

Roger A. New M.S., E.H.S.
Environmental Health Scientist
P.O. Box 460849 Leeds, UT 84746
Phone/text (435) 632-2833
ranew2065@gmail.com

Septic System Feasibility Proposal for Quail Mesa Subdivision

The purpose of this submission is to establish septic feasibility for Quail Mesa Subdivision, a proposed 20 lot subdivision on 35 acres located at 265 S. Red Hill Lane in Virgin, Utah (Washington County parcel V-2-1-26-4421). It is under the ownership of Hidden Canyon Mesa LLC. General engineering is being provided by Universal Engineering, and Roger A. New MS,EHS is acting as an Environmental Health consultant.

Pressurized culinary water will be provided by an existing pipeline from the Town of Virgin, an approved community water system. Waste water treatment and disposal will be addressed through an AquaTech BioMOD MBBR onsite treatment system and pressurized distribution into leaching trenches. It will be subject to approval by the Utah State Department of Environmental Quality - Division of Water Quality, and will require sponsorship of a body politic.


Soil exploration was conducted to a depth of 11 to 13 ft. at 7 test locations. Soil conditions were marginal, but within parameters acceptable for underground waste water disposal. Hydraulic loading rates within the treatment area varied from 0.35 to 0.65 gallons per sq ft per day and suitable soils ranging from 10 to 13 feet in depth. Overall system design is based on 0.35 g/sqft/day loading rate, and a 4.0 ft deep trench in 10 ft soil depth. Ground water was not encountered in this study.

There are no, wells, streams, or ponds in the vicinity. There is ample space for the leach field and septic replacement area.

Specifications, calculations and maps are included in this report. Permit application will follow "LUWWDS Alternative Wastewater System" format.

Feel free to contact me with any questions.

Respectfully,

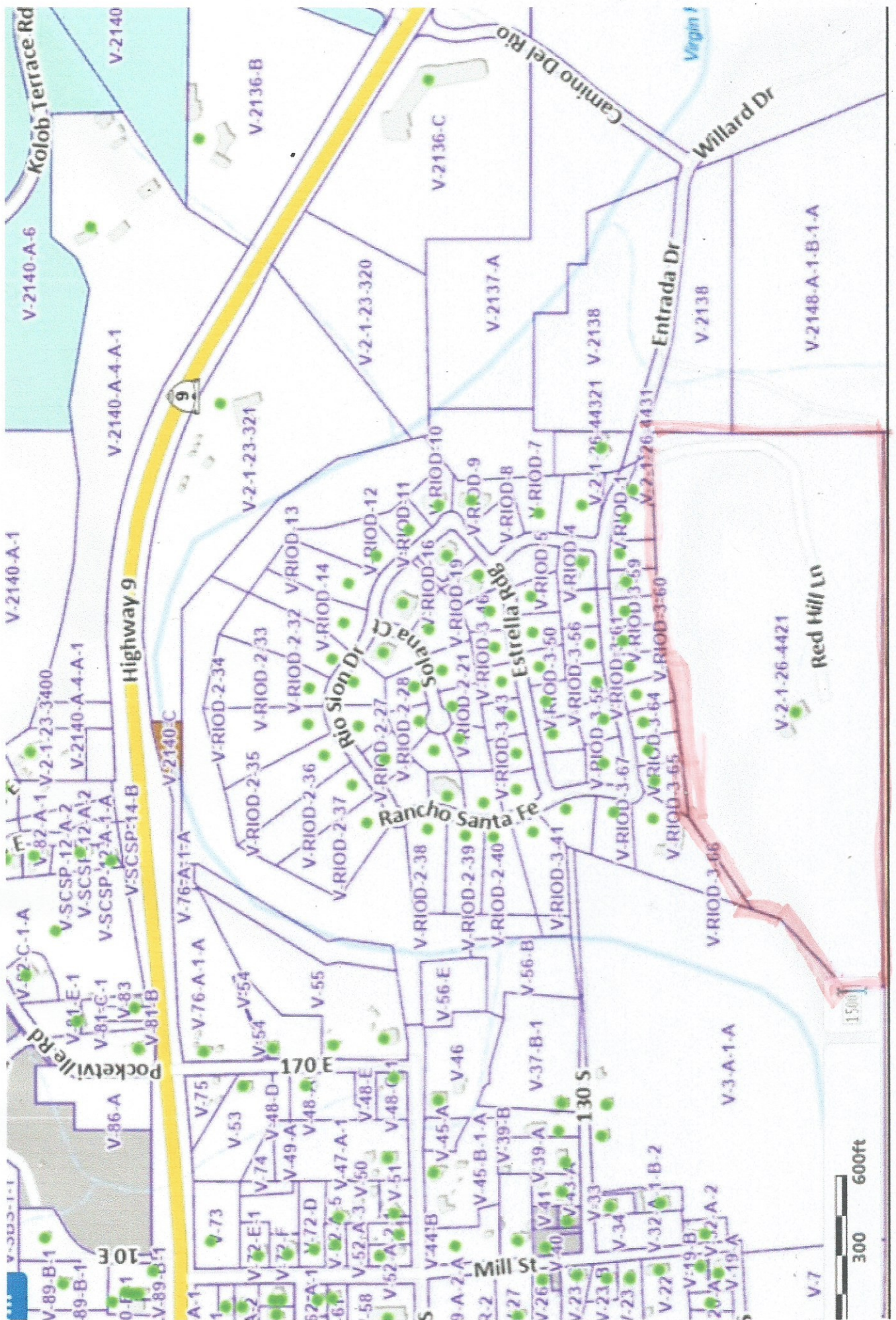


Roger A. New

Hidden Canyon Mesa LLC
Quail Mesa Subdivision
265 South Red Hill Lane
Virgin, UT

Washington Co.
Parcel: V-2-1-26-4421

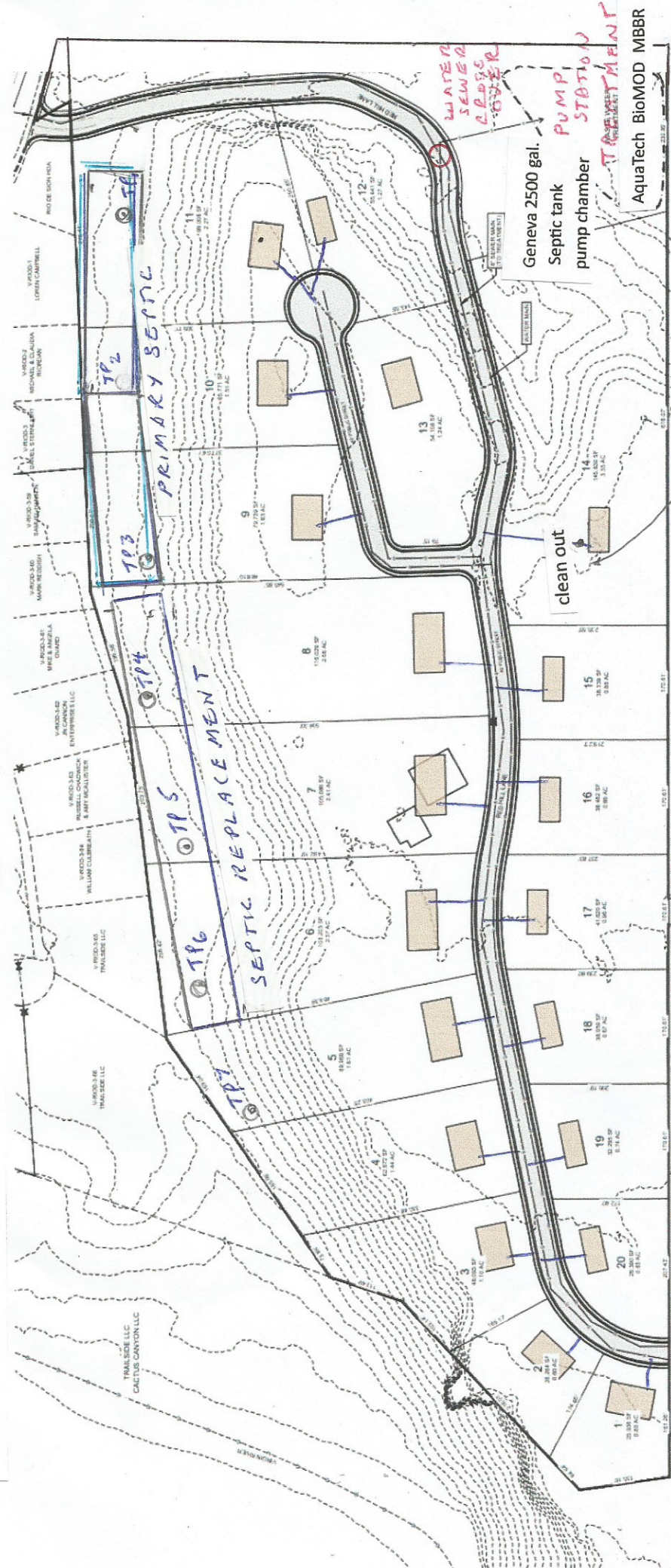
VICINITY MAP



TOPOGRAPHY SITE MAP

Hidden Canyon Mesa LLC
Quail Mesa Subdivision
265 South Red Hill Lane
Virgin, UT

Washington Co.
Parcel: V-2-1-26-4421



EACH INDIVIDUAL
SEWER CONNECTION
WILL HAVE A CLEAN-OUT
2 FT OR LESS FROM HOUSE

SCALE
0 100' 213.5'



Geneva 2500 gal.
Septic tank
pump chamber

AquaTech BioMOD MBBR

WATER
SEWER
CROSS
OVER

PUMP
STATION

TREATMENT

TP1
TP2
TP3
PRIMARY SEPTIC

TP4
TP5
TP6
SEPTIC REPLACEMENT

clean out

1 20.300 SF 0.467 AC
2 28.281 SF 0.648 AC
3 28.281 SF 0.648 AC
4 28.281 SF 0.648 AC
5 28.281 SF 0.648 AC
6 28.281 SF 0.648 AC
7 28.281 SF 0.648 AC
8 28.281 SF 0.648 AC
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17 28.281 SF 0.648 AC
18 28.281 SF 0.648 AC
19 28.281 SF 0.648 AC
20 28.281 SF 0.648 AC

Quail Mesa Subdivision Waste Water System Calculations and Specifications

Estimated waste water flow: 20 lots @ 450 gal/lot/day = 9,000 gal/day

Treatment system: AquaTech BioMOD - MBBR

Treated waste water distribution:

9,000 gpd / hydraulic loading rate 0.35 gal/sq ft/day = 3214 sq ft absorption area.

624 linear feet of 4.0 ft deep trench with pressurized distribution.

Pressurized Distribution:

10 laterals x 321 linear feet/ lateral 10 laterals divided into 5 zones, 2 laterals per zone.

Lateral diameter 3". Orifices 5/32" at 5 foot separation, 65 orifices per lateral

5/32 " orifices, 3 ft squirt height = flow rate 0.5 gpm/orifice

65 orifices x 10 laterals x 0.5 gpm = system flow rate = 325 gpm or 65 gpm per zone

Force main is 1250 ft of 3" sch40 PVC

Manifold is 60 ft of 3" sch40 PVC

Pump Selection:

TDH = 70 ft Zone flow = 65 gpm

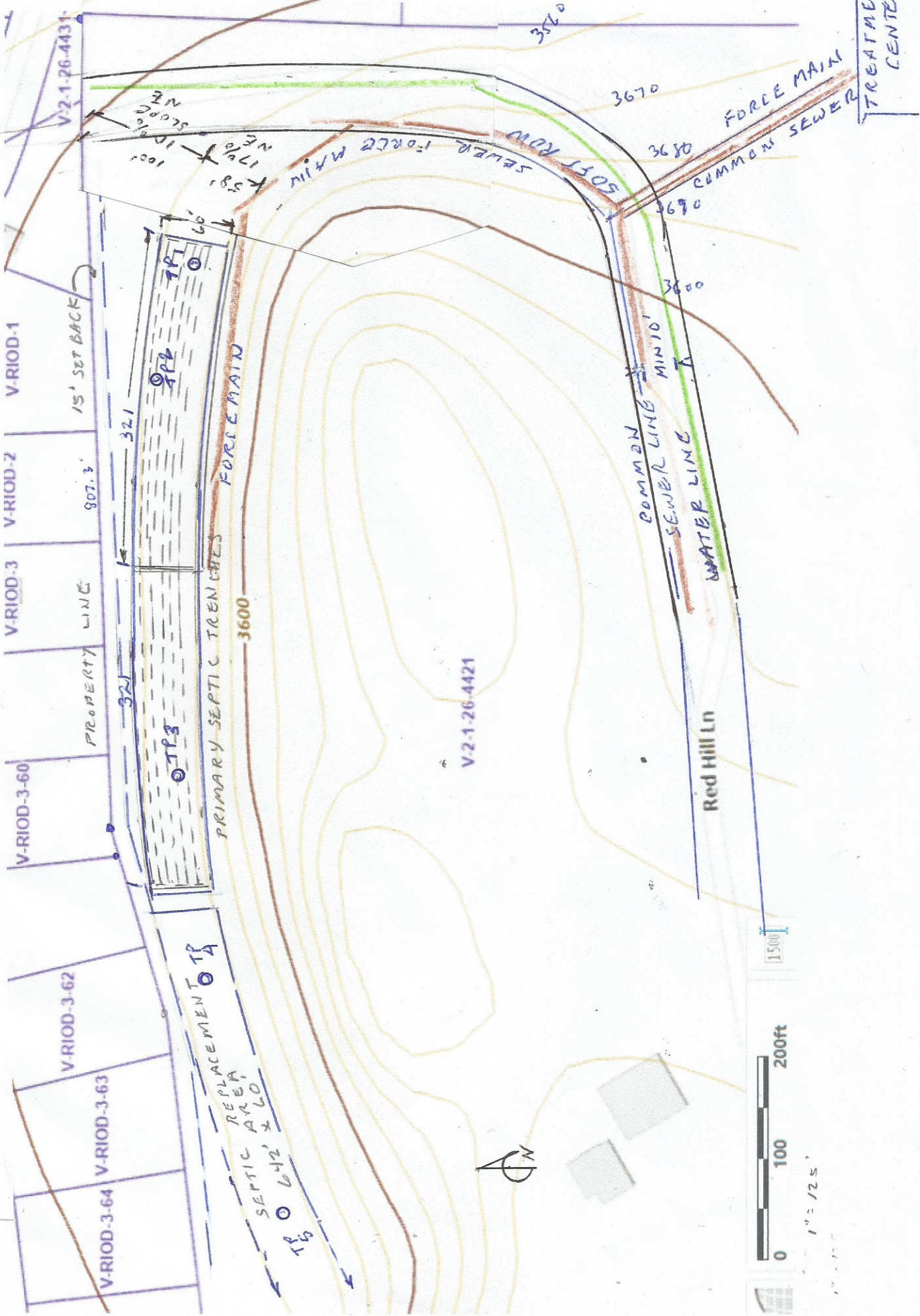
Recommend 2 redundant Zoeller 189-4189 or equivalent

Hidden Canyon Mesa LLC
 Quail Mesa Subdivision
 265 South Red Hill Lane
 Virgin, UT

Washington Co.

Parcel: V-2-1-26-4421

PLOT PLAN



FROM PUMP
CHAMBER
FORCE MAIN

ZONE VALVE

ZONE 1

FORCE MAIN 3" PVC
MANIFOLD 3" PVC

ZONE 2

MANIFOLD

ZONE 3

LATERALS

ZONE 4

LATERALS

ZONE 5

321'

321'

2.5' WIDE TRENCHES
12' TRENCH SEPARATION
DRIFILE SPACING = 5 FT.

IP 60.5'

Inspection port clean out

IP 22.5'

Inspection port clean out

IP 30.5'

Inspection port clean out

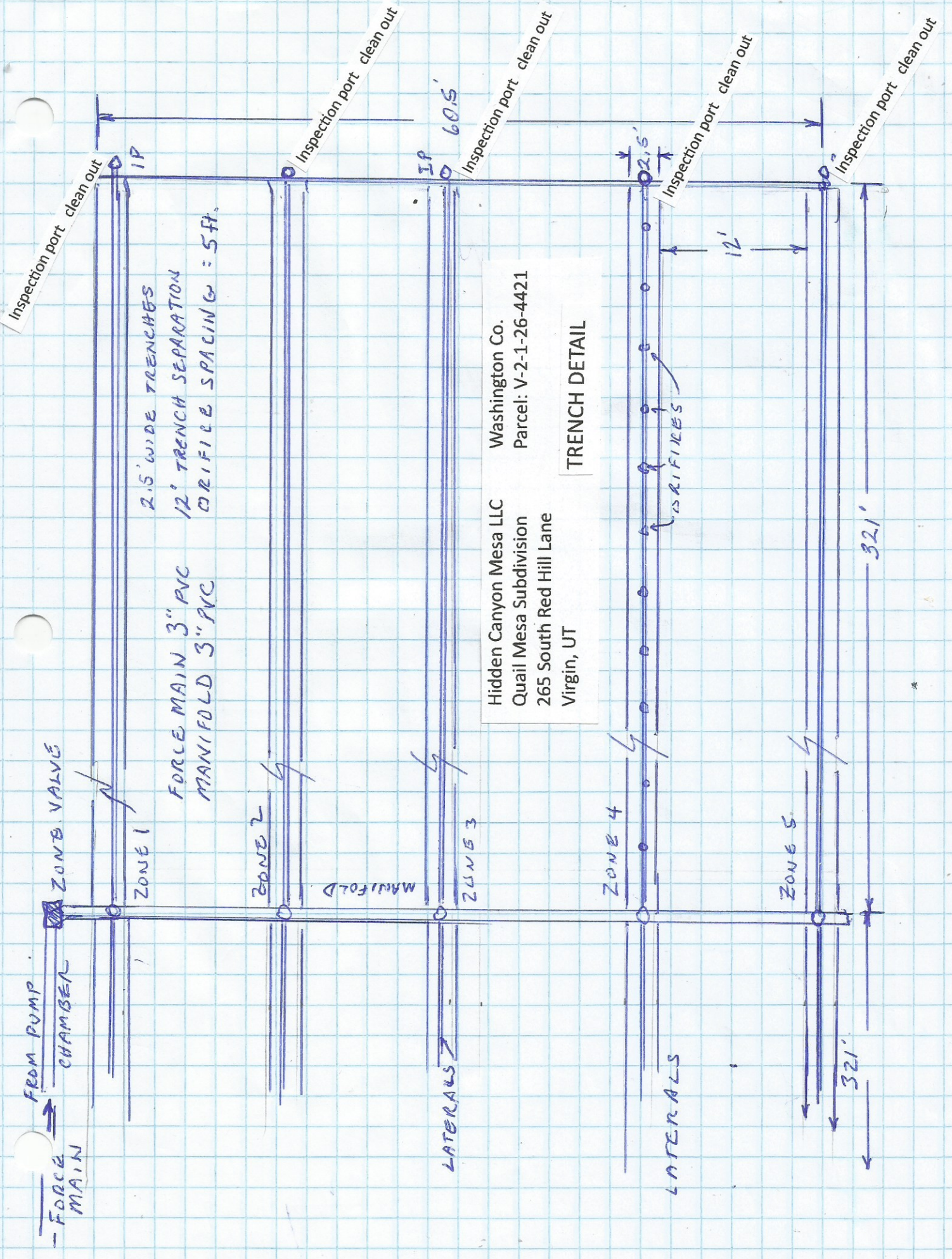
12'

DRIFILES

Hidden Canyon Mesa LLC
Quail Mesa Subdivision
265 South Red Hill Lane
Virgin, UT

Washington Co.
Parcel: V-2-1-26-4421

TRENCH DETAIL



TREATMENT AND ABSORPTION SYSTEM DESIGN SPECIFICATIONS

Roger A. New M.S., E.H.S
 Box 460849 Leeds, UT 84746
 Phone/text (435) 632-2833

Hidden Canyon Mesa LLC Washington Co.
 Quail Mesa Subdivision Parcel: V-2-1-26-4421
 265 South Red Hill Lane Virgin, UT
 Lot size 35 acres
 Topography: Varied

Absorption area required: 20 lots = 450 gpd x 20 / 0.35gal/sq ft/day = 2572sq ft

Proposed absorption area: 3214 linear feet of 4.0 ft deep trench.

Minimum septic tank capacity: Included in AquaTech BioMOD

Pump chamber: 2500 gallon Geneva concrete tank

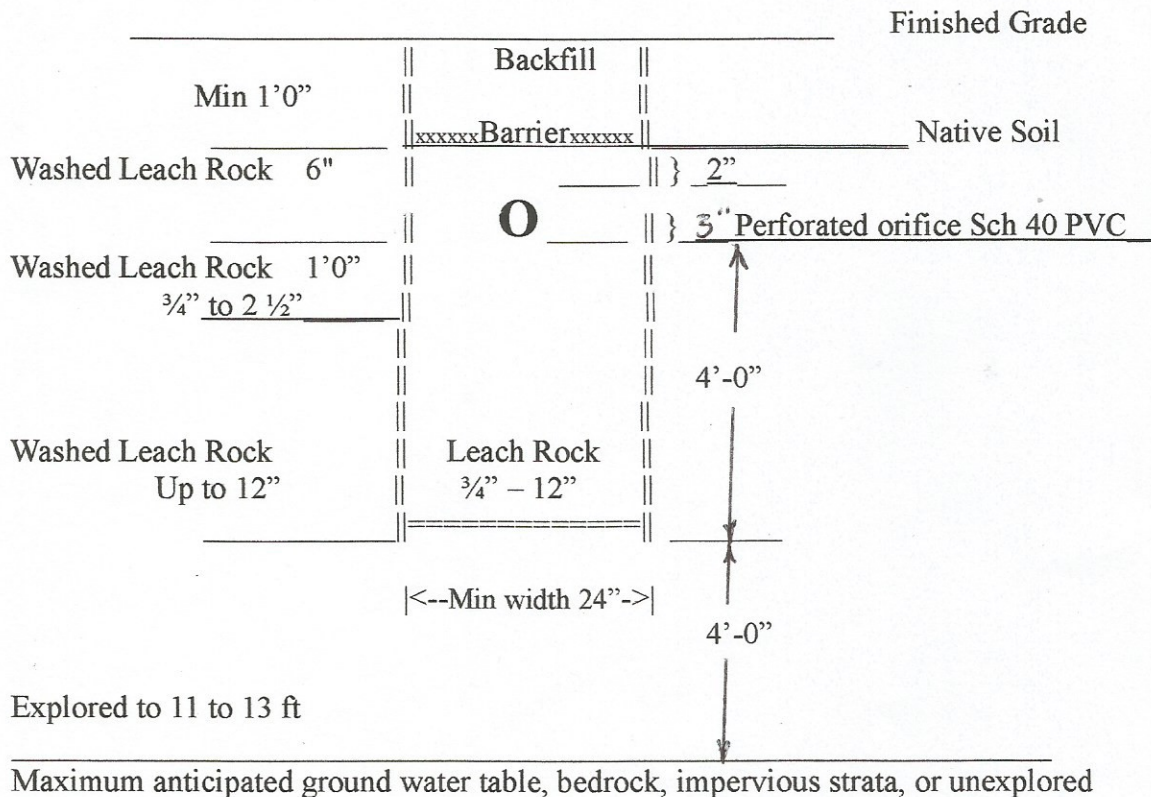
Minimum septic tank depth is 6 inches below finished grade.

Maximum septic tank depth is 4 feet. For deep installations manholes are required by R317-4-7 to extend to within 6 inches of finished grade.

Construction Materials: 3 inch dia. PVC schedule 40 for force main, manifold, and perforated lateral pipe with specified orifices.

Washed leach rock: ¾" to 2 ½" dia. Deep trenches may use up to 12" rock more than 6" below pipe.

Dirt barrier material: May be comprised of 2+ inches of compacted straw, or non-degradable filter fabric 4.0 ounces per square yard, or other effective pervious material pre approved by the local Health Department.





Visit Our Web Site
www.zoeller.com

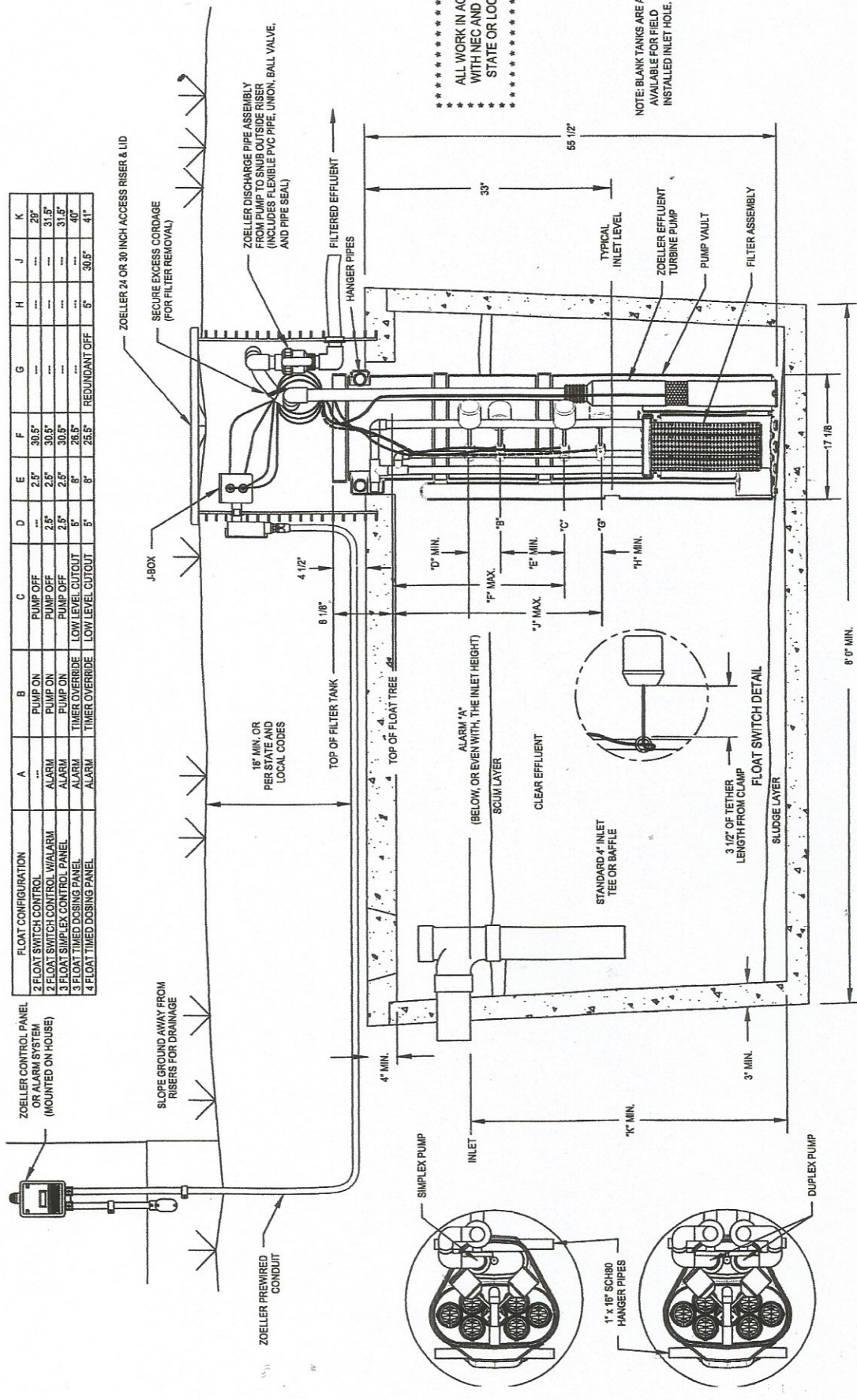


"Quality Pumps Since 1939"

Product information presented here reflects conditions at time of publication. Consult factory regarding discrepancies or inconsistencies.

EFFLUENT TURBINE FILTERED STEP SYSTEM - DIMENSIONAL DATA (Single Compartment Tank)

	A	B	C	D	E	F	G	H	J	K
1. FLOAT CONFIGURATION	...	PUMP ON	PUMP OFF	...	2.5"	30.5"	...	...	...	29"
2. FLOAT SWITCH CONTROL	...	PUMP ON	PUMP OFF	...	2.5"	30.5"	...	...	...	31.5"
3. FLOAT SWITCH CONTROL PANEL	...	PUMP ON	PUMP OFF	...	2.5"	30.5"	...	...	...	31.5"
4. FLOAT TIMED DOSING PANEL	...	TIMER OVERRIDE	LOW LEVEL CUTOUT	...	5"	26.5"	...	...	...	40"
5. FLOAT TIMED DOSING PANEL	...	TIMER OVERRIDE	LOW LEVEL CUTOUT	...	5"	25.5"	...	...	...	41"



ALL WORK IN ACCORDANCE
WITH NEC AND ANY OTHER
STATE OR LOCAL CODES

NOTE: BLANK TANKS ARE ALSO
AVAILABLE FOR FIELD
INSTALLED INLET HOLE.

"QUALITY PUMPS SINCE 1939"

ZOELLER PUMP CO.



SECTION: 2.20.060

FM0659

1104

Supersedes

0504

Product information presented here reflects conditions at time of publication. Consult factory regarding discrepancies or inconsistencies.

MAIL TO: P.O. BOX 16347 • Louisville, KY 40256-0347
SHIP TO: 3649 Cane Run Road • Louisville, KY 40211-1961
(502) 778-2731 • 1 (800) 928-PUMP • FAX (502) 774-3624

visit our web site:
www.zoeller.com

COMPARE THESE FEATURES

- Non-clogging vortex impeller design bronze class 88-8-0-4 (180 Series).
- Enclosed impeller design (191 Series).
- Float operated, submersible (NEMA 6) 2-pole mechanical switch.
- Durable cast construction. Cast iron switch case, base, motor and pump housing. No sheet metal parts to rust or corrode.
- Stainless steel screws, bolts, float rod, handle, guard, arm and seal assembly.
- 20 ft. UL Listed 3-wire neoprene cord and plug. Extra cord lengths available in 25-35-50 foot length only.
- Motor - 60 Hz, 3450 RPM, oil-filled, hermetically sealed, automatic reset, thermal overload protected (1 PH only).
- Maximum temperature for effluent or dewatering 130°F (54°C), WD189 120°F (49°C).
- Variable level control systems available.
- Square Ring & Gasket - Neoprene.
- Shaft Seal - Stainless steel carbon & ceramic rotary.
- Upper sleeve bearing and lower ball bearing running in bath of oil.
- All 180/4180 series pass 3/4-inch spherical solids. Model 191 pump passes 5/8 - inch spherical solids.
- On point 14 3/4" • Off point 5" (automatic units).
- Major width 12 3/4" • Height 18 3/16". (Single seal pumps)
- 1 1/2" NPT discharge with 2" or 3" flange available. (Model 191 is not available with 3" flange)
- Corrosion resistant powder coated epoxy finish.

MODELS 4185-4186-4188-4189

DOUBLE SEAL PUMPS (Nonauto only)

- Protects motor from seal leaks.
- Improved bearing lubrication.
- Helps eliminate seal and bearing damage from dry runs.
- Major width 12 3/4". Height 20 7/16".

Note: The sizing of effluent systems normally requires variable level float(s) controls and properly sized basins to achieve required pumping cycles or dosing timers with nonautomatic pumps.

AUTOMATIC UNITS NOT RECOMMENDED FOR USE IN EFFLUENT SYSTEMS

*NOTE: No UL Listing for 200/208 1 Phase Pumps, Model 186 & 191, or Double Seal Series. See Back Page for UL & CSA Listings

Nonautomatic Model for variable level systems

185 - 186 - 188 - 189 Single Seal Series
4185 - 4186 - 4188 - 4189 Double Seal Series
191 Single Seal Drip Pump
(For Pump Prefix Identification see News & Views 0052)



Tested to UL Standard UL778 & Certified to CSA Standard C22.2 No. 108



HIGH HEAD

"FLOW-MATE"

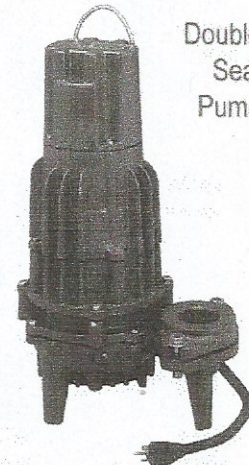
FOR SEPTIC TANK • LOW PRESSURE PIPE (LPP)
AND ENHANCED FLOW STEP SYSTEMS

EFFLUENT

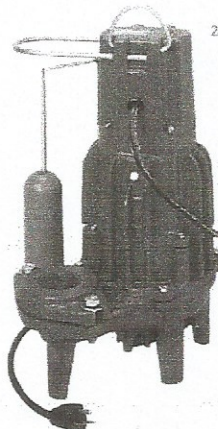
OR DEWATERING PUMP • SUBMERSIBLE
1 1/2" NPT DISCHARGE STANDARD • 2" or 3" FLANGE AVAILABLE



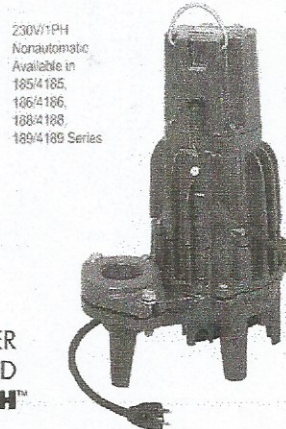
230V Automatic
Controlled by variable
level float switch
integral to the pump in
WD189/WD4189
Series only.



Double
Seal
Pump

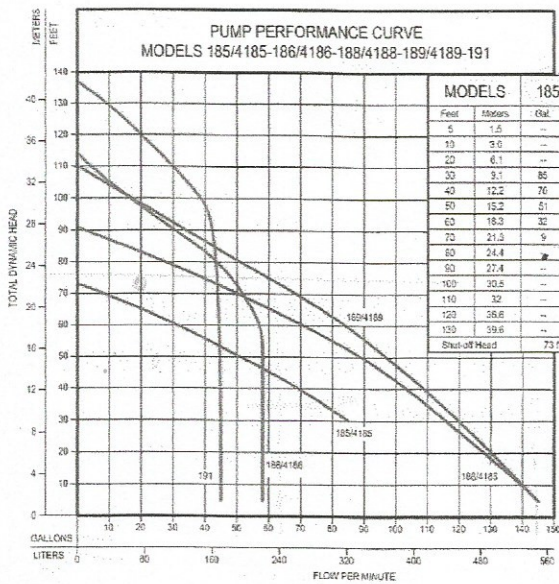


230V/1PH Automatic
Available in 185,
186, 188,
189 Series



230V/1PH
Nonautomatic
Available in
185/4185,
186/4186,
188/4188,
189/4189 Series

**POWDER
COATED
TOUGH™**

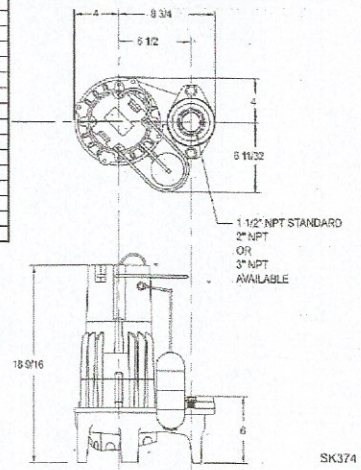


MODELS		185/4185		186/4186		188/4188		189/4189		191	
Feet	Meters	Gal	Liters	Gal	Liters	Gal	Liters	Gal	Liters	Gal	Liters
5	1.5	--	--	55	220	145	549	145	549	45	170
10	3.0	--	--	58	220	140	530	140	530	45	170
20	6.1	--	--	56	220	128	484	130.5	494	45	170
30	9.3	85	322	56	220	116	439	120	454	45	170
40	12.2	76	285	56	220	103.5	392	109	413	45	170
50	15.2	51	193	56	220	90	341	97	367	45	170
60	18.3	32	121	56	220	71	269	65	252	45	170
70	21.3	9	34	32	197	51	193	65	261	45	170
80	24.4	--	--	45	170	28	108	51	193	45	170
90	27.4	--	--	39.5	115	2	8	34	129	45	170
100	30.5	--	--	16	60	--	--	17	64	40	151
110	32	--	--	4	15	--	--	--	--	30	114
120	35.6	--	--	--	--	--	--	--	--	20	76
130	39.6	--	--	--	--	--	--	--	--	10	38
Shut-off Head		73 ft. (22m)		114 ft. (35m)		91 ft. (28m)		110 ft. (34m)		137 ft. (42m)	

DC9903

WARNING: Model 185 should not be subjected to heads less than 30 feet TDH.

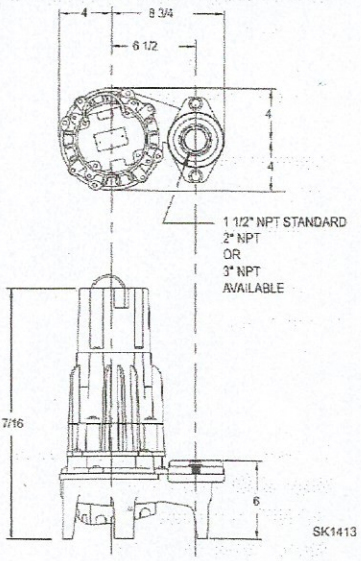
Single Seal-180 Series Automatic Design Weight 82-89 lbs.



SK374

185 MODELS		4185 MODELS		Standard all models - 20 ft. cord - 1 H.P.				Control Selection		Listings	
Single Seal	Double Seal	Volts	Ph	Mode	Amps	Simplex	Duplex	CSA	UL		
D185	--	230	1	Auto	9.8	1	--	Y	Y		
E185	E4185	230	1	Non	9.8	2 or 3	4	Y ⁽²⁾	Y		
* H185	--	200-208	1	Auto	11.5	1	--	N	N		
* I185	* I4185	200-208	1	Non	11.5	2 or 3	4	N	N		
* F185	* F4185	230	3	Non	7.4	3 & 5	4 & 5	Y	Y		
* J185	* J4185	200-208	3	Non	7.5	3 & 5	4 & 5	Y	Y		
* G185	* G4185	460	3	Non	3.7	3 & 5	4 & 5	Y	Y		
* BA185	--	575	3	Non	3.3	3 & 5	4 & 5	Y	N		

Double Seal-4180 Series / Weight 89-94 lbs.



SK1413

SELECTION GUIDE

1. Integral float operated mechanical switch, no external control required.
2. For automatic use single piggyback variable level float switch or double piggyback variable level float switch. Refer to FM0477.
3. See FM1228 for correct model of simplex control panel.
4. See FM0712 for correct model of duplex control panel.
5. Variable level control switch 10-0225 used as a control activator, specify simplex (3) float or duplex (4) float system.

CAUTION

All installation of controls, protection devices and wiring should be done by a qualified licensed electrician. All electrical and safety codes should be followed including the most recent National Electric Code (NEC) and the Occupational Safety and Health Act (OSHA).

For information on additional Zoeller products refer to catalog on Piggyback Variable Level Float Switches, FM0477; Electrical Alternator, FM0486; Mechanical Alternator, FM0495; Sump/Sewage Basins, FM0487; Simplex Pump Control, FM1596; Alarm Systems, FM0732; and Disconnect/Rail Systems, FM0787.

186 MODELS		4186 MODELS		Standard all models - 20 ft. cord - 1 1/2 H.P.				Control Selection		Listings	
Single Seal	Double Seal	Volts	Ph	Mode	Amps	Simplex	Duplex	CSA	UL		
D186	--	230	1	Auto	13.7	1	--	N	N		
E186	E4186	230	1	Non	13.7	2 or 3	4	N	N		
* F186	* F4186	230	3	Non	9.2	3 & 5	4 & 5	N	N		
* G186	* G4186	460	3	Non	4.6	3 & 5	4 & 5	N	N		

188 MODELS		4188 MODELS		Standard all models - 20 ft. cord - 1 1/2 H.P.				Control Selection		Listings	
Single Seal	Double Seal	Volts	Ph	Mode	Amps	Simplex	Duplex	CSA	UL		
D188	--	230	1	Auto	14.0	1	--	N	Y ⁽¹⁾		
E188	E4188	230	1	Non	14.0	2 or 3	4	Y ⁽²⁾	Y ⁽³⁾		
* H188	--	200-208	1	Auto	16.8	1	--	N	N		
* I188	* I4188	200-208	1	Non	16.8	2 or 3	4	N	N		
* F188	* F4188	230	3	Non	8.9	3 & 5	4 & 5	Y	Y		
* J188	* J4188	200-208	3	Non	10.3	3 & 5	4 & 5	Y	Y		
* G188	* G4188	460	3	Non	4.6	3 & 5	4 & 5	Y	Y		
* BA188	--	575	3	Non	3.5	3 & 5	4 & 5	Y	N		

189 MODELS		4189 MODELS		Standard all models - 20 ft. cord - 2 H.P.				Control Selection		Listings	
Single Seal	Double Seal	Volts	Ph	Mode	Amps	Simplex	Duplex	CSA	UL		
⁽¹⁾ D189	--	230	1	Auto	17.1	1	--	N	Y ⁽³⁾		
⁽²⁾ E189	⁽³⁾ E4189	230	1	Non	17.1	2 or 3	4	Y ⁽²⁾	Y ⁽³⁾		
* H189	--	200-208	1	Auto	20.5	1	--	N	N		
* I189	* I4189	200-208	1	Non	20.5	2 or 3	4	N	N		
* F189	* F4189	230	3	Non	11.2	3 & 5	4 & 5	Y	Y		
* J189	* J4189	200-208	3	Non	13.2	3 & 5	4 & 5	Y	Y		
* G189	* G4189	460	3	Non	6.0	3 & 5	4 & 5	Y	Y		
* BA189	--	575	3	Non	5.8	3 & 5	4 & 5	Y	N		
⁽³⁾ WD189	* WD4189	230	1	Auto	17.1	1	4	N	N		

191 MODEL		Standard all models - 20 ft. cord - 2 H.P.				Control Selection		Listings	
Single Seal	Double Seal	Volts	Ph	Mode	Amps	Simplex	Duplex	CSA	UL
E191	--	230	1	Non	14.5	2 or 3	4	N	N

* No Moulded Plug
 (1) UL Listed unit available with 20 Amp Plug.
 (2) CSA Approval without plug cap.
 (3) 20 Amp Outlet, P/N 10-0060 must be used.

RESERVE POWERED DESIGN

For unusual conditions a reserve safety factor is engineered into the design of every Zoeller pump.

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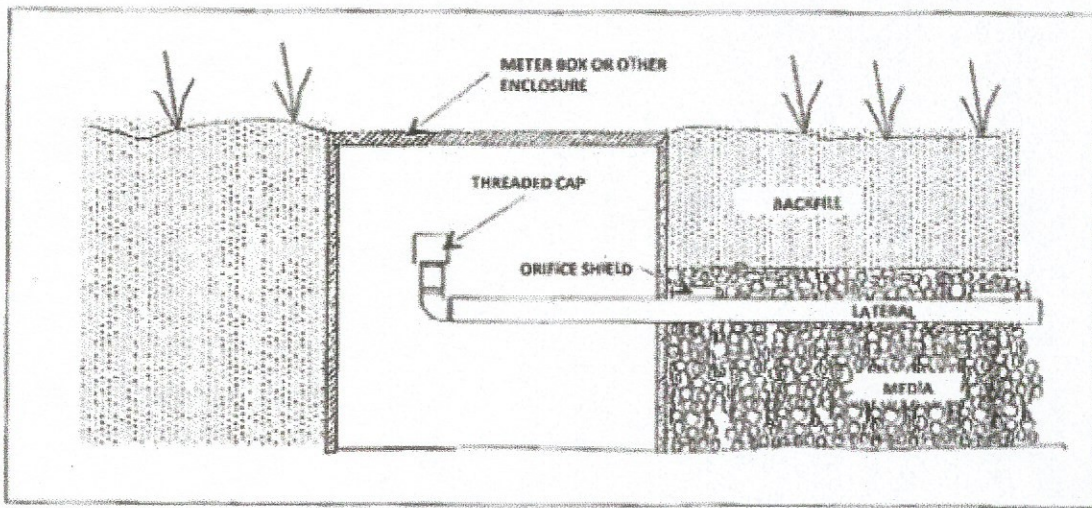
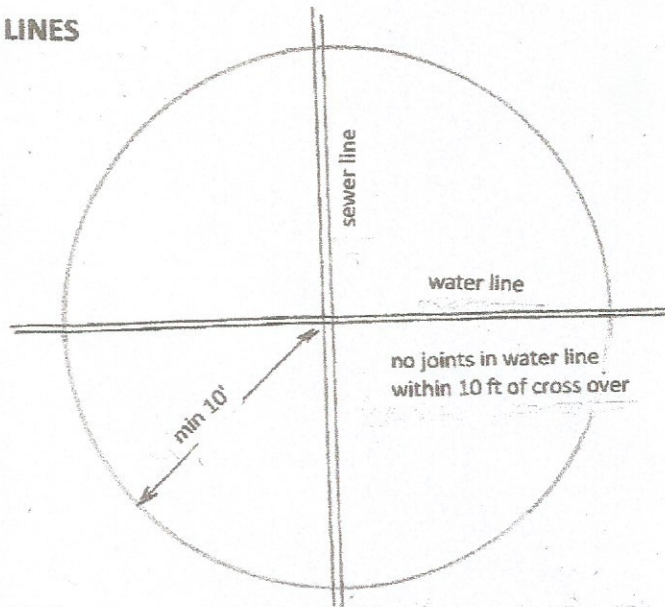
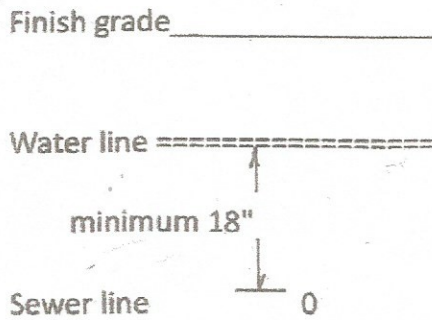


Figure 9A: Cleanout port

WHERE WATER LINES CROSS OVER SEWER LINES



Section R317-4-13 Table 4.

1. If the sewer leaving the house is three inches, the building sewer may be three inches.
- B. Building sewers shall be laid on a uniform minimum slope of not less than 1/4 inch per foot or 2.08% slope.
- C. The building sewer shall have a minimum of one cleanout and cleanouts every 100 feet.
 1. A cleanout is also required for each aggregate horizontal change in direction exceeding 135 degrees.
 2. Ninety degree ells are not recommended.
- D. Building sewers shall be separated from water service pipes in separate trenches, and by at least 10 feet horizontally, except that they may be placed in the same trench when all of the following conditions are met.
 1. The bottom of the water service pipe, at all points, shall be at least 18 inches above the top of the building sewer.
 2. The water service pipe shall be placed on a solid shelf excavated at one side of the common trench with a minimum clear horizontal distance of at least 18 inches from the sewer or drain line.
 3. The number of joints in the water service pipe should be kept to a minimum, and the materials and joints of both the sewer and water service pipes shall be of strength and durability to prevent leakage under adverse conditions.
 4. If the water service pipe crosses the building sewer, it shall be at least 18 inches above the latter within 10 feet of the crossing. Joints in water service pipes should be located at least 10 feet from such crossings.
- E. Building sewer placed under driveways or other areas subjected to heavy loads shall receive special design considerations to ensure against crushing or disruption of alignment.