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Subsurface (Drip) Irrigation On - Site Sewage Facility System Design

Carelli Residence
503 Hidden Oaks Lane
Corsicana, Texas 75109

June 19, 2014

Site Location: Hidden Oaks I Est.; lot 7; Installing new drip system.

DESIGN PARAMETERS

Soil Evaluation - Class IV soil.

Number of Bedrooms 3 Square feet living area - 3,389 S.F. (4 bedroom equivalent)

Gallons per day - 300 gpd (Water Saving Fixtures)

Application rate - .1 gal/sq ft / day (Class IV soil)

Required Disposal Area - 3,000 Sq. Ft.

Designed Disposal Area- 3,600 Sq. Ft.

1- Zone Zone 1 - 3,600 sq. ft. (1,800' of Netafim "PC" drip line)

Zone 1- 900 Emitters total at .61gal/ hr - 9.15 gpm Appl. Rate - 0.0854 gal/sq ft / day

Drip irrigation standards for class IV soil, require an application rate of .1 gal / sq ft / day. For 3 bedroom home (3,389 sq ft living area) area based 300 gpd divided by .1 gal/sq ft/day (application rate) = 3,000 sq.Ft. 1,800' of emitter line 900 emitters at 4 sq ft of area per emitter = 3,600 sq ft field area.

SYSTEM PARAMETERS

Pre-treatment tank - 400 gallon pretreatment chamber

Aeration Tank - Nu Water B-500 - 600 GPD Unit -1 - piece- (600 gpd)

Chlorinator - stackable - free flowing tablets (Optional)

Pump tank - 768 gallon pump tank chamber

Pump - 1/2 H.P. Submersible (Blaster 20EB or Equivalent)

Supply/Manifold line - 1" PVC SCH 40 /Backwash Lines - 1" PVC SCH 40

Netafim "Bioline" .61 gph Pressure Compensating Drip Emitter Tubing

Emitters placed on 2' centers in lateral field (All lines looped)

Tuff Tiger Filter - located over riser of pump tank, or valve box outside pump tank (1" Disc filters - 100 Micron Mesh) or standard 1" Disc filter

Pressure Gauge on outlet side of filter on supply line

Pressure - set for 40 PSI on supply side of drip field

Maximum length of any single drip lateral will be < 421'. At 40 PSI on inlet side of drip field, will achieve 2 ft/sec flush velocity minimum.

Vacuum breakers - on highest elevations on the supply and return lines

Pressure Gauge & Ball Valve cracked open at pump tank on return line - used to continuously back flush drip field to pump tank and monitor pressure on return line from drip field.

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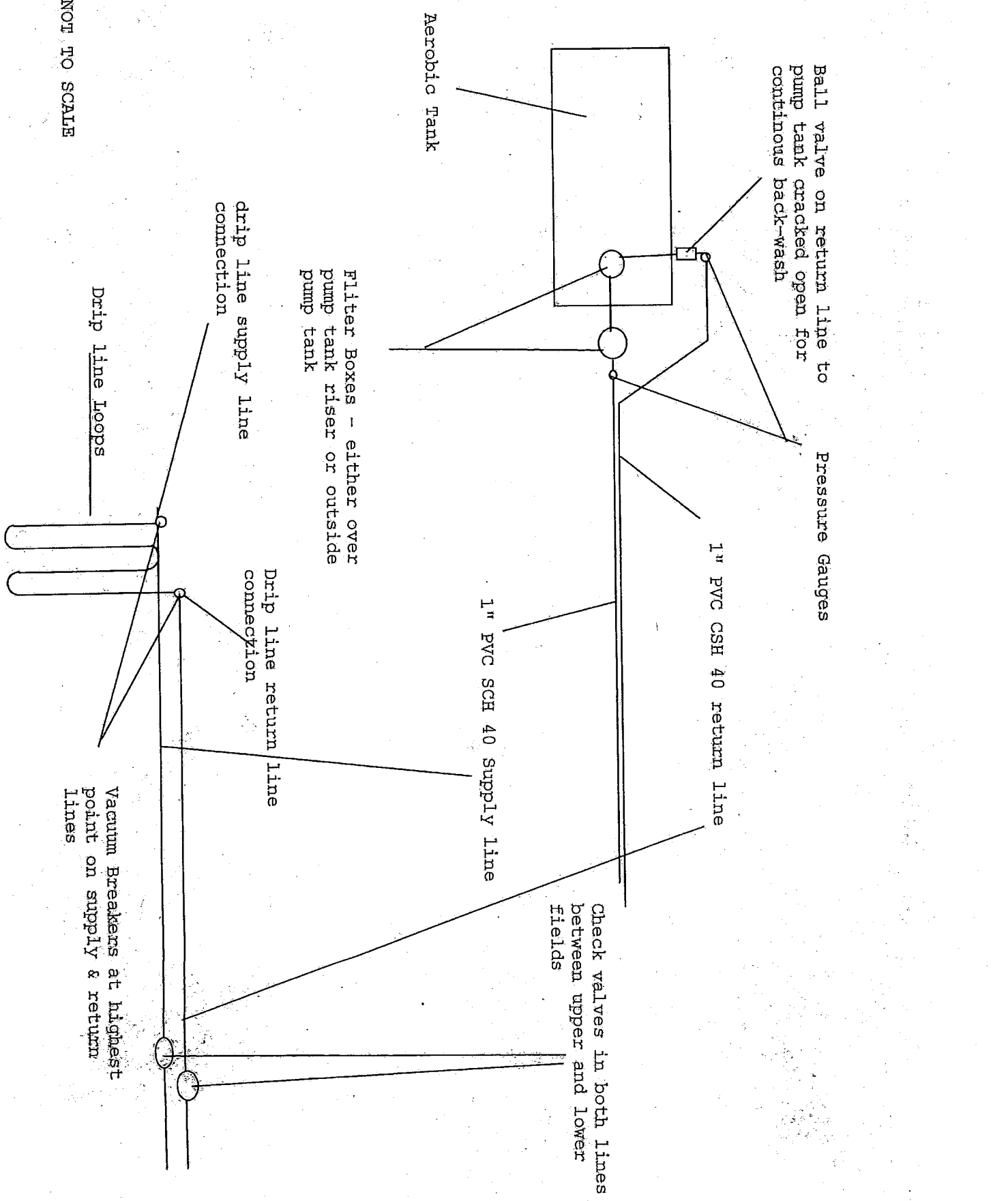
Check valves will be installed in upper field supply and return lines to prevent siphoning from upper field to lower field.

Dosing Volume - 38.43 gallons (Approx. 8 doses per day)

Timer used on pump to dose field - Pump run time per dosing approx. 4.2 min. every 3 hrs.

SOIL ANALYSIS

Class IV Soil.



Ball valve on return line to pump tank cracked open for continuous back-wash

Pressure Gauges

Aerobic Tank

Filter Boxes - either over pump tank riser or outside pump tank

1" PVC CSH 40 return line

1" PVC SGH 40 Supply line

Check valves in both lines between upper and lower fields

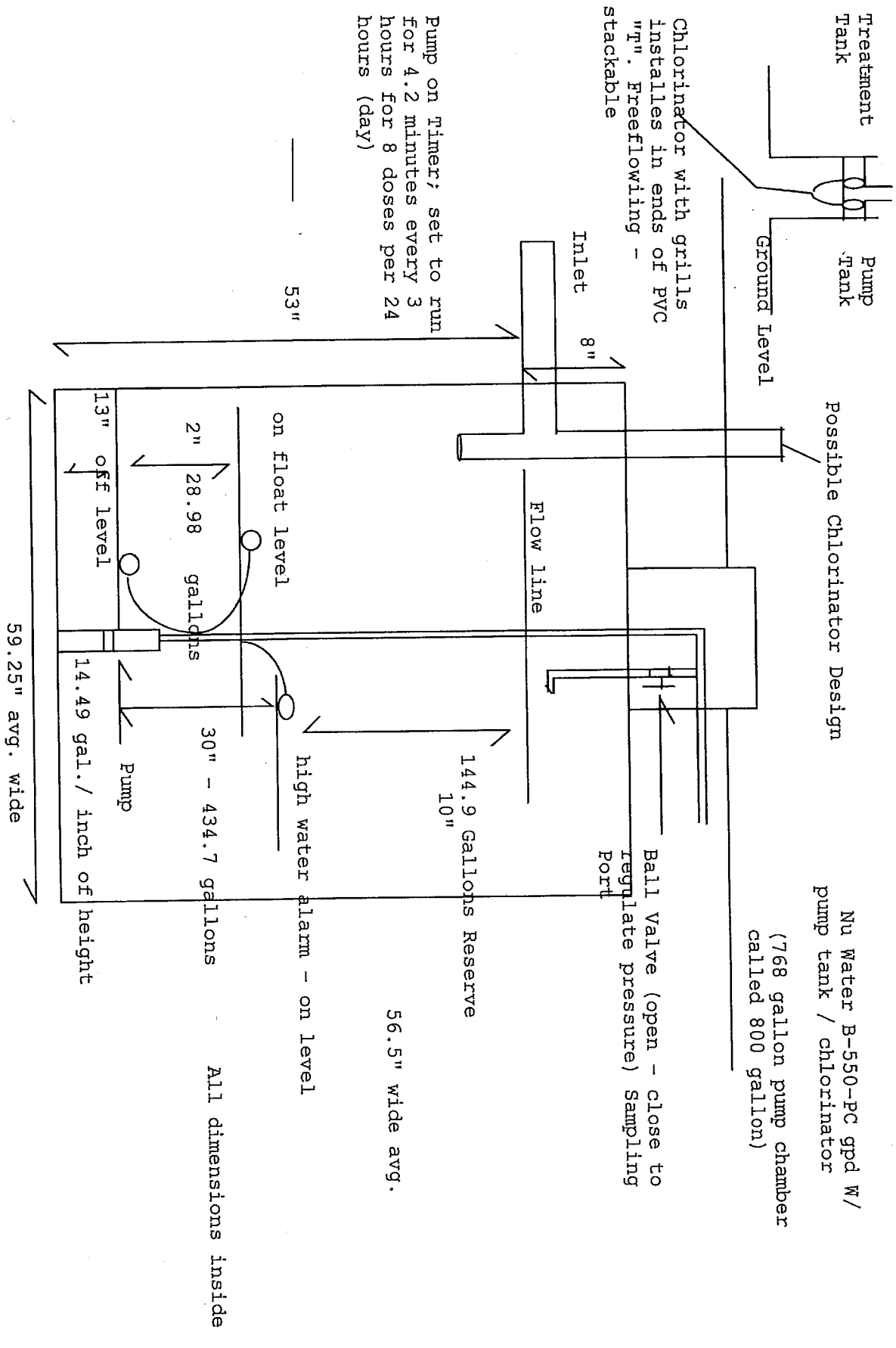
drip line supply line connection

Drip line return line connection

Drip line Loops

Vacuum Breakers at highest point on supply & return lines

NOT TO SCALE



Pump on timer; set to run for 4.2 minutes every 3 hours for 8 doses per 24 hours (day)

Possible Chlorinator Design

Nu Water B-550-PC gpd w/ pump tank / chlorinator (768 gallon pump chamber called 800 gallon)

Pump Time 4.2 minutes for 38.43 gallons at 9.15 gpm at 40 psi on supply side of drip field.

Total Head 122.4 FT at 9.15 gpm for 1" Sch 40 PVC piping @ 40 psi on supply side of drip field.

1/2 HP Submersible @ 9.15 gpm will deliver 140 + FT total head.

Approx. 8 doses per day

All dimensions inside

Site Location: 503 Hidden Oaks Ln Corsicana, TX 75109 Subsurface Disposal Surface Disposal

Schematic of Lot or Tract

Show:

Compass North, adjacent streets, property lines, property dimensions, location of buildings, easements, swimming pools, water lines, and any other structures where known, all to scale.

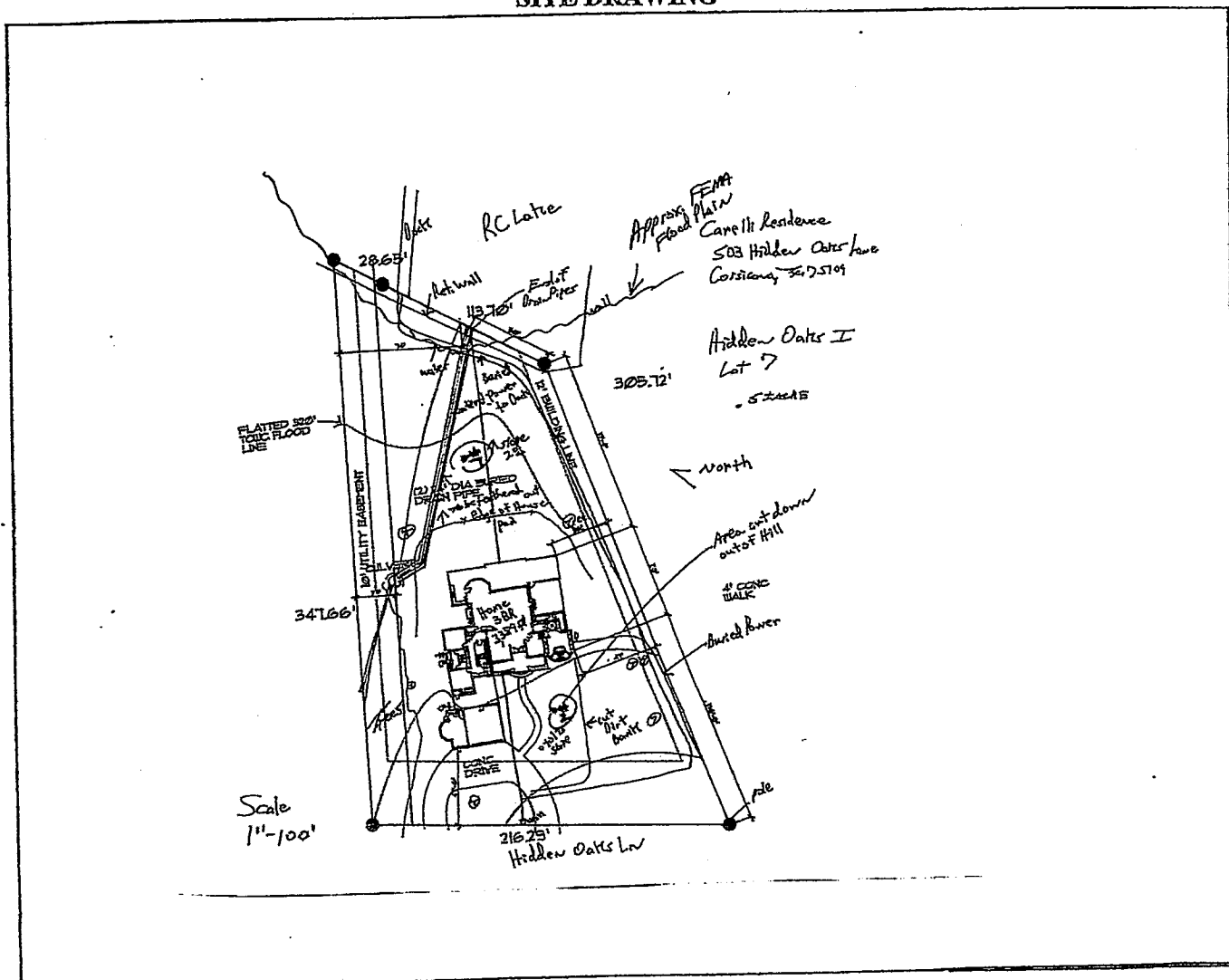
Location of existing or proposed water wells within 150 feet of the property.

Indicate slope or provide contour lines from the structure to the farthest location of the proposed disposal field.

Location of soil boring or excavation pits (show location with respect to a known reference point).

Location of natural, constructed, or proposed drainage ways (ditches, streams, ponds, lakes, rivers, etc.), water impoundment areas, cut or fill bank, sharp slopes and breaks.

Lot Size: _____ or Acreage: .5+Ac
SITE DRAWING



OSSF SOIL & SITE EVALUATION

Page 1 (Soil & Site Evaluation)

Date Performed: 6 / 4 / 14

Property Owner: Carelli Residence

Site Location: 503 Hidden Oaks Lane Corsicana, Texas 75109 Proposed Excavation Depth: 12"

REQUIREMENTS:

At least two soil excavations must be performed on the site, at opposite ends of the proposed disposal area. Locations of soil borings or dug pits must be shown on the site drawing. For subsurface disposal, soil evaluations must be performed to a depth of at least two feet below the proposed disposal field excavation depth. For surface disposal, the surface horizon must be evaluated. Describe each soil horizon and identify any restrictive features on this form.

Indicate depths where features appear.

Soil Boring #1:

Depth (feet)	Texture Class	Gravel Analysis (if Applicable)	Drainage (mottles / water table)	Restrictive Horizon	Observations
1 feet	III	N/A- None Found	No	No	SCL
2 feet	III	N/A- None Found	No	No	SCL
3 feet	IV	N/A- None Found	No	No	Clay
4 feet	IV	N/A- None Found	No	No	Clay
5 feet	IV	N/A- None Found	No	No	Clay

Soil Boring #2:

Depth (feet)	Texture Class	Gravel Analysis (if Applicable)	Drainage (mottles / water table)	Restrictive Horizon	Observations
1 feet	III / IV	N/A- None Found	No	No	SC / Clay
2 feet	IV	N/A- None Found	No	No	Clay
3 feet	IV	N/A- None Found	No	No	Clay
4 feet	IV	N/A- None Found	No	No	Clay
5 feet	IV	N/A- None Found	No	No	Clay

FEATURES OF SITE AREA

- Presence of 100 year flood zone on property Yes No
- Any part of OSSF located in "FEMA" 100 year flood zone Yes No
- Presence of upper water shed Yes No
- Presence of adjacent ponds, steams, water impoundments Yes No
- Existing or proposed water well in nearby area (within 150 feet) Yes No

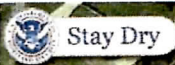
2 %

I certify that the findings of this report are based on my field observations and are accurate to the best of my ability.

(Signature of person performing evaluation)

Date

Registration Number and Type



- Reference Layers
- NFHL Data Available
 - FIRM Panel Boundary
- Flood Risk Areas
- High Risk Area - Floodway
 - High Risk Area
 - Moderate Risk Area
 - Low to Moderate Risk Area (without FIRM data)
 - Low to Moderate Risk Area
 - Undetermined Risk Area

Google earth



WASTEWATER REUSE AND DRIP DISPERSAL GUIDE

BIOLINE DOSING CHART Maximum Length (feet) of a Single Lateral (0.5 & 1.0 fps)

Dripper Spacing		12"			18"			24"		
Dripper Flow Rate (GPH)		0.4	0.6	0.9	0.4	0.6	0.9	0.4	0.6	0.9
Flushing Velocity (fps)		0.5 / 1.0	0.5 / 1.0	0.5 / 1.0	0.5 / 1.0	0.5 / 1.0	0.5 / 1.0	0.5 / 1.0	0.5 / 1.0	0.5 / 1.0
Inlet Pressure (psi)	15	301 / 248	242 / 205	188 / 163	422 / 344	341 / 285	265 / 228	531 / 427	429 / 355	335 / 285
	25	369 / 315	296 / 258	228 / 203	520 / 440	418 / 361	323 / 286	655 / 549	527 / 453	409 / 359
	35	421 / 367	337 / 299	260 / 234	595 / 513	476 / 419	368 / 331	749 / 643	603 / 527	467 / 417
	40	443 / 389	354 / 316	273 / 248	626 / 545	501 / 445	387 / 350	790 / 683	635 / 559	491 / 441
	45	464 / 409	371 / 332	285 / 260	656 / 574	524 / 468	404 / 367	829 / 721	665 / 589	513 / 463
Flow per 100' (GPM/GPH)		0.67 / 40	1.02 / 61	1.53 / 92	0.44 / 26.67	0.68 / 41	1.02 / 61	0.34 / 20	0.51 / 31	0.77 / 46

Additional flow of 0.4 GPM required per lateral to achieve 0.5 fps.
Additional flow of 0.8 GPM required per lateral to achieve 1.0 fps.

BIOLINE DOSING CHART Maximum Length (feet) of a Single Lateral (1.5 & 2.0 fps)

Dripper Spacing		12"			18"			24"		
Dripper Flow Rate (GPH)		0.4	0.6	0.9	0.4	0.6	0.9	0.4	0.6	0.9
Flushing Velocity (fps)		1.5 / 2.0	1.5 / 2.0	1.5 / 2.0	1.5 / 2.0	1.5 / 2.0	1.5 / 2.0	1.5 / 2.0	1.5 / 2.0	1.5 / 2.0
Inlet Pressure (psi)	15	201 / 161	171 / 141	140 / 119	275 / 217	235 / 191	194 / 164	337 / 263	289 / 233	241 / 201
	25	266 / 221	222 / 190	179 / 157	366 / 302	308 / 261	251 / 218	453 / 369	383 / 321	313 / 270
	35	316 / 269	262 / 229	210 / 187	437 / 370	365 / 316	295 / 260	543 / 455	455 / 391	369 / 324
	40	337 / 290	280 / 246	223 / 200	469 / 399	391 / 340	313 / 278	583 / 493	487 / 421	393 / 347
	45	358 / 310	296 / 261	235 / 212	497 / 427	413 / 362	331 / 296	619 / 527	517 / 449	415 / 369
Flow per 100' (GPM/GPH)		0.67 / 40	1.02 / 61	1.53 / 92	0.44 / 26.67	0.68 / 41	1.02 / 61	0.34 / 20	0.51 / 31	0.77 / 46

Additional flow of 1.2 GPM required per lateral to achieve 1.5 fps.
Additional flow of 1.6 GPM required per lateral to achieve 2.0 fps.

BIOLINE DOSING CHART Maximum Length (feet) of a Single Lateral (2.5 & 3.0 fps)

Dripper Spacing		12"			18"			24"		
Dripper Flow Rate (GPH)		0.4	0.6	0.9	0.4	0.6	0.9	0.4	0.6	0.9
Flushing Velocity (fps)		2.5 / 3.0	2.5 / 3.0	2.5 / 3.0	2.5 / 3.0	2.5 / 3.0	2.5 / 3.0	2.5 / 3.0	2.5 / 3.0	2.5 / 3.0
Inlet Pressure (psi)	15	128 / 102	115 / 94	100 / 84	172 / 136	155 / 127	136 / 113	205 / 161	187 / 151	165 / 137
	25	183 / 151	161 / 136	137 / 118	248 / 203	220 / 184	188 / 161	301 / 245	268 / 223	231 / 197
	35	228 / 193	198 / 171	166 / 146	310 / 260	272 / 232	229 / 200	379 / 315	333 / 283	283 / 245
	40	248 / 211	214 / 186	178 / 158	338 / 286	295 / 254	247 / 218	413 / 347	362 / 311	305 / 267
	45	266 / 228	229 / 200	190 / 169	364 / 310	316 / 274	263 / 233	447 / 377	389 / 335	327 / 287
Flow per 100' (GPM/GPH)		0.67 / 40	1.02 / 61	1.53 / 92	0.44 / 26.67	0.68 / 41	1.02 / 61	0.34 / 20	0.51 / 31	0.77 / 46

Additional flow of 2.0 GPM required per lateral to achieve 2.5 fps.
Additional flow of 2.3 GPM required per lateral to achieve 3.0 fps.

Table 11 - Maximum Length of a Single Lateral of Bioline Based on Flushing Velocity

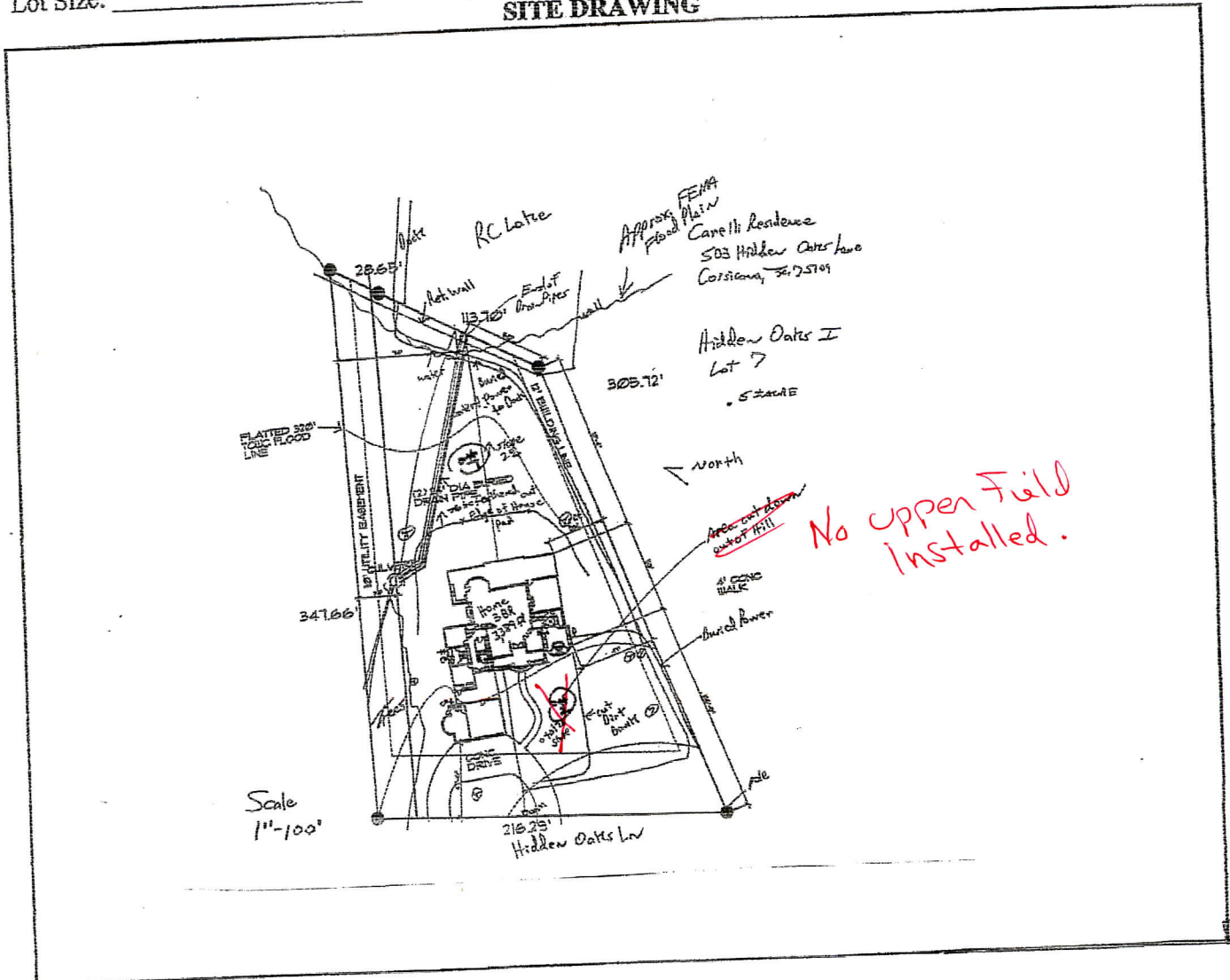
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Schematic of Lot or Tract

Show:

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Lot Size: _____ of Acreage: .54 ac
SITE DRAWING



Ball valve on return line to pump tank cracked open for continuous back-wash

Pressure Gauges

1" PVC CSH 40 return line

1" PVC SCH 40 Supply line

Check valves in both lines between upper and lower fields

(No upper field installed.)

Aerobic Tank

Filter Boxes - either over pump tank riser or outside pump tank

Drip line return line connection

drip line supply line connection

Vacuum Breakers at highest point on supply & return lines

Drip line Loops

NOT TO SCALE

