence that each additional customer will add 27,064 kWh of sales. This relationship has not been as clear since 2009, most likely due to the effects of the economic recession and a large energy conservation effort launched by MW&L in 2008. However, for this study it will be assumed that the rate of change in energy sales (and peak demand potential) will be equal to the rate of change expected for population and customers.

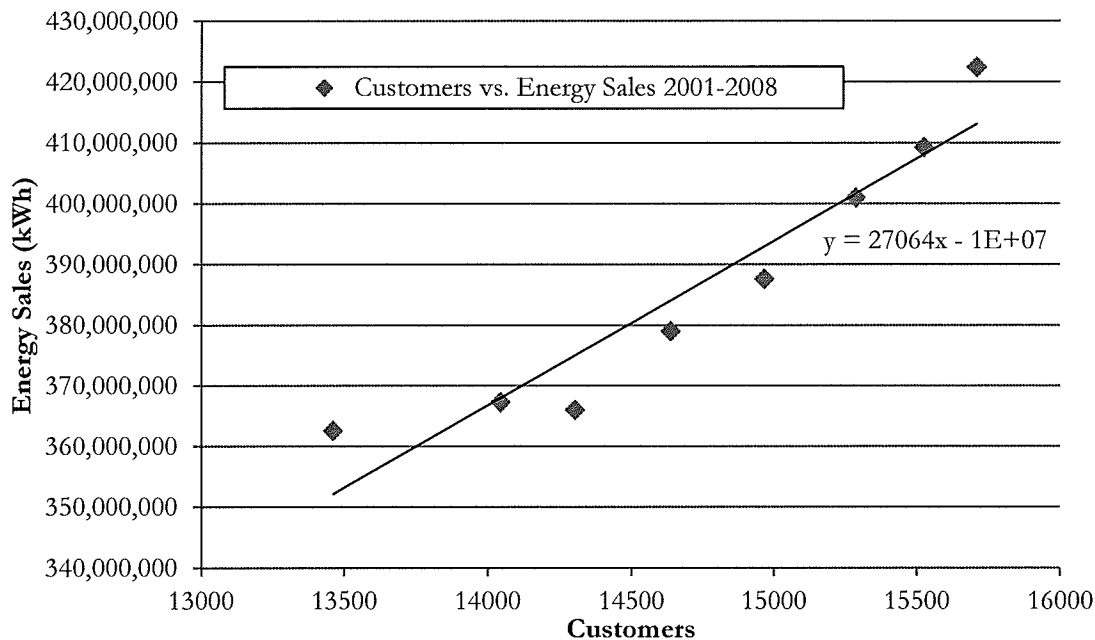


Figure 3-6: Scatter plot of customers vs. yearly energy sales for the 2001-2008 period with simple linear regression trend-line.

B. LOAD FORECAST

In order to determine the likely rate of MW&L distribution system growth, several forecasts were analyzed.

POPULATION

The results of the most commonly referenced population forecasts are summarized below:

- As a result of the 2012 coordinated population forecast process, Portland State University Population Research Center forecasts an average annual population growth rate for the City of McMinnville of 2.0% for the 2015-2020 period and 1.9% for the 2020-2025 period. These estimates are based on the assumption of a slow economic recovery which accelerates after 2015. This forecast considered several factors including demographics, mortality, fertility, immigration, urban growth boundaries, zoning, and historical trends.
- The Oregon Office of Economic Analysis (OEA) forecasts, released March 2013, project average annual population growth rates (for Yamhill County) of 1.67% for the 2015-2020 period and 1.73% for the 2020-2025 period.

ENERGY USE

The results of the available energy and peak demand forecasts are shown below:

- MW&L Staff have projected a range of expected energy sales and peak demand growth rates for the 2015-2030 period. These rates take into account recent high level state-wide forecasts made by the NPCC that include consideration for conservation, population growth, distributed generation, and several other factors.

- Low: 0.5%
- Medium: 0.8%
- High: 1.0%
- The BPA peak demand forecast calls for approximately 0.33% yearly average growth from 2015-2025

Under normal system growth conditions, occurring between 2001-2008, the growth rate of distribution system energy use (and peak demand potential) has been shown to be approximately equal to population and customer growth rates. In this study, it is assumed that this will hold generally true in the future. However, we also acknowledge the NPCC assertion that ongoing conservation programs and future technology improvements will continue to lower the average energy use per customer.

FORECAST ASSUMPTION

As a base case for future projections, the recent December 2013 cold weather peak, 106.4 MW, was used as the likely one in ten year cold weather event. Although the December 2009 coincident peak demand was higher, the economic recession and conservation efforts since 2008 lead us to believe that the December 2013 event more accurately reflects the system as it exists today. Additionally, it is assumed that energy use and projected possible peak demand will grow at a similar rate.

Based on a review of the available forecasts, the following load forecast growth rates were established as reasonable and bounding. The average annual energy and peak demand growth rates projected for the 2015-2025 period will be:

- Low: 0.5%
- Medium: 1.1%
- High: 1.7%

These forecasted rates are slightly higher than the MW&L and BPA projections. This can be attributed to the differing goals of serving peak demand load for isolated extreme weather events vs. predicting likely energy sales over the course of a year.

C. SUMMARY

Table 3-2 and Figure 3-7 summarize the findings and conclusions of the load forecast that will be used in the analysis and planning portions of this study. Figure 3-7 shows the actual historic annual peak demand, a linear trend line representing the approximate trajectory of the historic peak demand for average cold weather conditions, a forecast projection based on the same average cold weather conditions, and a forecast based on ten year extreme weather. Average cold weather conditions were calculated from the yearly WRCC 1927-2015 data to be 16.3 degrees. To provide a baseline average weather peak, the 2013 peak was scaled using the relationship developed in Figure 3-3 between cold weather and peak demand.

This forecast incorporates the analysis, assumptions, and projections of several different entities. It is also based on observation of historical trends and reflects expectations for potential future conditions. As always, unforeseen events could have a significant impact on future coincident peak demand. This forecast should be evaluated periodically and modified as needed to correspond with actual growth and changing system conditions.

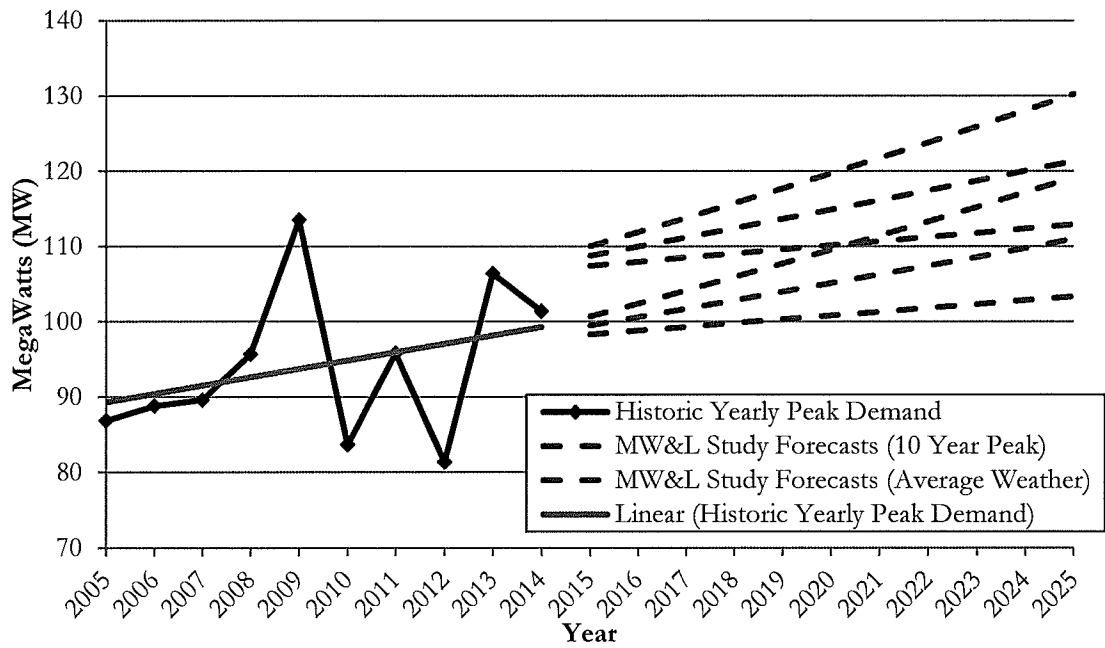


Figure 3-7: Peak demand historic data and peak demand forecasts for the MW&L distribution system.

Table 3-2
Study Load Forecast Summary

Growth Rate	Base Case 2013 Peak Load (MW)	2020 Peak Load (MW)	2025 Peak Load (MW)
Low (0.5%)	106.4	110.1	112.9
Med (1.1%)	106.4	114.9	121.4
High (1.7%)	106.4	119.7	130.2

CHAPTER 4

SYSTEM PLANNING CRITERIA

A. GENERAL

As part of the planning study, specific guidelines and planning criteria were developed and tailored to the MW&L electric system and service objectives. Many of the criteria discussed below were established in the previous electric system planning study and are based on factors which affect system operations and maintenance. These include:

- Providing dependable and economic electric service to ratepayers while giving strong attention to public and personal safety
- The planning, construction, and operating practices of comparable electric utilities
- The risk taken by following less stringent planning practices

B. IMPROVEMENT TIMING

Prudent utility practice requires that system improvements be implemented prior to load growth to allow the utility to meet customer service demand. However, existing facilities should be utilized to the maximum practical extent to avoid costly premature construction of new facilities. The recommended improvements in this report should be made on an as needed basis using the best available growth or age data. The time frame of improvement implementation should be adjusted if the actual load growth varies significantly from the load forecasts, but with sufficient time allowed for necessary engineering, permitting, material procurement and construction. An in-depth discussion of population and load growth is presented in Chapter 3, and system aging is discussed in Chapter 5.

C. SYSTEM RELIABILITY

A primary consideration in system planning is reliability. MW&L operates using single-contingency reliability criterion. Single-contingency reliability is achieved when an outage of any single major component of the electrical system (transmission or distribution line, substation transformer, protective device, cable segment, switching component, etc.) results in only minor service interruption to a limited number of customers while allowing the utility to meet expected peak demand for a one in ten year weather event.

To meet this objective, and provide acceptable service continuity to the extent practical, the following general criteria and recommendations should be used as guidelines in planning and operating the electric system.

PLANNING CRITERIA

TRANSMISSION

- Transmission line sections should be capable of being removed from service for maintenance without causing customer service interruptions.

SUBSTATIONS

- Substations should ideally have at least one alternate transmission line source (looped).
- Single substation transformer outages should not cause prolonged customer service interruptions.
- With the system configured normally and under present peak conditions, most of the MW&L system transformers are loaded below their lowest 55° C rise OA rating. This is a conservative loading practice, but it allows MW&L to easily switch load between substations without violating transformer nameplate loading criteria. It is recommended that MW&L continue to follow this practice.
- Future substations should standardize on the following criteria:
 - 20/27/33/38 MVA, 115-12.47/7.2-kV transformers with load tap changer
 - Capacity for four or five feeder bays

DISTRIBUTION

- MW&L should document and maintain up-to-date distribution circuit sectionalizing schemes. These schemes should allow for the transfer of load in case of the loss of any individual feeder or substation.
- MW&L currently designs distribution feeders for approximately 600 A capacity on the getaways and main backbone. With the system normally configured, peak loading should be kept below 300 A on each circuit. During planned maintenance or emergency system outages with load transfers, loading should be kept below 450 A.
- Primary conductors shall be operated within 80% of the IEEE standard line rating. It should be noted that this rating is a “summer” rating and that winter peaking utilities have additional line capacity available.
- Where feasible, distribution feeders should be capable of being supplied by one or more alternate distribution sources (sectionalized) through group-operated, load-break switching devices installed at appropriate system locations. This will allow circuit breakers or reclosers and other feeder components to be taken out of service while maintenance is performed without causing lengthy customer service interruptions.
- Circuit breakers or reclosers of circuits receiving load transfers should have alternate settings readily available to avoid nuisance tripping operations.
- The maximum secondary voltage drop allowed by MW&L is 3%. To comply with ANSI C84.1 and have a minimum planning voltage of 114 V (on a 120 V base) at the customer meter, the minimum primary voltage allowed should be 117.6 V.
- Phase load imbalance on distribution feeders should be minimized to avoid overloading individual phases and reduce the need to oversize feeder backbone and tap conductors. If

the imbalance on any feeder exceeds 15% during high load conditions, loads should be shifted between phases to reduce imbalance to 10% or below. This practice will help minimize neutral current and reduce neutral-to-ground potential.

- Capacitor banks
 - Should be used to maintain power factors between 97 to 99 percent lagging at peak load to avoid reactive power charges.
 - First preference for the location of capacitor banks should be at the customer’s site, especially at industrial installations. Avoid locating capacitor banks in substations.
 - Total installed fixed capacitor bank installations should be limited to avoid an excessive leading power factor during low load conditions. Use switched capacitor banks where appropriate.
 - To minimize switching transients where switched capacitor banks are used, avoid locating banks near each other.

GENERAL

- Equipment life shall be based on reasonable assumptions and industry typical values. MW&L uses the following general values:
 - Transformers: 40-45 years
 - Breakers: 30-35 years, replace controls at the same time
- It is good practice to have a replacement plan in place for all obsolete and aging equipment that no longer has available repair parts.
- When possible, system improvements shall strengthen ties for operational flexibility under abnormal conditions.
- When taking corrective measures, both initial cost and operating cost shall be considered.

D. STANDARD CONDUCTORS

The following tables detail the MW&L system present standard conductor sizes, and some that were used previously.

**Table 4-1
Overhead Conductors**

Voltage (kV)	Conductor	Circuit Application
115	556.5 & 336.4-kcmil AAC	Transmission
12.47	556.5-kcmil AAC*, 336.4-kcmil AAC, 795 or 954-kcmil AAC (future)	Distribution Main Backbones
12.47	#2-ACSR	Distribution Taps

*336.4-kcmil AAC was an old standard for distribution main backbones, not used for new construction

**Table 4-2
Underground Conductors**

Voltage (kV)	Conductor	Circuit Application
12.47	1000-kcmil Al EPR	Substation Getaways
12.47	750-kcmil AL EPR	Distribution Main Backbones
12.47	4/0-AL	Distribution Large Taps
12.47	1/0-AL TRXLP	Distribution Taps

*4/0 Al was an old standard, not used for new construction

The maximum ampacity rating and relative MW capacity for winter and summer loading for typical overhead and underground MW&L standard conductors are shown in Tables 4-3 and 4-4 below. For underground cables, a thermal resistivity (RHO) of 90 is assumed based on soil data from the United States Department of Agriculture Natural Resources Conservation Service. According to the data available, this generalized value should be sufficient for a majority of the MW&L system, but MW&L staff should understand that both soil type and moisture content will affect thermal resistivity and can increase or decrease the ampacity of underground cables.

**Table 4-3
Capacity Of Overhead Conductors**

Conductor		Winter(a)		Summer(a)	
ACSR	AAC	Ampacity	MW(b)	Ampacity	MW(b)
#2		225	4.7	155	3.3
	336.4	630	13.2	435	9.1
	556.5	870	18.2	600	12.6
	795*	1090	22.8	760	15.9
	954*	1220	25.6	850	17.8

a) Based on 75 Celsius (degrees) conductor temperature, 0 Celsius (degrees) Winter Ambient, 40 Celsius (degrees) Summer Ambient.

b) All MW ratings assume a three-phase 12.47 kV system with 97% power factor.

* Potential future standard conductor sizes.

TABLE 4-4A
Underground Cable Capacity 15 kV, 133%, Full Concentric (a) and 1/3 Concentric (b)

Conductor	In Duct Bank (c)		Direct Buried (c)	
	One Circuit (Amps)	MW (d) (1-Phase)	(Amps)	MW (d) (1-Phase)
#1/0 AL (a)	155	1.1	218	1.5
#4/0 AL (a)	230	1.6	324	2.3
750 kcmil AL (b)	547	11.5	635	13.5
1000 kcmil AL (b)	641	13.4	740	15.5

- a) Based on Southwire Primary Cable UD Jacketed literature for ONE single-phase circuit, one conductor in one conduit, with 90 deg C, 220 mil, 133% TRXLP insulation level with full concentric neutral.
- b) Based on AIEE-ICEA Power Cable Ampacity Ratings, Volume I and II and Okonite URO-J literature for ONE three-phase circuit, one cable per non-metallic duct, 220 mil, 133% insulation level with 1/3 concentric neutral. Derating is required for multiple circuits in a single duct bank.
- c) 1/C cables Direct buried on 7½" centers, 90 C conductor temperature, RHO = 90, 20 Celsius (degrees) ambient earth temperature, 100% load factor.
- d) All MW ratings assume a three-phase system with 97% power factor.

TABLE 4-4B
Underground Cable Capacity 15 kV, 133%, 1/3 Concentric (a)

Conductor	In Duct Bank (b)	
	One Circuit (Amps)	MW (c) (3-Phase)
#4/0 AL	240	5.0
750 kcmil AL	470	9.8
1000 kcmil AL	550	11.5

- a) Based on AIEE-ICEA Power Cable Ampacity Ratings, Volume I and II and Okonite URO-J literature for ONE three-phase circuit, three conductors in one duct, 220 mil, 133% insulation level with 1/3 concentric neutral. Derating is required for multiple circuits in a single duct bank.
- b) 90 C conductor temperature, RHO = 90, 20 Celsius (degrees) ambient earth temperature, 100% load factor (applicable both summer and winter loading).
- c) All MW ratings assume a three-phase system with 97% power factor.

TABLE 4-4C
Underground Cable Capacity – TWO Circuit Duct Bank (a)

Conductor	In Duct Bank (b)	
	Two Circuit (Amps)	MW (c) (3-Phase)
750 kcmil AL	405	8.5
1000 kcmil AL	465	9.7

- a) Based on AIEE-ICEA Power Cable Ampacity Ratings, Volume I and II and Okonite URO-J literature for TWO three-phase circuit, three conductors in each duct, 220 mil, 133% insulation level with 1/3 concentric neutral
- b) 90 C conductor temperature, RHO = 90, 20 Celsius (degrees) ambient earth temperature, 100% load factor (applicable both summer and winter loading).
- c) All MW ratings assume a three-phase system with 97% power factor.

TABLE 4-4D
Underground Cable Capacity – FOUR Circuit Duct Bank (a)

Conductor	In Duct Bank (b)	
	<u>Four</u> Circuit (Amps)	MW (c) (3-Phase)
750 kcmil AL	318	6.7
1000 kcmil AL	363	7.6

a) Based on AIEE-ICEA Power Cable Ampacity Ratings, Volume I and II and Okonite URO-J literature for **FOUR** three-phase circuit, three conductors in each duct, 220 mil, 133% EPR insulation level with 1/3 concentric neutral

b) 90 C conductor temperature, RHO = 90, 20 Celsius (degrees) ambient earth temperature, 100% load factor (applicable both summer and winter loading).

c) All MW ratings assume a three-phase system with 97% power factor.

CHAPTER 5

ANALYSIS OF EXISTING SYSTEM

A. TRANSMISSION

A majority of the MW&L system is fed at 115 kV from the BPA Carlton substation and BPA McMinnville switching stations. The only exception to this is the Cascade 230 substation which is fed at 230 kV from the BPA Carlton-Sherwood #1 line. MW&L owns approximately 5.9 miles of 115 kV transmission on a loop that serves Booth Bend, Gormley, Walnut City, and Baker Creek Substations. East McMinnville and Windishar Substations are fed directly from BPA. All MW&L substations are loop fed or have multiple energization sources. Refer to Appendix A for BPA Meter Diagrams and McMinnville area transmission diagrams.

EXISTING SYSTEM

With projected growth as modeled in Chapter 6, the MW&L-owned transmission loop, sized at 336.4 AAC and 556.5 AAC, should have sufficient capacity to serve MW&L through 2025. At 115 kV with 97% assumed power factor, 336.4 AAC has a summer capacity of 84 MW and a winter capacity of 121 MW. Under high growth conditions the MW&L loop loads (Baker Creek, Walnut City, Gormley, and Booth Bend) are projected to reach a coincidental winter peak of 84.7 MW in 2025. MW&L should begin planning improvements to this portion of the system when summer coincidental peak loading begins to approach 80 MW.

The 115 kV BPA lines serving the MW&L system are predominantly 556.5 ACSR, however there is a 5.63 mile section of 266.8 ACSR serving the Baker Creek side of the MW&L owned 115 kV loop. According to the power flow cases and growth assumptions as modeled in Chapter 6, the loads served by this section of 266.8 ACSR (Baker Creek, Walnut City, Gormley, and Booth Bend) have a coincident historical peak of 67.5 MW and could reach a peak of 84.7 MW by 2025 under high growth (1.7%) conditions. At 115 kV with assumed 97% power factor, the section of 266.8 ACSR has capacity for approximately 77.2 MW in summer conditions and 111.5 MW in winter conditions. MW&L and BPA should be aware that if summer peak conditions approach the magnitude of expected winter peak conditions, this line may need to be reconducted within the ten year planning period.

A 556.5 ACSR conductor at 115 kV with 97% assumed power factor has a summer capacity of approximately 124 MW and a winter capacity of 179 MW. The loads served by the BPA 556.5 ACSR conductor amount to all MW&L load aside from Cascade 230. Peak coincident loading reached 148 MW in 2014. Under high growth conditions (1.7% yearly) and with no additional growth in industrial loads at Windishar, the coincident peak could reach 172 MW by 2025. This conductor is currently adequate to serve all MW&L loads, however if high growth conditions occur along with an increase in summer peak conditions, this line may need to be reconducted by BPA at some point in the planning period.

In summary, the BPA and MW&L-owned transmission lines serving the MW&L system presently have adequate capacity. However, high growth coupled with an increase in coincident peak magnitude during the summer could lead to required improvements.

MW&L has 115 kV circuit switchers at every substation and three line breakers (B-710, B-712, and B-713) on the MW&L owned portion of the 115 kV loop. Although B-712 and B-713 at Walnut City Substation are equipped with SEL 387L line current differential relays, a differential line relaying scheme has not yet been implemented. If MW&L desires to operate the 115 kV loop without a normally open point, a line differential relay scheme should be implemented.

According to outage data provided by BPA, MW&L had 44 transmission outages between September 2009 and April 2015. 17 of these outages were greater than or equal to one minute, and only one (occurring on the McMinnville-Forest Grove line) was greater than three minutes. Of these total 44 outages, 17 occurred on the McMinnville-Forest Grove line, and BPA has improvements planned that address this in either BPA fiscal year 2016 or 2017.

BPA PLANNED IMPROVEMENTS

BPA has planned several improvements at BPA Carlton Substation, expected in fiscal year 2016-2017, that will improve reliability of service to MW&L. The preliminary improvement one-lines can be found in Appendix A and are summarized below:

- Carlton 230 kV Substation will have two new 230 kV breakers and disconnects installed with new breaker failure, bus differential, and bus tie relays. New surge arresters will also be installed. This will provide protection and reliability improvements to the MW&L 115 kV system as well as Cascade 230.
- Carlton 115 kV Substation will be expanded to include two new breakers and bays. The MW&L system will still be fed from the same breakers, but breaker B131 will now solely serve the MW&L system. The line to Forest Grove will be served through one of the new breaker positions and the other position will be a bus tie.
- Carlton 115 kV Substation relaying will also be improved with new instrument transformers and new breaker failure, bus differential, tie, and transformer differential relays.

B. SUBSTATIONS

Tables 5-1, 5-2, and 5-3 provide information on all major substation equipment owned and operated by MW&L. In general, the system is in good condition with several major improvements being made in the last ten year period. However, additional improvements are recommended for the ten year planning period. These recommendations can be found in Chapter 2.

**Table 5-1
System Transformers**

Transformer	Load Type	Voltage	Base Rating (MVA)	Top Rating (MVA)	LTC	Manufacturer	Year Purchased	2015 Age
McMinnville 2	D	115/12.47	20	37	YES	Delta Star	2011	4
McMinnville 1	D	115/12.47	12	20	NO	Allis-Chalmers	1974	41
Windishar #1	D	115/12.47	20	33	YES	Pauwels	1998	17
Walnut City	D	115/12.47	20	37	YES	Delta Star	2011	4
Booth Bend	D	115/12.47	20	37	YES	Delta Star	2011	4
Baker Creek	D	115/12.47	20	33	YES	GE/Prolec	2000	15
Gormley	D	115/12.47	20	33	YES	Delta Star	2009	6
Windishar #2	I	115/12.47	20	33	NO	ASEA	1984	31
Windishar #3	I	110/12.47	15	25	NO	Westinghouse	1977	38
Windishar #4	I	110/12.47	15	25	NO	Westinghouse	1980	35
Spare		110/12.47	12	20	NO	GE	1969	46
Cascade 230¹	I	230/34.5	100	133	NO	ABB	2013	2
Spare	I	230/34.5	100	133	NO	ABB	2005	10

1: The Cascade 230 transformer and spare are owned by Cascade Steel. Transformer presently in use was originally purchased in 1990, but was rewound and refurbished in 2013.

**Table 5-2
34.5 - 230 kV Devices & Control Type**

Substation	Device	Voltage	Mfr & Model	Year Purchased	2015 Age	Control Type
McMinnville 2	Bank 2 CS	115 kV	Alstom S1-145 F1	2003	12	TPU/MSOC
McMinnville 1	Bank 1 CS	115 kV	Alstom S1-145 F1	2003	12	TPU/MSOC
Windishar 1	Bank 1 CS	115 kV	Southern States CSV	2011	4	SEL 787/751A
Windishar 2	Bank 2 CS	115 kV	Southern States CSV	2013	2	SEL 787/751A
Windishar 3	Bank 3 CS	115 kV	Southern States CSV	2011	4	SEL 787/751A
Windishar 4	Bank 4 CS	115 kV	Southern States CSV	2013	2	SEL 787/751A
Walnut City	CS	115 kV	Alstom GL312P	2014	1	SEL 787/751A
	Transmission B-712	115 kV	Alstom DT-145FkF1	2014	1	SEL 387L
	Transmission B-713	115 kV	Alstom DT-145FkF1	2014	1	SEL 387L
Booth Bend	CS	115 kV	Southern States CSV	2011	4	SEL 787/751A
Baker Creek	CS	115 kV	S&C 2030	2001	14	TPU/MSOC
Gormley	CS	115 kV	Southern States CSV	2010	5	SEL 587/551
	Transmission B-710	115 kV	Areva DT1-123F1	2010	5	SEL 751A
Cascade	CS A-2	230 kV	S&C 2040	1991	24	Basler BE1-51
	Feeder C-2	34.5 kV	Siemens P38-23-3	1991	24	Basler BE1-51
	Feeder Spare	34.5 kV	Siemens P38-23-3	1991	24	Not in Service

**Table 5-3
Substation Feeder Breaker Devices & Control Type (12.47 kV)**

Substation	Feeder	Mfr & Model	Year Purchased	2015 Age	Control Type
McMinnville 2	11	GE VIB	1980	35	SEL 551
	12				
	13				
	14				
McMinnville 1	21	Areva EOX	2007	8	SEL 351S
	22				
	23				
	24				
Windishar 1	31	GE VIB	1978	37	SEL 751/751A
	32		1978	37	
	33		1982	33	
	34		1980	35	
Walnut City	40 (Main)	Powell VB	2014	1	SEL 751/751A
	41	Powell VB	2014	1	SEL 751
	42				
	43*				
	44				
	45				
Booth Bend	51	GE PVD	1984	31	IAC 77
	52				
	53				
	54				
Baker Creek	Main	GE Power Vac	2000	15	TPU
	61*	GE VB1	2001	14	PCD2000
	62				
	63				
	64*				
	65				
	66				
Gormley	70 (Main)	CH VCP	2010	5	SEL 751A
	71				
	72				
	73				
	74*				
	75*				

**Table 5-3
Substation Feeder Breaker Devices & Control Type (12.47 kV)**

Substation	Feeder	Mfr & Model	Year Purchased	2015 Age	Control Type
Windishar Industrial	91 ¹	Mitsubishi 17DV25-20	2013	2	SEL 751/751A
	92 ¹		2013	2	
	93 ¹		2014	1	
	94 ¹		2013	2	
	95 ¹	GE PVD	1985	30	
	96 ¹		1985	30	
	97 ¹		1990	25	
	98 ¹		1990	25	

*Denotes spare or tie breaker position

1: Settings provided by others

SUBSTATION CAPACITY

Figure 5-1 shows the existing substation capacity alongside the MW&L peak demand forecasts for the MW&L distribution substations (detailed in Chapter 3). If all load were to be distributed evenly between all of the transformers, MW&L has enough transformer capacity to satisfy the planning criteria until 2025 even if 1.7% yearly growth is seen. However, perfectly even load distribution and growth is not realistic. In the power flow analysis, detailed in Chapter 6, it was determined that even if some load is shifted between existing substations, likely growth conditions will potentially require additional transformation capacity and new substations. These recommendations are detailed in Chapter 2.

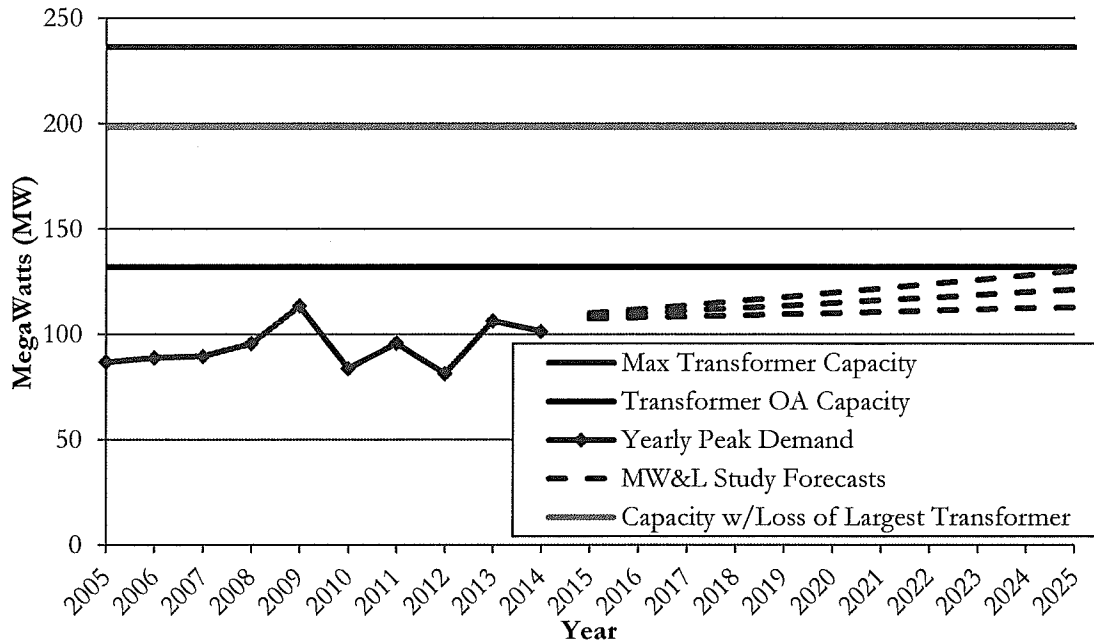


Figure 5-1: Substation capacity and future projected growth.

SUBSTATION GROUND GRIDS

Due to the age of existing substations and the importance of grounding for safety in electric substations, MW&L should periodically assess existing ground grids and grounding practices. According to MW&L staff, new grounding conductors and switch operator platforms have been added at every site as construction work has taken place. The only point of concern mentioned was at Windishar Substation #1, but work is currently planned at this site for the near future; additional conductor and platforms will be installed. It is recommend that MW&L continue the practice of adding additional grounding conductors as new equipment is installed.

In accordance with IEEE 80, it is recommended that MW&L perform periodic ground grid integrity checks or grid resistance measurements approximately every 10-15 years. Additionally, if factors affecting ground grid safety change (such as increases in available fault current) MW&L will need to review the existing grid to determine if safety has been compromised.

SEISMIC CONSIDERATIONS

It is well known that the Cascadia Subduction Zone Fault is a source of major earthquake events, up to magnitude 9.0 or greater, which occur approximately every 300 to 600 years. The last known event in the northwest occurred in the year 1700. While predicting the exact timing and magnitude of these events is impossible, it is prudent to take some precautions to improve infrastructure to better handle a possible earthquake. According to a recent BPA workshop, a magnitude 9.0 event would likely result in isolation of everything west of the cascades for at least three weeks, with up to three months before restoration of basic services and transportation.

It is recommended that MW&L address “low hanging fruit” related to critical equipment and consider the following as time and budget allows, and as new equipment is installed:

- Replace rigid connections with flexible connections to help prevent breakage of hard to replace equipment such as transformer bushings
- Anchor battery and control racks
- Anchor transformers, or consider newer concepts such as mounting on friction pendulum bearings which allow transformer to stay stationery while ground moves below (reduces force transfer)
- Brace tall structures with high center of gravity such as bus supports, live tank breakers, and HV CTs

C. DISTRIBUTION SYSTEM

Based on the analysis, the existing MW&L distribution system currently provides reliable service and acceptable voltage levels for all evaluated loading conditions up to the historical peak load when operating in a normal system configuration.

MW&L staff did not call attention to any major trouble areas within the distribution system. The sections below covering UG conductor, OH conductor, poles, and distribution transformers are based on the best available data from the MW&L GIS database. MW&L should continue the practice of logging all applicable age, location, and configuration data in the GIS system to allow for easy search and analysis of all different types of system data.

DISTRIBUTION CONDUCTORS

The MW&L GIS database has information on 578 circuit miles of conductor. Of the 578 circuit miles, 316 miles are listed as underground conductor and 256 are listed as overhead. Approximately six miles are not labeled.

UNDERGROUND CONDUCTOR

The MW&L GIS database has information on 144 miles of underground primary and 172 miles of underground secondary conductor. Age data is available for 88 miles of underground primary conductor (2231 segments in GIS) and 44 miles of underground secondary conductor (4590 segments in GIS). The statistics for underground primary and secondary cable age are shown below in Figure 5-2, but it should be noted that less than half of the MW&L underground system is represented in this figure.

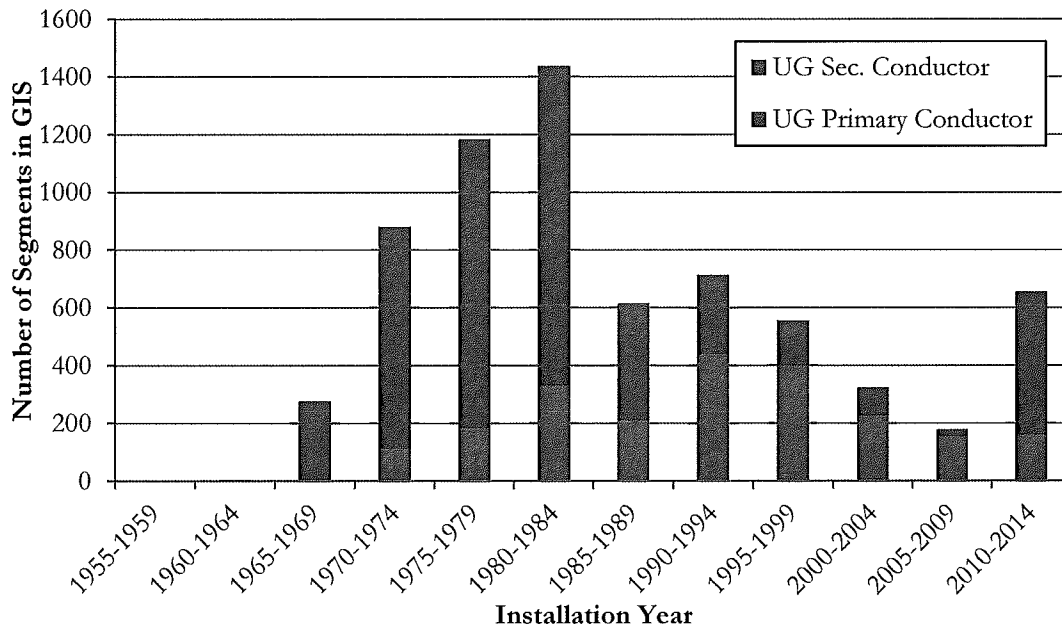


Figure 5-2: Underground conductor segment age distribution.

According to MW&L outage data as presented in Tables 5-6 and 5-7, five outages were attributed to cable failure in 2013 and six in 2014. These outages represented approximately 5% of the total customer hours out for each year: 786 hours in 2013 and 611 in 2014. In addition to the data presented here, available in the MW&L GIS system, MW&L has already produced a map of underground cables throughout the system colored according to age. It is recommended that MW&L staff continue to update and monitor these sources of information in order to use them as a guide for cable replacements in the future.

MW&L is aware of the issues with pre-1987 underground primary cable with unjacketed concentric neutral, as well as XPLE insulation from this period. The lack of jacket leads to accelerated neutral failure and accelerated treeing of XLPE insulation. MW&L will need to monitor and track this cable closely and plan for replacement. The limited data contains approximately 31.5 miles of primary

cable installed before 1987. Given that this cable is reaching the end of its expected life, it is recommended MW&L should plan to replace at least one mile of this cable annually.

OVERHEAD CONDUCTOR

The MW&L GIS database has information on 176 miles of overhead primary and 80 miles of overhead secondary conductor. However, GIS data on installation date is only available for 2.15 miles total of installed overhead conductor. Because of this, no reasonable conclusions can be made from this data. Except for issues with failures in copperweld conductors, overhead conductors have an expected 100 year lifespan. Eventual failures will occur due to work hardening and strand breakage.

DISTRIBUTION TRANSFORMERS

There are 4,485 distribution transformers listed in the GIS database for the MW&L system, but none have age or installation data available. Assuming a reasonable average transformer life of 40 years, MW&L should be retiring or replacing about 112 transformers per year. MW&L should strive to determine transformer age and add it to the GIS data to assist with planning. In many cases, the age of adjacent homes, businesses, or power poles may be a suitable substitute. MW&L should continue the policy of replacing any 30+ year old distribution transformers that make their way back to the equipment yard during normal operations and maintenance.

VOLTAGE REGULATORS

The MW&L system currently has only one line voltage regulator. However, more are planned and likely to be installed following the results of a 2013 voltage optimization study performed by SAIC. Voltage regulators, like most other equipment, require periodic maintenance and testing. Specific inspection and maintenance considerations include inspection of the control cabinet, controller, bushings, and regulator tank assembly along with electrical tests and oil testing. Depending on the manufacturer, the maintenance interval should be somewhere between four and ten years.

It is recommended that MW&L adopt O&M practices related to voltage regulators that include quarterly control checks and logging of number of operations. Maintenance should be performed based on number of operations and annual oil testing.

POLES

Age data is available for 5284 out of the total 5433 MW&L owned transmission and distribution poles in the GIS database, with 5309 MW&L owned distribution poles and 124 MW&L owned transmission poles. The 2015 MW&L system has an average distribution pole age of 33.7 years and an average transmission pole age of 32.3 years. The 2005 study calculated an average age of 23 years for 5014 existing poles. With an average expected pole lifespan of 55 years, MW&L would need to replace or retire approximately 97 distribution poles and 3 transmission poles each year to achieve this target life. Regular testing and treating should continue to guide MW&L toward the poles in greatest need of attention.

The age distribution of poles is presented in figures 5-3 and 5-4. Based on this data and the large number of distribution poles manufactured between 1965 and 1985, MW&L should be prepared to replace a higher number of distribution poles than average starting in 2020.

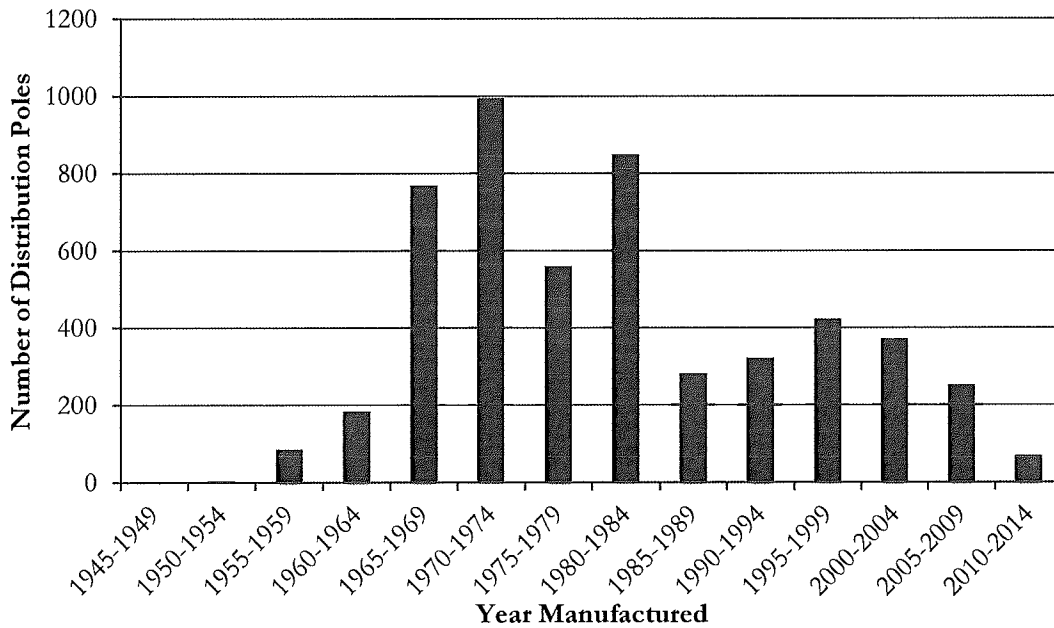


Figure 5-3: MW&L owned distribution pole age distribution.

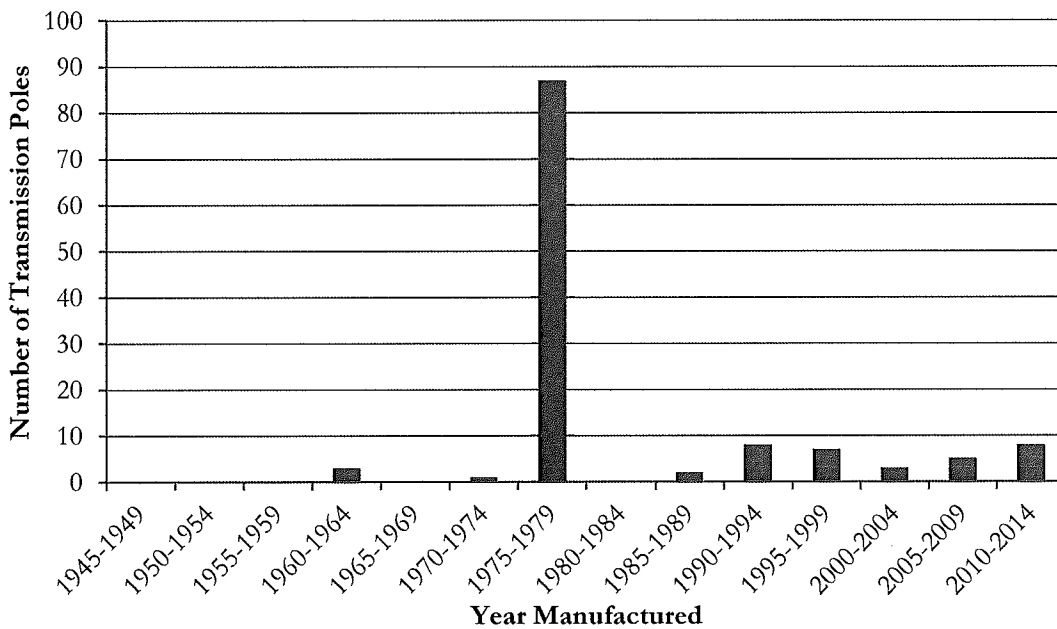


Figure 5-4: MW&L owned transmission pole age distribution.

PADMOUNT SECTIONALIZING DEVICES

MW&L has several Cooper Power System type (VFI) pad-mounted switching devices installed in the underground distribution infrastructure at key sectionalizing locations. These devices have a history of being susceptible to failure. MW&L staff is aware of this condition and has implemented a testing plan with a five year interval to monitor for any degradation that could cause mis-operation

or failure. Where VFI functionality is required, MW&L should regularly investigate manufacturer offerings and stay apprised on the best offerings available.

PHASE CURRENT IMBALANCE

The primary concern of imbalanced loading between phases of a circuit is the resulting unbalanced phase voltages, often a mix of high and low phase voltage at the same time. Unbalanced voltages can cause additional negative sequence currents to circulate in three-phase motors; this negative sequence current can lead to motors overheating. Load imbalance also causes excessive neutral currents, which can cause increased system losses and can affect ground relaying.

Because system loads are continually changing and since single phase loads are present on each feeder it is nearly impossible to achieve perfect phase balance. During high load conditions a policy of monitoring phase imbalance on each feeder is recommended. If the imbalance on any feeder exceeds 15%, loads should be shifted between phases to reduce imbalance to 10% or below. System balance may fluctuate seasonally or with system peaks, but these fluctuations should not be excessive if the policy above is followed.

Imbalance percentages are given on a per-feeder basis based on load data from the MW&L SCADA system and downloaded from substation relays. In general, individual phase data for the recent December 2013 peak was used to calculate phase imbalance. Some data came from other time periods or may need to be interpreted differently due to non-standard system configuration, lack of available historical SCADA data, and differences in data available from different relay types.

- For feeders 31-34, data from a high load period in October of 2013 was used to calculate imbalance.
- For feeders 41-45, data from a high load period in November of 2014 was used to calculate imbalance.
- For feeders 62-66, the PCD relays only provide maximum current for each phase individually instead of coincidentally. Because of this, calculated imbalance could be slightly higher than shown.
- For feeders 71 and 73, data from a high load period in February 2015 was used to calculate imbalance.
- For Feeder 72, imbalance was not calculated due to lack of available data where the waste management generation is off-line.

Results are shown in Table 5-4.

The results show that under recent winter peak conditions, some feeders do not stay within the 15% criterion. However, some of the circuits with high imbalance are lightly loaded. It is recommended that MW&L continue to monitor the imbalance on all feeders during peak load conditions, with special attention given to those with imbalance above 15% in Table 5-4. If the imbalance on these feeders continues to exceed 15%, action should be taken to shift load and reduce imbalance to below 10%. A period of monitoring is necessary following field changes to any feeder to identify the effect of the change on feeder balance. Additionally, phase balance should be considered prior to adding or reconfiguring any feeder loads.

**Table 5-4
MW&L Peak Load Phase Imbalance**

Feeder	Peak (kW)	Imbalance (%)
11	456	10.9%
12	1003	62.7%
13	3376	13.9%
14	1494	23.6%
21	1490	29.2%
22	4287	21.4%
23	1635	6.5%
24	5922	28.5%
31	5765	7.6%
32	2199	0.9%
33	4266	4.4%
34	6992	4.7%
41	1658	8.1%
42	2251	8.5%
44	4472	6.0%
45	3619	13.8%
51	8660	8.2%
52	917	27.5%
53	7632	3.6%
54	6339	7.0%
62	6156	9.7%
63	4462	16.7%
65	6204	5.9%
66	6573	12.4%
71	5009	6.8%
72	1531	NA
73	2005	10.8%

SERVICE RELIABILITY

The IEEE has developed specific guidelines through Standard 1366, Guide for Power Distribution Reliability Indices, to evaluate distribution reliability consisting of measures for monitoring outage duration and frequency. These reliability indices have received industry-wide acceptance and are divided into two categories, customer-based and load-based.

Customer-based indices record the frequency and duration of outages for individual customers and are used mainly in residential areas. Load-based indices record the frequency and duration of load

outages and are relevant for circuits that serve industrial and commercial loads. The following industry standard reliability indices have been calculated and furnished by MW&L for 2011-2014.

SAIFI -- System average interruption frequency index

$$SAIFI = \frac{\text{Total number of customers interrupted}}{\text{Total Number of Customers}}$$

SAIDI -- System average interruption duration index

$$SAIDI = \frac{\text{Sum of customer interruption duration}}{\text{Total number of customers}}$$

CAIDI -- Customer average interruption duration index

$$CAIDI = \frac{\text{Sum of customer interruption duration}}{\text{Total number of customer interruptions}}$$

SAIFI describes the percentage of customers experiencing an interruption in a given time period. SAIDI describes the average outage time per customer if every outage was spread throughout the whole system. CAIDI describes the average interruption duration per outage.

Table 5-5 presents yearly average figures of monthly calculations made by MW&L for 2000-2004 and 2011-2014. Table 5-6 presents yearly figures for PacifiCorp customers in the Willamette Valley, and Portland General Electric (PGE) whose service territory surrounds MW&L. The MW&L indices for 2011 through 2014 are in the same general range as seen in the 2005 study and compare favorably with PGE and PacifiCorp indices for the same time period.

Table 5-5
MW&L Calculated Reliability Indices

Year	SAIFI	SAIDI	CAIDI
1999-2000*	4.0%	3.96	NA
2000-2001*	68.3%	45.96	NA
2001-2002*	43.6%	30	NA
2002-2003*	8.5%	4.44	NA
2003-2004*	16.5%	15.42	NA
2011	13.8%	16.14	117.34
2012	14.2%	14.25	99.63
2013	83.2%	50.33	92.30
2014	43.2%	48.32	121.93

*Data from previous study issued in 2005.

**Table 5-6
PGE & PacifiCorp Reliability Indices**

Year	SAIFI	SAIDI	CAIDI
PacifiCorp Willamette Valley Services			
2011	158.7%	273	NA
2012	222.9%	444	NA
2013	159.3%	189	NA
2014	242.9%	597	NA
Portland General Electric			
2011	51%	66	129
2012	55%	72	131
2013	45%	62	138
2014	69%	93	135

It is clear that the number and duration of outages increased in 2013 and 2014 compared to 2011 and 2012. Table 5-7 and 5-8 provide a more clear idea of the cumulative duration and frequency of each type of outage in 2013 and 2014.

**Table 5-7
2013 Outage Details**

Cause	% of total 2013 customer minutes out	Number of Outages
Weather	58.74%	14
Animal	22.88%	32
Equipment	9.62%	18
Faulted Cable	4.20%	5
Damage	3.03%	6
Tree	1.06%	8
Misc.	0.46%	7

**Table 5-8
2014 Outage Details**

Cause	% of total 2014 customer minutes out	Number of Outages
Weather	61.44%	25
Tree	15.14%	16
Accident	5.90%	6
Lightning	5.80%	1
Faulted Cable	5.65%	6
Equipment	3.08%	10
Animal	1.81%	32
Tree Trimmers	1.00%	1
Misc.	0.19%	5

Tables 5-7 and 5-8 show that weather was the number one cause of customer minutes out in 2013 and 2014; however the most common cause of outages was animals with 32 outages attributed to the animal category in each year. Animal outages for 2013 and 2014 were entered into Google Earth to determine if certain areas might need special guards or protection; the mapped outages show a large cluster in central and north central McMinnville as well as several on the western portion of the service territory served by Baker Creek Feeder 63. A Google Earth KMZ file is provided with the study so MW&L staff can view the visual representation of this data.

SYSTEM VOLTAGE LEVELS

In accordance with standards established by the American National Standard Institute (ANSI C84.1, Range A), the voltage ranges in Table 5-9, shown as acceptable voltage or allowable voltage drop, should be maintained throughout the MW&L electric system. As established in the planning criteria, the maximum secondary voltage drop allowed by MW&L is 3%. To comply with ANSI C84.1 and have a minimum planning voltage of 114 V (on a 120 V base) at the customer meter, the minimum primary voltage allowed should be 117.6 V.

The voltages shown are presented on a 120 Volt base, however the percentages indicated apply to any voltage base, for example 12.47/7.2 kV, 480/277 V, etc., that is applicable to the location.

**Table 5-9
Acceptable Voltage Levels**

Location	Acceptable Voltage or Allowable Voltage Drop (120 V Base)	Acceptable Percentage
Bus voltage range at substation.	122 - 126	102% - 105%
Maximum voltage drop along a distribution feeder.	8	6.3%
Voltage range at primary terminals of distribution transformers.	118 - 126	98% - 105%
Maximum voltage drop across distribution transformer and service conductors.	4	3.3%
Voltage range at customer meter.	114 - 126	95% - 105%
Voltage range at customer's utilization equip.	110 - 126	92% - 105%

The power flow results indicate that present system voltages under peak conditions are at acceptable levels. However, all substation voltages should be monitored to ensure proper distribution voltage levels are maintained. In addition, during substation outages or feeder transfers, feeder voltage levels should be monitored to assure proper voltage levels are maintained.

SYSTEM ENERGY LOSSES

In order to maintain consistency between studies, energy losses are provided and calculated similarly to the 2005 study. Not including direct industrial sales to Cascade Steel and Air Liquide, yearly losses for calendar years 2010 to 2014 varied from 2.9% to 3.8%. This is comparable to the average of 3.6% for 2000-2004, presented in the 2005 study, and also comparable utilities similar in size and density to MW&L. It is suggested that MW&L continue to calculate, record, and monitor system losses on an annual basis.

Losses were calculated using energy sales data provided by MW&L staff and from the Oregon PUC Public Utility Statbooks. Detailed sales data is not tabulated in order to protect the privacy of industrial customers.

D. EMERGENCY RESTORATION

Emergency restoration plan concepts are tabulated in Appendix B. These tables are based on the peak load Power Flow simulations detailed in Chapter 6 (Power Flow). For a discussion of results of the Power Flow for each outage situation at peak load, see Chapter 6.

E. REGULATORY

PUBLIC UTILITY COMMISSION

MW&L staff requested a brief review of Public Utility Commission (PUC) safety requirements to aid with compliance. OAR 860-024 is the Oregon PUC Safety Standards document. Without performing an audit and inspections that are beyond the authorized scope, it is not possible for us to verify that all requirements have been met nor that they will be met in the future. MW&L should periodically monitor these safety standards for changes. In general, the safety standards filed through April 15, 2015 require the items in the simplified list below. This is not a comprehensive

list and is meant to be informational only. Official documents are available online in the Secretary of State Archives.

- Utilities must keep maps and records showing size, location, character, and date of install of major plant items. This includes location of all underground facilities.
- Utilities should have a defined service territory to prevent duplication of facilities.
- ANSI and NESC practices must be followed for facility construction.
- Utilities must maintain facilities in compliance with commission safety rules and maintain adequate written records of inspection policies, plans, and schedules.
- Utilities must inspect 100% of overhead facilities at a maximum interval of every ten years, and must report to the commission that 50% or more have been inspected at the five year point. A recommended rate of inspection is 10% of the system per year.
- Utilities must have inspections of UG facilities every ten years, with recommended inspection rate of 10% per year.
- Utilities must notify affected owners and occupants, in advance of inspection, of the geographic area to be inspected.
- Utilities must perform safety patrols of accessible facilities for hazards to the public at a maximum interval of two years.
- Utilities must inspect electrical supply stations at a maximum interval of 45 days.
- Utilities must correct violations no later than two years after discovery or they may defer correction for up to ten years if there is no foreseeable risk.
- Connection to ground may be used only for protection purposes, not for providing a return conductor for power purposes.
- Vegetation must be maintained at specified distance from conductors and readily climbable vegetation must also be trimmed or removed.
- Utilities must report incidents to the PUC immediately by facsimile/call/e-mail and in writing within 20 days based on the following criteria:
 - Operator owned and/or non-operator owned property damage exceeds \$100,000
 - Damage to property that causes loss of service to over 500 customers for over two hours, except for electric service loss restricted to single feeder line with an outage less than four hours
 - Serious injury to person, loss of life or limb

NERC RELIABILITY STANDARDS REQUIREMENTS

Due mainly to seven existing under frequency load shed (UFLS) relays and participation in a UFLS scheme, MW&L is registered through the Western Electricity Coordination Council (WECC) and the North American Electric Reliability Corporation (NERC) as part of the Bulk Electric System (BES). In short, this means that MW&L must comply with all applicable NERC reliability standards.

Under the current definition and implementation of the BES, MW&L is registered as a Distribution Provider (DP) and a Load Serving Entity (LSE). The registration status of an entity determines the reliability standards that apply. However, requirements surrounding the BES are in flux and have changed year to year. The most recent change involved the NERC Risk-Based Registration (RBR) Initiative, approved March 19, 2015 by the Federal Energy Regulatory Commission (FERC). RBR sought to ensure, through a consistent approach to risk assessment and registration, that the right

entities are subject to the right set of applicable reliability standards. The direct effects of RBR on MW&L were:

- MW&L is no longer registered as a Purchasing-Selling Entity (PSE)
- Reliability Standard PRC-005, dealing with protection systems for BES elements and transmission and generation protection system maintenance and testing, has been included on the list of reliability standards potentially applicable to MW&L

MW&L staff is aware of these changes. We have reviewed available MW&L self-certification compliance documentation and believe to our best engineering knowledge that MW&L has met reasonable expectation for compliance. Due to the constantly changing nature of the standards, definitions, and interpretations we feel MW&L staff should be cognizant of the following:

- While NERC is the creator and steward of the applicable reliability standards and FERC approves and gives orders to NERC, WECC is the regional organization tasked with enforcing and auditing compliance in the western United States. WECC has several tools on its website that can be used to determine applicable standards, and publishes a list of reliability standards subject to active monitoring each year.
- PRC-005 is on the actively monitored list for 2015. While MW&L does not currently have any transmission or generation protection systems that affect the reliability of the BES, this interpretation could be subject to change with future transmission configuration changes on the BPA side and/or changes in transmission relaying related to MW&L owned breakers B-712, B-713, and B-710.
- PRC-008, UFLS Equipment Maintenance Programs, is also on the actively monitored list for 2015.
- The definition of "Protection System" as used in the reliability standards changed on 4/1/2013 to more explicitly define the component parts that need to be tested. A protection system has been defined to include not just the protective relay but also the voltage/current sensors, AC/DC power systems, batteries, and associated wiring. This specifically applies to the testing of MW&L UFLS relays and associated equipment. The definition is available at the following URL:
http://www.nerc.com/files/glossary_of_terms.pdf

SPILL PREVENTION CONTROL AND COUNTERMEASURES (SPCC) PLAN REVIEW

As a part of this project the SPCC plans identified in the scope of work have been reviewed, revised, and certified. These documents have been provided and are on file with the MW&L.

CHAPTER 6

POWER FLOW ANALYSIS

In order to analyze the anticipated load growth and peak demands used in this Long Range Plan, a power flow analysis was performed. The main goals of the power flow analysis were:

- Determine if the MW&L system has adequate capacity under normal operating conditions to serve existing loads with no overload or undervoltage conditions
- Evaluate the adequacy of the system to accommodate future demand growth
- Evaluate the ability of the system to deal with loss of a single transformer or single feeder, with load appropriately sectionalized to other sources.
- Provide a review of power factor on all feeders

A. METHOD

The MW&L electric system (distribution substations and feeders) was modeled based on the following data:

- The existing MW&L *Windmil* distribution system model, provided by MW&L staff.
- BPA point-of-delivery (POD) meter data and MW&L SCADA and device data for the system, substations, and feeders. After peak coincident loading and power factor was determined for each feeder, load was allocated based on customer billing data using the load allocation tool in the *Windmil* software.
- Voltage at all substations was set to match existing voltage regulator settings or BPA delivery voltage. All substations were set at 123.5 V except for Windishar #1 which was set at 120.
- A coincidental distribution system peak demand of 106.3 MW (December 2009) was used for the Base Case.
- In the five-year growth case, a system peak demand of 119.7 MW was modeled based on the load forecast projections in Chapter 3.
- In the ten-year growth case, a system peak demand of 130.2 MW was modeled based on the load forecast projections in Chapter 3.
- To assess the loss of a substation transformer, the system was modeled under Base Case conditions with each substation transformer individually removed from service and load transferred to adjacent substation feeders. These cases are discussed in Section D of this chapter.

- To assess the loss of a feeder, the system was modeled under Base Case conditions with each feeder circuit removed individually from service and its load transferred to adjacent feeder circuit(s). These cases are discussed in Section D of this chapter.

B. EVALUATING POWER FLOW RESULTS

In general, caution should be practiced when interpreting system problems indicated by the power flow analysis. Power flow results typically identify system problems such as heavily loaded or overloaded conductors and undervoltage conditions. The modeled conditions are the result of analysis under peak demand or other 'worst case' conditions that may be considered extreme. The goal is to evaluate system operation under realistic worst-case conditions. It is recommended that where problems are noted, MW&L should verify that the actual system components and conditions support the analysis conclusions. The peak demand conditions modeled have occurred in the past and the system must be designed to meet the historical peak demand as well as the projected future peaks, even if these events do not occur frequently.

As with any model, the results will only be as accurate as the data used. If there is inaccuracy in the map compilation or any parameter of the data characteristics, there will be inaccuracy in the results.

C. POWER FLOW LOAD ALLOCATION AND RESULTS

BASE CASE

The Base Case Peak Winter Load power flow analysis was performed on the existing system in its normal configuration. A coincidental peak demand of 106.3 MW was modeled based on load and power factor data from BPA metering, the MW&L SCADA system, and information from MW&L staff.

The results of this analysis indicate that there are no conductor overload problems and only minor voltage violations under these conditions. The only undervoltage violations, as low as 116 V on a 120 V base, can occur at peak loading for the customers that are located on Peavine Road line (Feeder 71) but not past the Peavine line voltage regulator.

Some individual circuits including feeders 11 and 52 have power factors less than 0.97, but these feeders are very lightly loaded and the power factor at each respective BPA POD is acceptable. The feeder loading (kW) and power factor modeled for the Base Case are shown in Table 6-1.

Feeders 34, 51, and 53 are all loaded above 300 A, the preferred maximum feeder loading for normal peak conditions as outlined in the planning criteria. No new loads should be added to these circuits and an effort should be made to transfer some existing load to surrounding circuits so the system is better balanced between feeders. Feeders 24, 31, 54, 62, and 65 are all heavily loaded circuits but still remain under the planning threshold at peak.

Peak load at Booth Bend and Baker Creek substations exceeded 20 MW. Based on the criteria provided in Chapter 4, it is recommended that load be moved from Booth Bend and Baker Creek substations to surrounding substations. Additionally, attempts should be made to allocate future growth to different substations or shift more load as it occurs.

**Table 6-1
Base Case Power Flow Details**

Substation	Sub Load (kW)	Feeder	Fdr Load (kW)	PF (%)	Amps
McMinnville 2 (20/27/33/37)	6,329	11	456	56.9%	21
		12	1,003	99.8%	46
		13	3,376	99.2%	156
		14	1,494	99.1%	69
McMinnville 1 (12/16/20)	13,334	21	1,490	98.1%	69
		22	4,287	99.8%	198
		23	1,635	98.4%	76
		24	5,922	99.9%	274
Windishar #1 (20/27/33)	19,223	31	5,765	99.8%	267
		32	2,199	99.7%	102
		33	4,266	98.5%	198
		34	6,992	99.7%	324
Walnut City (20/27/33/37)	11,999	41	1,658	98.4%	77
		42	2,250	99.0%	104
		44	4,472	99.7%	207
		45	3,619	99.5%	168
Booth Bend (20/27/33/37)	23,548	51	8,660	99.8%	401
		52	917	84.0%	42
		53	7,632	99.3%	353
		54	6,339	99.3%	294
Baker Creek (20/27/33)	23,394	62	6,156	99.6%	285
		63	4,462	99.3%	207
		65	6,204	99.6%	287
		66	6,573	99.7%	304
Gormley (20/27/33)	8,545	71	5,009	99.2%	232
		72	1,531	96.3%	71
		73	2,005	100.0%	93

FIVE-YEAR GROWTH (2020)

The five-year growth on the McMinnville System is outlined in Table 6-2. The amount of growth was determined using the load forecast in Chapter 3. In order to be conservative and provide a worst-case outlook, the high growth case was used. Areas of likely growth were determined using maps and information supplied by MW&L staff. The feeder loading (kW) and power factor modeled for the Five-Year Growth Case are shown in Table 6-3.

In addition to the comments made for the Base Case, the results of this analysis indicate the following potential issues:

- Feeders 31, 34, 62, and 65 are all expected to see significant load growth and are heavily loaded under existing peak conditions.
- **Feeder 51:** With an additional 3 MW of peak load on Feeder 51, the main backbone 336.4 AAC conductor will be loaded to 83% of winter capacity and minor voltage violations may be experienced past switch L137 on 3-Mile Lane. In the conditions studied, Feeder 51 is the most heavily loaded circuit in the whole McMinnville distribution system. As expected growth occurs in this area, the circuits should be reconfigured so that new and existing load is allocated to different circuits (such as 11 and 21).

**Table 6-2
Five-Year Growth Case (2020)**

Growth Description	Load Type	Feeder(s)	Added Load (Peak kW)	Amps
Baker Creek Area	Residential, Commercial	62	500	23.15
		65	1000	46.3
West 2nd Street	Residential	41	1500	69.45
		44	500	23.15
3-Mile Lane	Industrial, Commercial	51	3000	138.9
Fox Ridge Rd. Pump Station	Pump Station	62	250	11.57
Grandhaven	Residential	34	750	34.72
		65	750	34.72
Riverside Drive Area	Industrial, Commercial	21	500	23.15
		31	1000	46.3
		32	750	34.72
		33	750	34.72
Misc Growth	Residential, Commercial	52	400	18.52
		63	400	18.52
		71	400	18.52
		72	400	18.52
		73	400	18.52

**Table 6-3
Five-Year Growth Case (2020)**

Substation	Sub Load (kW)	Feeder	Fdr Load (kW)	PF (%)	Amps
McMinnville 2 (20/27/33/37)	6,329	11	456	56.9%	21
		12	1,003	99.8%	46
		13	3,376	99.2%	156
		14	1,494	99.1%	69
McMinnville 1 (12/16/20)	13,834	21	1,990	98.1%	92
		22	4,287	99.8%	198
		23	1,635	98.4%	76
		24	5,922	99.9%	274
Windishar #1 (20/27/33)	22,473	31	6,765	99.8%	313
		32	2,949	99.7%	137
		33	5,016	98.5%	232
		34	7,742	99.7%	358
Walnut City (20/27/33/37)	13,999	41	3,158	98.4%	146
		42	2,250	99.0%	104
		44	4,972	99.7%	230
		45	3,619	99.5%	168
Booth Bend (20/27/33/37)	26,948	51	11,660	99.8%	540
		52	1,317	84.0%	61
		53	7,632	99.3%	353
		54	6,339	99.3%	294
Baker Creek (20/27/33)	26,294	62	6,906	99.6%	320
		63	4,862	99.3%	225
		65	7,954	99.6%	368
		66	6,573	99.7%	304
Gormley (20/27/33)	9,745	71	5,409	99.2%	250
		72	1,931	96.3%	89
		73	2,405	100.0%	111

TEN-YEAR GROWTH CASE (2025)

The ten-year growth on the McMinnville System is outlined in Table 6-4. The amount of growth was determined using the load forecast in Chapter 3. In order to be conservative and provide a worst-case outlook, the high growth case was used. Areas of likely growth were determined using maps and information supplied by MW&L staff. The feeder loading (kW) and power factor modeled for the Ten-Year Growth Case are shown in Table 6-5.

In addition to the comments made for the Base Case and Five-Year Growth Case, the results of this analysis indicate the following potential issues:

McMINNVILLE WATER & LIGHT
M E M O R A N D U M

TO: Sam Justice, MW&L General Counsel

DATE: April 2, 2019

FROM: Jaime Phillips, Senior Power Analyst, MW&L

RE: Baker Creek Substation

As Senior Power Analyst, I have a primary role in planning, directing, implementing, and managing the MW&L power supply program. I also manage the MW&L electric cost of service and rate design process. I report directly to the General Manager and work closely with the Senior Electrical Engineer and Electric Division Director. I write this memo to address the impact of anticipated load growth on our electric infrastructure, specifically the need for expansion of the Baker Creek substation.

The Baker Creek substation was built in 2000 to serve the area on the northwest side of the MW&L service territory. The existing transformer has a rating of 20/27/33 MVA. MW&L uses 20 MVA as its maximum load criteria. This maximum load rating ensures that there is adequate capacity on the substation transformers in case of emergency load. During a load emergency, MW&L may shift load from the overburdened substation to other substations and the load capacity rating above the 20 MVA base is reserved for to carry such an emergency load.

MW&L is a winter peaking electric system, with peak demand events predominantly caused by cold temperatures and residential load. There is a strong correlation between extreme cold temperatures and winter peak loading on the MW&L electric system. The Baker Creek substation has an average winter peak of approximately 20 MVA. In the winters of 2011 and 2013 loading on the existing transformer at Baker Creek exceeded 27 MVA.

City of McMinnville development projections show a residential build out potential of an estimated 772 additional units in west McMinnville. This appears likely to occur within the next five years. With a demand of 8 kW per unit, this translates to approximately 6 MVA of additional demand at the Baker Creek substation, pushing the peak load on the transformer well above the 20 MVA base rating. After build out of the additional units, the ability of the Baker Creek substation to respond to an emergency load event will be degraded. Commercial property and school district (high school and elementary school) development in the area of the substation will also create additional load growth. For example, the current McMinnville High School has the potential to create an additional 1-2 MVA of demand in a winter peaking scenario.

In 2015 McMinnville Water and Light (MW&L) commissioned Tri-Axis Engineering to update its Electric System Planning Study. The Tri-Axis study foresaw the potential load growth on the west side of McMinnville and recommended alternatives to accommodate this growth. One alternative was to expand the Baker Creek substation and add a second 20/27/33/38 MVA power transformer. According to the 2015 engineering study, the expansion of the Baker Creek substation was the least-cost alternative to accommodate the expected load growth. MW&L establishes its electric rates based on cost-of-service analysis. Lower capital improvement costs will translate to a lesser impact on electric rates.

The additional transformer at the Baker Creek substation will allow the substation to operate under the 20 MVA criteria threshold well into the future while at the same time accommodating continued development of residential, commercial, and publicly owned properties.

BLANK



230 NE Second Street • McMinnville, Oregon 97128 • www.ci.mcminnville.or.us

November 24, 1999

John Harshman
McMinnville Water and Light
P O Box 638
McMinnville OR 97128

Dear Mr. Harshman:

This is to advise you that at a meeting of the McMinnville Planning Commission on Thursday, November 18, 1999, your application for a conditional use permit to allow the construction of an electrical substation facility on a lot some 60 by 160 feet located north of Baker Creek Road and within the existing BPA transmission line easement and more specifically described as Tax Lot 101, Section 18, T. 4 S., R. 4 W., W.M., was presented and carefully studied.

Based on the materials submitted by the applicant, the testimony received, the findings of fact, and the conclusionary findings for approval, the Planning Commission voted to approve your conditional use application subject to the following conditions:

1. That the applicant submit to the McMinnville Landscape Review Committee for review and approval a detailed landscape and irrigation plan prior to issuance of any building permits for the proposed facility. Eight-foot high cyclone fencing shall be provided and secured access gates shall be installed so as to prohibit direct public access from all sides. Such fencing shall be set back a minimum of 20 feet from the Baker Creek Road right-of-way. Vegetative screening in the form of an evergreen hedge or similar planting material shall be placed along the site's perimeter within a landscape strip a minimum of five feet in width. Extensive landscaping to include trees and screening shall be provided along the site's southern perimeter. All trees to be planted along the site's Baker Creek Road frontage shall have a two-inch minimum caliper, exhibit size and growing characteristics appropriate for a particular planting area, and be spaced as appropriate for the selected species and as may be required for the location of underground utilities, above-ground utility vaults, transformers, light poles, and hydrants. All required landscaping and irrigation shall be installed prior to use of the substation.

Community Development Department
Planning Department (503) 434-7311 FAX (503) 472-4104

2. That all outside lighting shall have hoods or shall be "shoebox" type fixtures that will direct light beams both downward and away from neighboring residentially planned property.
3. That signage shall be limited to a maximum of one free-standing sign not more than two square feet in area. The sign, if illuminated, must be indirectly illuminated and non-flashing.
4. Construction of the proposed substation will require the applicant to gain a fill and grading permit from the City Building Division. All fill placed in the areas where building sites are expected shall be engineered and shall meet with the approval of the City Building Division and the City Engineering Department.
5. That the applicant shall dedicate sufficient public right-of-way along the subject site's southern frontage to provide 50-feet from the centerline of Baker Creek Road. A waiver of remonstrance against assessment for the future improvement of Baker Creek Road shall be signed by the property owner. Said waiver shall be prepared by the City.
6. That the proposed entry drive to the facility from Baker Creek Road shall be paved.

Pursuant to the Zoning Ordinance of the City of McMinnville, an application approved by the Planning Commission may be appealed within fifteen (15) days of the day of such approval to the City Council. If no appeal is filed with the City Recorder on or before December 3, 1999, the decision of the Planning Commission will be final.

If you have any questions or comments, please call me at (503) 434-7311.

Sincerely,



Doug Montgomery, AICP
Planning Director

DRM:ral

After recording, return to:
McMinnville Water & Light
P.O. Box 638, 855 Marsh Lane
McMinnville, OR 97128

Send tax Statements to:
No change.

Yamhill County Official Records	201900620
DMR-EDMR	
Stn=3 SUTTONS	01/15/2019 04:03:00 PM
6Pgs \$30.00 \$11.00 \$5.00 \$60.00	\$106.00
I, Brian Van Bergen, County Clerk for Yamhill County, Oregon, certify that the instrument identified herein was recorded in the Clerk records.	
Brian Van Bergen - County Clerk	

EASEMENT

THIS EASEMENT, is made this 14th day of January, 2019, by and between Baker Creek Development LLC an Oregon limited liability company, hereinafter called the Grantor, and the City of McMinnville, a Municipal Corporation of the State of Oregon, acting by and through its WATER & LIGHT COMMISSION, hereinafter called MW&L.

WITNESSETH:

WHEREAS: The Grantor is the record owner of the following described real estate in Yamhill County, State of Oregon, to-wit:

All that portion of the following described tract lying North of Baker Creek Road: Commencing at the Northeast corner of Section 18, Township 4 South, Range 4 West of the Willamette Meridian in Yamhill County, Oregon, which place of beginning is also the Northeast corner of the T.J. Shadden Donation Land Claim; thence South 39.30 chains; thence West 38.16 chains to the center of the County Road; thence North 39.31 chains to the Northwest corner of the lands formerly owned by William L. Toney as described in deed recorded in Volume "W", Page 20, Yamhill County Deed Records, said corner being also on the North line of Section 18; thence East 38.16 chains to the place of beginning.

EXCEPTING THEREFROM a parcel of land located in the T.J. Shadden Certificate Claim No. 18 in the Northeast Quarter of Section 18, in Township 4 South, Range 4 West of the Willamette Meridian in Yamhill County, Oregon that is more particularly described as follows:

Beginning at a 5/8 inch iron rod on the East section line of Section 18, said iron rod being South 00°08'00" East 716.65 feet from the Northeast corner of Section 18, Township 4 South, Range 4 West of the Willamette Meridian in Yamhill County, Oregon; thence South 89°52'00" West 323.00 feet to a 5/8 inch iron rod; thence South 00°08'00" East 725.16 feet, more or less, to the North line of Baker Creek Road; thence South 84°16'23" East along said North line 324.69 feet, more or less, to the East line of Section 18; thence North 00°08'00" West along said East line 758.31 feet, more or less, to the place of beginning.

FURTHER EXCEPTING those parcels conveyed to VJ-2 Development, Inc., in the following: deed recorded January 28, 1997 as Instrument No. 199701382; deed recorded January 26, 1998 as Instrument No. 199801435; and deed recorded February 5, 1999 as Instrument No. 199902487.

FURTHER EXCEPTING that parcel conveyed to the City of McMinnville in that dedication deed recorded August 10, 2017 as Instrument No. 201713023, Yamhill County Deed Records.

FURTHER EXCEPTING that parcel conveyed to the City of McMinnville in that dedication deed recorded September 10, 2018 as Instrument No. 201812980, Yamhill County Deed Records. Attachment 7, MW&L Applications

FIRST AMERICAN TITLE 3/2/19/18

as being South 00°08'00" East 691.80 feet and South 89°52'00" West 323.00 feet and South 00°08'00" East 724.19 feet and North 84°07'51" West 1211.13 feet from the northeast corner of said Section 18, said point being on the north right of way line of N.W. Baker Creek Road 30.00 feet at a perpendicular distance Northerly of the centerline of said road; thence South 84°07'51" East 37.69 feet along said north right of way to the TRUE POINT OF BEGINNING of this description; and running thence:

North 84°07'51" West 211.08 feet along said north right of way;
thence leaving said north right of way, North 0°02'49" East 242.92 feet;
thence South 89°57'11" East 210.00 feet;
thence South 0°02'49" West 264.33 feet to the TRUE POINT OF BEGINNING,
containing 1.223 acres of land, more or less.

Bearings are based on Yamhill County Survey No. 10616 (along the centerline of N.W. Baker Creek Road).

and has the unrestricted right to grant the easement hereinafter described relative to said real estate;

NOW, THEREFORE, for good and valuable consideration; the receipt of which is hereby acknowledged, the Grantor does hereby grant and convey unto MW&L: A perpetual easement to construct, maintain, re-construct, improve, repair and replace, operate, and make connections to an electric distribution system and related equipment, including but not limited to: conduit, transformers, vaults, primary conductors, secondary conductors, and meters ("the facilities").

Easement is for a right-of-way over, under and across Grantor's real estate described above and said easement is more particularly described as follows:

See the Attached **EXHIBIT A** for a description of both "BUMP OUT" EASEMENTS."

The easements are also as shown on the map attached hereto as **EXHIBIT B**. This Exhibit B is offered only for reference. Exhibit A controls.

MW&L shall have all rights of unobstructed ingress and egress to and from said easement (including the right to cut, trim and remove trees, bushes, brush, overhanging branches and other obstructions) necessary for the MW&L's use, operation and maintenance of the facilities and easement use hereby granted and all rights and privileges incident thereto.

The Grantor reserves the right to use the surface of the above-described easement, except Grantor shall not have the right to construct or locate any structures within the easement area.

The Grantor and the MW&L agree that the Grantor shall not have the authority to grant to any other third party, an easement over, under or through the easement area described above, without MW&L's written consent thereto. Any consent by the MW&L to a third party easement shall be subject to conditions required by MW&L to protect the MW&L's facilities line and the MW&L's unobstructed access to such facilities. The MW&L may require that all costs incurred by reason of the presence of such third party utility be borne by such third party upon the repair, replacement, construction or reconstruction of the MW&L's utility improvements.

The Grantor hereby covenants to and with the MW&L, its successors and assigns, that Grantor is lawfully seized and possessed of the real premises and that the Grantor

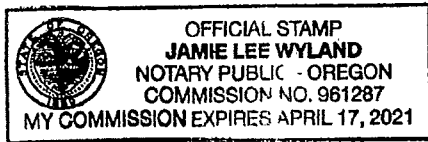
IN WITNESS WHEREOF, the parties hereto have subscribed this instrument on this, the day and year first hereinabove written.

Gordon C. Root

Gordon C. Root, Manager

STATE OF OREGON)
County of Oachamas) Ss.

This record was acknowledged before me on Jan 14, 2019 by Gordon C. Root as Manager of Baker Creek Development LLC, an Oregon limited liability company.



Before *Jamie Lee Wyland* me:

Notary Public for Oregon
My Commission Expires: 4/17/21

Statement of acceptance:

Scott A. Hill
Scott A. Hill
Mayor & Ex-Officio Member of
the Water & Light Commission

ATTESTED BY:

Trena McManus
Trena McManus
Clerk of Commission

STATE OF OREGON)
County of Yamhill) Ss.

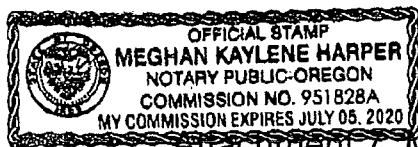
This record was acknowledged before me on January 7, 2019 by SCOTT A. HILL as MAYOR and Ex-Officio Member of the Water and Light Commission.



Before me: *M Harper*
Notary Public for Oregon
My Commission Expires: 7/5/20

STATE OF OREGON)
County of Yamhill) Ss.

This record was acknowledged before me on January 7, 2019 by Trena McManus as Clerk of the Water and Light Commission.



Before *M Harper* me:
Notary Public for Oregon
My Commission Expires: 7/5/20

IN WITNESS WHEREOF, the parties hereto have subscribed this instrument on this, the day and year first hereinabove written.

STATE OF OREGON)
) Ss.
County of _____)

Gordon C. Root, Manager

This record was acknowledged before me on _____, 201__ by Gordon C. Root as Manager of Baker Creek Development LLC, an Oregon limited liability company.

Before _____ me:

Notary Public for Oregon
My Commission Expires: _____

Statement of acceptance:

Scott A. Hill
Scott A. Hill
Mayor & Ex-Officio Member of
the Water & Light Commission

ATTESTED BY:
Trena McManus
Trena McManus
Clerk of Commission

STATE OF OREGON)
) Ss.
County of Yamhill)

This record was acknowledged before me on January 7, 2019 by SCOTT A. HILL as MAYOR and Ex-Officio Member of the Water and Light Commission.



Before me:
M Harper
Notary Public for Oregon
My Commission Expires: 7/5/20

STATE OF OREGON)
) Ss.
County of Yamhill)

This record was acknowledged before me on January 7, 2019 by Trena McManus as Clerk of the Water and Light Commission.



Before _____ me:
M Harper
Notary Public for Oregon
My Commission Expires: _____ Page 4

EXHIBIT A

TRACT I

A 15.00 foot wide strip of land situated in the northeast one quarter of Section 18, Township 4 South, Range 4 West of the Willamette Meridian, Yamhill County, Oregon, more particularly described as follows:

Beginning at a point that is 58.00 feet Northerly of and opposite Centerline Station 8+52.77 of the herein described centerline of N.W. Baker Creek Road; and running thence:
North 82°10'07" West 20.00 feet parallel with said centerline;
thence N07°49'53" East 15.00 feet;
thence South 82°10'07" East 20.00 feet parallel with said centerline;
thence South 07°49'53" West 15.00 feet to the Point of Beginning, containing 300 square feet of land, more or less.

TRACT II

A 15.00 foot wide strip of land situated in the northeast one quarter of Section 18, Township 4 South, Range 4 West of the Willamette Meridian, Yamhill County, Oregon, more particularly described as follows:

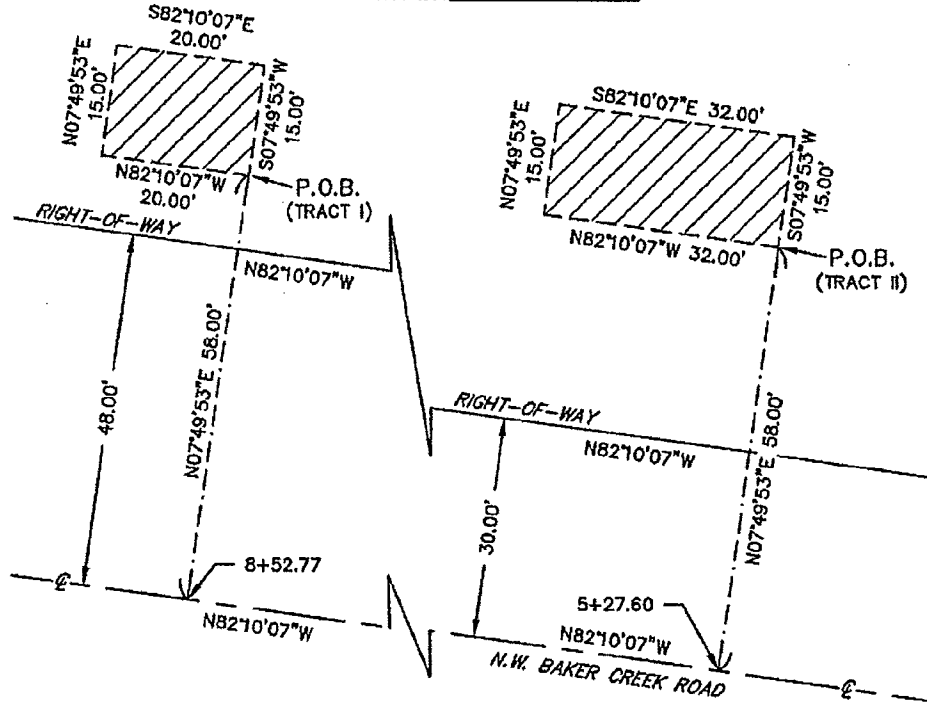
Beginning at a point that is 58.00 feet Northerly of and opposite Centerline Station 5+27.60 of the herein described centerline of N.W. Baker Creek Road; and running thence:
North 82°10'07" West 32.00 feet parallel with said centerline;
thence N07°49'53" East 15.00 feet;
thence South 82°10'07" East 32.00 feet parallel with said centerline;
thence South 07°49'53" West 15.00 feet to the Point of Beginning, containing 480 square feet of land, more or less.

The centerline of Baker Creek Road is described as follows:

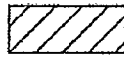
Beginning at the centerline station 0+00.00, from which the centerline intersection of Baker Creek Road and N.W. Meadows Drive bears South 82°10'07" East, a distance of 115.50 feet, monumented by a 5/8" iron rod, with yellow plastic cap inscribed "BARKER PLS 636";
thence North 82°10'07" West, a distance of 982.02 feet, to the intersection of Baker Creek Road and NW Hill Road, from which a 5/8" iron rod, with a yellow plastic cap inscribed "BARKER PLS 636" bears North 02°15'10" East, a distance of 30.22 feet;
thence continuing North 82°10'07" West, a distance of 12.80 feet at centerline station 9+94.84;
thence North 07°49'53" East, a distance of 5.19 feet at Centerline Station 10+00.00;
thence North 83°00'12" West, a distance of 334.21 feet to the Point of Curve at Centerline Station 13+34.20, of a 280.00 foot radius tangent curve to the right;
thence along said curve, through central angle of 58°45'54", a distance of 287.17 feet (chord bears North 53°37'15" West, a distance of 274.76 feet) at centerline station 16+21.38;
thence North 24°14'18" West, a distance of 78.62 feet at Centerline Station 17+00.00, from which a 5/8" iron rod with yellow plastic cap inscribed "BARKER PLS 636" bears South 22°17'11" East, a distance of 115.50 feet to the centerline intersection of Baker Creek Road and N.W. Meadows Drive.

EXHIBIT B

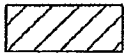
BAKER CREEK DEVELOPMENT, LLC
INST. NO. 201



SCALE: 1" = 20'



- UTILITY EASEMENT (TRACT I)
(300 SQUARE FEET)



- UTILITY EASEMENT (TRACT II)
(480 SQUARE FEET)

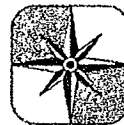
P.O.B. - POINT OF BEGINNING

REGISTERED
PROFESSIONAL
LAND SURVEYOR

Gregory L. Wilson

OREGON
JULY 19, 1994
GREGORY L. WILSON
2687

EXPIRATION DATE: 6/30/2020



**BARKER
SURVEYING**

BARKER SURVEYING
3657 KASHMIR WAY SE
SALEM, OREGON 97317
PHONE (503) 588-8800
FAX (503) 363-2469
EMAIL: INFO@BARKERWILSON.COM

GRANTOR: McMinnville Water and Light
GRANTEE: City of McMinnville, Oregon
CONSIDERATION: None

After recording return to:
City of McMinnville
230 NE 2nd Street
McMinnville Or 97128

Until a change is requested, all
tax statements shall be sent to
the following address: No
change

Yamhill County Official Records	201900623
DMR-DDMR	
Stn=3 SUTTONS	01/15/2019 04:20:00 PM
6Pgs \$30.00 \$11.00 \$5.00 \$60.00	\$106.00
I, Brian Van Bergen, County Clerk for Yamhill County, Oregon, certify that the Instrument Identified herein was recorded in the Clerk records.	
Brian Van Bergen - County Clerk	

DEDICATION DEED

THE CITY OF McMINNVILLE, a Municipal Corporation of the State of Oregon, acting by and through its Water and Light Commission GRANTOR(S), conveys, and dedicates to the PUBLIC, a perpetual right-of-way for roadway, pedestrian and public utility purposes, as described in Exhibits "A" and shown on Exhibit "B", attached hereto and incorporated herein by this reference.

The true and actual consideration for this conveyance is NONE.

The above described property is conveyed free of encumbrances, except as specifically set forth.

The Grantor(s) hereby covenant that the Grantor(s) are lawfully seized of the estate in the property, that the Grantor(s) have good right to convey the same, that at the time of the delivery of the deed the property is free from encumbrances except as specifically set forth on the deed, and that the Grantor(s) warrant and will defend the title to the property against all persons who may lawfully claim the same.

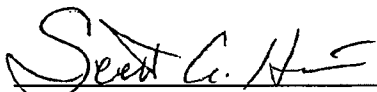
BEFORE SIGNING OR ACCEPTING THIS INSTRUMENT, THE PERSON TRANSFERRING FEE TITLE SHOULD INQUIRE ABOUT THE PERSON'S RIGHTS, IF ANY, UNDER ORS 195.300, 195.301 AND 195.305 TO 195.336 AND SECTIONS 5 TO 11, CHAPTER 424, OREGON LAWS 2007, SECTIONS 2 TO 9 AND 17, CHAPTER 855, OREGON LAWS 2009, AND SECTIONS 2 TO 7, CHAPTER 8, OREGON LAWS 2010. THIS INSTRUMENT DOES NOT ALLOW USE OF THE PROPERTY DESCRIBED IN THIS INSTRUMENT IN VIOLATION OF APPLICABLE LAND USE LAWS AND REGULATIONS. BEFORE SIGNING OR ACCEPTING THIS INSTRUMENT, THE PERSON ACQUIRING FEE TITLE TO THE PROPERTY SHOULD CHECK WITH THE APPROPRIATE CITY OR COUNTY PLANNING DEPARTMENT TO VERIFY THAT THE UNIT OF LAND BEING TRANSFERRED IS A LAWFULLY ESTABLISHED LOT OR PARCEL, AS


1 OF 6 - DEDICATION DEED

FIRST AMERICAN TITLE 3/21/18

DEFINED IN ORS 92.010 OR 215.010, TO VERIFY THE APPROVED USES OF THE LOT OR PARCEL, TO DETERMINE ANY LIMITS ON LAWSUITS AGAINST FARMING OR FOREST PRACTICES, AS DEFINED IN ORS 30.930, AND TO INQUIRE ABOUT THE RIGHTS OF NEIGHBORING PROPERTY OWNERS, IF ANY, UNDER ORS 195.300, 195.301 AND 195.305 TO 195.336 AND SECTIONS 5 TO 11, CHAPTER 424, OREGON LAWS 2007, SECTIONS 2 TO 9 AND 17, CHAPTER 855, OREGON LAWS 2009, AND SECTIONS 2 TO 7, CHAPTER 8, OREGON LAWS 2010."

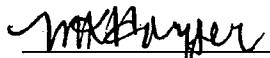
Dated this 7 day of January, 2019.

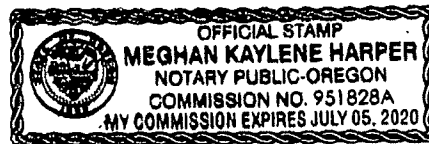

Name: Scott A. Hill
Title: Mayor and Ex-Officio Member of the Water and Light Commission

Attested By:

Name: Trena McManus
Title: Clerk of the Water and Light Commission

State of Oregon) SS.
County of Yamhill)

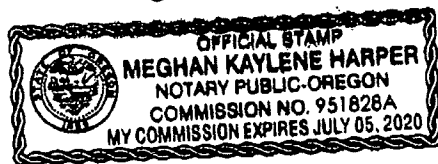
This record was acknowledged before me on January 7, 2019 by Scott A. Hill, as mayor and ex-officio member of the Water and Light Commission.

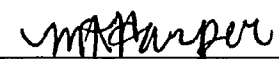

Notary Public for Oregon
My Commission Expires: 7/5/20



State of Oregon) SS.
County of Yamhill)

This record was acknowledged before me on January 7, 2019 by Trena McManus, as clerk of the Water and Light Commission.




Notary Public for Oregon
My Commission Expires: 7/5/20

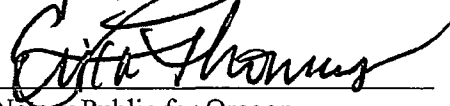
APPROVAL OF CONVEYANCE (ORS 93.808)

The City of McMinnville hereby approves of this conveyance and accepts title.


Name: Jeff Towery
Title: City Manager

State of Oregon) SS.
County of Yamhill)

This record was acknowledged before me on January 8, 2019 by Jeff Towery as
City Manager of the City of McMinnville.


Notary Public for Oregon
My Commission
Expires: 12-11-20

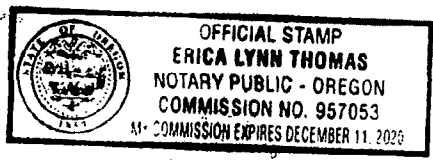


EXHIBIT A (page 1 of 2)

An 18.00 foot wide strip of land situated in the northeast one-quarter of Section 18, Township 4 South, Range 4 West of the Willamette Meridian, Yamhill County, Oregon, more particularly described as follows:

Beginning at the southeast corner of that property described in that instrument recorded as Instrument No. 2002008810, Yamhill County Deed Records, said point recorded as being South 00°08'00" East 691.80 feet and South 89°52'00" West 323.00 feet and South 00°08'00" East 724.19 feet and North 84°07'51" West 1211.13 feet from the northeast corner of said Section 18, said point being on the north right of way line of N.W. Baker Creek Road at a perpendicular distance of 30.00 feet Northerly from the centerline of said road; thence South 82°10'07" East 37.69 feet along said right of way to the southeast corner of that property described in that instrument recorded in Inst. No. 2019-00618 _____, Yamhill County Deed Records and the True Point of Beginning of this description; and running thence:

North 82°10'07" West 211.08 feet along said right of way to southwest corner of said property; thence North 02°00'32" East 18.09 feet along the west line of said property to a point that is 48.00 feet at a perpendicular distance Northerly from said centerline; thence South 82°10'07" East 211.08 along a line parallel with said centerline to a point on the east line of said property; thence South 02°00'32" West 18.09 feet along said east line to the True Point of Beginning, containing 3800 square feet of land, more or less.

Bearings are based on Yamhill County Survey No. 13244 (along the centerline of N.W. Baker Creek Road).

Exhibit A (page 2 of 2)

SAVE AND EXCEPT the following encumbrances noted as exceptions in First American Title Insurance Company report, Order No.: 1031-3121918:

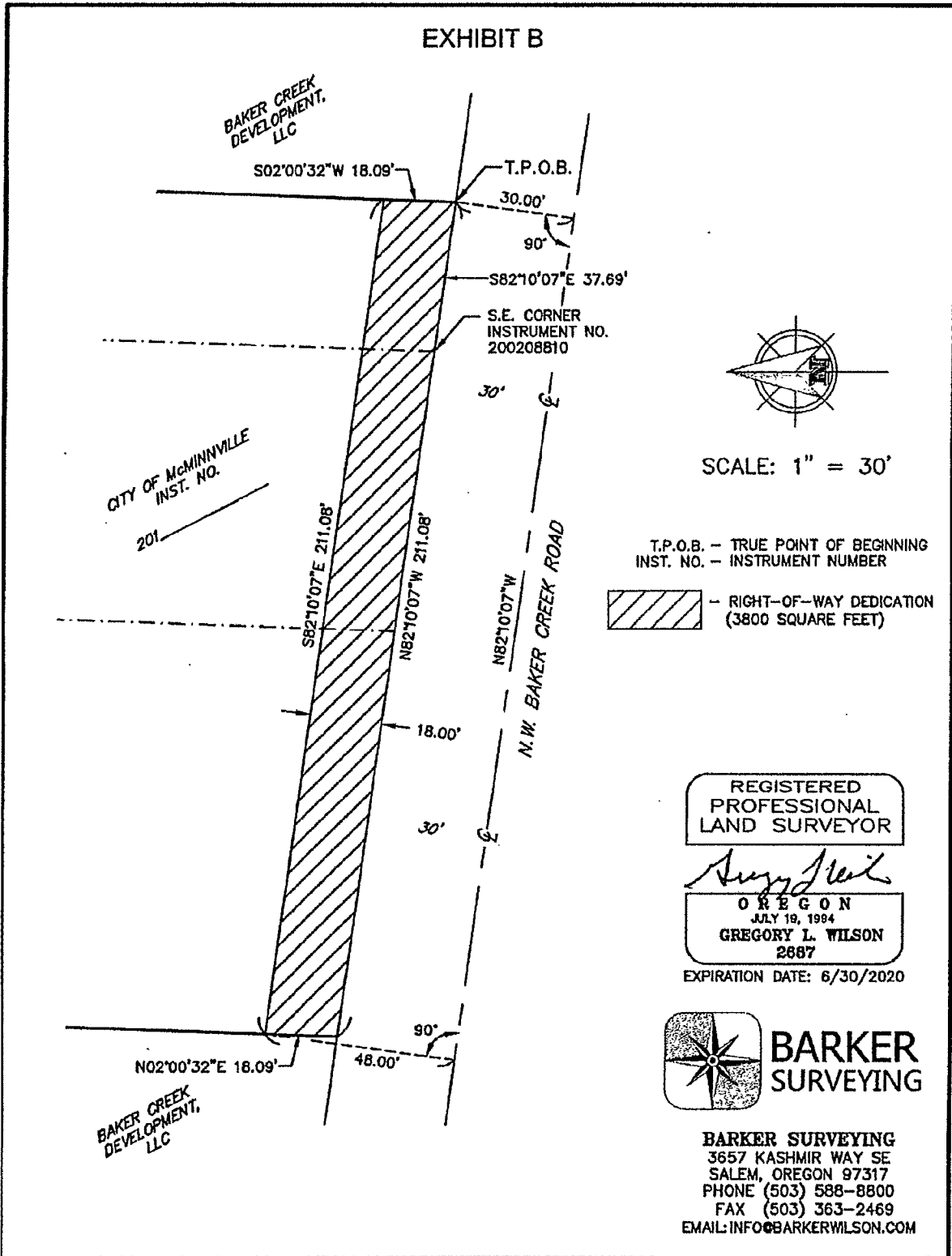
14. Right to enter and erect, operate, maintain, repair, rebuild and patrol one or more electric power transmission lines and appurtenant signal lines, wires, cables and appliances necessary in connection therewith; together with right to clear said parcel and keep same clear of all brush, timber, structures and fire hazards; right to top, limb, fell and remove all growing trees, dead trees and snags (collectively called 'Danger Trees') which could fall on said line.

Recorded: August 12, 1964
Recording Information: Film Volume 39, Page 462, Deed and Mortgage Records
Grantee: The United States of America

15. Right to enter and erect, operate, maintain, repair, rebuild and patrol one or more electric power transmission lines and appurtenant signal lines, wires, cables and appliances necessary in connection therewith; together with right to clear said parcel and keep same clear of all brush, timber, structures and fire hazards; right to top, limb, fell and remove all growing trees, dead trees and snags (collectively called 'Danger Trees') which could fall on said line.

Recorded: October 14, 1964
Recording Information: Film Volume 40, Page 851, Deed and Mortgage Records
Grantee: The United States of America

EXHIBIT B



AFTER RECORDING RETURN TO:

City of McMinnville
230 NE 2nd Street
McMinnville, OR 97128

Yamhill County Official Records **201900622**
DMR-EDMR
Stn=3 SUTTONS **01/15/2019 04:20:00 PM**
4Pgs \$20.00 \$11.00 \$5.00 \$60.00 **\$96.00**

I, Brian Van Bergen, County Clerk for Yamhill County, Oregon, certify that the instrument identified herein was recorded in the Clerk records.
Brian Van Bergen - County Clerk

SEND TAX STATEMENTS TO:

No Change.

UTILITY EASEMENT

THIS INDENTURE MADE and entered into this 7 day of January, 2019 by and between City of McMinnville, a Municipal Corporation of the State of Oregon, acting by and through its Water and Light Commission, hereinafter referred to as the Grantor, and the City of McMinnville, a Municipal Corporation of the State of Oregon, hereinafter referred to as the Grantee.

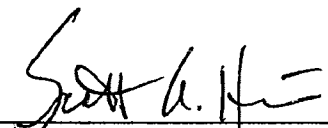
That the Grantors, for and in consideration of the sum of No Dollars, (\$0.00), do hereby grant, bargain, sell and convey unto the Grantee, perpetual easement, as described herein, together with the right to go upon said easement area hereinafter described for the purpose of constructing, reconstructing, maintaining and using **public and franchise utility facilities**, on the following described property, to-wit:

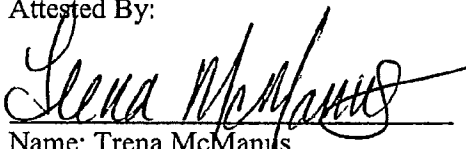
See attached Exhibit "A" for legal description

Said utility easement is also shown on the map attached as **Exhibit "B"**:

TO HAVE AND TO HOLD the above easement to the said Grantee, its successors and assigns forever.

Dated this 7 day of January, 2019.


Name: Scott A. Hill
Title: Mayor and Ex-Officio Member of the Water and Light Commission

Attested By:

Name: Trena McManus
Title: Clerk of the Water and Light Commission

FIRST AMERICAN TITLE 3/21/18

State of Oregon) SS.
County of Yamhill)

This record was acknowledged before me on January 7, 2019 by Scott A. Hill, as mayor and ex-officio member of the Water and Light Commission.



M Harper
Notary Public for Oregon
My Commission Expires: 7/5/20

State of Oregon) SS.
County of Yamhill)

This record was acknowledged before me on January 7, 2019 by Trena McManus, as clerk of the Water and Light Commission.



M Harper
Notary Public for Oregon
My Commission Expires: 7/5/20

APPROVAL OF CONVEYANCE (ORS 93.808)

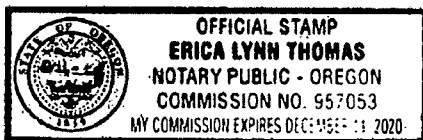
The City of McMinnville hereby approves of this conveyance and accepts title.

[Signature]

Name: Jeff Towery
Title: City Manager

State of Oregon) SS.
County of Yamhill)

This record was acknowledged before me on January 8, 2019 by Jeff Towery as City Manager of the City of McMinnville.



[Signature]
Notary Public for Oregon
My Commission Expires: 12-11-20

EXHIBIT A

A 10.00 foot wide strip of land situated in the northeast one-quarter of Section 18, Township 4 South, Range 4 West of the Willamette Meridian, Yamhill County, Oregon, more particularly described as follows:

Beginning at the southeast corner of that property described in that instrument recorded as Instrument No. 2002008810, Yamhill County Deed Records, said point recorded as being South 00°08'00" East 691.80 feet and South 89°52'00" West 323.00 feet and South 00°08'00" East 724.19 feet and North 84°07'51" West 1211.13 feet from the northeast corner of said Section 18, said point being on the north right of way line of N.W. Baker Creek Road at a perpendicular distance of 30.00 feet from the centerline of said road; thence South 82°10'07" East 37.69 feet along said right of way to the southeast corner of that property described in that instrument recorded in Inst. No.

2019-00618 _____, Yamhill County Deed Records; thence North 02°00'32" East 18.09 feet along the east line of said property to a point that is 48.00 feet at a perpendicular distance Northerly from said centerline and the True Point of Beginning of this description; and running thence:

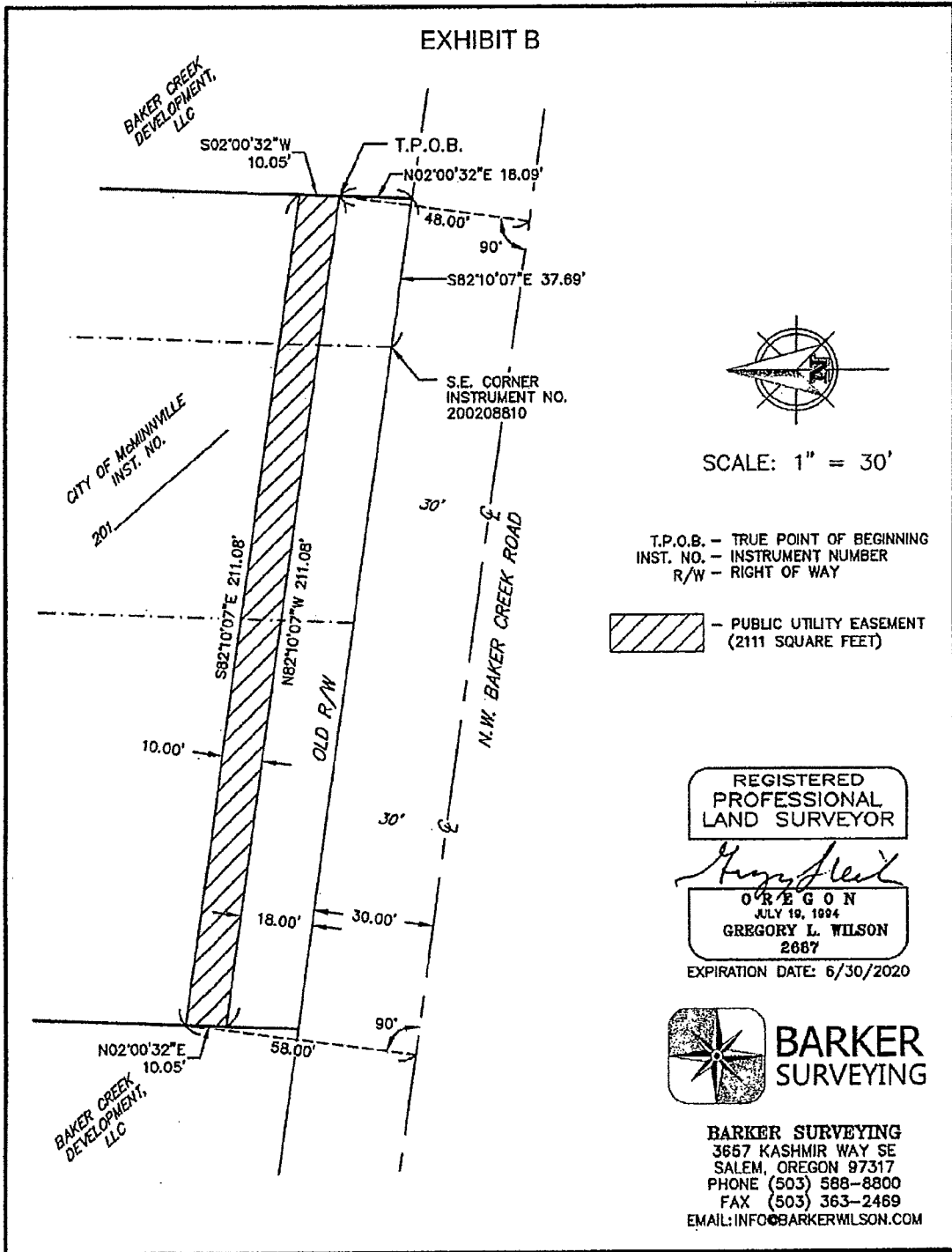
North 82°10'07" West 211.08 feet, parallel with said centerline to a point on the west line of said property;

thence North 02°00'32" East 10.05 feet along said west line to a point that is 58.00 feet at perpendicular distance Northerly from said centerline;

thence South 82°10'07" East 211.08 feet parallel with said centerline to a point on the east line of said property;

thence South 02°00'32" West 10.05 feet along said east line to the True Point of Beginning, containing 2111 square feet of land, more or less.

Bearings are based on Yamhill County Survey No. 10616 (along the centerline of N.W. Baker Creek Road).



Page 4 of 4 Pages - Utility Easement

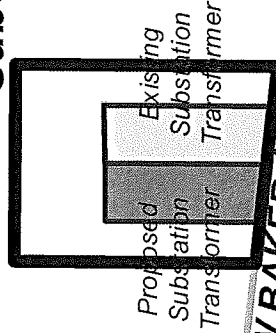


1 inch = 200 feet

GIS MAP AND CONCEPTUAL SITE PLAN

1/24/2019

R4418 00100 Baker Creek Substation



NW BAKER CREEK RD

NW HAUN DR

NW MATEO DR

NW YOHN RANCH DR

NW HAUN DR

NW MEADOWS DR

NW FENDLE WAY

NW GRENFELL LOOP

NW MCGAREY DR

NW 23RD ST

NW HILL RD

BLANK

After recording return to:
McMinnville Water and Light
Attn: Sam Justice
PO Box 638
McMinnville Or 97128

Send Tax Statements to:
No change

Yamhill County Official Records	201900618
DMR-DDMR	
Stn=3 SUTTONS	01/15/2019 04:03:00 PM
6Pgs \$30.00 \$11.00 \$5.00 \$60.00	\$106.00
I, Brian Van Bergen, County Clerk for Yamhill County, Oregon, certify that the instrument identified herein was recorded in the Clerk records.	
Brian Van Bergen - County Clerk	

WARRANTY DEED

Baker Creek Development, LLC, an Oregon limited liability company, GRANTOR, conveys and warrants to the City of McMinnville, a Municipal Corporation of the State of Oregon, acting by and through its **Water and Light Commission**, GRANTEE, the real property in Yamhill County, Oregon, as described as follows:

A tract of land situated in the northeast one quarter of Section 18, Township 4 South, Range 4 West of the Willamette Meridian, Yamhill County, Oregon, more particularly described as follows:

Beginning at the southeast corner of that property described in that instrument recorded as Instrument No. 200208810, Yamhill County Deed Records, said point recorded as being South 00°08'00" East 691.80 feet and South 89°52'00" West 323.00 feet and South 00°08'00" East 724.19 feet and North 84°07'51" West 1211.13 feet from the northeast corner of said Section 18, said point being on the north right of way line of N.W. Baker Creek Road 30.00 feet at a perpendicular distance Northerly of the centerline of said road; thence South 84°07'51" East 37.69 feet along said north right of way to the TRUE POINT OF BEGINNING of this description; and running thence:

North 84 °07'51" West 211.08 feet along said north right of way; thence leaving said north right of way, North 0°02'49" East 242.92 feet; thence South 89°57'11" East 210.00 feet; thence South 0°02'49" West 264.33 feet to the TRUE POINT OF BEGINNING, containing 1.223 acres of land, more or less.

Bearings are based on Yamhill County Survey No. 10616 (along the centerline of N.W. Baker Creek Road).

SAVE AND EXCEPT that real property Grantee currently owns within the above-described real property, as described in document No. 200208810 recorded in property records of Yamhill County, Oregon on May 1, 2002; and as described in the instrument recorded in property records of Yamhill County, Oregon at Film Volume 119, Page 241 on March 31, 1977.

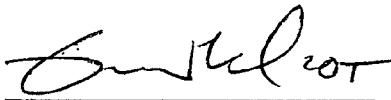
The true and actual consideration in dollars for this conveyance is \$175,000.00.

The above described property is conveyed free of encumbrances, except as specifically set forth herein in **Exhibit A**. This conveyance is made solely as an adjustment of a common boundary

FIRST AMERICAN TITLE 3121918

between adjoining properties pursuant to City of McMinnville boundary line adjustment BLA 10-18 as shown on the map attached as **Exhibit B**.

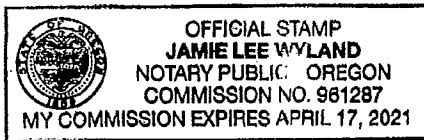
BEFORE SIGNING OR ACCEPTING THIS INSTRUMENT, THE PERSON TRANSFERRING FEE TITLE SHOULD INQUIRE ABOUT THE PERSON'S RIGHTS, IF ANY, UNDER ORS 195.300, 195.301 AND 195.305 TO 195.336 AND SECTIONS 5 TO 11, CHAPTER 424, OREGON LAWS 2007, SECTIONS 2 TO 9 AND 17, CHAPTER 855, OREGON LAWS 2009, AND SECTIONS 2 TO 7, CHAPTER 8, OREGON LAWS 2010. THIS INSTRUMENT DOES NOT ALLOW USE OF THE PROPERTY DESCRIBED IN THIS INSTRUMENT IN VIOLATION OF APPLICABLE LAND USE LAWS AND REGULATIONS. BEFORE SIGNING OR ACCEPTING THIS INSTRUMENT, THE PERSON ACQUIRING FEE TITLE TO THE PROPERTY SHOULD CHECK WITH THE APPROPRIATE CITY OR COUNTY PLANNING DEPARTMENT TO VERIFY THAT THE UNIT OF LAND BEING TRANSFERRED IS A LAWFULLY ESTABLISHED LOT OR PARCEL, AS DEFINED IN ORS 92.010 OR 215.010, TO VERIFY THE APPROVED USES OF THE LOT OR PARCEL, TO DETERMINE ANY LIMITS ON LAWSUITS AGAINST FARMING OR FOREST PRACTICES, AS DEFINED IN ORS 30.930, AND TO INQUIRE ABOUT THE RIGHTS OF NEIGHBORING PROPERTY OWNERS, IF ANY, UNDER ORS 195.300, 195.301 AND 195.305 TO 195.336 AND SECTIONS 5 TO 11, CHAPTER 424, OREGON LAWS 2007, SECTIONS 2 TO 9 AND 17, CHAPTER 855, OREGON LAWS 2009, AND SECTIONS 2 TO 7, CHAPTER 8, OREGON LAWS 2010."

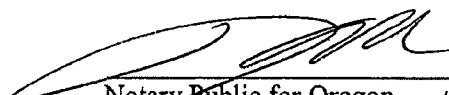

Gordon C. Root, Manager

01/14, 2019

State of Oregon) SS. *sw*
County of ~~Yamhill~~ *Cookman*

This record was acknowledged before me on 1/14/19 by Gordon C. Root as Manager of Baker Creek Development, LLC, an Oregon limited liability company.




Notary Public for Oregon
My Commission Expires: 4/17/21

APPROVAL OF CONVEYANCE (ORS 93.808)

Attested By:

Scott A. Hill

Name: Scott A. Hill
Title: Mayor and Ex-Officio Member of the
Water and Light Commission

Trena McManus

Name: Trena McManus
Title: Clerk of the Water and Light
Commission

State of Oregon) SS.
County of Yamhill)

This record was acknowledged before me on January 7th, 2019 by Scott A. Hill, as mayor
and ex-officio member of the Water and Light Commission.



M Harper

Notary Public for Oregon
My Commission Expires: 7-5-20

State of Oregon) SS.
County of Yamhill)

This record was acknowledged before me on January 7th, 2019 by Trena McManus, as clerk
of the Water and Light Commission.



M Harper

Notary Public for Oregon
My Commission Expires: 7-5-20

EXHIBIT A

From First American Title Insurance Company report Order No. 1031-3121918.

14. Right to enter and erect, operate, maintain, repair, rebuild and patrol one or more electric power transmission lines and appurtenant signal lines, wires, cables and appliances necessary in connection therewith; together with right to clear said parcel and keep same clear of all brush, timber, structures and fire hazards; right to top, limb, fell and remove all growing trees, dead trees and snags (collectively called 'Danger Trees') which could fall on said line.

Recorded: August 12, 1964

Recording Information: Film Volume 39, Page 462, Deed and Mortgage Records

Grantee: The United States of America

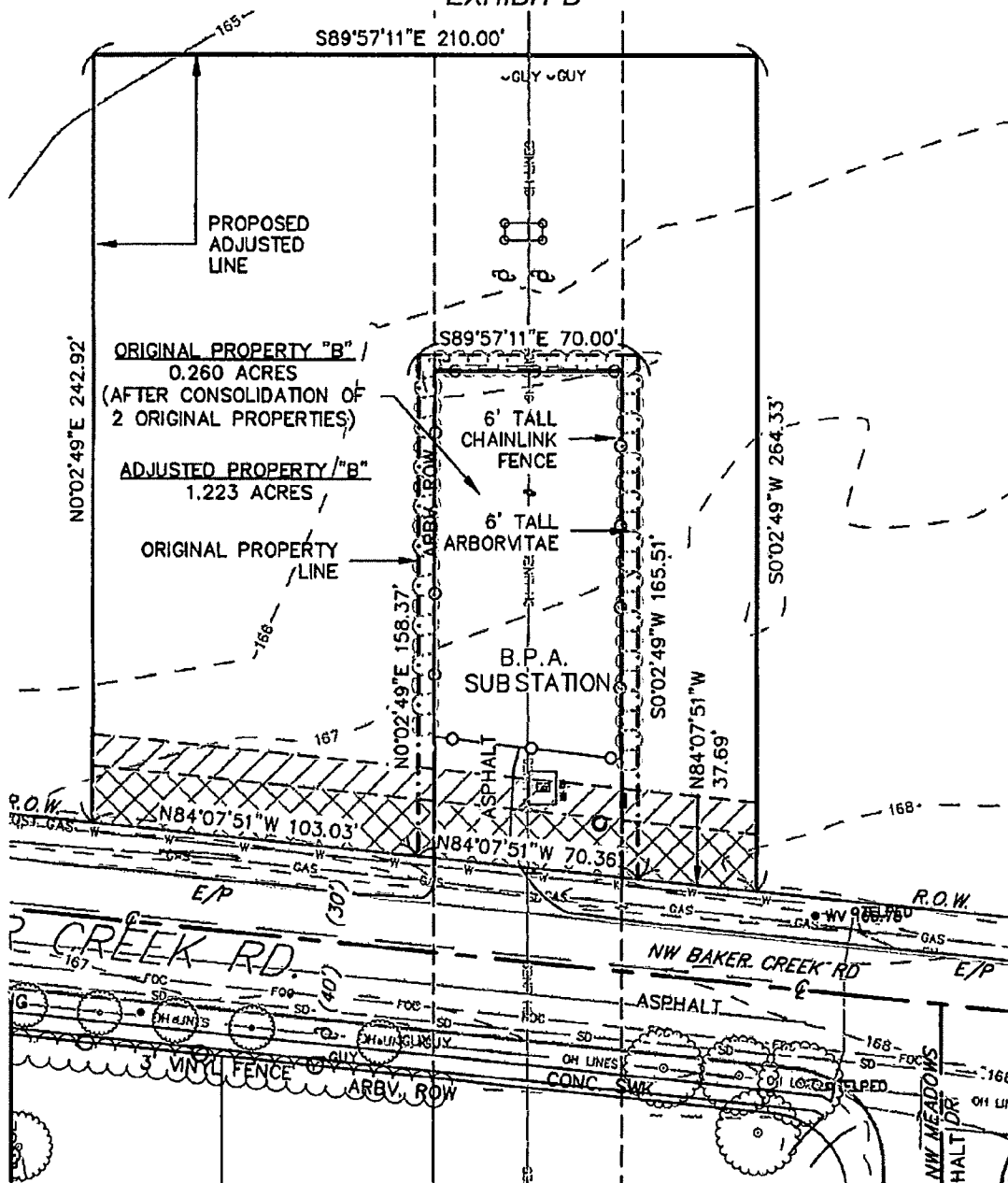
15. Right to enter and erect, operate, maintain, repair, rebuild and patrol one or more electric power transmission lines and appurtenant signal lines, wires, cables and appliances necessary in connection therewith; together with right to clear said parcel and keep same clear of all brush, timber, structures and fire hazards; right to top, limb, fell and remove all growing trees, dead trees and snags (collectively called 'Danger Trees') which could fall on said line.

Recorded: October 14, 1964

Recording Information: Film Volume 40, Page 851, Deed and Mortgage Records

Grantee: The United States of America

EXHIBIT B



- PROPOSED FUTURE 10' WIDE PUBLIC UTILITY EASEMENT
- PROPOSED FUTURE 18' WIDE RIGHT-OF-WAY DEDICATION

Page 5 of 5 Pages – Warranty Deed



Certification of Charges Paid
(2015 Oregon Laws Chapter 96)

Regarding the real property:

(submitter must provide one of the following Real Property Identification numbers)

Tax lot # R4418 00100	Tax Account / Property Identification Number 643294
--------------------------	--

All charges against the real property have been paid for the property that is the subject of the deed between:

Grantor Baker Creek Development, LLC

Grantee City of McMinnville, acting by and through its Water and Light Commission
--

Signed on (date) January 7, 2019	and for consideration of \$ 175,000.00
-------------------------------------	---

Authorized Assessor's representative signature <i>Eileen Slater</i>	Name Eileen Slater, Deputy Tax Collector	Date 1-15-2019
--	---	-------------------

NOTICE: The accuracy of information on this form that was not provided by the Assessor is not warranted by the Assessor's Office. Please be sure the information provided, regarding property for which the certificate is sought and the parties to the transaction, is correct.



Oregon

Theodore R. Kulongoski, Governor

Public Utility Commission

550 Capitol Street NE, Suite 215

Mailing Address: PO Box 2148

Salem, OR 97308-2148

Consumer Services

1-800-522-2404

Local: 503-378-6600

Administrative Services

503-373-7394

December 29, 2000

To: All electric utilities in Oregon.

Re: Electrical substation security.

During recent inspection tours across the state, OPUC staff members have observed circumstances related to electrical substation security that constitute a significant safety hazard to the public. Specifically, within the last three months, staff members have been able to literally walk into five substations. Although all the gates had some type of locking mechanism, by pulling up and out, we were able to open them.

The purpose of this letter is to re-emphasize the requirements of the National Electrical Safety Code (NESC), as it relates substation security measures. Rule 110 is very specific regarding minimum protective requirements. Staff strongly recommends prompt and continuing compliance inspections of your substations.

As the minimum, inspections at monthly intervals are suggested for such crucial installations as electrical substations. Particular attention needs to be given to inspection of substation fences and gates to ensure that they, as stated in Rule 110, "limit the likelihood of entrance of unauthorized persons or interference by them with equipment inside."

Critical items to be aware of when performing inspections are:

- Gaps and erosion under fencing and gates.
- Adequate fence heights (at least six feet of fabric) and barbed wire top assemblies. A total height of not less than seven (7) feet is required.
- Gates capable of being securely locked. (Chains are recommended.)
- Suitable warning signs at all gates and on fencing as required. (Note: ANSI Z535.1-1991, ANSI Z535.2-1991, ANSI Z535.3-1991, ANSI Z535.4-1991, and ANSI Z535.5-1991 contain information regarding safety signs.)
- Proper grounding/bonding techniques for fences and gates.
- Substations free of stored material and equipment not essential to the maintenance of installed equipment.
- Outside perimeter of substation fences free of objects that would provide access. (i.e., trees, shrubs, vehicles, fences, buildings, etc.)

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LIGHT DIVISION
Capital Improvements Plan
Fiscal Year 2018-2019

Description	Work Order #	<u>1</u> Original Budget 2017/18	<u>2</u> 2018/19	<u>3</u> 2019/20	<u>4</u> 2020/21	<u>5</u> 2021/22	<u>6</u> 2022/23
TRANSMISSION							
Trans. Line Rebuild 2nd St. (Walnut City) to Hill Rd.	20170136	150,000	125,000	125,000			
Pole Replacement		52,000	56,000	58,800	62,900	100,000	105,000
Lawson Lane Transmission Pole Replacement	20110090	200,000	100,000	100,000			
Transmission Line 3-Mile Lane Substation (1.3 Mile Tap)							250,000
Purchase Walnut City 115 KV line			40,000				
Walnut City Tap switch				40,000			
Walnut City tap reconductor						250,000	
Total Transmission		402,000	321,000	323,800	62,900	350,000	355,000
SUBSTATIONS							
Walnut City Substation							
SCADA/Communications			5,000				
<i>Sub Total - Walnut City Sub</i>			5,000				
Windishar Substation							
SCADA/Communications		30,000	5,000				
Bus Modifications (62.5% Cash CIAC)		30,000			30,000		
Breaker Modifications 98		30,000	5,000				
<i>Sub Total - Windishar Sub</i>		90,000	10,000		30,000		
Cascade Substation							
Replace Protective Relays & 34.5 kV Breaker (Cash CIAC)				100,000			
SCADA/Communications (Cash CIAC)				30,000			
Circuit Switcher replacement (Cash CIAC)							50,000
<i>Sub Total - Cascade Sub</i>				130,000			50,000
Booth Bend Substation							
Replace 12.5 kV Breakers and Relaying					150,000		
SCADA/Communications		30,000			30,000		
<i>Sub Total - Booth Bend Sub</i>		30,000			180,000		
East McMinnville Substation							
Replace E. Mac Bank 2 Transformer w/ 20/27/33 MVA		800,000	750,000				
SCADA Communications				30,000			
Bus Modifications	20160055	60,000	15,000	15,000			
Replace 12.5 kV Breakers Relaying Feeders 11-14					175,000		
Replace Transformer /Relaying				100,000			
<i>Sub Total - East McMinnville Sub</i>		860,000	765,000	145,000	175,000		
Baker Creek Substation							

LIGHT DIVISION
Capital Improvements Plan
Fiscal Year 2018-2019

Description	Work Order #	<u>1</u> Original Budget 2017/18	<u>2</u> 2018/19	<u>3</u> 2019/20	<u>4</u> 2020/21	<u>5</u> 2021/22	<u>6</u> 2022/23
Acquire Additional Property		300,000	200,000				
Consultant Engineer				125,000			
Additional Power Transformer					800,000		
Construct Addition transformer bay						1,000,000	
SCADA/Communications		30,000	30,000				
Protective Relay Replacement	20150249						
<i>Sub Total - Baker Creek Sub</i>		330,000	230,000	125,000	800,000	1,000,000	
Gormley Substation							
SCADA/Communications			5,000				
<i>Sub Total - Gormley Sub</i>			5,000				
3-Mile Lane Substation							
Acquire Property		250,000		250,000			
Construct Substation							
<i>Sub Total - 3-Mile Lane Sub</i>		250,000		250,000			
Grandhaven Substation							
Acquire Property							
Engineering Consultant							300,000
Construct Substation							
<i>Sub Total - Granhaven Sub</i>							300,000
Total All Substations		1,560,000	1,015,000	650,000	1,185,000	1,000,000	350,000
DISTRIBUTION PLANT							
Line Rebuilds and Extensions							
Line Rebuilds		66,000	50,000	54,000	58,000	62,000	66,000
Line Rebuilds - Service		129,000	20,000	33,000	35,000	35,000	
Construct 1.4 mi. main fdr from 3-mi. to BB #51		50,000		200,000			
Reconductor 2.0 miles along Peavine Road					300,000		
Re conductor Westside Rd						300,000	
115 New Underbuild Baker Cr- Westside							300,000
Meadows St. 750 Al UG (808)					150,000	150,000	
3 Mile Ln Bridge Engineering			70,000				
3 Mile Ln Bridge conduit				100,000			
<i>Sub Total - Line Rebuilds & Extensions</i>		245,000	140,000	387,000	543,000	547,000	366,000
Conversion from O/H to U/G							
Northeast Gateway Project	20160144	150,000					
Underground Fund Conversions		184,000	50,000	53,500	57,245	61,252	65,540

LIGHT DIVISION
Capital Improvements Plan
Fiscal Year 2018-2019

Description	Work Order #	<u>1</u> Original Budget 2017/18	<u>2</u> 2018/19	<u>3</u> 2019/20	<u>4</u> 2020/21	<u>5</u> 2021/22	<u>6</u> 2022/23
<i>Sub Total - OH to Underground Conversion</i>		334,000	50,000	53,500	57,245	61,252	65,540
Relocation Required by Other Public Agency							
2nd St. @ Adams & Baker		600,000					
Hill Road from 2nd St. to Baker Creek		200,000	1,500,000				
Old Sheridan Rd				50,000			
<i>Sub Total - Relocation</i>		800,000	1,500,000	50,000			
Underground Cable							
Replace deteriorated Primary URD Cables (801)		131,000	200,000	214,000	228,980	245,009	262,159
Elmwood Apts.		50,000					
<i>Sub Total - Underground Cable</i>		181,000	200,000	214,000	228,980	245,009	262,159
System Voltage Regulation							
Voltage Regulators/Capacitors			15,000	16,000	17,100	18,300	19,600
<i>Sub Total - System Voltage Regulation</i>			15,000	16,000	17,100	18,300	19,600
New Construction							
Residential Service (CIAC - Cash)		173,000	185,000	198,000	212,000	227,000	243,000
Subdivisions (CIAC - 80% Cash)		120,000	128,000	137,000	147,000	157,000	168,000
Subdivisions (CIAC - 20% In-Kind)		-	32,000	34,250	36,750	39,250	42,000
Commercial Projects (CIAC - 80% Cash)		280,000	300,000	321,000	343,000	367,000	393,000
Commercial Projects (CIAC - 20% In-Kind)		-	75,000	80,250	85,750	91,750	98,250
<i>Sub Total - New Construction</i>		573,000	720,000	770,500	824,500	882,000	944,250
Pole Replacements							
Pole Change outs (805)		268,000	230,000	246,000	263,000	281,000	301,000
<i>Sub Total - Pole Replacements</i>		268,000	230,000	246,000	263,000	281,000	301,000
Line Switches							
Line Switches/Reclosers		66,000	50,000	54,000	58,000	62,000	66,300
<i>Sub Total - Line Switches</i>		66,000	50,000	54,000	58,000	62,000	66,300
Transformers							
Transformers - Overhead		46,000	80,000	86,000	92,000	98,000	104,800
Transformers - Single-Phase UG		68,000	73,000	78,110	84,110	90,000	96,300
Transformers - 3-Phase UG		114,000	122,000	131,000	140,000	150,000	160,500
<i>Sub Total - Transformers</i>		228,000	275,000	295,110	316,110	338,000	361,600
Meters							
Single Phase Meters		60,000	60,000	64,000	68,000	73,000	83,500
Poly Phase Meters		40,000	40,000	43,000	46,000	52,400	56,100
<i>Sub Total - Meters</i>		100,000	100,000	107,000	114,000	125,400	139,600
Miscellaneous							

LIGHT DIVISION
Capital Improvements Plan
Fiscal Year 2018-2019

Description	Work Order #	<u>1</u> Original Budget 2017/18	<u>2</u> 2018/19	<u>3</u> 2019/20	<u>4</u> 2020/21	<u>5</u> 2021/22	<u>6</u> 2022/23
Rental Lighting		20,000	10,000	11,000	12,000	13,000	14,000
Municipal Lighting		92,000	15,000	16,000	17,000	18,000	19,000
<i>Sub Total - Miscellaneous</i>		112,000	25,000	27,000	29,000	31,000	33,000
Total Distribution		2,907,000	3,305,000	2,220,110	2,450,935	2,590,961	2,559,049
GENERAL PLANT							
Miscellaneous							
SCADA System Upgrade	20160082						
Engineering Consultant Work		80,000	30,000	32,000	34,000	36,000	39,000
<i>Sub Total - Miscellaneous</i>		80,000	30,000	32,000	34,000	36,000	39,000
Transportation Equipment							
Electric Portion of Transportation Equipment		205,800	350,000	452,000	228,000	350,000	320,400
<i>Sub Total - Transportation Equipment</i>		205,800	350,000	452,000	228,000	350,000	320,400
Tools and Test Equipment							
Various		43,000	20,000	21,000	22,000	24,000	60,000
<i>Sub Total - Tools & Test Equipment</i>		43,000	20,000	21,000	22,000	24,000	60,000
Facilities							
Electric Portion of Facilities		273,000	339,000	900,000	42,000	168,000	117,000
<i>Sub Total - Facilities</i>		273,000	339,000	900,000	42,000	168,000	117,000
Information Technology							
Electric Portion- Information Technology		9,000	45,000	52,000		33,000	36,000
<i>Sub Total - Information Technology</i>		9,000	45,000	52,000		33,000	36,000
Total General Plant		610,800	784,000	1,457,000	326,000	611,000	572,400
TOTAL ELECTRIC DIVISION CAPITAL BUDGET		5,479,800	5,425,000	4,650,910	4,024,835	4,551,961	3,836,449
Contributions in Aid Construction - Cash		(573,000)	(613,000)	(786,000)	(683,250)	(751,000)	(854,000)
Contributions in Aid Construction - In-Kind Donation		(100,000)	(107,000)	(114,500)	(122,500)	(131,000)	(140,250)
Contributions in Aid Construction (BPA Utility Efficiency)		(75,000)	(75,000)	(75,000)			
TOTAL ELECTRIC DIVISION CAPITAL NET OF CIAC		4,731,800	4,630,000	3,675,410	3,219,085	3,669,961	2,842,199

**RELATIVE COSTS OF DRIVING
ELECTRIC AND GASOLINE VEHICLES
IN THE INDIVIDUAL U.S. STATES**

**MICHAEL SIVAK
BRANDON SCHOETTLE**



**SUSTAINABLE WORLDWIDE
TRANSPORTATION**

UNIVERSITY OF MICHIGAN

RELATIVE COSTS OF DRIVING ELECTRIC AND GASOLINE VEHICLES
IN THE INDIVIDUAL U.S. STATES

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U.S.A.

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Technical Report Documentation Page

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16. Abstract <p>This study was designed to examine the variation across the individual U.S. states in the relative fuel cost of driving battery electric vehicles (BEVs) and gasoline vehicles. Also of interest was the state-by-state variation in the fuel economy that gasoline vehicles would have to exceed to make driving them less expensive than driving BEVs.</p> <p>The following are the main findings:</p> <ol style="list-style-type: none">(1) The current average annual cost of driving a typical new gasoline vehicle in the United States is \$1,117, with a maximum of \$1,509 in Hawaii and a minimum of \$993 in Alabama.(2) The current average annual cost of driving a typical new BEV in the United States is \$485, with a maximum of \$1,106 in Hawaii and a minimum of \$367 in Louisiana.(3) The ratio of the current average costs of driving a typical gasoline vehicle and a typical BEV in the United States is 2.3, with a maximum of 3.6 in Washington and a minimum of 1.4 in Hawaii.(4) The required fuel economy that gasoline vehicles would need to exceed for driving them to be less expensive than driving BEVs is 57.6 mpg in the United States, with a maximum of 90.0 mpg in Washington and a minimum of 34.1 mpg in Hawaii.					
17. Key Words Electric vehicles, BEV, gasoline vehicles, cost, price of gasoline, price of electricity				18. Distribution Statement Unlimited	
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Introduction

It is generally acknowledged that, in the United States, driving battery electric vehicles (BEVs) tends to be less expensive than driving gasoline-powered vehicles (e.g., INL, 2017). However, the variation in the price of gasoline across the individual states does not completely parallel the variation in the price of electricity. Therefore, this study was designed to examine the variation across the individual states in the relative fuel cost of driving BEVs and gasoline vehicles. Also of interest was the state-by-state variation in the fuel economy that gasoline vehicles would have to exceed to make driving them less expensive than driving BEVs.

Method

Approach

The analysis calculated the following measures for each state:

- Annual fuel cost of driving a typical gasoline vehicle
- Annual fuel cost of driving a typical BEV
- Ratio of the above two costs
- Fuel economy that gasoline vehicles would have to exceed to make them less expensive to drive than BEVs

Underlying data

The following data were used in the calculations:

State data

- Average price of regular gasoline on December 23, 2017 (AAA, 2017)
- Average price of electricity for residential customers in October 2017 (EIA, 2017)

National data

- Average (sales-weighted) fuel economy¹ of all light-duty vehicles purchased in December 2017 (25.0 mpg;² Sivak and Schoettle, 2018)
- Average (not sales-weighted) electricity consumption for all BEVs listed in the 2017 EPA Fuel Economy Guide³ (33.0 kWh/100 miles; EPA, 2017)
- Average annual distance driven per light-duty vehicle in 2015⁴ (11,443 miles; NHTSA, 2017)

¹ EPA combined fuel economy (city and highway).

² This average includes BEVs as well, but currently BEVs constitute less than 1% of all vehicles sold (EV Obsession, 2017). Therefore, using this measure for gasoline vehicles is a reasonable approximation. (This average also includes diesel vehicles.)

³ The 2018 edition of the Fuel Economy Guide is currently incomplete. It contains data for only a limited number of vehicle models.

⁴ The latest year for which data are available.

Results

Cost of driving gasoline vehicles

The average price of regular gasoline in the United States on December 23, 2017 was \$2.441/gallon (AAA, 2017). The price was highest in Hawaii (\$3.297) and lowest in Alabama (\$2.169). The ratio between these two extremes was 1.52.

The annual state-by-state fuel costs of driving a typical gasoline vehicle are listed in the second column of Table 1. The highest cost was in Hawaii (\$1,509), followed by Alaska (\$1,434), California (\$1,407), Washington (\$1,338), and Oregon (\$1,274). The lowest cost was in Alabama (\$993), followed by Texas (\$994), Mississippi (\$998), Arkansas (\$999), and South Carolina (\$1,003). The average cost for the United States overall was \$1,117.

Cost of driving BEVs

The average price of residential electricity in the United States in October 2017 was \$0.1284/kWh (EIA, 2017). The price was highest in Hawaii (\$0.2929) and lowest in Louisiana (\$0.0972).⁵ The ratio between the two extremes was 3.01.

The annual state-by-state costs of driving a BEV are listed in the third column of Table 1. The highest cost was in Hawaii (\$1,106), followed by Alaska (\$833), Connecticut (\$804), New Hampshire (\$751), and Rhode Island (\$737). The lowest cost was in Louisiana (\$367), followed by Washington (\$372), Arkansas (\$382), Idaho (\$390), and Tennessee (\$398). The average cost for the United States overall was \$485.

Ratio of the costs of driving gasoline vehicles and BEVs

The ratios of the costs of driving a gasoline vehicle and a BEV are shown in the fourth column of Table 1. The ratio was lowest in Hawaii (1.364), followed by New Hampshire (1.479), Connecticut (1.500), Rhode Island (1.565), and Massachusetts (1.579). The ratio was highest in Washington (3.602), followed by Oregon (3.075), Idaho (2.999), Louisiana (2.770), and Utah (2.765). The ratio for the United States overall was 2.304.

⁵ The correlation between the state prices in electricity and gasoline proved to be only moderate ($r = 0.59$).

Table 1

Annual fuel costs of driving a typical gasoline vehicle and a typical BEV, ratio of the costs, and fuel economy that gasoline vehicles would need to exceed to make driving them less expensive than driving BEVs. (The states are listed in increasing order of the cost ratio and the required fuel economy.)

State	Gasoline cost (\$)	Electricity cost (\$)	Cost ratio	Required fuel economy (mpg)
Hawaii	1,509	1,106	1.364	34.1
New Hampshire	1,111	751	1.479	37.0
Connecticut	1,207	804	1.500	37.5
Rhode Island	1,154	737	1.565	39.1
Massachusetts	1,154	731	1.579	39.5
Vermont	1,148	678	1.694	42.3
New York	1,200	708	1.694	42.4
Alaska	1,434	833	1.720	43.0
Maine	1,135	612	1.855	46.4
Wisconsin	1,108	570	1.945	48.6
Delaware	1,053	540	1.950	48.8
Kansas	1,022	503	2.031	50.8
Maryland	1,109	544	2.039	51.0
New Jersey	1,141	555	2.055	51.4
Alabama	993	481	2.065	51.6
Michigan	1,196	574	2.084	52.1
South Carolina	1,003	481	2.087	52.2
Minnesota	1,088	511	2.129	53.2
Arizona	1,064	485	2.193	54.8
New Mexico	1,083	491	2.205	55.1
Pennsylvania	1,234	555	2.224	55.6
Virginia	1,023	454	2.253	56.3
Ohio	1,103	475	2.321	58.0
Texas	994	424	2.341	58.5
Florida	1,078	458	2.355	58.9
Mississippi	998	423	2.360	59.0
Iowa	1,084	456	2.376	59.4
South Dakota	1,120	469	2.387	59.7
Georgia	1,040	431	2.413	60.3

Table 1 (continued)

State	Gasoline cost (\$)	Electricity cost (\$)	Cost ratio	Required fuel economy (mpg)
North Carolina	1,066	441	2.414	60.3
District of Columbia	1,229	508	2.422	60.6
California	1,407	580	2.425	60.6
Illinois	1,182	486	2.431	60.8
Oklahoma	1,012	416	2.433	60.8
Colorado	1,115	454	2.454	61.4
Missouri	1,004	407	2.464	61.6
Nevada	1,212	484	2.506	62.6
Indiana	1,185	468	2.530	63.2
Wyoming	1,115	438	2.544	63.6
West Virginia	1,157	452	2.562	64.1
Tennessee	1,020	398	2.565	64.1
Kentucky	1,077	413	2.606	65.1
Arkansas	999	382	2.617	65.4
Nebraska	1,089	413	2.635	65.9
North Dakota	1,117	418	2.672	66.8
Montana	1,186	431	2.750	68.8
Utah	1,107	400	2.765	69.1
Louisiana	1,017	367	2.770	69.2
Idaho	1,171	390	2.999	75.0
Oregon	1,274	414	3.075	76.9
Washington	1,338	372	3.602	90.0
<i>U.S.A.</i>	<i>1,117</i>	<i>485</i>	<i>2.304</i>	<i>57.6</i>

Required fuel economy of gasoline vehicles

The fifth column in Table 1 lists the fuel economy that gasoline vehicles would need to exceed to make driving them less expensive than driving BEVs. The required fuel economy was lowest in Hawaii (34.1 mpg), followed by New Hampshire (37.0 mpg), Connecticut (37.5 mpg), Rhode Island (39.1 mpg), and Massachusetts (39.5 mpg). The required fuel economy was highest in Washington (90.0 mpg), followed by Oregon (76.9 mpg), Idaho (75.0 mpg), Louisiana (69.2 mpg), and Utah (69.1 mpg). For the United States overall, the required fuel economy was 57.6 mpg.

Key findings

- (1) The current average annual cost of driving a typical new gasoline vehicle in the United States is \$1,117, with a maximum of \$1,509 in Hawaii and a minimum of \$993 in Alabama.
- (2) The current average annual cost of driving a typical new BEV in the United States is \$485, with a maximum of \$1,106 in Hawaii and a minimum of \$367 in Louisiana.
- (3) The ratio of the current average costs of driving a typical gasoline vehicle and a typical BEV in the United States is 2.3, with a maximum of 3.6 in Washington and a minimum of 1.4 in Hawaii.
- (4) The required fuel economy that gasoline vehicles would need to exceed for driving them to be less expensive than driving BEVs is 57.6 mpg in the United States,⁶ with a maximum of 90.0 mpg in Washington and a minimum of 34.1 mpg in Hawaii.⁷

⁶ By comparison, the average fuel economy of new vehicles sold in December 2017 was 25.0 mpg (Sivak and Schoettle, 2018).

⁷ The EPA Fuel Economy Guide for model year 2017 vehicles (EPA, 2017) lists seven all-gasoline vehicles that have better fuel economy than 34.1 mpg. Therefore, driving any of those seven gasoline vehicles in Hawaii is currently less expensive than driving a typical BEV.

References

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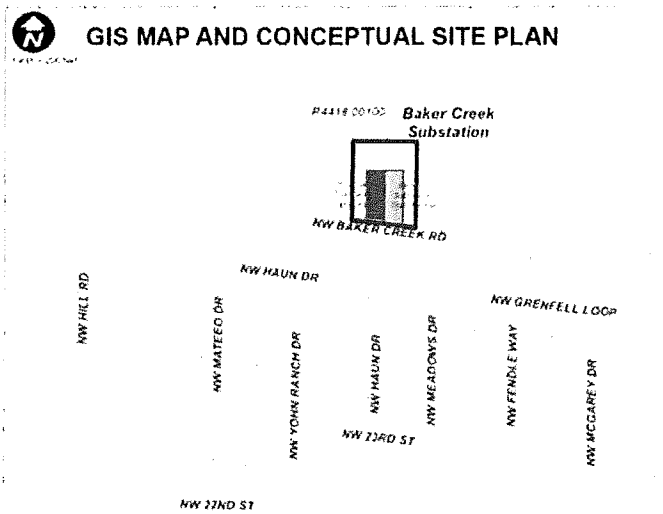
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February 27, 2019

City of McMinnville
Attn: Planning Department
231 NE 5th St
McMinnville, OR 97128

Dear Neighbor:

You are invited to a neighborhood meeting on Wednesday, March 27, 2019 at 6 PM at the office of McMinnville Water and Light, 855 NE Marsh Lane, McMinnville, OR 97128 for a conversation about the further development of MW&L's Baker Creek Substation. As part of the required land use process, Water and Light seeks a comprehensive plan amendment and zone change, as well as an amendment to a planned development overlay and conditional use permit, to expand the substation. You are receiving this invitation because you live or own property near the substation facility.



Currently, the substation facility hosts switchgear and transformer equipment at the facility to step down high voltage electricity to medium voltage electricity for distribution into the nearby neighborhoods. Due to growth in the north and west parts of the city, MW&L plans to place a second set of switchgear and a second transformer on the site. See the attached diagram.

Currently, the western part of the substation lot is designated for commercial development on the comprehensive plan map and the eastern part is designated residential. Likewise, a portion of the lot is

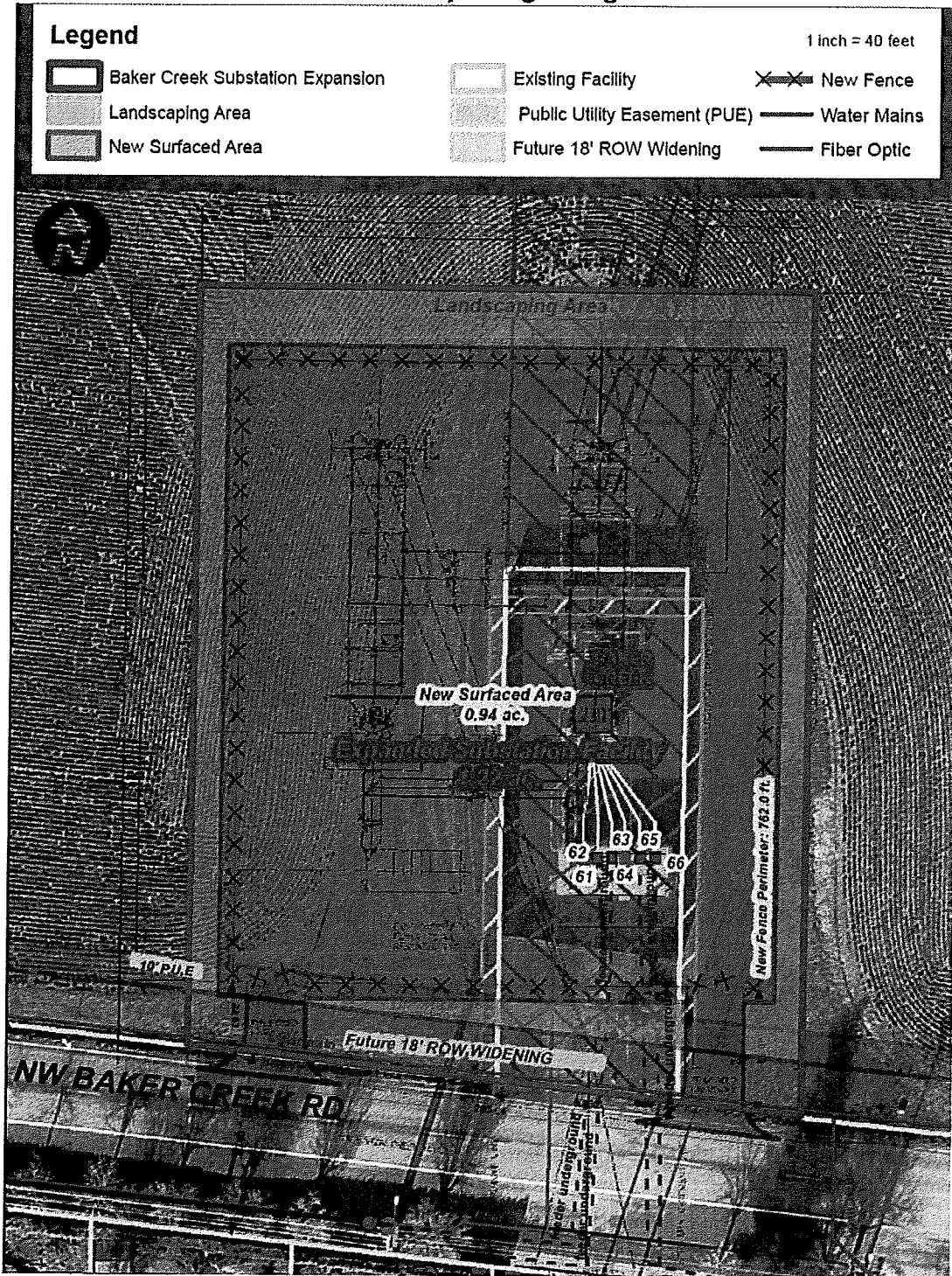
zoned R-1 (residential), while a portion remains in Farm Use zoning.

MW&L seeks to bring the entire lot under a residential designation (R-1). At the same time, MW&L will apply to remove the planned development overlay from the western half of the lot. MW&L will also apply for a conditional use permit to expand the substation facility. The lot is currently about 1.2 acres and is sized to accommodate an expansion of the facility. Water and Light welcomes your participation in this planning process and invites you to participate in this neighborhood meeting to learn about the facility and share your comments.

Sincerely,

Sam Justice
General Counsel

Preliminary Design Diagram



Map No.	Tax Lot	Site Address	Owner	Attn:	Mailing Address	City State	Zip
1	R4418AD10900	n/a	MCMINNVILLE CITY	MCMINNVILLE CITY OF	230 NE 2ND ST	MCMINNVILLE OR	97128
2	R4418AD11200	1918 NW HAUN DR	LONG KRISTEN	LONG KRISTEN	625 ESKATON CR #343	GRASS VALLEY CA	95945
3	R4418AD07700	1865 NW GRENFELL LOOP	FISHER CHARLES E	FISHER CHARLES E	1865 NW GRENFELL LP	MCMINNVILLE OR	97128
4	R4418AD07900	2390 NW MEADOWS DR	HENSEL ETHELINDA	HENSEL ETHELINDA	PO BOX 810	GASTON OR	97119
5	R4418AD11300	2391 NW HAUN DR	LONG KRISTEN	LONG KRISTEN	625 ESKATON CR #343	GRASS VALLEY CA	95945
6	R4418AD07800	2412 NW MEADOWS DR	LEHDE JOHN S TRUSTEE	LEHDE JOHN S TRUSTEE	1015 E 4TH ST	YAMHILL OR	97148
7	R4418AD07600	1857 NW GRENFELL LOOP	HOWLETT ROGER D TRUSTEE	HOWLETT ROGER D TRUSTEE	1857 NW GRENFELL LP	MCMINNVILLE OR	97128
8	R4418AD07500	1845 NW GRENFELL LOOP	SOTO FLORENCIA (WROS)	SOTO FLORENCIA (WROS)	1845 NW GRENFELL LP	MCMINNVILLE OR	97128
9	R4418AD11100	1921 NW HAUN DR	HOLMES LOGAN R	HOLMES LOGAN R	1921 NW HAUN DR	MCMINNVILLE OR	97128
10	R4418AD11000	1903 NW HAUN DR	DRULINER LARRY	DRULINER LARRY	1903 NW HAUN DR	MCMINNVILLE OR	97128
11	R4418AC03600		LGI HOMES-OREGON	TERRY LAMASTERS	1450 LAKE ROBBINS DR #430	THE WOODLANDS TX	77380
12	R4418AC00100		LGI HOMES-OREGON	TERRY LAMASTERS	1450 LAKE ROBBINS DR #430	THE WOODLANDS TX	77380
13	R4418AC00200		LGI HOMES-OREGON	TERRY LAMASTERS	1450 LAKE ROBBINS DR #430	THE WOODLANDS TX	77380
14	R4418AC00300		LGI HOMES-OREGON	TERRY LAMASTERS	1450 LAKE ROBBINS DR #430	THE WOODLANDS TX	77380
15	R4418AC00400		LGI HOMES-OREGON	TERRY LAMASTERS	1450 LAKE ROBBINS DR #430	THE WOODLANDS TX	77380
16	R4418AC00500		LGI HOMES-OREGON	TERRY LAMASTERS	1450 LAKE ROBBINS DR #430	THE WOODLANDS TX	77380
17	R4418AC00600		LGI HOMES-OREGON	TERRY LAMASTERS	1450 LAKE ROBBINS DR #430	THE WOODLANDS TX	77380
18	R4418AC00700		LGI HOMES-OREGON	TERRY LAMASTERS	1450 LAKE ROBBINS DR #430	THE WOODLANDS TX	77380
19	R4418AC00800		LGI HOMES-OREGON	TERRY LAMASTERS	1450 LAKE ROBBINS DR #430	THE WOODLANDS TX	77380
20	R4418AC05500		LGI HOMES-OREGON	TERRY LAMASTERS	1450 LAKE ROBBINS DR #430	THE WOODLANDS TX	77380
21	R4418AC05600		LGI HOMES-OREGON	TERRY LAMASTERS	1450 LAKE ROBBINS DR #430	THE WOODLANDS TX	77380
22	R4418 00101	1901 NW BAKER CREEK RD	MCMINNVILLE CITY OF	MCMINNVILLE CITY OF	PO BOX 638	MCMINNVILLE OR	97128
23	R4418 00100	1755 NW BAKER CREEK RD	BAKER CREEK	BAKER CREEK DEVELOPMENT LLC	8840 SW HOLLY LN	WILSONVILLE OR	97070
			CITY OF MCMINNVILLE	PLANNING DEPARTMENT	231 NE 5TH ST	MCMINNVILLE OR	97128

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Attachment 17 to Exhibit 1: Photo of Meeting Sign; Answers to Questions; MW&L Applications

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SIGN IN SHEET

NEIGHBORHOOD MEETING
 BAKER CREEK SUBSTATION EXPANSION
 6PM, Wednesday, March 27, 2019; 855 NE Marsh Lane, McMinnville, Oregon

	Print Name:	Address:	Email & Phone
1.	Sam Justice	2360 NW Grenfell Loop McMinnville OR 97128	svj@mc-power.com
2.	Scott Rosenbalm	1045 SW Tall Oaks Dr.	sgsr@mc-power.com
3.			
4.			
5.			
6.			
7.			
8.			
9.			

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Notes on Neighborhood meeting

Time: 6:00PM

Date: March 27, 2019

Location; Commission Room, McMinnville Water and Light, 855 NE Marsh Lane, McMinnville, OR 97128

Attendees: Sam Justice (MW&L General Counsel); Scott Rosenbalm (MW&L Electric Division Director)

Action Items:

1. Old Business: No Old Business
2. New Business: Mr. Justice opened the door at about 5:30PM, confirming that the public entrance to the Water and Light Commission room was open. Mr. Rosenbalm arrived at about the same time. Earlier in the day, Mr. Polzen (I.T. Manager) had set up the computer and screen for a PowerPoint presentation. Mr. Justice had the power point presentation ready to show.
3. Mr. Justice and Mr. Rosenbalm were present on behalf of applicant, at the meeting time of 6:00 PM.
4. Mr. Justice and Mr. Rosenbalm waited in the Commission room for over 30 minutes, and no one else arrived.
5. No PowerPoint presentation was made as Mr. Justice and Mr. Rosenbalm had already viewed the presentation.
6. At approximately 6:35PM Mr. Justice checked the front door. The parking lot, aside from MW&L employee cars, was empty. Mr. Justice secured the front door.

SUMMARY: No members of the public attended the neighborhood meeting.

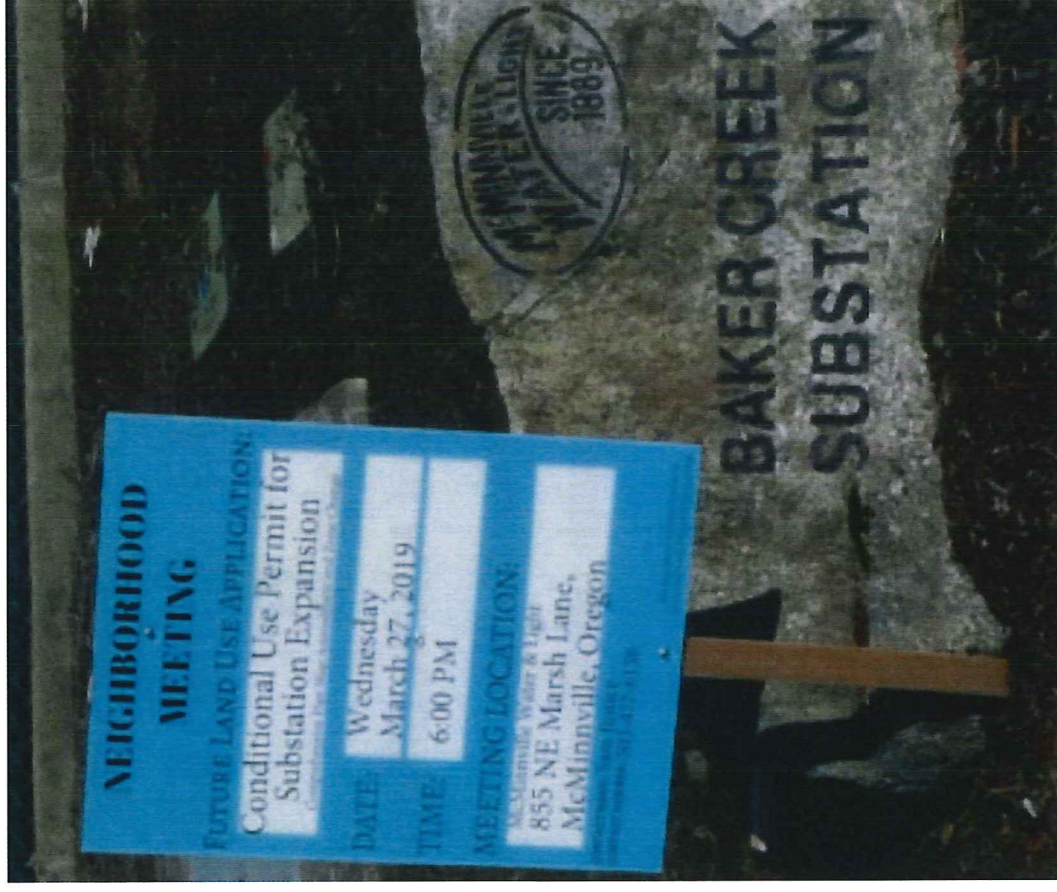
These notes were prepared by Sam Justice.

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Welcome Neighbors Substation Expansion

Agenda:

- 6:00PM Welcome/sign in
- 6:10PM Introduce W&L staff
- 6:15PM PowerPoint -Overview
- 6:30PM Conversation cont.
- 6:40PM Wrap Up Discussion
- 7:00PM Done



Agenda.

Neighborhood Meeting, 6PM; 3/27/19 MW&L

- 6:00PM – Welcome and sign in
- 6:10PM – Introductions of MW&L officials
- 6:15PM – PowerPoint Presentation
- 6:30PM – Conversation with neighbors
- 6:40PM – Wrap up
- 7:00PM - Done



This is us.

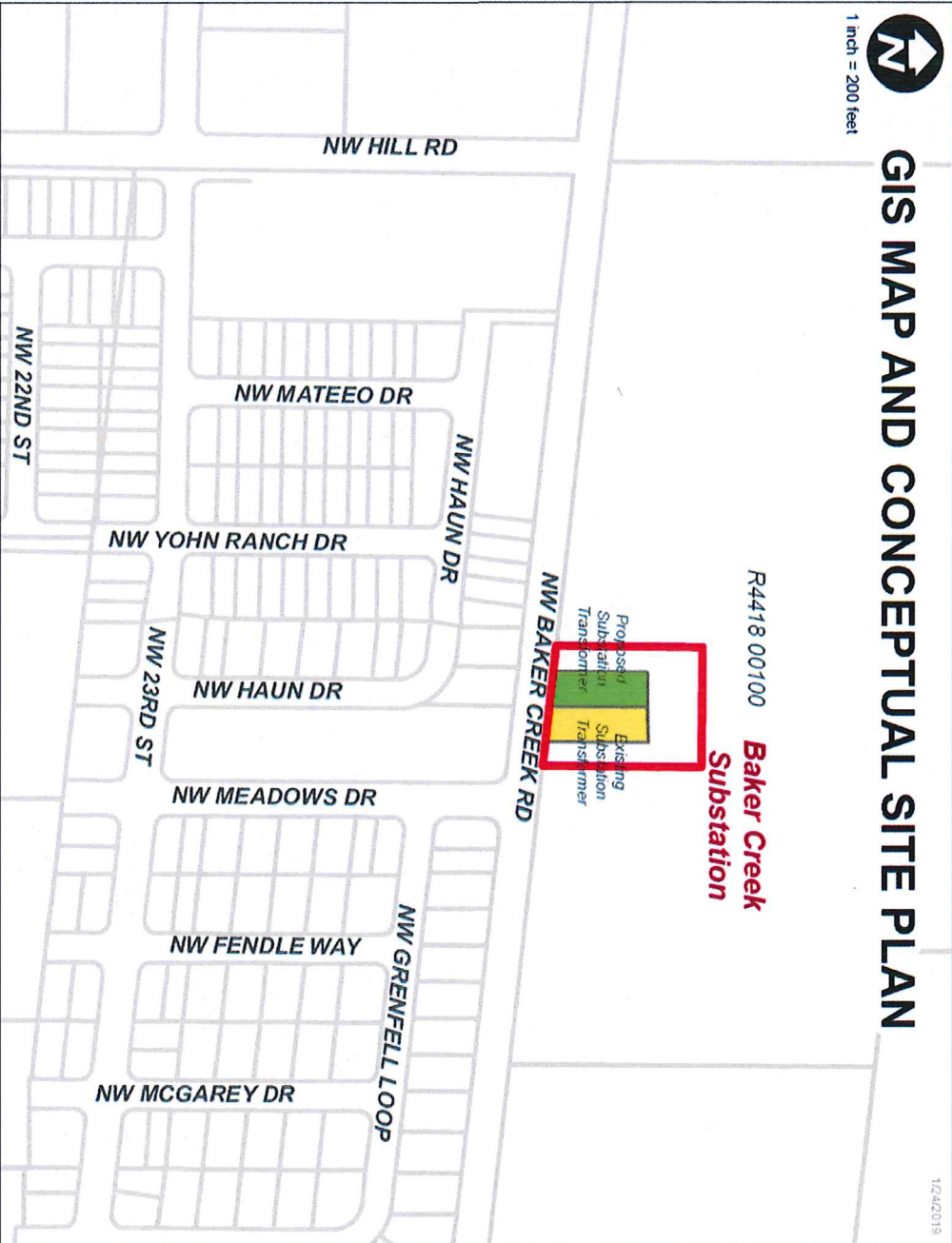


1 inch = 200 feet

GIS MAP AND CONCEPTUAL SITE PLAN

R4418 00100

**Baker Creek
Substation**

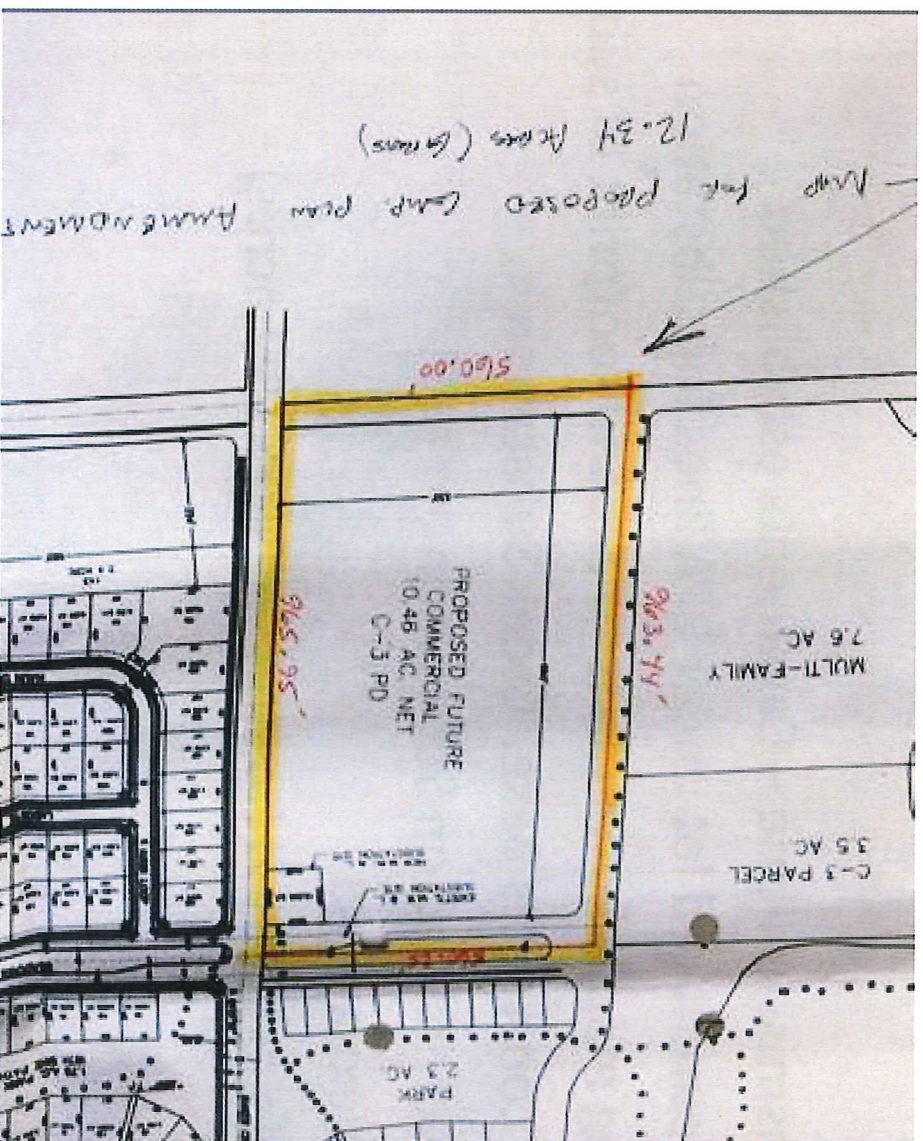


1/24/2019

Electric history of substation site

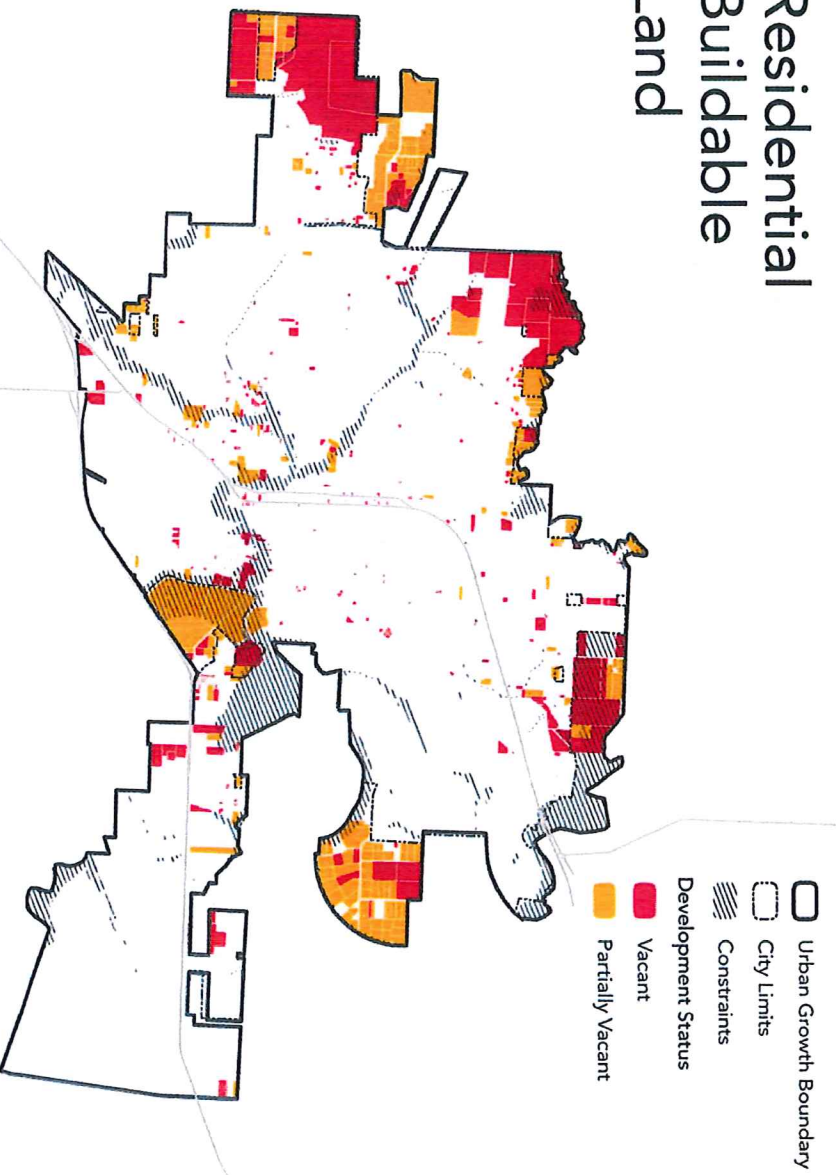
- 1965- BPA Transmission Line – Easements established
- 1977 - MW&L purchased lot under BPA lines for substation
- 1996 – Planning maps shows plans to expand footprint of substation
- 2000 – MW&L constructs Baker Creek Substation
- 2001 - First Electric Load on Substation
- 2002 – Lot first expanded
- 2019 - Lot again expanded (to present size; 1.22 acres)

1996 – Comp Plan – Foresees Expanded Substat.



If you build it they will come. Where to build?

Residential Buildable Land



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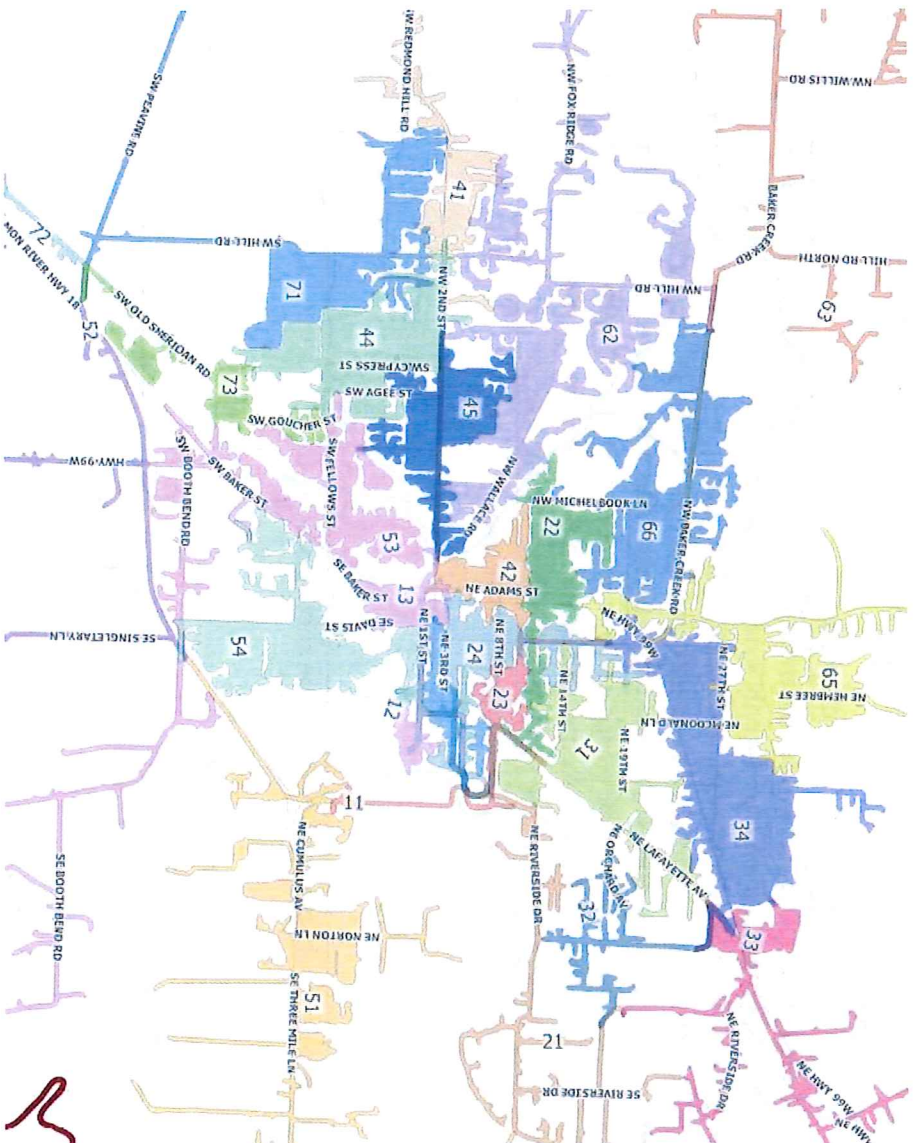
As of Date: Dec 10, 2018
Source: ECONorthwest; Yamhill County

2015 – Electric System Planning Study (TriAxis Eng.)

TABLE 2-1 - Recommendations

	Description	Estimated Cost (\$2015)
S-20	<p>Based on the best available growth forecasts and information on growth areas, feeders 31, 34, 62, and 65 are all likely to see load growth. These are heavily loaded feeders served by heavily loaded substation transformers with limited or no ability to transfer existing load to lightly loaded substations. A majority of the available MW&L transformer and circuit capacity is at East McMinville #2 and Gormley substations; without major circuit reconfigurations, this capacity cannot be utilized for load growth on the north and west sides of town. If load develops in these areas as expected, single contingency criteria may not be met during peak events for transformer outages at these locations. It is recommended that MW&L be prepared for one of the following options as load growth occurs:</p> <ul style="list-style-type: none"> ▪ Construct the previously planned Grand Haven substation ▪ Construct the previously planned 3-Mile Lane substation ▪ Expand Baker Creek Substation and add new transformer 	<p>\$1,900,000 (Sub)</p> <p>\$2,000,000 (Feeders & Transmission)</p> <p>\$2,040,000 (Sub & land)</p> <p>\$2,000,000 (Feeders & Transmission)</p> <p>\$2,000,000</p>

Why Expand? Baker Creek Feeders – 60's



Bumpy road to development

Lake Oswego company plans 425 homes, 180 apartments

By **TOM HENDERSON**
Of the News-Register

McMinnville proved irresistible for developers at Stafford Land Company, said Gordon Root, the founder of the Lake Oswego firm.

But McMinnville wasn't quite as eager to allow Stafford to develop 136 acres at and near the corner of Hill and Baker Creek roads. In

whole Northwest quadrant, which has been a long time coming," he said. "Development brings with it public improvements."

"It's a lot," Root said. "It's a significant investment in the community."

The land Stafford purchased in 2015 — which encompasses the northwest corner of McMinn-

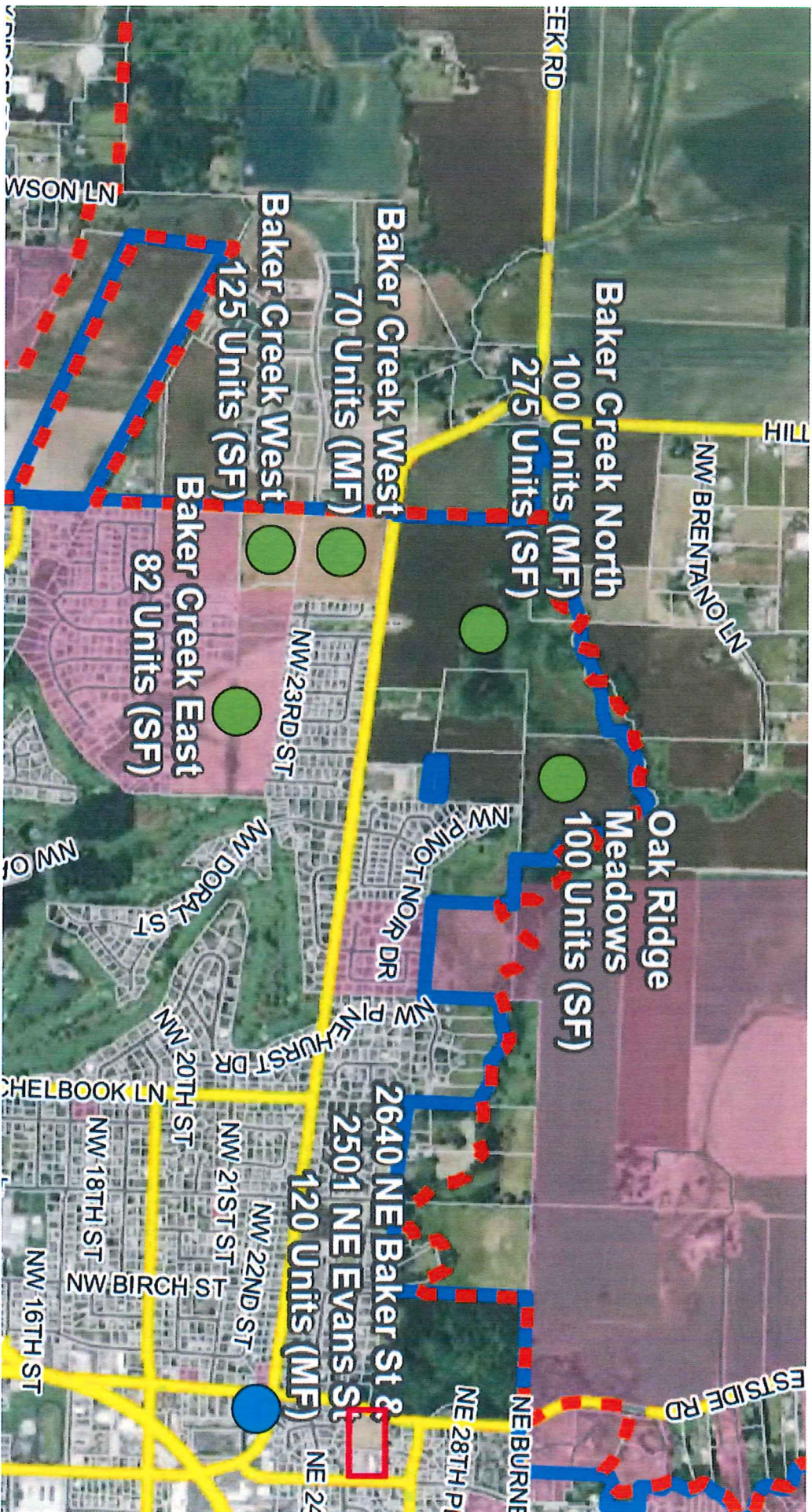
INSIDE

Current schools expected to suffice for years to come. **A9**

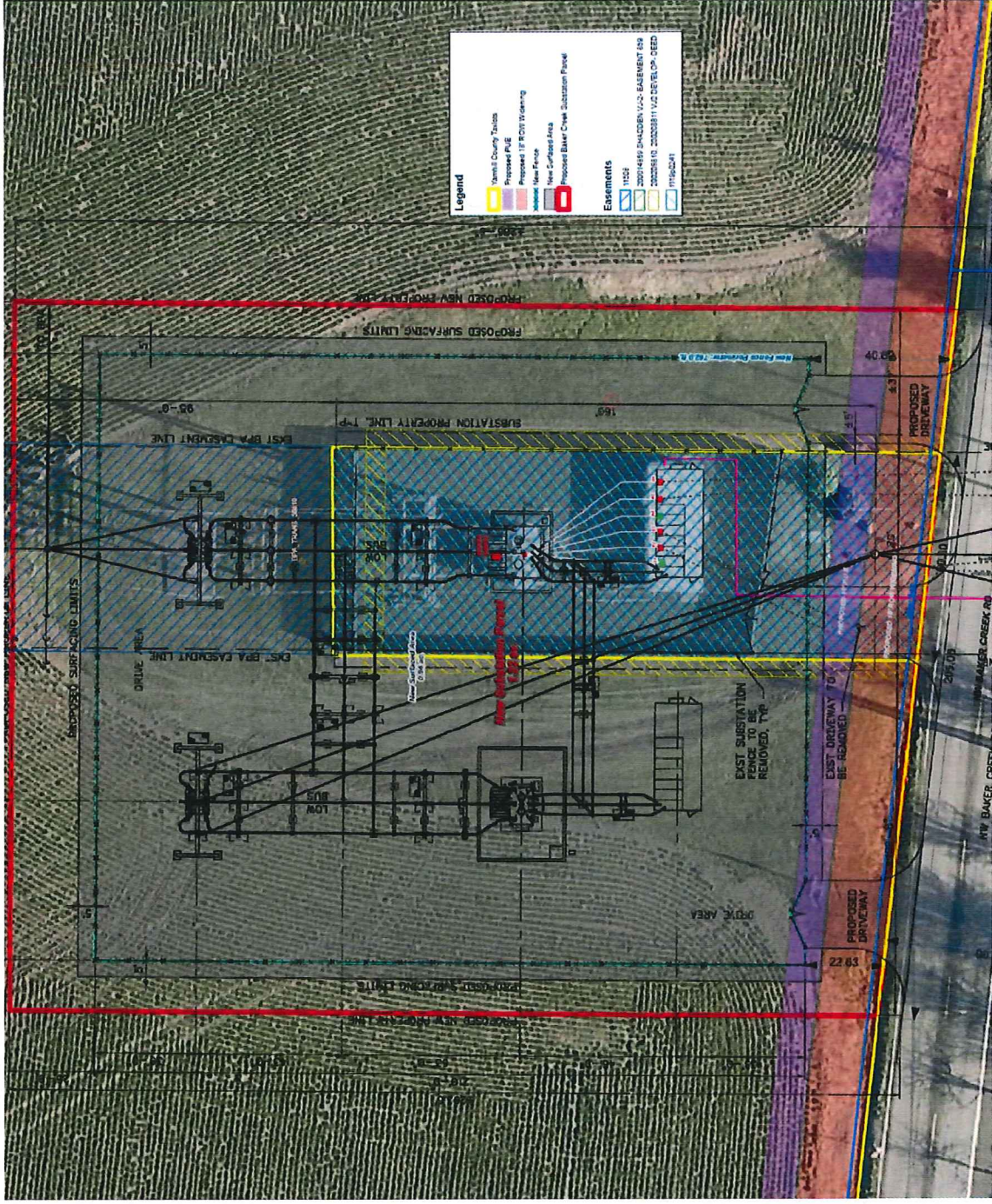
Editorial: A look at growth from all angles **B2**

a master plan that was praised for its thoughtful, community-friendly design, but criticized for being

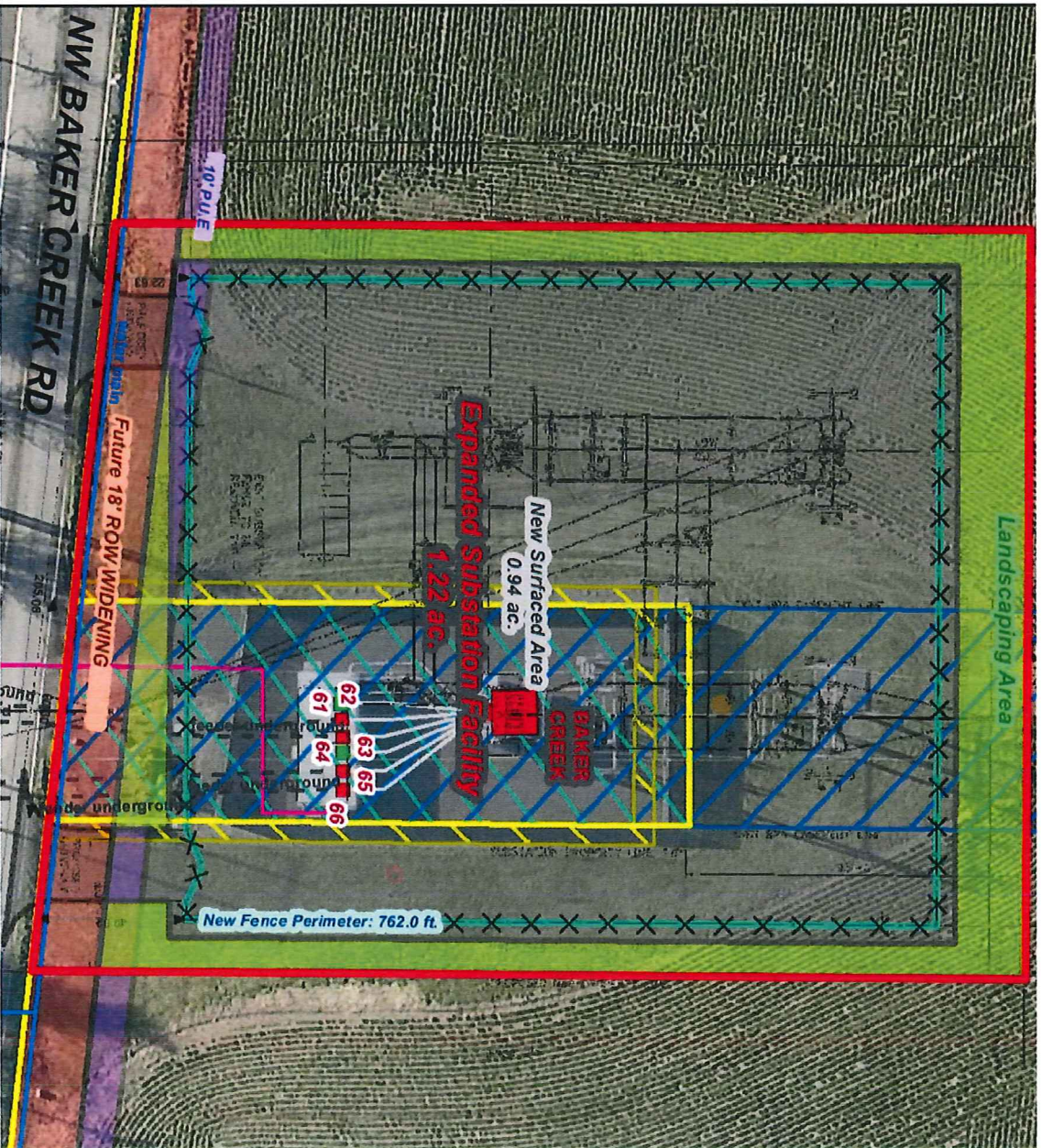
Current residential building surrounds substation site.



Plan to put
in a second
Transformer
and gear



Questions or Comments.



ORDINANCE NO. 4633

An Ordinance amending the City of McMinnville Comprehensive Plan Map from an existing residential designation to a commercial designation and enacting certain development conditions by placing a Planned Development overlay on approximately 12.34 acres of land located on the north side of Baker Creek Road and directly east of its intersection with Hill Road.

RECITALS:

The Planning Commission received an application from Don Jones for a comprehensive plan map amendment (CPA 2-96), dated July 9, 1996, for the property described as a portion of Tax Lot 100, Section 18, T. 4 S., R. 4 W., W.M.

A public hearing was held on September 12, 1996, at 7:30 p.m. before the Planning Commission after due notice had been given in the local newspaper on September 7, 1996, and written notice had been mailed to property owners within 300 feet of the affected property; and

At said public hearing, testimony was received, the application materials and a staff report were presented; and

The Planning Commission, being fully informed about said request, found that said change conformed to the applicable criteria listed in Ordinance No. 3380 based upon the material submitted by the applicant and findings of fact and the conclusionary findings for approval contained in the staff report, all of which are on file in the Planning Department, and that the plan map amendment is consistent with the Comprehensive Plan; and

The Planning Commission approved said plan map amendment and has recommended said change to Council; now, therefore,

THE CITY OF McMINNVILLE ORDAINS AS FOLLOWS:

Section 1. That the Council adopts the findings and conclusions of the Planning Commission, staff report on file in the Planning Department, and the application filed by Don Jones.

Section 2. That the Comprehensive Plan Map shall be amended from an existing residential designation to a commercial designation for the property described in Exhibit "A" which is attached hereto and by this reference incorporated herein.

Section 3. That a planned development overlay which shall be noted on the Comprehensive Plan Map is hereby created and placed on the property described in "Exhibit A" which is attached hereto and is referenced in Section 2 above. The planned development overlay establishes the following conditions and limitations on development of the site:

1. That development of the site is subject to the requirements of McMinnville Ordinance No. 4605, Section 2(a) - (g).
2. That no multiple-family residential use shall be allowed on the site.

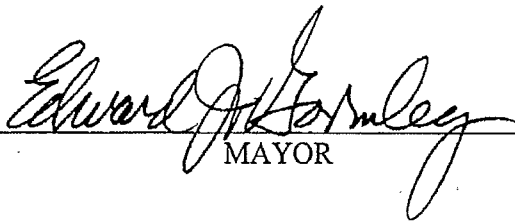
Read and passed by the Council this 8th day of October 1996 by the following votes:

Ayes: Hughes, Kirchner, Massey, Payne, Tomcho, Windle


Nays: _____

Abstentions: _____

Approved this 8th day of October 1996.


MAYOR

Attest:


RECORDER PRO TEM

ORDINANCE NO. 4506

An Ordinance adopting and approving certain changes to the McMinnville Comprehensive Plan Map, 1980, and the McMinnville Zoning Map, 1980; setting certain conditions of development; amending Ordinance Nos. 4082, 4214, and 4410; and repealing Ordinance Nos. 4381, 4441, 4453, and 4466 in their entirety.

RECITALS:

The City's periodic review notice from the Land Conservation and Development Commission requires that the City review its Comprehensive Plan for compliance with new or amended goals or rules. To comply with the commercial and economic development rule (OAR 660-09), the City completed an economic resources inventory and a land needs projection. It was concluded that an additional 98 acres of commercially designated land would be needed to accommodate the City's commercial land needs to year 2010.

The Citizens Advisory Committee worked on the topic to determine those areas where commercial expansion would be most logical over time. The product of their work was a recommendation to the Planning Commission that some 146 parcels located in several areas of town and totalling 98 acres be redesignated and rezoned to commercial.

The Planning Commission then held a public hearing and a special work session on the Citizen Advisory Committee's recommendation and ended up removing some of the recommended parcels while adding some others. The Planning Commission then forwarded their recommendation to the City Council.

The City Council reviewed the Planning Commission recommendation at an August 26, 1991 work session. A public hearing on the recommendation was held by the Council on October 8, 1991 and a public hearing on this Ordinance which implements the Council's decision on the matter was held on November 12, 1991.

It is the desire of the City Council to adopt the changes to the Comprehensive Plan Map within the City's urban growth boundary and to adopt the changes to the zoning map within the corporate limits of the City at this time in order to bring the City into compliance with the statewide planning statutes found in ORS Chapters 197 and 227, and specifically with the City's periodic review notice from the Land Conservation and Development Commission; now, therefore,

THE CITY OF McMINNVILLE ORDAINS AS FOLLOWS:

Section 1. That the City's Comprehensive Plan Map shall be amended as follows:

- (a) That parcels 1, 2, and 3 as shown on Exhibit "A," which is attached hereto and incorporated herein by this reference, be amended from a residential designation to a commercial designation; and that parcels 1, 2, 3, 4, 5, 6, 7, 21, 22, 23, 24 and 25, as shown on Exhibit "B," which is attached hereto and incorporated herein by this reference, likewise be amended from a residential designation to a commercial designation.

- (b) That parcels 1 through 22, inclusive; 24 through 32, inclusive; 35 through 48, inclusive; and 50 through 56, inclusive, as shown on Exhibit "C," which is attached hereto and incorporated herein by this reference, be amended from an industrial designation to a commercial designation; and that parcel 23 shown on Exhibit "C" be amended from a residential designation to a commercial designation.
- (c) That parcels 57, 60, 61, and 62 as shown on Exhibit "D," which is attached hereto and incorporated herein by this reference, be amended from an industrial designation to a commercial designation.
- (d) That parcels 1, 2, and 3 as shown on Exhibit "E," which is attached hereto and incorporated herein by this reference, be amended from a residential designation to a commercial designation; and that parcel 4 as shown on Exhibit "E" be amended from an industrial designation to a commercial designation.
- (e) That parcel 5 as shown on Exhibit "F," which is attached hereto and incorporated herein by this reference, be amended from a residential designation to a commercial designation.
- (f) That parcels 1, 2, 3, 4, and 6 as shown on Exhibit "G," which is attached hereto and incorporated herein by this reference, be amended from a residential designation to a commercial designation.
- (g) That parcels 1, 2, 3, 4, 5, and 6 as shown on Exhibit "H" which is attached hereto and incorporated herein by this reference, are hereby redesignated from the mixture of industrial and residential designations which encumber the property to a commercial designation and that Ordinance No. 4214, Section 2, be amended by striking all reference to the above described property and by amending the map adopted by said Ordinance to exclude the above described properties (CPA 1-82).

Section 2. That parcels 1, 2, and 3 as shown on Exhibit "A" are hereby rezoned from AH PD (Agricultural Holding Planned Development) to C-3 PD (General Commercial Planned Development), from R-1 PD (Single-family Residential Planned Development) to C-3 PD (General Commercial Planned Development), and from R-1 (Single-family Residential) to C-3 PD (General Commercial Planned Development), respectively, subject to the following conditions:

- (a) That landscape plans be submitted to and approved by the McMinnville Landscape Review Committee. A minimum of 14 percent of the site must be landscaped with emphasis placed at the street frontage. An arborvitae hedge or some similar type of planted visual screen shall be required along the property lines where adjacent to residentially zoned lands.

- (b) Detailed plans showing elevations, site layout, signing, landscaping, parking, and lighting must be submitted to and approved by the Planning Commission before actual development may take place. The provisions of Chapter 17.51 of the McMinnville Zoning Ordinance may be used to place conditions on any development and to determine whether or not specific uses are permissible.
- (c) No use of any retail commercial use shall normally occur between the hours of 12:30 a.m. and 6:00 a.m.
- (d) No building shall exceed the height of 35 feet.
- (e) That if outside lighting is to be provided, it must be directed away from residential areas and public streets.
- (f) That signs located within the planned development site be subject to the following limitations:
 - 1. All signs must be flush against the building and not protrude more than 12 inches from the building face, except that up to two free standing monument-type signs not more than six feet in height and which meet the requirements of (2) and (3) below are allowed;
 - 2. All signs, if illuminated, must be indirectly illuminated and nonflashing;
 - 3. No individual sign exceeding thirty-six (36) square feet in size shall be allowed.
- (g) All business, service, repair, processing, storage, or merchandise displays shall be conducted wholly within an enclosed building except for the following:
 - 1. Off-street parking and loading.
 - 2. Temporary display and sales of merchandise, providing it is under cover of a projecting roof and does not interfere with pedestrian or automobile circulation.
- (h) That Section 3 of Ordinance No. 4082 is hereby amended by substituting the words "C-3 PD (General Commercial Planned Development)" for the words "AH PD (Agricultural Holding Planned Development)". All other applicable provisions of Ordinance 4082 remain in full force and effect.
- (i) That Ordinance No. 4410, Section 2, be amended by removing the above described parcel 2 as shown on Exhibit "A" from the adopted description and map of those properties effected by Ordinance No. 4410.

Section 3. That the properties described as parcels 1, 2, 3, 4, 5, 6, 7, 21, 22, 23, 24, and 25 on Exhibit "B" of this Ordinance are hereby rezoned from an R-4 (Multiple-family Residential) zone to an O-R (Office/Residential) zone.

Section 4. That the properties described as parcels 1 through 22, inclusive; and 41 through 48, inclusive; as shown on Exhibit "C" of this Ordinance are hereby rezoned from an M-1 (Light Industrial) zone to a C-3 (General Commercial) zone. That the properties described as parcels 50 through 56, inclusive, as shown on Exhibit "C" of this Ordinance are hereby rezoned from an M-1 PD (Light Industrial Planned Development) zone to a C-3 (General Commercial) zone. That the properties described as parcels 25 through 32, inclusive; and 35 through 40, inclusive; as shown on Exhibit "C" of this Ordinance are hereby rezoned from an M-2 (General Industrial) zone to a C-3 (General Commercial) zone; and that the property described as parcel 23 on Exhibit "C" of this Ordinance is hereby rezoned from an R-4 (Multiple-family Residential) zone to a C-3 (General Commercial) zone.

Section 5. That the properties described as parcels 57, 60, 61, and 62 on Exhibit "D" of this Ordinance are hereby rezoned from an M-2 (General Industrial) zone, an M-1 (Light Industrial) zone, an M-2 zone, and an M-1 zone, respectively, to a C-3 PD (General Commercial Planned Development) zone subject to the following condition:

(a) All uses permitted in Chapter 17.33 of the McMinnville Zoning Ordinance (Ordinance No. 3380) are allowed subject to the provisions of that Chapter except for the following uses, which are not allowed:

1. Boarding house, lodging house, rooming house;
2. Public or private school;
3. Hotel or motel;
4. Single-family or multiple-family dwelling.

Section 6. That the properties described as parcels 1 and 2 on Exhibit "E" of this Ordinance are hereby rezoned from an R-2 (Single-family Residential) zone to a C-3 (General Commercial) zone. That the property described as parcel 3 on Exhibit "E" of this Ordinance is hereby rezoned from an R-4 (Multiple-family Residential) zone to a C-3 (General Commercial) zone. That the property described as parcel 4 on Exhibit "E" of this Ordinance is hereby rezoned from an M-1 (Light Industrial) zone to a C-3 (General Commercial) zone.

Section 7. That that portion of the property described as parcel 5 on Exhibit "F" of this Ordinance which is presently within the corporate limits of the City of McMinnville is hereby rezoned from an R-1 (Single-family Residential) zone to a C-3 (General Commercial) zone.

Section 8. That the properties described as parcels 1 and 2 on Exhibit "G" of this Ordinance are hereby rezoned from an R-3 (Two-family Residential) zone to an O-R (Office/Residential) zone. That the properties described as parcels 3 and 4 on Exhibit "G" of this Ordinance are hereby rezoned from an R-2 (Single-family Residential) zone to an O-R (Office/Residential) zone. That the property described as parcel 6 on Exhibit "G" of this Ordinance is hereby rezoned from an R-4 (Multiple-family Residential) zone to an O-R (Office/Residential) zone.

Section 9. That those portions of the properties shown as parcels 2 and 3 on Exhibit "H" of this Ordinance which are presently within the corporate limits of the City of McMinnville are hereby rezoned from an AH PD (Agricultural Holding Planned Development) zone to a C-3 PD (General Commercial Planned Development) zone, subject to the provisions of Section 10 below. That the property described as parcel 5 on Exhibit "H" of this Ordinance is hereby rezoned from a county AF-20 (Agricultural/Forestry 20-acre minimum) zone to a City C-3 PD (General Commercial Planned Development) zone, subject to the provisions of Section 10 below. That the property described as parcel 6 on Exhibit "H" of this Ordinance is hereby rezoned from an M-L PD (Limited Light Industrial Planned Development) zone to a C-3 PD (General Commercial Planned Development) zone, subject to the provisions of Section 10 below. That those properties shown on Exhibit "H" of this Ordinance as parcels 1 and 4, and those portions of the properties as shown on Exhibit "H" as parcels 2 and 3 but which are outside the corporate limits of the City, shall be zoned C-3 PD (General Commercial Planned Development) upon annexation to the City, shall be subject to the provisions of Section 10 below, and such requirements shall be noted on the face of the Comprehensive Plan Map.

Section 10. The provisions of Chapter 17.33 of Ordinance No. 3380 (the McMinnville Zoning Ordinance) shall apply to the development of the properties noted on Exhibit "H" of this Ordinance subject to the following conditions and limitations:

- (a) No individual use which according to the latest version of the Institute of Traffic Engineers Trip Generation Manual would generate in excess of 1,500 trips on an average week day is permitted.
- (b) No direct access onto Highway 18 (Three Mile Lane) is permitted.
- (c) All business, service, repair, processing, and merchandise displays shall be conducted wholly within an enclosed building except for the following:
 1. Off-street parking and loading.
 2. Temporary display and temporary sales of merchandise, providing it is undercover of a projecting roof and does not interfere with pedestrian or automobile circulation.

3. Outside storage of non-retail goods, provided it is screened from visibility beyond the property lines.
- (d) That all outside lighting must be directed away from residential areas.
 - (e) That landscape plans be submitted to and approved by the McMinnville Landscape Review Committee. A minimum of 14 percent of the site must be landscaped with emphasis placed on the street frontages. An arborvitae hedge or some similar type of planted screen shall be required along the north property line where the commercial zoning abuts residential zoning. Special attention shall be paid to the landscaping along Norton Lane where the commercial area is across the street from the residential portions of the Bend O'River Village First Addition subdivision.
 - (f) The following list is exempt from Section 10 (c) above: automobile, truck, trailer, boat, golf cart, or other type of implement sales, and nursery sales which require outdoor displays are allowed subject to strict interpretation and application of subsections (e) and (g) of Section 10.
 - (g) That plans and elevations for all buildings must be submitted to and approved through a design review process to be conducted by a person or persons to be appointed by the City Council before any development may take place. The provisions of Chapter 17.51 of the McMinnville Zoning Ordinance shall be used as the basis for such review. The decision(s) of the design review person or persons may be appealed to the Planning Commission.
 - (h) That only two free-standing signs, limited to a maximum of 30 feet in height, are allowed, one on the west side of Norton Lane and one on the east side of Norton Lane. All other signs must either be flush against the buildings and not protrude more than 12 inches from the building face, or they must be non-illuminated or indirectly illuminated monument-type signs not exceeding six feet in height nor 100 square feet in area.

Section 11. That Ordinance Nos. 4381, 4441, 4453, and 4466 are hereby repealed in their entirety.

Section 12. That this Ordinance shall be subject to the terms and conditions of Ordinance No. 3823, entitled "Initiative and Referendum," for a period of 30 days.

Passed by the Council this 10th day of December, 1991 by the following votes:

Ayes: Aleman, Windle, Massey, Blanchard, Dell, Hansen

Nays: _____

Approved this 10th day of December, 1991.

Attest: Carolyn Beredick
RECORDER

Edward J. Gormley
MAYOR

EXHIBIT 'A'

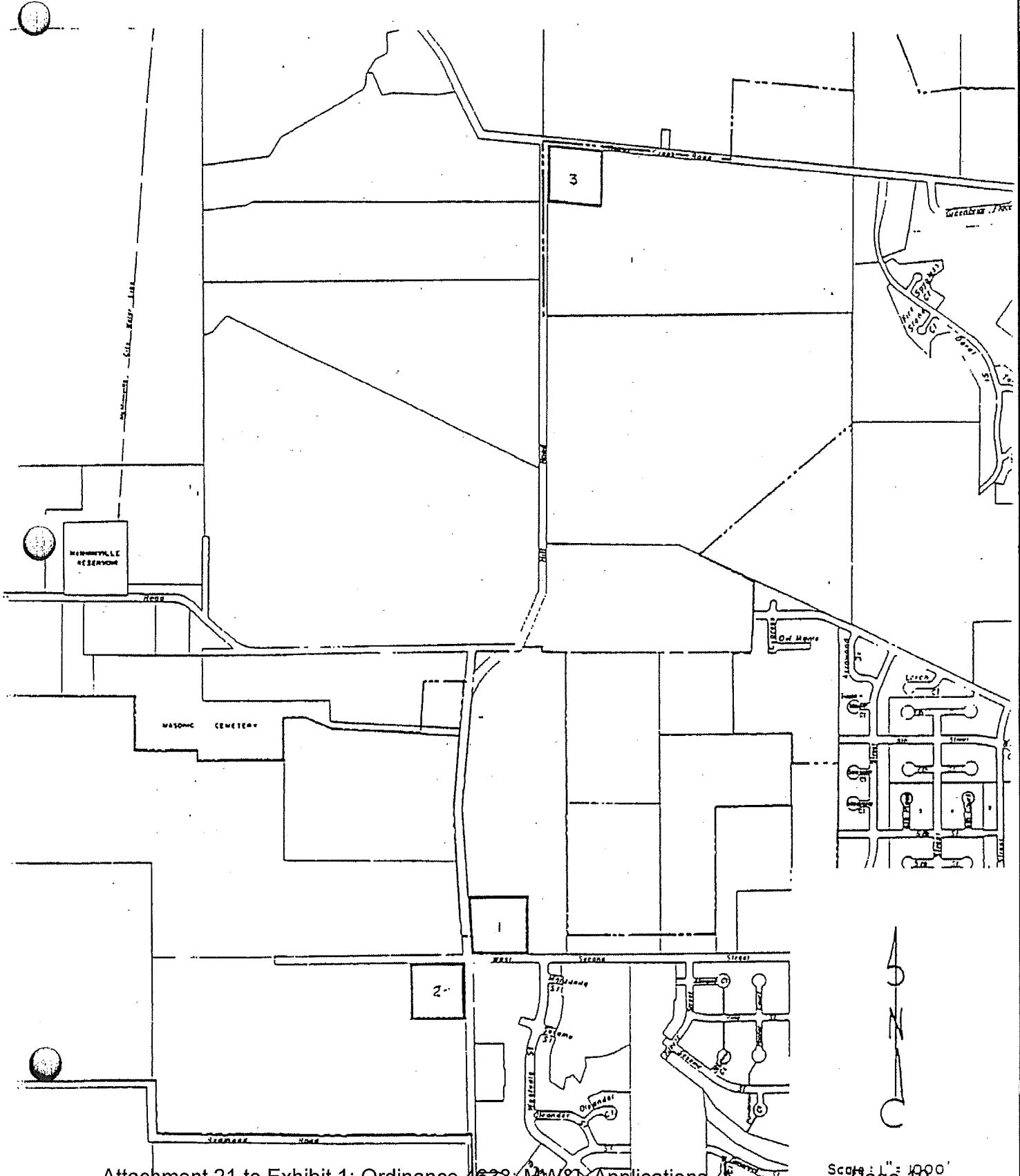


EXHIBIT "B"

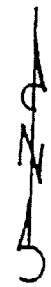
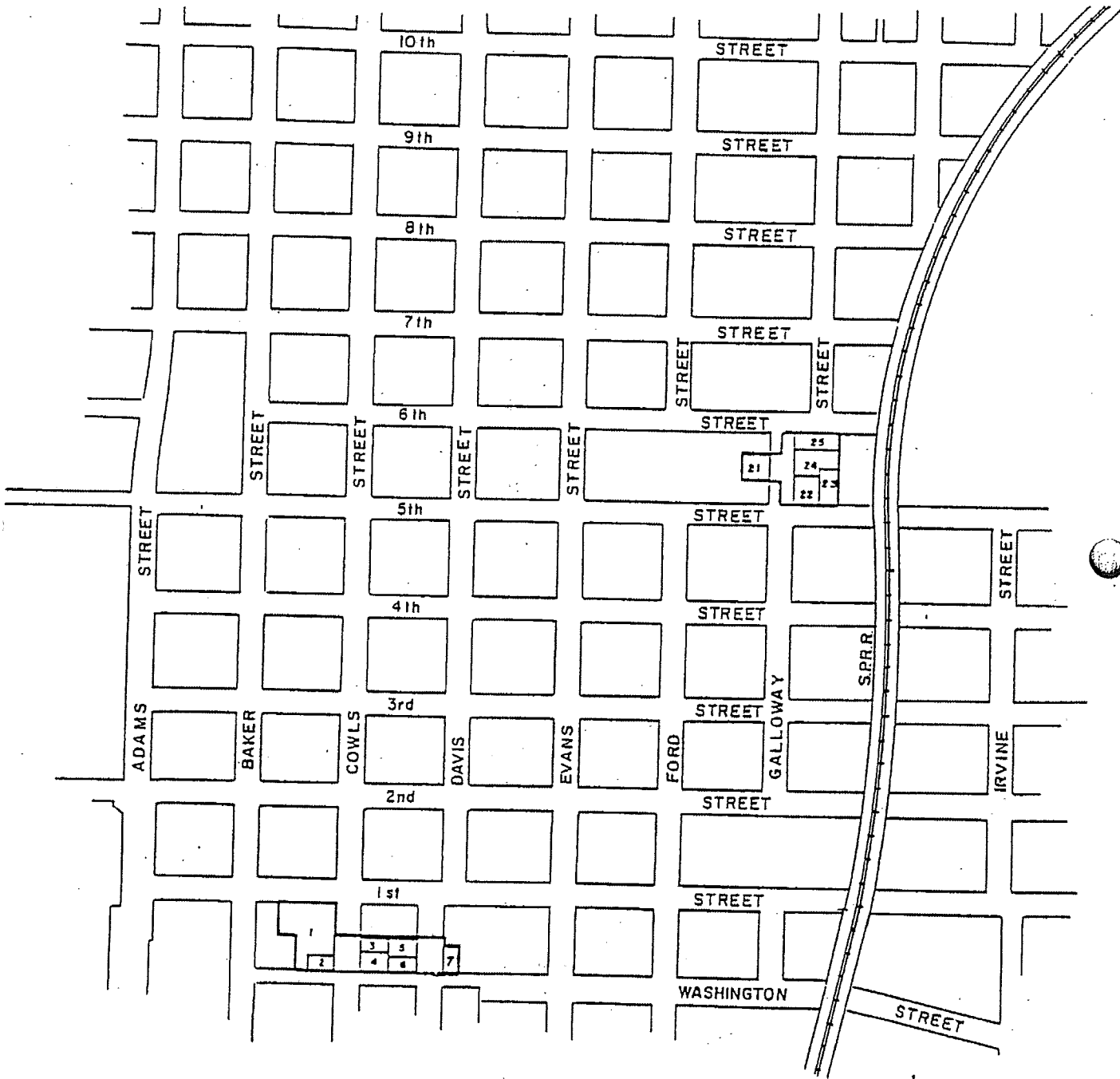


EXHIBIT "C"

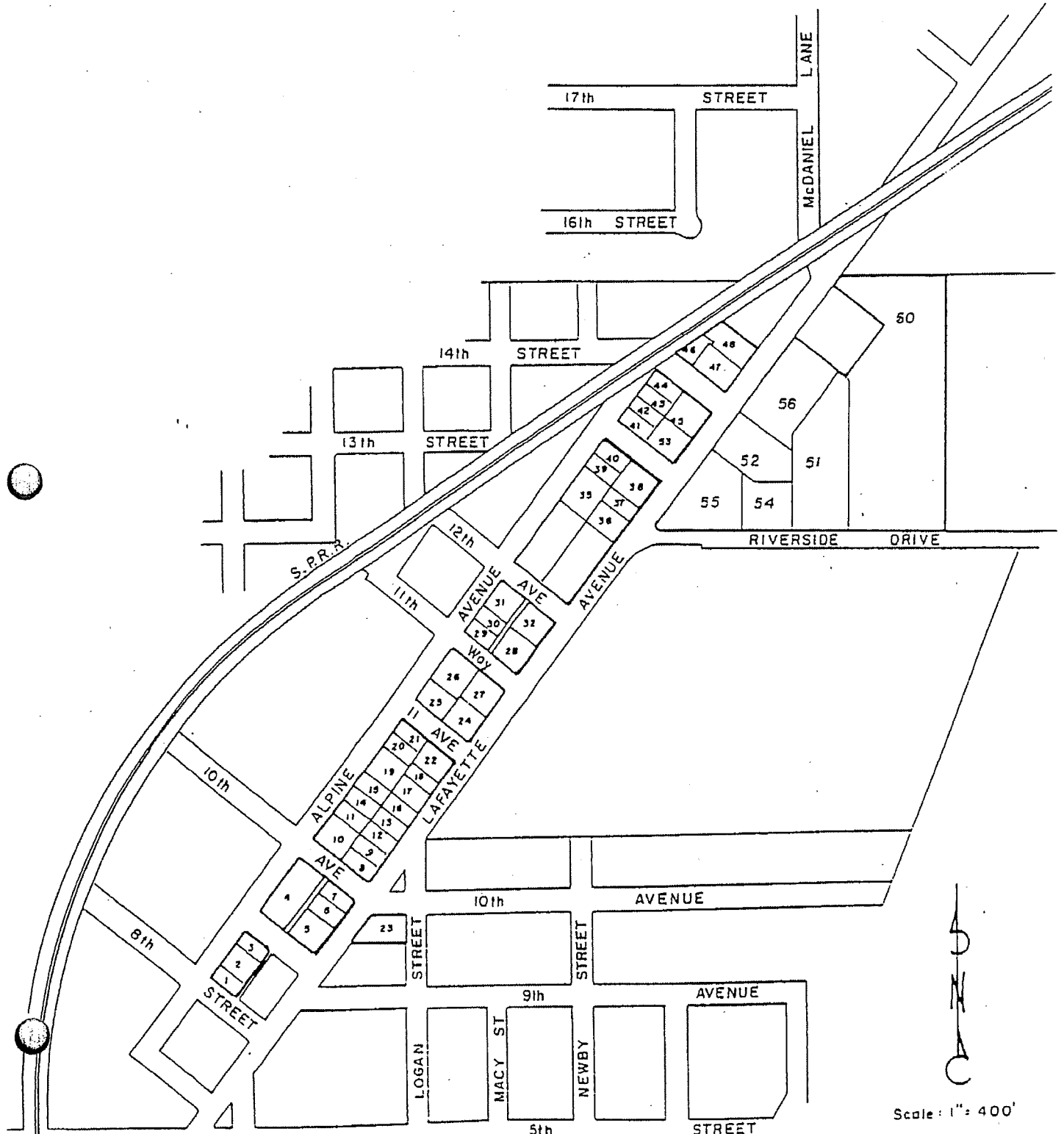


EXHIBIT "D"

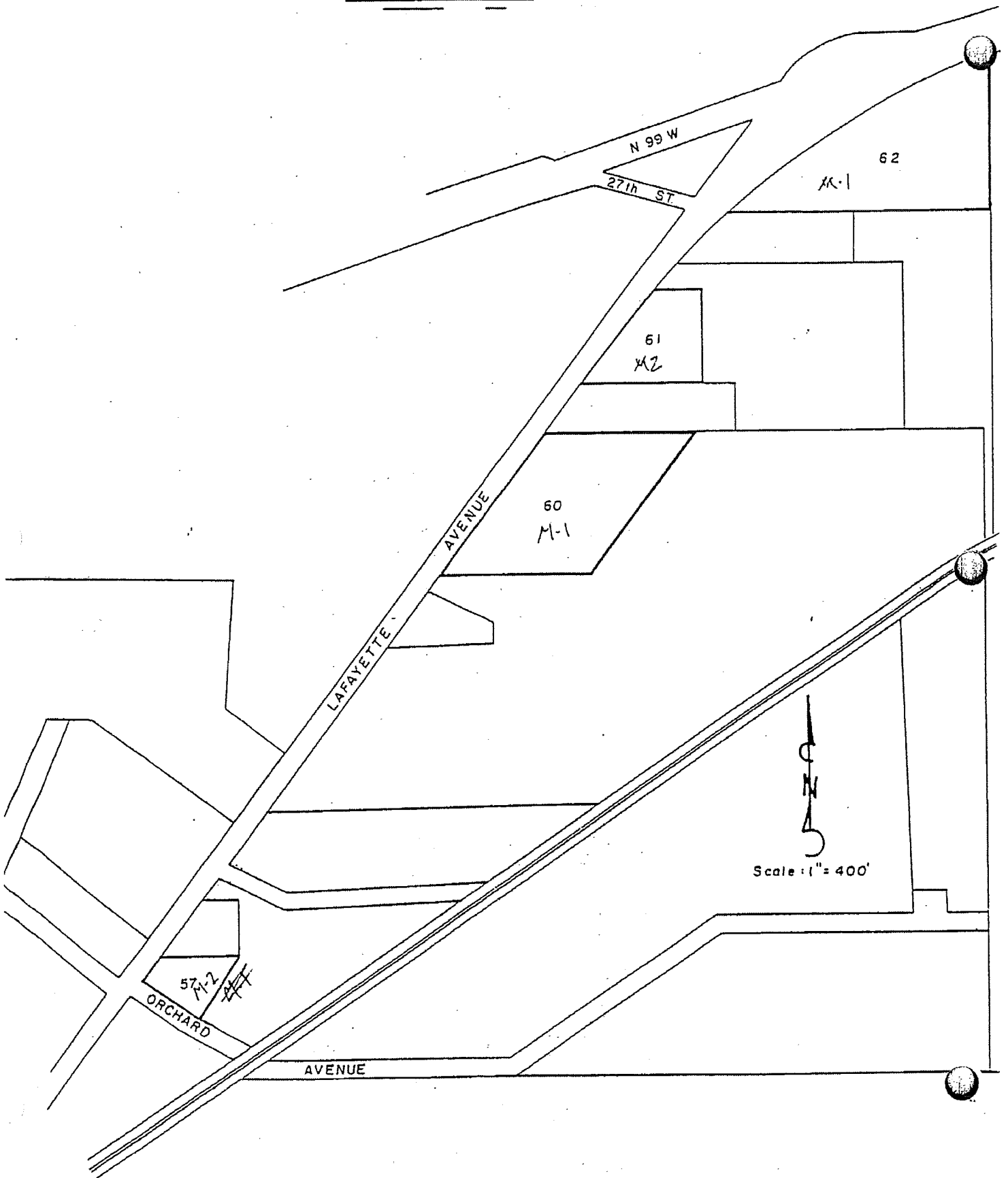


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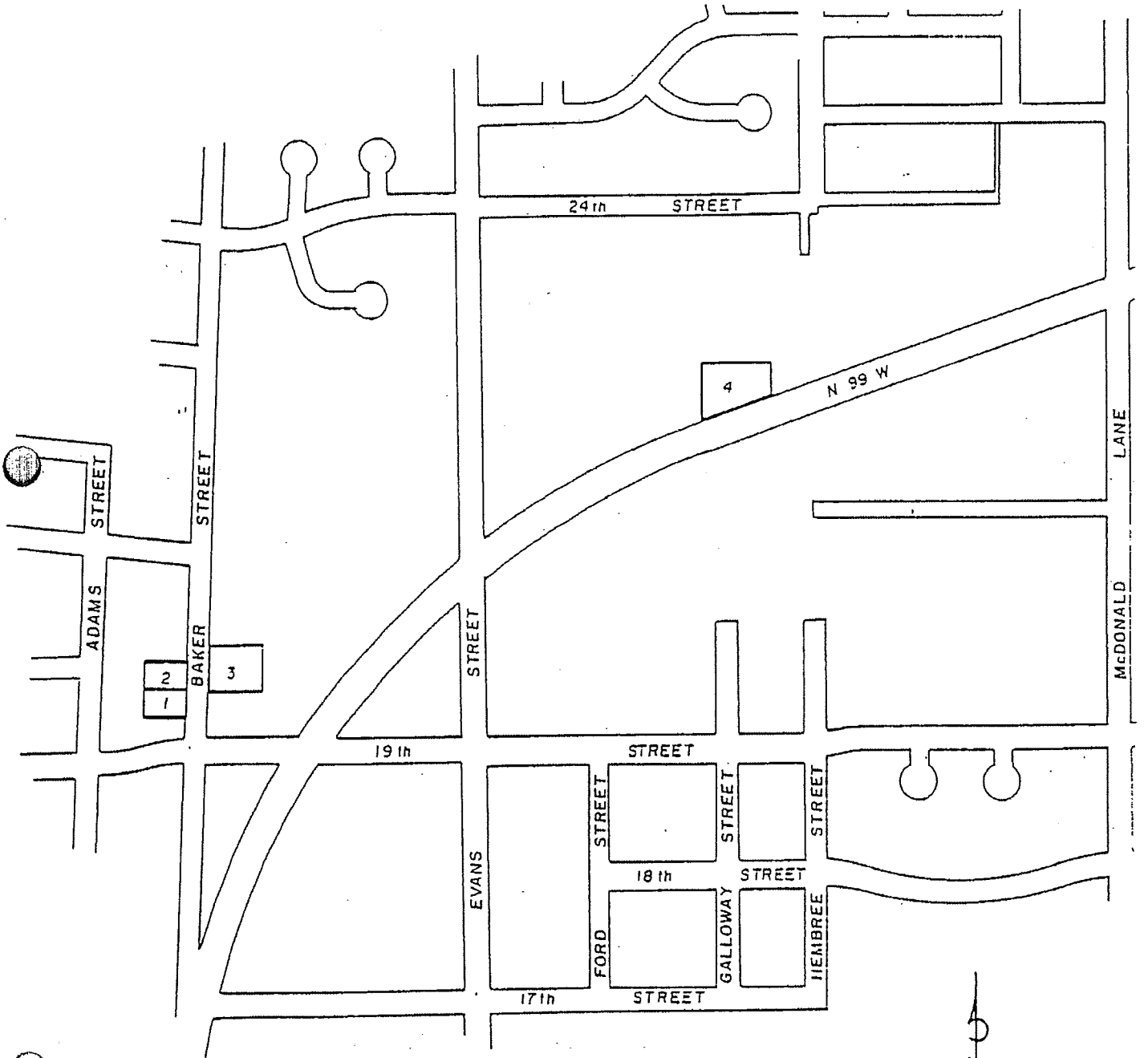


EXHIBIT "F"

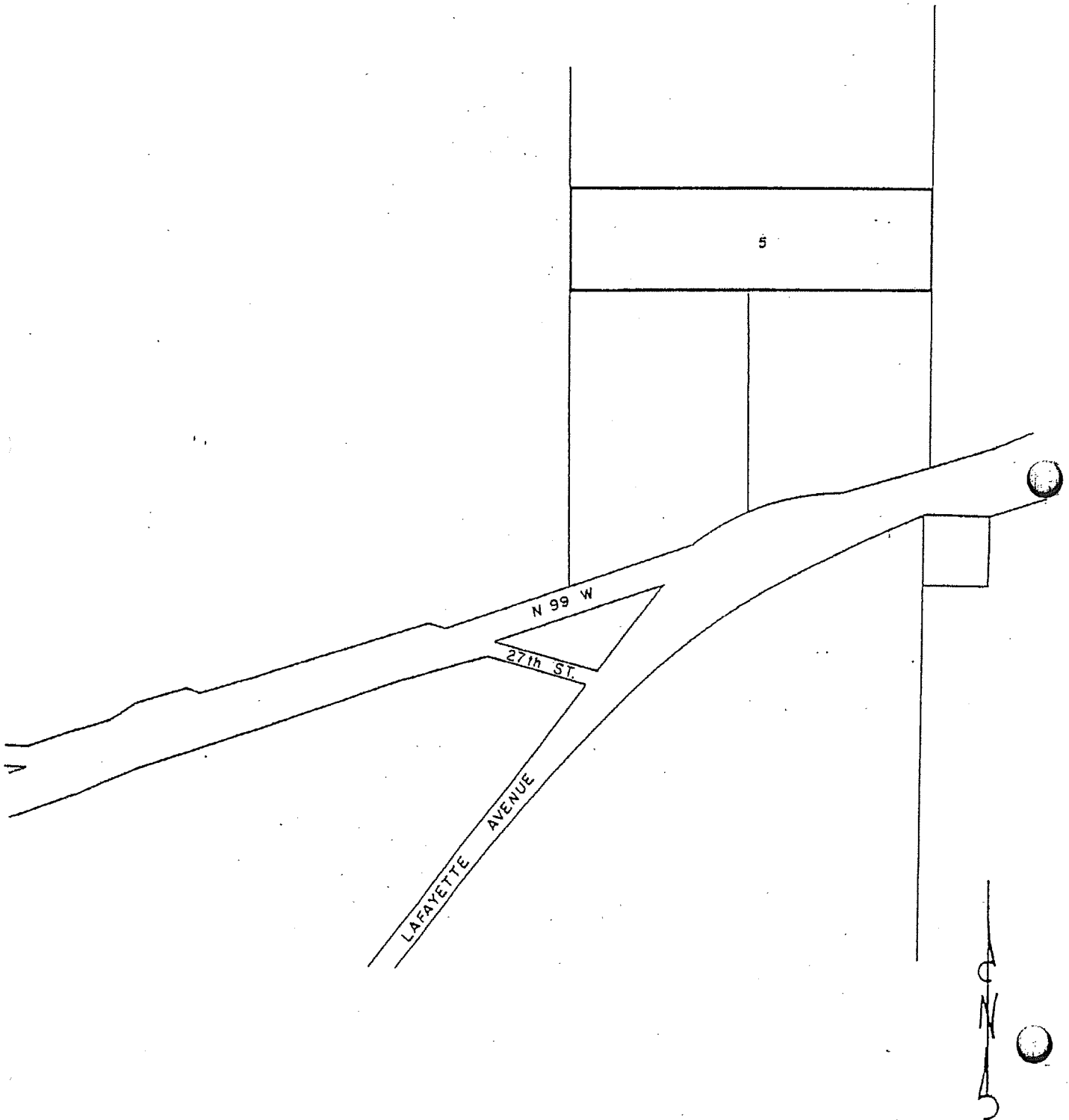
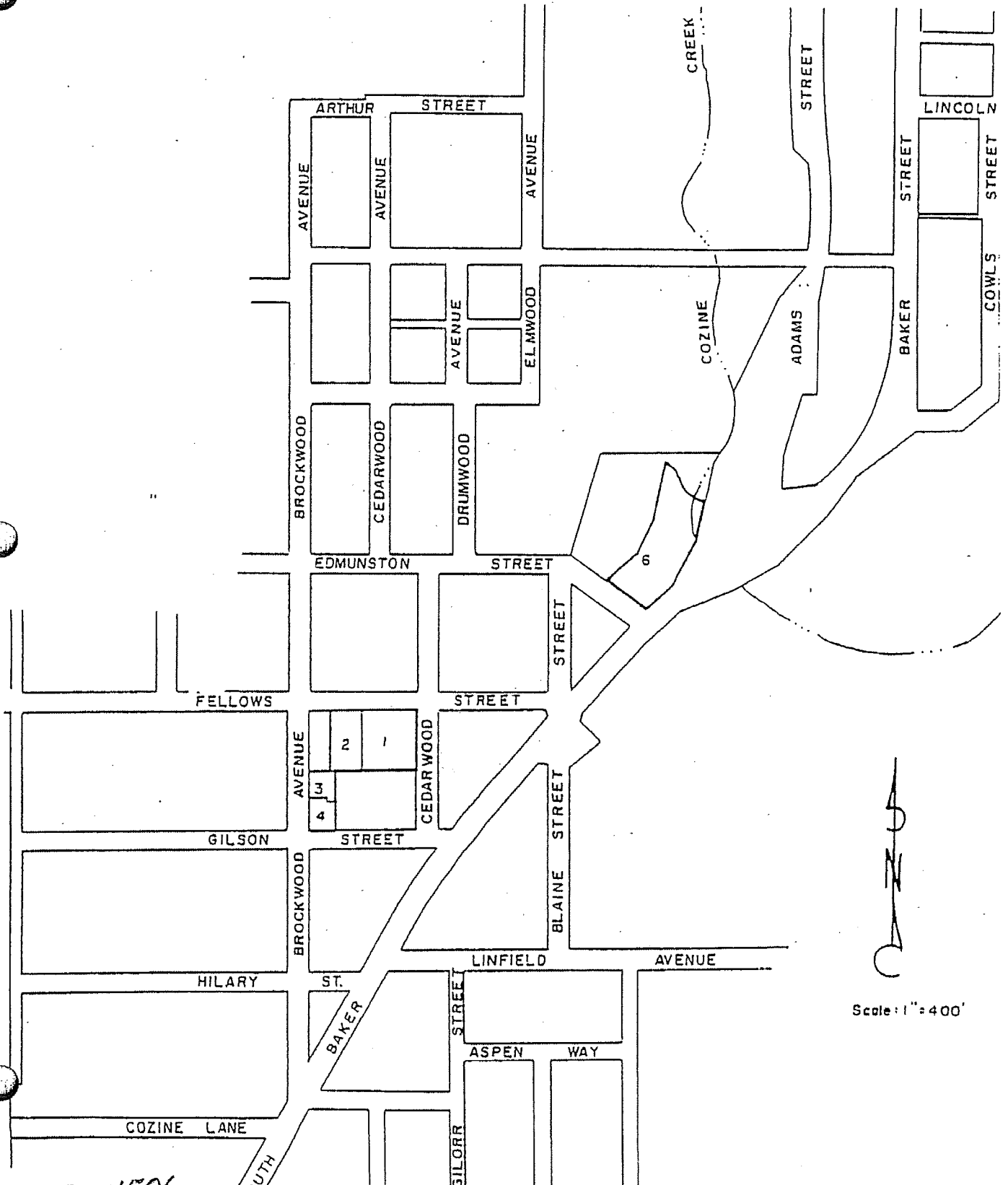
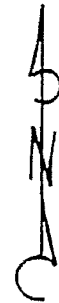
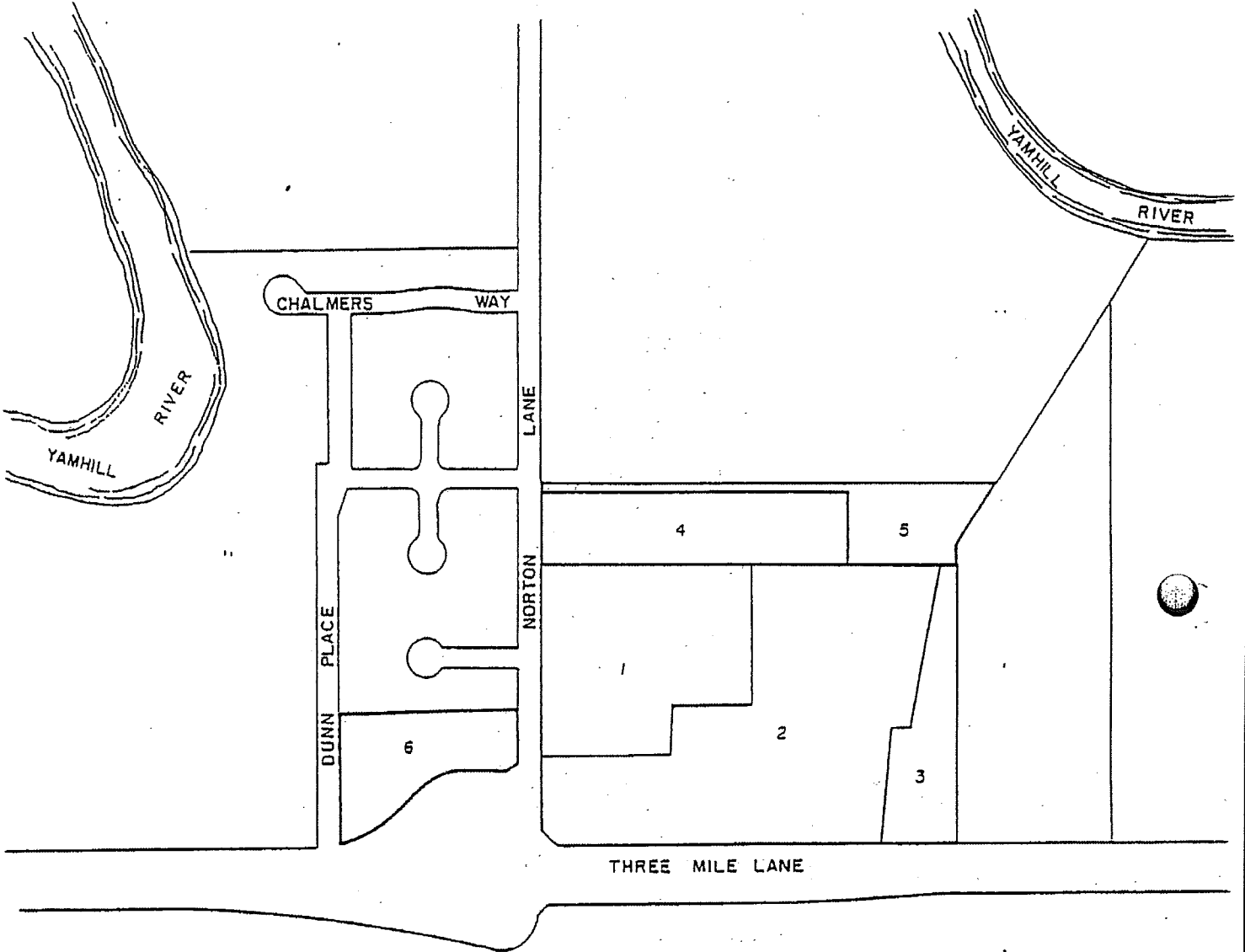


EXHIBIT "G"



ORD 4506

EXHIBIT "H"



Scale: 1" = 400'

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