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MEMORANDUM

To: Mariposa County Planning & Engineering Staff

From: Rob Christensen, PE, LS

cc: Samuel Morton, Topos Ventures, LLC
Nico Turek, Topos Ventures, LLC

Date: July 22, 2024

Re: Preliminary Water and Sanitary Sewer Demand Analysis
Offsite at Yosemite Project Conditional Use Permit
Coulterville, CA

Purpose

This memorandum will provide a preliminary estimate of the water and sanitary sewer demands generated by the proposed Offsite at Yosemite Project in Coulterville, CA.

Project Description

The project consists of redevelopment of the abandoned Yosemite Gold Country Lodge & Campground located on a 3.5 acre+/- property at 10407 Hwy 49 in Coulterville, CA. The redevelopment of the site will generally consist of removal of the existing dilapidated structures and installing new recreational vehicle (RV) pads and other site amenities to create a new, modern campground. The project includes the following improvements:

- 25 RV sites with pre-installed mobile “cabins”
- Manager’s residence (mobile home or RV site)
- Check-in office and dry goods store
- Storage structure
- Plunge pool / sauna
- Bathhouse with 2 restroom stalls and shower units
- Communal lounge space
- View decks and covered pavilion
- Communal fire pit area

Additional project details are included in the application materials for the proposed Conditional Use Permit (CUP) and a site plan is included as Attachment 1 to this memo.

Existing Water & Sanitary Sewer Utilities

Public water and wastewater service is provided to the Coulterville community by Mariposa County Services Area No. 1 M – Coulterville Water and Sewer Services Area (CSA 1 / CWS). VVHCE’s review of the

existing community water and wastewater systems included review of available documentation and discussions with County Public Works staff.

Existing Water System

The existing community water system is an active, permitted public water system operating under the State Water Resources Control Board's Division of Drinking Water (DDW). Available DDW records¹ indicate that the system has 76 residential service connections and 1 commercial service connection. The County's Water and Wastewater System Engineer's Report² indicates a total of 98 connections, with approximately 85 active connections, and 13 inactive connections. The Engineer's Report also indicates the system is supplied by a single groundwater well and storage is provided by a single 205,000 gallon tank and booster pump system.

County staff has indicated that there is an existing 2 in. metered service connection to the site that was used by the former hotel which has an estimated available pressure of 35 psi at the connection point. County staff has also indicated that a booster pump system was previously installed by the hotel in order to increase domestic water pressure.

The site also includes two existing fire hydrants along the frontage of Hwy. 49, as well as an existing private water well. Detailed information regarding the existing water distribution system (e.g. pipeline size, condition) was not readily available.

Existing Sanitary Sewer System

The site includes two existing sanitary sewer manholes along an existing 6 inch main within the project frontage of Hwy. 49. The Engineer's Report indicates the community wastewater system includes a network of approximately 13,375 l.f. of 6" and 8" sewer mains, a single lift station, and a wastewater treatment facility approximately 2 mi. to the south of the town. Detailed records or maps of the existing conveyance system were not readily available.

Domestic Water Demands

Mariposa County does not have any published requirements for water demand rates for new developments. Therefore, water demands for the project were estimated using published sources and engineering judgement.

Average Daily Water Demand

The average daily water demand for the project is estimated to be approximately **1,900 gallons per day**. Detailed calculations and reference sources for this estimate are included in Attachment 2. Summarized below is a brief description of how daily water demands were estimated for the various project components:

- **Landscape Irrigation:** The project is not anticipated to include any landscaping that would require irrigation. Therefore, landscape irrigation demands are not included in the estimate for average daily water demand.

¹ California State Water Board Division of Drinking Water Online Database: <https://sdwis.waterboards.ca.gov/PDWWW/>, Public Water System No. CA2210901, MPDW-COULTERVILLE CSA 1

² *County of Mariposa Engineer's Report*, prepared by Pinnacle Advanced Reliability Technologies, obtained from County website in July 2024, (no date provided on report).

- RV / Cabin Sites: California Plumbing Code³ (CPC) requires a minimum supply of 50 gallons per unit for recreational vehicle sites. This requirement was considered a reasonable estimate for this project. The manager's residence is assumed to consist of a mobile home similar to one of the RV/cabin sites.
- Bath House: The CPC has maximum gallon-per-minute flow requirements for all new restroom fixtures. An estimate of the daily usage for the proposed shower and restroom facilities was made which resulted in the estimated total average daily water demand for the bath house.
- Pool: Pool make-up water demand was estimated to be approximately 0.15 gallons per sq. ft. per day over the surface of the pool area, which is roughly equivalent to 1/4 in per day.
- Communal Lounge Space: Total average daily water demand was estimated using the square footage of the space and a demand rate for office uses as estimated by the publication *Commercial and Institutional End Uses of Water*, published by the American Water Works Association (AWWA). The office use demand rate was selected as it considered a conservative demand rate for the proposed use.
- Lobby / Dry Goods: Total average daily water demand for the lobby / dry goods store was estimated using a per employee rate for indoor office uses as described in *Commercial and Institutional End Uses of Water*. Water demands for this use were estimated assuming a single employee, which is appropriate for the relatively small lobby space for this project.
- Safety Factor: A safety factor of ten percent (10%) was applied to the total estimated water demand to account for other unanticipated demands.

Water Demand Load

In addition to the Average Daily Water Demand, an estimated Water Demand Load was computed for the project. The Water Demand Load represents the peak, or "instantaneous" maximum estimated water flow to the project in gallons per minute.

Determination of the estimated maximum water demand load was performed in accordance with procedures recommended by the CPC. The procedure generally consists of counting the proposed water supply fixture units (WSFU's) and utilizing the conversion chart within the CPC to determine the water demand load in gallons per minute.

Based on the estimated fixture unit count, the project Water Demand Load is estimated to be approximately **120 gallons per minute**. Refer to Attachment 2 for the fixture unit tabulation.

Fire Suppression Water Demand

Mariposa County Code⁴ indicates that National Fire Protection Agency (NFPA) 1142 Standard on Water Supplies for Suburban and Rural Fire Fighting, 2022 is the preferred methodology for determining water supply requirements for fire suppression purposes.

Required Fire Suppression Water Supply Volume

NFPA Standard 1142 determines the total required water supply for fire suppression purposes as follows:

³ 2022 California Plumbing Code, California Code of Regulations, Title 24, Part 5

⁴ Mariposa County Code, Section 15.30.010.B

$$WS_{min} = \frac{VS_{tot}}{OHC} (CC) * 1.5$$

Where:

WS_{min} = min. water supply in gallons

VS_{tot} = total volume of structure in cu. ft.

OHC = Occupancy Hazard Classification number

CC = Construction Classification Number

The largest structure on the project will be the combination of the store/check-in lobby and storage buildings. Average enclosed height for this structure will be assumed to be 12 ft. Total structure volume, VS_{tot} , is computed as follows:

$$(14 \text{ ft.}) \times 2 \times 22 \text{ ft.} \times 12' = 7,392 \text{ cu. ft.}$$

The Occupancy Hazard Classification (OHC) number will be 7. Section 5.2.5 of the NFPA 1142 assigns this classification for light hazard occupancies such as offices and dwellings.

The Construction Classification (CC) number will be assumed to be 1.0, which is the maximum number for dwellings per 6.2.2 of the NFPA 1142.

Given the above variables, the Minimum Water Supply for fire suppression purposes (WS_{min}) is computed as follows:

$$WS_{min} = \frac{7,392}{7} (1.0) * 1.5$$

$$WS_{min} = 1,584 \text{ gallons}$$

However, Section 4.3.2 of NFPA 1142 states *"The minimum water supply required for a structure with exposure hazards shall not be less than 3,000 gal (11,355L)."*

Given the above, the required water supply for fire suppression purposes for this project is estimated to be **3,000 gallons**.

It is noted that reductions may be allowed by the local Authority Having Jurisdiction if the structure is protected by automatic sprinkler systems. The calculated water supply may also be reduced by using a different exposure hazard and/or construction classification number. Additional analysis during the final design is recommended once more details regarding the structures are known.

Required Fire Suppression Flow

The required fire flow can be computed using the methods described in Annex G, Section G.4, of the NFPA 1142. The estimated effective area of the office / storage building is approximately 28' x 22', or 616 sq. ft. Assuming ordinary construction (F=1.0) and an Occupancy Hazard Classification of 7, the required minimum fire flow is **500 gpm**. Refer to the NFPA excerpt below.

Table G.4.2(c) Ordinary Construction ($F = 1.0$) and Occupancy Hazard Classification

Occupancy Hazard Class 7 $O_i = 0.75$			Occupancy Hazard Class 6 $O_i = 0.85$			Occupancy Hazard Class 5 $O_i = 1.00$			Occupancy Hazard Class 4 $O_i = 1.15$			Occupancy Hazard Class 3 $O_i = 1.25$		
Effective Area (ft ²)			Effective Area (ft ²)			Effective Area (ft ²)			Effective Area (ft ²)			Effective Area (ft ²)		
from	to	gpm	from	to	gpm	from	to	gpm	from	to	gpm	from	to	gpm
0	2150	500	0	1650	500	0	1200	500	0	900	500	0	750	500
2151	4200	750	1651	3250	750	1201	2350	750	901	1800	750	751	1500	750
4201	6950	1000	3251	5400	1000	2351	3900	1000	1801	2950	1000	1501	2500	1000
6951	10350	1250	5401	8050	1250	3901	5850	1250	2951	4400	1250	2501	3750	1250
10351	14500	1500	8051	11250	1500	5851	8150	1500	4401	6150	1500	3751	5200	1500
14501	19300	1750	11251	15000	1750	8151	10850	1750	6151	8200	1750	5201	6950	1750
19301	24750	2000	15001	21600	2124	10851	13950	2000	8201	10550	2000	6951	8900	2000
24751	30950	2250	21601	24100	2250	13951	17400	2250	10551	13150	2250	8901	11150	2250
30951	37800	2500	24101	29400	2500	17401	21250	2500	13151	16050	2500	11151	13600	2500
37801	45350	2750	29401	35300	2750	21251	25500	2750	16051	19300	2750	13601	16300	2750
45351	53550	3000	35301	41700	3000	25501	30150	3000	19301	22800	3000	16301	19300	3000
53551	62500	3250	41701	48650	3250	30151	35150	3250	22801	26550	3250	19301	22500	3250
62501	72100	3500	48651	56100	3500	35151	40550	3500	26551	30650	3500	22501	25950	3500
72101	82350	3750	56101	64150	3750	40551	46350	3750	30651	35050	3750	25951	29650	3750
82351	93350	4000	64151	72650	4000	46351	52500	4000	35051	39700	4000	29651	33600	4000
93351	105000	4250	72651	81750	4250	52501	59050	4250	39701	44650	4250	33601	37800	4250
105001	117350	4500	81751	91350	4500	59051	66000	4500	44651	49900	4500	37801	42250	4500
117351	130350	4750	91351	101500	4750	66001	73350	4750	49901	55450	4750	42251	46950	4750
130351	144100	5000	101501	112200	5000	73351	81050	5000	55451	61300	5000	46951	51850	5000
144101	158500	5250	112201	123400	5250	81051	89150	5250	61301	67400	5250	51851	57050	5250
158501	173550	5500	123401	135150	5500	89151	97650	5500	67401	73850	5500	57051	62500	5500
173551	189350	5750	135151	147400	5750	97651	106500	5750	73851	80550	5750	62501	68150	5750
189351	205800	6000	147401	160250	6000	106501	115750	6000	80551	87550	6000	68151	74100	6000
205801	222950	6250	160251	173600	6250	115751	125400	6250	87551	94850	6250	74101	80250	6250
222951	240800	6500	173601	187450	6500	125401	135450	6500	94851	102400	6500	80251	86700	6500
240801	259300	6750	187451	201900	6750	135451	145850	6750	102401	110300	6750	86701	93350	6750
259301	278500	7000	201901	216850	7000	145851	156650	7000	110301	118450	7000	93351	100250	7000
278501	298400	7250	216851	232300	7250	156651	167850	7250	118451	126900	7250	100251	107400	7250
298401	318950	7500	232301	248350	7500	167851	179400	7500	126901	135650	7500	107401	114850	7500
318951	340250	7750	248351	264900	7750	179401	191400	7750	135651	144700	7750	114851	122500	7750
340251	362150	8000	264901	281950	8000	191401	203700	8000	144701	154050	8000	122501	130400	8000

For SI units, 1 gpm = 0.0631 L/sec; 1 ft² = 0.093 m².

Existing Water System Storage Capacity

A full, detailed analysis of the existing water system's capacity to accommodate the proposed development is beyond the scope of this memorandum. However, a preliminary analysis of the existing water system demands and storage capacity can be made to determine if sufficient water storage is available for the proposed development.

Overall Water System Demands

Average Day Demand: The Engineer's Report indicates a total of 85 active, existing residential services. Assuming an average daily demand of 200 gallons per unit per day, the total Average Day Demand of the existing system and proposed project can be computed as follows:

Existing System (85 x 200)	17,000 gallons
Project Avg. Day Demand	1,900 gallons
Total Average Day Demand	18,900 gallons

Maximum Day Demand: Maximum Day Demand can be estimated as $2.3 \times \text{Average Day Demand}$, or:

$$2.3 \times 18,900 = 43,470 \text{ gallons}$$

Total Effective Available Water Storage

In addition to the existing 205,000 gallon storage tank, the existing groundwater well can be considered to provide additional storage for the system. A common practice is to consider available groundwater storage to be equivalent to the well capacity that is greater than the maximum day demand plus a 20% reserve capacity while pumping for a 24-hour period. The Engineer's Report indicates the existing well has an estimated pumping capacity of 110 gallons per minute. The additional storage provided by the groundwater can be estimated as follows:

$$\text{Available Groundwater Storage} = 24 \text{ hr Well Pumping Capacity} - (\text{Max. Day Demand}) \times 1.2$$

$$24 \text{ hr Well Pumping Capacity: } 110 \text{ gpm} \times 24 \times 60 = 158,400 \text{ gallons}$$

$$\text{Available Groundwater Storage Volume} = 158,400 \text{ gal.} - (43,470 \text{ gal}) \times 1.2 = 106,236 \text{ gal.}$$

The total effective available storage volume of the system can be estimated as follows:

Tank Volume:	205,000 gal.
Groundwater Storage Volume:	106,236 gal.
Total Effective Available Storage:	311,236 gal.

Required Water Storage

A typical design criteria for the required total storage volume within an existing water system is to provide storage volume as follows:

- Equalization Storage: 25% of Maximum Day Demand
- Emergency Storage: 1 x Average Day Demand
- Fire Flow Storage: For this system, a value of 2,000 gpm for 2 hours is assumed.

Using the above criteria, the total minimum required storage volume for the Coulterville water system, including the proposed project, is estimated in the table below:

Minimum Required Storage Volume – Coulterville Water System

Requirement	Value	Required Volume
Equalization Storage	25% of Max. Day Demand	10,868 gal.
Emergency Storage	1 x Avg. Day Demand	19,000 gal.
Fire Flow Storage	2,000 gpm for 2 hours	240,000 gal.
Total Required Volume:		252,768 gal.

The total available storage volume provided by the combined existing tank and groundwater well capacity of 311,236 gallons is more than the total estimated required storage volume of 252,768 gallons. Therefore, the existing system should have sufficient storage volume to accommodate the proposed development.

Sanitary Sewer Generation

Mariposa County does not have any published requirements for sanitary sewer generation rates from new developments. Sanitary sewer flows from the project are assumed to be nearly identical to the domestic water demands for the project since there will be no landscape irrigation for the project. Therefore, the sanitary sewer flows for the project are as estimated follows:

Average Daily Wastewater Flow: 1,900 gallons per day

Peak Wastewater Flow: 120 gallons per minute

Conclusions and Recommendations

The calculations performed herein are based on preliminary project information, only, and will need to be verified during the final design process. The following provides a brief summary of the findings of this memorandum:

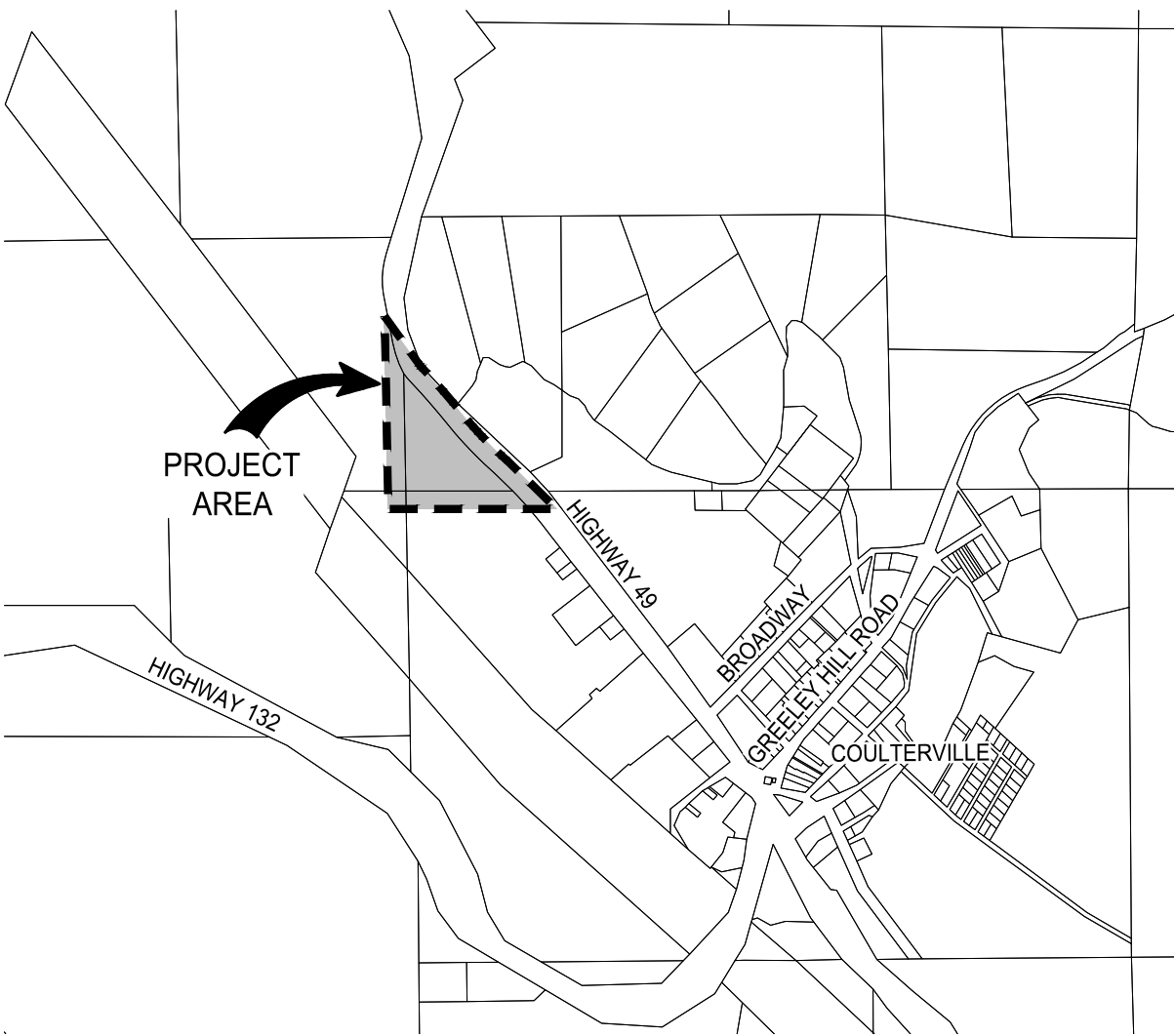
- Water demands for the project have been estimated as follows:
 - Average Daily Demand: 1,900 gallons
 - Water Demand Load (Maximum Flow): 120 gallons per minute
 - Minimum Water Supply for Fire Suppression: 3,000 gallons
 - Required Fire Flow: 500 gallons per minute
- The total water storage volume required for the overall Coulterville water system, including the proposed project, is estimated to be approximately 253,000 gallons. By comparison, the total available water storage provided by the system is approximately 311,000 gallons. These figures are based on preliminary calculations, but still indicate that the existing system should have enough storage capacity to accommodate the proposed development.
- Sanitary sewer flows for the project are assumed to be nearly identical to the domestic water demands for the project, and are estimated as follows:
 - Average Daily Wastewater Flow: 1,900 gallons per day
 - Peak Wastewater Flow: 120 gallons per minute
- The condition, slope, and existing flows within the existing 6 in. sewer main along the project frontage are not currently known. However, a 6 in. sewer main installed at a minimum slope of 0.5% (0.005 ft/ft) can accommodate a flow of nearly 150 gpm when flowing only 70% full. It is therefore reasonable to assume that the existing 6 in sewer main should accommodate the proposed 120 gpm peak flow from the development, assuming there are no downstream flow impediments or other unknown circumstances.
- Initial discussions with County Public Works staff have indicated an available pressure of 35 psi at the existing 2 in. meter at the site. This available pressure will likely require installation of a booster pump system to provide adequate pressures for the higher elevation portions of the project.

- Pressure and flow tests will need to be performed at the existing hydrants and meter to verify available pressure and flow to the site.

Attachments

Attachment 1: Preliminary Site Plan

Attachment 2: Preliminary Water Demand Calculations



PROJECT INFORMATION

APN: 002-220-001
SITE ADDRESS: 10407 HIGHWAY 49
COULTERVILLE, CA 95311

SITE AREA: 3.46 AC. (NOTE: AREA AND SITE DIMENSIONS ARE BASED ON AN UNRECORDED, PRELIMINARY BOUNDARY SURVEY PERFORMED BY BROWN BEAR ENGINEERING IN JULY 2024, AND ARE SUBJECT TO ADJUSTMENT.)

APPLICANT: TOPOS VENTURES, LLC
300 LENORA ST., PMB 6322
SEATTLE, WA 98121

PARKING SUMMARY

OPEN PARKING SPACES: 23

PRIVATE UNIT PARKING SPACES: 7

TOTAL PARKING PROVIDED: 30

PARKING REQUIRED:

25 UNITS AT 1 SPACE/UNIT:	25
CHECK-IN:	1
TOTAL REQUIRED:	26

LEGEND

PROPOSED PAVEMENT

PROPOSED GRAVEL/COMPACTED EARTH

PROPOSED WALKWAY (NOTE: MAY BE CONCRETE, ASPHALT, GRAVEL OR OTHER DURABLE SURFACE)

PROPOSED CABIN
TYPICAL CABIN SIZES ARE 8.5' X 30' OR 8.5' X 22'

PROPOSED PRIVATE PARKING

PROPOSED RETAINING WALL

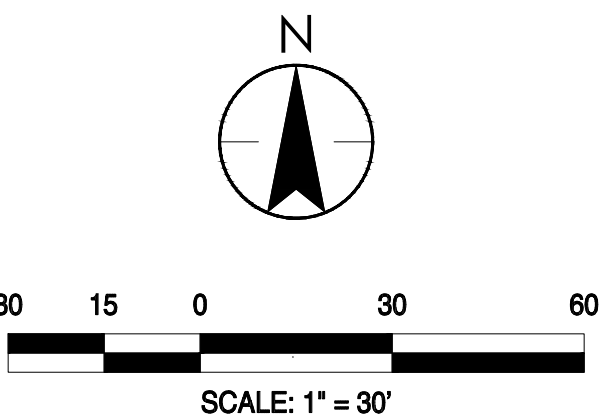
EX. TOP/TOE OF SLOPE

EX. SLOPE

MINIMUM STRUCTURE SETBACKS

FRONT YARD - 10 FT
SIDE YARD - NONE
REAR YARD - NONE

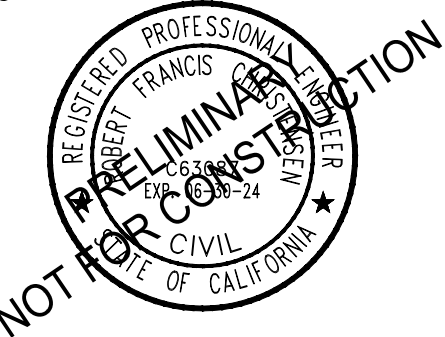
NOTE:
THIS SITE PLAN IS PRELIMINARY AND IS INTENDED FOR THE REVIEW
OF LAND USE PERMITTING APPLICATIONS, ONLY. THE LAYOUT SHOWN
HEREIN MAY CHANGE AS A RESULT OF REFINEMENTS MADE DURING
THE DESIGN PROCESS, AGENCY REQUIREMENTS, OR OTHER FACTORS.

[illegible]

anti/Project
TOPOS VENTURES, LLC.
OFFSITE AT YOSEMITE
CONDITIONAL USE PERMIT AND GENERAL PLAN AMENDMENT
COURTIERVILLE, CALIFORNIA

Title
PRELIMINARY SITE PLAN

Engineer's Seal



Engineer's Signature _____
Signature Date: _____



**Know what's below.
Call before you dig.**

Project Number: 1284-0100			
File Name: 20240712_prelim-site-plan			
IY	RFC	IY	07.19.24
Dwn.	Chkd.	Dsqn.	MM.DD.YY

Estimate of Total Project Average Daily Water Demand					
Item	Average Demand Rate (gal/day)	Unit	Quantity	Total Average Demand (gal/day)	Comments
Cabins	50	Per Cabin	25	1,250	See Reference Note 1
Pool	0.15	sq. foot pool area	420	63	See Reference Note 2
Bath House	161.8	Per bathroom	2	324	See Separate Tabulation
Manager's Quarters	50		1	50	Equivalent to a single cabin --See Reference Note 1
Communal Lounge Space	0.041	per sq. ft.	616	25	See Reference Note 3
Lobby / Dry Goods	16	per employee	1	16	See Reference Note 4
Total Average Daily Demand (gal):				1,728	
Safety Factor (10%):				173	
Adjusted Total Average Daily Demand (gal):				1,901	
<p><u>Reference Notes:</u></p> <p>1. <i>California Plumbing Code</i> , 2022, Appendix E, Section E 502.4 requires 50 gallons per unit for recreational vehicle sites with individual water connections.</p> <p>2. <i>Evaluation of Potential Best Management Practices - Pools, Spas, and Fountains</i> , prepared for the California Urban Water Conservation Council, 2010. Table 5 indicates an approximate evaporation rate of 46.75 gal per year per sq. foot (gpsfd) of pool area. This is approximately 0.13 gpsfd of pool area. A rate of 0.15 gpsfd was selected to be conservative.</p> <p>3. <i>Commercial and Institutional End Uses of Water</i> , American Water Works Association (AWWA), 2000. Study indicates an efficient office building would be expected to use 9-15 gallons per square foot per year of building area for indoor purposes. A rate of 15 gallons per square foot per year was utilized, which is equivalent to 0.041 gallons per square foot per day. This is considered a conservative estimate for the co-working spaces for this project.</p> <p>4. <i>Commercial and Institutional End Uses of Water</i> , American Water Works Association (AWWA), 2000. Study indicates an efficient office building would be expected to use 9-16 gallons per employee per day.</p>					

Estimated Daily Water Demand Per Bathroom

Item	gal	Unit	Usage	Gallons Per Use	Uses Per Day	Total Gallons Per Day
Shower	1.8	min	8 min.	14.4	10	144
Water Closet	1.28	flush	1 flush	1.28	10	12.8
Lav. Faucet	0.5	min	1 min	0.5	10	5
					Total:	161.8

Fixture flowrates are maximum allowable as indicated in California Plumbing Code, Chapter 4, Sections 407.2, 408.2 & 411.2

Total Water Flow Demand Estimate				
Item:	Water Supply Fixture Units (WSFU) Per Item	Item Count	Total WSFU's	Comments
Cabin	12	25	300	Table A 103.1, CPC --Mobile Home
Manager's Residence	12	1	12	Assumed similar demand as Cabin
Office / Dry Goods				
Lav. Sink	1	1	1	
Water Closet (FV)	5	1	5	
Co-Work Pods				
Lav. Sink	1	1	1	
Water Closet (FV)	5	1	5	
Bath House				
Shower	2	2	4	
Lav. Sink	1	2	2	
Water Closet (FV)	5	2	10	
Pool / Spa	10	1	10	
Hose Bibbs				
Office	2.5	1	2.5	
Additional	1	6	6	

Total WSFU: 358.5

Max. Water Flow Demand: 120 gpm

(Per Chart A 103.1(1), CPC Appx. A)