Attachment C

Water Usage

Attachment C-1 Stantec Preliminary Sewer and RW System Design memo 2021-05-01

Attachment C-2 Stantec Preliminary Water System Design Memo 2021-05-01

Attachment C-3 Yerba Buena Water Company Water Letter 2022-04-18

Attachment C–4 Stantec Total Annual Water Usage technical memo dated 2022-06-17

Stantec

Memo

To:	Doug Lynn, Rick Waters, Steve Searock Wilshire Boulevard Temple	From:	Jonny Zukowski, P.E. Project Civil Engineer Stantec 111 East Victoria Street Santa Barbara CA 93101
File:	Preliminary Sewer and Recycled Water System Design_memo.docx	Date:	May 1, 2021

Reference: Preliminary Wastewater and Recycled Water System Design

Purpose:

Stantec has been retained by WBT for the rebuild of the Camp after the Woolsey Fire in 2018. Stantec has prepared this memo to document the preliminary sizing, improvements, and development for the wastewater and recycled water systems to be used for planning purposes. The preliminary sizing and improvements in this memo will be based off of common engineering practice and will need to be verified based on final design.

Background:

The Camp consists of Camp Hess Kramer (lower and middle camp area), and Gindling Hilltop Camp (upper) which are located at 11495 Pacific Coast Highway in Malibu, Ventura County, California within APN 700-060-450 and APN 700-060-140. See Figure 1 for a vicinity map.

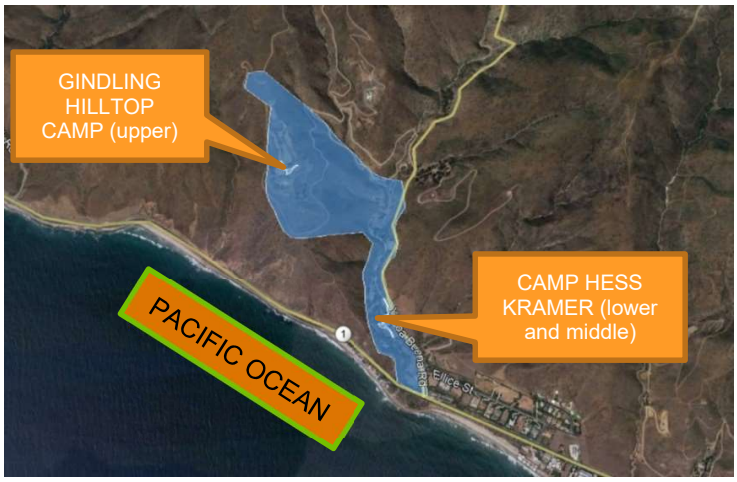

Figure 1 – Vicinity Map

The Camp consist of various administration buildings, assembly buildings, dining halls, restroom facilities, staff housing, cabins, and miscellaneous structures for camp related operations.

EXISTING WASTEWATER SYSTEM

Gindling Hilltop Camp - Upper Camp

Reference: **Preliminary Wastewater and Recycled Water System Design**

Gindling Hilltop Camp is remotely located at the north end of the camp site. The existing wastewater system includes a multitude of sewer conveyance laterals connecting buildings that discharge the wastewater into six onsite septic systems. Each system is composed of a septic tank sized between 1,200 to 4,500-gallons and associated leach fields. The average daily wastewater discharged from Gindling Hilltop camp is estimated to be 6,165 gallons per day (gpd) with the peak daily maximum flow at 9,750 gpd. The six onsite septic systems are currently subject to "General Waste Discharge Requirements for Small Commercial and Multifamily Residential Subsurface Sewage Disposal Systems," Order No. 01-031 and Monitoring and Reporting Program No. 9304 adopted by this Regional Board on February 22, 2001.

Camp Hess Kramer – Middle and Lower Camps

The Middle and Lower Camp's existing wastewater system includes a multitude of sewer conveyance laterals and sewer mains, four (4) sewer lift stations located at vehicular bridges crossing over Little Sycamore Creek, four (4) underground primary treatment tanks, and an Onsite Wastewater Treatment System (OWTS) located at the south end of the Camp near Highway 1. Wastewater treatment and discharge requirements are regulated by permit Order No. R4-2013-0079 from the State of California Regional Water Quality Control Board Los Angeles Region. The maximum daily volume discharged to the treatment facility is approximately 35,000 gallons per day (gpd) of wastewater influent. Prior to disposal, the influent is treated to tertiary levels via UV disinfection after settlement and filtration. For disposal, the existing effluent system utilizes two pumps that alternate and discharge treated effluent into two (2) seepage pit clusters each with multiple seepage pits. Each seepage pit is 6 feet in diameter with a total approximate depth of 30 feet. The two (2) existing seepage pit clusters are served each by an individual force main from each pump at the dosing tank. One cluster, made up of ten (10) seepage pits, is located in Gil Fitch Sports Field near the treatment facility. The other cluster is made up of seventeen (17) seepage pits and is located on the west side of the camp approximately 50 feet higher in elevation than the treatment facility.

Though many of the existing buildings, structures and utility infrastructure facilities were damaged or destroyed during Woolsey Fire at the end of November 2018 and subsequent debris flows, the wastewater conveyance and treatment facilities and irrigations systems remained intact.

PROPOSED WASTEWATER SYSTEM

All proposed and existing buildings in Upper, Middle, and Lower Camps that will have a proposed connection to the water system will be connected to the wastewater conveyance systems. The development plan will utilize the existing conveyance system to the extent possible by providing new 4" sewer laterals from the buildings to the existing sewer mains and providing new facilities where required. All proposed sewer mains will be assumed 6" and will need to be sized based on final design. The proposed development will not be increasing the population at the camp, hence there is no plan to change the system for the Upper Camp and Middle and Lower Camps will continue to utilize the existing OWTS for treatment and disposal.

Gindling Hilltop Camp - Upper Camp

The proposed wastewater development plan for Upper Camp will provide 4" sewer lateral extensions to proposed buildings and connect to the existing onsite septic systems, which include existing septic tanks and leach fields. As mentioned previously, the proposed development will not be increasing the population at the camp, therefore, there is no plan to change the system for Gindling Hilltop Camp.

Camp Hess Kramer - Middle Camp

Reference: **Preliminary Wastewater and Recycled Water System Design**

The proposed improvements for Middle Camp will include 4" sewer lateral extensions from buildings to the existing wastewater conveyance system. An extension of the wastewater conveyance system will be necessary to collect the wastewater from the proposed Scout's Grove area buildings. This will include approximately 500 LF of proposed 6" PVC SDR 35 gravity sewer main and four (4) proposed manholes. The proposed improvements will utilize the existing sewer lift stations at bridge crossings. All bridge crossings will require re-routing of the sewer force mains along the proposed bridges. Existing and proposed sewer laterals, mains, and facilities will need to be evaluated based on final design.

Camp Hess Kramer - Lower Camp

The proposed improvements for Lower Camp will include 4" sewer lateral extensions from the existing wastewater conveyance system to proposed buildings and will propose Fats-Oils-and-Grease Interceptors from the new kitchen facilities prior to discharging into the existing conveyance system. To re-route the collection system around the proposed kitchen pavilion building 4N, improvements will include abandoning approximately 230 LF of existing sewer main, abandoning an existing sewer manhole near building 4N and providing approximately 220 LF of proposed 6" PVC SDR 35 gravity sewer main. The proposed improvements will protect-in-place and utilize all the existing sewer lift stations. All bridge crossings will require re-routing of the sewer force mains along the proposed bridges. As mentioned previously, the improvement plan will not be changing the population at the Camp, therefore Middle and Lower Camps will continue to utilize the existing OWTS for treatment and disposal.

RECYCLED WATER AND IRRIGATION SYSTEM

Currently, the Camp uses potable water to supply the irrigation system throughout Lower, Middle, and Upper Camps. The proposed improvements will utilize the existing irrigation system and potable water connection but will also propose using tertiary treated wastewater effluent from the OWTS to supplement the irrigation system with recycled water in Lower Camp. The proposed recycled water system includes a new pump within the dosing tank at the OWTS to supply a new 3" Purple PVC Sch. 80 recycled water main that will extend approximately 1,300 LF from the OWTS to the vehicular bridge in Lower Camp. This main will supply tertiary treated recycled water at an average rate of 4,000 gallons per day to irrigate landscaping and vegetation in the lower camp when recycled water is available. During extended rainy periods, when irrigation demand is low, the existing seepage pits will be utilized for excess recycled water disposal. During periods of low occupancy when wastewater flows are below irrigation demand, a proposed air-gap connection from the existing 1-1/2" potable irrigation line to the existing dosing tank at the OWTS will be used to supplement recycled water. All irrigation facilities using recycled water for supply are required to follow the regulations and applications in California Code of Regulations Title 22 and will need to be verified based on final design.

CONCLUSION

The development plan will not be changing the population at the Camps and will utilize the existing conveyance system, treatment, and disposal system to the extent possible and will provide new facilities where required. This memorandum has been developed for preliminary planning purposes only. All building uses and sizing of wastewater improvements are preliminary and will need additional analysis prior to final design.

Reference: **Preliminary Wastewater and Recycled Water System Design**

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Memo

To:	Doug Lynn, Rick Waters, Steve Searock Wilshire Boulevard Temple	From:	Jonny Zukowski, P.E. Project Civil Engineer Stantec 111 East Victoria Street Santa Barbara CA 93101
File:	Preliminary Water System Design_memo.docx	Date:	May 1, 2021

Reference: Preliminary Water System Design

Purpose:

Stantec has been retained by WBT for the rebuild of the Camp after the Woolsey Fire in 2018. Stantec has prepared this memo to document the preliminary sizing and development for the domestic water and fire water systems to be used for planning purposes. The proposed sizing and development will be based off common engineering practice, the California Plumbing Code, Ventura County Fire Protection District fire flow requirements, and estimated domestic water demands, as described in the Preliminary Average and Maximum Day Demands and Onsite Storage Memo, see Appendix 2. This memorandum will document if the existing storage tanks are adequate to serve the project as well as size any pumping systems for supply and distribution.

Background:

The Camp consists of Camp Hess Kramer (lower and middle camp area), and Gindling Hilltop Camp (upper) which are located at 11495 Pacific Coast Highway in Malibu, Ventura County, California within APN 700-060-450 and APN 700-060-140. The Camp consist of various administration buildings, assembly buildings, dining halls, restroom facilities, staff housing, cabins, and miscellaneous structures for camp related operations. See Figure 1 for a vicinity map.

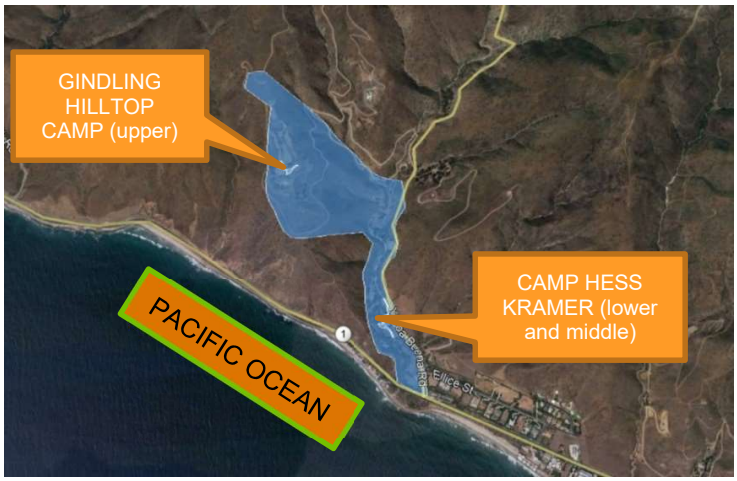

Figure 1 – Vicinity Map

Reference: **Preliminary Water System Design**

The Woolsey Fire at the end of November 2018 and subsequent debris flows destroyed or damaged many of the existing buildings, structures, and utility infrastructure. A development plan for the Camp is proposed for rebuilding the destroyed structures and infrastructure and re-using the undamaged buildings and infrastructure that are found adequate to serve the project through. The Camp is served by Yerba Buena Water Company (YBWC) for water service.

PRELIMINARY DOMESTIC WATER AND FIRE WATER SYSTEM

From preliminary investigations much of the above and below ground distribution and supply infrastructure was found to be either destroyed or unsalvageable. This memorandum and calculations assume all supply lines, distribution lines, valves, and appurtenances will be new construction. The existing above ground storage tanks are assumed in acceptable condition to be used for domestic and fire water storage purposes. Prior to final design, it is recommended that these tanks be inspected to meet current codes and standards.

A hydraulic analysis was performed to adequately size the supply and distribution water mains for domestic water, irrigation, and fire flow requirements. See Appendix 1 for hydraulic calculations.

SUPPLY SYSTEM

The supply for the onsite storage is provided through a 3-inch meter (170-4) from Yerba Buena Water Company. The purveyor's water tank that supplies water through meter 170-4 is located along Yerba Buena Road at an approximate pad elevation of 256 feet above sea-level. The water meter is located above ground at an approximate elevation of 165 feet. The existing onsite 100,000-gallon storage tank, at 251 feet, will serve domestic water, irrigation, and fire water for the project. To fill the tank to its capacity at elevation 274.50 feet, a pumping system is needed to meet the pressure requirements caused by the difference in elevation and pipeline friction losses. The pumping system is recommended to be located near meter 170-4. Based on hydraulic calculations, a pump (Pump #1) supplying a minimum 5 HP will be required to supply water through a proposed 3-inch pipe to the tank. See Appendix 1 for hydraulic calculations and Appendix 2 for a description of the supply and on-site storage facilities

The 100,000-gallon storage tank will also be used to supply (1) 67,000-gallon fire water and (2) 45,000-gallon domestic water tanks located at Gindling Hilltop Camp (GHC). These tanks are located at an approximate elevation of 855 feet. Based on hydraulic calculations, it is recommended to utilize (2) two booster pumping systems with 2-inch water mains to fill the tanks at GHC. One pumping system (Pump #2) will be located near the 100,000-gallon tank to supply an existing 3,200-gallon intermediate tank, at an approximate elevation of 496-feet. The other pumping system (Pump #3) will be located near the 3,200-gallon intermediate tank to pump up to the tanks at GHC. Both pumping systems will need a pump capable of supplying a minimum 5-HP to meet the pressure requirements caused by the difference in elevation and pipeline friction losses. Utilizing two pumping system at different elevations and an intermediate tank will minimize the need for installing thicker walled pipe compared to one pumping system that requires a greater amount of pressure to deliver water from the 100,000-gallon tank to the three tanks at GHC. For water circulation purposes, the tanks at GHC are recommended to be plumbed together and utilized for domestic, fire, and irrigation water. See Appendix 1 for hydraulic calculations and Appendix 2 for a description of the supply and on-site storage facilities

See Table 1 for the supply system summary.

Reference: **Preliminary Water System Design**

Table 1 - Supply System Summary

Supply From	Supply Elevation	Discharge To	Discharge Elevation	Water main size (inch)	Pumping system req?	Pump HP	Flow (gpm)	Pipeline Velocity (fps)
YBWC	256	100,000-gallon Tank	274.5	3	Yes	5	120	5.2
100,000-gallon Tank	251	3,200-gallon Intermediate	496	2	Yes	5	25	2.4
3,200-gallon Intermediate	496	GHC Tanks	855	2	Yes	5	25	2.4

DISTRIBUTION SYSTEM

Domestic Water Distribution

Based on the California Plumbing Code and common engineering practice it is recommended that pipeline velocities are within 2 - 6 feet per second while maintaining a residual domestic water pressure within the range of 35 – 80 psi at the connection to the building to allow adequate pressure to all building fixtures.

- Gindling Hilltop Camp (GHC)

The preliminary distribution system for GHC will consist of a single water main serving both domestic and fire water to the buildings and fire hydrants. The system will be supplied by all three tanks, which will be plumbed together for circulation purposes.

A hydraulic analysis was performed on the distribution system utilizing the estimated Peak Hour Demands and irrigation demands per Appendix 2. Based on the analysis, utilizing the storage tanks at GHC for distribution will provide adequate pressure within the desired ranges for all buildings at GHC. The domestic water can be provided through a single 6-inch main serving domestic, fire water, and [1]irrigation demand.

- Camp Hess Kramer (CHK; Middle and Lower)

The preliminary distribution system for CHK will consist of a single water main connected to the 100,000-gallon storage tank main serving both domestic and fire water to the buildings and fire hydrant at lower elevations in the camp. The domestic water demand to buildings at higher elevations will be supplied via a booster pump (Pump #1) directly connected to meter 170-4. The system is described further below.

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[1] [1]Irrigation demand is the largest cycle use provided by Studio MLA, Water Efficient Landscape Worksheet. See Appendix 2.[1]

Reference: **Preliminary Water System Design**

A hydraulic analysis was performed on the distribution system utilizing the estimated Peak Hour Demands and irrigation demands from Appendix 2. See Appendix 1 for hydraulic calculations. Based on the analysis, utilizing the 100,000-gallon tank for domestic water distribution will provide adequate pressure for buildings below elevation 158 feet through an 8-inch water main. As discussed further below, the water main can be utilized for both domestic and fire water purposes. 2-inch branch lines off the 8-inch main will be adequate along with smaller service connections for domestic water distribution to camp buildings. This main will serve domestic water to buildings. Service connections will need to be sized on and individual basis further along in the design phase.

The proposed alignment for 8-inch main will be along the interior access road utilizing approximately the same alignment as the existing water main. It will have two 6-inch branch mains serving domestic and fire water to buildings 2, 3, 4, & 16, 18, 19 and fire water to buildings 13, and 14. The branch mains will terminate at the lower end of the camp.

The proposed buildings in the middle camp that are located above elevation 158 feet will not have adequate pressure within the recommended range with supply from the 100,000-gallon tank alone, therefore a pumping system is recommended. A pump with Variable Frequency Drive (VFD) in combination with a hydro-pneumatic tank will provide flow and pressure requirements for these buildings. If Pump #1 as described in the Supply System section is equipped with a VFD it can provide a range of flows at constant pressure to meet on demand system requirements as well as provide supply to the 100,000-gallon storage tank through simple controls at the tank. Utilizing Pump #1, a 3-inch distribution main is recommended to middle camp buildings above elevation 158 feet. In the event of a power outage, the pump will be inoperable. It is recommended that the pump controller be fitted with a transfer switch to utilize a portable backup generator if needed. The pump station should also be constructed with a bypass connected to the 3-inch distribution main to middle camp as well as the 8-inch main that supplies lower camp. Providing a bypass to Pump #1 will maintain water supply from meter 170-4 to all buildings in middle and lower camp. Control of the bypass will be done via manual operation of division gate valves. During normal operation, these division gate valves will be closed. It should be noted that utilizing the pressure zone from meter 170-4 will result in lower pressures than distribution with Pump #1.

The Lower Camp buildings along Yerba Buena Road, excluding buildings 1 and 2, the tennis court area, the wastewater treatment facility, as well as hillside and turf irrigation areas are assumed to utilize a direct connection to the 8-inch YBWC main through existing water meters 190-1 through 190-4 and are not included in this hydraulic analysis.

See Table 2 for a Domestic Water Distribution summary.

Reference: **Preliminary Water System Design**

Table 2 - Domestic Water Distribution System Summary

Supply From	Supply Elevation	Discharge To	Discharge Elevation	Water main size (inch)	Pumping system req?	Pump HP	PHD (gpm)	Pipeline Velocity (fps)	Residual Pressure (psi)
GHC Tanks	855	GHC Highest Bldg. (58)	762	6	No	-	43	0.5	60.0
GHC Tanks	855	GHC Lowest Bldg. (45)	711	6	No	-	43	0.5	38.0
Meter 170-4/ Pump #1	165	Middle Camp Highest Bldg. (36)	221	3	Yes	5	37[1]	1.62	37.3
100,000-gallon Tank	251	Lower Camp lowest Bldg. (1)	60	6[3]	No	-	26[2]	0.3	78.3

[1] Lower/Middle Camp estimated domestic PHD * 0.59; See Appendix B
[2]Lower/Middle Camp estimated domestic PHD * 0.41 plus irrigation demand; See Appendix B
[3] 6-inch Branch Water Main from 8-inch gravity water main connected to 100,000-gallon Tank

Fire Water Distribution

Ventura County Fire Protection District requires private rural fire water systems to be designed per NFPA 1142 to supply the minimum fire flow with a 20-psi residual at the “fire scene”. For purposes of this memorandum the ‘fire scene’ will be analyzed as the most demanding structure area or the area with structure at the highest elevation served by the fire main. These include the connection to the automatic fire sprinkler system within the structure and the adjacent fire hydrants. Hydraulic calculations will analyze fire flow separately to the either structure. To be conservative during the planning stages, a minimum of 25 psi will be used in this analysis to size the water mains supplying the fire flow. It is also common engineering practice to keep pipeline velocities below 15 fps during fire flow.

- **Gindling Hilltop Camp (Upper)**

A hydraulic analysis was performed using the fire flow requirements outlined in Appendix 2 while maintaining a 25-psi residual. Utilizing the existing onsite water storage tanks, a 6-inch fire water main can provide 750 gpm with a pressure residual above 25 psi to either ‘fire scene ‘located in GHC. Double Check Detector Assemblies equipped with two check valves will be necessary for back flow prevention on the branches to the onsite fire hydrant(s) and fire sprinkler system mains. See Appendix 1 for hydraulic calculations.

Reference: **Preliminary Water System Design**

- **Camp Hess Kramer (Middle and Lower)**

As described above, a single 8-inch water main connected to the 100,000-gallon storage tank main can be utilized to serve both domestic and fire water to the buildings and fire hydrants at lower elevations in the camp. Double Check Detector Assemblies equipped with two check valves will be necessary for back flow prevention on the branches to the onsite fire hydrant(s) and fire sprinkler system mains. Near the tank, the main will branch off to a dedicated fire pump to meet pressure and flow requirements for buildings at higher elevations as discussed further below.

A hydraulic analysis was performed on the fire water system utilizing the fire flow requirements outlined in Appendix 2. Based on the analysis, utilizing the 100,000-gallon, an 8-inch fire water main can provide 1,000 gpm with a pressure residual above 25 psi at the 'fire scene' located below elevation 165 feet.

The proposed buildings and fire hydrants in the Middle Camp that are located above elevation 165 feet will not have adequate pressure above 25 psi with supply from the 100,000-gallon tank alone, therefore a dedicated fire pumping system is recommended for those buildings in Middle Camp. Based on Ventura County Fire Protection District and NFPA 1142, the dedicated fire water system serving the most demanding building in Middle Camp requires a fire flow of 750 gpm. Utilizing a UL/FM listed 25 hp fire pump and an 8-inch fire water main, flow and pressure requirements can be met for all buildings and hydrants located above elevation 165 in Middle Camp. The fire pump shall be designed per the requirements of NFPA 20 and NFPA 70 and will require a stand-by generator with a fuel tank (gas or diesel) for backup power during an outage.

See Table 3 for a Fire Water System summary and Appendix 1 for hydraulic calculations.

Table 3 - Fire Water System Summary

Supply From	Supply Elev.	'Fire Scene'	Bldg./ FH Elev.	FW main size (inch)	Pumping system req?	Fire Pump HP	Fire Flow (gpm)	Pipeline Velocity (fps)	Residual Pressure (psi)
GHC Tanks	855	Largest Building (45)	711	6	No	-	750	7.7	32.2
GHC Tanks	855	Highest Elev. Building (58)	762	6	No	-	750	7.7	26.6
100,000-gallon Tank/Fire Pump	251	Middle Camp Highest Elev. bldg. (36)	221	8	Yes	25	750	4.47	40.2
100,000-gallon Tank	251	Lower Camp Bldg. (14)	100	8	No	_	1000	5.6	30.4

Reference: **Preliminary Water System Design**

CONCLUSIONS AND RECOMMENDATIONS

The onsite water supply for the project is serviced by Yerba Buena Water Company through a 3-inch water meter. A minimum 3-inch water main and pumping system (Pump #1) is needed to fill the 100,000-gallon onsite storage tank to full capacity. To utilize the 100,000-gallon storage tank for supply to the 67,000-gallon Fire Water tank and 45,000-gallon Domestic Water tanks at Gindling Hilltop Camp, multiple pumping systems (Pumps #2 and #3) are required. Pump #2 will be located by the 100,000-gallon tank and will supply an intermediate 3,200-gallon tank through a 2-inch main. Pump# 3 will be located by the 3,200-gallon storage tank and will supply the tanks at GHC through a 2-inch main.

For distribution, the existing storage tanks at Gindling Hilltop Camp with a 6-inch water main can be utilized to meet domestic, irrigation and fire flow requirements. The existing storage tanks will be plumbed together to allow for water circulation within the entire system.

To provide adequate pressure for domestic demand requirements for Middle and Lower Camp buildings below elevation 158 feet (buildings: 2, 4, 16, 18, 19, 20, 29, 30, 31) distribution from the 100,000-gallon tank will require a single 8-inch water main and 2-inch branch domestic lines. Buildings in middle camp above 158 feet (buildings: 21, 22, 23, 24, 25, 26, 27, 28, 32, 33, 34, 35, 36, 37, 38, 39, 40 and 41) will require a booster pumping system to deliver adequate pressure for domestic water. Pump #1 equipped with a VFD and a hydro-pneumatic tank can provide adequate flow and pressure to these buildings as well as fill the 100,000-gallon tank. Pump #1 will be directly connected to meter 170-4. A bypass constructed at Pump #1 will provide water from meter 170-4 to all buildings in Middle and Lower camp using the onsite water supply in the case of a power outage.

The fire distribution system for Middle and Lower Camp will utilize the single 8-inch water main to serve fire flow to buildings and fire hydrants below elevation 165 feet. Backflow prevention assemblies will be required at all fire main branches that serve building sprinkler systems and fire hydrants. Middle Camp buildings and fire hydrants above elevation 165 feet (buildings. 26, 27, 28, 32, 33, 34, 35, 36, 39, 40 and 41) will require a dedicated fire pump pulling from the 100,000-gallon tank with an 8-inch fire main to meet fire flow requirements. The fire pump will require a stand-by generator with a fuel tank (gas or diesel) for backup power.

This memorandum is for preliminary planning purposes only. All building and tank elevations are preliminary and will need additional analysis prior to final design.

See Appendix 3 for a Domestic Water and Fire Water System Schematic.

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May 1, 2021

Doug Lynn, Rick Waters, Steve Searock

Reference: **Preliminary Water System Design**

APPENDIX 1

Hydraulic Calculations

Domestic Water System Hydraulic Analysis - Camp Hess Kramer

Project	CAMP HESS KRAMER WATER SYSTEM
WO.	2042586200
Date	4/29/2021
Calc'd By:	JTZ

Hydraulic info

100K-gal Tank Elev. =	251.00	ft
36, highest bldg elev =	221.00	ft
1, Welcome Center elve. =	60.00	ft

Domestic Flow Requirements

	Scenario #1 - Bldg. 1		Scenario #2 - Bldg. (36)	
ADD =	11.53	gpm	16.60	gpm
MDD =	17.30	gpm	24.90	gpm
PHD =	25.95	gpm	37.34	gpm
Irrigation Demand, H3 =	4.69	gpm	-	gpm
Static Pressure =	82.68	psi	12.99	psi

Domestic Pumping Information

Pump #1 5HP VFC

Flow =	37.34	gpm
TDH =	86.00	ft
Discharge Pressure =	37.23	psi

Hazen Williems Equation

$h_f = 0.2083*(100/C)^{1.85} * (Q^{1.85}/D^{4.8655})$

Pipe Data																			
Material	Class	Nom. Dia.	Roughness	Inside Dia.	Inside Area	Flow Rate		Velocity	Head Loss	Length	Pipe Head Loss	Elevation Beginning	Elevation Ending	Minor Losses	Other Losses	Total Headloss	Pressure		Description	Comments
		OD	C	D	A	Q		V	h_f	L	h	Elev.	Elev.	hm		Ht	P			
		(in)	-	(in)	(ft^2)	(gpm)	(cfs)	(fps)	(ft/100 ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(psi)		
PVC	CL165 DR25	8	130	8.280	0.374	31	0.07	0.18	0.00	2610	0.06	251.00	90.00	0.00	5.00	5.07	155.93	**67.50**	Scenario #1 - PHD + IRR to Lower/Middle Camp junction	
PVC	CL165 DR25	6	130	6.310	0.217	26	0.06	0.27	0.01	1525	0.10	90.00	60.00	0.00	5.00	5.11	180.82	**78.28**	Scenario #1 - PHD t o Welcome Center Bldg. (1)	Adequate pressure
PVC	Sch. 40	3	130	3.068	0.051	37	0.08	1.62	0.44	1160	5.15	165.00	221.00	0.00	10.00	15.15	86.11	**37.28**	Scenario #2 - PHD to 36, highest building, Piness Village (middle) using pump	Inculdes Pump #1 and residual pressure from *Pumping System - From YBWC tank to M 170-4*

Minor Loss Equation:

$$h_m = K\frac{V^2}{2g}$$

g = 32.174

Row #	K	V	hm
1	8.43	0.18	0.00
2	3.20	0.27	0.00
3	5.61	1.13	0.11
4	0.00	1.62	0.00
5	0.00	1.62	0.00
6	0.00	0.00	0.00
7	0.00	0.00	0.00
8	0.00	0.00	0.00
9	0.00	0.00	0.00
10	0.00	0.00	0.00

Fire Water System Hydraulic Analysis - Camp Hess Kramer

Project	Camp Hess Kramer Water System
WO.	2042586200
Date	9/16/2020
Calc'd By:	JTZ

Hydraulic Information

100K-gal Tank Elev. =	251.00	ft
14 Largest Bldg. elev. =	100.00	ft
36, highest bldg elev =	221.00	ft
1, Welcome Center elve. =	60.00	ft

Fire Flow Requirements

	Scenario #1 - Bldg. 13	Scenario #2 - Bldg. 36	Scenario #3 - Bldg. 1	
Fire Sprinkler flow =	225.00	225.00	225.00	gpm
Fire Hose flow =	250.00	250.00	250.00	gpm
Total Fire Flow Required =	1000.00	750.00	750.00	gpm
Static Pressure =	65.37	12.99	82.68	psi

Fire pump Information

Peerless Fire Pump - Model 4AEF11

Flow =	750.00	gpm
TDH =	92.00	ft
Discharge Pressure =	39.83	psi

Hazen Williems Equation

$h_f = 0.2083*(100/C)^{1.85} * (Q^{1.85}/D^{4.8655})$

Pipe Data																				
Material	Class	Nom. Dia.	Roughness	Inside Dia.	Inside Area	Flow Rate		Velocity	Head Loss	Length	Pipe Head Loss	Elevation		Minor Losses	Other Losses	Total Headloss	Pressure		Description	Comments
		OD	C	D	A	Q		V	h_f	L	h	Beginning Elev.	Ending Elev.	hm		Ht	P			
		(in)	-	(in)	(ft^2)	(gpm)	(cfs)	(fps)	(ft/100 ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(psi)		
PVC	CL165 DR25	8	130	8.280	0.374	1000	2.23	5.96	1.55	2610	40.54	251.00	90.00	4.87	5.00	50.41	110.59	**47.88**	Scenario #1 - FF to Lower/middle camp junction	
PVC	CL165 DR25	6	130	6.310	0.217	1000	2.23	10.26	5.83	390	22.72	90.00	100.00	2.62	5.00	30.34	70.26	**30.41**	Scenario #1 - FF to Lower/middle camp junction to Largest bldg (14) Lower Camp	Adequate pressure
PVC	CL165 DR25	8	130	8.280	0.374	750	1.67	4.47	0.91	1800	16.42	251.00	221.00	2.78	10.00	29.20	92.80	**40.17**	Scenario #2 - FF from Fire Pump to 36, highest building, Piness Village (middle camp)	Includes Fire Pump - All Buildings above 65ft need dedicated Fire Pump
PVC	CL165 DR25	8	130	8.280	0.374	750	1.67	4.47	0.91	2610	23.81	251.00	90.00	2.62	5.00	31.42	129.58	**56.09**	Scenario #3 - FF to Lower/middle camp junction	
PVC	CL165 DR25	6	130	6.310	0.217	750	1.67	7.70	3.42	1525	52.18	90.00	60.00	2.95	5.00	60.12	99.45	**43.05**	Scenario #3 - FF from Lower/Middle camp junction to bldg (1) Welcome Center	Adequate pressure
PVC	CL165 DR25	8	130	8.280	0.374	750	1.67	4.47	0.91	1800	16.42	251.00	165.00	2.78	5.00	24.20	61.80	**26.75**	FF from tank to highest possible elev Piness Village (middle camp) for 25 psi residual	All Bldgs below elev. 165 can utilize onsite storage

Minor Loss Equation:

$$h_m = K\frac{V^2}{2g}$$

g = 32.174

Row #	K	V	hm
1	8.82	5.96	4.87
2	8.43	4.47	2.62
3	3.20	7.70	2.95
4	8.97	4.47	2.78
5	8.97	4.47	2.78
6	0.00	0.00	0.00
7	0.00	0.00	0.00
8	0.00	0.00	0.00
9	0.00	0.00	0.00
10	0.00	0.00	0.00

Supply System Hydraulic Analysis

Project *CAMP HESS KRAMER WATER SYSTEM*
WO. *2042586200*
Date *9/10/2020*
Calc'd By: *JTZ*

MAXIMUM LOAD TO SYSTEM

Tank information		
GHC Max operating Water Height =	*16.00*	*ft*
GHC Heighest tank pad Elev =	*855.00*	*ft*
Static lift =	*620.00*	*ft*
100k tank Elev =	*251*	*ft*
100K Max operateing Water Height =	*23.50*	*ft*
YBWC Tank Elev =	256	*ft*
M 170-4 Elev =	*165.00*	*ft*

Pipe lengths		
from 100KTank to intermediate tank area =	*1410.00*	*ft*
Intermediate to Hilltop tanks =	*800.00*	*ft*
From YBWC Tank to M170-4 =	***225.00***	*ft*
From M170-4 to 100k Tank =	***675.00***	*ft*

Pump Station information			
Option #1 - (Pump #2) One pump near 100,000-gal tank			*Discharge Pressure*
Pump station pad Elev =	*251.00*	*ft*	*303.03* psi
TDH =	*700.00*	*ft*	
Flow =	*25.00*	*gpm*	
Option # 2 - (Pump #2 & #3)two pumps			
Pump station pad Elev =	*251.00*	*ft*	*151.52* psi
TDH =	*350.00*	*ft*	
Flow =	*25.00*	*gpm*	
Pump station pad Elev =	*496.00*	*ft*	*151.52* psi
TDH =	*350.00*	*ft*	
Flow =	*25.00*	*gpm*	
Pump#1 - Booster to 100k Tank			
Pump station pad Elev =	*165.00*	*ft*	*32.47* psi
TDH =	*75.00*	*ft*	
Flow =	*120.00*	*gpm*	

Pipe Data																			
Material	Class	Nom. Dia.	Roughness	Inside Dia.	Inside Area	Flow Rate		Velocity	Head Loss	Length	Pipe Head Loss	Elevation Beginning	Elevation Ending	Minor Losses	Other Losses	Total Headloss	Pressure		Description	Comments
		OD	C	D	A	Q		V	h_f	L	h	Elev.	Elev.	h_m		Ht	P			
		(in)	-	(in)	(ft^2)	(gpm)	(cfs)	(fps)	(ft/100 ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(psi)		
Steel	SCH. 40	2	100	2.070	0.023	25	0.06	2.38	2.33	2210	51.51	251.00	871.00	0.65	5.00	57.16	22.84	***9.89***	Option #1 - Boost up to Hilltop Tanks	
Steel	SCH. 40	2	100	2.070	0.023	25	0.06	2.38	2.33	1410	32.87	251.00	496.00	1.55	5.00	39.41	65.59	***28.39***	Option #2 - Boost up to intermediate area	
Steel	SCH. 40	2	100	2.070	0.023	25	0.06	2.38	2.33	800	18.65	496.00	871.00	0.48	5.00	24.13	16.46	***7.12***	Option #2 - Boost up to Hilltop Tanks	
Steel	SCH. 40	3	100	3.070	0.051	120	0.27	5.20	6.24	225	14.03	256.00	165.00	0.31	5.39	19.73	71.27	***30.85***	From YBWC tank to M 170-4	
PVC	Sch. 40	3	130	3.068	0.051	120	0.27	5.21	3.85	675	25.99	165.00	274.50	2.45	5.00	33.44	3.33	***1.44***	From M 170-4 to 100K Tank	

Minor Loss Equation:

$$h_m = K\frac{V^2}{2g}$$

g = 32.174

Row #	K	V	hm
1	7.38	2.38	0.65
2	17.52	2.38	1.55
3	5.46	2.38	0.48
4	3.54	2.38	0.31
5	5.80	5.21	2.45
6	0.00	5.20	0.00
7	0.00	5.21	0.00
8	0.00	0.00	0.00
9	0.00	0.00	0.00

Hazen Williems Equation

$h_f = 0.2083*(100/C)^{1.85} * (Q^{1.85}/D^{4.8655})$

Domestic Water System Hydraulic Analysis - Gindling Hilltop Camp

Project	Camp Hess Water System
WO.	2042586200
Date	9/16/2020
Calc'd By:	JTZ

Hydraulic info

Fire Water Tank Elev. =	855.00 ft
45, Largest bldg. elev. =	711.00 ft
58, Highest bldg. elev =	762.00 ft

Domestic Flow Requirements

	Scenario #1 - Bldg. 45	Bldg. 58
ADD =	14.07	14.07 gpm
MDD =	21.10	21.10 gpm
PHD =	31.65 gpm	31.65 gpm
Irrigation Demand =	11.25 gpm	
Static Pressure =	**62.34** psi	**40.26** psi

Hazen Williems Equation

$h_f = 0.2083*(100/C)^{1.85} * (Q^{1.85}/D^{4.8655})$

Pipe Data						Flow Rate					Pipe	Elevation		Minor	Other	Total	Pressure		Description	Comments
Material	Class	Nom. Dia.	Roughness	Inside Dia.	Inside Area	Q		Velocity	Head Loss	Length	Head Loss	Beginning	Ending	Losses	Losses	Headloss	P			
		OD	C	D	A			V	h_f	L	h	Elev.	Elev.	hm		Ht				
		(in)	-	(in)	(ft^2)	(gpm)	(cfs)	(fps)	(ft/100 ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(psi)		
PVC	Sch. 40	6	130	6.065	0.201	43	0.10	0.48	0.02	1600	0.33	855.00	711.00	0.04	5.00	5.37	138.63	**60.01**	Scenario #1 - PHD + IRR to Bldg (45) Lower Camp	Adequate pressure
PVC	Sch. 40	6	130	6.065	0.201	43	0.10	0.48	0.02	525	0.11	855.00	762.00	0.03	5.00	5.14	87.86	**38.03**	Scenario #2 - PHD + IRR to 58, highest building	Adequate pressure

Minor Loss Equation:

$$h_m = K\frac{V^2}{2g}$$

g = 32.174

Row #	K	V	hm
1	11.07	0.48	0.04
2	9.64	0.48	0.03
3	0.00	0.00	0.00
4	0.00	0.00	0.00
5	0.00	0.00	0.00
6	0.00	0.00	0.00
7	0.00	0.00	0.00
8	0.00	0.00	0.00
9	0.00	0.00	0.00
10	0.00	0.00	0.00

Fire Water System Hydraulic Analysis - Gingling Hilltop Camp

Project	Camp Hess Kramer Rebuild Project
WO.	2042586200
Date	9/16/2020
Calc'd By:	JTZ

Hydraulic Information

Fire Water Tank Elev. =	855.00 ft
45, Largest bldg. elev. =	711.00 ft
58, Highest bldg. elev =	762.00 ft

Fire Flow Requirements

	Scenario #1 - Bldg. 45	Scenario #2 - Bldg, 58
Fire Sprinkler flow =	225.00 gpm	225.00 gpm
Fire Hose flow =	250.00 gpm	250.00 gpm
Fire Flow Required =	750.00 gpm	750.00 gpm
Static Pressure =	62.34 psi	40.26 psi

Hazen Williems Equation

$h_f = 0.2083*(100/C)^{1.85} * (Q^{1.85}/D^{4.8655})$

30.11

Pipe Data						Flow Rate					Pipe	Elevation		Minor	Other	Total			Description	Comments
Material	Class	Nom. Dia.	Roughness	Inside Dia.	Inside Area	Q		Velocity	Head Loss	Length	Head Loss	Beginning	Ending	Losses	Losses	Headloss	Pressure			
		OD	C	D	A			V	h_f	L	h	Elev.	Elev.	hm		Ht	P			
		(in)	-	(in)	(ft^2)	(gpm)	(cfs)	(fps)	(ft/100 ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(psi)		
PVC	CL165 DR25	6	130	6.310	0.217	750	1.67	7.70	3.42	1600	54.74	855.00	711.00	9.82	5.00	69.56	74.44	**32.22**	Scenario #1 - FF to Largest bldg (45) GCK Camp	
PVC	CL165 DR25	6	130	6.310	0.217	750	1.67	7.70	3.42	525	17.96	855.00	762.00	8.50	5.00	31.47	61.53	**26.64**	Scenario #2 - FF to highest elevation Structure (58) GHK Camp	
														0.00						
														0.00						
														0.00						
														0.00						
														0.00						
														0.00						

Minor Loss Equation:

$$h_m = K\frac{V^2}{2g}$$

g = 32.174

Row #	K	V	hm
1	10.67	7.70	9.82
2	9.24	7.70	8.50
3	0.00	7.70	0.00
4	0.00	0.00	0.00
5	0.00	0.00	0.00
6	0.00	0.00	0.00
7	0.00	0.00	0.00
8	0.00	0.00	0.00
9	0.00	0.00	0.00
10	0.00	0.00	0.00

May 1, 2021

Doug Lynn, Rick Waters, Steve Searock

Reference: **Preliminary Water System Design**

APPENDIX 2

Preliminary Average and Maximum Day Demands and On-site Storage Calculations Memo

Stantec

Memo

To:	Doug Lynn, Rick Waters, Steve Searock Wilshire Boulevard Temple	From:	Jonny Zukowski, P.E. Stantec 111 East Victoria Street Santa Barbara CA 93101-2018
File:	CHK_Preliminary ADD_MDD_Storage memo.docx	Date:	May 1, 2021

Reference: Preliminary Average and Maximum Day Demands and On-site Storage Calculations

Purpose:

Stantec been retained by Wilshire Boulevard Temple (WBT) for the rebuild of the Camp Hess Kramer (lower and middle camp area), and Gindling Hilltop Camp (upper) after the Woolsey Fire in 2018. Stantec has prepared this memo to document the proposed development preliminary domestic water average day demand (ADD), maximum day demand (MDD), peak hour demand (PHD), fire flow demand, irrigation demand, and storage calculations to be used for preliminary planning purposes. In addition, Stantec will document the capacities of the existing on-site storage. This memorandum uses the following methodologies to perform calculations and for requirements:

Estimating Domestic Water and Fire Flow Demands:

- Ventura County Water Works Manual

Estimating Irrigation Demands:

- Water Efficient Landscape Worksheet proved by Studio-MLA (Appendix E)

Domestic and Fire Water Storage Requirements:

- Ventura County Water Works Manual
- Ventura County Fire Protection District Ordinance No. 31 (VCFC)
- NFPA 1142 & 13

Background:

The Camp consists of Camp Hess Kramer (lower and middle camp area), and Gindling Hilltop Camp (upper) which are located at 11495 Pacific Coast Highway in Malibu, Ventura County, California within APN 700-060-450, and APN 700-060-140. The Camp facilities were made up of various administration buildings, assembly buildings, dining halls, restroom facilities, staff housing, cabins, and miscellaneous structures for camp related operations. The Woolsey Fire at the end of November 2018 and subsequent debris flows destroyed or damaged many of the existing buildings, structures, and utility infrastructure. A development plan for the Camp is proposed for rebuilding the destroyed structures and infrastructure and re-using the undamaged buildings and infrastructure that are found adequate to serve the project through. See Figure 1 for a vicinity map.

Reference: **Preliminary Average and Maximum Day Demands and On-site Storage Calculations**

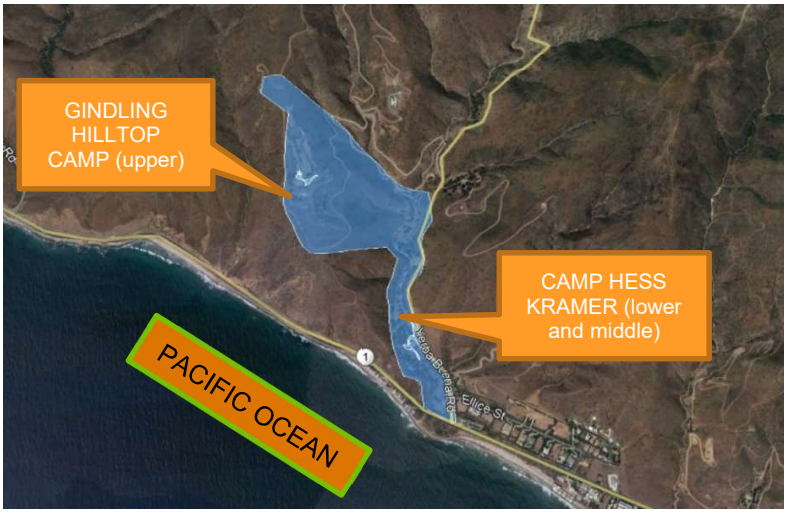

Figure 1 – Vicinity Map

The Camp is served by Yerba Buena Water Company (YBWC) for water service and onsite collection, treatment and disposal system for sewer service. The YBWC connections and the Camp water system details and are described below.

Proposed Development

The planned development project includes a combination of existing structures and proposed new structures totaling 49 buildings in the lower, middle, and upper camp areas (see Appendix A for proposed site plan and building information tables) that will be connected to the water system. Pursuant to the 2017-10-4 Notice of Land Use Entitlement LU10-0069 (CUP), the total population allowed at the Camp is 1,113 persons daily and overnight during the summer camp session (July). During the “off season” the population is 557 guests and staff. An additional 556 persons are allowed during third-party events in the ‘off season’.

Existing Yerba Buena Water Company Connections

The Camp has five (5) existing water service meters connected to an existing YBWC 8-inch water main located in Yerba Buena Road (see **Table 1**).

Table 1 – Existing Yerba Buena Water Company Service Meters

Meter Number	Service Meter Type	Size	Location
190-1	Domestic	2-inch	Yerba Buena Road
190-2	Domestic	2-inch	Yerba Buena Road
190-3	Domestic	1 -inch	Yerba Buena Road
190-4	Irrigation	1 ½-inch	Yerba Buena Road
170-4	Domestic	3-inch	Middle Camp

Reference: **Preliminary Average and Maximum Day Demands and On-site Storage Calculations**

Existing Camp Water System

Pre Woolsey-Fire, the existing water system of the Lower and Middle Camps utilized a 100,000-gallon onsite storage tank for domestic and fire water supply. This tank served various on-site wharf-head style fire hydrants throughout the camp, two 6-inch fire hydrants in the lower camp, irrigation in the Lower Camp, and all buildings in the Middle Camp. The tank was supplied through meter 170-4. Approximately 90 percent[1] of the total water supply is directed to onsite storage through meter 170-4 while the remaining 10 percent[2] is directly supplied to the end user through the remaining four meters. It is assumed that Lower Camp buildings 6, 7, 13, and 14 along Yerba Buena Road utilized a direct connection to YBWC's 8-inch main for domestic water through meters 190-1 through 190-3. Based on the preliminary water system design, it is assumed that these connections along with the irrigation connection to meter 190-4 will remain.

The existing water system in the Upper Camp utilized two existing 45,000-gallon storage tanks for domestic water and one 67,000-gallon storage tank for supply to onsite fire hydrants in the Upper Camp.

The existing onsite storage includes multiple tanks as listed in Table 2. It is assumed the tanks listed in Table 2 are in acceptable condition to be used for domestic and fire water storage.

Table 2 - Existing Onsite Storage Tank Information

Tank Designation	Material	Nominal Capacity (gallons	Calculated Capacity (gallons)
Domestic/Fire – Lower & Middle Camps	steel	100,000	95,577
Domestic – Upper Camp	steel	45,000	41,187
Domestic – Upper Camp	steel	45,000	40,734
Fire – Upper Camp	steel	67,000	46,332

Note: Existing storage tank information was provided via email by Camp staff on July 28, 2020.

ESTIMATING DOMESTIC AVERAGE DAY, MAXIMUM DAY, PEAK HOUR DEMANDS AND IRRIGATION DEMANDS:

YBWC has no published guidelines for estimating domestic average and maximum day water demands, the Ventura County Water Works Manual (VCWWM) shall be used for estimating daily water use as well as sizing required storage facilities for domestic supply.

Per the VCWWM, "All systems shall satisfy the requirements of the California Code of Regulations Title 22, Division 4, Chapter 16 for Maximum Day Demand (MDD) and Peak Hour Demand (PHD)." Per California Code of Regulations Title 22, Division 4, Chapter 16, § 64554, the previous 10 years of historical water usage can be used to estimate water demands for the proposed project.

[1] Per 5/15/2020 meter reading data provided by Camp staff via emailed spreadsheet
[2] Per 5/15/2020 meter reading data provided by Camp staff via emailed spreadsheet

Reference: **Preliminary Average and Maximum Day Demands and On-site Storage Calculations**

HISTORICAL WATER USAGE:

Camp staff provided Stantec with water usage data collected every two months by YBWC from 2009 to the present for each of their five water service meters (Appendix B). Post Woolsey Fire (2019-2020) is not included in the data presented as it does not reflect full occupancy water usage.

As the proposed project will not be increasing the population allowed at the camp per the CUP, the literature per Title 22 requires the maximum monthly historical usage to be used for estimating purposes. Bi-monthly historical uses were converted to daily uses and the maximum values over the previous 10 years (period of record) were used in the calculations (Appendix C). It is estimated from Camp staff that the upper camp uses approximately one-third of the water metered through 170-4.

The preliminary water system design for the project requires a booster pump for eighteen (18) buildings in the Middle Camp to meet pressure requirements within the California Plumbing Code. The booster pump and distribution main will be directly connected to YBWC meter 170-4 and will not rely on onsite storage for supply. These eighteen (18) buildings, with area totaling 36,881 square feet, are estimated to account for 59% of the Lower/Middle camp domestic demand, based on building area, and will not be included in the onsite storage requirements.

Table 3 shows the average day, maximum day, and peak hours demand calculations.

Table 3 –Water Demand Estimates (Historical Usage 2009 – 2018 Meter 170-4)

Use Designation	Maximum Bi-monthly Usage (gal) (Sept. & Oct. 2018)	Average Day Demand (gpm)	Maximum Day Demand (MDD) (gpm) = 1.5[1] x ADD	Peak Hour Demand (PHD) (gpm) = 1.5[1] x MDD
Total Domestic Demand	**3,696,466**	**42.20**	**63.30**	**94.95**
Total Lower/Middle Camps (assumed 2/3 of demands per Camp staff)	2,464,311	28.13	42.20	63.30
Lower/Middle Camp Utilizing onsite storage (assumed 41% of Total Lower/Middle demands)	1,010,368	11.53	17.30	25.95
[2]Lower/Middle Camp bypassing onsite storage (assumed 59% of Lower/Middle Total demands)	**1,453,943**	**16.60**	**24.90**	**37.35**
Upper Camp (assumed 1/3 demands per Camp staff)	1,232,155	14.07	21.10	31.65

Reference: **Preliminary Average and Maximum Day Demands and On-site Storage Calculations**

[1] Factor per Title 22
[2] Not included in Domestic Water Storage Calculations

ESTIMATING IRRIGATION DEMAND:

Irrigation demands were provided for Lower/Middle and Upper camp by Studio MLA via emailed Water Efficient Landscape Worksheets on 8/16/2020 and 9/9/2020, attached as Appendix E. The largest watering cycle use is in the month of July. Each watering cycle was assumed to be distributed over a 24-hour period for calculations in this memo.

Upper Camp

The total upper camp irrigation demand will be supplied entirely by the tanks at the upper camp and will need to be accounted for in the storage requirements.

Middle and Lower Camps

It is assumed that a combination of tertiary recycled water from the Onsite Water Treatment System and potable water from irrigation meter 190-4 will supply the hillside hydro zone H-1 and meter 190-4 only will supply the irrigation water for the turfed hydro zone H-2. These irrigation demands will not be included in the storage requirement calculations. Hydro zone H-3 will be supplied by the 100,000-gallon onsite storage tank and will need to be considered in the storage calculations. See Table 4 for and summary of the irrigation demand for the camp.

Table 4 - Irrigation Demand Summary

Use Designation	Hydro-zone	Largest Cycle Usage (24-hours) (gal)	Largest Cycle Usage (gpm)
Irrigation Demand Upper Camp	**H-1, H-3**	**16,207**	**11.25**
Irrigation Demand Lower/Middle Camp	H-3	6,750	4.69

FIRE FLOW AND STORAGE REQUIREMENTS:

The Ventura County Fire Code VCFC shall be used to designate required fire flow for development projects within Ventura County Fire Protection District (VCFPD) jurisdiction.

Per the VCFC, the proposed project is considered ‘rural’ in which no direct connection to a public water supply system exists. The VCFC requires the proposed development project to utilize either NFPA standards 1142 or 13 for required fire flow rates, durations, and storage requirements, whichever yields the most demanding values. Using the most demanding structure based on the occupancy hazard designation, building construction material, and enclosed building volume, the methods in NFPA standard 1142 required larger fire flow rates and storage requirements than NFPA 13 and will be used for this project.

Per the VCFC a reduction in required fire flow/storage of up to 50 percent, as approved by the Fire Code Official, is allowed when the building is provided with an approved automatic sprinkler system. For the

Reference: **Preliminary Average and Maximum Day Demands and On-site Storage Calculations**

purposes of this memorandum, it is assumed all proposed buildings will have approved fire sprinkler systems. It is assumed all buildings served directly from YBWC or are within 250 ft from a public fire hydrant on all sides are not included in the onsite fire water storage tank calculations as they have a direct connection to a public water system. All buildings in Middle Camp will utilize the onsite fire storage for fire suppression purposes. Lower Camp buildings that do not have a direct connection to YBWC are assumed supplied from onsite fire water storage as well and consist of buildings 2, 3, 4, 13, 14, 16, 18, and 19. Any changes in the proposed site plan or the preliminary onsite water system will require an additional analysis for fire flow and storage requirements.

The most demanding structure in Lower/Middle camp served by the onsite storage system for fire suppression purposes is building 13, the proposed Dining Hall, and has an estimated enclosed volume of 320,884 cu-ft. The most demanding structure served by the on-site storage system in the Upper Camp is building number 45, the Dining Pavilion and has an estimated enclosed volume of 82,367 cu-ft. See Appendix A for building volumes. It is assumed that the building construction material for all proposed buildings in the Camp will be Type IA/Type IB Fire Resistive Non-combustible commonly used with Group-I (Institutional) and Group-R (Residential) Occupancies. Based on the proposed building construction material and occupancy class, the buildings have been designated with a light occupancy hazard classification. Per NFPA 1142, equation 4.3.1 shall be used to calculate required fire water storage. Based on required fire water storage, table 4.6.1 of NFPA 1142 shall be used to designate a required fire flow rate. See Table 5 for a summary of Fire Flow and Storage calculations and Appendix D for NFPA 1142 References and Fire Storage Calculations.

Table 5 - Fire Flow and Storage Calculations (NFPA 1142)

Building Location	Building No./ Name	Building Enclosed Volume (ft^3)	Calculated Fire Storage (gallons)	Required Storage (gallons)	Required Fire Flow Rate (gpm)
Lower/Middle Camp	13/ Dining Hall/administration	320,884	68,761[1]	34,380[2]	1,000[3]
Upper Camp	45/ Dining Pavilion	82,367	17,650[1]	8,825[2]	750[3]

[1] Per NFPA 1142 Equation 4.3.1
[2] Per VCFC - 50 Percent reduction from required fire flow/Storage,
[3] Per NFPA 1142 Table 4.6.1

The calculated and required fire flow will need to be reviewed and approved by VCFD Fire Code Official.

REQUIRED DOMESTIC STORAGE VOLUME BASED OF ESTIMATED DOMESTIC AND IRRIGATION DEMANDS

Based on the preliminary water system design, the Camp, including lower, middle, and upper camp will utilize the existing onsite storage tanks for dedicated water storage and the existing direct connections to YBWC's facilities for domestic, irrigation and fire water purposes. See Table 2 for calculated capacities of the existing storage facilities.

Required Domestic Storage

Reference: **Preliminary Average and Maximum Day Demands and On-site Storage Calculations**

As stated previously, it is estimated from camp staff that upper camp uses approximately one-third of the water metered through 170-4. The preliminary design requires a portion of Middle Camp buildings to utilize a booster pump directly connected to meter 170-4 for domestic supply, leaving only a portion of the lower and middle camp buildings reliant on the onsite storage tank for supply. This portion is estimated to be 41% of the Lower/Middle Camp domestic demands. To calculate the domestic storage requirements for the lower/middle and upper camp separately, the total domestic storage requirement will be separated as follows:

$$Domestic\ Storage\ (Lower\ \&\ Middle\ camp) = Total\ Required\ Domestic\ Storage * \frac{2}{3} * 0.41$$

$$Domestic\ Storage\ (Upper\ camp) = Total\ Required\ Domestic\ Storage * \frac{1}{3}$$

Per California Code of Regulations Title 22, Division 4, Chapter 16, § 64554, the onsite domestic storage shall be a minimum of the Maximum Day Demand (MDD).

Total required domestic storage for the Camp is shown in Table 6.

Table 6 – Total Required Domestic Storage

Storage Location	Average Day Demand (ADD) (gpm)	Maximum Day Demand (MDD) (gpm) = 1.5[1] * ADD	Required Storage Volume MDD (24 hrs) (gallons)
Lower/Middle Camp	11.53[2]	17.30[2]	24,912[2]
Upper Camp	14.07[3]	21.10[3]	30,382[3]

[1] Factor per Title 22
[2] Lower/Middle Camp Buildings reliant on Onsite Storage Only - estimated to be 41% of Lower/Middle Camp estimated demands from historical usage through meter 170-4.
[3] Upper Camp estimated demand – one third of Total estimated demands from historical usage through meter 170-4.

Irrigation Storage

Water storage for irrigation purposes will be included in the storage requirement calculations based on the estimated irrigation demands and preliminary water system design. For purposes of this memo, the irrigation storage is the volume required for a largest 24-hour cycle as shown in Table 4. See Appendix E for estimated irrigation demands.

CONCLUSION:

This memorandum is provided for estimation purposes only and will need review and approval from Ventura County Fire Department for final fire flow and storage requirements. All assumptions have been listed and are subject to change as the project progresses in the planning phases. Estimated domestic water demand, fire flow demands, and onsite storage requirements were calculated using the methodology outlined in the Venture Counter Water Works Manual and Ventura County Fire Protection District Ordinance No. 31 adopted as the Ventura County Fire Code (VCFC). Based on the preliminary water system design and onsite storage calculations, the existing storage capacities of the onsite storage tanks meet the domestic and fire water storage requirements.

Reference: **Preliminary Average and Maximum Day Demands and On-site Storage Calculations**

Table 7 - Estimated Water Demand and Required Storage Summary – Lower/Middle Camp

Item	ADD (gpm)	MDD (gpm)	PHD (gpm)	Storage Requirement (gallons)	Existing Storage (gallons)	Is Existing Storage Adequate (Y/N)
Domestic Water Demand	11.53[1]	17.30[1]	25.95[1]	24,912	-	-
Irrigation Demand	-	4.69	-	6,750	-	-
Fire Flow Requirements	-	-	1,000	34,380	-	-
Total	-	-	-	66,042	95,577	Y

[1] Lower/Middle Camp Buildings reliant on Onsite Storage Only - estimated to be 41% of estimated demands for Lower/Middle Camp from historical usage through meter 170-4.

Table 8 - Estimated Water Demand and Required Storage Summary – Upper Camp

Item	ADD (gpm)	MDD (gpm)	PHD (gpm)	Storage Requirement (gallons)	Existing Storage (gallons)	Is Existing Storage Adequate (Y/N)
Domestic Water Demand	14.07[1]	21.10[1]	31.65[1]	30,382	-	-
Irrigation Demand	-	11.25	-	16,207	-	-
Fire Flow Requirements	-	-	750	8,825	-	-
Total	-	-	-	55,414	128,253	Y

[1] Upper Camp usage – estimated one third of total estimated demands from historical usage through meter 170-4

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Stantec

Date May 1, 2021

Doug Lynn, Rick Waters, Steve Searock

Reference: **Preliminary Average and Maximum Day Demands and On-site Storage Calculations**

APPENDIX A

WBTCR Master Plan and Building Volumes

Camp Hess Kramer (Lower Camp) - 17 Acres in CRE							
Proposed Building Name	**Building Number**	**Use**		**Building Coverage (roof/porch area)**	**Total Enclosed Building Area**		**Notes**
		Proposed	(E) CUP	Proposed (SF)	Proposed (SF)	(E) CUP (SF)	
Tennis Courts o/ Parking	0.N	Tennis Courts o/ Parking	Surface Parking & Tennis	23,308	23,743	-	Existing tennis courts = 33,621 sf (parking is 21,330 sf)
Entry Booth	1.N	Entrance Booth	Staff Housing	50	48	1,922	
Welcome Center	2.N	Reception, Infirmary, residence	Maintenance	5,166	6,380	1,250	
Fine Arts	3.N	Program Space	Maintenance	5,631	3,247	393	
Kitchen Pavillion	4.N	Program Space	Staff Housing	2,482	1,364	885	
	5	-	Restroom		-	184	
Conference Center	6.E	Overnight Accommodations	Overnight Accommodations	8,751	13,224	13,224	Existing to remain; renovation of deck, remove triangular bay window
Irmas Hall	7.E	Program Space, Staff Housing, Infirmary	Dining Hall, Kitchen, Staff Housing	9,931	12,649	8,899	
	8	Kitchen & Restrooms	-	-	-	2,675	Relabel with 7.E
	9	-	Camp Office	-	-	1,664	Demo existing browns
	10	-	Infirmary	-	-	1,951	Demo existing browns
	11	-	Infirmary Store Room	-	-	238	Demo existing browns
	12	-	Rooms 41-42	-	-	992	Demo existing browns
Dining Hall	13.N	Dining Hall, administration	Rooms 43-45	15,553	17,875	1,664	Demo existing browns
Gildred Hall	14.N	Program Space; Exec Housing	Program Space;	7,785	7,905	2,960	
Trash Enclosure	15.N	Trash Enclosure	Executive Housing	514	347	2,675	
Restroom Building	16.E	Restroom	Restroom	564	420	420	
Arts & Crafts	17.N	Arts & Crafts	Arts & Crafts	2,581	520	2,113	
Baruh Hall	18.N	Program Space	Program Space/Pool Restroom	8,634	6,311	5,796	
Pool Building	19.N	Pool equip, showers & restrooms	Pool pump building	2,316	1,962	405	
	19A.R	-	Outdoor dance stage	-	-	625	
	Shed N	-	Storage (Shipping Container)	-	-	160	
Climbing Storage	Shed O	Storage Shed	Storage Shed	120	120	120	
	Shed P	-	Storage Shed	-	-	48	
Garden Storage	Shed Q	Storage Shed	Storage Shed	120	120	108	
Nursery Storage	Shed R	Storage Shed	Storage (Shipping Container)	120	120	320	
	Shed S	-	Storage Shed	-	-	48	
Basketball/Volleyball Storage	Shed T	Storage Shed	Storage Shed	120	120	72	
	Shed U	-	Storage Shed	-	-	96	
Archery Storage	Shed V	Storage Shed	Storage Shed	168	120	42	
Sport Field Storage	Shed W	Storage Shed	Storage Shed	168	120	96	
Maintenance Storage	Shed X	Storage Shed	Storage Shed	168	120	49	
	Jacuzzi	-	Jacuzzi	-	-	25	
SUBTOTAL LOWER CAMP				**94,250**	**96,835**	**52,119**	
Allowable area (Lower Camp) = 25% of CRE			740,520 CRE SF		**185,130**	**Max Allowable SF**	

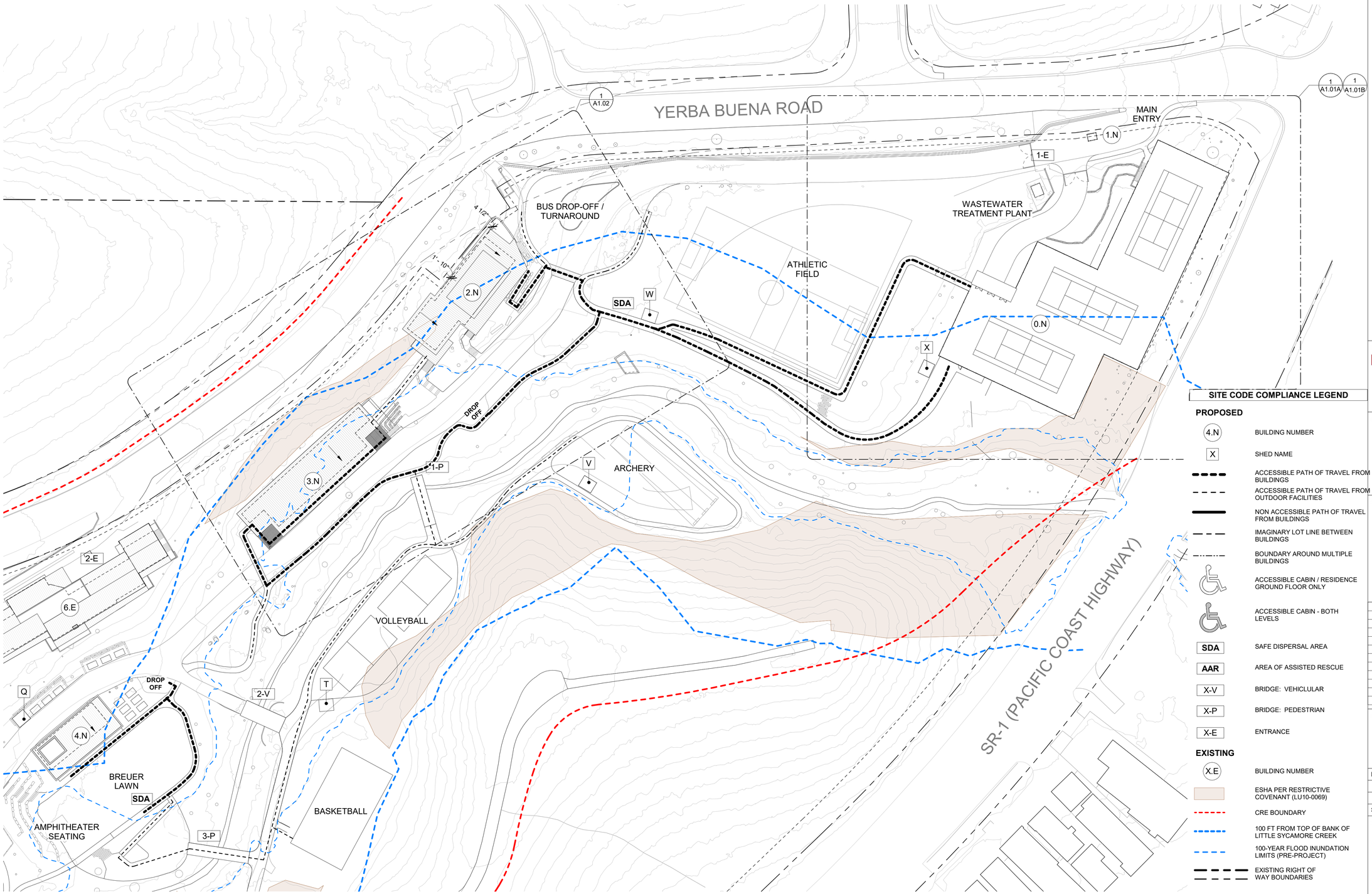
Camp Hess Kramer (Middle Camp) - 11 Acres in CRE							
Proposed Building Name	**Building Number**	**Use**		**Building Coverage (roof/porch area)**	**Total Area**		**Notes**
		Proposed	(E) CUP	Proposed (SF)	Proposed (SF)	(E) CUP (SF)	
Cabin 20.N	20.N	Cabin	Cabin 1-2	1,854	2,475	1,106	Demo existing cabin
Cabin 21.N	21.N	Cabin	Cabin 3-4	1,665	2,254	1,082	
Cabin 22.N	22.N	Cabin	Cabin 5-6	1,665	2,254	1,342	
Cabin 23.N	23.N	Cabin	Cabin 7-8	1,617	2,254	1,082	
Cabin 24.N	24.N	Cabin	Cabin 9-10	1,617	2,254	1,342	
Cabin 25.N	25.N	Cabin	Cabin 11-30	1,646	2,254	1,060	
Cabin 26.N	26.N	Cabin	Cabin 12-13	1,657	2,254	1,106	
Cabin 27.N	27.N	Cabin	Cabin 14-15	1,657	2,254	1,082	
Cabin 28.N	28.N	Cabin	Cabin 16-17	1,599	1,127	1,082	
Cabin 29.N	29.N	Cabin	Piness Village Cabin 18	1,588	1,127	668	
Cabin 30.N	30.N	Cabin	Piness Village Cabin 22	1,588	1,127	668	
Cabin 31.N	31.N	Cabin	Piness Village Cabin 19	1,588	1,127	668	
Cabin 32.N	32.N	Leadership Village Cabin 1	Piness Village Shower Bldg	1,599	1,127	692	Demo existing cabin
Cabin 33.N	33.N	Leadership Village Cabin 2	Piness Village Cabin 21	1,599	1,127	668	
Cabin 34.N	34.N	Leadership Village Cabin 3	Piness Village Cabin 20	1,599	1,127	668	
Cabin 35.N	35.N	Leadership Village Cabin 4	Leadership Village Cabin 1	1,599	1,127	400	
Cabin 36.N	36.N	Leadership Village Cabin 5	Leadership Village Cabin 2	1,657	2,254	400	
Cabin 37.N	37.N	Senior Staff Cabin	Leadership Village Cabin 3	1,985	2,898	400	
Cabin 38.N	38.N	Senior Staff Cabin	Leadership Village Cabin 4	1,985	2,898	400	
Cabin 39.N	39.N	Staff Cabin	Leadership Village Cabin 5	1,661	2,392	400	
Cabin 40.N	40.N	Year Round Staff Cabin	Leadership Village Cabin 6	1,807	2,898	400	
Maintenance Building	41.N	Maintenance	Leadership Village Restroom	1,240	2,128	345	
	42.N	-	Leadership Village Shower	-	-	581	
Pump Shed	Shed F	Domestic Water Pump Shed	Storage (Shipping Container)	144	100	320	
Pump Shed	Shed G	Domestic Water Pump Shed	Pump House	144	100	80	
Yerba Buena H2O Shed	Shed H	Yerba Buena Storage	Yerba Buena Storage	80	80	80	
Pump Shed	Shed I	Fire Pump Shed	Storage Shed	144	100	56	
	Shed J		Storage Shed	-	-	64	
	Shed K		Storage Shed	-	-	64	
	Shed L		Storage Shed	-	-	16	
	Shed M		Storage Shed	-	-	32	
Yerba Buena Water Tank	YB Tank	Yerba Buena Water Tank	Yerba Buena Water Tank	452	-	452	
SUBTOTAL MIDDLE CAMP				**37,436**	**43,117**	**18,806**	Note: Total Area in CUP isn't correct
Allowable area (Middle Camp) = 25% of CRE			479,160 CRE SF		**119,790**	**Max Allowable SF**	
TOTAL LOWER & MIDDLE CAMP				**131,686**	**139,952**	**70,925**	

Gindling Hilltop (Upper Camp) - 26 Acres in CRE							
Proposed Building Name	**Building Number**	**Use**		**Building Coverage (roof/porch area)**	**Total Area**		**Notes**
		Proposed	(E) CUP	Proposed (SF)	Proposed (SF)	(E) CUP (SF)	
UC Staff Residence	43.N	Staff Residence	Staff Residence	3,766	3,142	2,882	
UC Dining Hall	45.N	Dining Pavilion	Dining Pavilion	10,507	8,162	8,045	
UC Arts & Crafts	46.E	GHC Arts & Crafts	GHC Arts & Crafts	2,095	554	529	Demo existing bldg
UC Pool Recreation	47.E	GHC Pool/Shower/Rec	GHC Pool/Shower/Rec	2,089	1,333	1,330	Demo existing bldg
UC Utility	48.N	GHC Pool Pump Bldg	GHC Pool Pump Bldg	161	161	120	
UC Administration	49.N	Administration	Administration	1,538	845	960	
UC Cabins	50.N	Guest Cabin 1-2	Guest Cabin 1-2	1,303	1,127	1,198	
UC Cabins	51.N	Guest Cabin 3-4	Guest Cabin 3-4	1,303	1,127	1,520	Demo existing cabin
UC Cabins	52.N	Guest Cabin 5-6	Guest Cabin 5-6	1,303	1,127	1,198	
UC Cabins	53.N	Guest Cabin 7-8	Guest Cabin 7-8	1,303	1,127	1,198	
UC Cabins	54.N	Guest Cabin 43-44	Guest Cabin 43-44	1,303	1,127	904	
UC Cabins	55.N	Guest Cabin 9-10	Guest Cabin 9-10	1,303	1,127	1,198	
UC Cabins	56.N	Guest Cabin 11-12	Guest Cabin 11-12	1,303	1,127	1,198	
UC Cabins	57.N	GHC Staff Cabin 25-28	GHC Staff Cabin 25-28	1,303	1,127	1,040	
UC Cabins	58.N	GHC Caretaker 21-24	GHC Caretaker 21-24	1,303	1,127	1,040	
Storage Shed	Shed A	Storage Shed	Storage Shed	336	336	336	
Storage Shed	Shed B	Storage Shed	Storage Shed	480	480	480	
Storage Shed	Shed C	Storage Shed	Storage Shed	400	400	400	
Storage Shed	Shed D	Storage Shed	Storage Shed	112	112	112	
Storage Shed	Shed E	Storage Shed	Storage Shed	120	120	120	
Storage Shed	Shed E1	Storage Shed	Storage Shed	120	120	120	
SUBTOTAL UPPER CAMP				**33,451**	**25,908**	**25,928**	
TOTAL UPPER CAMP				**33,451**	**25,908**	**25,928**	
Allowable area = 25% of CRE		1,132,560 CRE SF			**283,140**	**Max Allowable SF**	

BUILDING NO.	BUILDING NAME	LEVEL	AREA (SF)	BUILDING AREA (SF)	BUILDING VOL (cu f)	NO. OF STORIES	SPRINKLERED
LOWER CAMP							
0.N	PARKING W/ TENNIS ABOVE	LEVEL 1	21,330			2	Y
		LEVEL 2	23,308	44,638	**234,630**		
1.N	ENTRY BOOTH	LEVEL 1	48	48	-	1	N
2.N	WELCOME CENTER	LEVEL 1	3,190			2	
		LEVEL 2	3,190	6,380	**63,800**		Y
3.N	FINE ARTS	LEVEL 1	3,247	3,247	**45,458**	1	Y
4.N	KITCHEN PAVILION	LEVEL 1	1,364	1,364	**19,778**	1	Y
6.E	CONFERENCE CENTER	LEVEL 1	6,612			2	Y - EXISTING
		LEVEL 2	6,612	13,224	**132,240**		
7.E	IRMAS	LEVEL 0	2,805			3	Y
		LEVEL 1	7,226				
		LEVEL 2	2,618	12,649	**170,661**		
13.N	DINING HALL	LEVEL 0	1,722			3	Y
		LEVEL 1	12,122				
		LEVEL 2	5,123	18,967	**320,884**		
14.N	GILDRED	LEVEL 1	5,985			2	Y
		LEVEL 2	1,920	7,905	**82,890**		
15.N	TRASH ENCLOSURE	LEVEL 1	347	347	-	1	N
16.E	RESTROOM	LEVEL 1	463	463	-	1	N - EXISTING
17.N	ARTS & CRAFTS	LEVEL 1	520	520	-	1	N
18.N	BARUH	LEVEL 1	6,311	6,311	**203,530**	1	Y
19.N	POOL BUILDING	LEVEL 1	1,962	1,962	**37,278**	1	Y
TOTAL LOWER CAMP				**118,025**	**1,311,148**		

BUILDING NO.	BUILDING NAME	LEVEL	AREA (SF)	BUILDING AREA (SF)	BUILDING VOL (cu f)	NO. OF STORIES	SPRINKLERED
MIDDLE CAMP							
20.N	CABIN TYPE B1	LEVEL 1	1,348			2	Y
		LEVEL 2	1,127	2,475	**30,385**		
21.N	CABIN TYPE B2	LEVEL 1	1,127			2	Y
		LEVEL 2	1,127	2,254	**28,175**		
22.N	CABIN TYPE B2	LEVEL 1	1,127			2	Y
		LEVEL 2	1,127	2,254	**28,175**		
23.N	CABIN TYPE B	LEVEL 1	1,127			2	Y
		LEVEL 2	1,127	2,254	**28,175**		
24.N	CABIN TYPE B	LEVEL 1	1,127			2	Y
		LEVEL 2	1,127	2,254	**28,175**		
25.N	CABIN TYPE D2	LEVEL 1	1,127			2	Y
		LEVEL 2	1,127	2,254	**28,175**		
26.N	CABIN TYPE D1	LEVEL 1	1,127			2	Y
		LEVEL 2	1,127	2,254	**28,175**		
27.N	CABIN TYPE D1	LEVEL 1	1,127			2	Y
		LEVEL 2	1,127	2,254	**28,175**		
28.N	CABIN TYPE A3	LEVEL 1	1,127	1,127	**16,905**	1	Y
29.N	CABIN TYPE A2	LEVEL 1	1,127	1,127	**16,905**	1	Y
30.N	CABIN TYPE A2	LEVEL 1	1,127	1,127	**16,905**	1	Y
31.N	CABIN TYPE A2	LEVEL 1	1,127	1,127	**16,905**	1	Y
32.N	CABIN TYPE A1	LEVEL 1	1,127	1,127	**16,905**	1	Y
33.N	CABIN TYPE A1	LEVEL 1	1,127	1,127	**16,905**	1	Y
34.N	CABIN TYPE A1	LEVEL 1	1,127	1,127	**16,905**	1	Y
35.N	CABIN TYPE A1	LEVEL 1	1,127	1,127	**16,905**	1	Y
36.N	CABIN TYPE D1	LEVEL 1	1,127			2	
		LEVEL 2	1,127	2,254	**28,739**		Y
37.N	CABIN TYPE C1	LEVEL 1	1,449			2	
		LEVEL 2	1,449	2,898	**36,225**		Y
38.N	CABIN TYPE C1	LEVEL 1	1,449			2	
		LEVEL 2	1,449	2,898	**36,225**		Y
39.N	STAFF RESIDENCE	LEVEL 1	1,196			2	
		LEVEL 2	1,196	2,392	**25,116**		Y
40.N	STAFF RESIDENCE	LEVEL 1	1,448			2	
		LEVEL 2	1,448	2,896	**30,408**		Y
41.N	MAINTENANCE	LEVEL 1	1,064	1,064	**13,832**	1	Y
TOTAL MIDDLE CAMP				**41,671**	**533,395**		

BUILDING NO.	BUILDING NAME	LEVEL	AREA (SF)	BUILDING AREA (SF)	BUILDING VOL (cu f)	NO. OF STORIES	SPRINKLERED
43.N	CABIN TYPE C2	LEVEL 1	1,581	1,581	23,715	1	
45.N	UC - DINING HALL	LEVEL 1	5,314	5,314	82,367	1	
46.N	UC - ARTS & CRAFTS	LEVEL 1	554	554	5,540	1	
47.N	UC - POOL RECREATION	LEVEL 1	1,333	1,333	17,662	1	
48.N	UC - UTILITY	LEVEL 1	161	161	1,610	1	
49.N	UC - ADMINISTRATION	LEVEL 1	845	845	12,041	1	
50.N	UC - CABIN TYPE A4	LEVEL 1	1,127	1,127	16,905	1	
51.N	UC - CABIN TYPE A4	LEVEL 1	1,127	1,127	16,905	1	
52.N	UC - CABIN TYPE A4	LEVEL 1	1,127	1,127	16,905	1	
53.N	UC - CABIN TYPE A4	LEVEL 1	1,127	1,127	16,905	1	
54.N	UC - CABIN TYPE A4	LEVEL 1	1,127	1,127	16,905	1	
55.N	UC - CABIN TYPE A4	LEVEL 1	1,127	1,127	16,905	1	
56.N	UC - CABIN TYPE A4	LEVEL 1	1,127	1,127	16,905	1	
57.N	UC - CABIN TYPE A4	LEVEL 1	1,127	1,127	16,905	1	
58.N	UC - CABIN TYPE A4	LEVEL 1	1,127	1,127	16,905	1	
TOTAL UPPER CAMP				**19,931**	**295,081**		
TOTAL CAMP				**179,627**	**2,139,623**		



1 SITE PLAN - LOWER CAMP (SOUTH) CODE
1" = 40'-0"

SITE CODE COMPLIANCE LEGEND

PROPOSED

- 4.N — BUILDING NUMBER
- X — SHED NAME
- ACCESSIBLE PATH OF TRAVEL FROM BUILDINGS
- ACCESSIBLE PATH OF TRAVEL FROM OUTDOOR FACILITIES
- NON ACCESSIBLE PATH OF TRAVEL FROM BUILDINGS
- IMAGINARY LOT LINE BETWEEN BUILDINGS
- BOUNDARY AROUND MULTIPLE BUILDINGS
- ACCESSIBLE CABIN / RESIDENCE GROUND FLOOR ONLY
- ACCESSIBLE CABIN - BOTH LEVELS
- SDA — SAFE DISPERSAL AREA
- AAR — AREA OF ASSISTED RESCUE
- X-V — BRIDGE: VEHICLULAR
- X-P — BRIDGE: PEDESTRIAN
- X-E — ENTRANCE

EXISTING

- X.E — BUILDING NUMBER
- ESHA PER RESTRICTIVE COVENANT (LU10-0069)
- CRE BOUNDARY
- 100 FT FROM TOP OF BANK OF LITTLE SYCAMORE CREEK
- 100-YEAR FLOOD INUNDATION LIMITS (PRE-PROJECT)
- EXISTING RIGHT OF WAY BOUNDARIES

0 20 40 80 ft.

N

Project Title:

CAMP HESS KRAMER / GINDLING HILLTOP CAMP WOOLSEY FIRE REBUILD

11495 & 11677 PACIFIC COAST HWY, MALIBU, CA 90265

APN#: 700-0-060-310, 260, 140 & 700-0-070-450

Design Firm:

SIEGEL & STRAIN Architects

6201 Doyle St, Suite B
Emeryville, CA 94608
TEL 510 / 547-8092
info@siegelstrain.com

Consultant:

Stamp:

No.	Description	Date

Issue Note:

PLANNING SUBMISSION

05/01/21

Project ID: WBTC

Scale: As indicated

Sheet Title:

SITE CODE COMPLIANCE PLAN - LOWER CAMP - SOUTH

Sheet No.:

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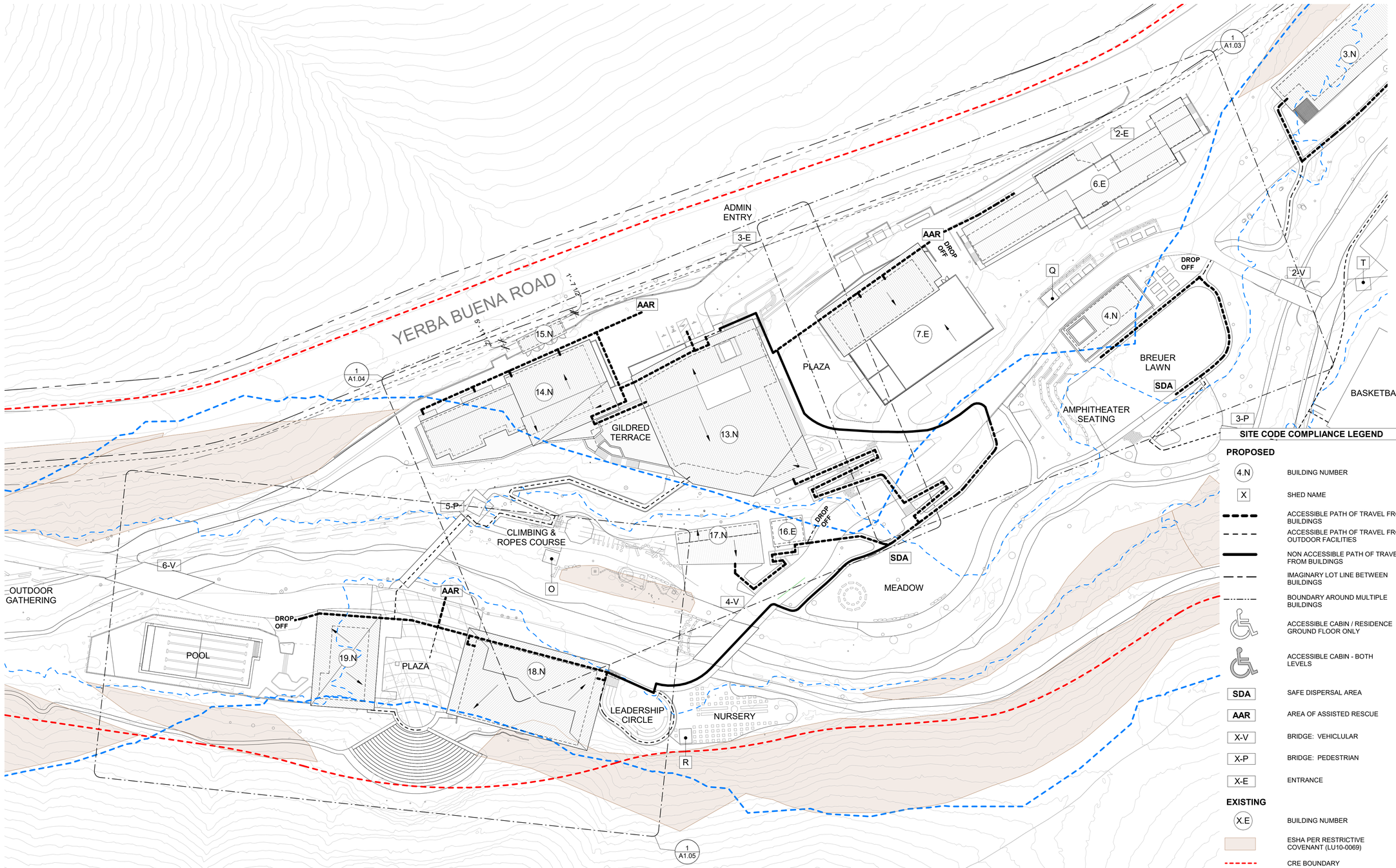

1 SITE PLAN - LOWER CAMP (NORTH) CODE
1" = 40'-0"

SITE CODE COMPLIANCE LEGEND

PROPOSED

- 4.N — BUILDING NUMBER
- X — SHED NAME
- ACCESSIBLE PATH OF TRAVEL FROM BUILDINGS
- ACCESSIBLE PATH OF TRAVEL FROM OUTDOOR FACILITIES
- NON ACCESSIBLE PATH OF TRAVEL FROM BUILDINGS
- IMAGINARY LOT LINE BETWEEN BUILDINGS
- BOUNDARY AROUND MULTIPLE BUILDINGS
- ACCESSIBLE CABIN / RESIDENCE GROUND FLOOR ONLY
- ACCESSIBLE CABIN - BOTH LEVELS
- SDA — SAFE DISPERSAL AREA
- AAR — AREA OF ASSISTED RESCUE
- X-V — BRIDGE: VEHICLULAR
- X-P — BRIDGE: PEDESTRIAN
- X-E — ENTRANCE

EXISTING

- X.E — BUILDING NUMBER
- ESHA PER RESTRICTIVE COVENANT (LU10-0069)
- CRE BOUNDARY
- 100 FT FROM TOP OF BANK OF LITTLE SYCAMORE CREEK
- 100-YEAR FLOOD INUNDATION LIMITS (PRE-PROJECT)
- EXISTING RIGHT OF WAY BOUNDARIES

0 20 40 80 ft.

N

Project Title:

CAMP HESS KRAMER / GINDLING
HILLTOP CAMP WOOLSEY FIRE REBUILD

11495 & 11677 PACIFIC COAST HWY, MALIBU, CA 90265

APN#: 700-0-060-310, 260, 140 & 700-0-070-450

Design Firm:
SIEGEL & STRAIN Architects
6201 Doyle St, Suite B
Emeryville, CA 94608
TEL 510 / 547-8092
info@siegelstrain.com

Consultant:

Stamp:

No.	Description	Date

Issue Note:
PLANNING SUBMISSION
05/01/21

Project ID: WBTC

Scale: As indicated

Sheet Title:
SITE CODE COMPLIANCE PLAN - LOWER CAMP - NORTH

Sheet No.:
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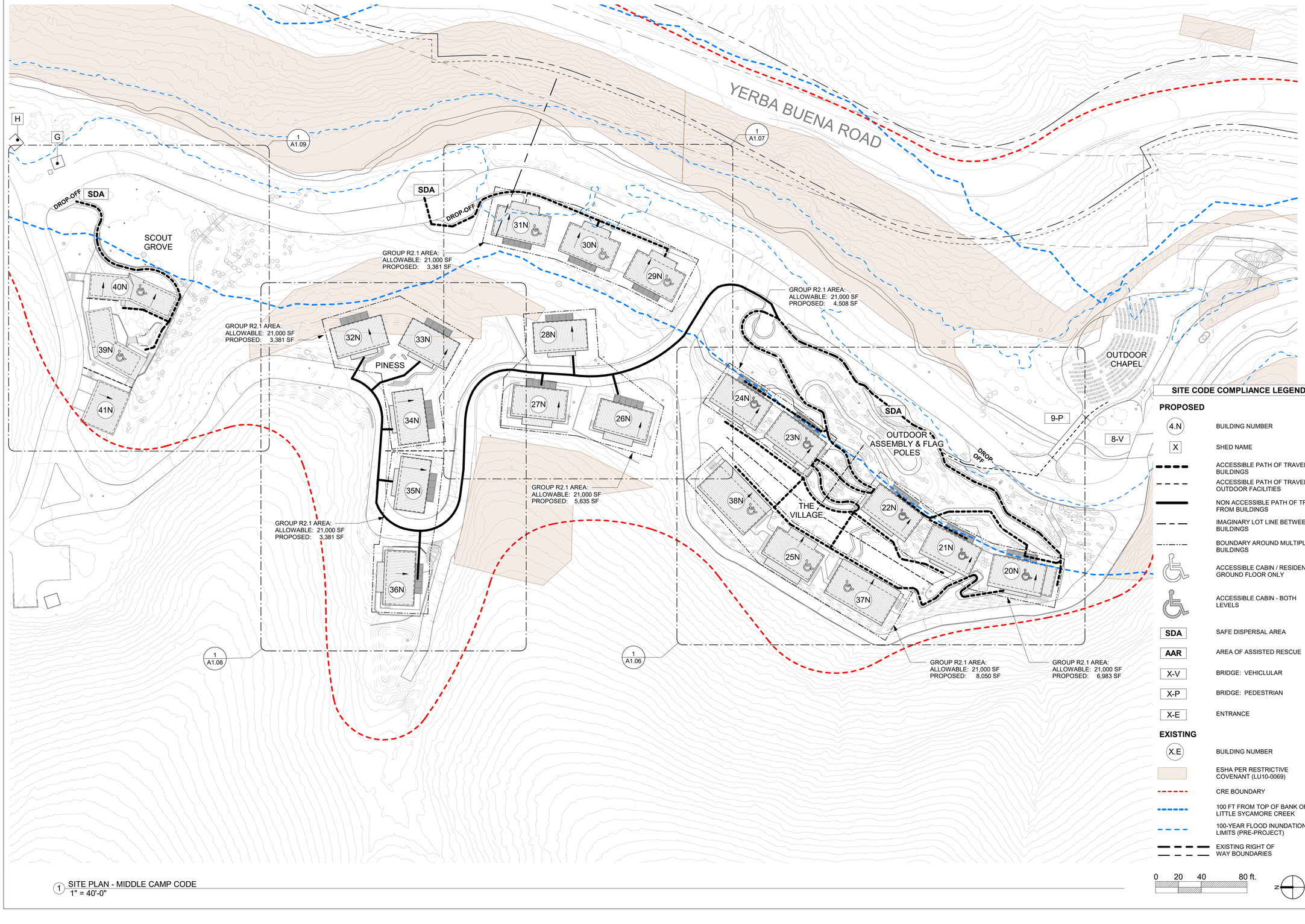

1 SITE PLAN - MIDDLE CAMP CODE
1" = 40'-0"

SITE CODE COMPLIANCE LEGEND

PROPOSED

- 4.N — BUILDING NUMBER
- X — SHED NAME
- ACCESSIBLE PATH OF TRAVEL FROM BUILDINGS
- ACCESSIBLE PATH OF TRAVEL FROM OUTDOOR FACILITIES
- NON ACCESSIBLE PATH OF TRAVEL FROM BUILDINGS
- IMAGINARY LOT LINE BETWEEN BUILDINGS
- BOUNDARY AROUND MULTIPLE BUILDINGS
- ACCESSIBLE CABIN / RESIDENCE GROUND FLOOR ONLY
- ACCESSIBLE CABIN - BOTH LEVELS
- SDA — SAFE DISPERSAL AREA
- AAR — AREA OF ASSISTED RESCUE
- X-V — BRIDGE: VEHICLULAR
- X-P — BRIDGE: PEDESTRIAN
- X-E — ENTRANCE

EXISTING

- X.E — BUILDING NUMBER
- ESHA PER RESTRICTIVE COVENANT (LU10-0069)
- CRE BOUNDARY
- 100 FT FROM TOP OF BANK OF LITTLE SYCAMORE CREEK
- 100-YEAR FLOOD INUNDATION LIMITS (PRE-PROJECT)
- EXISTING RIGHT OF WAY BOUNDARIES

0 20 40 80 ft.

N

Project Title:

CAMP HESS KRAMER / GINDLING
HILLTOP CAMP WOOLSEY FIRE REBUILD

11495 & 11677 PACIFIC COAST HWY, MALIBU, CA 90265

APN#: 700-0-060-310, 260, 140 & 700-0-070-450

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6201 Doyle St, Suite B
Emeryville, CA 94608
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Consultant:

Stamp:

No.	Description	Date

Issue Note:

PLANNING SUBMISSION

05/01/21

Project ID: WBTC

Scale: As indicated

Sheet Title:

SITE CODE COMPLIANCE PLAN - MIDDLE CAMP

Sheet No.:

G2.03

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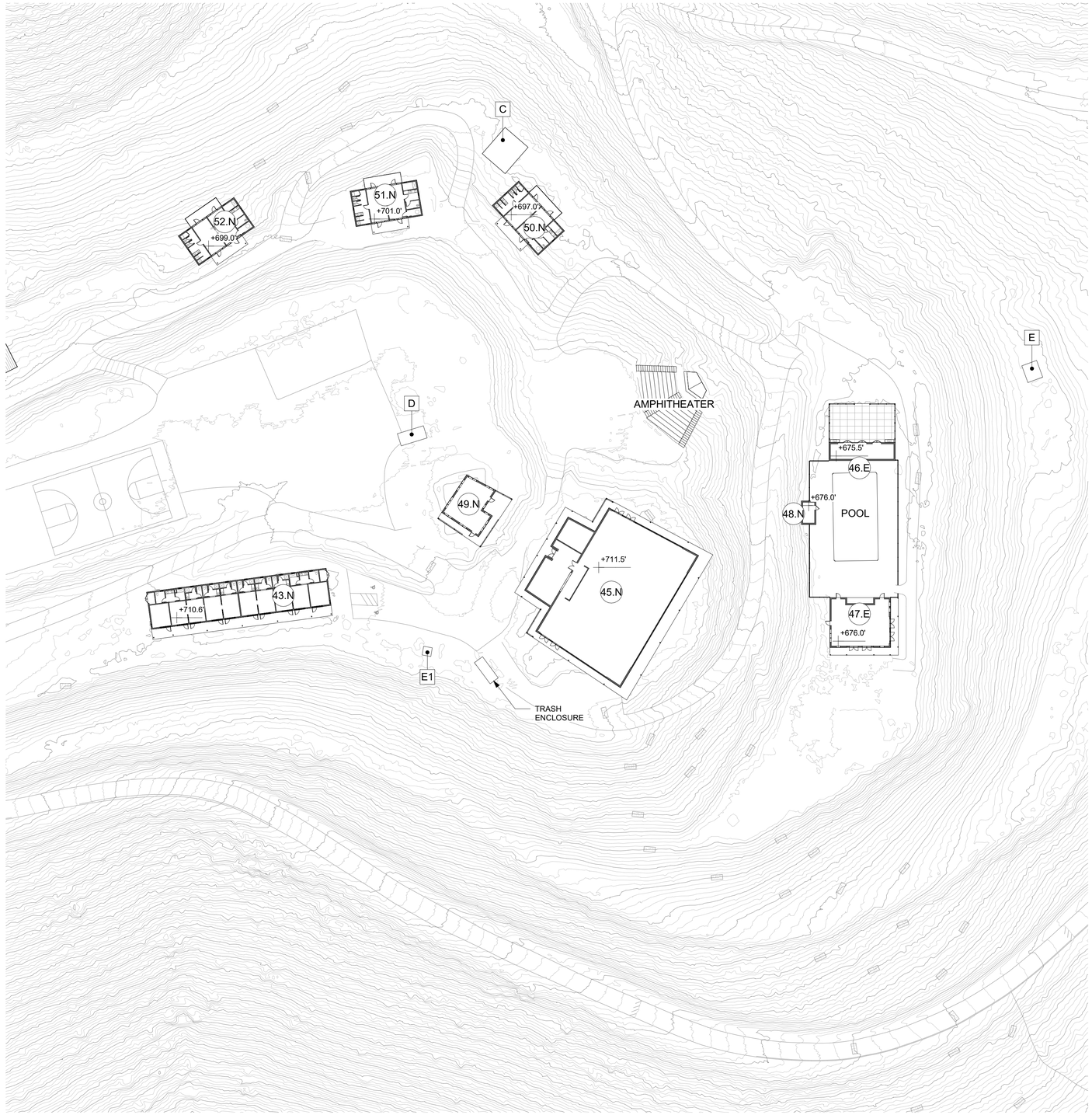

1 SITE PLAN - UPPER CAMP SOUTH
1" = 40'-0"

KEYNOTES	
Key Value	Keynote Text

UPPER CAMP BUILDINGS	
BUILDING NO.	BUILDING NAME
45.N	UC - DINING HALL
46.E	UC - ARTS & CRAFTS
47.E	UC - POOL RECREATION
49.N	UC - ADMINISTRATION
50.N	UC - CABIN TYPE A4
51.N	UC - CABIN TYPE A4
52.N	UC - CABIN TYPE A4
53.N	UC - CABIN TYPE A4
54.N	UC - CABIN TYPE A4
55.N	UC - CABIN TYPE A4
56.N	UC - CABIN TYPE A4
57.N	UC - CABIN TYPE A4
58.N	UC - CABIN TYPE A4

SITE LEGEND

PROPOSED

- X.N — BUILDING NUMBER
- X — SHED NAME
- X-V — BRIDGE: VEHICLULAR
- X-P — BRIDGE: PEDESTRIAN
- X-E — ENTRANCE

EXISTING

- X.E — BUILDING NUMBER
- ESHA PER RESTRICTIVE COVENANT (LU10-0069)
- CRE BOUNDARY
- 100 FT FROM TOP OF BANK OF LITTLE SYCAMORE CREEK
- 100-YEAR FLOOD INUNDATION LIMITS (PRE-PROJECT)
- PROPERTY SETBACK
- EXISTING RIGHT OF WAY

N

0 8 16 32 ft.

Project Title:

CAMP HESS KRAMER / GINDLING
HILLTOP CAMP WOOLSEY FIRE REBUILD

11495 & 11677 PACIFIC COAST HWY, MALIBU, CA 90265

APN#: 700-0-060-310, 260, 140 & 700-0-070-450

Design Firm:
SIEGEL & STRAIN Architects
6201 Doyle St, Suite B
Emeryville, CA 94608
TEL 510 / 547-8092
info@siegelstrain.com

Consultant:

Stamp:

No.	Description	Date

Issue Note:
PLANNING SUBMISSION
05/01/21

Project ID: WBTC

Scale: As indicated

Sheet Title:
SITE PLAN - UPPER CAMP SOUTH

Sheet No.:
A1.11

4/9/2021 3:46:37 PM

1 SITE PLAN - UPPER CAMP NORTH
1" = 40'-0"

KEYNOTES	
Key Value	Keynote Text

UPPER CAMP BUILDINGS	
BUILDING NO.	BUILDING NAME
45.N	UC - DINING HALL
46.E	UC - ARTS & CRAFTS
47.E	UC - POOL RECREATION
49.N	UC - ADMINISTRATION
50.N	UC - CABIN TYPE A4
51.N	UC - CABIN TYPE A4
52.N	UC - CABIN TYPE A4
53.N	UC - CABIN TYPE A4
54.N	UC - CABIN TYPE A4
55.N	UC - CABIN TYPE A4
56.N	UC - CABIN TYPE A4
57.N	UC - CABIN TYPE A4
58.N	UC - CABIN TYPE A4

SITE LEGEND

PROPOSED

- X.N — BUILDING NUMBER
- X — SHED NAME
- X-V — BRIDGE: VEHICLULAR
- X-P — BRIDGE: PEDESTRIAN
- X-E — ENTRANCE

EXISTING

- X.E — BUILDING NUMBER
- ESHA PER RESTRICTIVE COVENANT (LU10-0069)
- CRE BOUNDARY
- 100 FT FROM TOP OF BANK OF LITTLE SYCAMORE CREEK
- 100-YEAR FLOOD INUNDATION LIMITS (PRE-PROJECT)
- PROPERTY SETBACK
- EXISTING RIGHT OF WAY

N

0 8 16 32 ft.

Project Title:

CAMP HESS KRAMER / GINDLING
HILLTOP CAMP WOOLSEY FIRE REBUILD

11495 & 11677 PACIFIC COAST HWY, MALIBU, CA 90265

APN#: 700-0-060-310, 260, 140 & 700-0-070-450

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Consultant:

Stamp:

No.	Description	Date

Issue Note:
PLANNING SUBMISSION
05/01/21

Project ID: WBTC

Scale: As indicated

Sheet Title:
SITE PLAN - UPPER CAMP NORTH

Sheet No.:
A1.12

4/9/2021 3:46:43 PM

Date May 1, 2021

Doug Lynn, Rick Waters, Steve Searock

Reference: **Preliminary Average and Maximum Day Demands and On-site Storage Calculations**

APPENDIX B

Yerba Buena Water Usage Data (2004 – 2020)

YERBE BUENA WATER COMPANY
METER READINGS

9/14/2020

Meter Read Date	Gildred Hall Acre Feet 190-1	Gallons	Conference Center Acre Feet 190-2	Gallons	Gate 3-Gildred adjacent Acre Feet 190-3	Gallons	CHK Athletic Field Acre Feet 190-4	Gallons	Main Service Well #6 Cubic Feet 170-4	Gallons	Avg. gal. per day per 2 mo.	Avg. gal. per day per year
09/02/04	10.672		5.510		96,205		51.001		7,623,160			
11/04/04	10.696	7,820	5.536	8,472	96,205		51.318	103,288	7,789,020	1,240,633	22670.2	
01/06/05	10.895	64,840	5.536	0	96,205	0	51.413	30,954	7,914,330	937,319	17218.54	
03/07/05	13.265	772,214			96,205	0	51.413	0	7,940,400	195,004	16120.3	
05/07/05	16.163	944,252		0	96,205	0	51.854	143,691	7,941,070	5,012	18215.9	
07/08/05	16.163	0	5.748	69,076	96,205	0	52.267	134,567	8,124,050	1,368,690	26205.56	
09/02/05	16.163	0	6.031	92,210	96,205	0	52.887	202,014	8,400,820	2,070,240	39407.72	23306.37
10/28/05	16.163	0			96,205	0	53.174	93,513	8,623,680	1,666,993	29341.76	
01/08/06	8.064	-2,638,887	6.084	17,269	96,205	0	53.424	81,457	8,999,070	2,807,917	4462.598	
03/07/06	8.064	0	6.204	39,099	96,205	0	53.537	36,819	9,108,270	816,816	14878.9	
05/07/06	8.064	0	6.242	12,381	96,205	0	53.628	29,650	9,196,450	659,586	11693.64	
07/06/06	8.064	0	6.242	0	96,205	0	53.815	60,930	9,353,120	1,171,892	20547.03	
09/07/06	8.064	0	6.242	0	96,205	0	54.489	219,609	9,647,950	2,205,328	40415.62	20223.26
11/05/06	8.064	0	6.242	0	96,205	0	54.851	117,950	9,967,800	2,392,478	41840.47	
01/08/07	8.064	0	6.242	0	96,205	0	55.042	62,233	10,181,790	1,600,645	27714.64	
03/06/07	8.064	0	6.242	0	96,205	0	55.254	69,076	10,289,640	806,718	14596.56	
05/07/07	8.064	0	6.242	0	96,205	0	55.481	73,963	10,390,620	755,330	13821.56	
07/06/07	1.521	-2,131,898	6.343	32,909	96,205	0	55.481	0	10,547,420	1,172,864	-15435.4	
09/07/07	1.521	0	6.677	108,827	96,205	0	55.481	0	10,767,010	1,642,533	29189.33	18621.19
11/08/07	1.521	0	6.828	49,200	96,205	0	55.481	0	10,928,120	1,205,103	20905.05	
01/08/08	1.521	0	6.973	47,245	96,205	0	55.481	0	11,035,440	802,754	14166.65	
03/07/08	1.521	0	7.059	28,021	96,205	0	55.481	0	11,151,730	869,849	14964.51	
05/07/08	1.521	0	7.254	63,537	96,205	0	55.481	0	11,287,930	1,018,776	18038.54	
09/08/08	1.521	0	7.768	167,476	96,205	0	55.481	0	11,699,460	3,078,244	54095.34	
11/08/08	1.521	0	7.892	40,403	96,205	0	55.481	0	11,830,070	976,963	16956.09	23187.7
01/08/09	1.521	0	7.961	22,482	96,205	0	55.481	0	11,908,270	584,936	10123.64	
03/06/09	1.521	0	8.051	29,325	96,205	0	55.481	0	12,008,010	746,055	12923	
05/02/09	1.521	0	8.174	40,077	96,205	0	55.481	0	12,117,510	819,060	14318.95	
07/05/09	1.521	0	8.314	45,616	96,205	0	55.481	0	12,265,260	1,105,170	19179.77	
11/05/09	1.521	0	8.680	119,253	Removed----------		31,880	238,047	12,670,750	3,033,065	56506.1	
01/03/10	1.521	0	8.798	38,448	Removed----------		43,920	90,059	12,772,630	762,062	14842.82	21315.71
		-495,586		-2,866,642				-328,522		-95,539,272		
		0		0				0		0		
		0		0				0		0		

Each horizontal grid
holds one calendar
year of water purchases

YERBE BUENA WATER COMPANY
METER READINGS
From 03-02-10

9/14/2020

Meter	Gildred Hall		Conference Center		CHK Athletic Field		Main Service Well #6		Gildred Parking lot		Avg. gal.	Avg. gal.				
Read	Acre Feet		Acre Feet		Acre Feet		Cubic Feet		Gallons		per day	per day				
Date	190-1	Gallons	190-2	Gallons	190-4	Gallons	170-4	Gallons	190-3	Gallons	per 2 mo.	per year				
03/02/10	1.521	0	8.866	22,156	46,040	15,858	12,879,830	801,856	0	0	13997.83					
05/03/10	1.521	0	8.952	28,021	56,190	75,922	13,012,860	995,064	0	0	18316.79					
07/01/10	1.521	0	9.110	51,481	71,540	114,818	13,157,750	1,083,777	0	0	20834.6					
09/03/10	1.521	0	9.394	92,535	74,270	20,420	13,375,730	1,630,490	0	0	29057.44					
11/02/10	1.521	0	9.521	41,380	100,920	199,342	13,527,400	1,134,492	0	0	22920.23					
01/04/11	1.521	0	9.630	35,515	104,980	30,369	13,642,110	858,031	0	0	15398.58	20087.58				
03/03/11	1.521	0	9.703	23,786	113,040	60,289	13,749,610	804,100	0	0	14802.91					
05/02/11	1.521	0	9.790	28,347	133,490	152,966	13,882,620	994,915	0	0	19603.8					
07/05/11	1.521	0	9.947	51,155	160,590	202,708	14,019,260	1,022,067	0	0	21265.51					
09/01/11	1.599	25,415	10.160	69,402	198,570	284,090	14,205,780	1,395,170	0	0	29567.94					
11/02/11	1.603	1,303	10.283	40,077	221,910	174,583	14,309,460	775,526	0	0	16524.83					
01/03/12	1.603	0	10.345	20,201	232,450	78,839	14,433,300	926,323	0	0	17089.4	19809.06				
03/05/12	1.603	0	10.433	28,673	246,650	106,216	14,559,000	940,236	0	0	17918.75					
05/03/12	1.924	104,591	10.498	21,179	258,890	91,555	14,662,460	773,881	40	40	16520.77					
07/02/12	1.924	0	10.710	69,076	290,220	234,348	14,850,560	1,406,988	43,130	43,090	29225.04					
09/05/12	1.924	0	10.973	85,693	330,800	303,538	15,029,540	1,338,770	434,620	391,490	35324.86					
11/05/12	1.924	0	11.067	30,628	371,060	301,145	15,137,240	805,596	434,890	270	18960.65					
01/06/13	1.924	0	11.145	25,415	376,130	37,924	15,208,970	536,540	434,980	90	9999.477	21324.92				
03/03/13	1.924	0	11.272	41,380	391,580	115,566	15,307,980	740,595	435,080	100	14960.68					
05/05/13	1.924	0	11.377	34,212	416,880	189,244	15,420,470	841,425	435,120	40	17748.69					
07/03/13	1.954	9,775	11.583	67,121	439,800	171,442	15,563,780	1,071,959	437,850	2,730	22050.43					
09/01/13	1.954	0	11.833	81,457	473,820	254,470	15,773,370	1,567,733	437,850	0	31727.67					
11/03/13	1.954	0	11.940	34,864	505,500	236,966	15,971,400	1,481,264	437,850	0	29218.24					
01/04/14	1.954	0	12.024	27,370	521,490	119,605	16,086,900	863,940	437,850	0	16848.58	22092.38				
03/02/14	1.954	0	12.136	36,493	527,100	41,963	16,194,650	805,970	437,850	0	14740.43		5299.009			
05/03/14	2.185	75,266	12.253	38,122	535,720	64,478	16,347,580	1,143,916	437,850	0	22029.71		5376	0.244034		
07/03/14	2.185	0	12.513	84,715	574,670	291,346	16,523,430	1,315,358	418,250	-19,600	27863.66		6063	0.217595		
09/01/14	2.185	0	12.720	67,447	604,970	226,644	16,734,230	1,576,784	418,250	0	31181.24		6375	0.20445		
11/02/14	2.187	652	12.827	34,864	635,720	230,010	16,857,130	919,292	418,450	200	19750.29		5063.813			
01/02/15	2.187	0	12.901	24,111	642,900	53,706	16,941,960	634,528	418,450	0	11872.44	21239.63	4268	0.359488		
03/05/15	2.187	0	12.978	25,089	652,470	71,584	17,036,730	708,880	418,450	0	13425.87					
05/03/15	2.187	0	13.013	11,404	659,920	55,726	17,172,060	1,012,268	418,450	0	17989.97		32444.82			
07/03/15	2.187	0	13.172	51,807	673,970	105,094	17,339,310	1,251,030	418,450	0	23465.51					
09/02/15	2.187	0	13.357	60,278	697,610	176,827	17,554,020	1,606,031	418,450	0	30718.94			1.025567	0.256392	
11/01/15	2.187	0	13.447	29,325	709,850	91,555	17,742,980	1,413,421	418,450	0	25571.68					
01/02/16	2.187	0	13.522	24,437	713090	24,235	17892140	1,115,717	418450	0	19406.49	21763.08				
03/03/16	4.893	881,693	13.726	66,469	719140	45,254	17,943,420	383,574	598,720	180,270	25954.34					
5/1/2016	4.893	0	13.806	26,066	725480	47,423	18136120	1,441,396	598720	0	25248.09					
7/2/2016	4.893	0	13.806	0	748420	171,591	18347500	1,581,122	598720	0	29211.89					
9/3/2016	4.893	0	13.806	0	791870	325,006	18665250	2,376,770	598720	0	45029.6					
11/2/2016	4.893	0	13.806	0	824830	246,541	18874050	1,561,824	598720	0	30139.41					
1/2/2017	4.893	0	13.806	0	837950	98,138	19070880	1,472,288	598720	0	26173.77	30292.85				
3/3/2017	4.893	0	13.806	0	837990	299	19298430	1,702,074	598720	0	28372.89					
5/4/2017	4.893	0	13.806	0	845370	55,202	19581860	2,120,056	598720	0	36254.31					
7/2/2017	4.893	0	13.806	0	884610	293,515	19900810	2,385,746	598720	0	44654.35					
9/2/2017	6.908	656,545	13.806	0	913140	213,404	20238210	2,523,752	625030	26,310	57000.19					
11/4/2017	6.988	26,066	13.806	0	936730	176,453	20559960	2,406,690	631110	6,080	43588.16					
1/5/2018	6.988	0	13.806	0	952230	115,940	20967480	3,048,250	631110	0	52736.49	43767.73				
3/4/2018	6.988	0	13.806	0	967350	113,098	21367560	2,992,598	631110	0	51761.6					
5/5/2018	7.177	61,582	13.806	0	971310	29,621	21764700	2,970,607	631110	0	51030.16					
7/5/2018	8.544	445,408	13.806	0	1008570	278,705	22196560	3,230,313	631110	0	65907.09					
9/1/2018	11.307	900,265	13.806	0	1044450	268,382	22597010	2,995,366	631130	150	69402.72					
11/3/2018	11.808	163,240	13.806	0	1082310	283,193	23091190	3,696,466	631140	75	69049.57			avg 27,428 gal/per day		
1/1/2019	11.915	34,864	13.806	0	1088280	44,656	23091190	0	659970	28,830	1805.821	51492.83		over last 10 years		
3/1/2019	11.915	0	13.806	0	1088280	0	23091190	0	736440	76,470	1274.5					
5/1/2019	11.915	0	13.806	0	1088280	0	23091190	0	736440	0	0					
7/1/2019	11.915	0	13.806	0	1088280	0	23091190	0	736440	0	0					
9/1/2019	11.915	0	13.806	0	1088280	0	23141070	373,102	928470	192,030	3139.624					
11/1/2019	11.915	0	13.806	0	1088280	0	23141070	0	998150	69,680	1161.333					
1/1/2020	11.915	0	13.806	0	1088280	0	23141070	0	1061930	63,780	1063					
3/1/2020	12.000	27,695	14	63,211	1088280	0	23141070	0	1138620	76,690	2793.271					
5/1/2020	12.000	0	14	0	1088280	0	23141070	0	1139800	1,180	19.66667					

Date May 1, 2021

Doug Lynn, Rick Waters, Steve Searock

Reference: **Preliminary Average and Maximum Day Demands and On-site Storage Calculations**

APPENDIX C

Title 22 – Estimated Water Demand Calculations

CCR Title 22, Div. 4, Chapter 16, § 64554. New and Existing Source Capacity.

Based on previous 10-year Historical Usage

Calc'd by JTZ

September 14, 2020

Meter 170-4 Usage from YBWC meter data (2009 – 2018):

Total Camp

Maximum Bi-monthly Usage = 3,696,466 gal

Average Day Demand (gpd) = 3,696,466 / [365 days / (12 months/ 2 month use)] = 60,764 gpd

ADD (gpm) = 60,764 gpd / (1440 minutes per day) = **42.20 gpm**

Maximum Day Demand, MDD (gpm) = ADD * 1.5 = 42.20 * 1.5 **= 63.30 gpm**

Peak Hour Demand, PHD, (gpm) = MDD * 1.5 = 63.30 * 1.5 = **94.94 gpm**

Per Meter Data Spreadsheet Camp Staff Note: "Domestic water usage at the hilltop camp is estimated to be one-third of the 170-4 volume based on camp size/guest count."

Lower and Middle Camp:

ADD (gpm) = 66.67% * 42.20 gpm = **28.13 gpm**

MDD (gpm) = 66.67% * 63.30 gpm = **42.20 gpm**

PHD (gpm) = 66.67% * 94.94 gpm = **63.30 gpm.**

Required Domestic Storage MDD = 42.20 gpm * 1440 minutes per day = 60,764 gal

Upper Camp:

ADD (gpm) = 33.33% * 42.20 gpm = **14.07 gpm**

MDD (gpm) = 33.33% * 63.30 gpm = **21.10 gpm**

PHD (gpm) = 33.33% * 94.94 gpm = **31.65 gpm**

Required Domestic Storage MDD = 21.10 gpm * 1440 minutes per day = 30,382 gal

Date May 1, 2021

Doug Lynn, Rick Waters, Steve Searock

Reference: **Preliminary Average and Maximum Day Demands and On-site Storage Calculations**

APPENDIX D

NFPA 1142 & NFPA 13 – Fire Flow and Storage Calculations

Camp Hess Kramer and Gindling Hilltop Camp Fire Flow and Storage Calculations

NFPA 1142 & NFPA 13

Calc'd by JTZ

May 1, 2021

NFPA 1142:

Lower and Middle Camp:

$VS_{tot} = 320{,}884\ ft3$

OHC = 7

CC = 1

$WS_{min} = [320{,}884/7 * (1)] * 1.5 = 68{,}761$ *gal*

*VCFC 50 Percent Reduction = 68,761 * 0.50 =* ***34,380 gal***

Water Delivery Rate per Table 4.6.1 = 1000 gpm

Upper Camp:

$VS_{tot} = 82{,}367\ ft3$

OHC = 7

CC = 1

$WS_{min} = [82{,}6367/7 * (1)] * 1.5 = 17{,}650$ *gal*

*VCFC 50 Percent Reduction = 17,650 * 0.50 =* ***8,825 gal***

Water Delivery Rate per Table 4.6.1 = 750 gpm

[4.3.1]

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

where:
$WS_{\min}$ = minimum water supply in gal (For results in L, multiply by 3.785.)
VS_{tot} = total volume of structure in ft^3 (If volume is measured in m^3, multiply by 35.3.)
OHC = occupancy hazard classification number
CC = construction classification number

4.3.2 The minimum water supply required for a structure with exposure hazards shall not be less than 3000 gal (11,355 L).

5.2.5 Occupancy Hazard Classification Number 7.

5.2.5.1 Occupancy hazard classification number 7 shall be used for light hazard occupancies, in which the quantity or combustibility of contents is expected to develop relatively light rates of spread and heat release.

5.2.5.2 Occupancies having conditions similar to the following shall be assigned occupancy hazard classification number 7:

(1) Apartments
(2) Colleges and universities
(3) Clubs
(4) Dormitories
(5) Dwellings
(6) Fire stations
(7) Fraternity or sorority houses
(8) Hospitals
(9) Hotels and motels
(10) Libraries (except large stockroom areas)
(11) Museums
(12) Nursing and convalescent homes
(13) Offices (including data processing)
(14) Police stations
(15) Prisons
(16) Schools
(17) Theaters without stages

Table 4.6.1 Water Delivery Rate

Total Water Supply Required		Water Delivery Rate	
gal	L	gpm	L/min
<2,500	9,459	250	950
2,500–9,999	9,460–37,849	500	1,900
10,000–19,999	37,850–75,699	750	2,850
≥20,000	≥75,700	1,000	3,800

Camp Hess Kramer and Gindling Hilltop Camp Fire Flow and Storage Calculations

NFPA 1142 & NFPA 13

Calc'd by JTZ

May 1, 2021

NFPA 13:

Lower and Middle Camp:

Build Occupancy Hazard = Light

Building inside/outside Hose Allowance per Table 19.3.3.1.2 = 100 gpm

Density (gpm/ft2) per Figure 19.3.3.1.1 = 0.075

Area per Figure 19.3.3.1.1 = 3000 ft2

*Design flow = 0.075 * 3000 = 225 gpm*

Duration = 30 minutes

*Water Supply Volume = (100 + 225) * 30 =* ***9,750 gal.***

Upper Camp:

Build Occupancy Hazard = Light

Building inside/outside Hose Allowance per Table 19.3.3.1.2 = 100 gpm

Density (gpm/ft2) per Figure 19.3.3.1.1 = 0.075

Area per Figure 19.3.3.1.1 = 3000 ft2

*Design flow = 0.075 * 3000 = 225 gpm*

Duration = 30 minutes

*Water Supply Volume = (100 + 225) * 30 =* ***9,750 gal.***

Table 19.3.3.1.2 Hose Stream Allowance and Water Supply Duration Requirements for Hydraulically Calculated Systems

	Inside Hose		Total Combined Inside and Outside Hose		
Occupancy	gpm	L/min	gpm	L/min	Duration (minutes)
Light hazard	0, 50, or 100	0, 190, or 380	100	380	30
Ordinary hazard	0, 50, or 100	0, 190, or 380	250	950	60–90
Extra hazard	0, 50, or 100	0, 190, or 380	500	1900	90–120

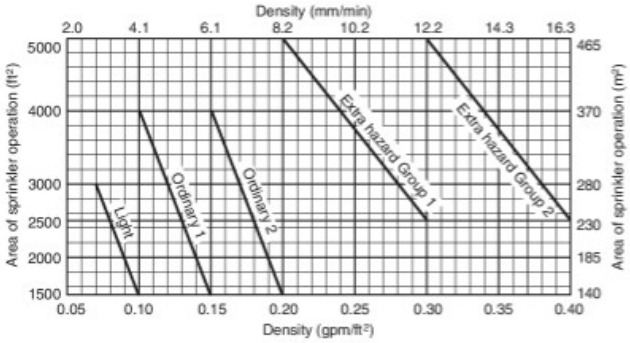

FIGURE 19.3.3.1.1 Density/Area Curves.

Date May 1, 2021

Doug Lynn, Rick Waters, Steve Searock

Reference: **Preliminary Average and Maximum Day Demands and On-site Storage Calculations**

APPENDIX E

Irrigation Demands – Water Efficiency Landscape Worksheets

WATER EFFICIENT LANDSCAPE WORKSHEET

Landscape Area (LA)	
Regular	251869.00
Special	0.00
TOTAL	**251,869.00**

Reference Evapotranspiration (Eto)	
Reference Site	Eto
Los Angeles	50.1

Conversion Factor (to Gallons/SF)
0.62

Estimated Applied WaterUse (EAWU):

REGULAR LANDSCAPE AREAS

Hydrozone No.	Hydrozone Description	Hydrozone Area (FT^2)	Plant Factor (PF)	Irrigation Method	Irrigation Efficiency (IE)	ETAF (PF/IE)	(ETAF x Area)
H-1	Shrubs	113795	0.2	Drip Area	0.81	0.25	28097.53
H-2	turf	52740	0.6	Spray	0.75	0.80	42192.00
H-3	Shrubs	85334	0.2	Drip Area	0.81	0.25	21070.12
	Total Area	**251,869.00**			**TOTALS**	**251869**	**91359.65**

SPECIAL LANDSCAPE AREAS - IRRIGATED BY <*source*> FOR FUTURE USE

Hydrozone No.	Hydrozone Description	Hydrozone Area (FT^2)	Plant Factor (PF)	Irrigation Method	Irrigation Efficiency (IE)	ETAF (PF/IE)	(ETAF x Area)
H-4	Native Planting (L)	0	0.2	DRIP	0.81	0.25	0.00
H-5	Bioswale (L)	0	0.2	DRIP	0.81	0.25	0.00
H-6	Demo Garden (M)	0	0.5	DRIP	0.81	0.62	0.00
H-7	Roof Garden (L)	0	0.2	DRIP	0.81	0.25	0.00
	Total Area	**0.00**			**TOTALS**	**0**	**0.00**

ETAF Calculations	
Regular Landscape Areas	
Average ETAF	**0.36**
All Landscape Areas	
Sitewide ETAF	**0.36**

ESTIMATED TOTAL WATER USE (ETWU)

MAXIMUM ALLOW WATER ALLOWANCE (MAWA)

Monthly Estimated Total Water Use (ETWU):

JANUARY — Reference Eto: 2.2

Hydrozone No.	Hydrozone Description	Hydrozone Area (FT^2)	Plant Factor (PF)	Irrigation Method	Irrigation Efficiency (IE)	Hydrozone Water Use	
H-1	Shrubs	113795	0.2	Drip Area	0.81	38,325.03	
H-2	turf	52740	0.6	Spray	0.75	57,549.89	
H-3	Shrubs	85334	0.2	Drip Area	0.81	28,739.65	
SLA							
H-4	Native Planting (L)	0	0.2	DRIP	0.81	-	
H-5	Bioswale (L)	0	0.2	DRIP	0.81	-	
H-6	Demo Garden (M)	0	0.5	DRIP	0.81	-	
H-7	Roof Garden (L)	0	0.2	DRIP	0.81	-	
					TOTAL	**124,614.57**	GALLONS

FEBRUARY — Reference Eto: 2.7

Hydrozone	Hydrozone	Hydrozone Area	Plant Factor	Irrigation Method	Irrigation Efficiency	Hydrozone	
H-1	Shrubs	113795	0.2	Drip Area	0.81	47,035.27	
H-2	turf	52740	0.6	Spray	0.75	70,629.41	
H-3	Shrubs	85334	0.2	Drip Area	0.81	35,271.39	
SLA							
H-4	Native Planting (L)	0	0.2	DRIP	0.81	-	
H-5	Bioswale (L)	0	0.2	DRIP	0.81	-	
H-6	Demo Garden (M)	0	0.5	DRIP	0.81	-	
H-7	Roof Garden (L)	0	0.2	DRIP	0.81	-	
					TOTAL	**152,936.06**	GALLONS

MARCH — Reference Eto: 3.7

Hydrozone	Hydrozone	Hydrozone Area	Plant Factor	Irrigation Method	Irrigation Efficiency	Hydrozone	
H-1	Shrubs	113795	0.2	Drip Area	0.81	64,455.74	
H-2	turf	52740	0.6	Spray	0.75	96,788.45	
H-3	Shrubs	85334	0.2	Drip Area	0.81	48,334.86	
SLA							
H-4	Native Planting (L)	0	0.2	DRIP	0.81	-	
H-5	Bioswale (L)	0	0.2	DRIP	0.81	-	
H-6	Demo Garden (M)	0	0.5	DRIP	0.81	-	
H-7	Roof Garden (L)	0	0.2	DRIP	0.81	-	

Camp Hess Kramer Project - Lower and Middle Camps
Water Use Calculations

					TOTAL	**209,579.05**	GALLONS
APRIL	Reference Eto	4.7					
Hydrozone	Hydrozone	Hydrozone Area	Plant Factor	Irrigation Method	Irrigation Efficiency	Hydrozone	
H-1	Shrubs	113795	0.2	Drip Area	0.81	81,876.20	
H-2	turf	52740	0.6	Spray	0.75	122,947.49	
H-3	Shrubs	85334	0.2	Drip Area	0.81	61,398.34	
SLA							
H-4	Native Planting (L)	0	0.2	DRIP	0.81	-	
H-5	Bioswale (L)	0	0.2	DRIP	0.81	-	
H-6	Demo Garden (M)	0	0.5	DRIP	0.81	-	
H-7	Roof Garden (L)	0	0.2	DRIP	0.81	-	
					TOTAL	**266,222.03**	GALLONS
MAY	Reference Eto	5.5					
Hydrozone	Hydrozone	Hydrozone Area	Plant Factor	Irrigation Method	Irrigation Efficiency	Hydrozone	
H-1	Shrubs	113795	0.2	Drip Area	0.81	95,812.58	
H-2	turf	52740	0.6	Spray	0.75	143,874.72	
H-3	Shrubs	85334	0.2	Drip Area	0.81	71,849.12	
SLA							
H-4	Native Planting (L)	0	0.2	DRIP	0.81	-	
H-5	Bioswale (L)	0	0.2	DRIP	0.81	-	

H-6	Demo Garden (M)	0	0.5	DRIP	0.81	-	
H-7	Roof Garden (L)	0	0.2	DRIP	0.81	-	
					TOTAL	**311,536.42**	GALLONS
JUNE	Reference Eto	5.8					
Hydrozone	Hydrozone	Hydrozone Area	Plant Factor	Irrigation Method	Irrigation Efficiency	Hydrozone	
H-1	Shrubs	113795	0.2	Drip Area	0.81	101,038.72	
H-2	turf	52740	0.6	Spray	0.75	151,722.43	
H-3	Shrubs	85334	0.2	Drip Area	0.81	75,768.16	
SLA							
H-4	Native Planting (L)	0	0.2	DRIP	0.81	-	
H-5	Bioswale (L)	0	0.2	DRIP	0.81	-	
H-6	Demo Garden (M)	0	0.5	DRIP	0.81	-	
H-7	Roof Garden (L)	0	0.2	DRIP	0.81	-	
					TOTAL	**328,529.32**	GALLONS
JULY	Reference Eto	6.2					
Hydrozone	Hydrozone	Hydrozone Area	Plant Factor	Irrigation Method	Irrigation Efficiency	Hydrozone	
H-1	Shrubs	113795	0.2	Drip Area	0.81	108,006.91	
H-2	turf	52740	0.6	Spray	0.75	162,186.05	
H-3	Shrubs	85334	0.2	Drip Area	0.81	80,993.55	
SLA							
H-4	Native Planting (L)	0	0.2	DRIP	0.81	-	
H-5	Bioswale (L)	0	0.2	DRIP	0.81	-	
H-6	Demo Garden (M)	0	0.5	DRIP	0.81	-	
H-7	Roof Garden (L)	0	0.2	DRIP	0.81	-	
					TOTAL	**351,186.51**	GALLONS
AUGUST	Reference Eto	5.9					
Hydrozone	Hydrozone	Hydrozone Area	Plant Factor	Irrigation Method	Irrigation Efficiency	Hydrozone	
H-1	Shrubs	113795	0.2	Drip Area	0.81	102,780.77	
H-2	turf	52740	0.6	Spray	0.75	154,338.34	
H-3	Shrubs	85334	0.2	Drip Area	0.81	77,074.51	
SLA							
H-4	Native Planting (L)	0	0.2	DRIP	0.81	-	
H-5	Bioswale (L)	0	0.2	DRIP	0.81	-	
H-6	Demo Garden (M)	0	0.5	DRIP	0.81	-	
H-7	Roof Garden (L)	0	0.2	DRIP	0.81	-	
					TOTAL	**334,193.62**	GALLONS
SEPTEMBER	Reference Eto	5					
Hydrozone	Hydrozone	Hydrozone Area	Plant Factor	Irrigation Method	Irrigation Efficiency	Hydrozone	
H-1	Shrubs	113795	0.2	Drip Area	0.81	87,102.35	
H-2	turf	52740	0.6	Spray	0.75	130,795.20	
H-3	Shrubs	85334	0.2	Drip Area	0.81	65,317.38	
SLA							
H-4	Native Planting (L)	0	0.2	DRIP	0.81	-	
H-5	Bioswale (L)	0	0.2	DRIP	0.81	-	
H-6	Demo Garden (M)	0	0.5	DRIP	0.81	-	
H-7	Roof Garden (L)	0	0.2	DRIP	0.81	-	
					TOTAL	**283,214.93**	GALLONS
OCTOBER	Reference Eto	3.9					
Hydrozone No.	Hydrozone Description	Hydrozone Area (FT^2)	Plant Factor (PF)	Irrigation Method	Irrigation Efficiency (IE)	Hydrozone Water Use	
H-1	Shrubs	113795	0.2	Drip Area	0.81	67,939.83	
H-2	turf	52740	0.6	Spray	0.75	102,020.26	
H-3	Shrubs	85334	0.2	Drip Area	0.81	50,947.56	
SLA							
H-4	Native Planting (L)	0	0.2	DRIP	0.81	-	
H-5	Bioswale (L)	0	0.2	DRIP	0.81	-	
H-6	Demo Garden (M)	0	0.5	DRIP	0.81	-	
H-7	Roof Garden (L)	0	0.2	DRIP	0.81	-	
					TOTAL	**220,907.64**	GALLONS
NOVEMBER	Reference Eto	2.6					
Hydrozone No.	Hydrozone Description	Hydrozone Area (FT^2)	Plant Factor (PF)	Irrigation Method	Irrigation Efficiency (IE)	Hydrozone Water Use	
H-1	Shrubs	113795	0.2	Drip Area	0.81	45,293.22	
H-2	turf	52740	0.6	Spray	0.75	68,013.50	
H-3	Shrubs	85334	0.2	Drip Area	0.81	33,965.04	
SLA							
H-4	Native Planting (L)	0	0.2	DRIP	0.81	-	
H-5	Bioswale (L)	0	0.2	DRIP	0.81	-	
H-6	Demo Garden (M)	0	0.5	DRIP	0.81	-	
H-7	Roof Garden (L)	0	0.2	DRIP	0.81	-	
					TOTAL	**147,271.76**	GALLONS
DECEMBER	Reference Eto	1.9					
Hydrozone No.	Hydrozone Description	Hydrozone Area (FT^2)	Plant Factor (PF)	Irrigation Method	Irrigation Efficiency (IE)	Hydrozone Water Use	

Camp Hess Kramer Project - Lower and Middle Camps
Water Use Calculations

H-1	Shrubs	113795	0.2	Drip Area	0.81	33,098.89	
H-2	turf	52740	0.6	Spray	0.75	49,702.18	
H-3	Shrubs	85334	0.2	Drip Area	0.81	24,820.61	
SLA							
H-4	Native Planting (L)	0	0.2	DRIP	0.81	-	
H-5	Bioswale (L)	0	0.2	DRIP	0.81	-	
H-6	Demo Garden (M)	0	0.5	DRIP	0.81	-	
H-7	Roof Garden (L)	0	0.2	DRIP	0.81	-	
					TOTAL	**107,621.67**	GALLONS

Camp Hess Kramer Project - Lower and Middle Camps
Water Use Calculations

Evapotranspiration Adjustment Factor (ETAF)
0.45

Estimated Total Water Use (Gallons) (ETWU)
872765.50
1310567.90
654480.17
2837813.58

Estimated Total Water Use (ETWU)
0.00
0.00
0.00
0.00
0.00

2,837,814	**GALLONS**
3,520,600	**GALLONS**

Watering days per month	Gallons per usage
8	4,790.63
12	4,795.82
8	3,592.46
	13,178.91
8	5,879.41
12	5,885.78
8	4,408.92
	16,174.12
8	8,056.97
12	8,065.70
8	6,041.86

	22,164.53		
12	6,823.02		
12	10,245.62		
12	5,116.53		
	22,185.17		
12	7,984.38		
15	9,591.65		
12	5,987.43		

	23,563.46		
12	8,419.89		
15	10,114.83		
12	6,314.01		
	24,848.74		
12	9,000.58		
15	10,812.40		
12	6,749.46		
	26,562.44		
12	8,565.06		
16	9,646.15		
12	6,422.88		
	24,634.09		
12	7,258.53		
15	8,719.68		
12	5,443.12		
	21,421.32		
8	8,492.48		
12	8,501.69		
8	6,368.44		
	23,362.61		
8	5,661.65		
12	5,667.79		
8	4,245.63		
	15,575.07		

8	4,137.36		
12	4,141.85		
8	3,102.58		
	11,381.79		

WATER EFFICIENT LANDSCAPE WORKSHEET

Landscape Area (LA)	
Regular	195515.00
Special	0.00
TOTAL	**195,515.00**

Reference Evapotranspiration (Eto)	
Reference Site	Eto
Los Angeles	50.1

Conversion Factor (to Gallons/SF)
0.62

Estimated Applied WaterUse (EAWU):

REGULAR LANDSCAPE AREAS

Hydrozone No.	Hydrozone Description	Hydrozone Area (FT^2)	Plant Factor (PF)	Irrigation Method	Irrigation Efficiency (IE)	ETAF (PF/IE)	(ETAF x Area)
H-1	Shrubs	117309	0.2	spray	0.75	0.27	31282.40
H-2	turf	0	0.6	Spray	0.75	0.80	0.00
H-3	Shrubs	78206	0.2	Drip Area	0.81	0.25	19310.12
	Total Area	**195,515.00**			**TOTALS**	**195515**	**50592.52**

SPECIAL LANDSCAPE AREAS - IRRIGATED BY <*source*> FOR FUTURE USE

Hydrozone No.	Hydrozone Description	Hydrozone Area (FT^2)	Plant Factor (PF)	Irrigation Method	Irrigation Efficiency (IE)	ETAF (PF/IE)	(ETAF x Area)
H-4	Native Planting (L)	0	0.2	DRIP	0.81	0.25	0.00
H-5	Bioswale (L)	0	0.2	DRIP	0.81	0.25	0.00
H-6	Demo Garden (M)	0	0.5	DRIP	0.81	0.62	0.00
H-7	Roof Garden (L)	0	0.2	DRIP	0.81	0.25	0.00
	Total Area	**0.00**			**TOTALS**	**0**	**0.00**

ETAF Calculations	
Regular Landscape Areas	
Average ETAF	**0.26**
All Landscape Areas	
Sitewide ETAF	**0.26**

ESTIMATED TOTAL WATER USE (ETWU)

MAXIMUM ALLOW WATER ALLOWANCE (MAWA)

Monthly Estimated Total Water Use (ETWU):

JANUARY — Reference Eto: 2.2

Hydrozone No.	Hydrozone Description	Hydrozone Area (FT^2)	Plant Factor (PF)	Irrigation Method	Irrigation Efficiency (IE)	Hydrozone Water Use	
H-1	Shrubs	117309	0.2	spray	0.75	42,669.19	
H-2	turf	0	0.6	Spray	0.75	-	
H-3	Shrubs	78206	0.2	Drip Area	0.81	26,339.01	
SLA							
H-4	Native Planting (L)	0	0.2	DRIP	0.81	-	
H-5	Bioswale (L)	0	0.2	DRIP	0.81	-	
H-6	Demo Garden (M)	0	0.5	DRIP	0.81	-	
H-7	Roof Garden (L)	0	0.2	DRIP	0.81	-	
					TOTAL	**69,008.20**	GALLONS

FEBRUARY — Reference Eto: 2.7

Hydrozone	Hydrozone	Hydrozone Area	Plant Factor	Irrigation Method	Irrigation Efficiency	Hydrozone	
H-1	Shrubs	117309	0.2	spray	0.75	52,366.74	
H-2	turf	0	0.6	Spray	0.75	-	
H-3	Shrubs	78206	0.2	Drip Area	0.81	32,325.15	
SLA							
H-4	Native Planting (L)	0	0.2	DRIP	0.81	-	
H-5	Bioswale (L)	0	0.2	DRIP	0.81	-	
H-6	Demo Garden (M)	0	0.5	DRIP	0.81	-	
H-7	Roof Garden (L)	0	0.2	DRIP	0.81	-	
					TOTAL	**84,691.88**	GALLONS

MARCH — Reference Eto: 3.7

Hydrozone	Hydrozone	Hydrozone Area	Plant Factor	Irrigation Method	Irrigation Efficiency	Hydrozone	
H-1	Shrubs	117309	0.2	spray	0.75	71,761.83	
H-2	turf	0	0.6	Spray	0.75	-	
H-3	Shrubs	78206	0.2	Drip Area	0.81	44,297.42	
SLA							
H-4	Native Planting (L)	0	0.2	DRIP	0.81	-	
H-5	Bioswale (L)	0	0.2	DRIP	0.81	-	
H-6	Demo Garden (M)	0	0.5	DRIP	0.81	-	
H-7	Roof Garden (L)	0	0.2	DRIP	0.81	-	

Camp Hess Kramer Project - Upper Camp
Water Use Calculations

					TOTAL	**116,059.25**	GALLONS
APRIL	Reference Eto	4.7					
Hydrozone	Hydrozone	Hydrozone Area	Plant Factor	Irrigation Method	Irrigation Efficiency	Hydrozone	
H-1	Shrubs	117309	0.2	spray	0.75	91,156.91	
H-2	turf	0	0.6	Spray	0.75	-	
H-3	Shrubs	78206	0.2	Drip Area	0.81	56,269.70	
SLA							
H-4	Native Planting (L)	0	0.2	DRIP	0.81	-	
H-5	Bioswale (L)	0	0.2	DRIP	0.81	-	
H-6	Demo Garden (M)	0	0.5	DRIP	0.81	-	
H-7	Roof Garden (L)	0	0.2	DRIP	0.81	-	
					TOTAL	**147,426.61**	GALLONS
MAY	Reference Eto	5.5					
Hydrozone	Hydrozone	Hydrozone Area	Plant Factor	Irrigation Method	Irrigation Efficiency	Hydrozone	
H-1	Shrubs	117309	0.2	spray	0.75	106,672.98	
H-2	turf	0	0.6	Spray	0.75	-	
H-3	Shrubs	78206	0.2	Drip Area	0.81	65,847.52	
SLA							
H-4	Native Planting (L)	0	0.2	DRIP	0.81	-	
H-5	Bioswale (L)	0	0.2	DRIP	0.81	-	

H-6	Demo Garden (M)	0	0.5	DRIP	0.81	-	
H-7	Roof Garden (L)	0	0.2	DRIP	0.81	-	
					TOTAL	**172,520.50**	GALLONS
JUNE	Reference Eto	5.8					
Hydrozone	Hydrozone	Hydrozone Area	Plant Factor	Irrigation Method	Irrigation Efficiency	Hydrozone	
H-1	Shrubs	117309	0.2	spray	0.75	112,491.51	
H-2	turf	0	0.6	Spray	0.75	-	
H-3	Shrubs	78206	0.2	Drip Area	0.81	69,439.20	
SLA							
H-4	Native Planting (L)	0	0.2	DRIP	0.81	-	
H-5	Bioswale (L)	0	0.2	DRIP	0.81	-	
H-6	Demo Garden (M)	0	0.5	DRIP	0.81	-	
H-7	Roof Garden (L)	0	0.2	DRIP	0.81	-	
					TOTAL	**181,930.71**	GALLONS
JULY	Reference Eto	6.2					
Hydrozone	Hydrozone	Hydrozone Area	Plant Factor	Irrigation Method	Irrigation Efficiency	Hydrozone	
H-1	Shrubs	117309	0.2	spray	0.75	120,249.55	
H-2	turf	0	0.6	Spray	0.75	-	
H-3	Shrubs	78206	0.2	Drip Area	0.81	74,228.11	
SLA							
H-4	Native Planting (L)	0	0.2	DRIP	0.81	-	
H-5	Bioswale (L)	0	0.2	DRIP	0.81	-	
H-6	Demo Garden (M)	0	0.5	DRIP	0.81	-	
H-7	Roof Garden (L)	0	0.2	DRIP	0.81	-	
					TOTAL	**194,477.66**	GALLONS
AUGUST	Reference Eto	5.9					
Hydrozone	Hydrozone	Hydrozone Area	Plant Factor	Irrigation Method	Irrigation Efficiency	Hydrozone	
H-1	Shrubs	117309	0.2	spray	0.75	114,431.02	
H-2	turf	0	0.6	Spray	0.75	-	
H-3	Shrubs	78206	0.2	Drip Area	0.81	70,636.43	
SLA							
H-4	Native Planting (L)	0	0.2	DRIP	0.81	-	
H-5	Bioswale (L)	0	0.2	DRIP	0.81	-	
H-6	Demo Garden (M)	0	0.5	DRIP	0.81	-	
H-7	Roof Garden (L)	0	0.2	DRIP	0.81	-	
					TOTAL	**185,067.45**	GALLONS
SEPTEMBER	Reference Eto	5					
Hydrozone	Hydrozone	Hydrozone Area	Plant Factor	Irrigation Method	Irrigation Efficiency	Hydrozone	
H-1	Shrubs	117309	0.2	spray	0.75	96,975.44	
H-2	turf	0	0.6	Spray	0.75	-	
H-3	Shrubs	78206	0.2	Drip Area	0.81	59,861.38	
SLA							
H-4	Native Planting (L)	0	0.2	DRIP	0.81	-	
H-5	Bioswale (L)	0	0.2	DRIP	0.81	-	
H-6	Demo Garden (M)	0	0.5	DRIP	0.81	-	
H-7	Roof Garden (L)	0	0.2	DRIP	0.81	-	
					TOTAL	**156,836.82**	GALLONS
OCTOBER	Reference Eto	3.9					
Hydrozone No.	Hydrozone Description	Hydrozone Area (FT^2)	Plant Factor (PF)	Irrigation Method	Irrigation Efficiency (IE)	Hydrozone Water Use	
H-1	Shrubs	117309	0.2	spray	0.75	75,640.84	
H-2	turf	0	0.6	Spray	0.75	-	
H-3	Shrubs	78206	0.2	Drip Area	0.81	46,691.88	
SLA							
H-4	Native Planting (L)	0	0.2	DRIP	0.81	-	
H-5	Bioswale (L)	0	0.2	DRIP	0.81	-	
H-6	Demo Garden (M)	0	0.5	DRIP	0.81	-	
H-7	Roof Garden (L)	0	0.2	DRIP	0.81	-	
					TOTAL	**122,332.72**	GALLONS
NOVEMBER	Reference Eto	2.6					
Hydrozone No.	Hydrozone Description	Hydrozone Area (FT^2)	Plant Factor (PF)	Irrigation Method	Irrigation Efficiency (IE)	Hydrozone Water Use	
H-1	Shrubs	117309	0.2	spray	0.75	50,427.23	
H-2	turf	0	0.6	Spray	0.75	-	
H-3	Shrubs	78206	0.2	Drip Area	0.81	31,127.92	
SLA							
H-4	Native Planting (L)	0	0.2	DRIP	0.81	-	
H-5	Bioswale (L)	0	0.2	DRIP	0.81	-	
H-6	Demo Garden (M)	0	0.5	DRIP	0.81	-	
H-7	Roof Garden (L)	0	0.2	DRIP	0.81	-	
					TOTAL	**81,555.15**	GALLONS
DECEMBER	Reference Eto	1.9					
Hydrozone No.	Hydrozone Description	Hydrozone Area (FT^2)	Plant Factor (PF)	Irrigation Method	Irrigation Efficiency (IE)	Hydrozone Water Use	

Camp Hess Kramer Project - Upper Camp
Water Use Calculations

H-1	Shrubs	117309	0.2	spray	0.75	36,850.67	
H-2	turf	0	0.6	Spray	0.75	-	
H-3	Shrubs	78206	0.2	Drip Area	0.81	22,747.33	
SLA							
H-4	Native Planting (L)	0	0.2	DRIP	0.81	-	
H-5	Bioswale (L)	0	0.2	DRIP	0.81	-	
H-6	Demo Garden (M)	0	0.5	DRIP	0.81	-	
H-7	Roof Garden (L)	0	0.2	DRIP	0.81	-	
					TOTAL	**59,597.99**	GALLONS

Evapotranspiration Adjustment Factor (ETAF)
0.45

Estimated Total Water Use (Gallons) (ETWU)
971693.91
0.00
599811.05
1571504.96

Estimated Total Water Use (ETWU)
0.00
0.00
0.00
0.00
0.00

1,571,505	**GALLONS**
2,732,889	**GALLONS**

Watering days per month	Gallons per usage
8	5,333.65
12	-
8	3,292.38
	8,626.03
8	6,545.84
12	-
8	4,040.64
	10,586.49
8	8,970.23
12	-
8	5,537.18

	14,507.41		
12	7,596.41		
12	-		
12	4,689.14		
	12,285.55		
12	8,889.42		
15	-		
12	5,487.29		

	14,376.71		
12	9,374.29		
15	-		
12	5,786.60		
	15,160.89		
12	10,020.80		
15	-		
12	6,185.68		
	16,206.47	11.25	
12	9,535.92		
16	-		
12	5,886.37		
	15,422.29		
12	8,081.29		
15	-		
12	4,988.45		
	13,069.74		
8	9,455.11		
12	-		
8	5,836.48		
	15,291.59		
8	6,303.40		
12	-		
8	3,890.99		
	10,194.39		

8	4,606.33		
12	-		
8	2,843.42		
	7,449.75		

May 1, 2021

Doug Lynn, Rick Waters, Steve Searock

Reference: **Preliminary Water System Design**

APPENDIX 3

Preliminary Domestic Water and Fire Water System Schematic

ELEV.

880
860
840
820
800
780
760
740
720
700
680
660
640
620
600
580
560
540
520
500
480
460
440
420
400
380
360
340
320
300
280
260
240
220
200
180
160
140
120
100
80

EX. 67,000–GAL
FIRE WATER TANK

ELEV. 855

(2) EX.
45,000–GAL
WATER TANK

6" W

6" FW

W

ELEV. 762

GINDLING HILLTOP
CAMP BLDGS

6" FW

2"
DW

ELEV. 711

2" DW

2" DW

LEGEND

———	SUPPLY (YBWC TANK ZONE)
– – – – –	SUPPLY (PUMP ZONE)
———	DISTRIBUTION (100,000–GAL. TANK ZONE)
– – – – –	DISTRIBUTION (PUMP ZONE)
	FH
	BACKFLOW PREVENTOR

ABBREVIATIONS

DIV. GV	DIVISION GATE VALVE
DW	DOMESTIC WATER
GAL.	GALLON
FW	FIRE WATER
N.C.	NORMALLY CLOSED

NOTES:

ELEVATIONS ARE APPROXIMATE. DOMESTIC AND FIRE WATER LAYOUT IS SCHEMATIC AND IS FOR INFORMATIONAL PURPOSES ONLY.

IRRIGATION CONNECTIONS ARE NOT SHOWN FOR SIMPLICITY.

*WHEN PUMP #1 IS INOPERABLE DUE TO A POWER OUTAGE, A BYPASS WILL BE UTILIZED VIA MANUAL OPERATION OF NORMALLY CLOSED (N.C.) DIVISION GATE VALVES. THIS WILL BYPASS PUMP #1 TO PROVIDE WATER FROM METER 170–4 TO SERVE BUILDINGS IN THE MIDDLE AND LOWER CAMPS.

**THE FIRE WATER PUMP WILL REQUIRE A BACKUP POWER GENERATOR PER NFPA 20 AND NFPA 72 IN CASE OF A POWER FAILURE DURING A FIRE.

2" DW

PUMP #3

EX. 3,200–GAL
INTERMEDIATE
WATER TANK

ELEV. 495

PUMP #2

EX. TANK
(YBWC)

EX. 100,000–GAL.
WATER TANK

**FW PUMP

8" FW

FW

MIDDLE CAMP
(BLDGS ABOVE 165 FT)

ELEV. 165 TO 221

3" DW

ELEV. 251

ELEV. 256

3" DW

3" DW

*3" BYPASS LINE

*DIV. GV (N.C.)

8" GRAVITY WATER MAIN

METER
170–4

8" DW
(YBWC)

MIDDLE CAMP
(BLDGS: 158 FT TO 165 FT)

MIDDLE CAMP
(BLDGS BELOW
158 FT)

6" FW BRANCH

ELEV. 165

PUMP #1

2" DW

6" FW BRANCH

METERS
190–1,
190–2,
190–3

LOWER CAMP
BLDGS. 1,2,4,16

ELEV.
60 – 86

ELEV. 100

2" DW

6" FW BRANCH

LOWER CAMP BLDGS 6,7,13,14

DRAWING: c: \users \jzukowski \documents \work \projects \2042586200 \drawing \exhibit_files \chk_ghc_wtr_sys_schmtc.dwg

PROPOSED DOMESTIC WATER AND FIRE WATER SYSTEM SCHEMATIC
CAMP HESS KRAMER PROJECT

Stantec
111 East Victoria Street, Santa Barbara, CA 93101
Phone: (805) 963–9532

OCTOBER 2020

YERBA BUENA WATER COMPANY

WILL SERVE LETTER

Date: 4/18/2022

From Purveyor:
Yerba Buena Water Company (YBWC)
P.O. Box 3829
Paso Robles, CA 93447

To:
Public Works Agency
County of Ventura
800 South Victoria Avenue
Ventura, CA 93009-1670

Attn: Building and Safety Division,

1. This letter certifies that YBWC's water system described in its Water Availability Letter, WAL 15-0010, dated July 31, 2015, revised October 26, 2015 and accepted by the County of Ventura on December 3, 2015, will supply water to Camp Hess Kramer, Inc. for the Subject Property described below, via the existing 5 service meters, limited to 10,621,000 gallons per calendar year, as provided in and subject to other terms and conditions specified in a separate written agreement between YBWC and Camp Hess Kramer, Inc. dated October 16, 2003. The Subject Property is within YBWC's service area of the Water Availability Letter on file. YBWC certifies that the above water allocation for the Project described below, will not adversely impact any other current user of YBWC's Water System described in the referenced Water Availability Letter.

2. Project information:

   a. Owner's Name: Camp Hess Kramer, Inc.
   3663 Wilshire Boulevard
   Los Angeles, CA 90010

   b. Subject Property: Camp Hess Kramer and Gindling Hilltop Camp
   11495 and 11677 Pacific Coast Highway
   Malibu, CA 90265

   c. Project Description: Rebuild of Camp Hess Kramer and Gindling Hilltop Camp after November, 2018 Woolsey Fire

Yerba Buena Water Company

By: Robert M. Berry Dated: 4/18/2022
Robert M. Berry, President and Manager

Stantec

Memo

To:	James Maxwell Ventura County Public Works	From:	Jonny Zukowski, P.E. Project Civil Engineer Stantec 111 East Victoria Street, Santa Barbara, CA 93101
File:	CHK 2022 Total Annual Water Usage Memo_County_20220617.docx	Date:	June 17, 2022

Reference: Camp Hess Kramer and Gindling Hilltop Camp Woolsey Fire Rebuild Total Annual Water Usage (County reference PL21-0051)

Purpose:

Ventura County provided email comments [Attachment 1] on May 4, 2022, regarding Stantec's memo titled *Preliminary Average and Maximum Day Demands and On-site Storage Calculations,* dated May 1, 2021 ("Storage Memo"). Stantec has prepared this response memo for planning purposes to 1) further clarify the estimated total annual water usage of the proposed Camp Hess Kramer and Gindling Hilltop Camp ("Camp") Woolsey Fire Rebuild ("rebuild project") with respect to the Will Serve Letter from Yerba Buena Water Company, dated April 18, 2022, and 2) to differentiate the annual usage in this memo from the daily demands shown in the Storage Memo.

Background:

Camp consists of Camp Hess Kramer (Lower and Middle Camp areas), and Gindling Hilltop Camp (Upper Camp) which are located at 11495 and 11677 Pacific Coast Highway in Malibu, California (APNs 700-0-070-450, 700-0-060-310, 700-0-060-180, 700-0-060-140). The Camp has historically consisted of various administration buildings, assembly buildings, dining halls, restroom facilities, staff housing, cabins, and miscellaneous structures for camp-related operations. Please see Figure 1 Vicinity Map.

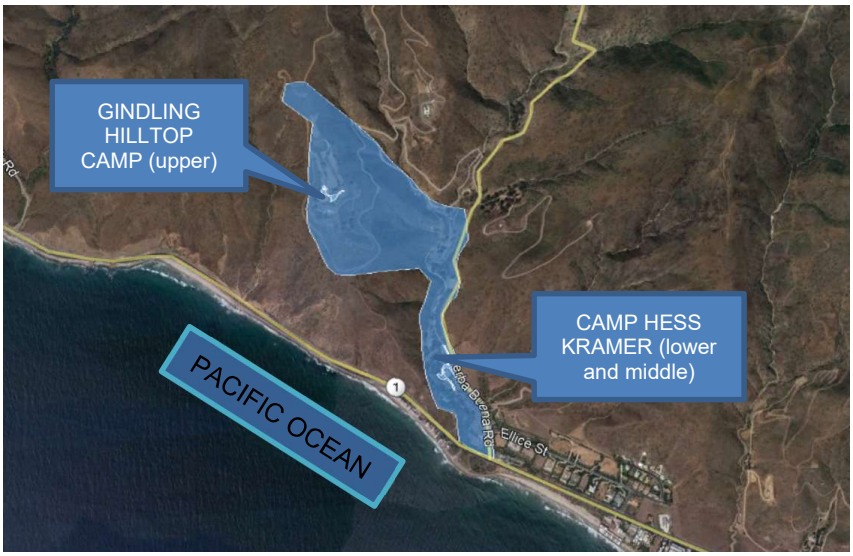

Figure 1 – Vicinity Map

Reference: **Camp Hess Kramer and Gindling Hilltop Camp Woolsey Fire Rebuild Annual Water Usage (County reference PL21-0051)**

The Woolsey Fire at the end of November 2018 and subsequent debris flows destroyed and damaged many of the buildings, structures, and utility infrastructure at the Camp. The proposed project is a rebuild to replace destroyed structures, utilities, and infrastructure and re-use remaining buildings and infrastructure. Water service to Camp is provided by Yerba Buena Water Company (YBWC). Wastewater service on site occurs via an advanced wastewater treatment system for Lower and Middle Camps, and private onsite septic systems at Upper Camp.

Existing Yerba Buena Water Company (YBWC) Connections

The Camp has five (5) water service meters connected to an existing YBWC 8-inch water main located in Yerba Buena Road. Table 1 details each water service meter.

Table 1 – Existing Yerba Buena Water Company Service Meters

Meter Number	Service Meter Type	Size	Location
190-1	Domestic	2-inch	Yerba Buena Road
190-2	Domestic	2-inch	Yerba Buena Road
190-3	Domestic	1 ½-inch	Yerba Buena Road
190-4	Irrigation	1-inch	Yerba Buena Road
170-4	Domestic	3-inch	Middle Camp

Will Serve Letter from YBWC

As part of the application to rebuild the Camp, the applicant team provided a Will Serve Letter from Yerba Buena Water Company dated April 18, 2022. The Will Serve Letter confirms that YBWC will supply water to Camp Hess Kramer, Inc. for the camp property via the five existing service meters up to **10,621,000 gallons** (**32.60 AF**) per calendar year.

Daily Demands from the Storage Memo

Daily Demands shown in the *Storage Memo, dated May 1, 2021*, were calculated based on the methodology outlined in the Ventura County Water Works Manual 2nd Edition to adequately size the proposed water infrastructure and onsite storage facilities to meet fire flow, California Plumbing Code, and Ventura County requirements. As is typical for such a study, the daily demands used in the *Storage Memo* are for infrastructure sizing purposes only, and do not reflect an estimated annual water usage for the project.

ESTIMATED ANNUAL WATER USAGE

The proposed Camp rebuild project includes a combination of existing and new structures including administration buildings, gathering, and dining halls, restroom facilities, overnight accommodations, and other miscellaneous structures for Camp programming. Proposed building area calculations were provided by *Siegel & Strain Architects*. The proposed rebuild for the Camp consists of a total of 49 existing and proposed buildings ("Rebuild Buildings") in the Lower, Middle, and Upper Camp areas that will connect to the water system. The

Reference: **Camp Hess Kramer and Gindling Hilltop Camp Woolsey Fire Rebuild Annual Water Usage (County reference PL21-0051)**

proposed Rebuild Buildings total 144,507 square feet, increasing the aggregate building square footage by approximately 52,679 square feet compared to pre-fire conditions. Table 2 shows a breakdown of Rebuild Building types and sizing information used in the annual domestic water usage calculations.

Table 2 – Proposed Rebuild Buildings Aggregate Area

Camp Area	Building Type(s)	No. of Buildings	Building Area (sq-ft)
Lower Camp	*Administration, Program Space, Dining, Overnight Accommodations*	*12*	*77,430* [1]
Middle Camp	*Overnight Accommodations*	*22*	*42,737* [1]
Gindling Hilltop Camp (upper)	*Administration, Program Space, Dining, Overnight Accommodations*	*15*	*24,340* [1]
Total		***49***	***144,507*** [1]

[1] *Values provided by Siegel & Strain Architects*

Estimated Total Water Use (ETWU) calculations for landscaped areas have been provided by Studio-MLA for the Lower, Middle and Upper Camps.

Recycled water currently produced by the onsite wastewater treatment plant will be utilized for irrigating a portion of the Lower Camp to offset domestic water used for irrigation.

Total annual water use for the project is estimated to be **32.60 AFY**, which includes domestic water use for all proposed and existing buildings and facilities, irrigation water use, and recycled water to offset domestic water used for irrigation.

See

Reference: **Camp Hess Kramer and Gindling Hilltop Camp Woolsey Fire Rebuild Annual Water Usage (County reference PL21-0051)**

Table 3 for a summary of estimated total annual water usage for the Camp rebuild project.

Reference: **Camp Hess Kramer and Gindling Hilltop Camp Woolsey Fire Rebuild Annual Water Usage (County reference PL21-0051)**

Table 3 – Estimated Total Annual Potable Water Usage

Description	Recycled Water Use Factor (gpd; Annual Daily Average)	Estimated Water Usage (AFY)
Domestic Water Use	-	*24.57*
Irrigation Water Use	-	*11.39* [a]
Recycled Water Use	*4,000*	*-3.36* [b]
Total		***32.60***

[a] *Values provided by Studio-MLA*

[b] *Annual recycled water use is estimated based on 9 months and will offset the potable water used for irrigation.*

PROPOSED WATER USE MONITORING PROGRAM

As mentioned previously, the proposed water systems will utilize the existing connections to YBWC and the existing onsite storage tanks for domestic, fire protection and irrigation. The Camp will implement a monthly program to monitor water use and detect any leakage or excessive water use within its onsite water system and deploy water use reduction measure as appropriate.

Water Use Monitoring

The supply for the onsite storage is provided through a 3-inch meter (170-4) from Yerba Buena Water Company. This meter will measure the volume of water supplied to the onsite water systems. To measure any leakage or discrepancies between supply and water use, various sub-meters will be installed at strategic locations throughout upper, middle, and lower camp. It is recommended that all booster pumping stations, discharge mains from the existing onsite storage tanks, and distribution branches to building areas be equipped with metering devices to determine areas of leakage or excessive water use. The locations of metering devices will be determined at final design.

Monitoring should be implemented monthly and shall consist of the following:

- Water use data collection and recording at all meters and submeters
- Inspection on above ground domestic water and fire water appurtenances to check for leaks, damage or required maintenance
- Inspections on building plumbing fixtures to check for leaks, damage or required maintenance
- Inspection on irrigation drip lines, sprayers, and valves to check for leaks, damage or required maintenance.

Reference: **Camp Hess Kramer and Gindling Hilltop Camp Woolsey Fire Rebuild Annual Water Usage (County reference PL21-0051)**

Water Use Reduction Measures

In the event the projected water usage (including seasonal usage) may exceed the average annual water allocation, the following measures may be implemented individually or in combination to reduce and limit any such future water use quantities.

- Camp will inspect system for leaks and repair them promptly.
- Irrigation may be reduced and/or restricted to nighttime hours or;
- Irrigation may be supplied with recycled water only.
- Additional information in the form of a water conservation program may be deployed that guides camp staff and camp users to conserve water at all building fixtures.
    - Flyers and placards may be placed in strategic locations to provide information and encourage reduced water use.
    - Indoor water uses may be restricted to specific times or in certain ways (e.g., limitation on bathing or laundry frequency or duration).
- Reduce outdoor water use including pool area uses.

CONCLUSION

The estimated total annual water usage for the Camp is **32.60 AFY**. Actual water usage may vary depending on operations and water use practices implemented at the Camp. These values are estimates for planning purposes only. Any changes to assumed building uses and/or sizes will impact estimates. When water usage is projected to exceed the annual allocation provided in the Will Serve Letter from YBWC, the Camp will implement water use reduction measures to reduce and limit such water use quantities.

Jonny Zukowski, P.E.
Senior Civil Engineer
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Stantec