

Drinking Water Source Assessment

Water System

System name

Quail Valley Water District – Westside System

Water Source

Source name

Montclair West and Montclair East

Assessment Date

Month, year

October, 2017

State Water Resources Control Board
Division of Drinking Water (DDW)
Drinking Water Field Operations Branch
DDW, Tehachapi District

District No. _____
System No. 1503226
Source No. 1503226-002, 1503226-XXX
PS Code _____

Checklist for Drinking Water Source Assessment - Ground Water Source

District Name: Quail Valley Water District District No. 1503226 County: Kern
System Name: Quail Valley Water District – Westside System System No. 1503226
Source Name: Montclaire West and Montclaire East Source No. 1503226-002, 1503226-XXX
PS Code: _____ Completed by: Quail Valley Water District Date: 10-26-17

The following information should be contained in the drinking water source assessment submittal.

Cover Page

Checklist (*this form*)

Assessment Summary

Vulnerability Summary

Source Location Form (*not currently available, contact SWRCB-DDW for information*)

Delineation of groundwater protection zones

Source Data Sheet (select appropriate form)

X Well Data Sheet

Spring Data Sheet

Horizontal Well Data Sheet

Physical Barrier Effectiveness Checklist

Possible Contaminating Activities (PCA) inventory form

Vulnerability Ranking

Assessment map with source location and protection zone

Additional maps (optional) (e.g. local maps of zones and PCAs, recharge area maps, or maps indicating direction of ground water flow)

Means of Public Availability of Report (indicate those that will be used)

X Notice in the Consumer Confidence Report* (minimum)

X Copy in regulatory agency (SWRCB-DDW or LPA) office (minimum)

X Copy in public water system office (recommended)

Copy in public library/libraries

X Internet (indicate Internet address: www.qvwd.org)

Other (describe)

*The CCR should indicate where customers can review the assessments.

Assessment Summary

District Name: Quail Valley Water District District No. 1503226 County: Kern
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Description of System and Source

The Quail Valley Water District – Westside System water system is located in Kern County and serves the Sand Canyon and Quail Valley communities. There are approximately 65 active service connections serving a population of 215.

The drinking water source for the Quail Valley Water District – Westside System water system is three groundwater wells, two of which are located in close proximity to each other in the northwest portion of the system and the third is located in the south-central portion of the system. The two Montclair wells are located in fractured granite and have been determined by District hydrogeologist to be hydraulically communicating.

The recharge area for the above sources includes approximately 3200 acres. General land use is residential, undeveloped and agriculture.

Assessment Procedures

The assessment of the source Montclair West and Montclair East was conducted by Quail Valley Water District. The following sources of information were used in the assessment: water system files, previous study, topographical maps.

Procedures used to conduct the assessment include: review of District files, calculations, field review, review of available maps and reports.

Contents of this Assessment

Yes	No	Assesment Summary
Yes	No	Vulnerability Summary
Yes	No	Source Location Form
Yes	No	Delineation of Protection Zones
Yes	No	Physical Barrier Effectiveness Checklist
Yes	No	Source Data Sheet
Yes	No	Inventory of Possible Contaminating Activities
Yes	No	Vulnerability Ranking
Yes	No	Assessment Map

Comments

Montclair West is a new well to be constructed in close proximity to the existing Montclair East well with the expectation of simultaneous operation and communication between both wells. Both wells are expected to be vulnerable to the same PCAs.

Vulnerability Summary

District Name: Quail Valley Water District District No. 1503226 County: Kern
System Name: Quail Valley Water District – Westside System System No. 1503226
Source Name: Montclaire West and Montclaire East Source No. 1503226-002, 1503226-XXX
PS Code: _____ Completed by: Quail Valley Water District Date: 10-26-17

THE FOLLOWING INFORMATION MUST BE INCLUDED IN THE SYSTEM CONSUMER CONFIDENCE REPORT

A source water assessment was conducted for the Montclaire West and Montclaire East wells of the Quail Valley Water District – Westside System water system in October, 2017.

The source is considered most vulnerable to the following activities associated with contaminants detected in the water supply:

No contaminants associated with the identified activities were detected in the water supply.

The source is considered most vulnerable to the following activities not associated with any detected contaminants:

*Septic systems;
Drinking water treatment plants;
Above ground storage tanks;
Wells – Water supply;
Transportation corridors – Roads/Streets;
Surface water-streams/lakes/rivers.*

Discussion of Vulnerability

There have been no contaminants detected in the water supply, however the source is still considered vulnerable to activities located near the drinking water source.

Delineation of Ground Water Protection Zones

District Name: Quail Valley Water District District No. 1503226 County: Kern
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Source Name: Montclaire West and Montclaire East Source No. 1503226-002, 1503226-XXX
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Indicate the method used to delineate the zones:

(For more information refer to the Drinking Water Source Assessment and Protection document)

X Calculated Fixed Radius (Default) (Show calculations below)

Modified Calculated Fixed Radius (Show calculations below and attach documentation for direction of ground water flow)

More detailed methods

Type used (i.e., analytical methods, hydrogeologic mapping, modeling):

Arbitrary Fixed Radius (For use only by or with permission of SWRCB-DDW—use minimum distances shown below)

Calculated Fixed Radius Equation

The equation for the calculated fixed radius (R) is $R_t = \sqrt{Q t / \pi \eta H}$

$R_t = R_2, R_5, \text{ or } R_{10}$ corresponding to t (Calculate R for each travel time)

Q = maximum pumping capacity of well

(ft³/year = gpm * 70,267): 100*70267=7,0267,000 (combined pumping rate for both wells)

t = time of travel (years), 2, 5 and 10 years

$\pi = 3.1416$

η = effective porosity (decimal percent) (If unknown, assume 0.2): 0.2

H = screened interval of well (feet) (If unknown, assume 10% of Q gpm, 10 ft minimum): Existing well 150', new well unknown, use 10'

Specific methods follow on next page

Calculated Fixed Radius Delineation Method (Default)

Using the equation presented above, calculate the size of zones for the appropriate aquifer setting of the source.

Porous Media Aquifer

Zone A	(2 year TOT) $R_2 =$	ft, minimum = 600 ft—use larger: ft
Zone B5	(5 year TOT) $R_5 =$	ft, minimum = 1,000 ft—use larger: ft
Zone B10	(10 year TOT) $R_{10} =$	ft, minimum = 1,500 ft—use larger: ft

Fractured Rock Aquifer

(Increase size of zones by 50%)

Zone A	(2 year TOT) $1.5R_2 = 2242$	ft, minimum = 900 ft—use larger: 2242 ft
Zone B5	(5 year TOT) $1.5R_5 = 3548$	ft, minimum = 1,500 ft—use larger: 3548 ft
Zone B10	(10 year TOT) $1.5R_{10} = 5016$	ft, minimum = 2,250 ft—use larger: 5016 ft

Modified Calculated Fixed Radius Delineation Method

In porous media aquifers, if the direction of ground water flow is known (see Section 6.2.3), the default zone circle may be shifted upgradient by $0.5R_i$. The upgradient and downgradient limits of the zone are determined below.

Zone A (2-year TOT)

upgradient distance	$= 1.5R_2 =$	ft, minimum = 900 ft, use larger: ft
downgradient distance	$= 0.5R_2 =$	ft, minimum = 300 ft, use larger: ft

Zone B5 (5-year TOT)

upgradient distance	$= 1.5R_5 =$	__ ft, minimum = 1,500 ft, use larger: __ ft
downgradient distance	$= 0.5R_5 =$	__ ft, minimum = 500 ft, use larger: __ ft

Zone B10 (10-year TOT)

upgradient distance	$= 1.5R_{10} =$	ft, minimum = 2,250 ft, use larger: __ ft
downgradient distance	$= 0.5R_{10} =$	ft, minimum = 750 ft, use larger: __ ft

Physical Barrier Effectiveness Checklist - Ground Water Source

District Name: Quail Valley Water District District No. 1503226 County: Kern
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Source Name: Montclair West and Montclair East Source No. 1503226-002, 1503226-XXX
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Use the DDW Well Data Sheet (separate document) to complete the following form.

Directions:

1. Read through the form and collect the information needed to complete the form.
(Hydrogeology, Soils, Presence of abandoned or improperly destroyed wells, Well construction and operation.)
2. Determine Parameter A, Type of Aquifer.
 - If the aquifer is confined, use the right-hand column, and evaluate only the parameters indicated for confined aquifers.
 - If the aquifer is unconfined, semi-confined, or the degree of confinement is unknown, or if the aquifer is fractured rock, use the left-hand column and evaluate only the parameters for unconfined aquifers.
3. For each parameter appropriate for the source, place a check in the box for the answer that most closely applies to that source. If more than one answer is possible, select the more conservative (i.e. lower points) answer. *[For example, if the depth to static water (Parameter D) has varied between 45 and 55 feet, choose answer 2 (20 to 50 feet).]*
4. Add the points in the column appropriate for the source and interpret the score as shown on the bottom of the last page.
 - Determine whether the source has a High, Moderate or Low Physical Barrier Effectiveness. Use this in the Vulnerability analysis. The higher the points, generally the more effective the source and site are to retarding the movement of contaminants to the water supply.

NOTE: If the source is located in fractured rock the source is considered to have a Low Physical Barrier Effectiveness, regardless of the point total. So, if Parameter B, Aquifer Material is 3, the remainder of the form does not need to be completed.

Physical Barrier Effectiveness (PBE) – Ground Water, page 1 of 2

Source Name: _____

Source No.: _____

PARAMETER	POINTS			
	Unconfined		Confined	
A. TYPE OF AQUIFER Confinement (up to 50 points maximum) choose one				
a. Unconfined, Semi-confined, Fractured Rock, Unknown	0			
b. Confined				
B. AQUIFER MATERIAL (Unconfined Aquifer) Type of materials within the aquifer (up to 20 points maximum) choose one				
1. Porous Media (Interbedded sands, silts, clays, gravels) with continuous clay layer minimum 25' thick above water table within Zone A				
2. Porous Media (Interbedded sands, silts, clays, and gravels)				
3. Fractured rock *	0			
(* Low Physical Barrier Effectiveness - no further questions required)				
C. PATHWAYS OF CONTAMINATION (All Aquifers) Presence of Abandoned or Improperly Destroyed Wells (up to 10 points maximum)				
1. Are they present within Zone A (2-year time of travel (TOT) distance)?				
a. Yes or unknown				
b. No				
2. Are they present within Zone B5 (2- to 5-year TOT distance)?				
a. Yes or unknown				
b. No				

3. Are they present within Zone B10 (5- to 10-year TOT distance)?				
a. Yes or unknown				
b. No				
D. STATIC WATER CONDITIONS (Unconfined Aquifer)				
Depth to static Water (DTW) = feet (up to 10 points maximum) choose one				
1. 0 to 20 feet				
2. 20 to 50 feet				
3. 50 to 100 feet				
4. > 100 feet				
E. WELL OPERATION (Unconfined Aquifer)				
Depth to Uppermost Perforations (DUP) DUP = feet				
Maximum Pumping Rate of Well (Q) Q = gallons/minute				
Length of screened interval (H) H = feet				
$\frac{[(DUP - DTW) / (Q/H)]}{(up\ to\ 10\ points\ maximum)} =$ choose one				
1. < 5				
2. 5 to 10				
3. > 10				

Source Name:

Source No.

PARAMETER	POINTS			
	Unconfined		Confined	
<p>F. HYDRAULIC HEAD (Confined Aquifer) What is the relationship in hydraulic head between the confined aquifer and the overlying unconfined aquifer? (i.e. does the well flow under artesian conditions?) (up to 20 points maximum) choose one</p>				
1. head in confined aquifer is higher than head in unconfined aquifer <u>under all conditions</u>				
2. head in confined aquifer is higher than head in unconfined aquifer <u>under static conditions</u>				
3. head in confined aquifer is lower than or same as head in unconfined aquifer				
4. unknown				
<p>G. WELL CONSTRUCTION (All Aquifers)</p>				
1. Sanitary Seal (Annular Seal) Depth = _____ feet (up to 10 points maximum) choose one				
a. None or less than 20 feet deep				
b. 20 to 50 ft deep				
c. 50 ft or greater				
2. Surface seal (concrete cap) (up to 4 points maximum) choose one				
a. Not present or improperly constructed				
b. Watertight, slopes away from well, at least 2' laterally in all directions				

3. Flooding potential at well site (up to 1 point maximum) choose one				
a. Subject to localized flooding (i.e. in low area or unsealed pit or vault) or Within 100 year flood plain				
b. Not subject to flooding				
4. Security at well site (up to 5 points maximum) choose one				
a. Not secure				
b. Secure (i.e. housing, fencing, etc.)				
Maximum Points Possible	70	100		
POINT TOTAL FOR THIS SOURCE	0			

Physical Barrier Effectiveness SCORE INTERPRETATION

Point Total Effectiveness

0 to 35 = Low

36 to 69 = Moderate

70 to 100 = High

(includes all sources in Fractured Rock)

Possible Contaminating Activities (PCA) Inventory Form - Ground Water

District Name: Quail Valley Water District District No. 1503226 County: Kern
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Check the PCA tables that will be used for this drinking water source (assessment must include the "Other" checklist and at least one of the remaining three checklists):

- Commercial/Industrial
- X Residential/Municipal
- X Agricultural/Rural
- X Other (required for all)

Proceed to appropriate checklist or checklists. Indicate whether the PCA is located in the zone by placing a Y (yes), N (no), or U (unknown) in the appropriate boxes.

Example:

Zone A	Zone B5	Zone B10
Y	N	N
N	Y	U
U	N	N

Risk Ranking of PCAs, where VH = Very High Risk, H = High Risk, M = Moderate Risk, L = Low Risk

PCA Checklist COMMERCIAL/INDUSTRIAL

PCA (Risk Ranking)	PCA in Zone A?	PCA in Zone B5?	PCA in Zone B10?	Comments
Automobile- Body shops (H)				
Automobile- Car washes (M)				
Automobile- Gas stations (VH)				
Automobile- Repair shops (H)				
Boat services/repair/ refinishing (H)				

Chemical/petroleum pipelines (H)				
Chemical/petroleum processing/storage (VH)				
Dry cleaners (VH)				
Electrical/electronic manufacturing (H)				
Fleet/truck/bus terminals (H)				
Furniture repair/ manufacturing (H)				
Home manufacturing (H)				
Junk/scrap/salvage yards (H)				
Machine shops (H)				
Metal plating/ finishing/fabricating (VH)				
Photo processing/printing (H)				
Plastics/synthetics producers (VH)				
Research laboratories (H)				
Wood preserving/treating (H)				
Wood/pulp/paper processing and mills (H)				
Lumber processing and manufacturing (H)				
Sewer collection systems (H, if in Zone A, otherwise L)				
Parking lots/malls (>50 spaces) (M)				
Cement/concrete plants (M)				
Food processing (M)				
Funeral services/graveyards (M)				
Hardware/lumber/parts stores (M)				
Appliance/Electronic Repair (L)				
Office buildings/complexes (L)				
Rental Yards (L)				
RV/mini storage (L)				

PCA Checklist RESIDENTIAL/MUNICIPAL

PCA (Risk Ranking)	PCA in Zone A?	PCA in Zone B5?	PCA in Zone B10?	Comments
Airports - Maintenance/ fueling areas (VH)	N	N	N	
Landfills/dumps (VH)	N	N	N	
Railroad yards/ maintenance/ fueling areas (H)	N	N	N	
Septic systems - high density (>1/acre) (VH if in Zone A, otherwise M)	N	N	N	
Sewer collection systems (H, if in Zone A, otherwise L)	N	N	N	
Utility stations - maintenance areas (H)	N	N	N	
Wastewater treatment plants (VH in Zone A, otherwise H)	N	N	N	

Drinking water treatment plants (M)	Y	N	N	
Golf courses (M)	N	N	N	
Housing - high density (>1 house/0.5 acres) (M)	N	N	N	
Motor pools (M)	N	N	N	
Parks (M)	N	N	N	
Waste transfer/recycling stations (M)	N	N	N	
Apartments and condominiums (L)	N	N	N	
Campgrounds/ Recreational areas (L)	N	N	N	
Fire stations (L)	N	N	N	
RV Parks (L)	N	N	N	
Schools (L)	N	N	N	
Hotels, Motels (L)	N	N	N	

PCA Checklist AGRICULTURAL/RURAL

PCA (Risk Ranking)	PCA in Zone A?	PCA in Zone B5?	PCA in Zone B10?	Comments
Grazing (> 5 large animals or equivalent per acre) (H in Zone A, otherwise M)	N	N	N	
Concentrated Animal Feeding Operations (CAFOs) as defined in federal regulation ¹ (VH in Zone A, otherwise H)	N	N	N	
Animal Feeding Operations as defined in federal regulation ² (VH in Zone A, otherwise H)	N	N	N	
Other Animal operations (H in Zone A, otherwise M)	N	N	N	
Farm chemical distributor/ application service (H)	N	N	N	
Farm machinery repair (H)	N	N	N	
Septic systems - low density (<1/acre) (H in Zone A, otherwise L)	Y	Y	Y	
Lagoons / liquid wastes (H)	N	N	N	
Machine shops (H)	N	N	N	
Pesticide/fertilizer/ petroleum storage & transfer areas (H)	N	N	N	
Agricultural Drainage (H in Zone A, otherwise M)	N	N	N	
Wells - Agricultural/ Irrigation (H)	N	N	N	
Managed Forests (M)	N	N	N	
Crops, irrigated (Berries, hops, mint, orchards, sod, greenhouses, vineyards, nurseries, vegetable) (M)	N	N	N	

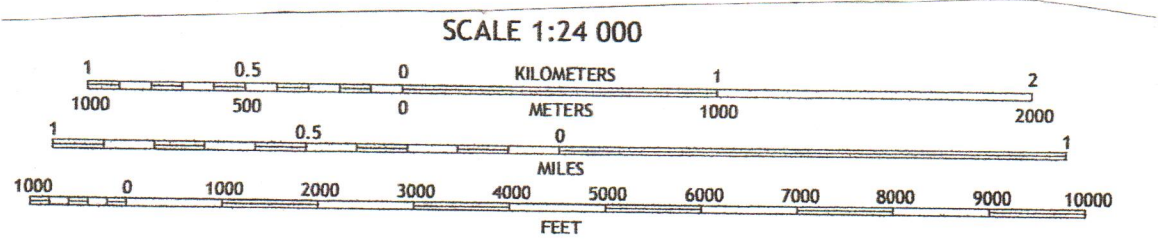
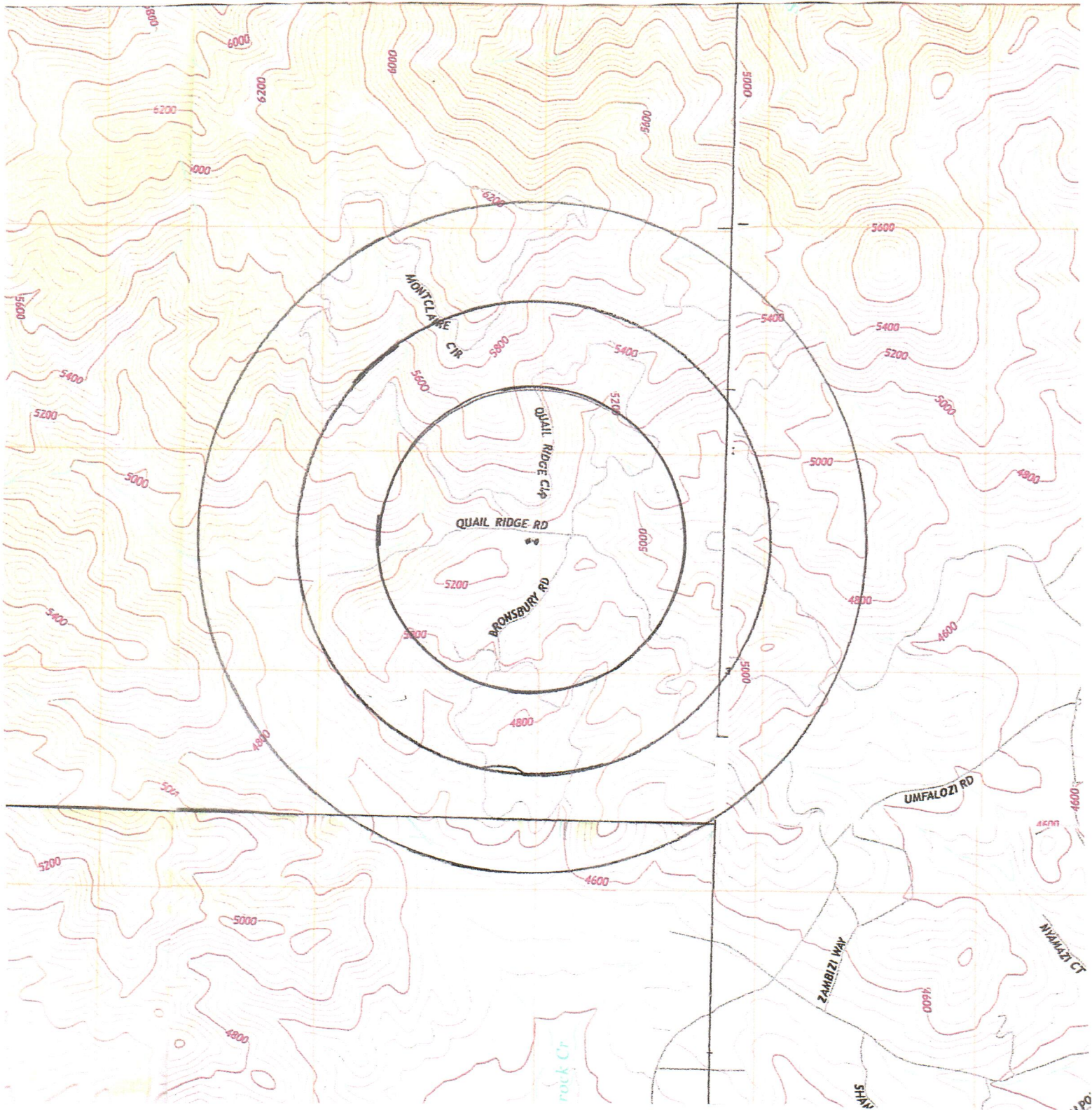
Fertilizer, Pesticide/ Herbicide Application (M)	N	N	N	
Sewage sludge/biosolids application (M)	N	N	N	
Crops, nonirrigated (e.g., Christmas trees, grains, grass seeds, hay, pasture) (L) (includes drip-irrigated crops)	N	N	N	

PCA Checklist OTHER ACTIVITIES

PCA (Risk Ranking)	PCA in Zone A?	PCA in Zone B5?	PCA in Zone B10?	Comments
NPDES/WDR permitted discharges (H)	N	N	N	
Underground Injection of Commercial/Industrial Discharges (VH)	N	N	N	
Historic gas stations (VH)	N	N	N	
Historic waste dumps/ landfills (VH)	N	N	N	
Illegal activities/ unauthorized dumping (H)	N	N	N	
Injection wells/ dry wells/ sumps (VH)	N	N	N	
Known Contaminant Plumes (VH)	N	N	N	
Military installations (VH)	N	N	N	
Mining operations - Historic (VH)	N	N	N	
Mining operations - Active (VH)	N	N	N	
Mining - Sand/Gravel (H)	N	N	N	
Wells - Oil, Gas, Geothermal (H)	N	N	N	
Salt Water Intrusion (H)	N	N	N	
Recreational area - surface water source (H)	N	N	N	
Underground storage tanks - Confirmed leaking tanks (VH)	N	N	N	
Underground storage tanks - Decommissioned - inactive tanks (L)	N	N	N	
Underground storage tanks - Non-regulated tanks (tanks smaller than regulatory limit) (H)	N	N	N	
Underground storage tanks - Not yet upgraded or registered tanks (H)	N	N	N	
Underground storage tanks - Upgraded and/or registered - active tanks (L)	N	N	N	

Above ground storage tanks (M)	Y	Y	Y	Potable Water
	Y	N	N	
Wells - Water supply (M)				Montclair West and Montclair East
Construction/demolition staging areas (M)	N	N	N	
Contractor or government agency equipment storage yards (M)	N	N	N	
Dredging (M)	N	N	N	
Transportation corridors - Freeways/state highways (M)	N	N	N	
Transportation corridors - Railroads (M)	N	N	N	
Transportation corridors - Historic railroad right-of-ways (M)	N	N	N	
Transportation corridors - Road Right-of-ways (herbicide use areas) (M)	N	N	N	
Transportation corridors - Roads/ Streets (L)	Y	Y	Y	
Hospitals (M)	N	N	N	
Storm Drain Discharge Points (M)	N	N	N	
Storm Water Detention Facilities (M)	N	N	N	
Artificial Recharge Projects - Injection wells (potable water) (L)	N	N	N	
Artificial Recharge Projects - Injection wells (non-potable water) (M)	N	N	N	
Artificial Recharge Projects - Spreading Basins (potable water) (L)	N	N	N	
Artificial Recharge Projects - Spreading Basins (non-potable water) (M)	N	N	N	
Medical/dental offices/clinics (L)	N	N	N	
Veterinary offices/clinics (L)	N	N	N	
	Y	Y	Y	Storm Water/Snow Melt
Surface water - streams/ lakes/rivers (L)				
Wells - monitoring, test holes (L)	N	N	N	

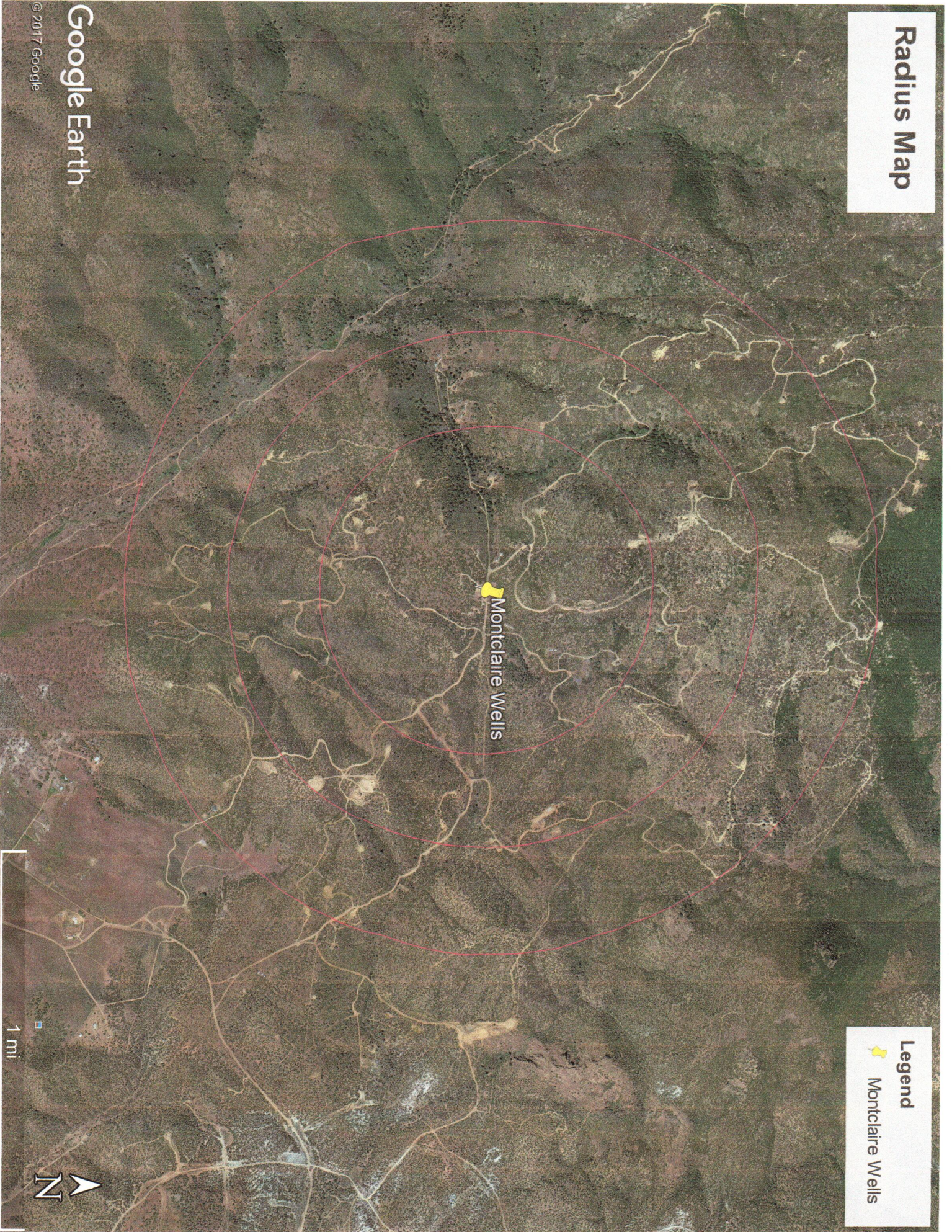
VULNERABILITY RANKING MASTER LIST - Ground Water					
District Name:		District No.	County		
System Name:		System No.			
Source Name:		Source No.	PS Code:		
	PCA	PCA Risk Points	Zone Points	PBE Points	Vulnerability Score
		VH = 7	A = 5	L = 5	Risk + Zone + PBE points
		H = 5	B5 = 3	M = 3	
		M = 3	B10 = 1	H = 1	
Zone	PCA (Risk)	L = 1	Unknown = 0		
A	Septic systems – low density (<1/acre) (H in Zone A, otherwise L)	5	5	5	15
A	Drinking water treatment plants (M)	3	5	5	13
A	Above ground storage tanks (M)	3	5	5	13
A	Wells – Water supply (M)	3	5	5	13
A	Transportation Corridors- Roads/ Streets (L)	1	5	5	11
A	Surface water - streams/ lakes/rivers (L)	1	5	5	11
B5	Above ground storage tanks (M)	3	3	5	11
B5	Septic systems – low density (<1/acre) (H in Zone A, otherwise L)	1	3	5	9
B5	Transportation Corridors- Roads/ Streets (L)	1	3	5	9
B5	Surface water - streams/ lakes/rivers (L)	1	3	5	9
B10	Above ground storage tanks (M)	3	1	5	9
B10	Septic systems – low density (<1/acre) (H in Zone A, otherwise L)	1	1	5	7
B10	Surface water - streams/ lakes/rivers (L)	1	1	5	7



CONTOUR INTERVAL 40 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988

Radius Map

Legend
Montclair Wells



1 mi

Google Earth

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