

Wildfire Safety Concerns Due to PG&E High Voltage Transmission Wires in the Line-of-Fire from a Proposed Gun Range on Millville Plains; Rev. 1 by Edward B. Wilkes; December 3, 2025

1. Summary. A proposed outdoor gun range on Millville Plains, if constructed and operating, will have 60 rifle firing positions aimed toward Pacific Gas & Electric high voltage transmission towers. Clearly, this would pose an imminent threat of wildfire if a bullet should:

- strike equipment and cause a high voltage wire to touch the ground, or
- strike equipment or the tower, causing 1400° F bullet fragments.¹

The gun range proposal by Patrick Jones was originally approved by Shasta County Board of Supervisors in 2023, but was ordered vacated by the Shasta County Superior Court on March 10, 2025,² following a lawsuit filed by county residents. Jones has publicly stated he will try again.³

2. PG&E High Voltage Transmission Towers and Wires in the Line-of-Fire.

Ten Pacific Gas and Electric (PG&E) 500,000 volt transmission towers, 41 lesser-voltage towers (not PG&E) and 2.2 miles of high-voltage power lines⁴ cross directly into the errant shot fall zone of the three rifle ranges (300-, 500-, and 600-yard),⁵ where 60 people could be shooting at the same time (see Table 1 and Figures 1-3).

Table 1. List of PG&E 500 kV Transmission Towers in the Surface Danger Zone (SDZ)

Sequential Number Used in this Paper to Differentiate Towers	True Bearing of Transmission Tower from 300-yard rifle range	Degrees Left (L) or Right (R) of 300-yard Rifle Range Line-of-Fire	Range (yards) from the Rifle Firing Line to the Tower
1	325° T (Note 2)	35° L	2807
2	333° T (Note 2)	27° L	3021
3	339° T (Note 2)	21° L	3267
4	346° T (Note 2)	14° L	3579
5	351° T	9° L	3957
6	354° T	6° L	4236
7	356° T	4° L	4479
8	000° T	000°	4909
9	002° T	2° R	5254
10	004° T	4° R	5484
11	006° T	6° R	5861
12	008° T	8° R	6288
13	011° T (Note 3)	11° R	6731
14	011.2° T (Note 3)(Note 4)	11.2° R	7191

Notes: 1. Bearings and ranges from Shasta County Map Viewer; gis.shastacounty.gov

2. These transmission towers are outside of the SDZ (Surface Danger Zone) (10° on either side of the line-of-fire) of the proposed 300-yard rifle range. However, they are within range of the most common ammunition/rifle combinations.

3. These towers are outside the SDZ of the 300-yard rifle range, but they are in the envelope of the 500- and 600- yard rifle ranges.

4. Listed range is greater than the nominal maximum range of 7,000 yards; with a 10 mph southerly breeze, the maximum range of the bullet increases 200 yards.

¹ U.S. Forest Service testing: <https://www.youtube.com/watch?v=DBVm5Lw8JKg> & <https://www.youtube.com/watch?v=QQLOoHQv5Z4>

² Ruling on Verified Petition for Writ of Mandate, Superior Court of the State of California for the County of Shasta, Case #23CV-0203713, Ruling dated March 10, 2025 and filed March 11, 2025.

³ Action News Now; televised interview with Patrick Jones, March 12, 2025.

⁴ Count of towers from Shasta County Map Viewer; gis.shastacounty.gov

⁵ References will be made in this paper to the original gun range design as approved by Shasta County Planning Commission Resolution 2023-010

3. Rifle Ammunition Ranges

The NRA lists 29 commercial standard large-bore rifle ammunition calibers with maximum ranges from 2,000 to 6,190 yards (median maximum range of 3,750 yards), and 26 commercial magnum rifle ammunition calibers with maximum ranges from 2,400 to 7,000 yards (approximately 4 miles) (median maximum range of 4,475 yards).⁶ See Attachment A for the maximum range of popular ammunition and large-caliber rifles.

A southerly breeze on Millville Plains increases the distance a bullet will travel. Since the 300-, 500- and 600-yard rifle ranges all point essentially due north (the 300-yard range line of fire bears 000° T, the 500-yard line of fire bears 006° T, and the 600-yard range line of fire bears 006° T), a southerly breeze will provide a tailwind for the bullets. A thumb rule for wind-enhanced bullet distance is a .30 caliber bullet will travel 20 yards farther for every 1 mile per hour of tailwind speed.⁷ For example, a 10 mph southerly breeze will cause a .30 caliber bullet to travel approximately 200 yards farther than with no wind.

4. Surface Danger Zone

“Bullet containment is extremely important not only for shooter/public safety reasons, but also ... to mitigate impacts to the environment. ... The selected containment system should be designed to meet site-specific training/shooting requirements, as well as available space for surface danger zone (SDZ), and address all of the environmental concerns. ... “An open range, with an earth berm and no overhead baffles, ... has the largest SDZ and is the range layout most likely to have rounds leave the range proper. ...⁸ The proposed shooting complex on Millville Plains is an open range.

Applying an accepted SDZ dispersion of 5 degrees from either side of the line of fire,⁹ and an additional 5 degrees for ricochet¹⁰ for the 3 rifle ranges (with 10° on the left line of fire (000° T) and 10° on the right line of fire (006° T), yields an SDZ cone 26° wide. **Note that the high voltage lines cross CA Highway 44; a downed high voltage line over the highway would be a catastrophic danger to the travelling public.**

5. Additional Factors Increasing the Risk of Wildfires from the Proposed Shooting Complex

- As of February 16, 2025, all of the property planned for the gun range was upgraded from a HIGH to a VERY HIGH Wildland Fire Hazard Severity Zone (FHSZ) by the State Fire Marshall (see Figure 1).¹¹ This zone classification is an immutable characteristic of the terrain, fire history, and weather, and cannot be mitigated by defensible space, maintenance, and any other human-caused actions.
- According to CalFire, the Bascom Fire, which started in the immediate vicinity of the proposed gun range on June 23, 2018, burned 328 acres and was not contained until January 4, 2019: 195 days later.¹²
- The Cow Fire in Millville started as a grassland fire and took 7 days to put out. It was initiated by hot metal from a deteriorating catalytic converter from a passing motorist on June 20, 2021.¹³ It eventually burned 761 acres and was 100% contained June 26, 2021. Two structures were destroyed and one injury occurred.¹⁴

⁶ *NRA Firearms Sourcebook. Your Ultimate Guide to Guns, Ballistics and Shooting.* Michael E. Bussard and Stanton L. Wormley, Jr. 2006. pp 27-28. National Rifle Association of America, 11250 Waples Mill Road, Fairfax, VA 22030-9400.

⁷ *Range Safety.* Department of the Army Pamphlet 385-63. 16 April 2014. Table 4-17, p. 42.

⁸ *Environmental Management at Operating Outdoor Small Arms Firing Ranges: Technical Guidance.* Interstate Technology Regulatory Council (ITRC). 50 F Street NW, Suite 350, Washington, DC 20001. February 2005.

⁹ “line of fire” used in this paper is equivalent to “line of sight” from the NRA definition “an imaginary straight line from the eye through the sights of a firearm to the target” [*The Range Source Book*, National Rifle Association, 2023.]

¹⁰ *Range Design Criteria.* US Department of Energy. 6/4/2012. Available on line at: <http://www.hss.energy.gov>

¹¹ <https://osfm.fire.ca.gov>; FHSZ Maps and Info; Office of the State Fire Marshal (OSFM), 715 P St., Sacramento CA 94244-2460; ©2025 State of California

¹² www.fire.ca.gov/incidents/2018/6/23/bascom-fire; and Redding Record Searchlight, June 23, 2018.

¹³ Cal Fire News Release June 22, 2021.

¹⁴ Cal Fire data from website www.fire.ca.gov.

Figure 1. Fire Hazard Severity Zone Map, Showing the Proposed Shooting Complex and PG&E 500 kV towers and Transmission Lines

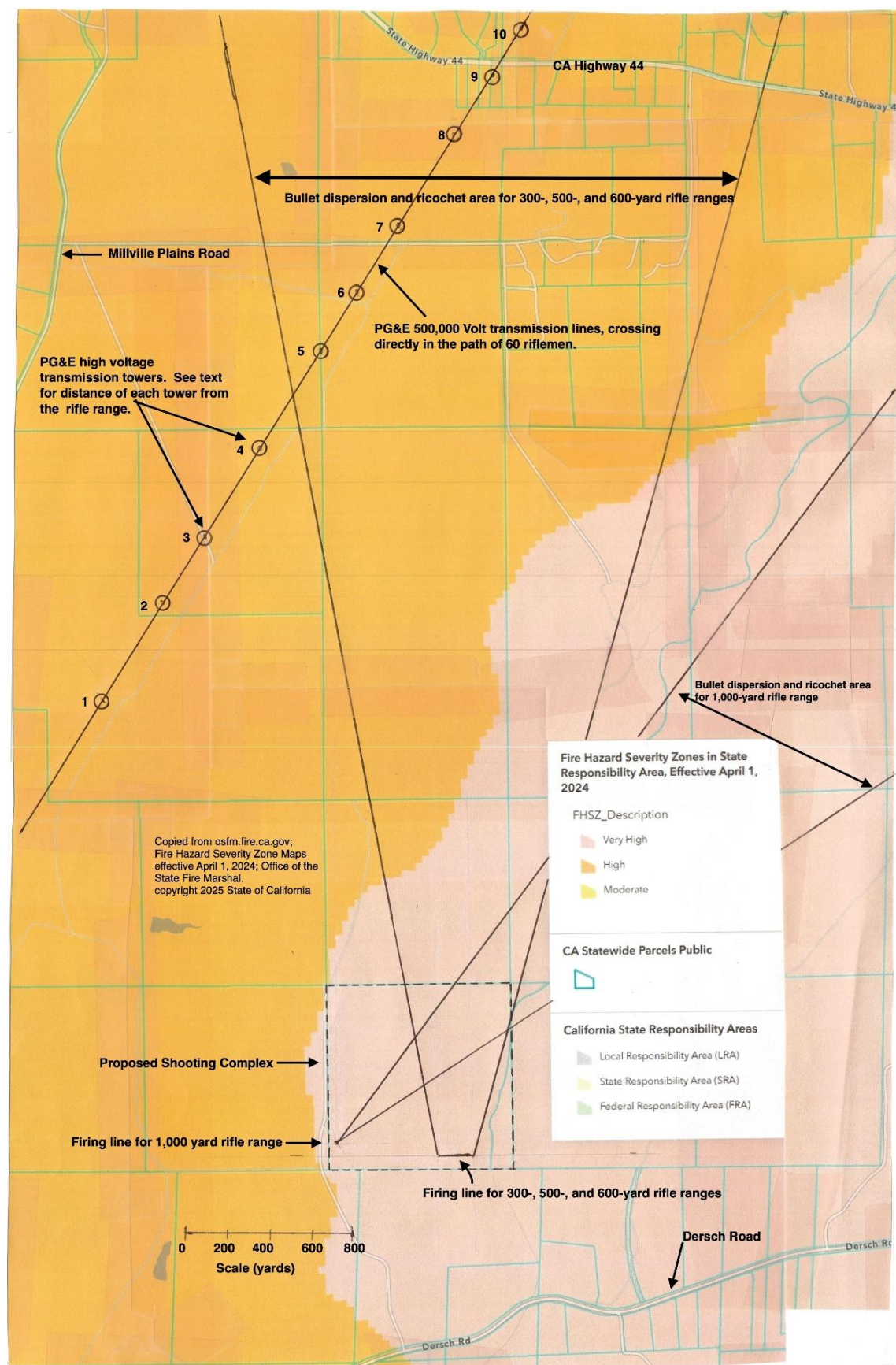


Figure 2. Shasta County Planning Division GIS Map Annotated with Proposed Shooting Complex and PG&E 500kV Transmission Towers

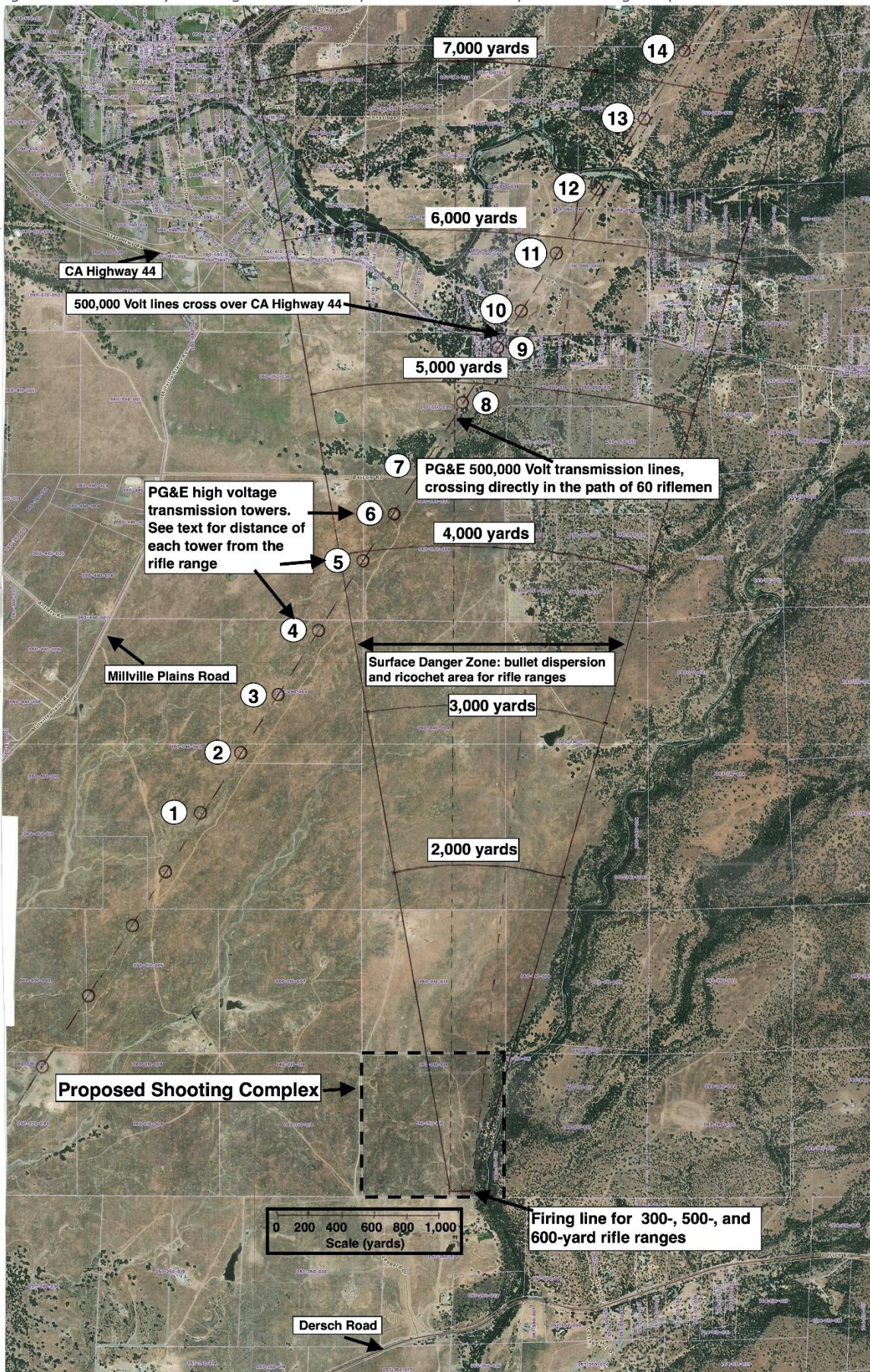
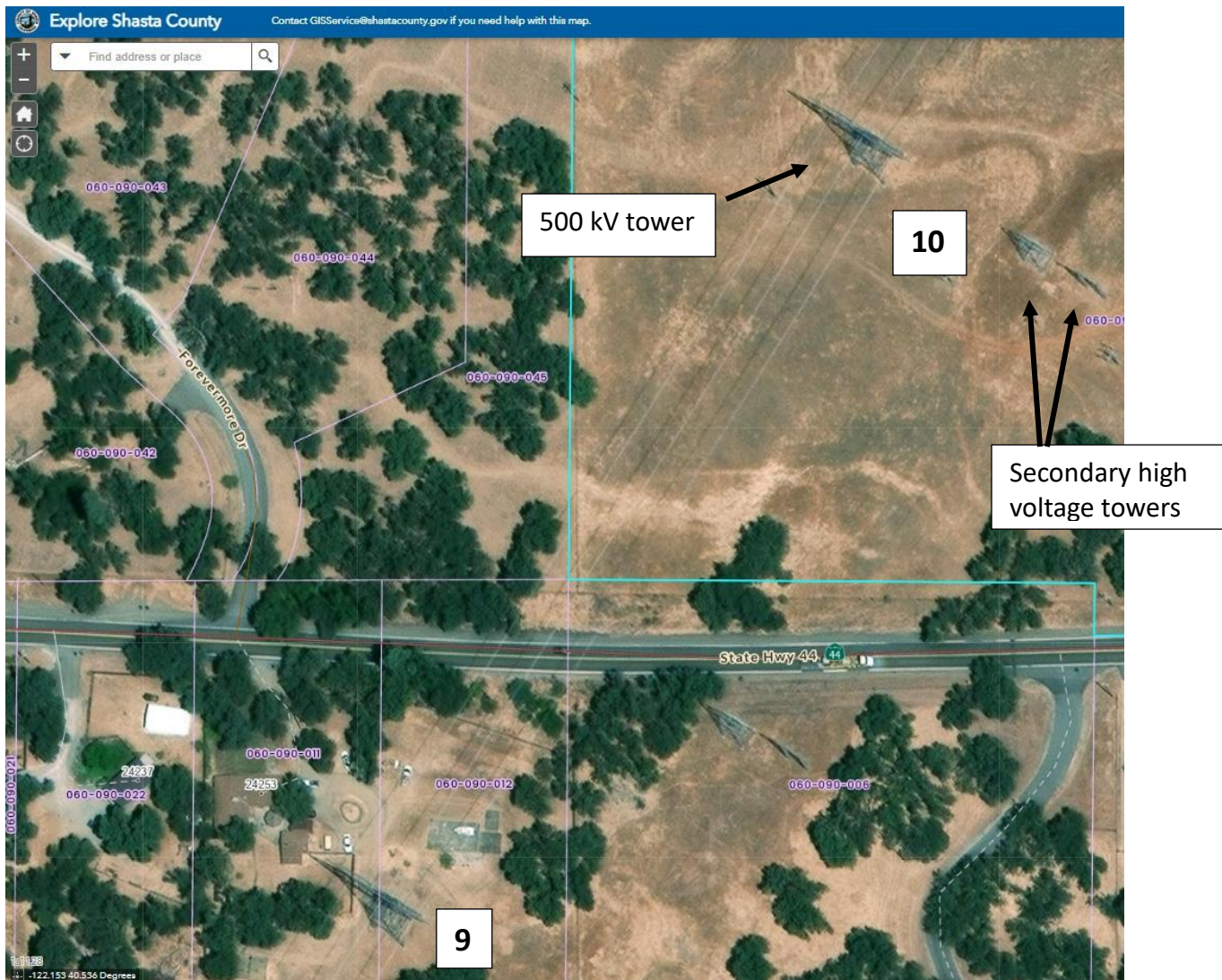


Figure 3. GIS Close-up View of PG&E 500,000 Volt Transmission Lines Between Towers 9 and 10 Crossing CA Highway 44



Copied from Shasta County Map Viewer; gis.shastacounty.gov

For further information, see our website www.stopmillvillegunrange.com.

Attachment A. Maximum Range of Popular Ammunition and Large Caliber Rifles

Table A-1. NRA Data for Maximum Range of Large Caliber Rifle Ammunition

Commercial Standard Rifle Calibers			Commercial Magnum Rifle Calibers		
Caliber	Bullet Wt. (grs.)	Max Range (yds.)	Caliber	Bullet Wt. (grs.)	Max Range (yds.)
.243 Win	100	4000	.243 WSSM	95	4250
6 mm Rem	100	4649	.25 WSSM	115	5000
.25-20 Win	86	2446	.257 Wby Mag	115	5400
.25-35 Win	117	3183	.264 Wby Mag	140	4875
.250 Savage	100	3836	.270 WSM	130	5300
.25-'06 Rem	120	4656	270 Wby. Mag	130	5000
6.8 Rem, SPC	115	3400	7 mm Rem Mag	165	6951
.270 Win	130	4795	7mm Rem Ultra	150	5000
7 mm-08 Rem	140	4400	8 mm Rem Mag	200	4850
7 mm Mauser	139	4196	.300 Win Mag	180	5312
.280 Rem	150	4446	.300 Rem Ultra	150	4700
.284 Win	150	4423	.300 Rem SAUM	190	5800
.30-30 Win	150	3010	.300 WSM	180	5700
.30-30 Win	170	3307	.300 Wby Mag	180	5800
.308 Win	180	4655	.325 WSM	180	5000
.30-06 Sprg soft pt	180	4170	.338 Win Mag	225	5179
.30-06 Sprg	180	5670	.340 Wby Mag	225	4400
.30-06 Sprg	200	6190	.338 Lapua Mag	250	7000
.30-40 Krag	180	4551	.350 Rem Mag	200	3877
.300 Savage	180	4506	.375 H&H Mag	300	4088
8x57mm JS Mauser	170	2871	.375 Rem Ultra	300	4400
.348 Win	200	3632	.416 Rigby	400	2400
.35 Rem	200	2647	.416 Rem Mag	400	2400
.35 Whelen	250	3500	.416 Wby Mag	350	2900
.358 Win	250	3964	.458 Win Mag	500	4235
.405 Win	300	2000	.458 Lott	500	4400
.444 Marlin	240	2221	.460 Wby Mag	450	4700
.45-70 Gov't	405	3500	Mean		4,775
.450 Marlin	325	3500	Median		4475
Mean		3,873			
Median		3750			

Bullet data from *NRA Firearms Sourcebook: Your Ultimate Guide to Guns, Ballistics and Shooting*. Michael E. Bussard and Stanton L. Wormley, Jr. 2006. pp 27-28. National Rifle Association of America, 11250 Waples Mill Road, Fairfax, VA 22030-9400.

The NRA defines maximum range as the “Approximate maximum distance a bullet will travel to point of first impact with the ground at standard conditions with the muzzle elevated between 28 and 34 degrees.¹⁵ The NRA states: “Note that some military ammunition, special sporting ammunition and handloads may have greater flight distances than those listed.¹⁶ For example, the .300 Winchester Magnum 220 grain Sierra Match King has a maximum range of 6,994 yards, with the 190 grain having a maximum range of 6,577 yards.¹⁷ “Americans simply love .300 Magnums, and among the lineup, the .300 Winchester Magnum has become the most popular choice.”¹⁸

¹⁵ *NRA Firearms Sourcebook. Your Ultimate Guide to Guns, Ballistics and Shooting*. Michael E. Bussard and Stanton L. Wormley, Jr. 2006. Page 26. National Rifle Association of America, 11250 Waples Mill Road, Fairfax, VA 22030-9400.

¹⁶ Ibid.

¹⁷ Ammunition available by hand load or on line (\$87/20). Maximum range from *Range Safety*, USA 385-63

¹⁸ “Top 5 All-Around North American Big-Game Cartridges,” Phillip Massaro, *NRA American Hunter*, posted on November 8, 2021, AmericanHunter.org. National Rifle Association, 11250 Waples Mill Road, Fairfax, VA 22030.