Appendix D-2

Onsite Wastewater Treatment System Report, Proposed Commercial Development, Assessor's Parcel Number 0357-122-09, Located on State Highway 138, Hesperia Area, San Bernardino County, California

Patel & Associates, Inc

September 20, 2022

San Bernardino County Department of Public Health
Division of Environmental Health Services

Percolation Report EHS REF# 112197

DESIGN RATE: 91 **square feet per 100 gallons septic tank capacity**

This rate applies to:

☐ Location(s) where tested ☑ Leach lines/bed ☐ Seepage pits
☐ Replacement only ☐ Entire lot/subdivision ☐ Limited to:

Additional requirements:

☑ Maintain septic tank minimum 100/100 ft setback from Stream/Well
☑ Maintain disposal area minimum 100/150 ft setback from Stream/Well
☐ New construction requires perc test ☐ Clearance from _____ RWQCB
☑ EHS special conditions apply Maximum daily flow for Lahontan RWQCB area is 500gpd/acre.
Maximum flow for site is 1600gpd.

CONSTRUCTION DETAILS SUBJECT TO BUILDING AND SAFETY APPROVAL

Design Rate Issued By: A. Calderon Date: 10/26/2022

Patel & As
12284 Industrial Blvd S
(760

September 20, 2022

Mr. Mark Alnakoud
12077 State Highway 138
Hesperia, CA 92395

Subject: **Onsite Wastewater Treatment System Report, Proposed Commercial Development, Assessor's Parcel Number 0357-122-09, Located on State Highway 138, Hesperia Area, San Bernardino County, California**

Reference: County of San Bernardino, Division of Environmental Health Services, Department of Public Health, 2017, *Local Agency Management Program for Onsite Wastewater Treatment Systems*, dated May.

Patel & Associates, Inc. is pleased to present this onsite wastewater treatment system (OWTS) report for the proposed commercial development, referenced above. The purpose of our feasibility study was to determine the percolation rates and physical characteristics of the subsurface earth materials within the vicinity of the proposed leach lines. We have provided guidelines for the design of an onsite wastewater treatment system, where applicable. This evaluation is intended to provide adequate data to satisfy the County of San Bernardino, Community Health Agency, Department of Environmental Health guidelines a one bath dwelling approval.

PROPERTY DESCRIPTION AND LOCATION

The subject property is located on State Highway 138 in the Hesperia Area in San Bernardino County, California (See Figure 1). The subject property consists of a developed parcel of land with relatively flat terrain. There are no rock outcrops with a stream on the south side.

PROPOSED CONSTRUCTION

Based on information provided by you, the existing development includes a three (3) bedroom single family residence, complete with an onsite wastewater treatment system. This building will become part of the commercial operation. It will be converted to no bedrooms and one bath. The existing convenience store is to be demolished and a larger one built, to include a drive thru coffee shop.

SUBSURFACE EXPLORATION AND PERCOLATION TESTING

SUBSURFACE EXPLORATION

Subsurface exploration of the subject site consisted of three (3) deep exploratory test holes; one (1) to a depth of 16.5 feet, conducted on August 26, 2021, and two (2) to the depths of 36.5 feet and 40 feet, conducted on May 24, 2021 and July 23, 2021. The deep exploratory test hole was excavated to interpret groundwater depth. The historic groundwater is presented in Appendix C. Depth to groundwater is over 100 feet. Impermeable soil layers were present. Earth materials encountered within the deep exploratory test hole were classified and logged using the guidelines of ASTM 2487. The approximate location of the deep exploratory test hole is shown on the attached Percolation Location Map, Plate 1. The exploratory log has been included within Appendix A.

PERCOLATION TESTING

A total of nine (9) percolation tests were conducted on August 26 and 27, 2021 to evaluate the feasibility of utilizing leach fields for onsite wastewater treatment. The percolation tests were performed in general accordance with the referenced guidelines.

The percolation tests were performed at the bottom of 3½ to 4 feet deep test pits in 8- inch diameter tests holes. The exploratory log and locations of the percolation test holes are indicated on the attached Percolation Location Map, Plate 1. The percolation and deep exploratory test holes were located by property boundary measurement on the site plan and by using geographic features. Percolation testing was performed per the referenced San Bernardino County Local Agency Management Program guidelines.

The final percolation test reading is summarized in the following table and the test data recorded in the field is included in Appendix B.

PERCOLATION TEST SUMMARY

TEST NUMBER	PERCOLATION HOLE DIAMETER (IN.)	HOLE DEPTH (FT.)	FINAL PERCOLATION RATE (MPI)	EARTH MATERIAL DESCRIPTION
P-1	8	3.5	15	Silty SAND
P-2	8	3.5	13	Silty SAND
P-3	8	4	15	Silty SAND
P-4	8	4	10	Silty SAND
P-5	8	3.5	8.6	Silty SAND
P-6	8	3.5	10	Silty SAND
P-7	8	4	7.5	Silty SAND
P-8	8	4	9.0	Silty SAND
P-9	8	4	10	Silty SAND

FINDINGS

EARTH MATERIALS

A general description of the earth materials observed on site is provided below:

Quaternary Alluvial Deposits (Qoa): These deposits consist of a brown, dry to moist medium dense, silty sand with gravel.

GROUNDWATER

Groundwater was not observed within the deep exploratory hole (B-1) excavated to a depth of 36.5 feet or within the geotechnical study to 40 feet. The regional groundwater data is presented in Appendix C and is in excess of 49 feet.

PERCOLATION TEST RESULTS

The final measured percolation test design rate is 15 minutes per inch (mpi), yielding a loading rate at 1.37 square feet per 100 gallons of septic tank capacity per day.

CONCLUSIONS AND RECOMMENDATIONS

GENERAL

Based on the data presented in this report and using the recommendations set forth, it is the judgment of this professional that there is sufficient area on the lot to support a primary and expansion OWTS that will meet the current standards of the Department of Environmental Health and the Regional Water Quality Control Board (RWQCB). The design system shall be located in natural undisturbed soil at the depth of the tests performed. The natural occurring body of minerals and organic matter at the proposed wastewater disposal area contains earthen materials having more than 50% of its volume composed of particles smaller than 0.08 inches (2mm) in size.

Based on the data presented in this report and the testing information accumulated, it is the judgment of this professional that the groundwater table will not encroach within the current allowable limit set forth by County and State requirements.

SEWAGE DISPOSAL DESIGN RECOMMENDATIONS

The proposed sewage disposal system should consist of leach lines utilizing EZ Flow System. The areas for both a primary system and a 100 percent expansion system are required. Septic tanks should be located upslope from the leach fields to provide gravity flow from the septic tank to the leach lines. Descriptions of the general design and construction of the wastewater treatment systems is provided below.

Septic Tank Capacity: The minimum septic tank capacity is determined, in accordance with the referenced guidelines, by the total fixture count within the proposed design.

Allowable Design Percolation Rate: To determine the approximate square footage of each leaching area, the individual percolation rate test for each area that meet the requirements may be used as a guideline.

Primary System: Primary systems consist of a 1,000 gallon and a 2,500 gallon septic tank and leach field composed of subsurface leach lines. The minimum leach field absorption area is based upon the proposed septic tank capacity and the percolation rate of the proposed leach field area. The dimensions for individual leach field absorption areas are based on the total trench bottom area only and the areas between the leach line trenches are not included. In addition, the total linear footage can be reduced by 30 percent for designs utilizing plastic EZ Flow, as long as each line is of equal length.

Trench Width, Depth, and Minimum Soil Cover: For leach field areas having a slope of 10 percent, a minimum soil cover of 1½ feet over the leach lines is required. This soil cover is required to maintain a 15 feet minimum horizontal distance from the slope face to any portion of the leach lines. In order to provide a ±1½ foot soil cover, the trenches should be excavated to a depth on the order of 3 to 3½ feet below the surface. It should be noted that the required depth of cover is greater for those areas where the slope is steeper than 10 percent.

Individual leach line trenches should be excavated along the contours of the property which will maintain approximately the same elevation at the top of the trench. The leach line trench should be 36 inches wide, with a minimum center to center spacing of 7 feet, respectively.

EZ FLOW SYSTEM 1			
DESIGN RATE (mpi)	MIN FT^2/100 GALLONS	MIN SQUARE FEET	TOTAL LENGTH OF LINES (feet)
15	1.37	918	92
EZ FLOW SYSTEM 2			
DESIGN RATE (mpi)	MIN FT^2/100 GALLONS	MIN SQUARE FEET	TOTAL LENGTH OF LINES (feet)
15	1.37	2,329	233

As a result, the recommended leach field design for System One consists of ninety two (92) feet long leach lines with EZ Flow System per line for both the primary and expansion system disposal areas. The proposed location for each system shall provide sufficient areas for both primary and 100% expansion.

As a result, the recommended leach field design for System Two consists of two hundred thirty three (233) feet long leach lines with EZ Flow System per line for both the primary and expansion system disposal areas. The proposed location for each system shall provide sufficient areas for both primary and 100% expansion

100 Percent Expansion System: Sufficient area must be set aside for future construction of a backup system of equal size in the event the primary system fails. The area required for the 100 percent expansion system is identical to that of the primary system.

ADDITIONAL DESIGN CONSIDERATIONS AND RECOMMENDATIONS

To encourage the maximum loss of sewage effluent through evaporation and transpiration, the leach lines should be installed at the recommended depth and as close to the ground surface as possible. As noted above, leach lines should also be installed within trenches excavated along ground contours of equal elevation to maintain a relatively consistent trench depth. The minimum center to center spacing between the leach line trenches is 7 feet for 36-inch wide trenches.

Backfill materials placed over the leach lines should not be compacted but slightly mounded to allow for settlement and to minimize infiltration of surface water. To prevent collapse or crushing of the system, cobbles and boulders should be removed from the backfill soils over the pipes.

A minimum horizontal clearance of 5 feet is required between the leach lines and property lines. A minimum horizontal clearance of 5 feet is also required between the septic tank and proposed structures. A minimum horizontal clearance of 8 feet is required between the leach lines and proposed structures.

In the event that future access to the 100 percent expansion area is compromised by development (ie., garden walls, etc.), consideration should be given to constructing the expansion system at the same time as the primary system. If the systems are not constructed concurrently, consideration should be given to accessibility of the 100 percent expansion area after all site improvements are constructed.

The leach line trenches should be observed by the geotechnical consultant during and after excavation, as well as before the placement of perforated pipe. The site observations are to verify the suitability of the exposed earth materials. Necessary revisions or modifications may be needed if unforeseen conditions exposed during construction, such as hard impermeable rock. Revisions could include adding additional lines or a redesign of the system that conforms to the site conditions.

The leach field areas should not be used for recreation, horse corrals or other uses that would compact the earth materials at the surface. The ground surface over the disposal areas should be seeded or sodded to mitigate erosion.

The property owners should take note that proper use and maintenance are crucial to extending the effective design life of the sewage disposal system. The use of excessive water, introduction of detergents or chemicals, and solid food waste from garbage disposals can cause premature system failures. Properly maintained sewage disposal systems can function for many years. However, a rest period of roughly 10 to 15 years is generally needed to promote bacterial decay and a chance to dry up. After this resting period, the primary system can often be reactivated and alternated with the 100 percent expansion system.

GRADING PLAN REVIEW AND CONSTRUCTION SERVICES

This report has been prepared for the exclusive use of **Mr. Mark Alnakoud** and their authorized representative. It likely does not contain sufficient information for other parties or other uses. Patel & Associates, Inc. should be engaged to review the final design plans and specifications prior to construction. This is to verify that the recommendations contained in this report have been properly incorporated into the project plans and specifications. Should Patel & Associates, Inc. not be accorded the opportunity to review the project plans and specifications, we are not responsibility for misinterpretation of our recommendations.

Patel & Associates, Inc. should be retained to provide observations during construction to validate this report. In order to allow for design changes in the event that the subsurface conditions differ from those anticipated prior to construction.

Patel & Associates, Inc. should review any changes in the project and modify and approve in writing the conclusions and recommendations of this report. This report and the drawings contained within are intended for design input purposes only and are not intended to act as construction drawings or specifications. In the event that conditions encountered during grading or construction operations appear to be different than those indicated in this report, this office should be notified immediately, as revisions may be required.

REPORT LIMITATIONS

Our services were performed using the degree of care and skill ordinarily exercised, under similar circumstances, by reputable soils engineers and geologists, practicing at the time and location this report was prepared. No other warranty, expressed or implied, is made as to the conclusions and professional advice included in this report.

Earth materials vary in type, strength, and other geotechnical properties between points of observation and exploration. Groundwater and moisture conditions can also vary due to natural processes or the works of man on this or adjacent properties. As a result, we do not and cannot have complete knowledge of the subsurface conditions beneath the subject property. No practical study can completely eliminate uncertainty with regard to the anticipated geotechnical conditions in connection with a subject property. The conclusions and recommendations within this report are based upon the findings at the points of observation and are subject to confirmation by Patel & Associates, Inc. during construction. This report is considered valid for a period of one year from the time the report was issued.

This report was prepared with the understanding that it is the responsibility of the owner or their representative, to ensure that the conclusions and recommendations contained herein are brought to the attention of the other project consultants and are incorporated into the plans and specifications. The owners' contractor should properly implement the conclusions and recommendations during grading and construction, and notify the owner if they consider any of the recommendations presented herein to be unsafe or unsuitable.

Respectfully submitted,

PATEL & ASSOCAITES, INC.

Stephen M. Poole, PE 40219
President
Principal Engineer

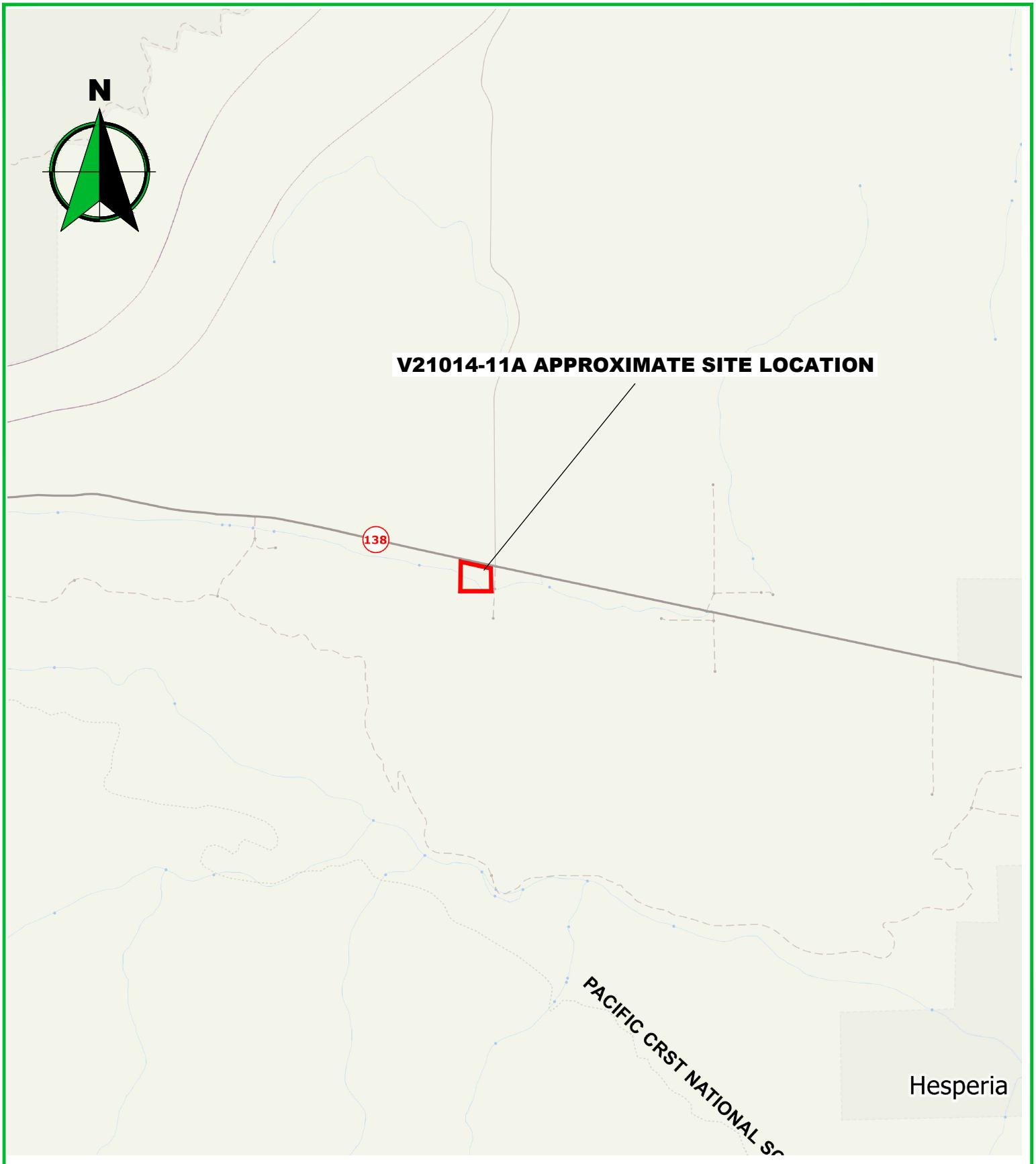
SMP/sez

Distribution: (2) Addressee

Attachments: Figure 1 – Vicinity Map *(Rear of Text)*
Appendix A – Exploratory Log *(Rear of Text)*
Appendix B – Percolation Test Results *(Rear of Text)*
Appendix C – Historic Groundwater *(Rear of Text)*
Appendix D – Calculations (*Rear of Text)*
Plate 1 – Percolation Location Map *(Rear of Text)*

FIGURE 1

VICINITY MAP



SCALE

0 1,000 2,000 3,000

Feet

PROPOSED SINGLE FAMILY RESIDENCE	V21014-11A
VICINITY MAP	SEE SCALE BAR
	SEP 2021 / FIGURE 1

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APPENDIX A

EXPLORATORY LOG

Geotechnical Boring Log B-1

Date: 5/24/2021	**Project Name: Silverwood**
Project Number: V21014-10	**Logged By: MWG**
Drilling Company: GP Drilling	**Type of Rig: B-61**
Drive Weight (lbs): 140	**Drop (in): 30 Hole Diameter (in): 8**
Top of Hole Elevation (ft): See Map	**Hole Location: See Geotechnical Map**

Depth (ft)	Blow Count Per Foot	Sample Depth	Dry Density (pcf)	Moisture (%)	Classification Symbol	MATERIAL DESCRIPTION
0					Qa	Quaternary alluvium, Concrete upper 4"
					SC	Clayey SAND, dark brown, moist, loose
	8	2.5	105.6	8.0		
5	7	5	105.9	11.6		
	10	7.5	112.7	10.2		
10	9	10	106.0	12.9		
15	12	15	119.6	9.0		
					SM	Silty SAND, orangish brown, slightly moist, medium dense
20	16	20	119.7	6.6		
					SC	Clayey SAND, dark brown, moist, medium dense
25	12	25	110.3	6.8		
30						

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PATEL & ASSOCIATES, INC.

Geotechnical Boring Log B-1

Date: 5/24/2021	**Project Name: Silverwood**
Project Number: V21014-10	**Logged By: MWG**
Drilling Company: GP Drilling	**Type of Rig: B-61**
Drive Weight (lbs): 140	**Drop (in): 30 Hole Diameter (in): 8**
Top of Hole Elevation (ft): See Map	**Hole Location: See Geotechnical Map**

Depth (ft)	Blow Count Per Foot	Sample Depth	Dry Density (pcf)	Moisture (%)	Classification Symbol	MATERIAL DESCRIPTION
30	14	30	113.7	9.1	SC	Clayey SAND, brown, moist, medium dense
					SM	Silty SAND with gravel, light brown, slightly moist, medium dense
35	18	35	112.5	9.1		
						END OF BORING 36.5'
						NO GROUNDWATER
40						
45						
50						
55						
60						

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Geotechnical Boring Log B-4

Date: 7/23/2021	**Project Name: Silverwood**
Project Number: V21014-10	**Logged By: MWG**
Drilling Company: GP Drilling	**Type of Rig: B-61**
Drive Weight (lbs): 140	**Drop (in): 30 Hole Diameter (in): 8**
Top of Hole Elevation (ft): See Map	**Hole Location: See Geotechnical Map**

Depth (ft)	Blow Count Per Foot	Sample Depth	Dry Density (pcf)	Moisture (%)	Classification Symbol	MATERIAL DESCRIPTION
0					Qa	Quaternary alluvium
					SM	Silty SAND, light brown, slightly moist, medium dense
	12	2.5	114.1	1.8		
5	9	5	106.3	3.6	SC	Clayey SAND, brown, moist, loose
						Medium dense below 7'
	12	7.5	118.7	8.0		
10	12	10	111.4	7.4		
15	10	15	116.5	7.6		
20	12	20	98.0	15.5		
25	17	25	113.1	10.9		
						END OF BORING 40'
						NO GROUNDWATER
30						

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Geotechnical Log SP-3

Date: July 23, 2021	**Project Name: Silverwood Market Hwy 138** **Page: 1 of 2**
Project Number: V21014-11A	**Logged By: MWG**
Drilling Company: GP Drilling	**Type of Rig: B-61**
Drive Weight (lbs): 140	**Drop (in): 30** **Hole Diameter (in): 8**
Top of Hole Elevation (ft): See Map	**Hole Location: See Geotechnical Map**

Depth (ft)	Blow Count Per Foot	Sample Depth	Dry Density (pcf)	Moisture (%)	Classification Symbol	MATERIAL DESCRIPTION
0						**Quaternary Alluvium (Qa):**
					SM	Silty SAND; light brown, slightly moist, loose
5					SM	Silty SAND; brown, slightly moist, medium dense
10					SC	Clayey SAND; brown, moist, dense
15						
20						
25						
					SC-GC	Clayey-Gravely SAND, brown, moist, dense
30						

Geotechnical Log SP-3

Date: July 23, 2021	**Project Name: Silverwood Market Hwy 138** **Page: 2 of 2**
Project Number: V21014-11A	**Logged By: MWG**
Drilling Company: GP Drilling	**Type of Rig: B-61**
Drive Weight (lbs): 140	**Drop (in): 30** **Hole Diameter (in): 8**
Top of Hole Elevation (ft): See Map	**Hole Location: See Geotechnical Map**

Depth (ft)	Blow Count Per Foot	Sample Depth	Dry Density (pcf)	Moisture (%)	Classification Symbol	MATERIAL DESCRIPTION
30						
35						
40						Total Depth 40 feet No Groundwater
45						
50						
55						
60						

42184 Remington Avenue, Temecula, CA 92590

PATEL & ASSOCIATES, INC.

Geotechnical Boring Log MW-1

Date: 5/24/2021	**Project Name: Silverwood**
Project Number: V21014-10	**Logged By: MWG**
Drilling Company: GP Drilling	**Type of Rig: B-61**
Drive Weight (lbs): 140	**Drop (in): 30 Hole Diameter (in): 8**
Top of Hole Elevation (ft): See Map	**Hole Location: See Geotechnical Map**

Depth (ft)	Blow Count Per Foot	Sample Depth	Dry Density (pcf)	Moisture (%)	Classification Symbol	MATERIAL DESCRIPTION
0					Qa	Quaternary alluvium
					SC	Clayey SAND, brown, moist, medium dense
	12	2.5	115.9	8.2		
5	10	5	111.8	5.2		
					SM	Silty SAND, brown, moist, loose
	9	7.5	108.6	11.5		
10	13	10	108.5	3.5		Orange, slightly moist, medium dense below 10'
15	10	15	116.9	6.4		
						END OF BORING 16.5'
						NO GROUNDWATER
20						
25						
30						

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PATEL & ASSOCIATES, INC.

APPENDIX B

PERCOLATION TEST RESULTS

PERCOLATION SHEET

Tested By: MWG

Project No.: V21014-11A

Test Hole Number: P-1

Test Hole Diameter (inches): 8

Soil Classification: SM

Date Excavated: 8/25/2021

Depth of Test Hole (ft): 3.5

Date Tested: 8/26/2021

Date / Time	Presoak Period	Amount of Water Used / Comments
Start	Time Interval of Presoak	
Stop	N/A	

Time	Time Interval (min.)	Time Elapsed (min.)	Initial Water Level (Inches)	Final Water Level (Inches)	Water Level Drop (Inches)	Percolation Rate (Min./Inch)
10:28	30	30	33.25	36.5	3.25	9.3
10:58						
10:59	30	60	34.75	37	2.25	13.4
11:29						
11:30	30	90	35.25	36.5	1.25	24.0
12:00						
12:01	30	120	34	36	2.00	15.0
12:31						
12:32	30	150	33.5	35.5	2.00	15.0
13:02						
13:03	30	180	33.75	35.75	2.00	15.0
13:33						
13:34	30	210	33	35	2.00	15.0
14:04						
14:05	30	240	33.25	35.25	2.00	15.0
14:35						
14:36	30	270	33.75	35.75	2.00	15.0
15:06						
15:07	30	300	32	33	1.00	30.0
15:37						
15:38	30	330	32.5	34.5	2.00	15.0
16:08						
16:09	30	360	31.75	33.75	2.00	15.0
16:39						

MEASURED FROM TOP

PERCOLATION SHEET

Tested By: MWG

Project No.: V21014-11A

Test Hole Number: P-2

Test Hole Diameter (inches): 8

Soil Classification: SM

Date Excavated: 8/25/2021

Depth of Test Hole (ft): 3.5

Date Tested: 8/26/2021

Date / Time	Presoak Period	Amount of Water Used / Comments
Start	Time Interval of Presoak	
Stop	N/A	

Time	*Time Interval (min.)*	*Time Elapsed (min.)*	*Initial Water Level (Inches)*	*Final Water Level (Inches)*	*Water Level Drop (Inches)*	*Percolation Rate (Min./Inch)*
10:30	30	30	32.5	35.5	3.00	10.0
11:00						
11:01	30	60	33.25	35.5	2.25	13.4
11:31						
11:32	30	90	33	35	2.00	15.0
12:02						
12:03	30	120	32	34.5	2.50	12.0
12:33						
12:34	30	150	33	35.25	2.25	13.4
13:04						
13:05	30	180	33.25	35.25	2.00	15.0
13:35						
13:36	30	210	33.75	36	2.25	13.4
14:06						
14:07	30	240	32.75	34.75	2.00	15.0
14:37						
14:38	30	270	33.25	35.75	2.50	12.0
15:08						
15:09	30	300	32.25	34.5	2.25	13.4
15:39						
15:40	30	330	32	34.25	2.25	13.4
16:10						
16:11	30	360	31.75	34	2.25	13.4
16:41						

MEASURED FROM TOP

PERCOLATION SHEET

Tested By: MWG

Project No.: V21014-11A

Test Hole Number: P-3

Test Hole Diameter (inches): 8

Soil Classification: SM

Date Excavated: 8/25/2021

Depth of Test Hole (ft): 4

Date Tested: 8/26/2021

Date / Time	Presoak Period	Amount of Water Used / Comments
Start	Time Interval of Presoak	
Stop	N/A	

Time	*Time Interval (min.)*	*Time Elapsed (min.)*	*Initial Water Level (Inches)*	*Final Water Level (Inches)*	*Water Level Drop (Inches)*	*Percolation Rate (Min./Inch)*
10:32	30	30	31	34.25	3.25	9.3
11:02						
11:03	30	60	33.25	35.25	2.00	15.0
11:33						
11:34	30	90	32.5	34.25	1.75	17.2
12:04						
12:05	30	120	31	33.5	2.50	12.0
12:35						
12:36	30	150	32	34.25	2.25	13.4
13:06						
13:07	30	180	31.5	33.5	2.00	15.0
13:37						
13:38	30	210	32.5	34.5	2.00	15.0
14:08						
14:09	30	240	32.5	34.5	2.00	15.0
14:39						
14:40	30	270	32.5	34.5	2.00	15.0
15:10						
15:11	30	300	31.5	33.5	2.00	15.0
15:41						
15:42	30	330	32	34	2.00	15.0
16:12						
16:13	30	360	31.5	33.5	2.00	15.0
16:43						

MEASURED FROM TOP

PERCOLATION SHEET

Tested By: MWG

Project No.: V21014-11A

Test Hole Number: P-4

Test Hole Diameter (inches): 8

Soil Classification: SM

Date Excavated: 8/25/2021

Depth of Test Hole (ft): 4

Date Tested: 8/26/2021

Date / Time	Presoak Period	Amount of Water Used / Comments
Start	Time Interval of Presoak	
Stop	N/A	

Time	*Time Interval (min.)*	*Time Elapsed (min.)*	*Initial Water Level (Inches)*	*Final Water Level (Inches)*	*Water Level Drop (Inches)*	*Percolation Rate (Min./Inch)*
10:34	30	30	33.5	36.5	3.00	10.0
11:04						
11:05	30	60	31.75	35.75	4.00	7.5
11:35						
11:36	30	90	32	36	4.00	7.5
12:06						
12:07	30	120	31	35.25	4.25	7.1
12:37						
12:38	30	150	32	35	3.00	10.0
13:08						
13:09	30	180	33	36.25	3.25	9.3
13:39						
13:40	30	210	32.75	36	3.25	9.3
14:10						
14:11	30	240	31.75	34	2.25	13.4
14:41						
14:42	30	270	30.5	33.75	3.25	9.3
15:12						
15:13	30	300	32.75	36	3.25	9.3
15:43						
15:44	30	330	31	34	3.00	10.0
16:14						
16:15	30	360	32.5	35.5	3.00	10.0
16:45						

MEASURED FROM TOP

PERCOLATION SHEET

Tested By: MWG

Project No.: V21014-11A

Test Hole Number: P-5

Test Hole Diameter (inches): 8

Soil Classification: SM

Date Excavated: 8/26/2021

Depth of Test Hole (ft): 3.5

Date Tested: 8/27/2021

Date / Time	Presoak Period	Amount of Water Used / Comments
Start	Time Interval of Presoak	
Stop	N/A	

Time	*Time Interval (min.)*	*Time Elapsed (min.)*	*Initial Water Level (Inches)*	*Final Water Level (Inches)*	*Water Level Drop (Inches)*	*Percolation Rate (Min./Inch)*
10:36	30	30	32.25	38	5.75	5.3
11:06						
11:07	30	60	29	34	5.00	6.0
11:37						
11:38	30	90	30.5	34.5	4.00	7.5
12:08						
12:09	30	120	31	36.25	5.25	5.8
12:39						
12:40	30	150	32.5	36.5	4.00	7.5
13:10						
13:11	30	180	30.75	33.5	2.75	11.0
13:41						
13:42	30	210	31.25	35.5	4.25	7.1
14:12						
14:13	30	240	32.25	36.25	4.00	7.5
14:43						
14:44	30	270	33.5	37.25	3.75	8.0
15:14						
15:15	30	300	31.25	35.25	4.00	7.5
15:45						
15:46	30	330	32.5	36	3.50	8.6
16:16						
16:17	30	360	31.25	34.75	3.50	8.6
16:47						

MEASURED FROM TOP

PERCOLATION SHEET

Tested By: MWG

Project No.: V21014-11A

Test Hole Number: P-6

Test Hole Diameter (inches): 8

Soil Classification: SM

Date Excavated: 8/26/2021

Depth of Test Hole (ft): 3.5

Date Tested: 8/27/2021

Date / Time	Presoak Period	Amount of Water Used / Comments
Start	Time Interval of Presoak	
Stop	N/A	

Time	*Time Interval (min.)*	*Time Elapsed (min.)*	*Initial Water Level (Inches)*	*Final Water Level (Inches)*	*Water Level Drop (Inches)*	*Percolation Rate (Min./Inch)*
11:21	10	10	34	36.5	2.50	4.0
11:31						
11:32	10	20	33.75	35.75	2.00	5.0
11:42						
11:43	10	30	33.25	34.5	1.25	8.0
11:53						
11:54	10	40	32	33.25	1.25	8.0
12:04						
12:05	10	50	32.25	33.25	1.00	10.0
12:15						
12:16	10	60	32.25	33	0.75	13.4
12:26						
12:27	30	90	31.5	33.75	2.25	13.4
12:57						
12:59	30	120	31	33.5	2.50	12.0
13:29						
13:30	30	150	32	34.75	2.75	11.0
14:00						
14:02	30	180	32	34.5	2.50	12.0
14:32						
14:33	30	210	32	35	3.00	10.0
15:03						

MEASURED FROM TOP

PERCOLATION SHEET

Tested By: MWG

Project No.: V21014-11A

Test Hole Number: P-7

Test Hole Diameter (inches): 8

Soil Classification: SM

Date Excavated: 8/26/2021

Depth of Test Hole (ft): 4

Date Tested: 8/27/2021

Date / Time	Presoak Period	Amount of Water Used / Comments
Start	Time Interval of Presoak	
Stop	N/A	

Time	*Time Interval (min.)*	*Time Elapsed (min.)*	*Initial Water Level (Inches)*	*Final Water Level (Inches)*	*Water Level Drop (Inches)*	*Percolation Rate (Min./Inch)*
10:38	30	30	30.5	36.5	6.00	5.0
11:08						
11:09	30	60	31.75	36	4.25	7.1
11:39						
11:40	30	90	30	34.75	4.75	6.4
12:10						
12:11	30	120	32	36	4.00	7.5
12:41						
12:42	30	150	31.5	36.5	5.00	6.0
13:12						
13:13	30	180	32.25	37.25	5.00	6.0
13:43						
13:44	30	210	32.5	37	4.50	6.7
14:14						
14:15	30	240	31.5	36	4.50	6.7
14:45						
14:46	30	270	33.75	38	4.25	7.1
15:16						
15:17	30	300	31.25	35.5	4.25	7.1
15:47						
15:48	30	330	30	34	4.00	7.5
16:18						
16:19	30	360	32	36	4.00	7.5
16:49						

MEASURED FROM TOP

PERCOLATION SHEET

Tested By: MWG

Project No.: V21014-11A

Test Hole Number: P-8

Test Hole Diameter (inches): 8

Soil Classification: SM

Date Excavated: 8/26/2021

Depth of Test Hole (ft): 4

Date Tested: 8/27/2021

Date / Time	Presoak Period	Amount of Water Used / Comments
Start	Time Interval of Presoak	
Stop	N/A	

Time	*Time Interval (min.)*	*Time Elapsed (min.)*	*Initial Water Level (Inches)*	*Final Water Level (Inches)*	*Water Level Drop (Inches)*	*Percolation Rate (Min./Inch)*
10:32	30	30	31	34.25	3.25	9.3
11:02						
11:03	30	60	33.25	36.25	3.00	10.0
11:33						
11:34	30	90	32.5	35.25	2.75	11.0
12:04						
12:05	30	120	31	33.5	2.50	12.0
12:35						
12:36	30	150	32	34.75	2.75	11.0
13:06						
13:07	30	180	31.5	34.5	3.00	10.0
13:37						
13:38	30	210	32.5	36	3.50	8.6
14:08						
14:09	30	240	32.5	35.5	3.00	10.0
14:39						
14:40	30	270	32.5	35.5	3.00	10.0
15:10						
15:11	30	300	31.5	34.5	3.00	10.0
15:41						
15:42	30	330	32	35.25	3.25	9.3
16:12						
16:13	30	360	31.5	35	3.50	8.6
16:43						

MEASURED FROM TOP

PERCOLATION SHEET

Tested By: MWG

Project No.: V21014-11A

Test Hole Number: P-9

Test Hole Diameter (inches): 8

Soil Classification: SM

Date Excavated: 8/26/2021

Depth of Test Hole (ft): 4

Date Tested: 8/27/2021

Date / Time	Presoak Period	Amount of Water Used / Comments
Start	Time Interval of Presoak	
Stop	N/A	

Time	*Time Interval (min.)*	*Time Elapsed (min.)*	*Initial Water Level (Inches)*	*Final Water Level (Inches)*	*Water Level Drop (Inches)*	*Percolation Rate (Min./Inch)*
10:32	30	30	34	36.5	2.50	12.0
11:02						
11:03	30	60	33.75	36.25	2.50	12.0
11:33						
11:34	30	90	33.25	35.25	2.00	15.0
12:04						
12:05	30	120	32	33.5	1.50	20.0
12:35						
12:36	30	150	32.25	34.75	2.50	12.0
13:06						
13:07	30	180	32.25	34.5	2.25	13.4
13:37						
13:38	30	210	32.5	36	3.50	8.6
14:08						
14:09	30	240	31	34.5	3.50	8.6
14:39						
14:40	30	270	32	35.5	3.50	8.6
15:10						
15:11	30	300	32	35	3.00	10.0
15:41						
15:42	30	330	32	35.25	3.25	9.3
16:12						
16:13	30	360	32	35	3.00	10.0
16:43						

MEASURED FROM TOP

APPENDIX C

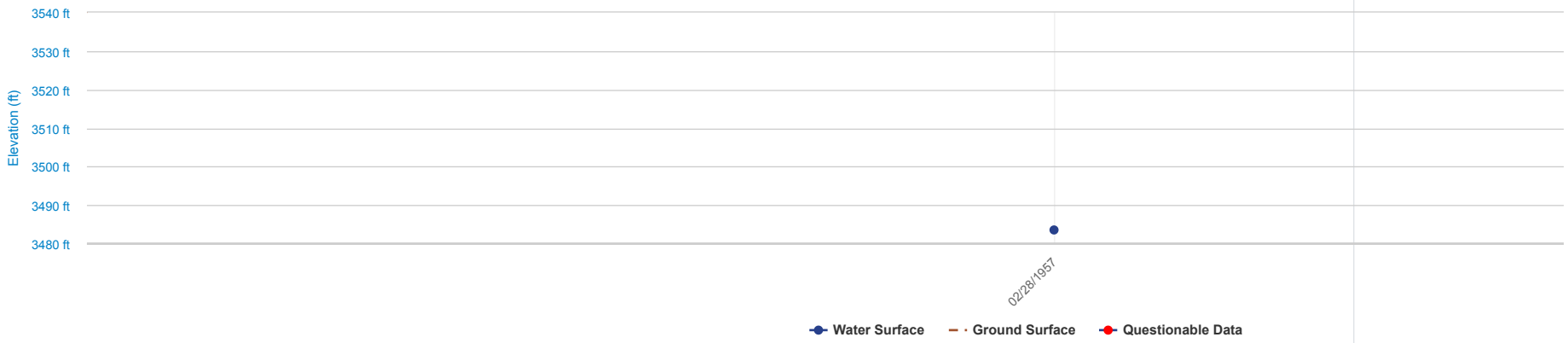
HISTORIC GROUNDWATER

Groundwater Level Report

Station 343220N1173985W003

Station Data | Groundwater Level Data

Groundwater Levels for Well 343220N1173985W003



Download Data

Measurement Date (PST)	Reference Point Elevation	Ground Surface Elevation	Distance from RP to WS	Groundwater Elevation	Ground Surface to Water Surface	Measurement Issue	Collecting Agency	Water Level Measurement Comments
02/28/1957 00:00:00	3532.890	3532.890	49.4	3483.49	49.4		Department of Water Resou...	

1 record

APPENDIX D

CALCULATIONS

Appendix D

System No. 1

EZ Flow System

- 1,000 Gallon Septic Tank
- Design rate per EPA Design Manuals (1980) for 15 mpi = 1.37 square feet/ gallon/day
- Effluent: 1,000 x $\frac{2}{3}$ = 670 gallons

Proposed Primary
670 gallon tank x 1.37 = 918 ÷ 7 = 131 linear feet x 0.7 = 92 linear feet
92 linear feet, with 3' x 3' trench using EZ Flow.
2 Lines at 46 Feet Each.
Proposed 100% Expansion
670 gallon tank x 1.37 = 918 ÷ 7 = 131 linear feet x 0.7 = 92 linear feet
92 linear feet, with 3' x 3' trench using EZ Flow.
2 Lines at 46 Feet Each.

Trench Width, Depth, and Minimum Soil Cover: For leach field areas having a slope of 10 percent, a minimum soil cover of 1½ feet over the leach lines is require. In order to provide a ±1½ foot soil cover, the trenches should be excavated to a depth on the order of 3 to 3½ feet below the surface. It should be noted that the required depth of cover is greater for those areas where the slope is steeper than 10 percent.

Individual leach lines trenches should be excavated along the contours of the property which will maintain approximately the same elevation at the top of the trench. The leach line trench should be 36 inches wide, with a minimum center to center spacing of 4,6, and 8 feet for 1 x 3, 2 x 3, and 3 x 3, respectively.

Appendix D

System No. 2

EZ Flow System

- 2,500 Gallon Septic Tank
- Design rate per EPA Design Manuals (1980) for 15 mpi = 1.37 square feet/ gallon/day
- Effluent: 2,500 x $\frac{2}{3}$= 1,667 gallons; use 1,700 gallons

Proposed Primary
2,500 gallon tank: 1700 gallons x 1.37 = 2,329 ÷ 7 = 333 linear feet x 0.7 = 233 linear feet
233 linear feet, with 3' x 3' trench using EZ Flow.
3 Lines at 78 Feet Each.
Proposed 100% Expansion
2,500 gallon tank: 1700 gallons x 1.37 = 2,329 ÷ 7 = 333 linear feet x 0.7 = 233 linear feet
233 linear feet, with 3' x 3' trench using EZ Flow.
3 Lines at 78 Feet Each.

Trench Width, Depth, and Minimum Soil Cover: For leach field areas having a slope of 10 percent, a minimum soil cover of 1½ feet over the leach lines is require. In order to provide a ±1½ foot soil cover, the trenches should be excavated to a depth on the order of 3 to 3½ feet below the surface. It should be noted that the required depth of cover is greater for those areas where the slope is steeper than 10 percent.

Individual leach lines trenches should be excavated along the contours of the property which will maintain approximately the same elevation at the top of the trench. The leach line trench should be 36 inches wide, with a minimum center to center spacing of 4,6, and 8 feet for 1 x 3, 2 x 3, and 3 x 3, respectively.

LEGEND

Locations are Approximate

Symbols

- Limits of Report
- P-4 - Percolation Test Location
- MW-1 - Percolation Monitoring Well Location
- Primary Leach Lines

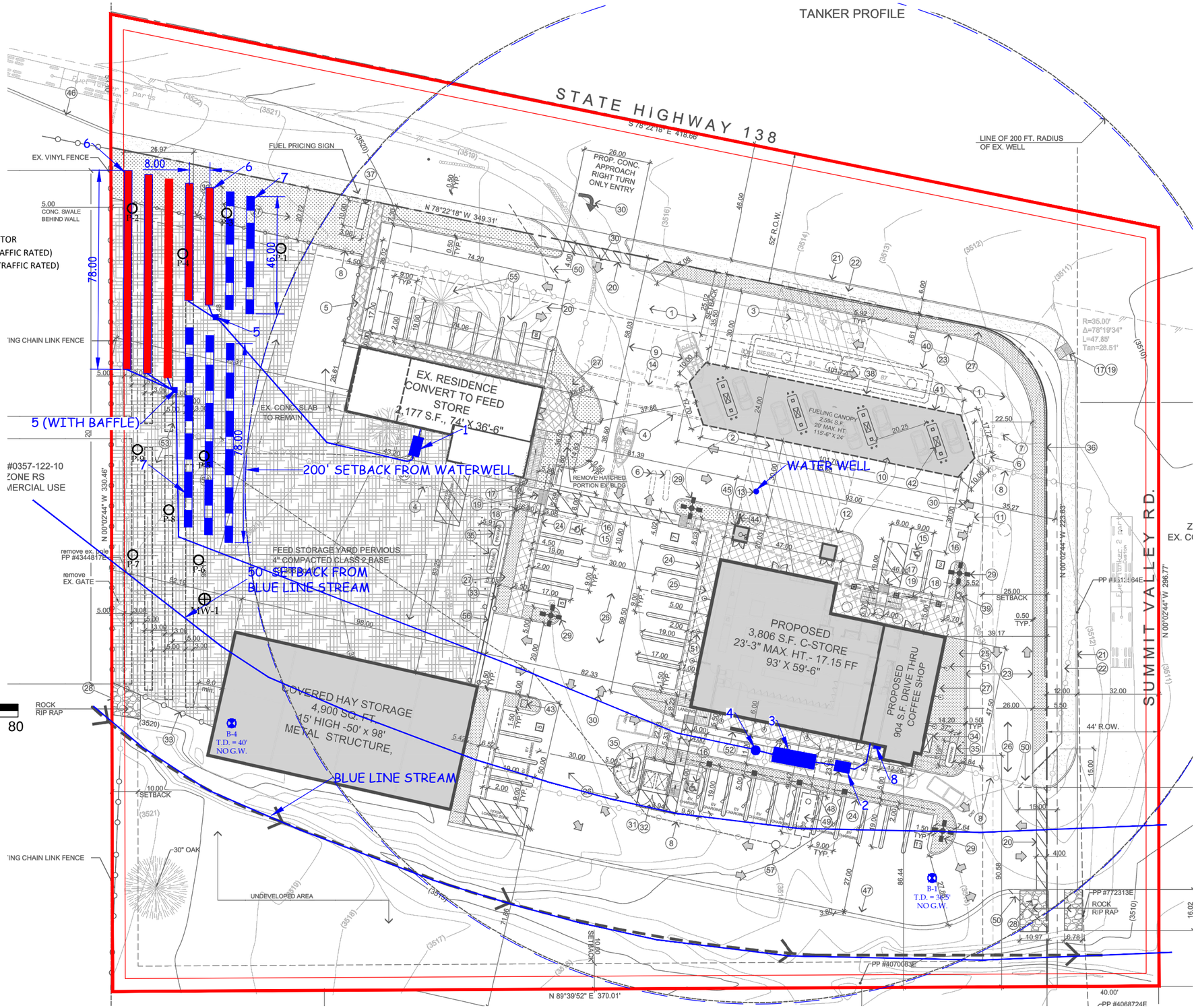
SYSTEM 1 NOTES:

- PROPOSED FEED STORE
- 1000 GALLON SEPTIC TANK
- TOTAL EFFLUENT = 670 GALLONS
- DESIGN RATE = 15 MPI, 1.37 SQFT / GALLON / DAY
- TOTAL LENGTH (30% REDUCTION) = 92 FEET
- PRIMARY: 2 LINES @ 46 FEET LONG (EZ FLOW)
- 100% EXPANSION: 2 LINES @ 46 FEET LONG (EZ FLOW)

SYSTEM 2 NOTES:

- PROPOSED CONVENIENCE STORE
- 2500 GALLON SEPTIC TANK
- TOTAL EFFLUENT = 1700 GALLONS
- DESIGN RATE = 15 MPI, 1.37 SQFT / GALLON / DAY
- TOTAL LENGTH (30% REDUCTION) = 233 FEET
- PRIMARY: 3 LINES @ 78 FEET LONG (EZ FLOW)
- 100% EXPANSION: 4 LINES @ 59 FEET LONG (EZ FLOW)

1. 1000 GALLON SEPTIC TANK
2. 750 GALLON GREASE INTERCEPTOR
3. 2500 GALLON SEPTIC TANK (TRAFFIC RATED)
4. 70 GALLON PUMP CHAMBER (TRAFFIC RATED)
5. DISTRIBUTION BOX
6. PRIMARY LEACH LINES
7. 100% EXPANSION AREA
8. CONTROL PANEL



Commitment of Excellence through Engineered Solution

PERCOLATION MAP

LOCATED ON STATE HIGHWAY 138

HESPERIA AREA, SAN BERNARDINO COUNTY, CALIFORNIA

APN 0357-122-09

PROJECT	***PROPOSED SINGLE FAMILY RESIDENCE***		
CLIENT	***MR.MARK ALNAKOUD***		
PROJECT NO.	***V21014-11A***		
DATE	***SEPTEMBER 2021***		
SCALE	***1:40***		
DWG XREFS			
REVISION	***2***	***SEPTEMEBER 12, 2022***	
DRAWN BY	***JDG***	***PLATE***	***1 OF 1***