Drinking Water Source Assessment

Water System

Westside Water System

Kern County

Water Source

Umtali Well

Assessment Date

August, 2006

California Department of Health Services
Drinking Water Field Operations Branch
DHS Tehachapi District

District No.	
System No.	1503226
Source No.	1503226-001
PS Code	

Checklist for Drinking Water Source Assessment - Ground Water Source

District Name: Quail Valley Water District
County: Kern
System Name: Westside Water System
System No.: 1503226
Source Name: Umtali Well
Source No.: 1503226-001

Completed by: Quad Knopf, Inc.
Date: August 2006

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

__X__ Cover Page

__X__ Checklist *(this form)*

__X__ Assessment Summary

__X__ Vulnerability Summary

__X__ Source Location Form *(not currently available, contact DHS for information)*

__X__ Delineation of groundwater protection zones

__X__ Source Data Sheet (select appropriate form)

- __X__ Well Data Sheet
- _____ Spring Data Sheet
- _____ Horizontal Well Data Sheet

__X__ Physical Barrier Effectiveness Checklist

__X__ Possible Contaminating Activities (PCA) inventory form

__X__ Vulnerability Ranking

__X__ 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)

__X__ 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 (DHS or LPA) office (minimum)
- __X__ Copy in public water system office (recommended)
- _____ Copy in public library/libraries
- _____ Internet (indicate Internet address: _____)
- _____ Other (describe)

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

Assessment Summary

District Name: Quail Valley Water District
County: Kern
System Name: Westside Water System
System No.: 1503226
Source Name: Umtali Well
Source No.: 1503226-001

Completed by: Quad Knopf, Inc.
Date: August 2006

Description of System and Source

The Westside Water System is located in Kern County and serves a Sand Canyon Valley community west of Sand Canyon Road located in Tehachapi, CA. There are 25 service connections within the community.

The main drinking water source for the Westside Water System is two groundwater wells. Well 1, Umtali Well, is located northwest of the Umtali Road and Toldi Court. The land use of the property is Residential Suburban combining. The land use in the areas surrounding the property is Agricultural and Residential Suburban combining.

Assessment Procedures

The assessment of the source Umtali Well was conducted for the Westside water system in August 2006. A copy of the complete assessment is available at the DHS Tehachapi District Office, 1200 Discovery Drive Suite 100, Bakersfield, California. You may request a summary of the assessment be sent to you by contacting the DHS Tehachapi District Office at (661) 335-7315. The following sources of information were used in the assessment: topographic and aerial maps, water system files, field survey notes, and well records.

Procedures used to conduct the assessment include: meetings with water system owner, site visit notes, and review of files, maps, and reports.

Contents of this Assessment

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

Comments

Vulnerability Summary

District Name: Quail Valley Water District County: Kern
System Name: Westside Water System System No.: 1503226
Source Name: Umtali Well Source No.: 1503226-001

Completed by: Quad Knopf, Inc. Date: August 2006

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

A source water assessment was conducted for the *Umtali Well source* of the *Westside* water system in *August, 2006*.

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 (vulnerability score above 8) to the following activities not associated with any detected contaminants (in order of most vulnerable to least):

Septic Systems
Above ground storage tanks
Wells – Water Supply
Transportation Corridors – Road Right-of ways (herbicide use)
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.

In addition, you may include a description of actions that the water system is taking to protect the water supply.

Delineation of Ground Water Protection Zones

District Name: Quail Valley Water District
County: Kern
System Name: Westside Water System
System No.: 1503226
Source Name: Umtali Well
Source No.: 1503226-001

Completed by: Quad Knopf, Inc.
Date: August 2006

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 DHS—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, or R_{10} corresponding to t (Calculate R for each travel time)
Q = maximum pumping capacity of well
(ft^3/year = gpm * 70,267): 94 gpm = 6.605×10^6
t = time of travel (years), 2, 5 and 10 years
π = 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):
10 ft

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 = 1,450 ft, minimum = 600 ft —use larger: 1,450 ft
Zone B5 (5 year TOT) R_5 = 2,293 ft, minimum = 1,000 ft—use larger: 2,293 ft
Zone B10 (10 year TOT) R_{10} = 3,242.3 ft, minimum = 1,500 ft—use larger: 3,242 ft

Fractured Rock Aquifer

(Increase size of zones by 50%)

Zone A (2 year TOT) $1.5R_2$ = _____ft, minimum = 900 ft—use larger: _____ft
Zone B5 (5 year TOT) $1.5R_5$ = _____ft, minimum = 1,500 ft—use larger: _____ft
Zone B10 (10 year TOT) $1.5R_{10}$ = _____ft, minimum = 2,250 ft—use larger: _____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 $0.5R_t$. 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 County: Kern
System Name: Westside Water System System No.: 1503226
Source Name: Umtali Well Source No.: 1503226-001

Completed by: Quad Knopf, Inc. Date: August 2006

Use the DHS 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: Umtali Well Source No.: 1503226-001

PARAMETER	POINTS			
	Unconfined		Confined	
A. TYPE OF AQUIFER				
Confinement *(up to **50** points maximum)* choose one				
a. Unconfined, Semi-confined, Fractured Rock, Unknown	0	0		
b. Confined			50	
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	20			
2. Porous Media (Interbedded sands, silts, clays, and gravels)	10	10		
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	0		0	
b. No	5	5	5	
2. Are they present within Zone B5 (2- to 5-year TOT distance)?				
a. Yes or unknown	0		0	
b. No	3	3	3	
3. Are they present within Zone B10 (5- to 10-year TOT distance)?				
a. Yes or unknown	0		0	
b. No	2	2	2	
D. STATIC WATER CONDITIONS (Unconfined Aquifer)				
Depth to static Water (DTW) = 235 feet				
*(up to **10** points maximum)* choose one				
1. 0 to 20 feet	0			
2. 20 to 50 feet	2			
3. 50 to 100 feet	6			
4. > 100 feet	10	10		
E. WELL OPERATION (Unconfined Aquifer)				
Depth to Uppermost Perforations (DUP) DUP = 480 feet				
Maximum Pumping Rate of Well (Q) Q = 94 gallons/minute				
Length of screened interval (H) H = 10 feet				
[(DUP – DTW) / (Q/H)] = 26				
*(up to **10** points maximum)* choose one				
1. < 5	0			
2. 5 to 10	5			
3. > 10	10	10		

Physical Barrier Effectiveness – Ground Water, page 2 of 2
Source Name: Umtali Well Source No. 1503226-001

PARAMETER	POINTS Unconfined		POINTS Confined	
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				
1. head in confined aquifer is higher than head in unconfined aquifer under all conditions			20	
2. head in confined aquifer is higher than head in unconfined aquifer under static conditions			10	
3. head in confined aquifer is lower than or same as head in unconfined aquifer			0	
4. unknown			0	
G. WELL CONSTRUCTION (All Aquifers) 1. Sanitary Seal (Annular Seal) Depth = 55 feet *(up to **10** points maximum)* choose one				
a. None or less than 20 feet deep	0		0	
b. 20 to 50 ft deep	6		10	
c. 50 ft or greater	10	10	10	
2. Surface seal (concrete cap) *(up to **4** points maximum)* choose one				
a. Not present or improperly constructed	0		0	
b. Watertight, slopes away from well, at least 2' laterally in all directions	4	4	4	
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	0		0	
b. Not subject to flooding	1	1	1	
4. Security at well site *(up to **5** points maximum)* choose one				
a. Not secure	0	0	0	
b. Secure (i.e. housing, fencing, etc.)	5		5	
Maximum Points Possible	70		100	
POINT TOTAL FOR THIS SOURCE	**55**			

Physical Barrier Effectiveness SCORE INTERPRETATION

	Point Total		Effectiveness	
____	0 to 35	=	**Low**	(includes all sources in Fractured Rock)
_x_	36 to 69	=	**Moderate**	
____	70 to 100	=	**High**	

Possible Contaminating Activities (PCA) Inventory Form - Ground Water

District Name: Quail Valley Water District
County: Kern
System Name: Westside Water System
System No.: 1503226
Source Name: Umtali Well
Source No.: 1503226-001

Completed by: Quad Knopf, Inc.
Date: August 2006

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)	X

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

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	**Septic system is low density**
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)	N	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 regulation1 (VH in Zone A, otherwise H)	N	N	N	
Animal Feeding Operations as defined in federal regulation2 (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

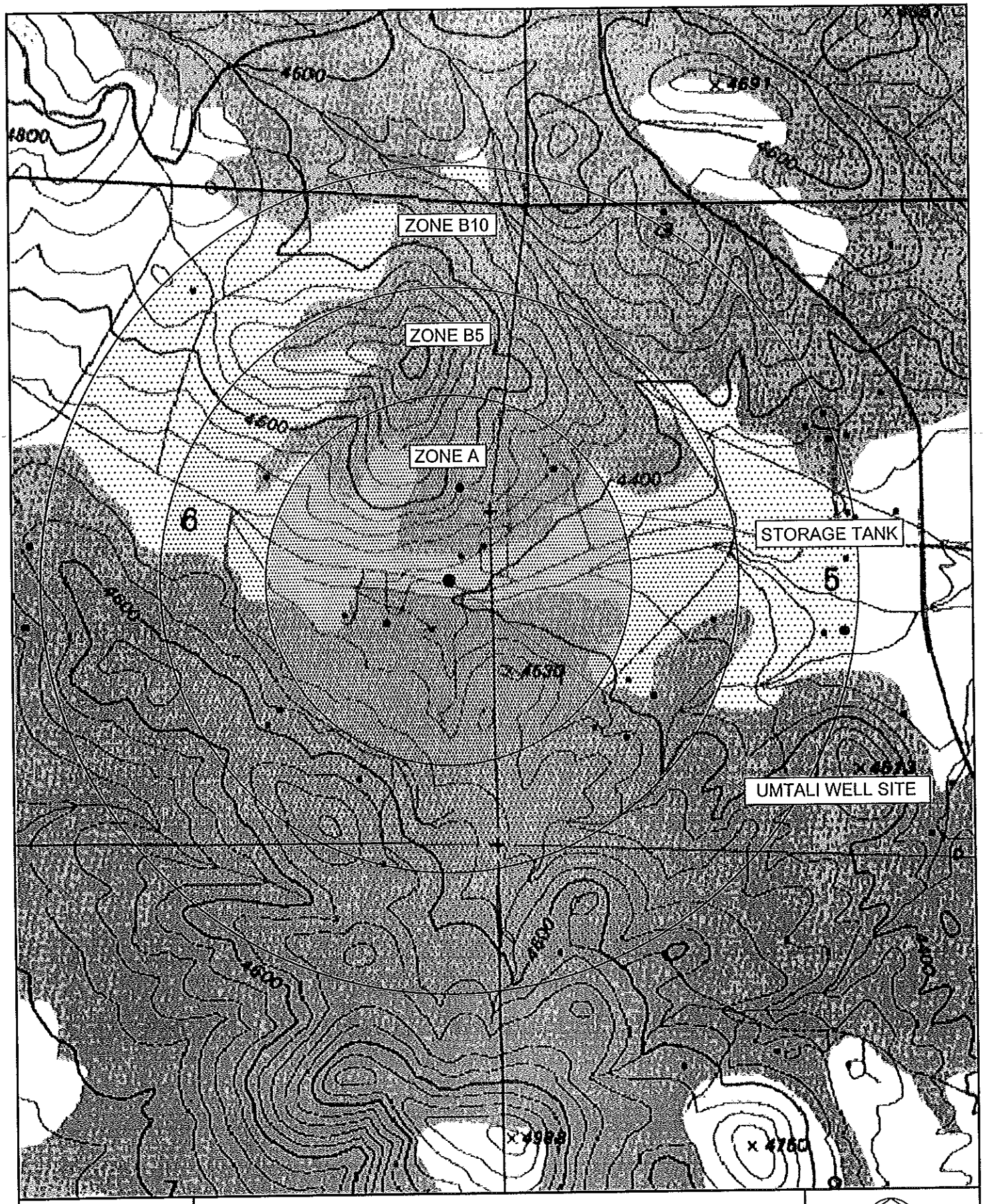
PCA (Risk Ranking)	PCA in Zone A?	PCA in Zone B5?	PCA in Zone B10?	Comments
NPDES/WDR permitted discharges (H)	N	N	N	
Underground Injection of Commercial/Industrial Discharges (VH)	N	N	N	
Historic gas stations (VH)	N	N	N	
Historic waste dumps/ landfills (VH)	N	N	N	
Illegal activities/ unauthorized dumping (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**	N	N	**Umtali Storage Tank**
Wells - Water supply (M)	**Y**	N	N	**Umtali Well**
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)	**Y**	**Y**	**Y**	
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	

PCA Checklist OTHER ACTIVITIES (continued)

PCA (Risk Ranking)	PCA in Zone A?	PCA in Zone B5?	PCA in Zone B10?	Comments
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	
Surface water - streams/ lakes/rivers (L)	**Y**	**Y**	**Y**	**Sand Creek Tributary**
Wells - monitoring, test holes (L)	N	N	N	

VULNERABILITY RANKING MASTER LIST - Ground Water

District Name: Quail Valley Water District		County:	Kern		
System Name: Westside Water System		System No.	1503226		
Source Name: Umtali Well		Source No.	1503226-001		
	PCA	PCA Risk Points	Zone Points	PBE Points	Vulnerability Score
		VH = 7	A = 5	L = 5	
		H = 5	B5 = 3	M = 3	Risk + Zone
		M = 3	B10 = 1	H = 1	+ PBE points
Zone	PCA (Risk)	L = 1	Unknown = 0		
A	Septic systems – low density (<1/acre) (H in Zone A, otherwise L)	5	5	3	13
A	Above ground storage tanks (M)	3	5	3	11
A	Wells – Water supply (M)	3	5	3	11
A	Transportation Corridors- Roads/ Streets (L)	1	5	3	9
A	Transportation Corridors- Road Right-of-ways (herbicide use) (M)	3	5	3	11
A	Surface water - streams/lakes/rivers (L)	1	5	3	9
B5	Septic systems – low density (<1/acre) (H in Zone A, otherwise L)	1	3	3	7
B5	Transportation Corridors- Roads/ Streets (L)	1	3	3	7
B5	Transportation Corridors- Road Right-of-ways (herbicide use) (M)	3	3	3	9
B5	Surface water - streams/lakes/rivers (L)	1	3	3	7
B10	Septic systems – low density (<1/acre) (H in Zone A, otherwise L)	1	1	3	5
B10	Transportation Corridors- Roads/ Streets (L)	1	1	3	5
B10	Transportation Corridors- Road Right-of-ways (herbicide use) (M)	3	1	3	7
B10	Surface water - streams/lakes/rivers (L)	1	1	3	5



Quad Knopf

UMTALI WELL GROUNDWATER PROTECTION ZONES FOR WESTSIDE WATER SYSTEM

Scale 1" = 1000'

Drinking Water Source Assessment

Water System

Westside Water System

Kern County

Water Source

Montclaire Well

Assessment Date

August, 2006

California Department of Health Services
Drinking Water Field Operations Branch
DHS Tehachapi District

District No.	
System No.	1503226
Source No.	1503226-002
PS Code	

Checklist for Drinking Water Source Assessment - Ground Water Source

District Name: Quail Valley Water District County: Kern
System Name: Westside Water System System No.: 1503226
Source Name: Montclaire Well Source No.: 1503226-002

Completed by: Quad Knopf, Inc. Date: August 2006

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

__X__ Cover Page

__X__ Checklist *(this form)*

__X__ Assessment Summary

__X__ Vulnerability Summary

__X__ Source Location Form *(not currently available, contact DHS for information)*

__X__ Delineation of groundwater protection zones

__X__ Source Data Sheet (select appropriate form)

- __X__ Well Data Sheet
- _____ Spring Data Sheet
- _____ Horizontal Well Data Sheet

__X__ Physical Barrier Effectiveness Checklist

__X__ Possible Contaminating Activities (PCA) inventory form

__X__ Vulnerability Ranking

__X__ 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)

__X__ 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 (DHS or LPA) office (minimum)
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- _____ Copy in public library/libraries
- _____ Internet (indicate Internet address: _____)
- _____ Other (describe)

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

Assessment Summary

District Name: Quail Valley Water District
County: Kern
System Name: Westside Water System
System No.: 1503226
Source Name: Montclaire Well
Source No.: 1503226-002

Completed by: Quad Knopf, Inc.
Date: August 2006

Description of System and Source

The Westside Water System is located in Kern County and serves a Sand Canyon Valley community west of Sand Canyon Road located in Tehachapi, CA. There are 25 service connections within the community.

The main drinking water source for the Westside Water System is two groundwater wells. Well 2, Montclaire Well, is located south of Quail Ridge Road near the intersection of Quail Ridge Road and Montclaire Road. The land use of the property is Residential Suburban combining. The land use in the areas surrounding the property is Agricultural and Residential Suburban combining.

Assessment Procedures

The assessment of the source Montclaire Well was conducted for the Westside water system in August 2006. A copy of the complete assessment is available at the DHS Tehachapi District Office, 1200 Discovery Drive Suite 100, Bakersfield, California. You may request a summary of the assessment be sent to you by contacting the DHS Tehachapi District Office at (661) 335-7315. The following sources of information were used in the assessment: topographic and aerial maps, water system files, field survey notes, and well records.

Procedures used to conduct the assessment include: meetings with water system owner, site visit notes, and review of files, maps, and reports.

Contents of this Assessment

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

Comments

Vulnerability Summary

District Name: Quail Valley Water District
County: Kern
System Name: Westside Water System
System No.: 1503226
Source Name: Montclaire Well
Source No.: 1503226-002

Completed by: Quad Knopf, Inc.
Date: August 2006

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

A source water assessment was conducted for the *Montclaire Well source* of the *Westside* water system in *August, 2006*.

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 (vulnerability score above 8) to the following activities not associated with any detected contaminants (in order of most vulnerable to least):

Septic Systems
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.

In addition, you may include a description of actions that the water system is taking to protect the water supply.

Delineation of Ground Water Protection Zones

District Name: Quail Valley Water District County: Kern
System Name: Westside Water System System No.: 1503226
Source Name: Montclaire Well Source No.: 1503226-002

Completed by: Quad Knopf, Inc. Date: August 2006

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 DHS—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, or R_{10} corresponding to t (Calculate R for each travel time)
Q = maximum pumping capacity of well
(ft^3/year = gpm * 70,267): 100 gpm = 7.03×10^6
t = time of travel (years), 2, 5 and 10 years
π = 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):
10 ft

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 = 1496 ft, minimum = 600 ft —use larger: 1496 ft
Zone B5 (5 year TOT) R_5 = 2365 ft, minimum = 1,000 ft—use larger: 2365 ft
Zone B10 (10 year TOT) R_{10} = 3345 ft, minimum = 1,500 ft—use larger: 3345 ft

Fractured Rock Aquifer

(Increase size of zones by 50%)

Zone A (2 year TOT) $1.5R_2$ = _____ft, minimum = 900 ft—use larger: _____ft
Zone B5 (5 year TOT) $1.5R_5$ = _____ft, minimum = 1,500 ft—use larger: _____ft
Zone B10 (10 year TOT) $1.5R_{10}$ = _____ft, minimum = 2,250 ft—use larger: _____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 $0.5R_t$. 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 County: Kern
System Name: Westside Water System System No.: 1503226
Source Name: Montclaire Well Source No.: 1503226-002

Completed by: Quad Knopf, Inc. Date: August 2006

Use the DHS 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: Montclaire Well Source No.: 1503226-002

PARAMETER	POINTS			
	Unconfined		Confined	
A. TYPE OF AQUIFER				
Confinement *(up to **50** points maximum)* choose one				
a. Unconfined, Semi-confined, Fractured Rock, Unknown	0	0		
b. Confined			50	
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	20			
2. Porous Media (Interbedded sands, silts, clays, and gravels)	10	10		
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	0		0	
b. No	5	5	5	
2. Are they present within Zone B5 (2- to 5-year TOT distance)?				
a. Yes or unknown	0		0	
b. No	3	3	3	
3. Are they present within Zone B10 (5- to 10-year TOT distance)?				
a. Yes or unknown	0		0	
b. No	2	2	2	
D. STATIC WATER CONDITIONS (Unconfined Aquifer)				
Depth to static Water (DTW) = 150 feet				
*(up to **10** points maximum)* choose one				
1. 0 to 20 feet	0			
2. 20 to 50 feet	2			
3. 50 to 100 feet	6			
4. > 100 feet	10	10		
E. WELL OPERATION (Unconfined Aquifer)				
Depth to Uppermost Perforations (DUP) DUP = 200 feet				
Maximum Pumping Rate of Well (Q) Q = 100 gallons/minute				
Length of screened interval (H) H = 10 feet				
[(DUP – DTW) / (Q/H)] = 5				
*(up to **10** points maximum)* choose one				
1. < 5	0			
2. 5 to 10	5	5		
3. > 10	10			

Physical Barrier Effectiveness – Ground Water, page 2 of 2
Source Name: Montclaire Well Source No. 1503226-002

PARAMETER	*POINTS*			
	Unconfined		Confined	
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				
1. head in confined aquifer is higher than head in unconfined aquifer under all conditions			20	
2. head in confined aquifer is higher than head in unconfined aquifer under static conditions			10	
3. head in confined aquifer is lower than or same as head in unconfined aquifer			0	
4. unknown			0	
G. WELL CONSTRUCTION (All Aquifers) 1. Sanitary Seal (Annular Seal) Depth = 50 feet *(up to **10** points maximum)* choose one				
a. None or less than 20 feet deep	0		0	
b. 20 to 50 ft deep	6		10	
c. 50 ft or greater	10	10	10	
2. Surface seal (concrete cap) *(up to **4** points maximum)* choose one				
a. Not present or improperly constructed	0		0	
b. Watertight, slopes away from well, at least 2' laterally in all directions	4	4	4	
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	0		0	
b. Not subject to flooding	1	1	1	
4. Security at well site *(up to **5** points maximum)* choose one				
a. Not secure	0	0	0	
b. Secure (i.e. housing, fencing, etc.)	5		5	
Maximum Points Possible	70		100	
POINT TOTAL FOR THIS SOURCE	50			

Physical Barrier Effectiveness SCORE INTERPRETATION

Point Total		Effectiveness	
____ 0 to 35	=	**Low**	(includes all sources in Fractured Rock)
__x__ 36 to 69	=	**Moderate**	
____ 70 to 100	=	**High**	

Possible Contaminating Activities (PCA) Inventory Form - Ground Water

District Name: Quail Valley Water District County: Kern
System Name: Westside Water System System No.: 1503226
Source Name: Montclaire Well Source No.: 1503226-002

Completed by: Quad Knopf, Inc. Date: August 2006

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)	X

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

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	Septic system is low density
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)	N	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 regulation1 (VH in Zone A, otherwise H)	N	N	N	
Animal Feeding Operations as defined in federal regulation2 (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

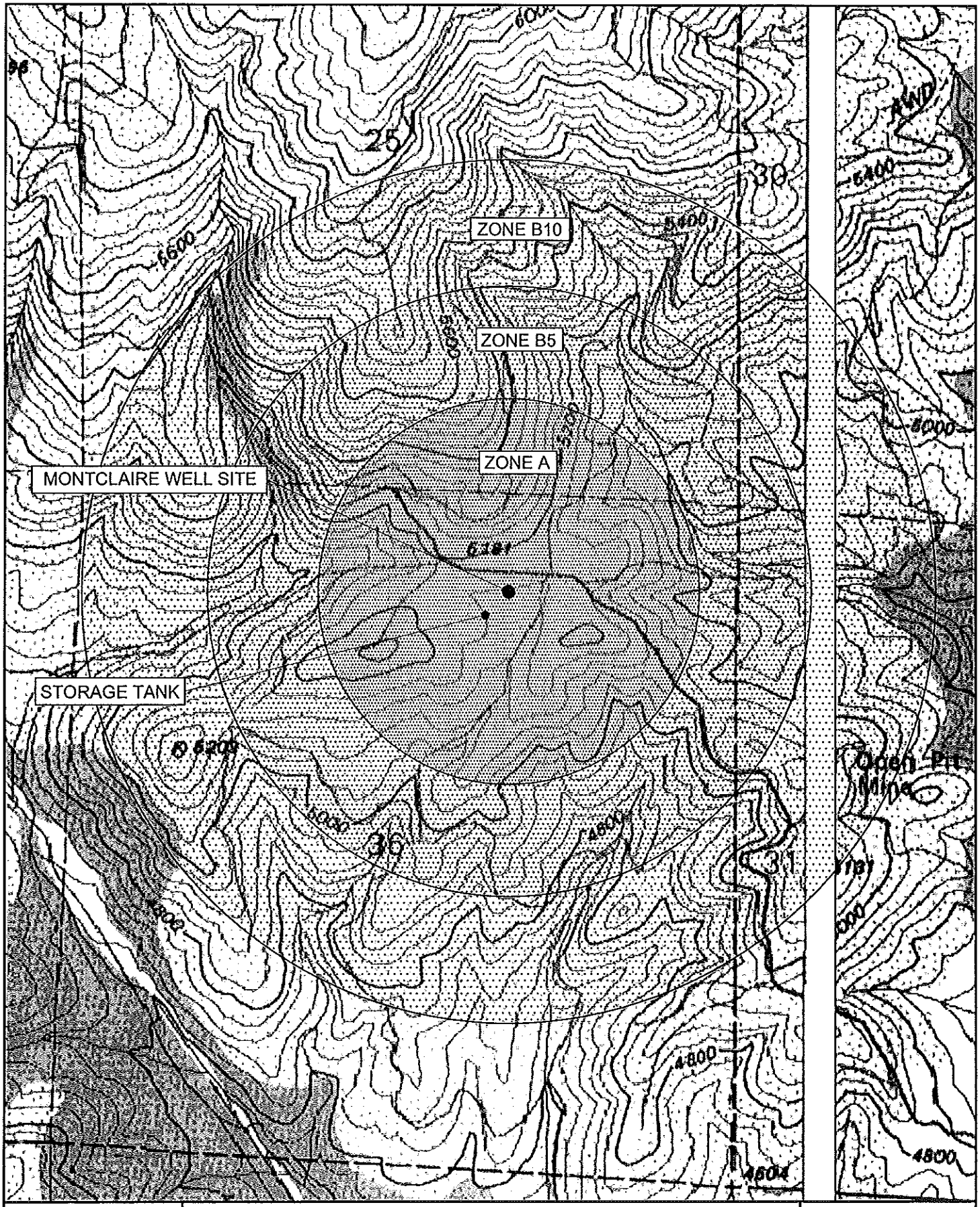
PCA (Risk Ranking)	PCA in Zone A?	PCA in Zone B5?	PCA in Zone B10?	Comments
NPDES/WDR permitted discharges (H)	N	N	N	
Underground Injection of Commercial/Industrial Discharges (VH)	N	N	N	
Historic gas stations (VH)	N	N	N	
Historic waste dumps/ landfills (VH)	N	N	N	
Illegal activities/ unauthorized dumping (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**	N	N	**Montclaire Tank**
Wells - Water supply (M)	**Y**	N	N	**Montclaire Well**
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	

PCA Checklist OTHER ACTIVITIES (continued)

PCA (Risk Ranking)	PCA in Zone A?	PCA in Zone B5?	PCA in Zone B10?	Comments
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	
Surface water - streams/ lakes/rivers (L)	**Y**	**Y**	**Y**	**Whiterock & Sand Creek Tributaries**
Wells - monitoring, test holes (L)	N	N	N	

VULNERABILITY RANKING MASTER LIST - Ground Water

District Name: Quail Valley Water District		County:	Kern		
System Name: Westside Water System		System No.	1503226		
Source Name: Montclaire Well		Source No.	1503226-002		
	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	3	13
A	Above ground storage tanks (M)	3	5	3	11
A	Wells – Water supply (M)	3	5	3	11
A	Transportation Corridors- Roads/ Streets (L)	1	5	3	9
A	Surface water - streams/lakes/rivers (L)	1	5	3	9
B5	Septic systems – low density (<1/acre) (H in Zone A, otherwise L)	1	3	3	7
B5	Transportation Corridors- Roads/ Streets (L)	1	3	3	7
B5	Surface water - streams/lakes/rivers (L)	1	3	3	7
B10	Septic systems – low density (<1/acre) (H in Zone A, otherwise L)	1	1	3	5
B10	Transportation Corridors- Roads/ Streets (L)	1	1	3	5
B10	Surface water - streams/lakes/rivers (L)	1	1	3	5



Quad Knopf

MONTCLAIRE WELL GROUNDWATER PROTECTION ZONES FOR WESTSIDE WATER SYSTEM

Scale 1" = 1000'