

NOTES:

*** THE LOCATION OF UNDERGROUND AND OVERHEAD UTILITIES IS APPROXIMATE. LIKEWISE, STRUCTURE AND PAVEMENT LOCATIONS ARE APPROXIMATE. THE ACTUAL LOCATION OF UTILITIES, DRIVEWAYS AND STRUCTURES SHOULD BE FIELD VERIFIED PRIOR TO THE INSTALLATION OF THE PROPOSED SEPTIC SYSTEM. ANY REVISIONS TO THE SYSTEM SHOULD BE APPROVED BY THE DESIGN ENGINEER PRIOR TO IMPLEMENTING.

I CERTIFY THAT THE LAYOUT DRAWING SHOWS THE LOCATION OF ALL KNOWN EASEMENTS ON THE LOT AND PUBLIC WATER LINES ON OR WITHIN 20 FEET OF THE LOT BOUNDARIES.

KEVIN BRESNAHAN, P.E.

SEPTIC LAYOUT FOR: ELFIN FOREST/HARMONY GROVE VOLUNTEER FIRE DEPT.

SHEET 2 OF 4

DEH Control Number: LOWTS-006471

This approval will be VOID unless the Structures, Driveways and Grading are located as shown and the Lines or Seepage Pit(s) are located exactly as shown on this plan. Any proposed change shall be approved by the Department of Environmental Health prior to beginning construction. The applicant shall provide all utility trenching to 48" depth. The location of all utility lines shall be marked from the top of the utility trench to the surface of the ground.

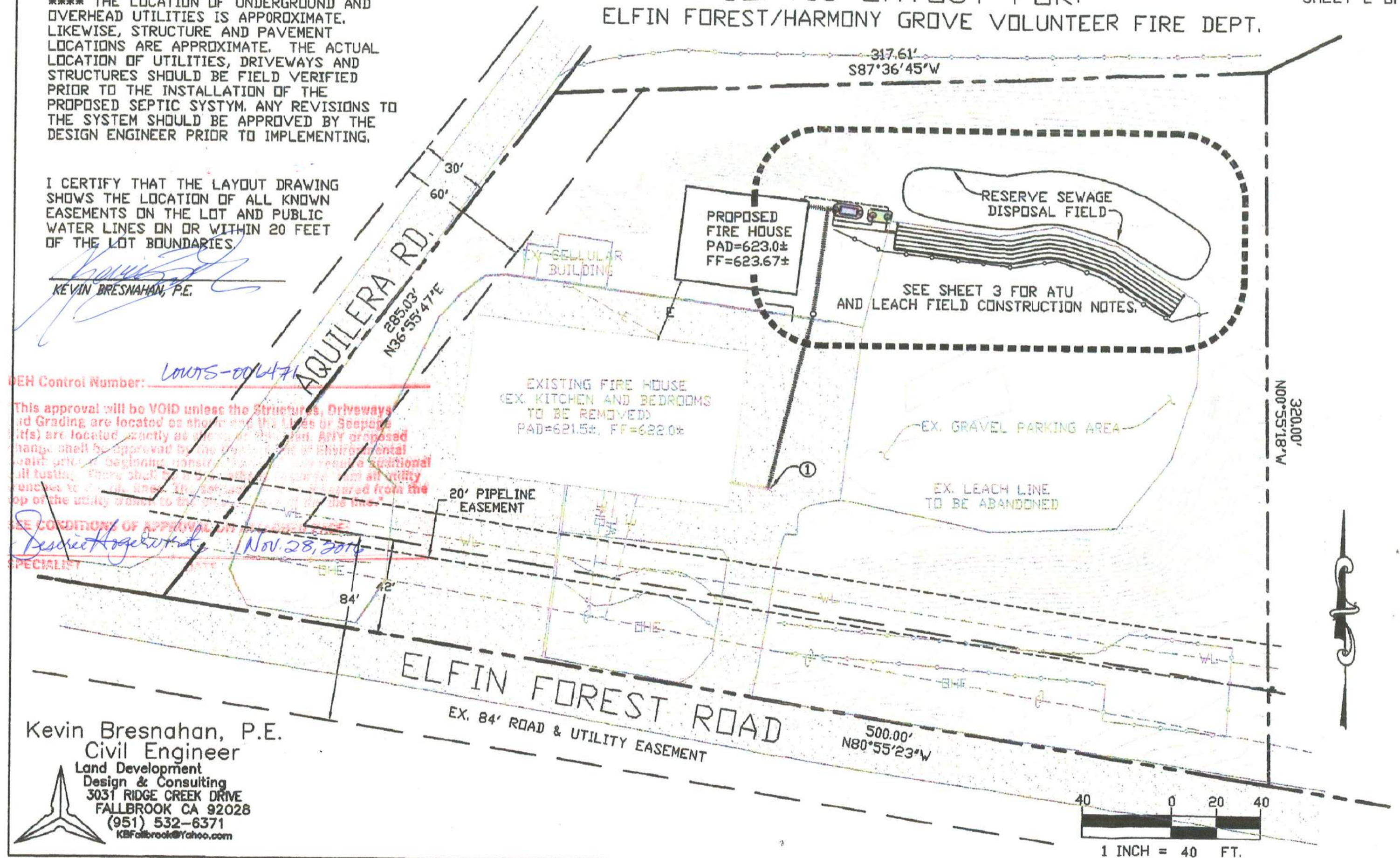
SEE CONDITIONS OF APPROVAL ON ALL SHEETS.

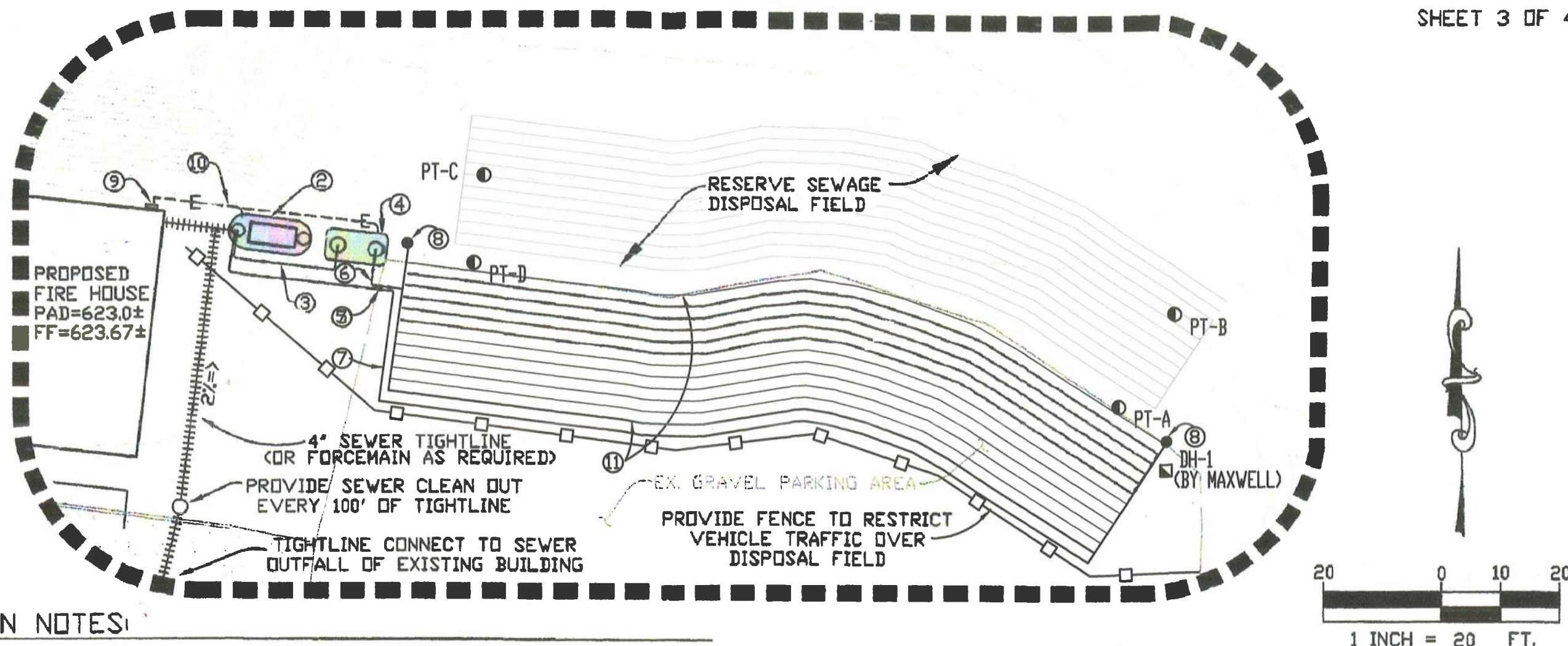
Respectfully,
SPECIALIST

Nov. 28, 2016

Kevin Bresnahan, P.E.
Civil Engineer

Land Development
Design & Consulting
3031 RIDGE CREEK DRIVE
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CONSTRUCTION NOTES:

- ① REMOVE EXISTING CONCRETE SEPTIC TANK, OR UTILIZE AS CHAMBER FOR ANCILARY PUMP AS ELEVATION REQUIRES FOR FALL TO ATU (SEE SHEET 2)
- ② INSTALL ADVANTEX AX20 MODE 3B W/ 1500 GAL. FIBERGLASS TANK & ORENCO MODEL NO. P300511 PUMP VAULT 57' HIGH VAULT W/ 24' FILTER CARTRIDGE). ELEVATIONS PER DETAIL ON SHEET 2. PROVIDE FOR ANTI-BOUYANCY MEASURE ON ADVANTEX TANK AND AX-20 POD PER MANUFACTURER RECCOMENDATIONS.
- ③ INSTALL 24 L.F. 2' SCHEDULE 40 PVC OUTFLOW LINE (2% MIN. SLOPE TO PUMP CHAMBER)
- ④ INSTALL ROTH (RMT1250 GAL) SINGLE COMPARTMENT SEPTIC TANK (AS PUMP CHAMBER) WITH ORENCO 1/2 HP ORENCO (PF3005-1-1-20) EFFLUENT PUMP. ELEVATIONS PER DETAIL ON SHEET 4. NOTE: PROVIDE ANTI-BOUYANCY MEASURES.
- ⑤ INSTALL ORENCO (WHW-1.0-AUT) 1' AUTOMATIC FIELD FLUSH VALVE
- ⑥ INSTALL 12 L.F. 1-1/4' SCHEDULE 40 PVC SUPPLY LINE
- ⑦ INSTALL 185 L.F. 1-1/4' SCHEDULE 40 PVC RETURN LINE
- ⑧ INSTALL ADVANTEX (AX-VENT) AIR VENT AT HIGH POINTS AS NOTED.
- ⑨ INSTALL CONTROL PANEL ON FREE STANDING 4'X4' REDWOOD POST
- ⑩ INSTALL ELECTRICAL SUPPLY LINE AS REQUIRED PER ELECTRICIAN
- ⑪ INSTALL 1500 L.F. WASTEFLOW PC-1 GPH GEOWFLOW PIPE 2' D.C. W/OMITTEERS AT 1' DC. 6' BURIAL DEPTH (12 LINES AT 125 L.F. EACH)

NOTE: DRIPFIELD SHALL BE LAWN OR
OTHER LANDSCAPE AS APPROVED
BY DESIGN ENGINEER

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County of San Diego

Department of Environmental Health

Land and Water Quality
5500 Overland Ave., Suite 210, San Diego, CA 92123 / (858) 565-5173
www.sdcdeh.org

ELFIN FOREST / HARMONY GROVE

Owner: County Of San Diego *FIRE DEPT.* **Site:** 20223 ELFIN FOREST RD, ESCONDIDO
Address: 20223 Elfin Forest
Escondido, CA 92029 **Parcel:** 264-042-12-00
Phone: **Certification:** *GRANT DEED*
Professional: Kevin Bresnahan; DEH Engineer #59954 **Record ID:** DEH2016-LOWTS-006471

This project is **APPROVED** for the following:

Commercial / Residential: Commercial Gallons / Day: 600

Number of Bedrooms: *SEE CALCS. ON ATTACHED PAGE.*

THIS IS NOT A SEPTIC PERMIT

You have until 11/28/2017 to obtain a septic permit. However, a site recheck may be required at any time to determine if site conditions have changed. Refer to the County of San Diego, Department of Environmental Health Local Agency Management Program for Onsite Wastewater Treatment Systems for all applicable setbacks and standard conditions of approval.

ONSITE WASTEWATER SYSTEM REQUIREMENTS

Primary Septic Tank (in gallons): 1500

Pump Tank (in gallons): 1250

Supplemental Treatment: See Below *

* Supplemental Treatment Type: AdvanTex AX Pod

Soil Disposal System:

CONDITIONS TO BE COMPLETED PRIOR TO THE ISSUANCE OF A SEPTIC PERMIT

1. VERIFICATION OF POTABLE WATER SOURCE
2. REVIEW OF GRADING BY **DEH STAFF** (CALL THE INSPECTION LINE AT (858) 694-2553 AFTER GRADING IS COMPLETED IF NOT SIGNED OFF BELOW)
3. REVIEW OF STAMPED BUILDING PLANS

Potable Water Source: Public Water Supply

Water District: Olivehain Municipal Water District

DEH Grading Inspection:

DEH Building Plan Review:

DEH Pump System Review:

COMMENTS: PROPOSED VOLUNTEER FIRE STATION, 5 permanent firefighters, 1 office staff, 10 trainees twice a week. See calculations attached.

Advantex AX20 Mode 3B ATU w/ 1500 gal fiberglass tank and mounted Orenco Pump Vault w/ 24" Filter Cartridge. Roth 1250 gallon pump chamber, both tanks require manufacturer- recommended anti-buoyancy straps.

Fencing or barrier required to prohibit vehicular traffic over drip field and treatment tanks.

1500 linear feet of GeoFlow drip tubing, 2' on center, 6" deep, emitters 1' on center.

100% reserve in area of Water Wise Garden. Revision of this area may be required to accommodate installation of reserve area.

Approved By: Desiree Hogervorst

Date: 11/28/2016

APPENDIX A

PERCOLATION CERTIFICATION & APPLICATION CALCULATIONS

COUNTY OF SAN DIEGO
DEPARTMENT OF ENVIRONMENTAL HEALTH
PERCOLATION TEST REPORT

DEH Control #: LAUTS006471
Date: Nov. 28, 2016
Activity Code: E12

Assessor's Parcel #: APN 264-042-12 Map #: BY DEED Lot #: --

Site Address: 20223 ELFIN FOREST ROAD Town: ELFIN FOREST Zip Code: 92029

Owner: ELFIN FOREST/HARMONY GROVE FIRE DEPARTMENT Phone: _____

Mailing Address: 20223 ELFIN FOREST ROAD, ELFIN FOREST CA 92029

Test Hole	Test Depth	Stabilized Rate	Test Hole	Test Depth	Stabilized Rate	Test Hole	Test Depth	Stabilized Rate	Average Perc Rate	
A	12"	52							USE 60 MPI USE 0.200 GAL/SF/DAY	
B	12"	40	NOTE: YOU HAVE ONE YEAR TO OBTAIN A SEPTIC TANK PERMIT. HOWEVER, A SITE RECHECK <u>MAY</u> BE REQUIRED ANY TIME TO DETERMINE IF SITE CONDITIONS HAVE CHANGED.							
C	12"	55								
D	12"	39								

TYPE OF SOIL: (clay, silt, sand, decomposed granite, etc.)

Surface DESC. PER MAXWELL PERC IN COUNTY FILE

1-3' ft. below surface SILTY SAND WITH CLAY TO DECOMPOSED GRANITE

3-5' ft. below surface DECOMPOSED GRANITE WITH VARIABLE CALY

5-8' ft. below surface DECOMPOSED GRANITE WITH VARIABLE CALY

8-20' ft. below surface DECOMPOSED GRANITE WITH VARIABLE CALY

Depth to Refusal: RANDOM ROCK Depth to Groundwater: OBSERVED AT 11'

RECOMMENDATIONS:

Septic Tank: _____ gal. Pump Chamber: _____ gal. Surge Tank: _____ gal.

Leach Line Length: _____ ft. Seepage Pit Type: _____ Number of Pits: _____

Trench Depth: _____ ft. Length: _____ ft. Width: _____ ft.

Rock Below Pipe: _____ in. Total Depth: _____ ft. Cap Depth: _____ ft.

Other: ADVANTECH AX20 ATU W 1250 GAL PUMP TANK AND 3000 SQFT DRIP DISPOSAL (6' DEPTH)

Proposed Structure: PROPOSED FIRE STATION ADDITION ~ SEE CALCS FOR SIZING

WATER SUPPLY:

Source of Potable Water: OLIVENHAIN Well Permit Number: N/A

Registered CE, PE, Geologist, REHS: KEVIN BRESNAHAN RCE 59954

Address: 3031 RIDGE CREEK DRIVE ~ FALLBROOK CA 92028 Phone: 951-532-6371 Date: 10/2016

FOR DEPARTMENTAL USE ONLY

APPROVED YES ✓ NO _____ DATE 11/28/16 FINAL MAP REQUIREMENTS _____ NO ✓

Specialist: Asierio Aguerros

Bldg. Plan Review: _____ DATE: _____

Grading Review: _____ DATE: _____

Water Analysis Results: _____ DATE: _____

Septic System Design:

- Calculate Daily Flow (DF):

Given a anticipated usage the daily flow is calculated as

Typical Usage: 5 Firefighters w/ 24 Hour Shift Daily (75 GPD per F.F.)

1 Regular Office Staff 8 hours Daily (20 GPD per Staff)

Training Twice Weekly additional 10 F.F.

For 8 hrs (total of 15 including on call F.F.) (20 GPD per Staff)

Flow values established per the UPC Private On-site Sewage "Appendix K."

Typical Daily Flow (TDF) = 5 Fire Fighters. x 75gallons/per./day

Plus

1 Office Staff. x 20 gallons/person/day

TDF = 395 Gallons Per Day

Peak Daily Flow (PDF) = 15 Fire Fighters. x 75 gallons/person/day

Plus

1 Office Staff. x 20gallons/person/day

Plus

10 Trainees x 20 gallons/person/day

PDF = 595 Gallons Per Day

Average Daily Flow (ADF)

= Typ. Daily Flow x (5 days/7days) +Peak Daily Flow (2days/7days) ADF = 452.14 Gallons Per Day

Design ATU and Drip Disposal system for 600 GPD.

- **Determine Soil Application**

Given observed perc rate of 55 mpi, conservatively utilize a 60 minute per inch percolation rate which corresponds to a rate of 0.20 gal./sq.ft./day for a design hydraulic loading rate requiring a total area of 500-sq.ft./100 gallons/day of disposal area. This conservative percolation rate allows for manipulation of the manufactures spreadsheet to provide a design that utilizes all the available area in the front yard. It is felt the additional drip line expense is minimal and will provide for a long term maintenance free distribution system.

Total square feet of disposal area= (daily flow)/(design hydraulic loading rate) Total square feet of disposal area= (600)/(0.200 gal./sq.ft./day)=3000 sq.ft. Use 3000 s.f. as a minimum allowing for calculated use.

- **Wasteflow Dripline Parameters**

Utilize 1500 l.f. Wasteflow PC 1 gph Dripline, Place 24" on center,
Place emitters 12" on center along length of tubing,
Bury dripline 6" below ground,

TABLE K-2
Capacity of Septic Tanks*

Single-Family Dwellings – Number of Bedrooms	Multiple Dwelling Units or Apartments – One Bedroom Each	Other Uses: Maximum Fixture Units Served per Table 7-3	Minimum Septic Tank Capacity in	
			Gallons	(Liters)
1 or 2		15	750	(2,838)
3		20	1,000	(3,785)
4	2 units	25	1,200	(4,542)
5 or 6	3	33	1,500	(5,678)
	4	45	2,000	(7,570)
	5	55	2,250	(8,516)
	6	60	2,500	(9,463)
	7	70	2,750	(10,409)
	8	80	3,000	(11,355)
	9	90	3,250	(12,301)
	10	100	3,500	(13,248)

*Note:

Extra bedroom, 150 gallons (568 liters) each.

Extra dwelling units over 10,250 gallons (946 liters) each.

Extra fixture units over 100,25 gallons (95 liters) per fixture unit.

Septic tank sizes in this table include sludge storage capacity and the connection of domestic food waste disposal units without further volume increase.

TABLE K-3

Estimated Waste/Sewage Flow Rates

Because of the many variables encountered, it is not possible to set absolute values for waste/sewage flow rates for all situations. The designer should evaluate each situation and, if figures in this table need modification, they should be made with the concurrence of the Authority Having Jurisdiction.

Type of Occupancy	Gallons (liters) Per Day
1. Airports	15 (56.8) per employee 5 (18.9) per passenger
2. Auto washers	Check with equipment manufacturer
3. Bowling alleys (snack bar only)	75 (283.9) per lane
4. Camps:	
Campground with central comfort station	35 (132.5) per person
Campground with flush toilets, no showers	25 (94.6) per person
Day camps (no meals served)	15 (56.8) per person
Summer and seasonal	50 (189.3) per person
5. Churches (Sanctuary)	5 (18.9) per seat
with kitchen waste	7 (26.5) per seat
6. Dance halls	5 (18.9) per person
7. Factories	
No showers	25 (94.6) per employee
With showers	35 (132.5) per employee
Cafeteria, add	5 (18.9) per employee
8. Hospitals	250 (946.3) per bed
Kitchen waste only	25 (94.6) per bed
Laundry waste only	40 (151.4) per bed
9. Hotels (no kitchen waste)	60 (227.1) per bed (2 person)

TABLE K-3 (Continued)

Type of Occupancy	Gallons (liters) Per Day
10. Institutions (Resident)	75 (283.9) per person
Nursing home	125 (473.1) per person
Rest home	125 (473.1) per person
11. Laundries, self-service	
(minimum 10 hours per day)	50 (189.3) per wash cycle
Commercial	Per manufacturer's specifications
12. Motel	50 (189.3) per bed space
with kitchen	60 (227.1) per bed space
13. Offices	20 (75.7) per employee
14. Parks, mobile homes	250 (946.3) per space
picnic parks (toilets only)	20 (75.7) per parking space
recreational vehicles –	
without water hook-up	75 (283.9) per space
with water and sewer hook-up	100 (378.5) per space
15. Restaurants – cafeterias	20 (75.7) per employee
toilet	7 (26.5) per customer
kitchen waste	6 (22.7) per meal
add for garbage disposal	1 (3.8) per meal
add for cocktail lounge	2 (7.6) per customer
kitchen waste – Disposable service	2 (7.6) per meal
16. Schools – Staff and office	20 (75.7) per person
Elementary students	15 (56.8) per person
Intermediate and high	20 (75.7) per student
with gym and showers, add	5 (18.9) per student
with cafeteria, add	3 (11.4) per student
Boarding, total waste	100 (378.5) per person
17. Service station, toilets	1000 (3785) for 1st bay
	500 (1892.5) for each additional bay
18. Stores	20 (75.7) per employee
public restrooms, add	1 per 10 sq. ft. (4.1/m ²) of floor space
19. Swimming pools, public	10 (37.9) per person
20. Theaters, auditoriums	5 (18.9) per seat
drive-in	10 (37.9) per space

(a) **Recommended Design Criteria.** Sewage disposal systems sized using the estimated waste/sewage flow rates should be calculated as follows:

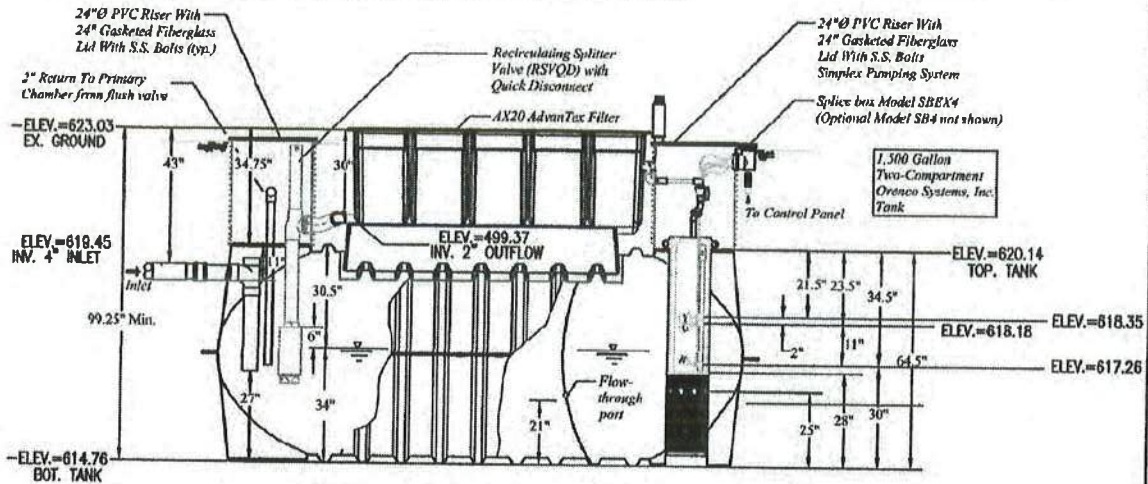
- (1) Waste/sewage flow, up to 1,500 gallons/day (5,677.5 L/day)
Flow x 1.5 = septic tank size
- (2) Waste/sewage flow, over 1,500 gallons/day (5,677.5 L/day)
Flow x 0.75 + 1,125 = septic tank size
- (3) Secondary system shall be sized for total flow per 24 hours.

(b) Also see Section K 2 of this appendix.

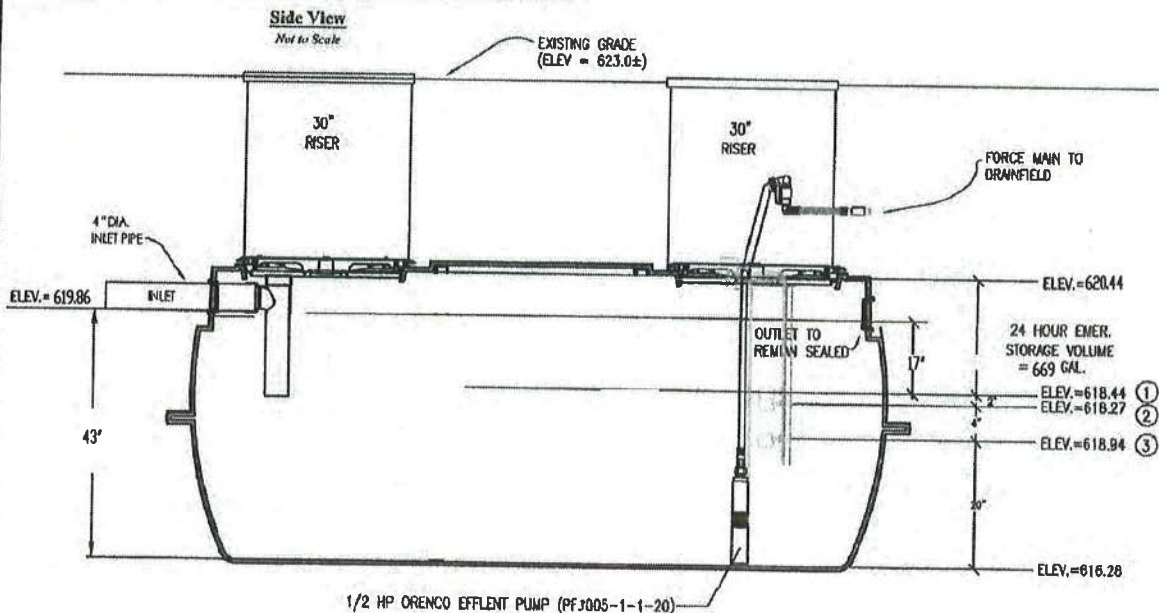
AdvanTex AX20 Mode 3B w/Fiberglass Tank (Modified)

SPECIFICATIONS FOR A 3 BEDROOM HOME UTILIZING A 1500 GALLON TANK			
FLOAT SETTINGS			
FLOAT	DISTANCE FROM TOP OF TANK (IN.)	LIQUID DEPTH (IN.)	GALLONS IN TANK
HIGH LEVEL ALARM (Y)	21.5"	43"	1305
OVERRIDE TIMER ON/OFF (G)	23.5"	41"	1234
LOW LEVEL ALARM/O (W)	34.5"	30"	823
INTERVAL VOLUMES			
INTERVAL	DISTANCE FROM TOP OF TANK (IN.)	LIQUID DEPTH (IN.)	GALLONS IN TANK
NORMAL LOW LIQUID LEVEL	30.5"	34"	977
SURGE VOLUME	30.5-23.5"	34"-41"	257
EMERGENCY STORAGE	0.5"-21.5"	43"-64"	495

Float Functions	
Y	High Level Alarm
G	Override Timer ON/OFF
W	Low Level Alarm
B	Pump On
R	Pump Off



Pump Basin w/ Tank



Dosing Calc:
 dose volume = (600 gal/day) / (12 dose/day) = 50 gal/dose
 Tank Capacity = 1343 gal/43" = 31 gal/inch
 1 dose = approximately 2.0 inches

- ① HIGH LEVEL ALARM
- ② REDUNDANT ON/OFF
- ③ LOW LEVEL ALARM

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DEP 2016-1015-006471

Received

NOV 07

County of San Diego
Dept. of Environmental Health
Land & Water Quality Div.

SHEET 8

SEPTIC LAYOUT FOR: ELFIN FOREST/HARMONY GROVE VOLUNTEER FIRE DEPT.

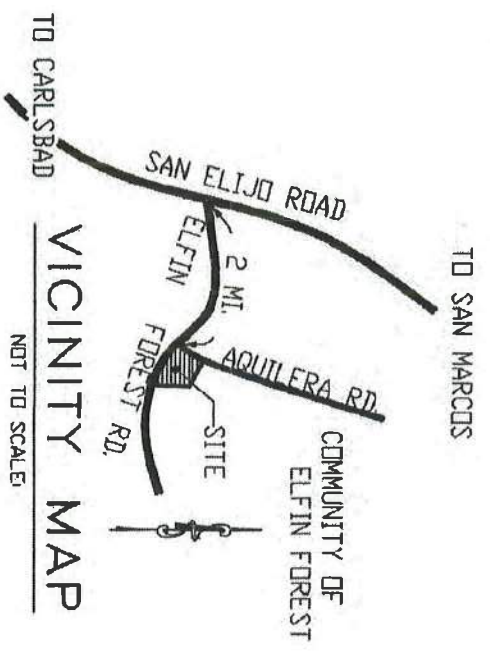
APPLICANT:
ELFIN FOREST/HARMONY GROVE
VOLUNTEER FIRE DEPT.
20223 ELFIN FOREST ROAD
ELFIN FOREST CA 92029
PH: 760-744-2186

OWNER:
COUNTY OF SAN DIEGO
20223 ELFIN FOREST ROAD
ELFIN FOREST CA 92029

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SITE DESC.
2.01 ACRES BY GRANT DEED D0C223849REC69 IN NWQ OF NEQ SEC 3-13-3W.
20223 ELFIN FOREST ROAD, ELFIN FOREST CA 92029
APN 264-042-12-00

PROPOSED USE:
VOLUNTEER FIRE STATION
-EXISTING FACILITY TO BE REMODELED TO A NON-HABITABLE SPACE
WITH BATHROOM TO REMAIN.
-NEW 5 MM FIRE STATION V/1 ADMIN. STAFF.
STATION
-SEWAGE DISPOSAL PER ADVANTEX AX-20 ALTERNATIVE TREATMENT UNIT
WITH PRESSURE FLOW GEORGRID DISPOSAL FIELD.
SOURCE OF DRINKING WATER:
OLIVENHAIN MUNICIPAL WATER DISTRICT



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APPENDIX B

DISPOSAL FIELD PUMP HEAD CALCULATIONS

FIELD FLOW

Job Description: **ELFIN FOREST FIRE**
 Contact: **ELFIN FOREST FIRE**
 Prepared by: **KEVIN BRESNAHAN PE**
 Date: **1-Nov-16**

Please fill in the shaded areas and drop down menus:
 This spreadsheet is a guide for **small** systems with **residential** waste & is not a complete

Worksheet 1- Field Flow

Total field

Total Quantity of effluent to be disposed per day	Total	600	gallons / day
Hydraulic loading rate	Hydraulic loading rate	0.2	gallons / sq.ft. / day
Minimum Dispersal Field Area		3,000	square ft.
Total Dispersal Field Area	Total Dispersal Field Area	1,500	square ft.

Flow per zone

Number of Zones		1	zone(s)
Dispersal area per zone	Dispersal area per zone	1,500	square ft.
Choose line spacing between WASTEFLOW lines	Choose line spacing between WASTEFLOW lines	2	ft.
Choose emitter spacing between WASTEFLOW emitters	Choose emitter spacing between WASTEFLOW emitters	2	ft.
Total linear ft. per zone (minimum required)	Total linear ft. per zone	750	ft. per zone
Total number of emitters per zone	Total number of emitters per zone	375	emitters per zone
Select Wasteflow dripline (16mm)	Wasteflow PC - 1 gph		dripline
Pressure at the beginning of the dripline		30	psi
Feet of Head at the beginning of the dripline		69.3	ft.
What is the flow rate per emitter in gph?		1.02	gph
Dose flow per zone		6.38	gpm

Note: A few States or Counties require additional flow for flushing. Please check your local regulations.
 Flush velocity calculation below is for PC dripline. Classic dripline requires less flow to flush than PC.

Please refer to Geoflow's spreadsheet "Design Flow and Flush Curves" at www.geoflow.com or call 800-4

If required, choose flush velocity		2	ft/sec
How many lines of WASTEFLOW per zone?		12	lines
Fill in the <i>actual</i> length of longest dripline lateral		125	ft.
Flush flow required at the end of each dripline		1.48	gpm
Total Flow required to achieve flushing velocity		17.76	gpm
Total Flow per zone- worst case scenario		24.14	gpm

Select Filters and zone valves

Select Filter Type	BioDisc Filter	
Recommended Filter (item no.)	BioDisc Filter-150	1.5in < 30 gpm
Select Zone Valve Type	Electric Solenoid	
Recommended Zone Valve (item no.)	0	0

Dosing

Number of doses per day / zone:		12	doses
Timer ON. Pump run time per dose/zone:		7.51	mins:secs
Timer OFF. Pump off time between doses		1:52	hrs:mins
Per Zone - Pump run time per day/zone:		1:34	hrs:mins
All Zones - Number of doses per day / all zones		12	doses / day

PUMP SIZING

Job Description:	ELFIN FOREST FIRE
Contact:	ELFIN FOREST FIRE
Prepared by:	KEVIN BRESNAHAN PE
Date:	11/1/2016

Please fill in the shaded areas and drop down menus:

This spreadsheet is a guide for small systems with residential waste & is not a complete design. Pressure losses may be grossly overstated, particularly if designing with WASTEFLOW. The letters on the diagram(right) match the letters in section 2 below.

Worksheet - Pump Sizing

Section 1 - Summary from Worksheet 1

Flow required to dose field	6.38	gpm
Flow required to flush field	17.76	gpm
Flow required to dose & flush field	24.14	gpm
Filter	BioDisc Filter-150	
No. of Zones	1	zones
Zone valve	-	
Dripline	Wasteflow PC - 1	gph
Dripline longest lateral	125.00	ft.

Section 2

A. Flush line - Losses through return lineA. Flush

Select Pipe from dropdown menu	PVC schedule 40	
Select Flush Line Diameter	1-1/4" inch	
Length of return line	185 ft.	
Equivalent length of fittings	46 ft.	
Elevation change. (if downhill enter 0)	0 ft.	
Pressure loss in 100 ft of pipe	4.80 ft.	2.08 psi
Total pressure loss from end of dripline to return tank	11.1 ft.	4.80 psi

B. Dripline - Losses through Wasteflow driplineB. Dripline - Losses through Wasteflow dripline

Length of longest dripline lateral	23 ft.	
Minimum dosing pressure required at end of dripline	23.10 ft.	10.00 psi
Loss through dripline during flushing	4.13 ft.	1.79 psi
Total minimum required dripline pressure	27.23 ft.	11.79 psi

A+B. Minimum Pressure required at beginning of dripfieldA+B. Minimum Pressure required at beginning of dripfield

CALCULATED pressure required at beginning of dripfield	38.33 ft.	16.59 psi
SPECIFIED pressure at beginning of dripfield (from worksheet)	69.3 ft.	30.00 psi
Great! SPECIFIED Pressure is greater than CALCULATED Pressure requirement. Go to next step		

C. Drip components - Losses through headworks

Filter	11.6 ft.	5.00 psi
Zone valve pressure loss (not in diagram)	- ft.	- psi
Flow meter pressure loss (not in diagram)	- ft.	- psi
Other pressure losses	- ft.	- psi
Total loss through drip components	11.55 ft.	5.00 psi

D. Supply line - Minimum Pressure head required to get from pump tank to top of dripfield

Select Pipe from dropdown menu	PVC schedule 40	
Select Supply line diameter	1-1/4" inch	
Length of supply line	12 ft.	
Equivalent length of fittings	3 ft.	
Height from pump to tank outlet	5 ft.	
Elevation change. (if downhill enter 0)	0 ft.	
Pressure loss/gain in 100 ft. of pipe	8.48 ft.	3.67 psi
Total gain or loss from pump to field	6.3 ft.	2.71 psi
Total dynamic head	87.1 ft.	37.71 psi
Pump capacity * - Field Flush Flow	24.1 gpm	37.71 psi
- Field Dose Flow	6.4 gpm	
- Filter Flush Flow	- gpm	- psi
Pump Model Number		
Voltz / Hp / phase	plot	

* Note: Pump capacity flow assumes flow in dripline does not change during a dose cycle. With Wasteflow ClearFlow for more accurate flows please see Geoflow's Flushing worksheet.

If you need assistance designing for this additional flow, please

- See Geoflow flushing worksheet or
- Contact Geoflow at 800-828-3388.

AX20 Timer Settings Calculations:

(see attached sheet for manufacturers notes on timer settings)

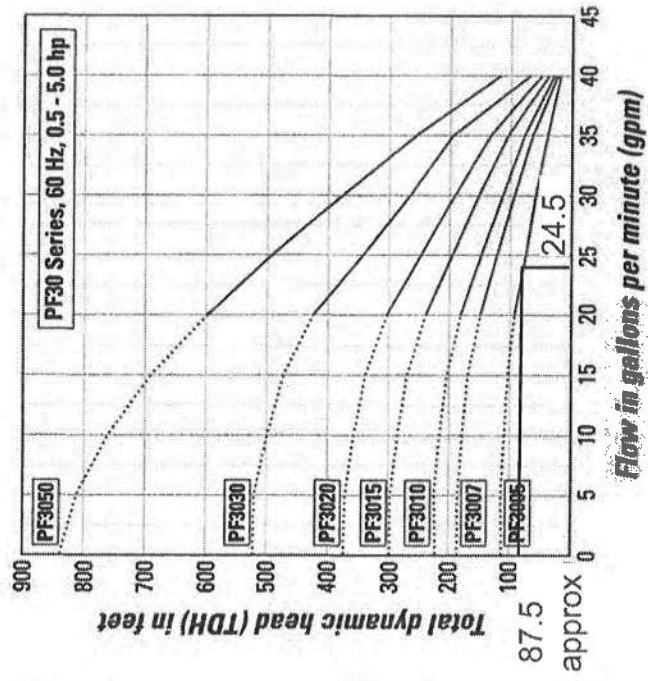
Design for 600 GPD

Parameters:	Values:	Notes:
Q_i Actual Daily Flow	600 gpd	
R_b Return Circulation Ratio	3:1	$600 \times (3 + 1) = 2400 < 3000$
R_f Filter Recirculation Ratio	4:1	
Q_d Actual Pump Dose Rate	30 gpm	Nominal 30gpm for specified high head pump model no. P300511
T_d Pump On Cycle Time	0.50 minutes	----
T_r Pump Off Cycle Time	11.5 minutes	----

$$T_r = \left[\frac{1440 \times T_d \times Q_d}{(R_b + 1) \times Q_i} \right] - T_d = \left[\frac{1440 \times 0.50 \times 30}{(3 + 1) \times 600} \right] - .50 = 8.5 \text{ minutes}$$

Cycle Time	9.0 minutes	less than 20 minutes, OK
Pumps cycles per day	160 cycles	less than 300 minutes, OK
Gallons per Cycle	15 gallons	0.22 gallons per orifice

Note: These parameters assume a specific daily usage and pump performance. Based on actual usage, the cycle times may need to be reevaluated to achieve optimal performance. The installer and/or maintenance provider shall contact the engineer to discuss any changes to the timer settings.



APPENDIX C

PARTS SPECIFICATIONS

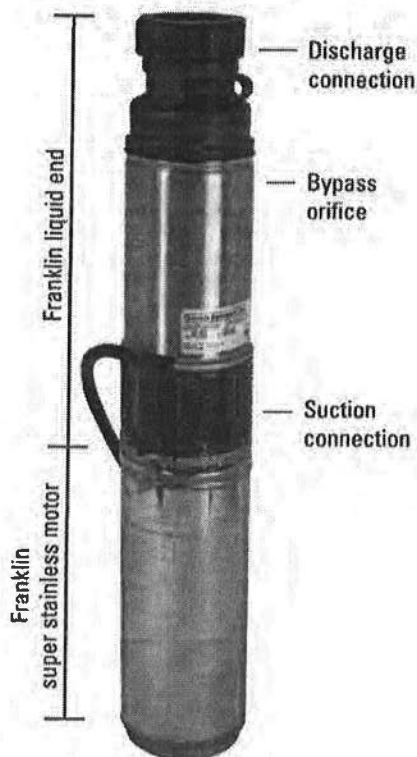
PF Series 4" (100 mm) Submersible Effluent Pumps



Applications

Our 4" (100 mm) Submersible Effluent Pumps are designed to transport screened effluent (with low TSS counts) from septic tanks or separate dosing tanks. All our pumps are constructed of lightweight, corrosion-resistant stainless steel and engineered plastics; all are field-serviceable and repairable with common tools; and all 60-Hz PF Series models are CSA certified to the U.S. and Canadian safety standards for effluent pumps, meeting UL requirements.

Orencia's Effluent Pumps are used in a variety of applications, including pressurized drainfields, packed bed filters, mounds, aerobic units, effluent irrigation, effluent sewers, wetlands, lagoons, and more. These pumps are designed to be used with a Biotube® pump vault or after a secondary treatment system.



Powered by
Franklin Electric

Features/Specifications

To specify this pump for your installation, require the following:

- Minimum 24-hour run-dry capability with no deterioration in pump life or performance*
- 1/8-inch (3-mm) bypass orifice (patent pending) to ensure flow recirculation for motor cooling and to prevent air bind
- Liquid end repair kits available for better long-term cost of ownership
- TRI-SEAL™ floating impeller design on 10, 15, 20, and 30 gpm (0.6, 1.3, and 1.9 L/sec) models; floating stack design on 50 and 75 gpm (3.2 and 4.7 L/sec) models
- Super stainless Franklin Electric motor, rated for continuous use and frequent cycling
- Type SOOW 600-V motor cable (suitable for Class I, Division 1 and Division 2 applications)
- Five-year warranty on pump or retrofit liquid end from date of manufacture against defects in materials or workmanship

* Not applicable for 5-hp (3.73 kW) models

Standard Models

See specifications chart, pages 2-3, for a list of standard pumps. For a complete list of available pumps, call Orencia.

Nomenclature

PF -

Cord length, ft (m):
Blank = 10 (3) 20¹ = 20 (6)
30 = 30 (9) 50 = 50 (15)

Voltage, nameplate:
1 = 115² 200 = 200
2 = 230³ 4 = 460

Frequency:
1 = single-phase 60 Hz 3 = three-phase 60 Hz
5 = single-phase 50 Hz

Horsepower (kW):
03 = 1/8 hp (0.25) 05 = 1/4 hp (0.37)
07 = 3/8 hp (0.56) 10 = 1 hp (0.75)
15 = 1-1/2 hp (1.11) 20 = 2 hp (1.50)
30 = 3 hp (2.24) 50 = 5 hp (3.73)

Nominal flow, gpm (L/sec):
10 = 10 (0.6) 15 = 15 (1.0)
20 = 20 (1.3) 30 = 30 (1.9)
50 = 50 (3.2) 75 = 75 (4.7)

Pump (PF Series)

¹ Note: 20-foot cords are available only for single-phase pumps through 1-1/2 hp

² 1/2-hp (0.37kW) only

³ 220 volts for 50 Hz pumps