

**ON-SITE WASTEWATER TREATMENT SYSTEM
DESIGN**

FOR

ORANGE GROVE ENERGY, L.P.

ORANGE GROVE POWER PLANT

JUNE 10, 2008

PREPARED BY:



**16041 Foster P.O. BOX 1000
Stilwell, Kansas 66085-1000
(913) 681-2881**

Sega Project No. 07-0098

Orange Grove Energy, L.P.
On-site Wastewater Treatment System Calculations for the
Orange Grove Power Plant
June 10, 2008

Table of Contents

<u>Topic</u>	<u>Page(s)</u>
Introduction	3
Infiltration Rate	3
Leach Line	4
Layout	4
Septic Tank	4
Distribution Box	4
Potable Water Supply	5
Primary and Reserve Areas	5
Maintenance Plan	5
Conclusion	6
References	7
• Figure 1 - Site Location & Project Vicinity Map	
• Drawing C100 – Rev. L – Site Layout Plan	
• Vinje & Middleton Engineering, Inc. Design Packet by DEH Certified Geotechnical Engineer Ralph Malcolm Vinje	
• DEH Septic System Design Requirements, February 1999	
• Drawing C200 – Rev. F - On-site Wastewater Treatment System	
• DEH OWTS Permitting Process and Design Criteria Setbacks Excerpt	
• Chapter 3 – Septic Tanks and Seepage Pits, Section 68.343 & 68.344	

Orange Grove Energy, L.P.
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Introduction

Orange Grove Energy, L.P.'s proposed Orange Grove Power Plant (OGPP) is located in Unincorporated San Diego County (SDC) west of Pala, California 92059 about 0.1 mile north of the intersection of State Road 76 (Pala Road or SR-76) and a private road called Pala Del Norte Road. The 8.5 acre proposed project site is located on approximately 202 acres of property owned by San Diego Gas & Electric (SDG&E) in San Diego County, California in Section 29, Township 9 South, Range 2 West (Please refer to Figure 1 - Site Location and Project Vicinity Map in the References section).

A geotechnical investigation of fourteen site borings was performed on site with a maximum explored depth of 30.5 feet below grade. No seasonal high groundwater table was encountered with any of the borings.

The purpose of the Service Building sanitary system will be to receive the domestic drain and waste and to route to an approved system in accordance with the County of San Diego standards and specifications. Public sewer is not available at this time. As a result, this system will be located on site, east of the Service Building (Please refer to Drawing C100 – Rev. L – Site Layout Plan in the References section). Should public sewer become available in the future, this system could be converted with the approval of the County.

The Service Building sanitary system, which will support two restroom facilities, was designed conservatively for six full-time employees using an average rate of 15 gal/person/day. The drains and waste will be directed to a septic tank with an effluent filter and outlet to an infiltration field.

On-site wastewater treatment systems (OWTS), which have a subsurface discharge into the ground, are required to abide by the California Water Code, Section 13282. This section allows the Regional Water Quality Control Board (RWQCB) to give permission to issue permits for conventional OWTS to the local public agencies. As a result, the County of San Diego - Department of Environmental Health (DEH) OWTS Permitting Process and Design Criteria was used for the OGPP's sanitary system. Accordingly, the purpose of these OWTS calculations is to show that the proposed septic tank and infiltration system are adequate.

Infiltration Rate

A Percolation Test was performed by Vinje & Middleton Engineering, Inc. in the approximate area of the proposed leach field (Please refer to the Vinje & Middleton Engineering, Inc. Design Packet in the References Section). The Percolation Test had an average infiltration rate of 43 MPI (Please refer to the Vinje & Middleton Engineering, Inc. Design Packet in the References Section).

Orange Grove Energy, L.P.
On-site Wastewater Treatment System Calculations for the
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Leach Line

The proposed leach lines are 4 inch diameter Schedule 40 PVC pipes with 5/8 inch holes spaced at 60 degree offsets with a trench depth of 3 feet (Please refer to the DEH Septic System Design Requirements in the References section). The leach lines must be approved by both the DEH director and an International Association of Plumbing and Mechanical Officials (IAPMO) representative prior to backfilling.

Layout

The layout design was based on the required setback minimum distance listed in Table 1 below. The infiltration field, designed to meet the requirements for an industrial/commercial facility with an average infiltration rate of 43 MPI, requires a minimum linear length of leach line of 157 feet. The infiltration field was designed for 200 feet with 100% reserve, per the county's minimum requirements if less than 200 linear feet (Please refer to the Vinje & Middleton Engineering, Inc. Design Packet and Drawing C200 – Rev. F - On-site Wastewater Treatment System in the References section).

TABLE 1 – Setback Summary*

System Component	Setback To:	Minimum Distance
Septic Tank	Structure	5 feet
Leach Lines	Structure	8 feet
Leach Lines	Drainage Course	50 feet from top of bank
Leach Lines	Pond	100 feet from spillway elev.
Leach Lines	Septic Tank	5 feet
Leach Lines	Leach Lines	10 feet

* Complete table of setback to minimum distance can be found in the DEH OWTS Permitting Process and Design Criteria Setbacks Excerpt in the References section.

Septic Tank

The septic tank will be a minimum 1,000 gallon watertight concrete tank with an effluent discharge to a leach field disposal system (Please refer to the DEH Septic System Design Requirements in the References section). The septic tank, which will be in accordance with the San Diego County Code of Regulatory Ordinances, must be approved by both the DEH director and an IAPMO representative prior to backfilling (Please refer to Chapter 3 – Septic Tanks and Seepage Pits, Section 68.343 – Minimum Requirements for Septic Tanks in the References section).

Orange Grove Energy, L.P.
On-site Wastewater Treatment System Calculations for the
Orange Grove Power Plant
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Distribution Box

The distribution box, which is based on the San Diego County Code of Regulatory Ordinances, will have a single inlet from the septic tank and will outlet on two sides to the leach field. The distribution box will be constructed of a watertight concrete box with a plastic baffle located on the inlet side of the box (Please refer to Chapter 3 – Septic Tanks and Seepage Pits, Section 68.344 – Minimum Requirements for Distribution Boxes in the References section).

Water Supply

Water for the OWTS will be supplied from an onsite 535,000 gallon water storage tank.

Primary and Reserve Areas

In addition to the primary area for the leach field, the county requires that new construction of OWTS with an average infiltration rate of 43 MPI, to have a minimum 100% reserve area. The reserve area would be used for the new OWTS if the primary system were to fail. Therefore, in the event that the OGPP OWTS were to fail, a new system would be installed in the reserve area as indicated on Drawing C200 – Rev. F. The primary system, per the direction of the county, would either be removed and disposed of properly or abandoned in place.

Maintenance Plan

Environmental Protection Agency's ten steps to keep a septic system working properly:

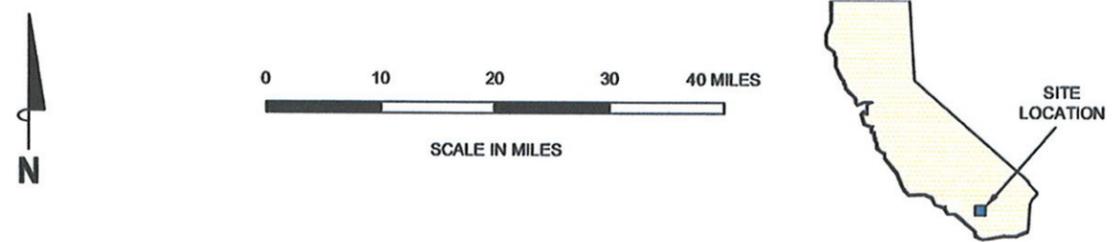
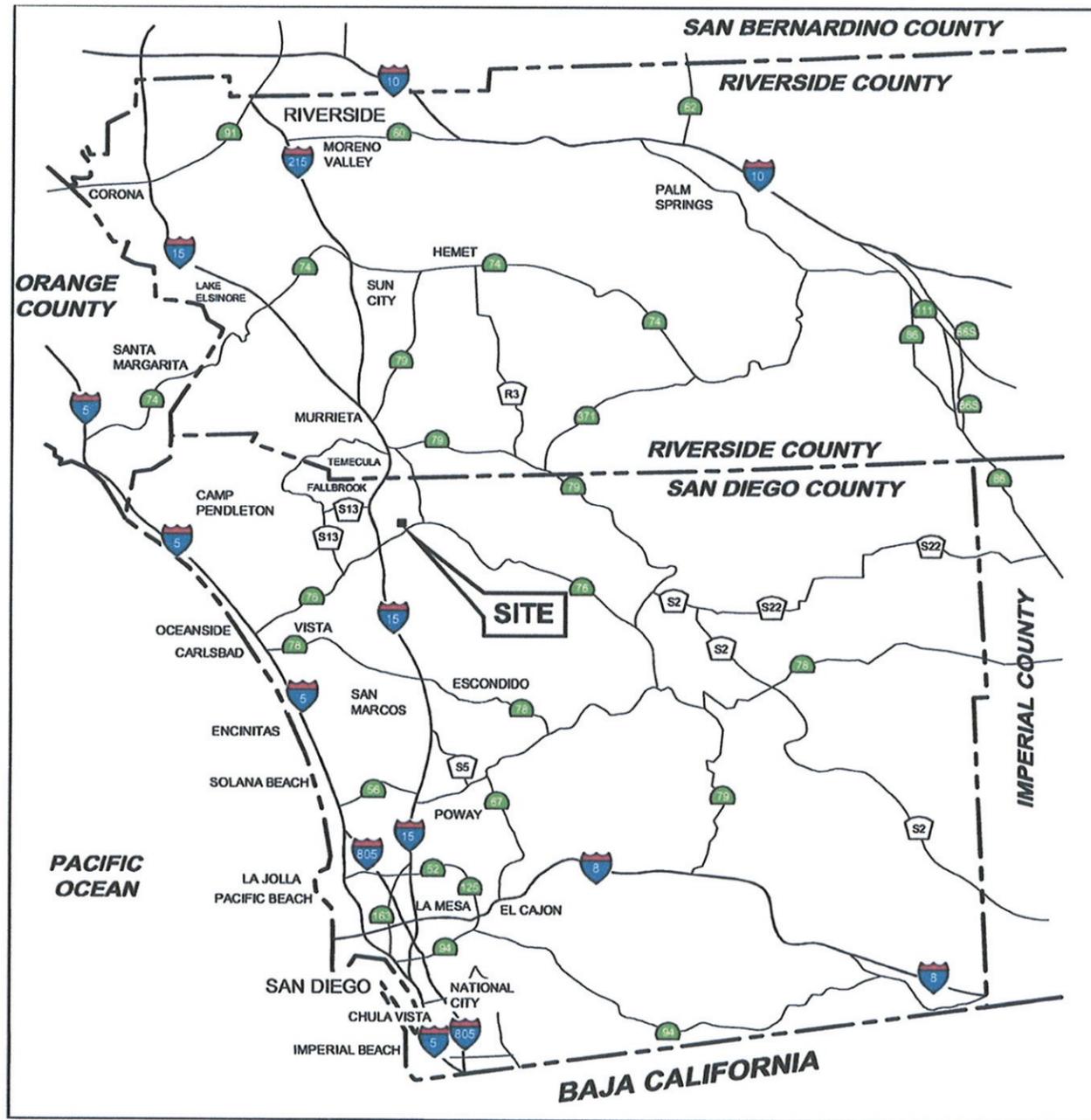
1. Keep a drawing of the OWTS in the maintenance building's records.
2. Have the septic system inspected at least every three years.
3. Pump the septic tank and clean or replace the effluent filter as needed (generally every three to five years).
4. Don't dispose of household hazardous wastes in sinks or toilets.
5. Keep other household items, such as dental floss, feminine hygiene products, condoms, diapers, and cat litter out of the system.
6. Use water efficiently.
7. Plant only grass over and near your septic system. Do not apply manure or fertilizers over the drainfield.
8. Keep vehicles and equipment off the OWTS. The weight can damage the pipes and tank, and the system may not drain properly under compacted soil.
9. Keep gutters from draining into or near the septic system.
10. Check with the local health department before using additives. Commercial septic tank additives do not eliminate the need for periodic pumping and can be harmful to the system.

Orange Grove Energy, L.P.
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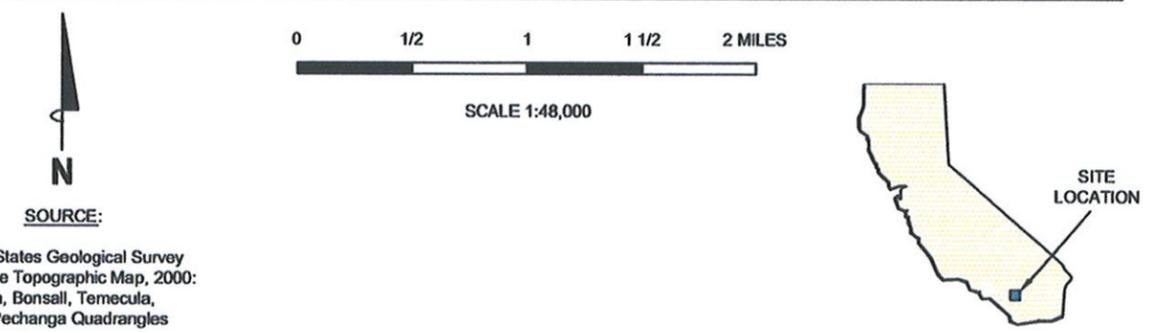
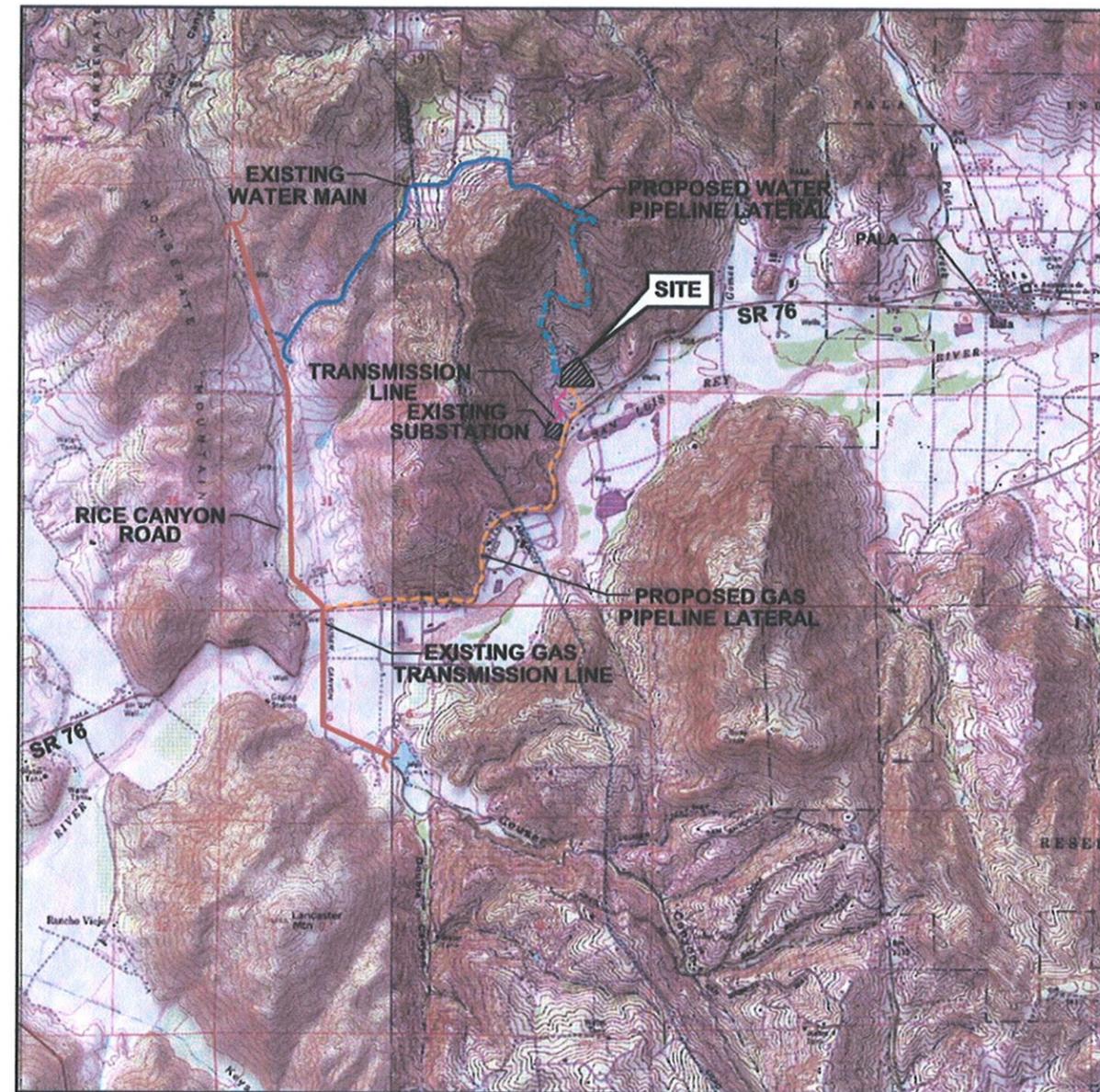
Conclusion

The proposed septic tank and leach field will be adequate as the Orange Grove Power Plant On-site Wastewater Treatment System. The OGPP is designed to serve local loads during peak demand and therefore may not be occupied full time, year round. During the peak demand operation hours, the OGPP will typically be manned with four full time employees, but may have at max, six employees. Thus, the OTWS, designed by San Diego County Department of Environmental Health Certified Geotechnical Engineer Ralph Malcolm Vinje, meets all requirements for the San Diego RWQCB and the County of San Diego Department of Environmental Health.

REFERENCES



SITE LOCATION MAP



PROJECT VICINITY MAP

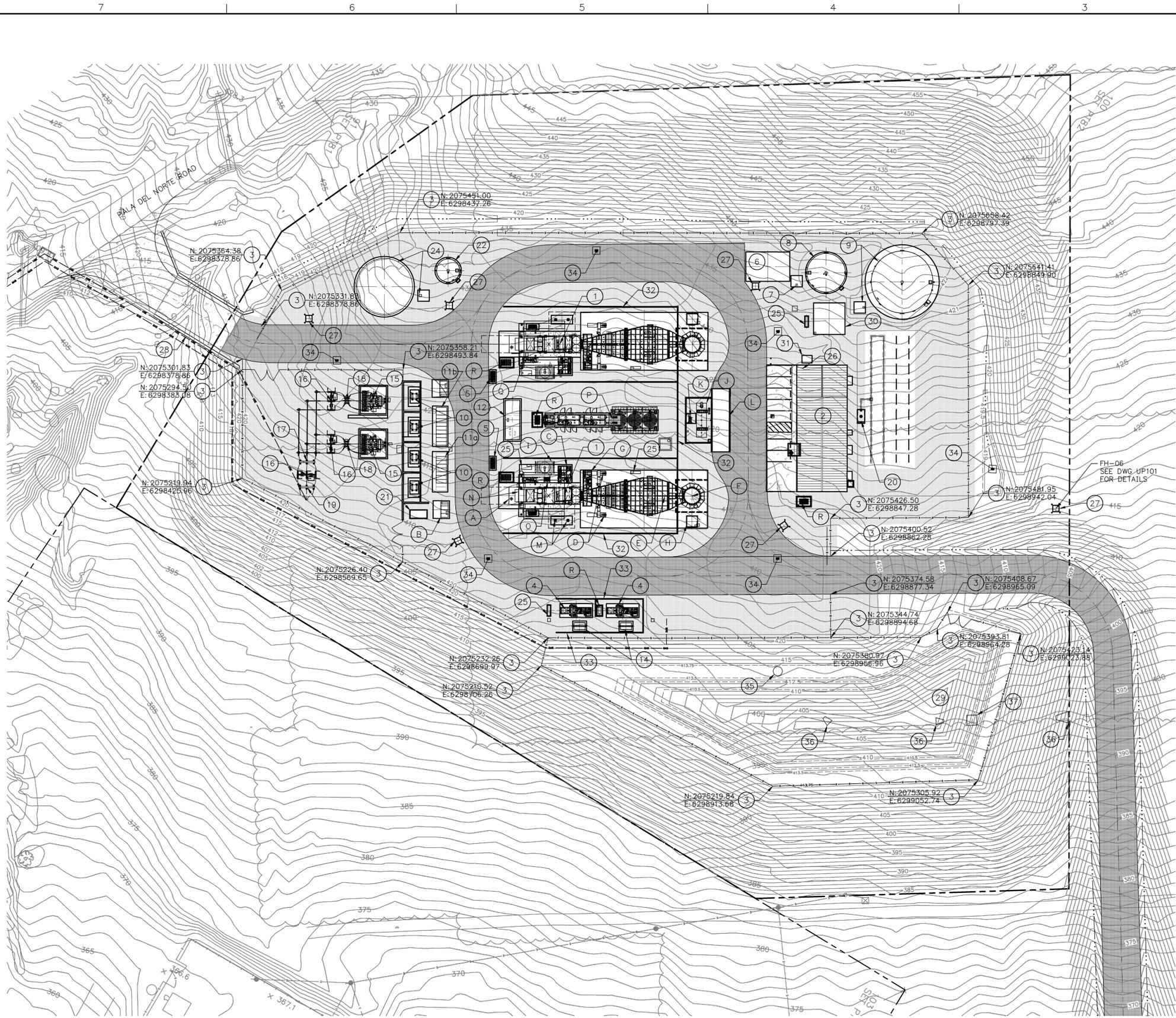


Engineers - Architects - Technicians
 Design - Construction - Field Service
 16041 Foster
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 Stilwell, KS 66085-1000

ORANGE GROVE ENERGY L.P.
 Schaumburg, IL

**FIGURE 1
 ORANGE GROVE
 POWER PLANT
 SITE LOCATION AND
 PROJECT VICINITY MAP**

DESIGN BY: J. LANGEL	CHECKED BY:
DRAWN BY: J. CLAUSSEN	DATE: 11-28-07
CLIENT I.D.	SEGA PROJECT NO. 07-201
FILE NAME: OG_site_vicinity.mxd	
DRAWING NO.	REV.



KEYNOTES:

- 1 COMBUSTION TURBINE (CT), GENERATOR, AND AUXILIARY EQUIPMENT. (FOR EACH UNIT): (HEIGHT = 43' AT THE TOP OF VBV DUCT).
 - (A) MAIN TURBINE GENERATOR SKID ENCLOSURE.
 - (B) 13.8KV ELECTRICAL SWITCHGEAR.
 - (C) CT AUXILIARY EQUIPMENT SKID.
 - (D) TEMPERING AIR FANS (2).
 - (E) EMISSION CONTROL SYSTEM-SCR (HEIGHT = ±33').
 - (F) STACK (HEIGHT = 80').
 - (G) AMMONIA VAPORIZATION SKID.
 - (H) CEMS ENCLOSURE WITH TRANSFORMER AND CALIBRATION GAS STORAGE.
 - (I) CT LUBE OIL COOLER.
 - (J) AMMONIA STORAGE TANK (COMMON TO BOTH CT UNITS).
 - (K) AMMONIA FORWARDING PUMP SKID (COMMON TO BOTH CT UNITS).
 - (L) AMMONIA UNLOADING PAD, SPILL CONTAINMENT (COMMON TO BOTH CT UNITS).
 - (M) TURBINE REMOVAL SUPPORTS.
 - (N) AIR INLET FILTER (HEIGHT = 34').
 - (O) SPRINT SKID.
 - (P) INLET AIR CHILLER AND COOLING TOWER (COMMON TO BOTH CT UNITS) (HEIGHT = 30').
 - (Q) WATER INJECTION SKID.
 - (R) OILY DRAIN TANK.
- 2 SERVICE BUILDING FOR CONTROL ROOM, ELECTRICAL EQUIPMENT, FIRE PUMPS, COMPRESSED AIR. (HEIGHT = 18').
- 3 SITE SECURITY CHAINLINK FENCE AND GATES.
- 4 FUEL GAS COMPRESSORS.
- 5 GAS COALESCING FILTER SKID.
- 6 CONCRETE PAD FOR TEMPORARY WATER TREATMENT TRAILER.
- 7 DEMIN. WATER PUMP SKID AND RELATED EQUIPMENT.
- 8 DEMIN. WATER STORAGE TANK (HEIGHT = 24').
- 9 RAW WATER/FIREWATER STORAGE TANK & PUMP SKID (HEIGHT = 44').
- 10 AUXILIARY TRANSFORMERS.
- 11a 4160V ELECTRICAL SWITCHGEAR.
- 11b 480V ELECTRICAL SWITCHGEAR.
- 12 BLACKSTART GENERATOR.
- 13 NOT USED.
- 14 FUEL GAS COMPRESSOR RECYCLE FIN-FAN COOLER.
- 15 13.8KV-69KV GENERATOR STEP-UP TRANSFORMER (GSU).
- 16 69KV DISCONNECT SWITCH AND SUPPORTS.
- 17 69KV CT/VT METERING UNIT.
- 18 69KV CIRCUIT BREAKER.
- 19 69KV TRANSITION STRUCTURE & POTHEAD.
- 20 UNDERGROUND SANITARY SYSTEM.
- 21 TRANSFORMER DELUGE VALVE ENCLOSURE.
- 22 WASTEWATER STORAGE TANK (HEIGHT = 24').
- 23 NOT USED.
- 24 COOLING TOWER MAKEUP TANK AND PUMP SKID (HEIGHT = 36').
- 25 480V MCC.
- 26 DIESEL FIRE PUMP ROOM.
- 27 YARD FIRE HYDRANTS WITH HYDRANT MOUNT FIRE MONITORS.
- 28 BRIDGE.
- 29 STORMWATER DETENTION BASIN.
- 30 RO WATER TREATMENT AREA.
- 31 DIESEL STORAGE TANK - DIESEL FIRE PUMP.
- 32 GAS TURBINE SOUND WALL (HEIGHT = 48').
- 33 GAS COMPRESSOR SOUND WALL (HEIGHT = 24').
- 34 AREA INLET.
- 35 STORM MANHOLE.
- 36 STORM END SECTION.
- 37 STORMWATER OUTLET CONTROL STRUCTURE.

REV.	DATE	DESCRIPTION	DWN	CHK
A	10-23-07	ISSUED FOR REVIEW	BGG	WHR
B	10-30-07	ISSUED FOR REVIEW	BGG	WHR
C	11-8-07	ISSUED FOR WESTPOWER APPROVAL	BGG	WHR
D	11-19-07	ISSUED FOR AIR MODEL	BGG	WHR
E	11-29-07	RE-ISSUED FOR AIR MODEL	BGG	WHR
F	11-30-07	ISSUED FOR MILESTONE 4	BGG	WHR
G	12-19-07	ISSUED FOR AMENDED SPPE APPLICATION	BGG	WHR
H	12-28-07	RE-ISSUED FOR MILESTONE 4	BGG	WHR
J	1-17-08	ISSUED PER FPP COMMENTS	BGG	MJB
K	02-29-08	FINAL ISSUE FOR APPROVAL	BGG	WHR
L	6-2-08	ISSUED FOR AFC PERMIT	BGG	MJB

Sealed Only When Signed in Blue Ink

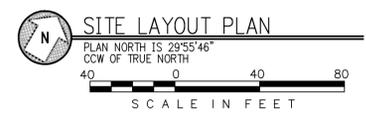

 Engineers - Architects - Technicians
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 P.O. Box 1000
 Stilwell, Kansas 66085-1000

ORANGE GROVE ENERGY L.P.
Schaumburg, IL

ORANGE GROVE POWER PLANT
SITE LAYOUT PLAN

DESIGN BY: B. ROMINES	CHECKED BY: J. BONDANK
DRAWN BY: B. GASPERS	DATE: 9-12-07
CLIENT I.D. ICC00101	SEGA PROJECT NO. 07-201

CADD FILE NAME: 07201-C100.dwg
DRAWING NO. **C100**

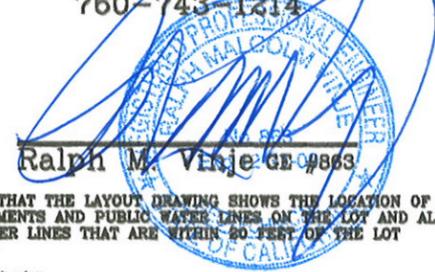


EMISSION COORDINATES SYMBOL		
DESCRIPTION	NORTHING	EASTING
COMBUSTION TURBINE #1 (NORTH)	2075491	6298683
COMBUSTION TURBINE #2 (SOUTH)	2075387	6298743
DIESEL FIRE PUMP (±2')	2075517	6298766
BLACK START GENERATOR (±2')	2075379	6298582

- KEYNOTES CONT.:**
- (36) STORM END SECTION.
 - (37) STORMWATER OUTLET CONTROL STRUCTURE.



VINJE & MIDDLETON ENGINEERING, INC.
 2450 Auto Park Way
 Escondido, CA 92029-1229
 760-743-1214



"I CERTIFY THAT THE LAYOUT DRAWING SHOWS THE LOCATION OF ALL KNOWN EASEMENTS AND PUBLIC WATER LINES ON THE LOT AND ALL PUBLIC WATER LINES THAT ARE WITHIN 50 FEET OF THE LOT BOUNDARY."

Design: MA 1/14/08
 R1: _____
 R2: _____
 R3: _____

LOT INFORMATION

DATE: 1/14/2008
 DEH No. LOWS
 JOB No. 08-122-S
 APN 110-072-26
 ACRES 41.15 (Site=8.66)

Site Location	Owners Address
Corner of Highway 76 and Pala Del Norte Road, Pala	SDG&E c/o: Saga Inc., P.O. Box 1000 Stillwell, KS 66085 913-681-2881

Legal
 (EX PAR 1 PER
 D98-109127) IN SW 1/4
 OF SE 1/4 OF SEC
 29-9-2W

LEGEND

- ⊙ — Perc Test Location
- ⊠ — Groundwater Boring
- 420 — Contour Line w/ 1' Interval
- 200' — Leach Line
- 200'R — Reserve Leach Line
- - - - - Easement
- · - · - · - Setback
- w - w - Water/Utilities
- · · · · Roads
- · - · - · - Cut/Fill
- Property Line
- + + + + + Tight Line

INSTALLATION NOTES

- Proposed Peaker Power Plant
- Proposed Man and Woman Bathroom
- Use 43 mpi @ 3' Trench Depth
- Use Usage 6 People Per Day Max.
- Use 15 gal/person/day
- Use Commercial Design with Safety Factor 2
- Use 1000 Gallon Septic Tank

SCALE: 1" = 100'

DEH Approval Stamp and Notes



COUNTY OF SAN DIEGO
DEPARTMENT OF ENVIRONMENTAL HEALTH
PERCOLATION TEST REPORT

DEH #: LOWS

Job #: 08-122-S

Date: 1/14/2008

Assessor's Parcel #: 110-072-26 Map #: _____ Lot #: _____

Site Location: Corner of Highway 76 and Pala Del Norte Road, Pala

Owner's Name: San Diego Gas & Electric Phone: (760) 743-1214 Vinje & Middleton Engineering, Inc.

Mailing Address: 2450 Auto Park Way, Escondido, CA 92029-1229

Test Hole	Test Depth	Time/Inch	Test Hole	Test Depth	Time/Inch	Average Rate (Time/Inch)
1	5'	40				43 mpi
2	8'	34				
3	10'	53				
4	14'	34				

Vertical seepage pits: Provide soils log, uniformity/capacity test results, and calculations on separate 8-1/2" x 11" sheets of paper.

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

Surface Topsoil

0 - 4.5' ft. below surface Reddish Brown Sandy Clay with ~ 20-30% Cobbels

4.5 - 10' ft. below surface Tan Clayey Sand with Cobbels

_____ ft. below surface Deep A = Refusal @ 10'

_____ ft. below surface Perc Hole #4 = End @ 14'

Depth to refusal: Refusal @ 10 - 14' Depth to groundwater: Not encountered.

Source of potable water: Rainbow M.W.D. (Per Proposed New Water Line To Site)

Proposed structure: One Peaker Power Plant With Men's & Woman's Bathroom (Calc. @ 6 People Per Day @ 15 gal/pers./day)

RECOMMENDATIONS: Use Standard Gravity COMMERCIAL System | I have reviewed this percolation data and design of the subsurface sewage disposal system for this parcel and find the data and design to be accurate and in compliance with state and local regulations and good engineering practice.
Use Safety Factor of 2

Septic tank size 1000 gal. Pit length n/a ft.

Leach line length 200' Primary ft. Pit width n/a ft.
+100% Reserve

Trench depth 3' ft. *Pit depth n/a ft.

Rock under pipe 12" in. **Cap depth n/a ft.

*BELOW CAP DEPTH

**BELOW GROUND SURFACE


Ralph M. Vinje GE #863
2450 Auto Park Way
Escondido, CA 92029-1229 (760) 743-1214 1/14/2008
Address Phone Date

FOR DEPARTMENTAL USE ONLY

APPROVED: YES _____ NO _____ DATE _____ FINAL MAP REQUIRED: YES _____ NO _____

Specialist: _____

Bldg. Plan Review: _____ DATE: _____

Grading Review: _____ DATE: _____

Water Analysis Results: _____ DATE: _____

Leach Field - Commercial

Drill Date 1/11/2008

Test Date 1/12/2008

Lot Information

Percolation Rate (*mpi*) 43
Flow (*gal/person/day*) 15
Number of People 6

Design Specifications

Active Leach Line (*ft*) 157
Reserve Leach Line (*ft*) 157
Trench Depth (*ft*) 3
Rock Below Pipe (*in*) 12
Septic Tank Capacity (*gal*) 1000

USE 200' Minimum
+ 100% Reserve

Calculations

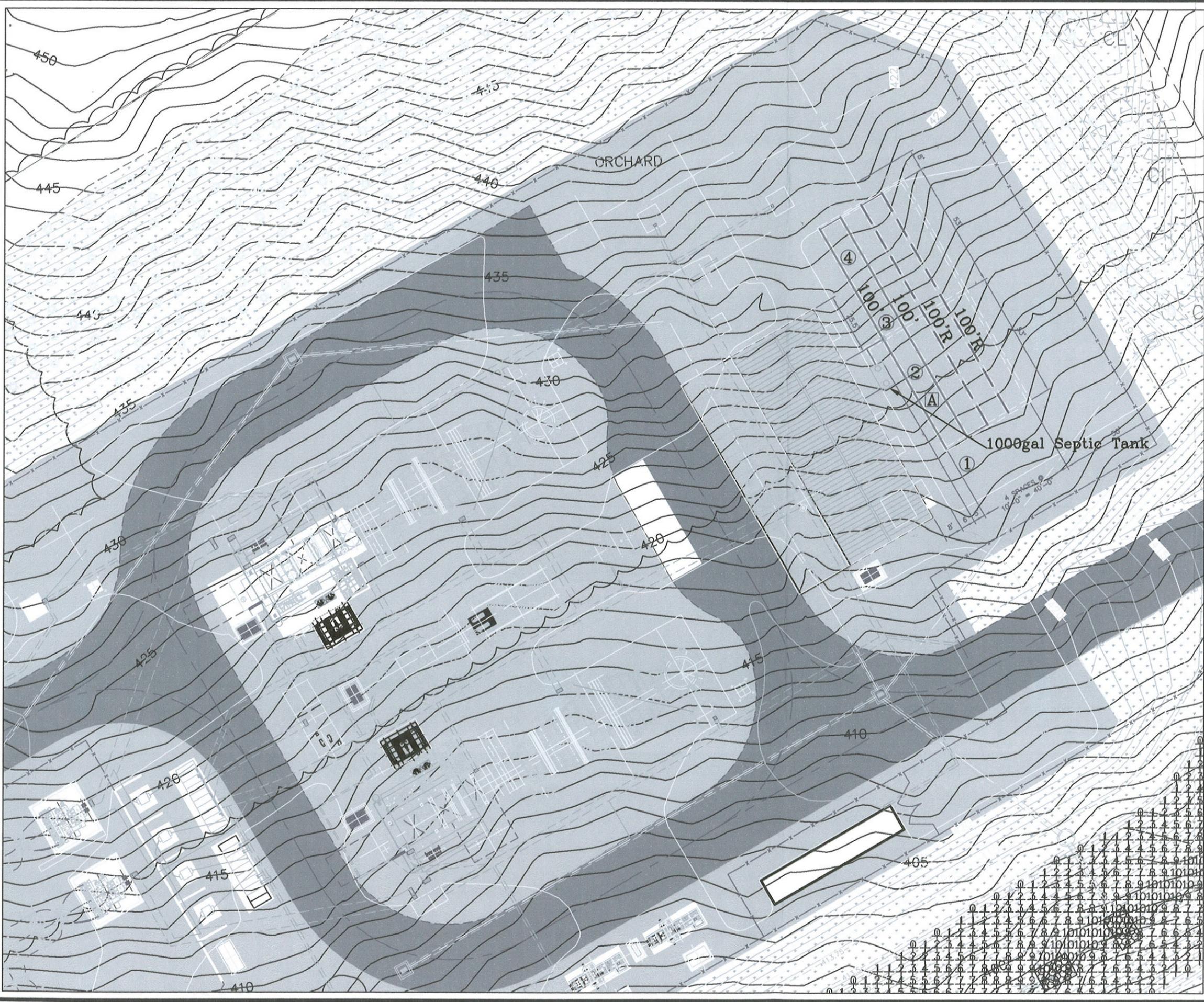
$$\left(\frac{6 \text{ people} \times 15 \frac{\text{gal}}{\text{person}/\text{day}}}{\sqrt[5]{43 \text{mpi}}} \right) = 118 \text{ft}^2 \text{ of required absorption area}$$

$$\left(\frac{118 \text{ft}^2}{1.5} \right) \times 2 = 157 \text{ft of active leach line}$$

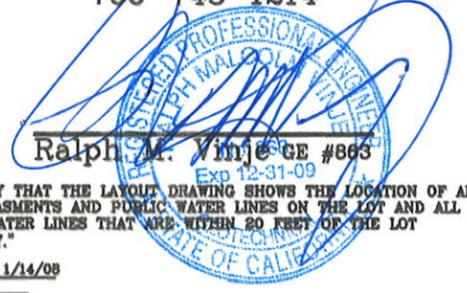


Vinje & Middleton
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 Escondido, CA 92029-1229
 760-743-1214



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

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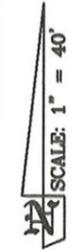
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 D98-109127) IN SW 1/4
 OF SE 1/4 OF SEC
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LEGEND

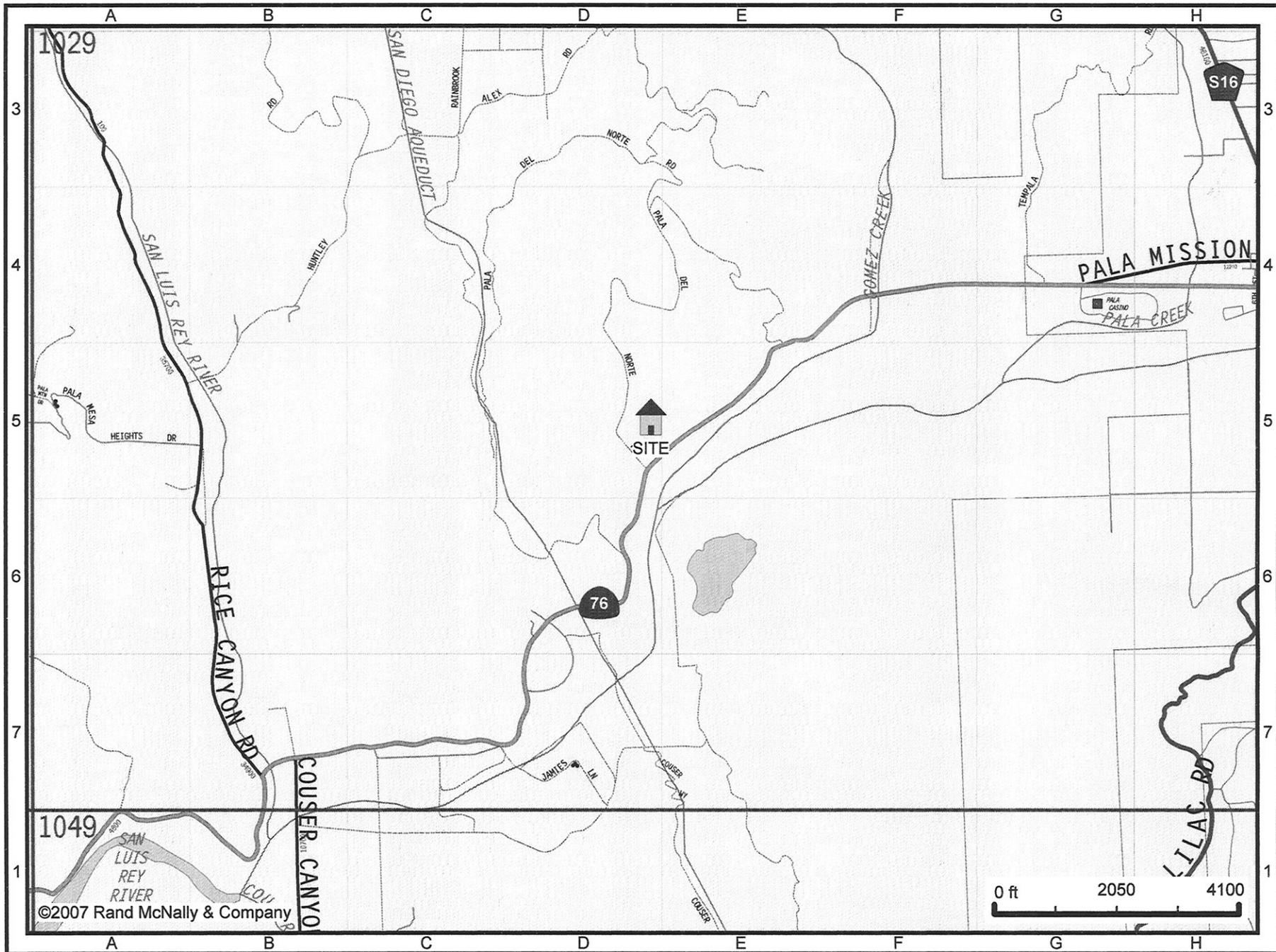
- ① ← Perc Test Location
- ⓐ ← Groundwater Boring
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- - - Setback
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- Property Line
- + + + + + Tight Line

INSTALLATION NOTES

- Proposed Peaker Power Plant
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- Use Commercial Design with Safety Factor 2
- Use 1000 Gallon Septic Tank



DEH Approval Stamp and Notes



SITE: 1029 - D5

SEPTIC SYSTEM DESIGN REQUIREMENTS

County of San Diego

Department of Environmental Health

February 1999

What is a septic system?

A septic system is an on-site subsurface sewage disposal system that is designed to have the sewage treated through the soil. The key components are a septic tank, leach lines or seepage pit, and permeable, unsaturated soil. The design life expectancy is 20 to 30 years for a properly designed and maintained septic system. A septic system is not an option if public sewer is readily available to the site.

Design Requirements

Septic Tank

The septic tank size is a function of the typical peak daily flow of sewage generated by the building served by the septic system. The leach field or seepage pit size is a function of the peak daily sewage flow and soil characteristics for the disposal system.

All septic tanks must have IAPMO approval and be approved by this Department. It is recommended that second dwellings have their own septic tank.

A 1,000 gallon tank is required for up to a 3-bedroom house.

A 1,200 gallon tank is required for a 4-bedroom house.

A 1,500 gallon tank is required for a 5-6-bedroom house.

Sewer Pipe

Tight sewer pipe must have IAPMO approval. SDR-35 rated pipe is recommended for all plumbing from the septic tank to leach lines and crossover connections.

Leach Line Pipe

Leach line pipe shall have IAPMO approval, be 4" diameter, have 5/8" holes offset 60 degrees, and be constructed of PVC or carlon plastic.

Trench Dimensions

The standard leach line trench dimension is 18" wide by 36", 48", or 60" deep. The total length and depth will be a function of the percolation test, or subdivision map design requirements for the parcel.

The bottom of the leach line trench shall be level, and the trench shall be level on contour in order to maintain a uniform trench depth.

The trench unit may need to be modified in conditions where shallow clay lenses are encountered or the leach lines are to be installed on a slope greater than 25%.

Separation to Groundwater

The disposal system must have at least 5 feet of unsaturated soil below the bottom of the leach line trench or seepage pit in order to function properly and not pollute the groundwater. This separation is based on historical high groundwater levels for the site. If the groundwater table rises within 8 feet

Dams and Siphons

Leach line installations on a hillside or slight grade will require a serial system design. A dam and siphon will connect each pair of leach lines so that one trench at a time will take sewage effluent.

Rock Requirements

Leach line rock shall be washed and 1.0" to 1.5" in graded size. Rock fines or dust will seal off the infiltrative sidewall and bottom surfaces of a disposal trench, and clog the void space in between the rock. This can result in premature failure of the disposal system.

Plastic Chambers

Plastic chambers shall have IAPMO approval and approval from this Department. Chamber widths less than 18" will require a correction factor to increase the total linear footage sizing. Chamber interior widths of 18" or greater will have a 1:1 ratio to a standard leach line of rock and pipe.

Sizing Requirements

The minimum size leach field per County Code is 200 linear feet. The size of the leach field or seepage pit will be based on the number of bedrooms of the house and the percolation rate of the soil. A second dwelling will be sized as a separate house and not as a bedroom addition. Commercial buildings will be sized on usage and peak daily flows. Septic systems in the desert communities have a reduced sizing requirement based on a horizontal seepage pit design.

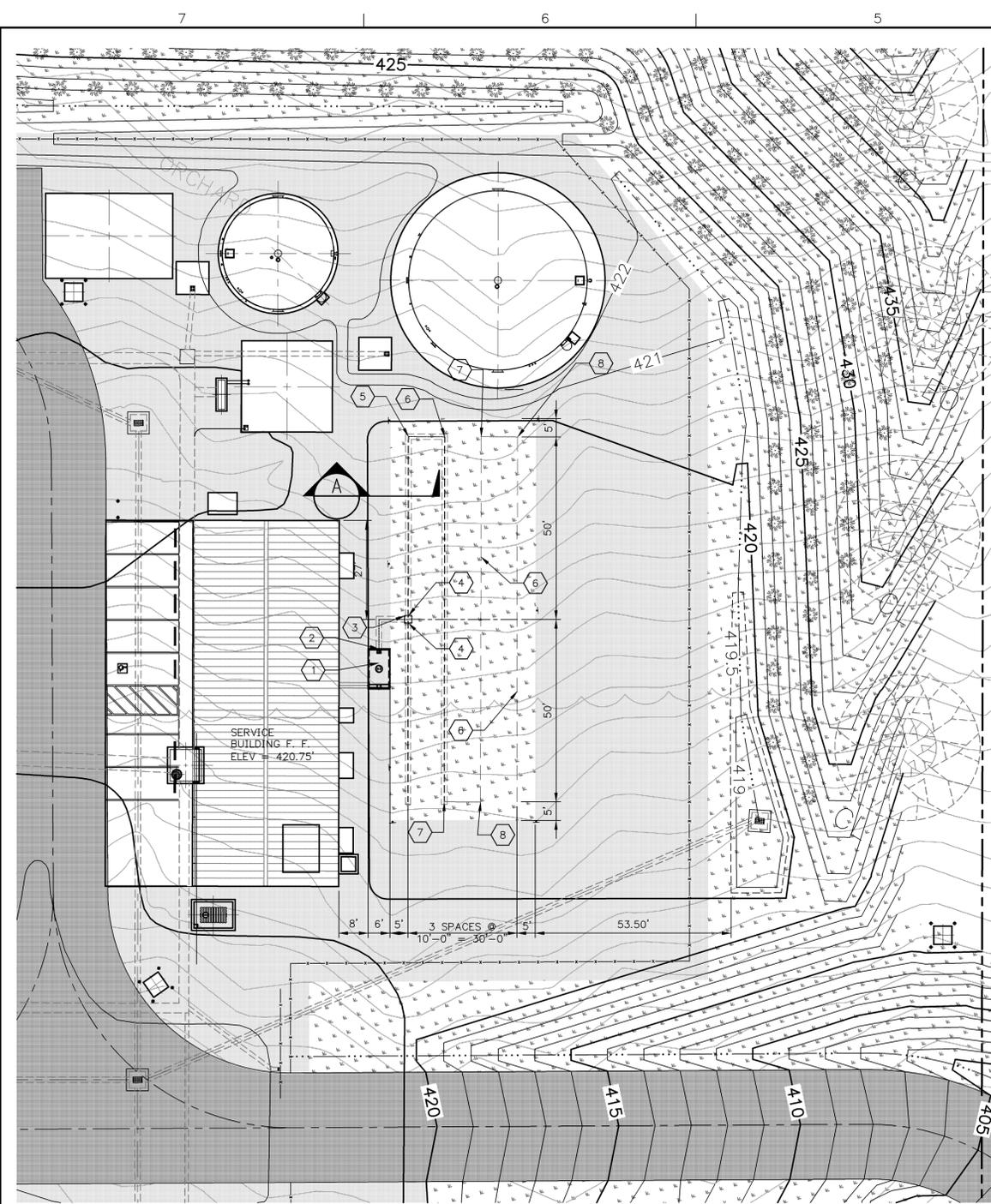
Horizontal Seepage Pits

Horizontal seepage pits are restricted to sites where the soil is uniform, the average percolation rate is no greater than 30 minutes per inch (mpi), and the depth of unsaturated soil is at least 13 feet. Full percolation testing is required for a horizontal seepage pit.

Vertical Seepage Pits

Vertical seepage pits are essentially large diameter shallow wells that sewage is discharged into. This type of disposal system is restricted to coastal sedimentary soil basins, where the groundwater is also contaminated by salt-water intrusion. Full percolation testing is required for a vertical seepage pit to serve new construction.





ON-SITE WASTEWATER TREATMENT SYSTEM (OWTS)
 PLAN NORTH IS 29°55'46"
 CCW OF TRUE NORTH
 SCALE IN FEET

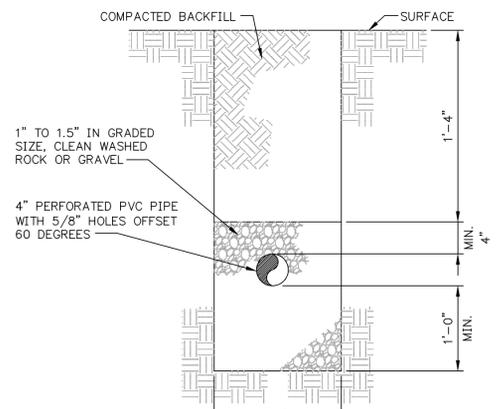
OWTS KEYNOTES:

- 1 INSTALL MINIMUM 1,000 GALLON WATERTIGHT CONCRETE SEPTIC TANK WITH AN EFFLUENT FILTER LOCATED ON TANK OUTLET THAT MEETS OR EXCEEDS THE MINIMUM REQUIREMENTS OF THE INTERNATIONAL ASSOCIATION OF PLUMBING AND MECHANICAL OFFICIALS (IAPMO), THE COUNTY OF SAN DIEGO DEPARTMENT OF ENVIRONMENTAL HEALTH-LAND AND WATER QUALITY DIVISION AND THE MANUFACTURER'S RECOMMENDATIONS. TOP ELEVATION PER MANUFACTURER'S RECOMMENDATIONS. FLOWLINE IN (SW) = 417.23' FLOWLINE OUT (NE) = 416.98'
- 2 INSTALL 15 L.F. 4" DIAMETER SCH 40 PVC PIPE TO DISTRIBUTION BOX @ 1.0% SL.
- 3 INSTALL A 2 OUTLET WATERTIGHT CONCRETE DISTRIBUTION BOX THAT MEETS OR EXCEEDS THE MINIMUM REQUIREMENTS OF THE IAPMO, THE COUNTY OF SAN DIEGO DEPARTMENT OF ENVIRONMENTAL HEALTH-LAND AND WATER QUALITY DIVISION AND THE MANUFACTURER'S RECOMMENDATIONS. TOP ELEVATION PER MANUFACTURER'S RECOMMENDATIONS. FLOWLINE IN (SW) = 416.83' FLOWLINE OUT (N&S) = 416.75'
- 4 INSTALL 50 L.F. 4" DIAMETER SCH 40 PVC PIPE WITH 5/8" HOLES OFFSET 60 DEGREES AS SHOWN ON PLAN.
- 5 INSTALL 10 L.F. 4" DIA. SCH. 40 PVC TIGHTLINE PIPE, NON-PERFORATED PIPE @ 0.0% SL.
- 6 INSTALL 100 L.F. 4" DIAMETER SCH 40 PVC PIPE WITH 5/8" HOLES OFFSET 60 DEGREES AS SHOWN ON PLAN.
- 7 RESERVED FOR 10 L.F. 4" DIA. SCH. 40 PVC RESERVE TIGHTLINE PIPE, NON-PERFORATED PIPE @ 0.0% SL.
- 8 RESERVED FOR 100' L.F. 4" DIA. SCH. 40 PVC RESERVE PIPE WITH 5/8" HOLES OFFSET 60 DEGREES AS SHOWN ON PLAN. LAND SET ASIDE FOR EMERGENCY RESERVE, INSTALLED IF PRIMARY SYSTEM FAILS.

OWTS DESIGN SETBACK REQUIREMENTS:

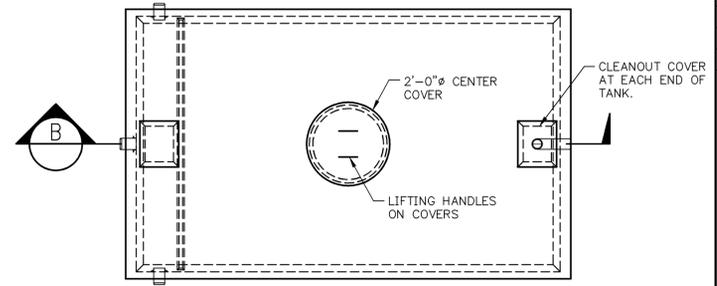
SYSTEM COMPONENT	SETBACK TO:	MINIMUM DISTANCE
SEPTIC TANK	STRUCTURE	5 FEET
LEACH LINES	STRUCTURE	8 FEET
LEACH LINES	DRAINAGE COURSE	50 FEET FROM TOP OF BANK
LEACH LINES	POND	100 FEET FROM SPILLWAY ELEV.
LEACH LINES	SEPTIC TANK	5 FEET
LEACH LINES	LEACH LINES	10 FEET

NOTES:
 1. DESIGN CRITERIA PER THE COUNTY OF SAN DIEGO DEPARTMENT OF ENVIRONMENTAL HEALTH-LAND AND WATER QUALITY DIVISION.

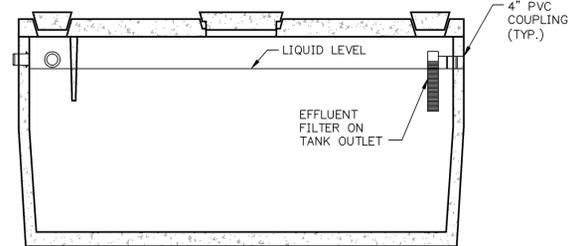


- NOTES:**
1. LEACH LINE PIPE SHALL BE IAPMO APPROVED.
 2. LEACH LINE TRENCHES AND PIPES SHALL BE LEVEL WITH NOT MORE THAN 2" PER 100 LINEAR FEET OF VARIATION IN GRADE.
 3. LEACH LINES SHALL BE LOCATED NO CLOSER THAN 10 FEET ON CENTER FROM ANY ADJACENT LEACH LINE.
 4. THE LEACH LINES MUST BE APPROVED BY BOTH THE DEPARTMENT OF ENVIRONMENTAL HEALTH DIRECTOR AND AN INTERNATIONAL ASSOCIATION OF PLUMBING AND MECHANICAL OFFICIALS (IAPMO) REPRESENTATIVE PRIOR TO BACKFILLING.

TYPICAL LEACH LINE SECTION
 N.T.S.



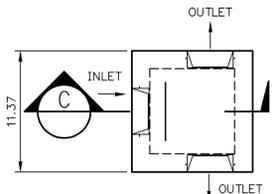
1000 GALLON SEPTIC TANK
 N.T.S.



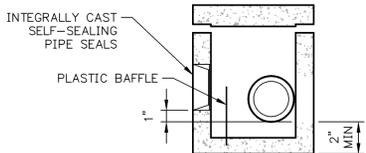
SEPTIC TANK SECTION
 N.T.S.

GENERAL NOTES:

- CONCRETE SPECIFICATIONS:**
1. 4500 PSI AFTER 28 DAYS.
 2. REINFORCING IS GRADE 60.
 3. ALL JOINTS SEALED WITH BUTYL RUBBER JOINT SEALANT (OR APPROVED EQUAL).
 4. CENTER ACCESS COVERS SHOULD HAVE RISERS TO BRING COVER ACCESS TO GRADE (SEE PLAN).
 5. COVER NOT DESIGNED FOR VEHICLE LOADS.
 6. SEPTIC TANK SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS.
 7. THE SEPTIC TANK MUST BE APPROVED BY BOTH THE DEPARTMENT OF ENVIRONMENTAL HEALTH DIRECTOR AND AN INTERNATIONAL ASSOCIATION OF PLUMBING AND MECHANICAL OFFICIALS (IAPMO) REPRESENTATIVE PRIOR TO BACKFILLING.



2 OUTLET DISTRIBUTION BOX
 N.T.S.

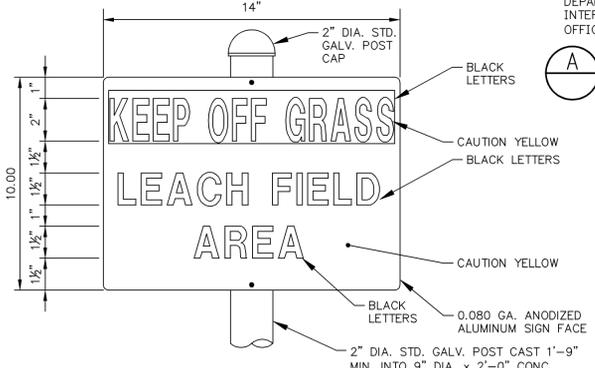


DISTRIBUTION BOX SECTION
 N.T.S.

GENERAL NOTES:

- CONCRETE SPECIFICATIONS:**
1. 4500 PSI AFTER 28 DAYS.
 2. REINFORCING IS GRADE 60.
 3. COVER NOT DESIGNED FOR VEHICLE LOADS.
 4. ALL PENETRATIONS TO DISTRIBUTION BOXES ARE INTEGRALLY CAST.
 5. DISTRIBUTION BOX SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS.

- LENGEND:**
- ▲ LEACH FIELD SIGN (7 PLACES)
 - DISTRIBUTION BOX
 - SEPTIC TANK
 - ==== LEACH LINE (PERFORATED)
 - ===== TIGHTLINE (NON-PERFORATED)
 - LEACH LINE RESERVE
 - TIGHTLINE RESERVE



TYPICAL LEACH FIELD SIGN
 N.T.S.

REV.	DATE	DESCRIPTION	DWN	CHK
A	11-30-07	ISSUED FOR MILESTONE 4	RLK	WHR
B	12-14-07	ISSUED FOR OWTS REVIEW	RLK	WHR
C	12-28-07	RE-ISSUED FOR MILESTONE 4	BGG	WHR
D	1-22-08	RE-ISSUED FOR OWTS	BGG	MJB
E	02-29-08	FINAL ISSUE FOR APPROVAL	BGG	WHR
F	6-2-08	ISSUED FOR AFC PERMIT	BGG	MJB

Sealed Only When Signed in Blue Ink

Sega
 Engineers - Architects - Technicians
 Design - Construction - Field Service
 16041 Foster
 P.O. Box 1000
 Stilwell, Kansas 66085-1000

ORANGE GROVE ENERGY L.P.
 Schaumburg, IL

ORANGE GROVE POWER PLANT
 ON-SITE WASTEWATER TREATMENT SYSTEM

DESIGN BY: M. BLAKE	CHECKED BY: B. ROMINES
DRAWN BY: R. KUHN	DATE: 9-12-07
CLIENT I.D. ICC00101	SEGA PROJECT NO. 07-201

CADD FILE NAME: 07201-C200.dwg	DRAWING NO. C200	REV. F
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Dwellings that have more bedrooms than the above will require a design with oversized or a battery-type tank, if a common system is being proposed. Separate tanks for each dwelling could be used even if connected to a common disposal field.

Setbacks

Setbacks in layout designs refer to the required spacing in distance from components of the sewage disposal system and to structures, property lines, easements, watercourses, wells, or grading. Specific setback requirements will vary based on the type of system design and site conditions. These are:

System Component	Setback To:	Minimum Distance
Septic Tank	Structure	5 feet
Septic Tank	Property Line	5 feet
Septic Tank	Water Well	100 feet
Leach Lines	Structure	8 feet
Leach Lines	Property Line	5 feet
Leach Lines	Water Lines (Public)	25 feet from edge of easement (a)
Leach Lines	Water Well	100 feet (d)
Leach Lines	Drainage Course	50 feet from top of bank
Leach Lines	Flowing Stream	100 feet from top of bank
Leach Lines	Pond	100 feet from spillway elev.
Leach Lines	Reservoir	500 feet to 1000 feet based on average slope
Leach Lines	Aqueduct	100 feet from edge of easement (c)
Leach Lines	Road Easements	8 feet from edge of ultimate easement width (b)
Leach Lines	Cut Slopes	5:1 Setback from top of cut slope (e)
Leach Lines	Septic Tank	5 feet
Leach Lines	Leach Lines	10 feet
Leach Lines	Seepage Pits	15 feet
Seepage Pits	Structure	10 feet
Seepage Pits	Property Line	10 feet
Seepage Pits	Water Lines (Public)	25 feet from edge of easement (a)
Seepage Pits	Water Well	150 feet (d)
Seepage Pits	Drainage Course	50 feet from top of bank
Seepage Pits	Flowing Stream	100 feet from top of bank
Seepage Pits	Pond	100 feet from spillway elev.
Seepage Pits	Reservoir	500 feet to 1000 feet based on average slope measurements
Seepage Pits	Aqueduct	100 feet from edge of easement (c)
Seepage Pits	Road Easements	10 feet from edge of ultimate easement width (b)
Seepage Pits	Cut Slopes	5:1 Setback from top of cut slope (e)
Seepage Pits	Septic Tank	5 feet
Seepage Pits	Seepage Pits	20 feet

- The setback to a domestic water line may increase if the 5:1 setback of the utility trench depth exceeds the 25-ft setback.
- The setback may increase if the 5:1 setbacks to road cuts are greater than the minimum setback of 8 feet.

- Any reduction in the Aqueduct setback requires approval from the San Diego County Water Authority or other purveyor, if another district.
- The minimum setback may be increased if site conditions show the minimum setback is insufficient to protect groundwater supplies.
- No part of an on-site wastewater system, with the exception of a septic tank, pump chamber, enclosed filter, or tight sewer pipe, shall be located closer than a 5:1 setback distance to the top of a cut bank, or the edge of an excavation. The horizontal distance would be five times the height of the cut or depth of the excavation. This setback would also be applied to the top of an eroded bank or natural slope in excess of 60%.

Leach Line Linear Footage Requirements

The charts located at the end of this policy show the corresponding length of leach line as a function of percolation rate and the number of bedrooms for a single-family dwelling. *The one-bedroom design lengths correspond to 2nd dwelling systems on a shared system with the main house or its own system.

Seepage Pits

Seepage Pits will require full percolation testing by a licensed civil engineer, registered geologist, or registered environmental health specialist.

- Horizontal seepage pits cannot be used if percolation rates exceed 30 minutes per inch.
- Vertical seepage pits are restricted to coastal sedimentary basins that have saltwater intrusion into the groundwater with TDS levels in excess of 1500 ppm.
- Desert seepage pits are used alluvial areas of the San Diego County desert areas, and percolation testing may be waived.

Grading Plan Review

Upon approval of a layout by DEH, the Specialist will write in the grading line on the approval form indicating whether a field check of completed grading is required prior to issuance of a septic tank permit. Keep in mind that DEH grading approval is not the same as local land use agency grading approval. For the unincorporated parts of the County, some small projects may not require grading permits. For other projects, County land use agencies issue the following kinds of grading permits:

- **Minor Grading:** Processed through the Department of Planning and Land Use (DPLU), Building Division. Please see the Grading Plan Checklist (DPLU: BLDG-009, Rev. 1-99). Phone: (858) 565-5920.
- **Major Grading:** Processed through the Department of Public Works, Land Development Division, Grading Improvements. Please see the Major Grading Plan Checklist. Phone: (858) 694-3281.

Minor and/or major grading plans will be reviewed by DEH prior to grading to determine impacts to the approved on-site wastewater system and adjacent properties. After completion of the grading, the appropriate DEH field office must be contacted to arrange for a field check, unless the field check is waived on the layout approval.

Cross reference(s)--Excavations, fills and obstructions, § [71.301](#) et seq.

SEC. 68.341. RESERVE AREA REQUIREMENTS.

An area shall be set aside for each on-site wastewater system design to allow for the replacement of the entire drainage/dispersal system design. This 100% reserve area is required for all on-site wastewater system designs that are a part of new construction, remodeling, a change in usage that increases potential occupancy or daily sewage flow, subdivisions, boundary adjustments, or grading plan projects.

For percolation rates greater than 60 minutes per inch and less than or equal to 90 minutes per inch, the reserve area requirement shall be 200%. For percolation rates greater than 90 minutes per inch and less than or equal to 120 minutes per inch, the reserve area requirement shall be 300%. For percolation rates greater than 120 minutes per inch, the reserve area requirement shall be 400%.

If an existing property does not have 100% reserve area, no construction shall take place that would remove any usable reserve area, unless the property can be connected to public sewer.

(Repealed by Ord. No. 6049 (N.S.), effective 6-11-81; new section 68.341 added by Ord. No. 9273 (N.S.), effective 12-15-00)

SEC. 68.342. TYPE OF ON-SITE WASTEWATER SYSTEM REQUIRED.

Any on-site wastewater system hereafter constructed or installed in the County shall consist of a septic tank with effluent discharging into either (1) a leach field disposal system, (2) a seepage pit disposal system, or (3) an alternative on-site wastewater system designed and installed to specifications as set forth by the Director.

(Amended by Ord. No. 6049 (N.S.), effective 6-11-81; amended by Ord. No. 7428 (N.S.), effective 2-4-88; amended by Ord. No. 9273 (N.S.), effective 12-15-00)

SEC. 68.343. MINIMUM REQUIREMENTS FOR SEPTIC TANKS.

Any septic tank hereafter installed in the County shall meet the following minimum specifications:

(a) All Septic Tanks shall be IAPMO approved and approved by the Department of Environmental Health.

(b) Such tank shall be watertight and shall be constructed of concrete or other approved material. The Director may approve alternative materials and construction specifications to meet health requirements.

(Amended by Ord. No. 3061 (N.S.), effective 5-11-67; amended by Ord. No. 6049 (N.S.), effective 6-11-81; amended by Ord. No. 7428 (N.S.), effective 2-4-88; amended by Ord. No. 9273 (N.S.), effective 12-15-00)

SEC. 68.344. MINIMUM REQUIREMENTS FOR DISTRIBUTION BOX.

Any distribution box hereafter constructed or installed in the County shall meet the following minimum specifications:

(a) Such distribution box shall be watertight and shall be constructed of the same materials authorized for construction of a septic tank. The inner surface of the distribution box shall be resistant to sewer gas corrosion.

(b) The outlets from such distribution box shall have exactly the same elevation and shall be located at least two inches above the bottom of the box. The inlet to such distribution box shall be one inch above the elevation of the outlets.

(c) Such distribution box shall be connected to a subsurface disposal system.

(Amended by Ord. No. 3061 (N.S.), effective 5-11-67; amended by Ord. No. 6049 (N.S.), effective 6-11-81; amended by Ord. No. 9273 (N.S.), effective 12-15-00)

SEC. 68.345. LEACH LINE DISPOSAL SYSTEMS.

Any leach field system hereafter constructed or installed in the County for the purpose of disposing of effluent from a septic tank shall meet the following minimum requirements:

(a) Perforated leach line pipe shall have IAPMO approval, and its installation must be approved by the Director.

(b) Each leach line shall consist of a trench 18 inches wide, 36 inches deep and be located no closer than 10 feet on center from any adjacent line. Clean washed rock or gravel grading 1 to 1-1/2 inches shall be placed around the leach line pipe. At least 12 inches of rock shall be placed under the leach line pipe and 4 inches above the leach line pipe.

(c) Leach line trenches and pipes shall be level with not more than 2 inches per 100 linear feet of variation in grade.

(d) Leach line trench depth may exceed 36 inches below the surface when percolation testing substantiates adequate soil conditions exist. Additional rock shall be added to the trench so the leach line pipe depth does not increase. The maximum trench depth shall not exceed 60 inches without special approval of the Director.

(Amended by Ord. No. 3061 (N.S.), effective 5-11-67; amended by Ord. No. 6049 (N.S.), effective 6-11-81; amended by Ord. No. 7428 (N.S.), effective 2-4-88; amended by Ord. No. 9273 (N.S.), effective 12-15-00)

SEC. 68.345.1. CHAMBER SYSTEMS.

Any chamber disposal system hereafter constructed or installed in the County for the purpose of disposing of wastewater from a septic tank shall meet the following minimum requirements:

(a) The minimum length of any chamber system shall be at least 200 linear feet.

(b) The chambers shall have IAPMO approval for use in an on-site wastewater system and its installation must be approved by the Director.

(c) Each chamber shall have a minimum width of 18 inches to provide the equivalent trench bottom absorption area of an 18-inch wide leach line trench. Chambers less than 18 inches wide may be used at the discretion of the Director but will require a correction factor to provide the equivalent trench bottom absorption area of an 18 inch wide leach line trench. The chambers shall be installed in a trench 24 to 36 inches deep and be located no closer than 10 feet on center from any adjacent line.

(d) Chamber trenches and chambers shall be level with not more than 2 inches per 100 linear feet of variation in grade.

(e) Chamber trench depth may exceed 36 inches below the ground surface when percolation testing substantiates adequate soil conditions exist. Clean washed rock or gravel grading 1 to 1-1/2 inches shall be added to the trench below the chamber so the chamber depth does not increase. The