

# West Wenatchee Substation – Site Selection





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# The Electric Power System

The Electric Power System is divided into generation, transmission, and distribution.

## 1. Hydro Project

In Chelan County, electrical power is generated at one of the PUD's three hydroelectric projects.

## 2. Transmission lines.

Transmission lines leave hydro projects and transmission switchyards.

## 3. Transmission Switchyard

Power moves across large transmission lines to a transmission switchyard where electrical voltage is reduced by transformers.

## 5. Distribution lines

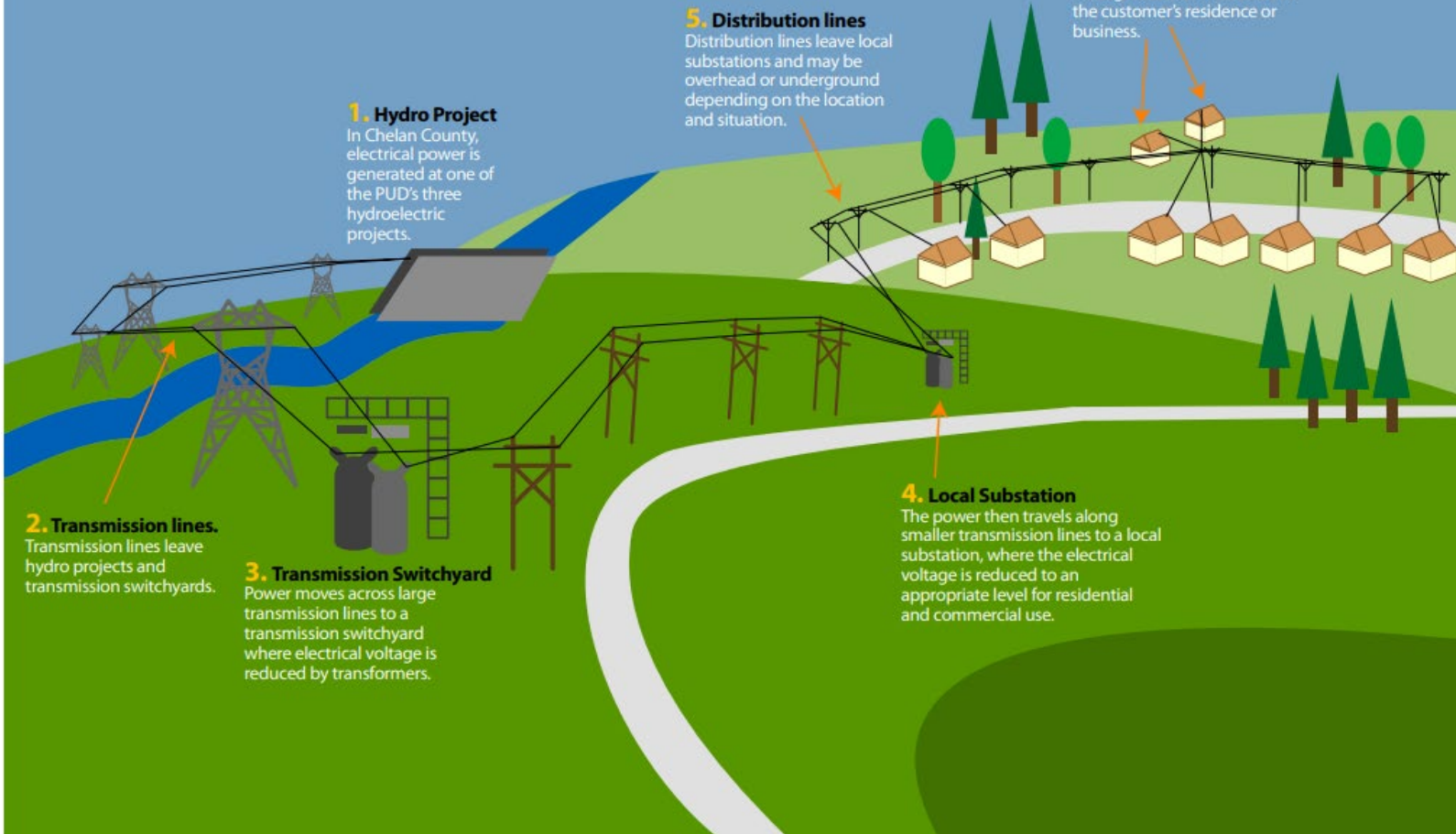
Distribution lines leave local substations and may be overhead or underground depending on the location and situation.

## 4. Local Substation

The power then travels along smaller transmission lines to a local substation, where the electrical voltage is reduced to an appropriate level for residential and commercial use.

## 6. Your home or business

Finally, power travels along distribution lines and is converted to a standard voltage through transformers and into the customer's residence or business.



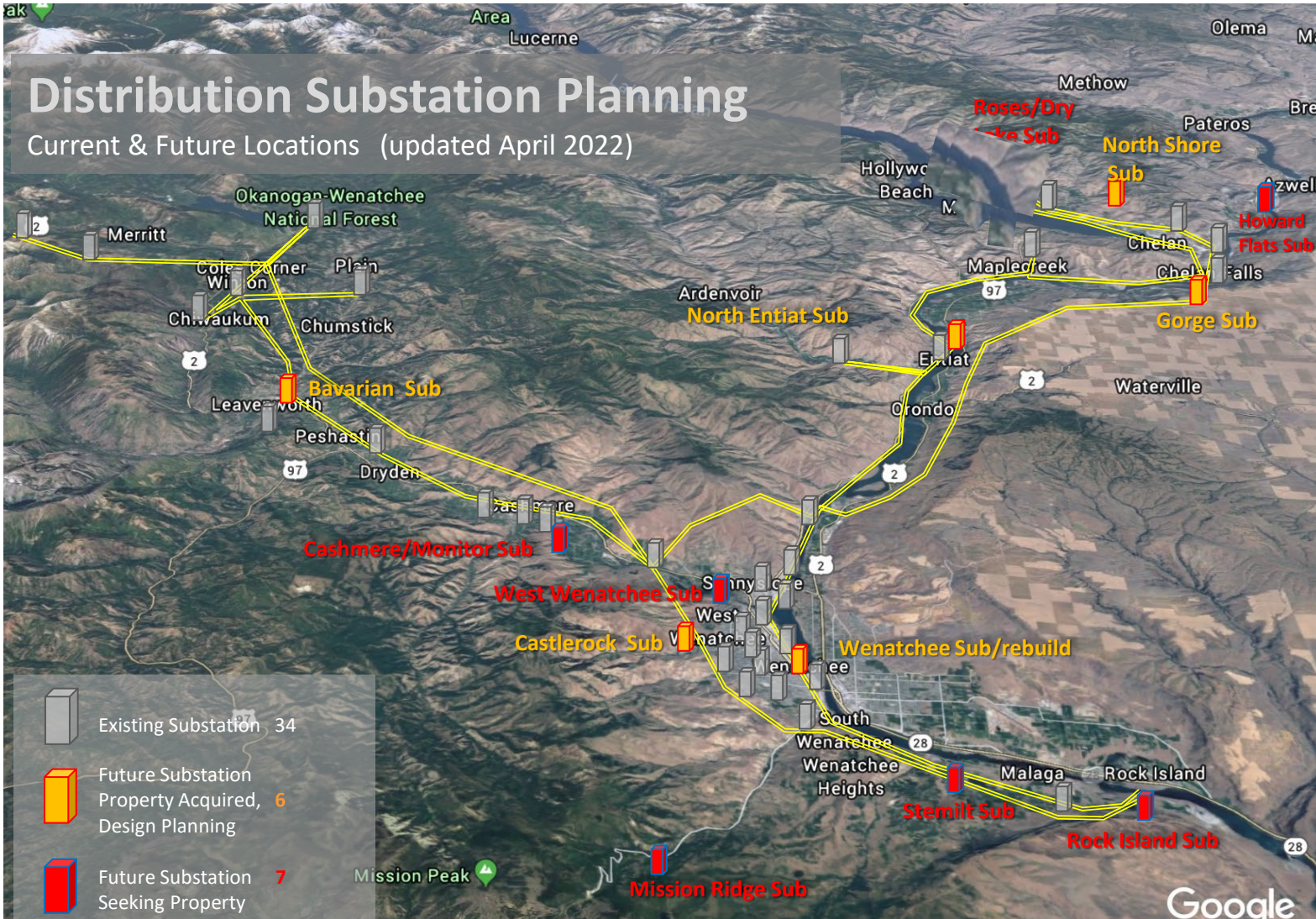
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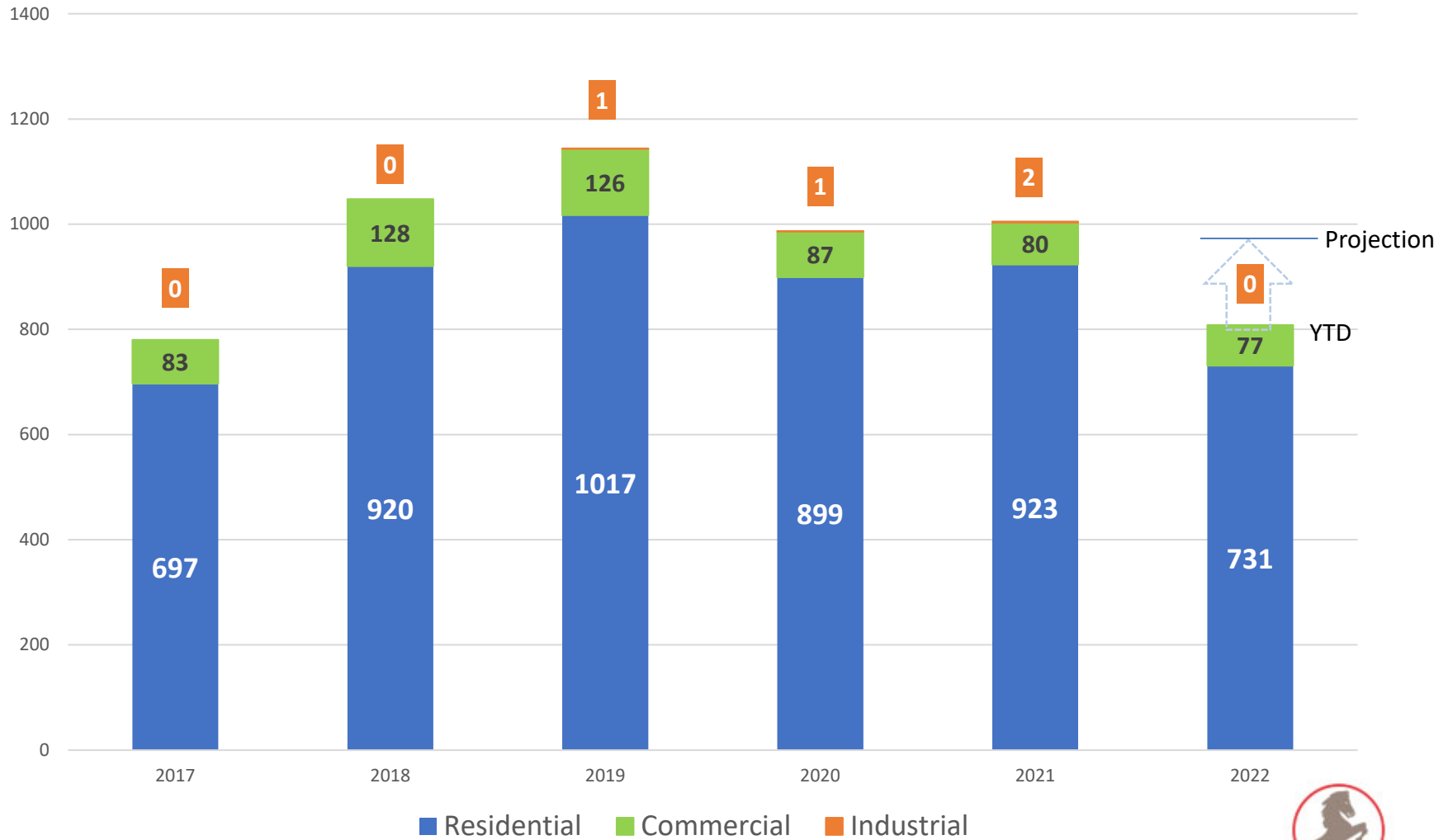


# Distribution Substation Planning

Current & Future Locations (updated April 2022)



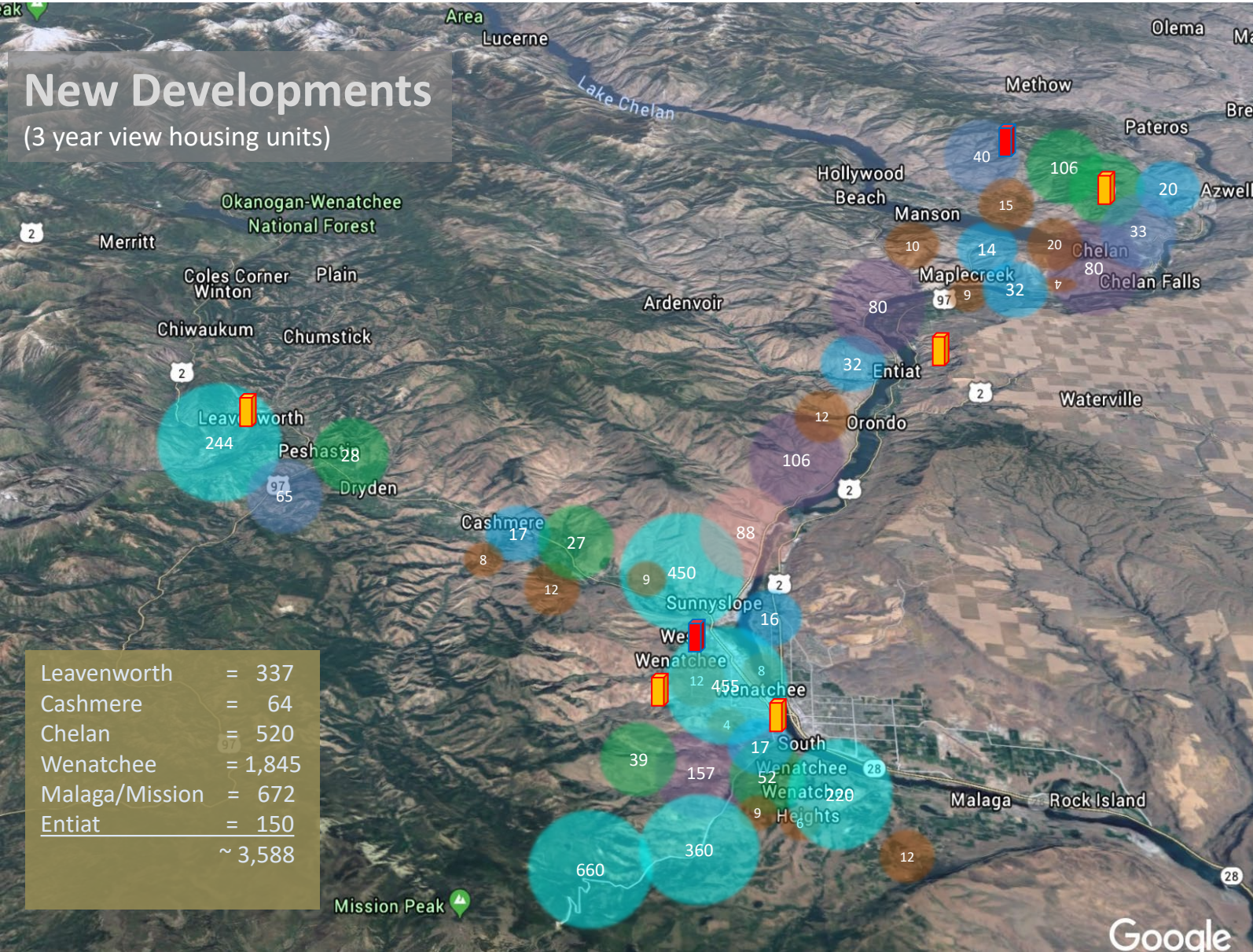
# New meter installs 2017 - 2022 YTD





# New Developments

(3 year view housing units)



Google



# Substation Build Plan



## (34) total active substation

*Under Peak load conditions:*

- (8) of 34 stations at or above 90% loading
- (12) of 34 stations at or above 80% loading
- (26) of 34 stations at or above 50% loading

- Ensures distribution system reliability for all customers
- Provide system capacity to meet the demands of local growth and development
- Peak demand (generally winter peaks) drive substation build schedule
- Peak demand is typically 2x greater than average energy



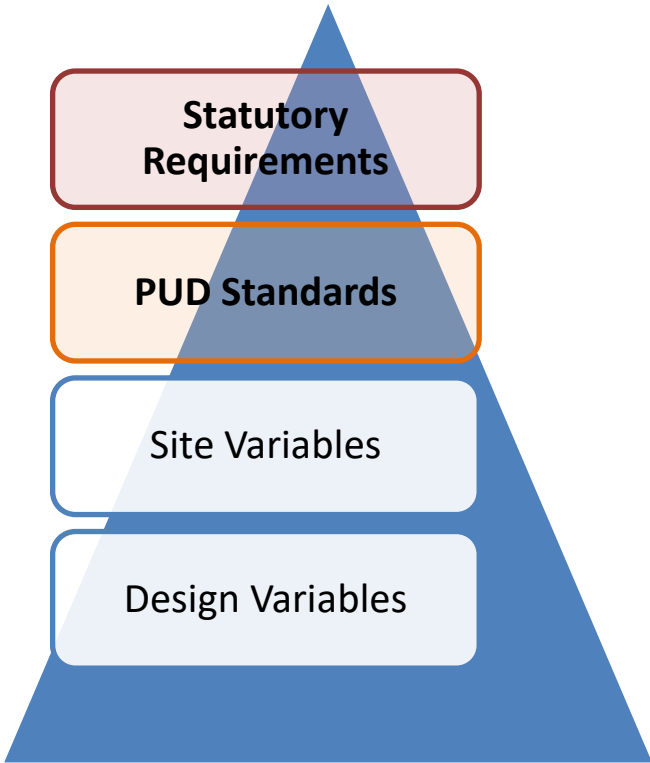
# Chelan PUD Substation Planning Updated Nov. 2022

Substation & Vicinity		Year needed <sup>1</sup>	Property Acquired	Transmission Required <sup>2</sup>
North Shore Substation	Lake Chelan, Henderson Road	2023	Yes	No
Bavarian Substation	Chumstick Highway Leavenworth	2023	Yes	Yes
Wenatchee Substation	Worthen Street Wenatchee	2024	Yes	No
Castlerock Substation	West Wenatchee, Castlerock Street	2024	Yes	Yes
West Wenatchee Substation	Western Foothills vicinity Wenatchee	2024	No	TBD
Gorge Substation	Gorge Road, South of Chelan City	2024	Yes	Yes
Stemilt Substation	Stemilt Creek/Malaga West Vicinity	2025	No	TBD
Roses Substation	North Shore Lake Chelan, Roses Lake	2025	No	TBD
Entiat North Substation	North End of Entiat City Hwy 97A	2027	Yes	No
Mission Ridge Substation	Mission Ridge / Upper Squilchuck	2030	No	Yes
Cashmere East Substation	Cashmere East / Monitor Vicinity	2030	No	TBD
Howard Flats Substation	Chelan Airport / Howard Flats Vicinity	2029	No	Yes
Rock Island Substation	Rock Island / Malaga East Vicinity	2030	No	TBD

Notes:

1. Year needed is based on forecasted capacity and is subject to change from year to year
2. Transmission required (Y/N) based on if significant new transmission corridors are required

# Substation Siting Decision Evaluation Criteria



**Chelan PUD has a culture of compliance and will not deviate from its legal obligations.**

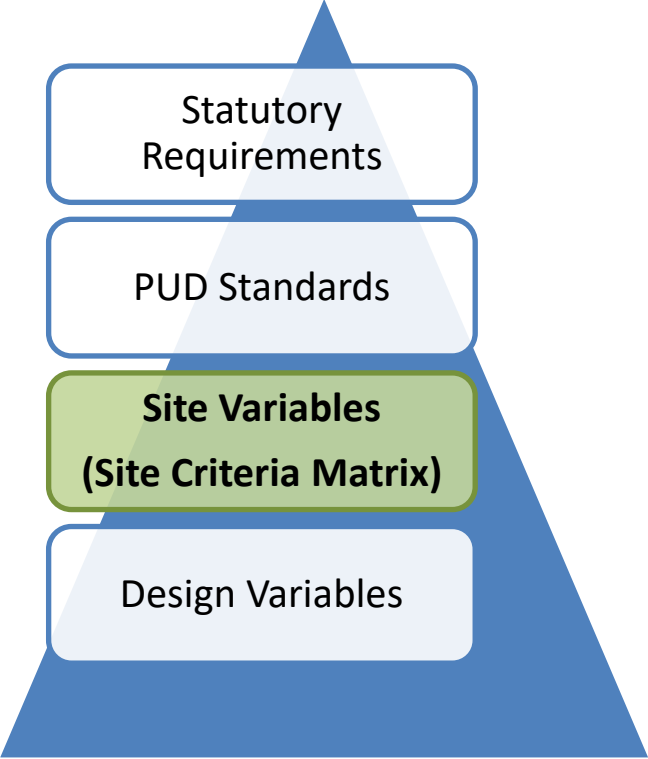
National Electric Safety Code (NESC) compliant	Conditional Use Permit (CUP)	<ul style="list-style-type: none"> <li>• Shoreline</li> <li>• Wetlands</li> <li>• Flood Zones</li> </ul>
Property purchase price and gifting laws	Historical and cultural significance	Critical area zoning

**A deviation from PUD standards will require an operational and economic impact study and is outside the scope of our typical community engagement process.**

Up to two-28 MVA substation transformers	Overhead transmission	American National Standards Institute (ANSI)
115kV transmission voltage loops	Institute of Electrical and Electronics Engineers (IEEE)	Awareness of most current technology (national standards)
12.47kV distribution voltage	Mobile substation capable	



# Substation Siting Decision Evaluation Criteria



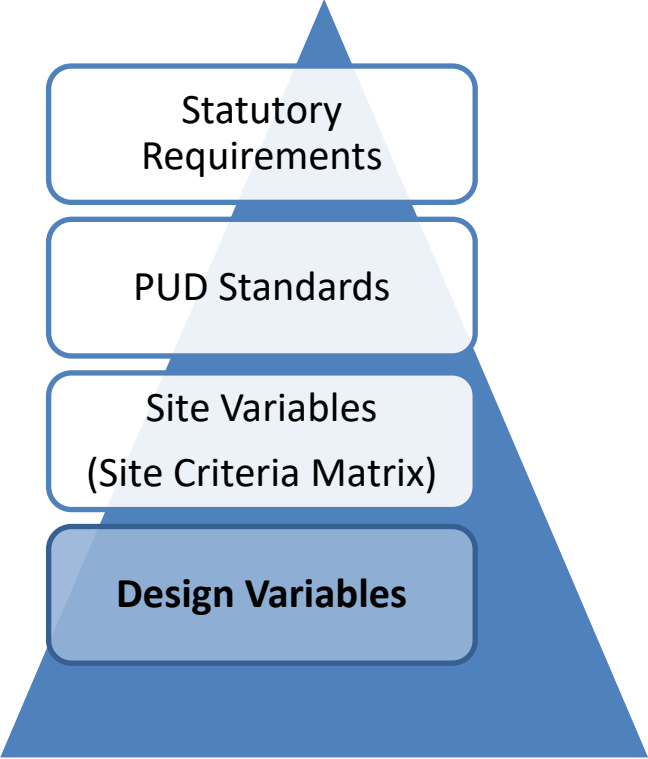
System Considerations

Land Considerations

Environmental Considerations

Aesthetics & Neighborhood Values

# Substation Siting Decision Evaluation Criteria



These are items that can be considered when mitigating potential impacts of specific sites. Site Variables will be applied to the identified site(s).

<ul style="list-style-type: none"> <li>Noise mitigation</li> <li>Landscaping</li> <li>Lighting</li> <li>Fencing</li> </ul>	<p>Architectural improvements</p>	<p>Distribution OH &amp; UG construction</p>
<ul style="list-style-type: none"> <li>Timing and impact of construction</li> </ul>	<p>Profile, including heights and set-backs</p>	<ul style="list-style-type: none"> <li>Orientation</li> <li>Mobile substations capable</li> </ul>



# Design Variables Applied



**Walla Walla St. Substation**



**Ohme Substation**





## Substation Siting - West Wenatchee Substation Decision Evaluation Matrix

		#1a	#1b	#2	#3				
System Considerations	Proximity to existing transmission lines	5	3	4	2				
	Proximity to service existing loads (reliability)	4	4	3	5				
	Ability to service planned and future loads (proximity to growth)	5	5	5	5				
	Reliability (loop feed vs. radial feed)	5	5	5	5				
	Ability to utilize District's standard substation footprint	5	4	4	4				
		24	21	21	21				
Land Considerations	Land availability	4	4	3	5				
	Land purchase price	4	4	5	5				
	Land parcel size (2 acre min.)	4	4	4	4				
	Site access (mobile substation)	4	4	2	4				
	Land slopes and contours	4	4	1	4				
	Highest and best use of land	4	4	4	3				
		24	24	19	25				
Environmental Considerations	Ability to mitigate groundwater on site (if present)	4	4	3	5				
	Ability to acquire easements (magnitude) and permitting	4	4	4	4				
	Ability to meet security standards at site	5	5	4	4				
	Ability to mitigate threats from natural disasters	5	5	4	5				
	Magnitude of land disturbance	4	4	1	4				
	Ability to mitigate threats from wildfire	4	4	3	4				
		26	26	19	26				
Aesthetics and Neighborhood Values	Ability to mitigate general aesthetic values								
	Ability to mitigate light and noise impact								
	Ability to utilize or install underground distribution								
	Ability to mitigate view impacts								
	Flexibility in landscaping theme options								
	Proximity to existing neighborhood and residences								
	Ability to incorporate community improvements								
	Other (as suggested by stakeholders)								
		0	0	0	0				
<b>RATING</b>		4.4	4.2	3.5	4.2				

RATING SCALE - 1 to 5  
5 = MORE PREFERRED  
1 = LESS PREFERRED

## Neighborhood & Aesthetic Values

Ability to mitigate general aesthetic values

Ability to mitigate light and noise impact

Ability to utilize or install underground distribution

Ability to mitigate view impacts

Flexibility in landscaping theme options

Proximity to existing neighborhood and residences

Ability to incorporate community improvements

Other

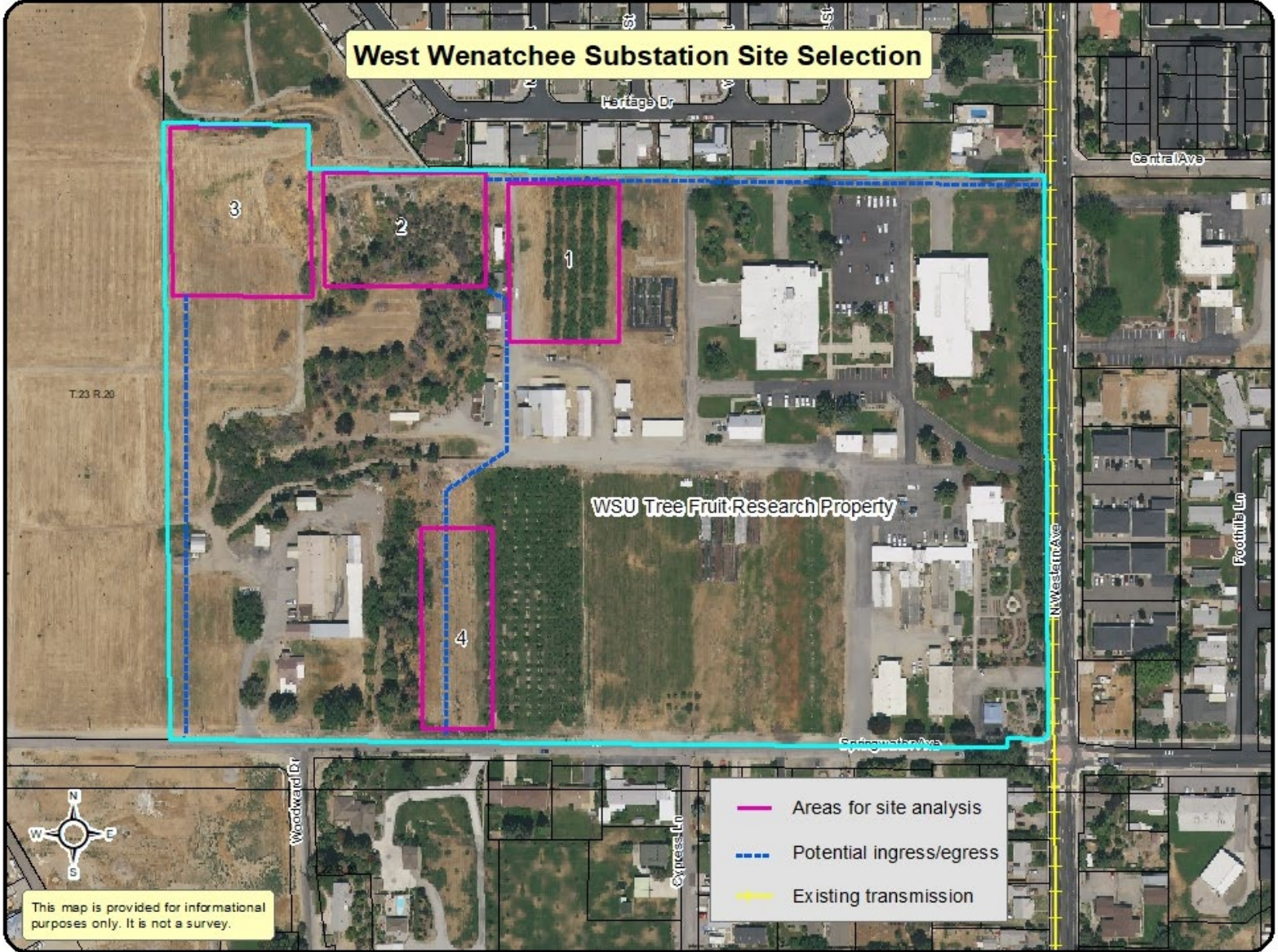


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# West Wenatchee Substation Site Selection



This map is provided for informational purposes only. It is not a survey.

- Areas for site analysis
- - - Potential ingress/egress
- - - Existing transmission



WSU - Location 1a (Ohme layout)

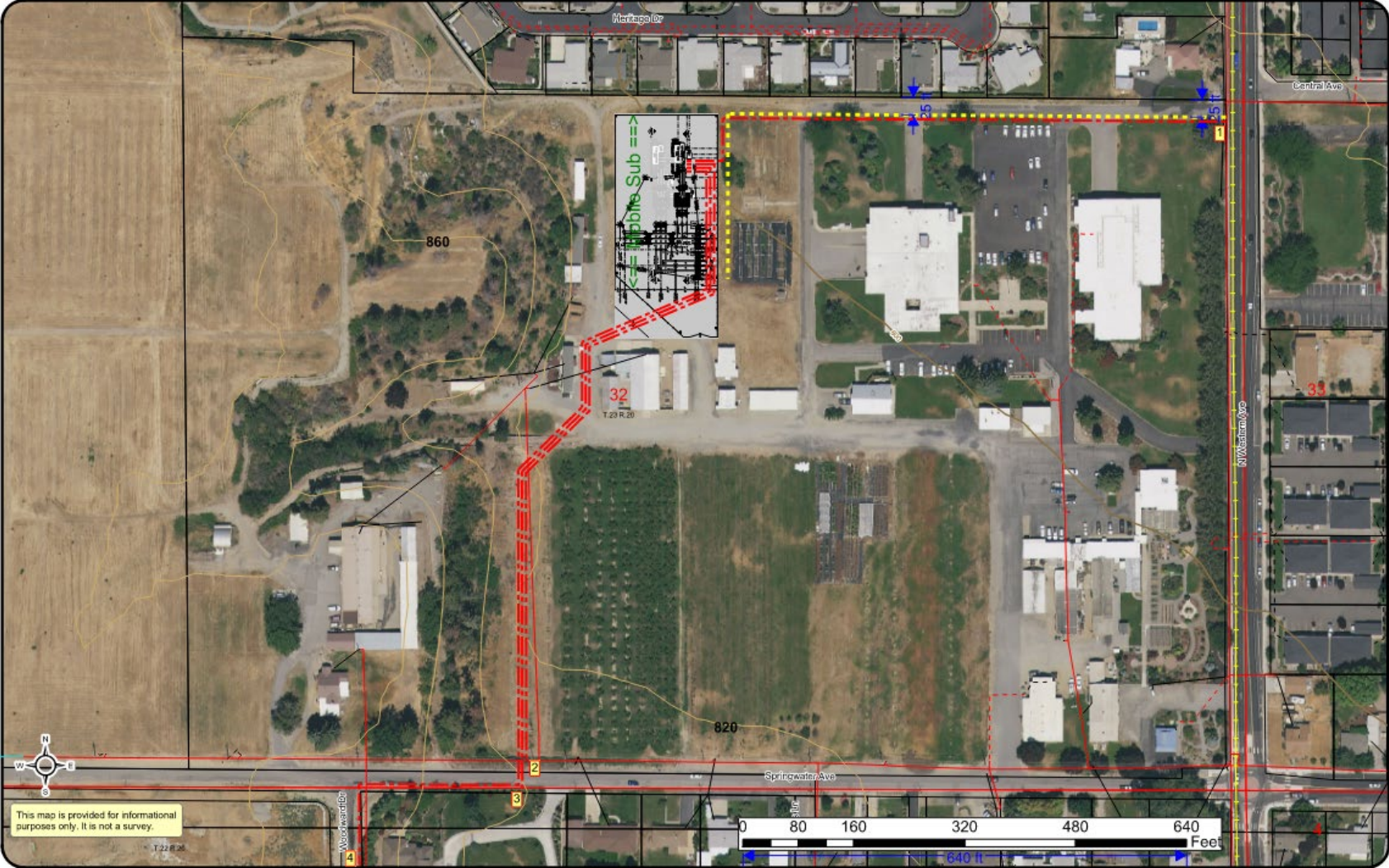


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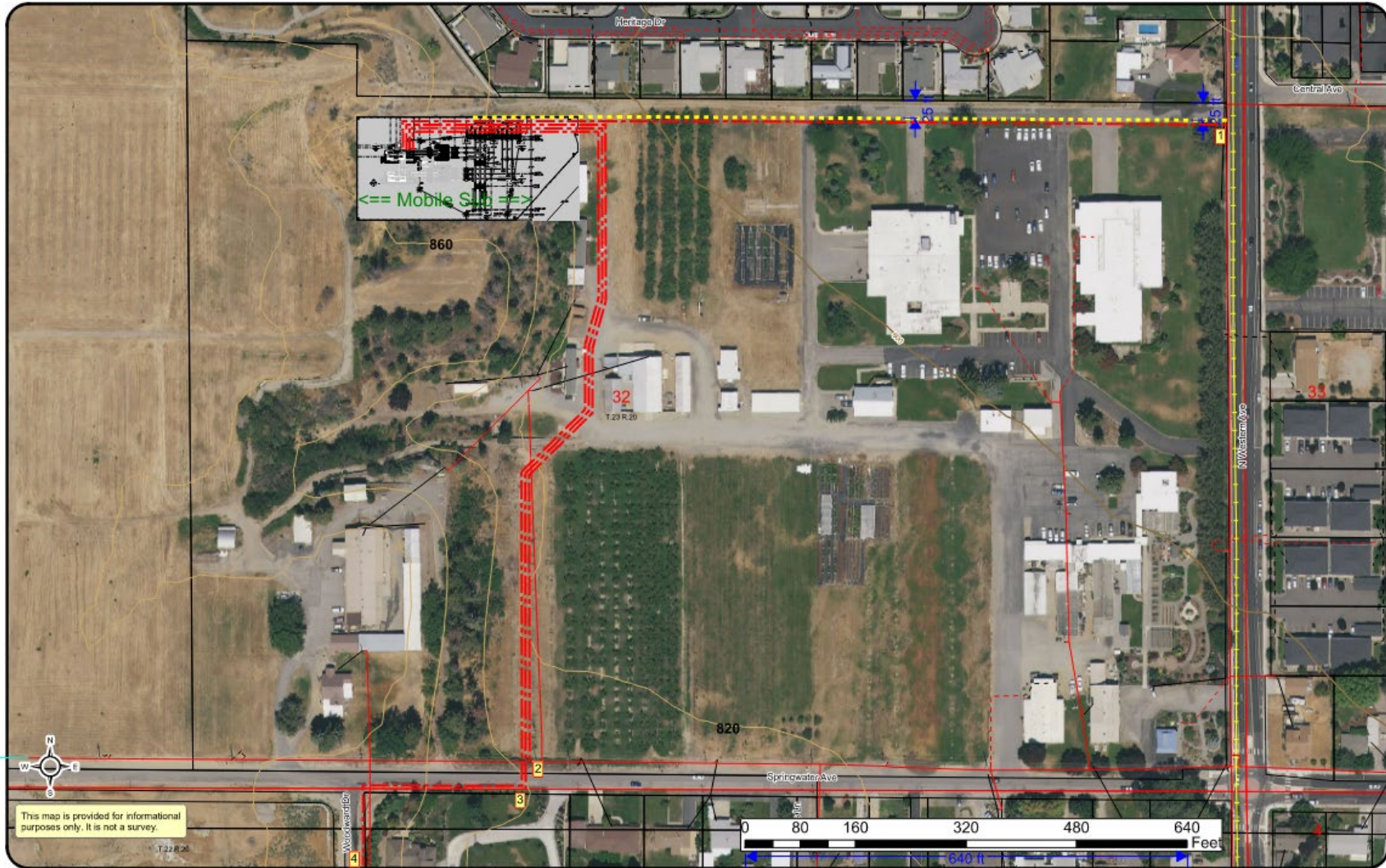


WSU - Location 1b (N. Shore layout)





WSU - Location 2 (N. Shore layout)

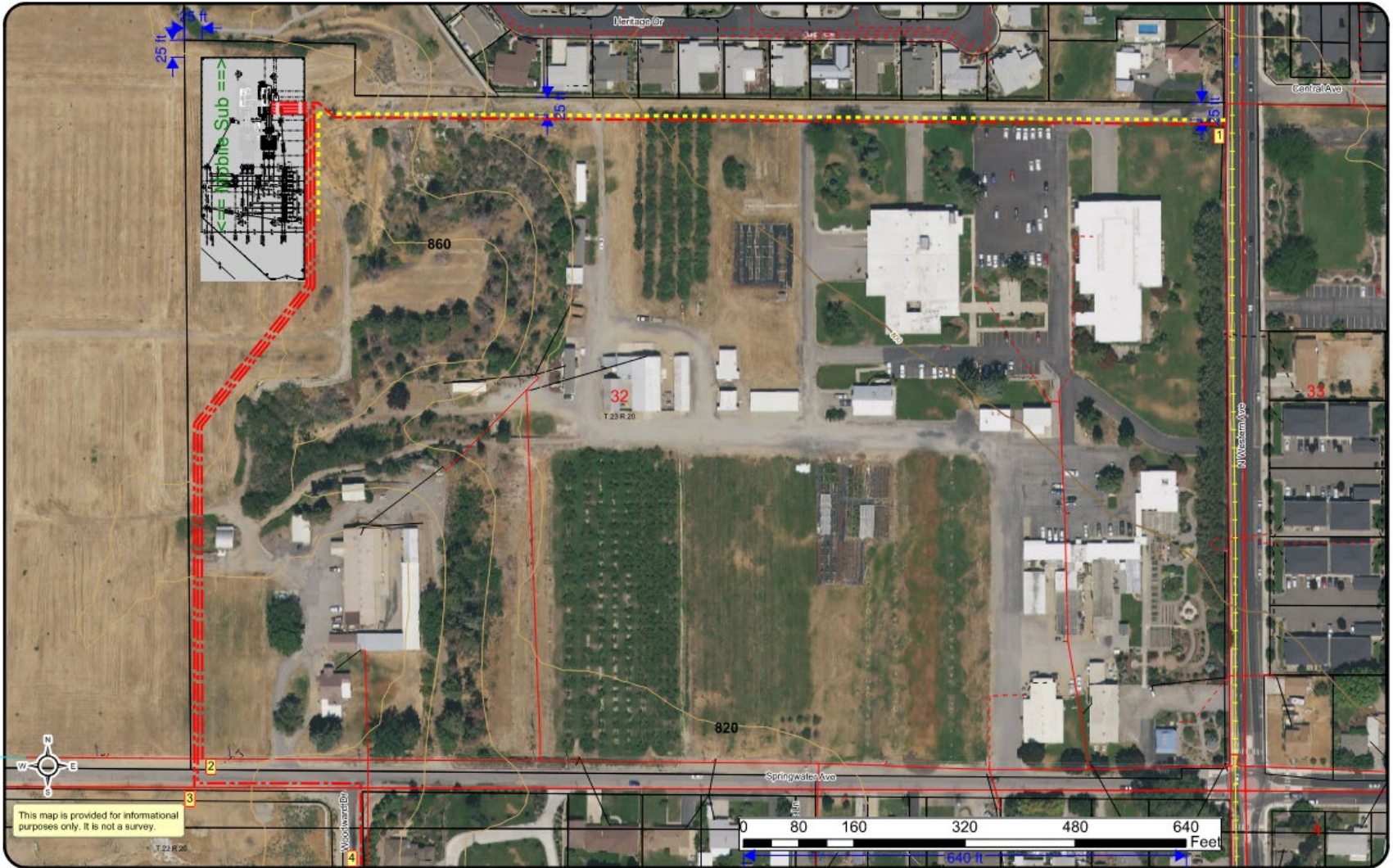


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WSU - Location 3 (N. Shore layout)





# Neighborhood & Aesthetic Values

	#1a	#1b	#2	#3
Ability to mitigate general aesthetic values				
Ability to mitigate light and noise impact				
Ability to utilize or install underground distribution				
Ability to mitigate view impacts				
Flexibility in landscaping theme options				
Proximity to existing neighborhood and residences				
Ability to incorporate community improvements				
Other				

# West Wenatchee Area Substation Timeline

