

## Referral Early Consultation

Date: August 30, 2021

To:Distribution List (See Attachment A)From:Teresa McDonald, Associate Planner<br/>Planning and Community Development

Subject: USE PERMIT APPLICATION NO. PLN2021-0012 – WEST MAIN COMPOST

Respond By: September 14, 2021

## \*\*\*\*PLEASE REVIEW REFERRAL PROCESS POLICY\*\*\*\*

The Stanislaus County Department of Planning and Community Development is soliciting comments from responsible agencies under the Early Consultation process to determine: a) whether or not the project is subject to CEQA and b) if specific conditions should be placed upon project approval.

Therefore, please contact this office by the response date if you have any comments pertaining to the proposal. Comments made identifying potential impacts should be as specific as possible and should be based on supporting data (e.g., traffic counts, expected pollutant levels, etc.). Your comments should emphasize potential impacts in areas which your agency has expertise and/or jurisdictional responsibilities.

These comments will assist our Department in preparing a staff report to present to the Planning Commission. Those reports will contain our recommendations for approval or denial. They will also contain recommended conditions to be required should the project be approved. Therefore, please list any conditions that you wish to have included for presentation to the Commission as well as any other comments you may have. Please return all comments and/or conditions as soon as possible or no later than the response date referenced above.

Thank you for your cooperation. Please call (209) 525-6330 if you have any questions.

Applicant:	Machado and Sons, Inc.
Project Location:	1236 W West Main Street, between S Carpenter Road and Crows Landing Road, in the Crows Landing area.
APN:	058-003-006
Williamson Act Contract:	1978-3106
General Plan:	Agriculture
Current Zoning:	A-2-40 (General Agriculture)

Project Description: Request to operate a composting facility on a 23.5-acre portion of a 47.82acre parcel in the A-2-40 zoning district, with the end user being Starkey Farms, a nearby farm that produces alfalfa, corn, and almonds. The facility will receive a maximum of 140 tons of feedstock per day, which will consist of a combination of landscape residue, vegetative food material, and green waste. Up to 778 cubic yards of feedstock, 10,888 cubic yards of in-process compost (active and curing), 500 cubic yards of amendments (gypsum and micronutrients), and 300 cubic yards of finished product are expected on site at one time. The facility will operate Monday through Saturday from 7:00 am to 5:00 pm. The applicant anticipates three full time employees on one shift, one mechanic on site two days a week, and one manager on site one day a week. On site equipment, which will be portable but remain on site, will consist of a grinder, front end loader, trommel screen, and water truck. No structures are proposed as part of this request. Up to 20 incoming truck deliveries of feedstock and three outgoing truckloads of finished compost are expected per day. The feedstock will be separated at local municipal solid waste (MSW) haulers transfer stations consistent with CalRecycle specifications before arriving at the site. The feedstock will be delivered by 20-yard dump trucks, which will be weighed, then the feedstock loads will be dumped for inspection at the feedstock unloading zone, which is anticipated to be on engineered fill (compacted CLII AB road base). Loads that contain greater than 1% contamination, by dry weight, will be rejected. Once the feedstock has passed inspection, material unloaded, and any contaminants removed, it is fed into a grinder by a front-end loader and stockpiled for up to seven days, before being formed into eight-foot-high aerated static pile (ASP) compost piles by front-end loader, located on a 20,000 square-foot concrete slab with embedded aeration piles and nozzle assemblies. Water will be added to the piles by water truck to achieve proper moisture content. Up to 27,500 square-feet of active composting material is expected on the ASP slab at one time. Aerated static pile compost piles are constructed over a network of aeration pipes and induce airflow into the pile using an electric blower that is operated in conjunction with a pile temperature control system, cycling air into the pile. After 30 days, the piles are moved to two curing piles each approximately, 135 x 60 feet in size and eight-feet-high, located on engineered fill, for 20-30 days. Up to 20,000 square-feet of material is expected to be curing at one time. Once the curing period is complete, the finished compost is filtered via portable diesel-powered screening equipment, amendments added, loaded onto trucks, and delivered to the end user. The operator intends to utilize a water truck for dust control and to cease grinding operations when wind exceeds 20 mph. Constant temperature monitoring and an onsite water tank with pump will be utilized for fire prevention and control. Vectors are expected to be controlled by applying the best composting practices, which include appropriate carbon to nitrogen ratio, sufficient moisture content, and adequate aeration to interrupt the fly cycle. Additionally, the applicant will utilize parasitic wasps, traps, and commercial pest control services if necessary. The project proposes one new well for fire suppression water and to utilize portable restrooms for the employees. No septic systems are proposed. Other proposed improvements include a five-foot-tall berm with 3:1 slopes and a chain link fence with fabric around the perimeter of the operation. Trees are proposed along the northern perimeter line. A composite lined storm water detention basin will handle any run off and the water will be recycled and used on the ASP curing pile. The project site has access to County-maintained W West Main Street.

Full document with attachments available for viewing at: <a href="http://www.stancounty.com/planning/pl/act-projects.shtm">http://www.stancounty.com/planning/pl/act-projects.shtm</a>



1010 10<sup>TH</sup> Street, Suite 3400, Modesto, CA 95354 Planning Phone: (209) 525-6330 Fax: (209) 525-5911 Building Phone: (209) 525-6557 Fax: (209) 525-7759

#### USE PERMIT APPLICATION NO. PLN2021-0012 – WEST MAIN COMPOST Attachment A

### **Distribution List**

Distri	DUIION LISI		
х	CA DEPT OF CONSERVATION Land Resources		STAN CO ALUC
Х	CA DEPT OF FISH & WILDLIFE		STAN CO ANIMAL SERVICES
	CA DEPT OF FORESTRY (CAL FIRE)	Х	STAN CO BUILDING PERMITS DIVISION
	CA DEPT OF TRANSPORTATION DIST 10	Х	STAN CO CEO
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Х	IRRIGATION DIST: TURLOCK	Х	STANISLAUS LAFCO
Х	MOSQUITO DIST: TURLOCK	Х	STATE OF CA SWRCB DIVISION OF DRINKING WATER DIST. 10
Х	MOUNTAIN VALLEY EMERGENCY MEDICAL SERVICES		SURROUNDING LAND OWNERS
	MUNICIPAL ADVISORY COUNCIL:	Х	TELEPHONE COMPANY: AT&T
Х	PACIFIC GAS & ELECTRIC		TRIBAL CONTACTS (CA Government Code §65352.3)
	POSTMASTER:		US ARMY CORPS OF ENGINEERS
	RAILROAD:	Х	US FISH & WILDLIFE
Х	SAN JOAQUIN VALLEY APCD		US MILITARY (SB 1462) (7 agencies)
Х	SCHOOL DIST 1: TURLOCK UNIFIED	Х	USDA NRCS
Х	SCHOOL DIST 2: CHATOM UNION		WATER DIST:
	WORKFORCE DEVELOPMENT	Х	CALRECYCLE
Х	STAN CO AG COMMISSIONER		
	TUOLUMNE RIVER TRUST		



## STANISLAUS COUNTY CEQA REFERRAL RESPONSE FORM

TO:Stanislaus County Planning & Community Development1010 10th Street, Suite 3400Modesto, CA95354

FROM:

## SUBJECT: USE PERMIT APPLICATION NO. PLN2021-0012 – WEST MAIN COMPOST

Based on this agency's particular field(s) of expertise, it is our position the above described project:

\_\_\_\_\_ Will not have a significant effect on the environment.

May have a significant effect on the environment.

No Comments.

Listed below are specific impacts which support our determination (e.g., traffic general, carrying capacity, soil types, air quality, etc.) – (attach additional sheet if necessary)

1.

- 2.
- 3.
- 4.

Listed below are possible mitigation measures for the above-listed impacts: *PLEASE BE SURE TO INCLUDE WHEN THE MITIGATION OR CONDITION NEEDS TO BE IMPLEMENTED* (*PRIOR TO RECORDING A MAP, PRIOR TO ISSUANCE OF A BUILDING PERMIT, ETC.*):

1. 2. 3.

4.

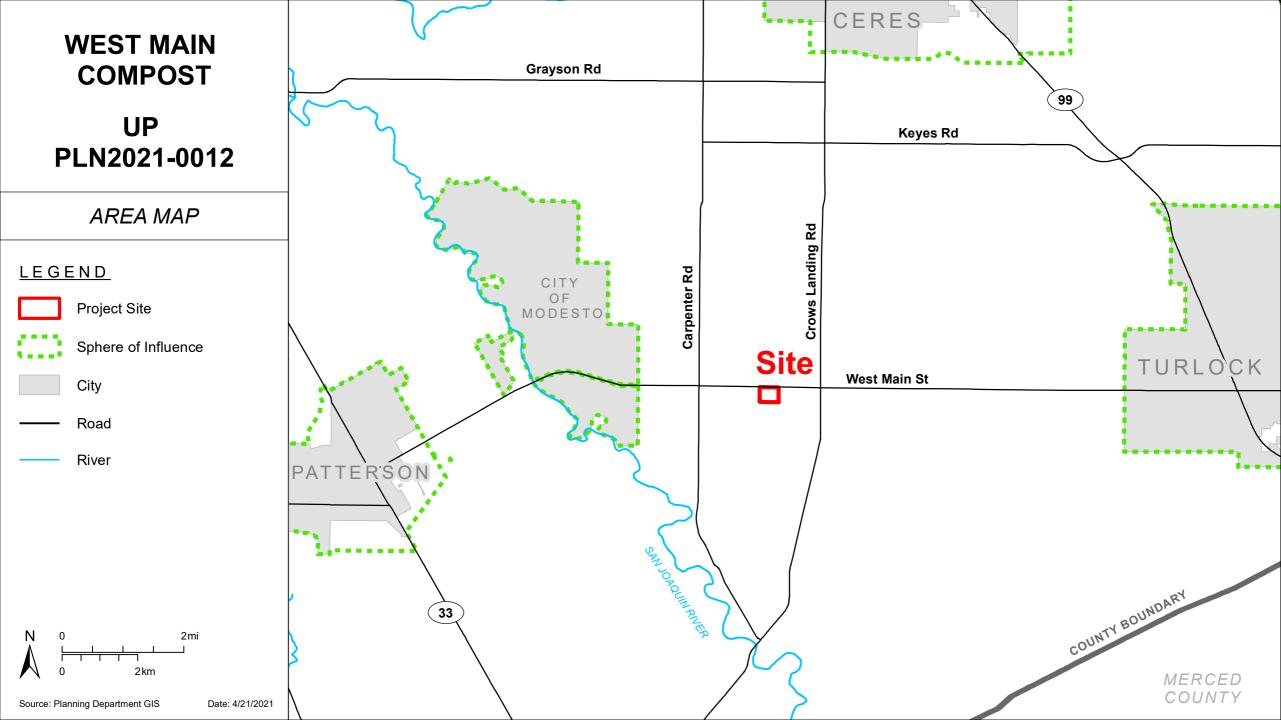
In addition, our agency has the following comments (attach additional sheets if necessary).

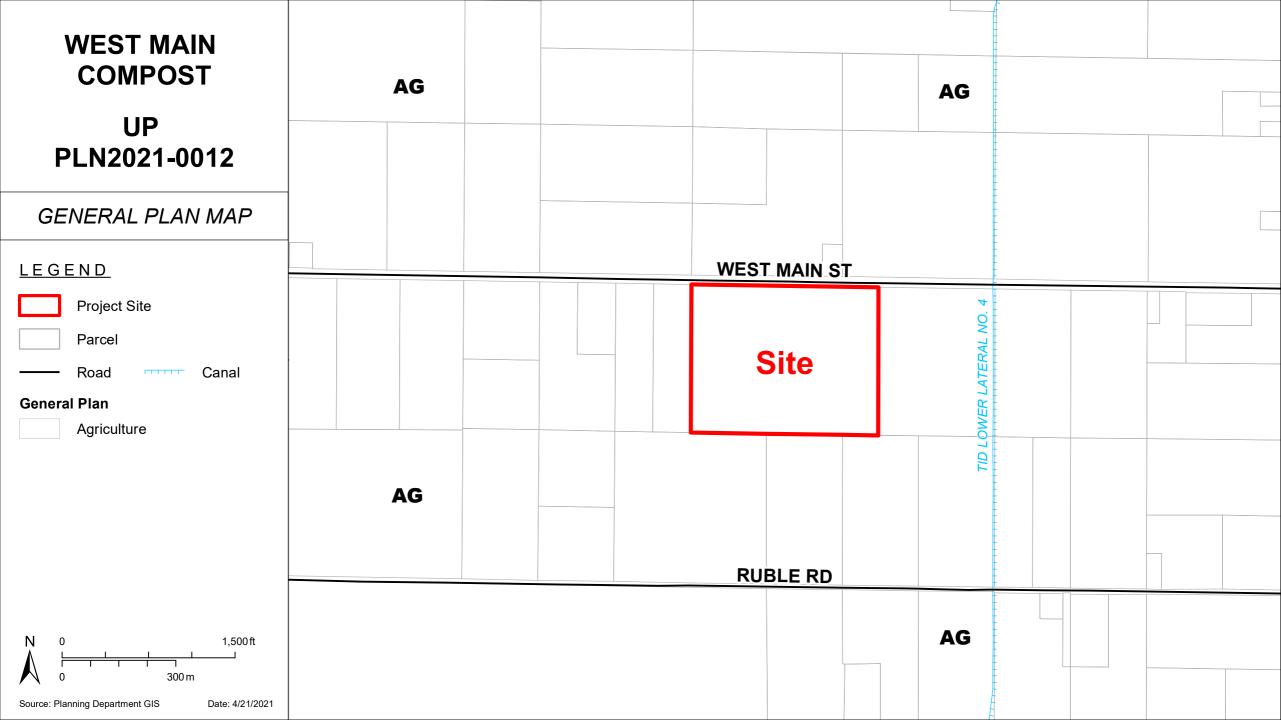
Response prepared by:

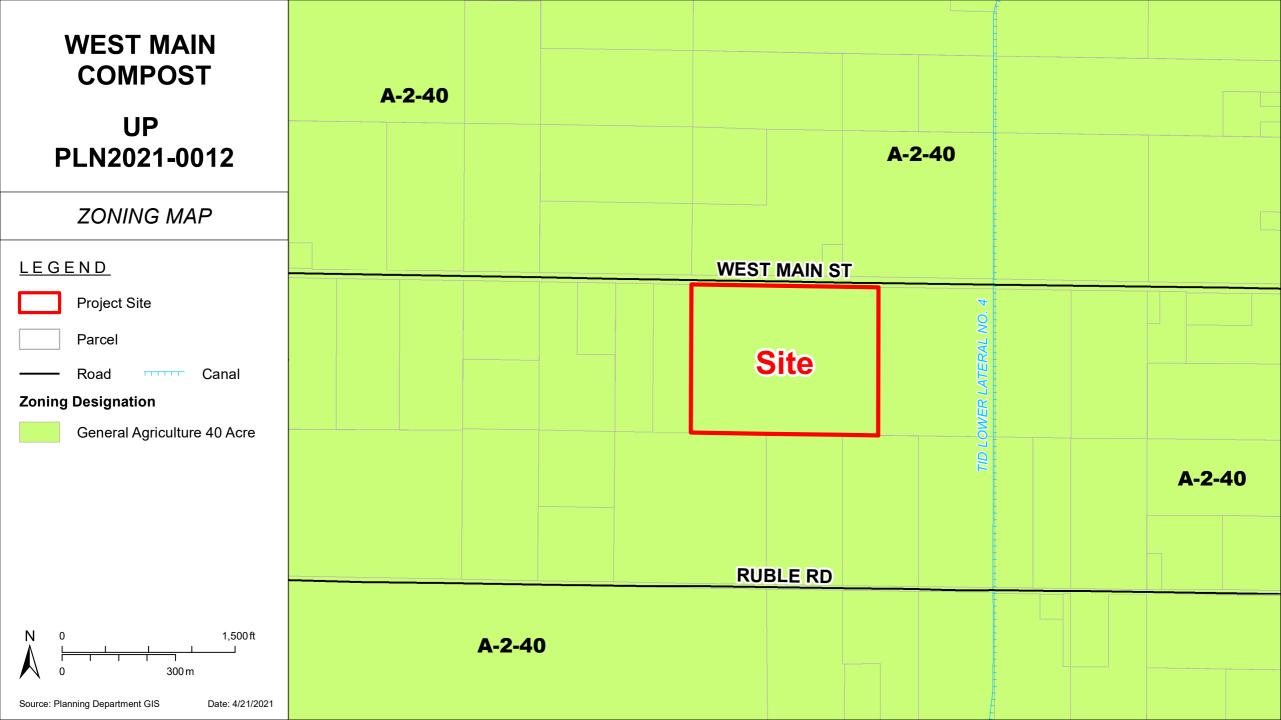
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Title

Date

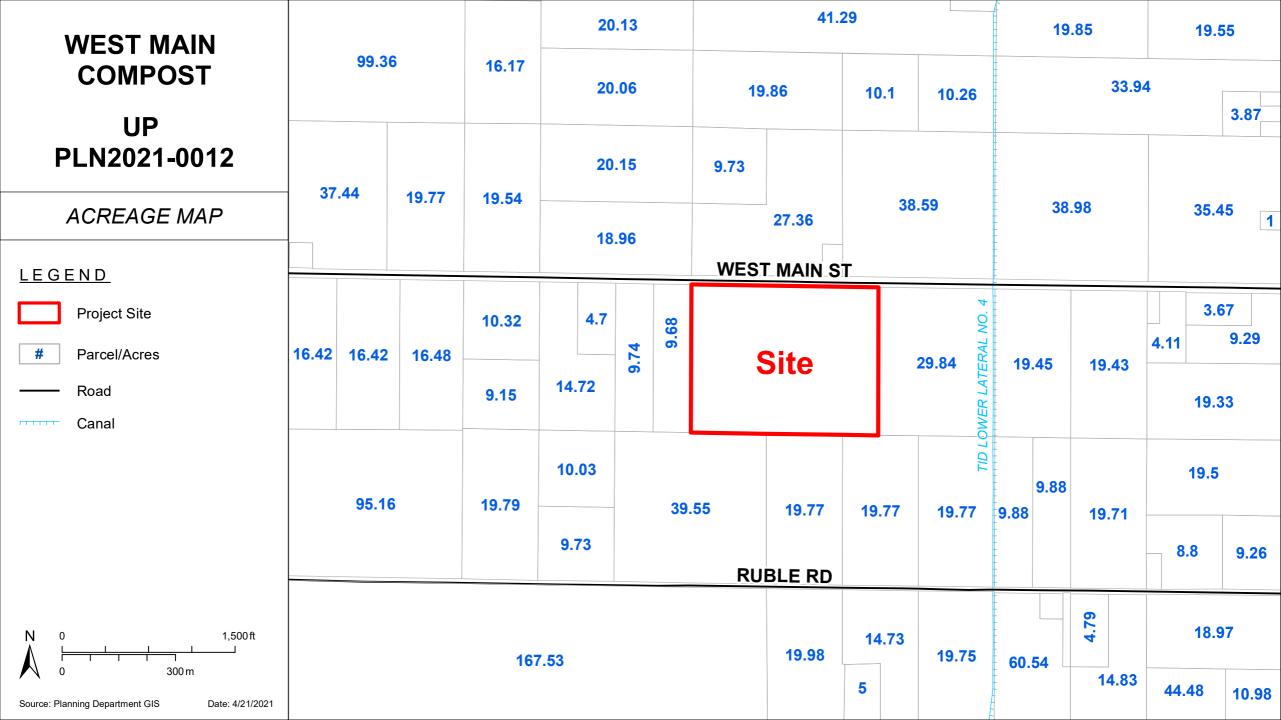






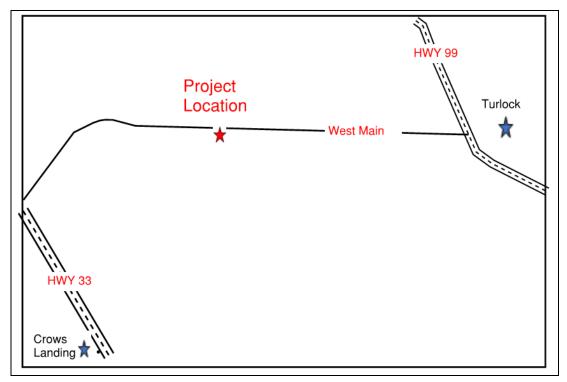




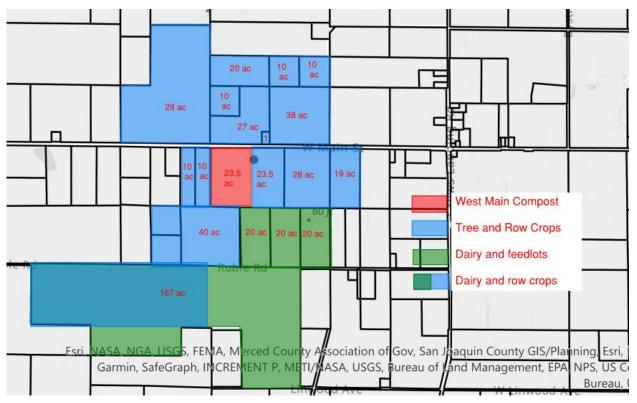


## Appendix A - Site Details

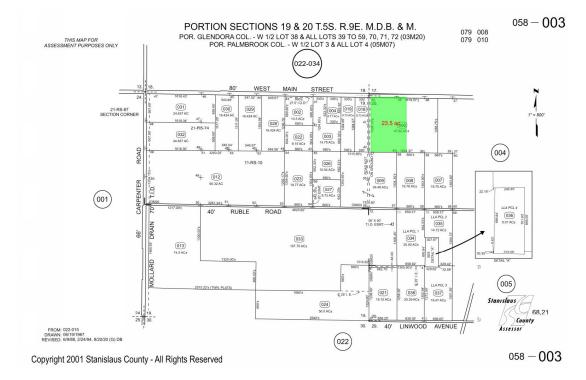
Project Location 1236 west Main Crows Landing, CA



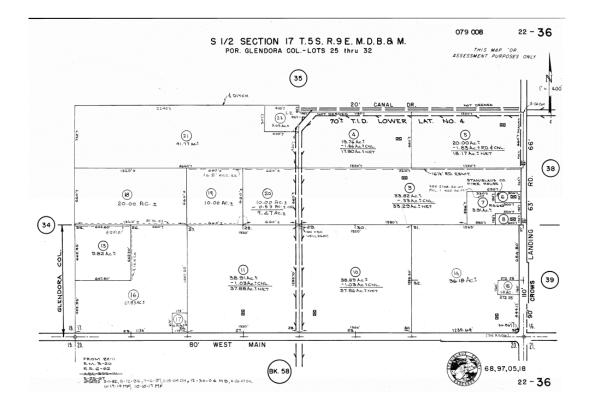
#### Adjoining Land Uses



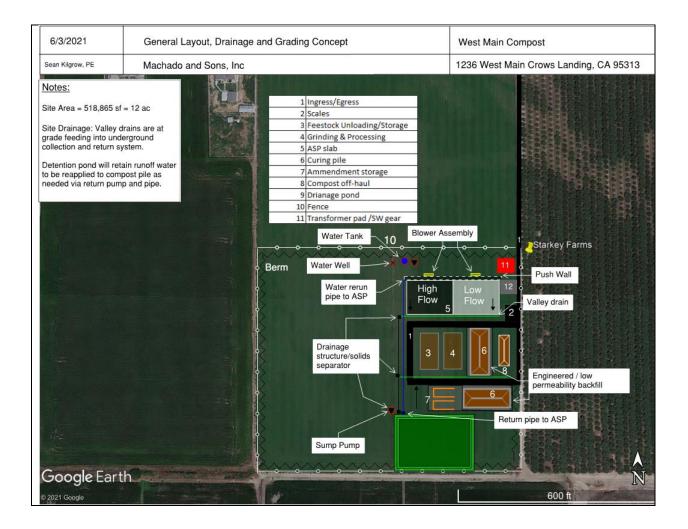
#### Assessor's Parcel Map



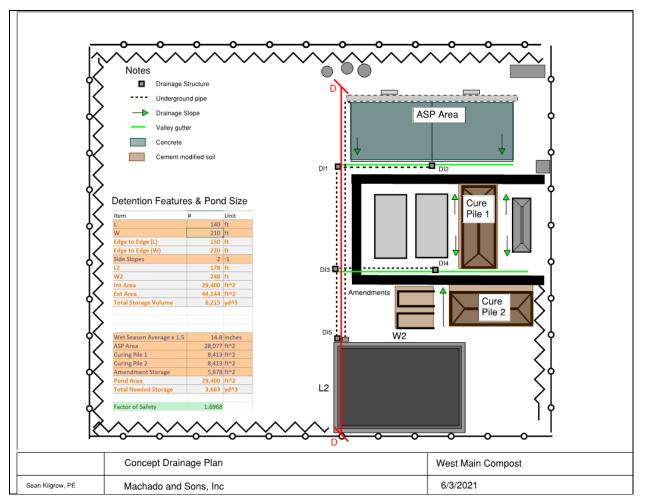
## Adjoining Parcel Maps



### Conceptual Site design



#### Conceptual Drainage Plan





DEPARTMENT OF PLANNING AND COMMUNITY DEVELOPMENT 1010 10<sup>TH</sup> Street, Suite 3400, Modesto, CA 95354 Planning Phone: (209) 525-6330 Fax: (209) 525-5911 Building Phone: (209) 525-6557 Fax: (209) 525-7759 Form Available Online: http://www.stancounty.com/planning/applications.shtm

# **APPLICATION QUESTIONNAIRE**

Part and a second se	e Check all applicable boxes	PLANNING STAFF USE ONLY:		
	s available to assist you with determ	Application No(s): <u>UP PLN 2021-00</u> 12		
otan i	s avanasie to assist you with determ	ining v	when applications are necessary	Date: _2/10/21
	General Plan Amendment		Subdivision Map	S <u>2D</u> T <u>5</u> R <u>9</u> GP Designation: <u>Agriculture</u>
	Rezone		Parcel Map	Zoning: <u>A-2-40</u>
×	Use Permit		Exception	Fee: _\$4,761 ∞
	Variance		Williamson Act Cancellation	Receipt No Received By: KA
	Historic Site Permit		Other	Notes:

In order for your application to be considered COMPLETE, please answer all applicable questions on the following pages, and provide all applicable information listed on the checklist on pages i – v. Under State law, upon receipt of this application, staff has 30 days to determine if the application is complete. We typically do not take the full 30 days. It may be necessary for you to provide additional information and/or meet with staff to discuss the application. Pre-application meetings are not required, but are highly recommended. An incomplete application will be placed on hold until all the necessary information is provided to the satisfaction of the requesting agency. An application will not be accepted without all the information identified on the checklist.

Please contact staff at (209) 525-6330 to discuss any questions you may have. Staff will attempt to help you in any way we can.

# **PROJECT INFORMATION**

**PROJECT DESCRIPTION:** (Describe the project in detail, including physical features of the site, proposed improvements, proposed uses or business, operating hours, number of employees, anticipated customers, etc. – Attach additional sheets as necessary)

\*Please note: A detailed project description is essential to the reviewing process of this request. In order to approve a project, the Planning Commission or the Board of Supervisors must decide whether there is enough information available to be able to make very specific statements about the project. These statements are called "Findings". It is your responsibility as an applicant to provide enough information about the proposed project, so that staff can recommend that the Commission or the Board make the required Findings. Specific project Findings are shown on pages 17 – 19 and can be used as a guide for preparing your project description. (If you are applying for a Variance or Exception, please contact staff to discuss special requirements).

See attached West Main Compost project narrative.

## **PROJECT SITE INFORMATION**

each section entirely. If question has been carefi	nformation saves time and is a question is not applicabl ully considered. Contact th oor, (209) 525-6330, if you	e to your p he Planning	roject, plea & Commu	se indicate nitv Develo	d this to sho pment Depa	w that each rtment Staff.
ASSESSOR'S PARCE	L NUMBER(S): Book	058	Page	003	Parcel	006
Additional parcel numbers: Project Site Address or Physical Location:	 1236 West Main Crow	s Landing, (	CA			
Property Area:	Acres:47.82	or Squa	re feet:	······		······
Current and Previous Land	Use: (Explain existing and pre	vious land u	se(s) of site t	or the last te	en years)	
General agriculture						
Proposed General Plan & . (if applicable)	oning: <u>general agriculture</u> Zoning: 5 <b>E:</b> (Describe adjacent land					cels in each
East: See attached are	a parcel map					
West:						
North:						
South:						
WILLIAMSON ACT CC	NTRACT:					
Yes 🗵 No 🗖	Is the property currently un Contract Number:		mson Act Co 77-3106	ntract?		
	If yes, has a Notice of Nor	n-Renewal be	en filed?			
	Date Filed:					

Yes 🗋 No 🗷	Do you propose to cancel any portion of the Contract?
Yes 🗋 No 🗷	Are there any agriculture, conservation, open space or similar easements affecting the use of the project site. (Such easements do not include Williamson Act Contracts)
	If yes, please list and provide a recorded copy:
SITE CHARACTE	RISTICS: (Check one or more) Flat 🗵 Rolling 🛛 Steep 🗖
VEGETATION: W	hat kind of plants are growing on your property? (Check one or more)
Field crops	Orchard D Pasture/Grassland D Scattered trees D
Shrubs	Woodland C River/Riparian C Other C
Explain Other:	
Yes 🗆 No 🗷	Do you plan to remove any trees? (If yes, please show location of trees planned for removal on plot plan and provide information regarding transplanting or replanting.)
GRADING:	
Yes 🗷 No 🗖	Do you plan to do any grading? (If yes, please indicate how many cubic yards and acres to be disturbed. Please show areas to be graded on plot plan.) <u>Approximately 5,000 cy</u>
STREAMS, LAKES	S, & PONDS:
Yes 🗋 No 🗷	Are there any streams, lakes, ponds or other watercourses on the property? (If yes, please show on plot plan)
Yes 🗷 No 🗖	Will the project change any drainage patterns? (If yes, please explain – provide additional sheet if needed) <u>See attached drainage concept.</u>
Yes 🗋 No 🗷	Are there any gullies or areas of soil erosion? (If yes, please show on plot plan)
Yes 🗷 No 🗋	Do you plan to grade, disturb, or in any way change swales, drainages, ditches, gullies, ponds, low lying areas, seeps, springs, streams, creeks, river banks, or other area on the site that carries or holds water for any amount of time during the year? (If yes, please show areas to be graded on plot plan)
	Please note: If the answer above is yes, you may be required to obtain authorization from other agencies such as the Corps of Engineers or California Department of Fish and Game.

## STRUCTURES:

Yes 🛛	No	X	Are there structures on the site? (If yes, please show on plot plan. Show a relationship to property lines and other features of the site.
Yes 🛛	No	X	Will structures be moved or demolished? (If yes, indicate on plot plan.)
Yes 🛛	No	X	Do you plan to build new structures? (If yes, show location and size on plot plan.)
Yes 🛛	No	X	Are there buildings of possible Historical significance? (If yes, please explain and show location and size on plot plan.)

## **PROJECT SITE COVERAGE:**

Existing Building Coverage:	0Sq. F	t. Landscaped Area:	0Sq. Ft.
Proposed Building Coverage:	0Sq. F	t. Paved Surface Area:	Sq. Ft.

## **BUILDING CHARACTERISTICS:**

Size of new structure(s) or building addition(s) in gross sq. ft.: (Provide additional sheets if necessary)

Number of floors for each building: \_\_\_\_\_

Building height in feet (measured from ground to highest point): (Provide additional sheets if necessary)

Height of other appurtenances, excluding buildings, measured from ground to highest point (i.e., antennas, mechanical equipment, light poles, etc.): (Provide additional sheets if necessary)\_\_\_\_\_

Proposed surface material for parking area: (Provide information addressing dust control measures if non-asphalt/concrete material to be used)

## UTILITIES AND IRRIGATION FACILITIES:

Yes No X Are there existing public or private utilities on the site? Includes telephone, power, water, etc. (If yes, show location and size on plot plan)

Who provides, or will provide the following services to the property?

Electrical:	PG&E	Sewer*:	NA	
Telephone:	NA	Gas/Propane:	PG&E	
Water**:	NA	Irrigation:	TID	

\*Please Note: A "will serve" letter is required if the sewer service will be provided by City, Sanitary District, Community Services District, etc.

\*\*Please Note: A "will serve" letter is required if the water source is a City, Irrigation District, Water District, etc., and the water purveyor may be required to provide verification through an Urban Water Management Plan that an adequate water supply exists to service your proposed development.

Will any special or unique sewage wastes be generated by this development other than that normally associated with resident or employee restrooms? Industrial, chemical, manufacturing, animal wastes? (Please describe:)

Please Note: Should any waste be generated by the proposed project other than that normally associated with a single family residence, it is likely that Waste Discharge Requirements will be required by the Regional Water Quality Control Board. Detailed descriptions of quantities, quality, treatment, and disposal may be required.

Yes 🛛	No	X	Are there existing irrigation, telephone, or power company easements on the property? (If yes, show location and size on plot plan.)
Yes 🛛	No	X	Do the existing utilities, including irrigation facilities, need to be moved? (If yes, show location and size on plot plan.)
Yes 🗖	No	X	Does the project require extension of utilities? (If yes, show location and size on plot plan.)

#### **AFFORDABLE HOUSING/SENIOR:**

Yes **No Will the project include affordable or senior housing provisions?** (If yes, please explain)

**RESIDENTIAL PROJECTS:** (Please complete if applicable – Attach additional sheets if necessary)

Total No. Lots:	Total Dwelling	Units:	Total Acreag	e:
Net Density per Acre:	Gross Density per Acre:			
(complete if applicable)	Single Family	Two Family Duplex	Multi-Family Apartments	Multi-Family Condominium/
Number of Units:				Townhouse
Acreage:				

## COMMERCIAL, INDUSTRIAL, MANUFACTURING, RETAIL, USE PERMIT, OR OTHER

**PROJECTS:** (Please complete if applicable – Attach additional sheets if necessary)

Square footage of each existing or proposed building(s):

Type of use(s):

Seasonal operation (i.e., packing shed, huller, etc.) months and hours of operation: <u>12 month a year operation.</u>						
Occupancy/capacity of building:						
Number of employees: (Maximum Shift):	4	(Minimum Shift):	3			
Estimated number of daily customers/visitors on site at pe	eak time:	20				
Other occupants:		·····				
Estimated number of truck deliveries/loadings per day:		15				
Estimated hours of truck deliveries/loadings per day:		7:00 am - 5:00 pm				
Estimated percentage of traffic to be generated by trucks:						
Estimated number of railroad deliveries/loadings per day:						
Square footage of:						
Office area:	Warehou	ise area:				
Sales area:	Storage	area:				
Loading area:		turing area:				
Other: (explain type of area)						
Yes No 🕅 Will the proposed use involve toxic or hazardous materials or waste? (Please explain)						
ROAD AND ACCESS INFORMATION:						
What County road(s) will provide the project's main acces	s? (Please show a	all existing and proposed dri	veways on the plot plan)			
See attached site plan.						

Yes 🛛	No	X	Are there private or public road or access easements on the property now? (If yes, show location and size on plot plan)
Yes 🗶	No		Do you require a private road or easement to access the property? (If yes, show location and size on plot plan)
Yes 🗶	No		Do you require security gates and fencing on the access? (If yes, show location and size on plot plan)

Please Note: Parcels that do not front on a County-maintained road or require special access may require approval of an Exception to the Subdivision Ordinance. Please contact staff to determine if an exception is needed and to discuss the necessary Findings.

## STORM DRAINAGE:

How will your project handle storm water runoff?	(Check one)	🗵 Drainage Basin	Direct Discharge	X Overland
Other: (please explain)				

If direct discharge is proposed, what specific waterway are you proposing to discharge to?

Please Note: If direct discharge is proposed, you will be required to obtain a NPDES permit from the Regional Water Quality Control Board, and must provide evidence that you have contacted them regarding this proposal with your application.

## **EROSION CONTROL:**

If you plan on grading any portion of the site, please provide a description of erosion control measures you propose to implement.

SWPPP provisions and berms shown on site plan.

Please note: You may be required to obtain an NPDES Storm Water Permit from the Regional Water Quality Control Board and prepare a Storm Water Pollution Prevention Plan.

## ADDITIONAL INFORMATION:

Please use this space to provide any other information you feel is appropriate for the County to consider during review of your application. (Attach extra sheets if necessary)

See attached project narrative.

## **Project Description**

## West Main Compost Facility

July 2021

Prepared by:

MACHADO & SONS CONSTRUCTION, INC. 1000 South Kilroy Road Turlock, CA 95380

#### Contents

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$( \cap$	nt		nts
CU	יווי	CI.	ILS.

Project Overview	2
Project Overview	3
Surrounding Land Use	3
Williamson Act	
Days and Hours of Operation	
Site Description	3
Permits and Approvals	
Site Capacity	4
Table 1 Estimated Site Capacity	
Table 2 Feedstock Type and Daily Volume	4
Feedstock delivery	4
Other Traffic	5
ASP Process	5
Table 3 – Emissions Reductions	6
Figure 1 – ASP Details	6
Soil Recycling Process	Error! Bookmark not defined.
Other Amendment	7
Odor impact minimization	7
Compost Biofilter:	7
Noise Control	8
Stormwater Discharge and Drainage	8
Self-Monitoring	8
Appendix A - Site Details	1
Appendix A - Site Details Project Location 1236 west Main Crows Landing, CA	
	1
Project Location 1236 west Main Crows Landing, CA	1
Project Location 1236 west Main Crows Landing, CA	I
Project Location 1236 west Main Crows Landing, CA Adjoining Land Uses Assessor's Parcel Map	
Project Location 1236 west Main Crows Landing, CA Adjoining Land Uses Assessor's Parcel Map Adjoining Parcel Maps Conceptual Site design	
Project Location 1236 west Main Crows Landing, CA Adjoining Land Uses Assessor's Parcel Map Adjoining Parcel Maps Conceptual Site design Generalized Drainage Plan	
Project Location 1236 west Main Crows Landing, CA Adjoining Land Uses Assessor's Parcel Map Adjoining Parcel Maps Conceptual Site design	
Project Location 1236 west Main Crows Landing, CA Adjoining Land Uses Assessor's Parcel Map Adjoining Parcel Maps Conceptual Site design Generalized Drainage Plan Appendix B –Grant Deed.	
Project Location 1236 west Main Crows Landing, CA Adjoining Land Uses Assessor's Parcel Map Adjoining Parcel Maps Conceptual Site design Generalized Drainage Plan Appendix B –Grant Deed. Appendix C – California Historical Resource record search.	
Project Location 1236 west Main Crows Landing, CA Adjoining Land Uses Assessor's Parcel Map Adjoining Parcel Maps Conceptual Site design Generalized Drainage Plan Appendix B –Grant Deed. Appendix C – California Historical Resource record search Appendix D – Non-Disposal Facility Element	
Project Location 1236 west Main Crows Landing, CA Adjoining Land Uses Assessor's Parcel Map Adjoining Parcel Maps. Conceptual Site design Generalized Drainage Plan Appendix B –Grant Deed. Appendix C – California Historical Resource record search Appendix C – California Historical Resource record search Appendix E – Odor Minimization Plan	

## **Project Description**

The following describes a proposed composting operation to be operated by Machado & Sons Construction on a site in Stanislaus County. The project is located on 23.5 acres of a 48-acre parcel at 1236 South Main Ave, Crows Landing, California. The facility will ultimately receive a maximum of 140 tons per day of landscape residue, vegetative food material, and green waste. Title 14 composting regulations (Title 14, California Code of Regulations, Chapter 3.1.) describe a tiered permitting structure for composting facilities and set forth design and operating standards for these facilities.

FACILITY NAME:	West Main Compost Facility
MAILING ADDRESS:	1000 South Kilroy Road, Turlock, CA 95358
PHYSICAL ADDRESS:	1236 West Main Crows Landing, CA
LANDOWNER:	Dave & Cindy Starkey 1643 W Tuolumne Rd Ceres, CA 95307
ASSESSOR'S PARCEL NUMBER:	058-003-006
OPERATOR:	Machado and Sons, Inc. Sean Kilgrow, P.E. 1000 South Kilroy Road Turlock, CA 93589 (O) (209) 632-3963 (M) (916) 206-4342 skilgrow@machadoandsons.com
REGULATORY CONTACTS:	CalRecycle (LEA for Stanislaus County) 1001 I Street

## **Project Overview**

The West Main Compost Facility is being proposed in coordination with local organic waste managers to comply with SB 1383/AB 1826 and serve the local agricultural compost market. The facility will receive source-separated green waste from local municipal waste haulers.

This facility will operate in conjunction with Starkey Farms, and other local farms, for off-take of the compost material which is consistent with the agricultural use of the property which is currently zoned general agriculture. There will be no concentration of other businesses or facilities added due to this use other that what is shown on the site plan. It is expected that there will be four full time employees at the facility complying with the employee limitation of the number of full-time, year-round employees involved in the operation. All maintenance and material management tasks will be completed during normal working hours.

This operation will provide the local farms access to the high-quality compost that the aerated static pile (ASP) system will generate. Moreover, this compost facility will enable the local jurisdictions and other organic waste generators to comply with the ambitious recycling mandate of SB 1383. This facility will not accept any organic waste that contains greater that 1% contamination by dry weight. Our feedstock will be green and vegetative food waste from local MSW haulers.

## Surrounding Land Use

The property is zoned agricultural and the surrounding land use is dominated by developed agricultural uses. Uses are a combination of relatively small dairy farms, row crop and orchard growers. The nearest residence is at 1512 West Main St, Crows Landing.

#### Williamson Act

The Williamson Act number for the site is Williamson Act #:1977-3106. We are anticipating that no cancellation of the Williamson Act will be necessary for this project because the compost will be used for an agriculture purpose.

#### Days and Hours of Operation

The facility will operate Monday through Saturday from 7:00 am to 5:00 pm. Working ours may shift or expand due to process demands caused by seasonal fluctuations per LEA approval.

#### Site Description

The project is located on 23.5 acres of a 48-acre parcel at 1236 West main Ave. Crows Landing, California. The parcel generally slopes to the southwest away from West Main and further to the Tuolumne river. See ROWD report in Attachment G for site, groundwater, soil, geologic and climate related information.

## Permits and Approvals

The following permits and approvals govern the design and operation of the facility:

- 1. Conditional Use Permit, Stanislaus County
- 2. Mitigated Negative Declaration, Stanislaus County
- 3. Registration Permit CalRecycle (SWIS # pending)
- 4. Technical Report, Central Valley Regional Water Quality Control Board
- 5. Authority to Construct/Permit to Operate San Joaquin Valley Air Pollution Control District
- 6 Stanislaus County Non-Disposal Facility Element

#### Site Capacity

Title 14 regulations describe a Registration tier for this type of facility and limit all on-site materials to 12,500 cubic yards at any one time. The on-site volumes have been estimated as follows using the following assumptions:

- 1. Max volume of feedstock delivered to site is 140 t/dy, 6 dy/wk
- 2. Max feedstock processing time is 72 hours
- 3. Feedstock & compost average bulk density = 40 lb/ft3
- 4. Feedstock retention time ~= 30 days
- 5. Compost cure time ~= 20 days
- 6. Compost amendments: wood grindings, gypsum

#### Table 1 Estimated Site Capacity

Assumptions						
Max daily feedstock 140 t/dy	=	Deliveries 6 days per week, 24 dy/mo		Feedstock average density = 40 lb/cf		
Onsite Volume						
Bulk Feedstock (3-dy retention)		Compost k retention)	Curing Piles (3-week retention	on)	Additives	Finished compost
420 t = 778 cy	3,360 t	= 6,222 cy	2,250 t = 4,666 c	сy	500 су	300 су
Total material onsite	: = 12,466	cy	·			

#### Table 2 Feedstock Type and Daily Volume

Feedstock	TPD average	TPD max
Green Material	120	140

#### Feedstock delivery

The feedstock that we will process originates from the local MSW haulers. The facility will ultimately receive up to twenty delivery trucks per day. All loads entering the facility shall undergo load inspection by our trained load checkers. No loads will be accepted without a load check onsite.

To increase the probability that the material will remain within CalRecycle specifications for plastic or other contaminates the following procedure will be implemented.

- The incoming green waste will be delivered from the MSW source. Our goal is to receive the waste in accordance with the CalRecycle >1% by volume specification. To start the operation, we will be running the CalRecycle contamination test frequently to confirm contamination levels based on the following methodology <a href="https://www.calrecycle.ca.gov/lea/regs/implement/fimguidance">https://www.calrecycle.ca.gov/lea/regs/implement/fimguidance</a>
- The contract with the MSW hauler will specify that the Green material will be sorted at the transfer station to the CalRecycle specification. Upon delivery our crews will inspect every load that enters the facility prior to preparing the green waste for composting. We will either accept the load, perform additional sorting/separation, or reject the load. In the beginning we expect that our crews will need to perform some additional sorting but our long-term goal is to work with the MSW haulers to deliver compliant waste.

The facility will keep records of training and load checks performed to meet the requirements set out by the LEA. The feedstock will be shredded to -4" and mixed to the proper C:N ratio before being hauled to the ASP active compost piles. All feedstock will be processed within 72 hours of receipt to avoid any odor or vector issues. Carbon sources and bulking agents, such as wood chips, will be stored in concrete block bins as shown on the site plan.

If the facility is unable to process the incoming feedstock within the 72-hour time limitation the plan is to divert the material to other compost facilities in the area (Recology or Modesto Compost).

## **Other Traffic**

In addition to the 20 feedstock deliveries per day, the facility will have 3 full time employees, 2 weekly mechanic visits, and weekly visits from management. We do not plan to sell to the public at this time; therefore, we expect no public traffic at the facility. We do anticipate utilizing the delivery trucks to haul the compost to customers. The maximum total daily traffic flow will be 20 vehicles. Average traffic flow will be 15 vehicles. Parking and portable toilet facilities will be available for all drivers and employees.

## ASP Process

Aerated static pile compost piles are constructed over a network of aeration pipes and induce airflow into the pile using an electric blower that is operated in conjunction with a pile temperature control system that cycles air into the pile. The piles are moved once to introduce addition oxygen during the first 30 days, a period referred to as the active phase of composting. We can adjust the airflow to manage the pile temperatures and optimize the biology of the composting process.

A study funded by the San Joaquin Valley Air Pollution Control District resulted in the following findings:

"The comparison of emissions from the 22-day active composting phase between the ASP and standard windrows demonstrated emissions reductions by the ASP of 99% for total non-methane, non- ethane VOCs, 70% for ammonia (average of field and lab), 88% for nitrous oxide, and 13% for methane. The overall reduction for CO2 equivalents was nearly 65%. Diesel use in pile construction and active-phase management was 87% less for the ASP system, with commensurate reductions in criteria pollutant emissions associated with diesel fuel combustion. Water used during the composting process was reduced by 20%, and land necessary for active-phase composting is calculated to be reduced by 55.5%."

Aeration is vital to our process. Aeration maintains aerobic conditions in the pile and optimizes the biology of the composting process and pile temperatures to within a desired range. Moreover, APS reduces offensive odors and

expedites the rate of composting. When managed properly this technique resolves odor impacts, controls vector problems reducing nuisance issues and neighbor complaints. The operation will use less fuel per ton of compost produced than windrow composting, but more importantly reduce the volume of VOCs and CH4 released into the atmosphere.

Table ES-1: Project Results							
		NH3		GHG			
	VOC	Field	Lab	CO2	CH4	N2O	CO2e
Prototype ASP (22 Days)	0.099	0.017	0.007	205.70	5.05	0.010	315
Baseline Windrow (22 days)	8.604	0.099	0.014	731.63	5.81	0.093	883
% reduction from Baseline	-98.8%	-83.2%	-53.3%	-71.9%	-13.0%	-88.8%	-64.3%

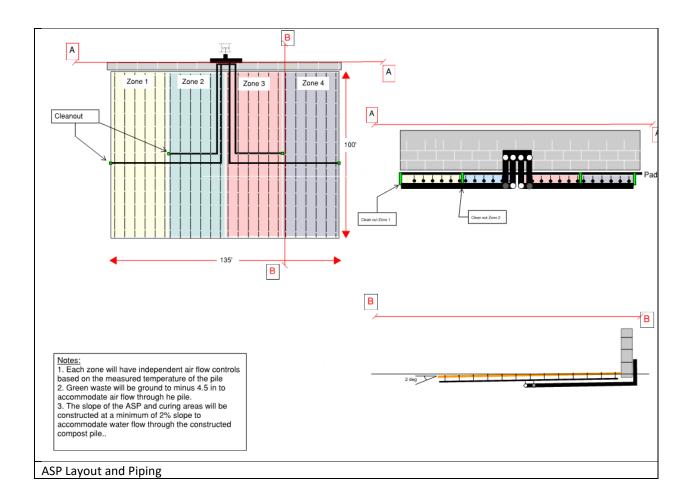
#### Table 3 – Emissions Reductions

Table ES-1: Results of emissions testing in pounds of pollutant per ton of feedstock over the 22-day active composting period.

The ASP composting technique reduces the footprint of the active compost pad. Typically, this approach significantly reduces the operational footprint from standard windrow compost. In this case, we plan to have a 100' x 200' ASP concrete slab with embedded aeration piles and nozzle assemblies as shown here.

## Figure 1 – ASP Details





#### Amendment

There are plans to mix soil amendment to the finished compost to create commercial soil products. The current amendment recipe calls for gypsum as an additive. There will be no more than 500 cy stored onsite at any given time.

#### Odor impact minimization

The facility will be required to have and maintain a written Odor Impact Minimization Plan (Please see Appendix B). The primary means of odor mitigation are the receipt of relatively benign feedstocks, in small quantities, away from a large volume of sensitive receptors. In addition, the facility will utilize an aerated composting system using a "compost biofilter" to reduce VOC and odor emissions.

#### **Compost Biofilter:**

The biofilter consists of a 1' layer of unscreened compost covering the entire ASP pile. This filter has active microorganisms that reside in the layer and absorb, treat, or block the VOCs and other gases from escaping the pile. Ammonia gets absorb as nitrogen that is sequestered chemically in the pile. The net result is a mild organic order that is not strong or offensive. Odor only become an issue when the anaerobic bacterial population inside the pile grows in a low oxygen environment and begins to consumption of the nutrients releasing H2S gas. This can only happen with improper design or operation resulting in insufficient oxygen filtering through the pile.

The biofilter also acts as an insulative barrier helping with moisture losses during hot summer temperatures. The piles will start out at 60-65% water content and will lose some of that moisture over the retention time.

The biofilter acts as vector barrier to flies, insects, rodents and birds. Any animal or insect curious or attracted to the pile will find the biofilter difficult to penetrate and if penetrated the active compost is hot. Once the compost reaches the curing pile the large majority of the consumable nutrients are gone reducing insect and rodent interest.

## Noise Control

There will be processing machinery, hauling equipment and trucking. To control noise, deliveries and processing work will only be allowed during normal working hours 7:00 AM - 5:00 PM Monday to Saturday. We also plan to construct a berm surrounding the site and plant trees on the North end of the property.

#### Stormwater Discharge and Drainage

The facility will be applying for coverage under the *State Water Resources Control Board Order WQ 2015-0121-DWG General Waste Discharge Requirements for Composting Operations*. We are proceeding under the assumption that this will be a Tier I facility as described in the General Waste Discharge Requirements for Composting Operations, see Appendix C. The facility will also comply with the National Pollutant Discharge Elimination System via the creation and implementation of a Stormwater Pollution Prevention Plan.

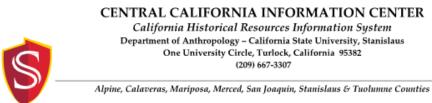
## Self-Monitoring

We will submit the required reports to the EA or other appropriate authority monthly. Specifically, we will actively need to show SB 1383 compliance and plan to collect the following information:

- 1. The types and quantities (in tons) of organic waste entering the facility per day.
- 2. The number and types of delivery vehicles in and out of the facility per day.
- 3. The number and weight of non-compliant loads.
- 4. Recording of any special occurrences, such as fires, explosions, earthquakes, significant injuries, accidents or property damage, and all measures taken to address the incident.
- 5. Recording of any complaints and all measures taken to address the incident.

## [Type here]

## Appendix C – California Historical Resource record search



Date: 2/4/2021

Records Search File#: 11650N Project: West Main Compost Facility APN 058-003-006; T5S R9E Section 20; 1236 W. Main, Crows Landing

Sean Kilgrow, P. E. Machado & Sons Construction, Inc. 1000 South Kilroy Road Turlock, CA 95380 916-206-4342

skilgrow@machadoandsons.com

Dear Mr. Kilgrow:

We have conducted a records search as per your request for the above-referenced project area located on the Crows Landing USGS 7.5-minute quadrangle map in Stanislaus County.

Search of our files includes review of our maps for the specific project area and the immediate vicinity of the project area, and review of the following:

National Register of Historic Places (NRHP) California Register of Historical Resources (CRHR) California Inventory of Historic Resources (1976) California Historical Landmarks California Points of Historical Interest listing Office of Historic Preservation Built Environment Resource Directory (BERD) and the Archaeological Determinations of Eligibility (ADOE) Survey of Surveys (1989) Caltrans State and Local Bridges Inventory General Land Office Plats Other pertinent historic data available at the CCaIC for each specific county

The following details the results of the records search:

#### Prehistoric or historic resources within the project area:

- There are no formally recorded prehistoric or historic archaeological resources or historic buildings or structures within the project area.
- The General Land Office survey plat for T5S R9E (dated 1855) shows no historic features in Section 20.

- The Official Map of the County of Stanislaus, California (1906) shows William Wood et al. as the landowner/s at that time.
- The Crows Landing USGS map (edition of 1916) shows West Main Street and an access road in the NW ¼ of Section 20, T5S R9E. The 1952 edition shows two buildings in the NW ¼ of Section 20—we have no further information on file regarding this possible historic buildings that would be 70 years in age (or older).

**Prehistoric or historic resources within the immediate vicinity of the project area:** There are no formally recorded prehistoric or historic archaeological resources within the immediate vicinity of the project area, but we must caution you that Native American prehistoric remains have been found in subsurface context (below the plow zone) in similar environs within Stanislaus County and the Crows Landing area.

**Resources that are known to have value to local cultural groups:** None has been formally reported to the Information Center.

**Previous investigations within the project area:** None has been formally reported to the Information Center.

**Recommendations/Comments:** Based on existing data in our files the project area has a moderate sensitivity for the possible discovery of historical resources, including both prehistoric and historic archaeological remains.

Please be advised that a historical resource is defined as a building, structure, object, prehistoric or historic archaeological site, or district possessing physical evidence of human activities over 45 years old. Since the project area has not been subject to previous investigations, there may be unidentified features involved in your project that are 45 years or older and considered as historical resources requiring further study and evaluation by a qualified professional of the appropriate discipline.

If the current project does not include ground disturbance, further study for archaeological resources is not recommended at this time. If ground disturbance is considered a part of the current project, we recommend further review for the possibility of identifying prehistoric or historic-era archaeological resources.

If the proposed project contains buildings or structures that meet the minimum age requirement (45 years in age or older) it is recommended that the resource/s be assessed by a professional familiar with architecture and history of the county. Review of the available historic building/structure data has included only those sources listed above and should not be considered

#### comprehensive.

If at any time you might require the services of a qualified professional the Statewide Referral List for Historical Resources Consultants is posted for your use on the internet at <a href="http://chrisinfo.org">http://chrisinfo.org</a>

If archaeological resources are encountered during project-related activities, work should be temporarily halted in the vicinity of the discovered materials and workers should avoid altering the materials and their context until a qualified professional archaeologist has evaluated the situation and provided appropriate recommendations. Project personnel should not collect cultural resources.

If human remains are discovered, California Health and Safety Code Section 7050.5 requires you to protect the discovery and notify the county coroner, who will determine if the find is Native American. If the remains are recognized as Native American, the coroner shall then notify the Native American Heritage Commission (NAHC). California Public Resources Code Section 5097.98 authorizes the NAHC to appoint a Most Likely Descendant (MLD) who will make recommendations for the treatment of the discovery.

Due to processing delays and other factors, not all of the historical resource reports and resource records that have been submitted to the State Office of Historic Preservation are available via this records search. Additional information may be available through the federal, state, and local agencies that produced or paid for historical resource management work in the search area. Additionally, Native American tribes have historical resource information not in the CHRIS Inventory, and you should contact the California Native American Heritage Commission for information on local/regional tribal contacts.

The California Office of Historic Preservation (OHP) contracts with the California Historical Resources Information System's (CHRIS) regional Information Centers (ICs) to maintain information in the CHRIS inventory and make it available to local, state, and federal agencies, cultural resource professionals, Native American tribes, researchers, and the public. Recommendations made by IC coordinators or their staff regarding the interpretation and application of this information are advisory only. Such recommendations do not necessarily represent the evaluation or opinion of the State Historic Preservation Officer in carrying out the OHP's regulatory authority under federal and state law.

We thank you for contacting this office regarding historical resource preservation. Please let us know when we can be of further service. Please sign and return the attached Access Agreement Short Form.

Note: Billing will be transmitted separately via email from the Financial Services office

•

(\$150.00), payable within 60 days of receipt of the invoice.

If you wish to include payment by Credit Card, you must wait to receive the official invoice from Financial Services so that you can reference the CMP # (Invoice Number), and then contact the link below:

https://commerce.cashnet.com/ANTHROPOLOGY

Sincerely,

E. II. Greathouse

E. A. Greathouse, Coordinator Central California Information Center California Historical Resources Information System

Copy of invoice to Laurie Marroquin, Financial Services (lamarroquin@csustan.edu)

## Appendix D – Non-Disposal Facility Element

## STANISLAUS COUNTY NON DISPOSAL FACILITY ELEMENT

## WEST MAIN COMPOST FACILITY

## 1. Name of Proposed Facility

West Main Compost Facility

## 2. Type of Facility

The facility is described as composting operation under Title 14 regulations. It will be permitted at the Registration tier.

## 3. Contact Person and Phone Number Operator

Sean Kilgrow, P. E. Machado & Sons Construction, Inc. 1000 South Kilroy Road Turlock, CA 95380 (O) (209) 632-3963 (M) (916) 206-4342 skilgrow@machadoandsons.com

## 4. Owner of Proposed Facility

Machado and Sons, Inc. 1000 South Kilroy Road Turlock, CA 93589 (O) (209) 632-3963 (M) (916) 206-4342 skilgrow@machadoandsons.com

## 5. Operator of Proposed Facility

Machado and Sons, Inc. 1000 South Kilroy Road Turlock, CA 93589 (O) (209) 632-3963 (M) (916) 206-4342 <u>skilgrow@machadoandsons.com</u>

Integrated Waste Management Consulting, LLC February 2021

NDFE Amendment Submittal West Main Compost Facility

1

## 6. Address of Proposed Facility

1236 West Main Crows Landing, CA 95313

## 7. Proposed Facility Capacity

The facility is being permitted to receive up to a maximum of 150 tons per day (120 tons of compost feedstock and up to 30 tons per day of amendments).

## 8. Anticipated Diversion Rate for the Proposed Facility

The Facility will receive only source-separated materials that can be processed into compost, mulch, soil amendments, or similar uses; and therefore will have a minimum diversion rate of 90%.

## 7. Jurisdictions to be Served by Proposed Facility

The facility is located in unincorporated Stanislaus County and will serve the surrounding jurisdictions of Crows Landing, Patterson, Turlock, and the unincorporated county.

## 8. Description of General Area (Zoning Designation)

The property is zoned agricultural and the surrounding land use is dominated by developed agricultural uses. Uses are a combination of relatively small dairy farms, row crop, and orchard growers.

Integrated Waste Management Consulting, LLC February 2021 NDFE Amendment Submittal West Main Compost Facility

2

Appendix E – Odor Minimization Plan

### ODOR IMPACT MINIMIZATION PLAN

### West Main Composting Facility

February 2021

Submitted to: CalRecycle Enforcement Agency Waste Permitting, Compliance and Mitigation Division as LEA for Stanislaus County

Prepared by: Integrated Waste Management Consulting, LLC 50 E. Scenic Avenue, Point Richmond, CA 94801

#### Contents

Se	Section Pag	
I	INTRODUCTION	
		1
2	ODOR IMPACT MINIZATION PLAN	2
	Odor Monitoring Protocol	2
	Meteorological Conditions	3
	Complaint Response Protocol	3
	Response to citizen complaints	3
	Design Considerations for Minimizing Odors	5
	Method and degree of aeration	5
	Moisture content	5
	Feedstock characteristics	5
	Airborne emissions production	5
	Process water distribution	5
	Pad and site drainage and permeability	6
	Equipment reliability	6
	Personnel training	6
	Weather event impacts	6
	Utility service interruptions	6
	Operating Procedures to Minimize Odor	9
	Composting Operation	9
	Aisles between piles	9
	Compost piles	9
	Curing piles	9
	Aeration	9
	Moisture management	9
	Feedstock quality	9
	Drainage controls	10
	Pad maintenance	
	Wastewater pond controls	10
	Storage practices	
	Contingency plans	10
	Weather impacts	10
	Biofiltration	
	Tarping	10
	Plan Revision	

#### Tables

I Sources of Odor and Possible Management Techniques		
	Appendices	
A	Title 14 Regulations regarding OIMP A-1	

#### ODOR IMPACT MINIMIZATION PLAN West Main Compost Facility

Title 14 regulations Title 14, CCR Section 17863.4 require that all compostable material handling operations and facilities prepare and maintain a site-specific Odor Impact Minimization Plan (OIMP). The following OIMP has been developed to assist the West Main Compost Facility in complying with these regulations.

Project Name:	West Main Composting Facility
Facility Address:	1236 West Main Crows Landing, CA 95313
Landowner:	Dave & Cindy Starkey 1643 W Tuolumne Rd Ceres, CA 95307
Operator	Machado and Sons, Inc. Sean Kilgrow, P.E. 1000 South Kilroy Road Turlock, CA 93589 (O) (209) 632-3963 (M) (916) 206-4342 skilgrow@machadoandsons.com
Regulatory Contacts:	CalRecycle Enforcement Agency Waste Permitting, Compliance and Mitigation Division as LEA for Stanislaus County 1001   Street Sacramento, CA 95814

The following provides specific information on compliance with 17863.4 (b) – (d). The text from Title 14 is presented in italics followed by the Facility's proposed method of compliance.

(b) Odor impact minimization plans shall provide guidance to on-site personnel by describing, at a minimum, the following items. If the operator will not be implementing any of these procedures, the plan shall explain why it is not necessary.

#### ODOR MONITORING PROTOCOL

(1) an odor monitoring protocol which describes the proximity of possible odor receptors and a method for assessing odor impacts at the locations of the possible odor receptors; and

The closest receptors will be facility staff and management who will be on-site daily monitoring the status of the facility. The site is surrounded by agricultural fields interspersed with ranch houses of low density. The closest residence is across W. Main Street and a second residence is just to the East (also across W. Main.). There is a large dairy just to the south of the site which probably dominates the odor shed in the region. The primary means of odor mitigation are the receipt of relatively benign feedstocks, in small quantities, away from a large volume of sensitive receptors. In addition, the facility will utilize an aerated composting system using a "compost biofilter" to reduce VOC and odor emissions.

Each day the operator will evaluate on-site odors and evaluate planned operations for potential release of objectionable odors. Operational practices will be implemented to minimize the release of objectionable odors These include good composting practice as described in the Report of Composting Site Information (appropriate C:N ratio, sufficient moisture content, adequate aeration and/or turning, etc.) to minimize production and persistence of odors; good housekeeping measures (like clearing spilled materials between compost piles, eliminating areas where water could pond, and maintaining reasonably sized stockpiles of feedstock and finished compost).

If the operator detects an objectionable on-site odor, they will follow the following protocol:

- I. Investigate and determine the likely source of the odor.
- 2. Determine if on-site management practice could remedy the problem and immediately take steps to remedy the situation. An example of possible sources and likely management actions is shown in Table I.
- 3. Determine whether or not the odor is travelling beyond the site by patrolling the site perimeter and noting existing wind conditions.

- 4. Determine whether or not the odor event is significant enough to warrant contacting the adjacent neighbors and/or- the LEA.
- 5. Log the odor source/cause and any corrective actions taken in the Site Operations Log.

#### **DESCRIPTION OF METEOROLOGICAL CONDITIONS**

(2) a description of meteorological conditions effecting migration of odors and/or transport of odor causing material off-site. Seasonal variations affect wind velocity and direction shall also be described; and

The weather in the project area typically is hot, arid and clear in the summer, winter is short, cold, wet, and partly cloudy. The predominant average hourly wind direction in the project area varies significantly throughout the year. The wind is most often from the West, for roughly 11 months of the year. The wind is most often from the North, from December to January. However local fluctuations can occur. The closest residents are to the West and North, so most of the time the wind will be blowing in the direction of the least-close residents. However still conditions can also lead to odor transport. Operators will monitor weather conditions and attempt to time material-disturbing activities to coincide with favorable conditions.

#### **COMPLAINT RESPONSE PROTOCOL**

(3) a complaint response protocol; and

Facility management will use the following protocol in responding to citizen complaints.

#### **Response to Citizen Complaints**

It is expected that the majority of complaints will be received, not by the operator, but by the LEA. If the facility receives a complaint (either from the original complainant, from the LEA or the Air District) they will follow the following protocol:

- 1. The Operator will go to the location of the complaint to verify that the compost facility is indeed the source of the odor.
- 2. The Operator will document the complaint(s) in the Site Operations Log.
- 3. The Operator will assess the complaint and the nature of the source of the odor complaint and will make a recommendation to the owner within 24 hours of receiving the complaint or 48 hours should the citizen complaint be received weekends or holidays.

- 4. The Operator will implement one or more of the management practices described in Table I.
- 5. The Operator will contact the complainant within a reasonable time frame to assess the original problem and result after each compliant.
- 6. Results and actions will be documented in the Site Operations Log, which serves as the Facility's permanent record.

#### **DESIGN CONSIDERATIONS FOR MINIMIZING ODORS**

(4) a description of design considerations and/or projected ranges of optimal operation to be employed in minimizing odor, including method and degree of aeration, moisture content of materials, feedstock characteristics, airborne emission production, process water distribution, pad and site drainage and permeability, equipment reliability, personnel training, weather event impacts, utility service interruptions, and site specific concerns; and

The most significant design consideration was the siting of the facility at a regional landfill, far from most sensitive receptors.

**Method and Degree of Aeration.** The facility will use an positive aerated static pile system of composting. Aerated static pile compost piles are constructed over a network of aeration pipes and induce airflow into the pile using an electric blower that is operated in conjunction with a pile temperature control system that cycles air into the pile. The piles are not turned during the first 30 days, a period referred to as the active phase of composting. Airflow will be adjusted to manage the pile temperatures and optimize the biology of the composting process. The system will include placement of a "compost cap" on top of each pile to absorb odors (and VOCs). Aeration rates will be developed to maximize aerobic decomposition, which is expected to also reduce VOC and odor production.

**Moisture Content.** The facility strives to maintain its compost piles between 40 and 60 percent moisture during the initial and active phase of composting. Aerated static piles tend to evaporate significant water which can be difficult to replace. The facility will develop a system to replace lost water using sprinklers or a water truck.

**Feedstock Characteristics.** The facility plans to receive up to 80 tons per day of noncontaminated soil and other waste containing landscape residue, vegetative food material, and green waste.

**Airborne Emissions Production.** The facility minimizes airborne emissions by minimizing dust-producing activities, regular watering of roads and avoiding unnecessary material handling. Aerated static pile facilities are not turned, eliminating one of the most significant material-handling activities on-site.

Process Water Distribution. Process water is added using a water truck.

**Pad and Site Drainage and Permeability.** The native site soil has been graded to provide positive drainage. Depressions and standing water are filled and covered with absorbent materials (like wood chips).

**Equipment Reliability.** Most of the key processing equipment (loaders, the grinder) is dieselpowered and portable. Minor equipment breakdowns are managed by Machado & Sons mechanics and typically are corrected within two days. In the event of severe mechanical failure, similar processing equipment can be rented from nearby facilities. Machado & Sons maintains good relationships with equipment vendors who can provide back up and temporary equipment on very short notice. Power failures do not present a significant risk, since most processing equipment is diesel powered. Key employees are issued radios or cellular phones for mobile communications.

**Personnel Training.** Facility management provides regular training to new and existing employees.

Weather Event Impacts. The most significant weather event impact affecting odors would be a prolonged inversion condition. During these conditions, Machado & Sons will minimize unnecessary material handling like screening and/or grinding. Under severe conditions regular material handling activities may be curtailed until winds decrease.

**Utility Service Interruptions.** As described above, most of the key processing equipment (loaders, the grinder) is diesel-powered and portable. Power outages would not significantly affect the composting facility.

## - D R A F T -

# Table I Sources of Odor and Possible Management Techniques

Source of Odor	Possible cause/Assessment	Management approach
Feedstock	Putrescible material (like green material	Expedite material processing
Receiving	or vegetative food material) sitting too	Increase operating shifts
	long prior to being processed or mixed	Reduce incoming throughput
		First in, first out processing
	Material arrives with odors	Reduce size of material stockpiles
		Create discreet stockpiles with greater surface to volume ratio
		Consider blanketing odiferous materials with a one foot layer of woody overs (water lightly to reduce odor releases)
		Consider refusing acceptance of the material.
		Consider finding an off-site use for the material (i.e., deliver to nearby composting facilities)
Material	Screening volatizes particles	Reduce screening activity during stagnant air conditions
Processing		Reduce screening activity when wind is in direction of nearby
(Screening)		receptors
		Mist water or neutralizer at dust generation points
Material	Material handling releases odorous gases,	Reduce handling activities during stagnant air conditions.
Handling	anaerobic conditions can form odorous	Create ASP piles which are sufficiently blended.
(Composting	compounds.	Turn regularly to re-establish porosity.
	Ammonia odor (high nitrogen level).	Maintain adequate moisture in compost piles.
	Sulfur odor (anaerobic conditions).	Avoid over-watering initial mix or in-process piles.
	Varying odors in pile	Increase surface to volume ratios of active piles.
	Odors generated after turning	Increase aeration frequency, check temperatures, check pH, increase
	Excessive temperature.	porosity, and/or add bulking agent.
		Measure oxygen/CO <sup><math>2</math></sup> content regularly to determine oxygen levels.
		Make piles on a one-foot bed of screened overs to increase air flow.
		Make piles on a one-toot bed of screened overs to increase air flow

# Table ISources of Odor and Possible Management Techniques (Cont.)

Aisles	Storm water allowed to pond	Absorb ponded water with wood chips/other absorbent, fill pothole.
		Clean aisles of spilled material (particularly at the end of each day).
		Remove and replace woody overs and spilled material from unpaved
	Uncomposted material in aisles	areas on a regular basis.
		Apply water and/or neutralizer to reduce dust during dry conditions.
Curing piles	Excessive temperatures	Decrease pile size (height), increase ASP residence time prior to
		moving to curing
Material	Material handling releases odorous gases.	Reduce handling during stagnant air conditions.
Handling		First-in, first-out processing
Material	Screening volatizes particles and releases	Reduce screening activity during stagnant air conditions
Processing	odorous gases	Reduce screening activity when wind is in direction of nearby
(Screening)		receptors
		Mist water or neutralizer at dust generation points

#### **OPERATING PROCEDURES TO MINIMIZE ODOR**

(5) a description of operating and design procedures for minimizing odor, including aeration, moisture management, feedstock quality, drainage controls, pad maintenance, wastewater pond controls, storage practices (e.g., storage time and pile geometry), contingency plans (i.e., equipment, water, power, and personnel) weather impacts, biofiltration, and tarping.

Machado & Sons operates its compost facility to manage all odor-producing areas of the facility so as to minimize the development of conditions that could lead to off-site odor problems. Major processing steps include:

**Aisles between piles.** Aisles between piles can be sources of odor if raw, uncomposted material is left for excessive amounts of time without being exposed to the high temperatures of composting. The facility will practice good housekeeping methods which include regular patrolling of aisles to clean any spilled materials. Aisles can also be a source of odor if storm water or process water is allowed to pond in potholes or other pad depressions. Any standing water that is discovered will be absorbed with chipped material (or other absorbent) and the depression will be filled with pad material (typically dirt or clay).

**Compost piles.** Odors emanating from the ASP system typically indicate problems in the initial mixing, pile porosity and/or moisture content of the pile. Machado & Sons strives to manage its compost with appropriate carbon to nitrogen level, assure adequate initial mixing and maintain adequate moisture within the compost piles. Any odors detected from the compost piles will be corrected using the techniques described in Table 1.

**Curing piles.** Curing piles have the potential to create odors if material that is not stable is moved to curing too soon, or if the pile is made too high (above 12 feet). Machado & Sons plans to only cure compost that has undergone thorough decomposition and is ready for curing. All curing piles at or below 12 feet in height.

**Aeration.** The facility uses a third-party Aerated Static Pile system. Aeration rates will be controlled via temperature feedback and operator experience. Positive aeration, combined with a compost cap is expected to significantly minimize odors and/or VOCs.

**Moisture Management.** In ASP composting, moisture is particularly important in the initial pile-building phase. Additional moisture will be added via water truck or sprinkler system to offset evaporated moisture.

**Feedstock Quality.** Compost feedstocks are all source-separated and are delivered promptly to the facility (they are not allowed to sit and generate odors prior to arriving at the facility).

Most of the feedstocks do not arrive with odor issues. Any particularly odiferous loads will be covered with chipped organic material to reduce odors.

**Drainage Controls.** The West Main Compost Facility site is in the process of complying with the SWRCB General Order. Drainage will be managed according to the Technical Report submitted to the RWQCB. Additional BMPs will be implemented if the drainage areas are identified as a significant odor source.

**Pad Maintenance.** Machado & Sons regularly scrapes the pad in order to minimize ponding. Standing water is absorbed using chipped green waste or other absorbent.

**Wastewater Pond Controls.** As described above, Machado & Sons is in the process of complying with the SWRCB General Order. The retention pond will be managed according to the Technical Report submitted to the RWQCB. Additional BMPs will be implemented if the retention pond (or other drainage areas) are identified as a significant odor source.

**Storage Practices.** Materials that could generate odor during storage include incoming green waste material and vegetative food materials. All incoming compost feedstocks are processed and placed in the ASP system within 7 days of receipt.

**Contingency Plans.** There are two nearby composting facilities (Recology and City of Modesto), who could manage feedstock loads during a prolonged odor issue at the site.

**Weather Impacts.** Operations are curtailed during periods of heavy rain and high winds. To date, specific weather impacts have not been identified as contributing to off-site odors.

**Biofiltration.** The facility will utilize a "compost cap" consisting of processed green material (or finished compost) to reduce odors from the tops of the ASP piles. This has proven to be very effective at reducing odors and VOCs.

**Tarping.** The facility does not currently use any tarps for the purposes of odor control.

#### **PLAN REVISION**

(c) The odor impact minimization plan shall be revised to reflect any changes, and a copy shall be provided to the enforcement agency, within 30 days of those changes.

A copy of the Odor Impact Minimization Plan will be kept at the facility office/trailer. The OIMP will be revised within 30 days to reflect significant changes to operations that affect the OIMP.

#### Appendix A TITLE 14 REGULATIONS REGARDING OIMPs

Title 14 Regulations regarding Odor Impact Minimization Plans follows this page.

Integrated Waste Management Consulting, LLC February 2021

#### COMPOSTABLE MATERIALS HANDLING OPERATIONS AND FACILITIES REGULATORY REQUIREMENTS

Chapter 3.1 Compostable Materials Handling Operations and Facilities Regulatory Requirements

Article I. General

Section 17863.4. Odor Impact Minimization Plan.

(a) All compostable material handling operations and facilities shall prepare, implement and maintain a site-specific odor impact minimization plan. A complete plan shall be submitted to the EA with the EA Notification or permit application.

(b) Odor impact minimization plans shall provide guidance to on-site operation personnel by describing, at a minimum, the following items. If the operator will not be implementing any of these procedures, the plan shall explain why it is not necessary.

(1) an odor monitoring and data collection protocol for on-site odor sources, which describes the proximity of possible odor receptors and a method for assessing odor impacts at the locations of the possible odor receptors; and,

(2) a description of meteorological conditions effecting migration of odors and/or transport of odor-causing material off-site. Seasonal variations that effect wind velocity and direction shall also be described; and,

(3) a complaint response and recordkeeping protocol; and,

(4) a description of design considerations and/or projected ranges of optimal operation to be employed in minimizing odor, including method and degree of aeration, moisture content of materials, feedstock characteristics, airborne emission production, process water distribution, pad and site drainage and permeability, equipment reliability, personnel training, weather event impacts, utility service interruptions, and site specific concerns as applicable; and,

(5) a description of operating procedures for minimizing odor, including aeration, moisture management, feedstock quality, drainage controls, pad maintenance, wastewater pond controls, storage practices (e.g., storage time and pile geometry), contingency plans (i.e., equipment, water, power, and personnel), biofiltration, and tarping as applicable.

(c) The odor impact minimization plan shall be revised to reflect any changes, and a copy shall be provided to the EA, within 30 days of those changes.

(d) The odor impact minimization plans shall be reviewed annually by the operator to determine if any revisions are necessary.

(e) The odor impact minimization plan shall be used by the EA to determine whether or not the operation or facility is following the procedures established by the operator. If the EA determines that the odor impact minimization plan is not being followed, the EA may issue a Notice and Order (pursuant to section 18304) to require the operator to either comply with the odor impact minimization plan or to revise it.

(f) If the odor impact minimization plan is being followed, and the EA determines, in a manner consistent with section 18302(d), that odor impacts are still occurring, the EA shall direct the

operator to prepare and implement an Odor Best Management Practice Feasibility Report (Report) as specified in section 17863.4.1. The EA shall consider the results of the Report prior to issuing a Notice and Order (pursuant to section 18304) requiring the operator to take additional reasonable and feasible measures to minimize odors unless:.

(1) the EA has evidence that a specific and immediate action would reduce the odor impacts;

(2) there is an imminent threat to public health and safety and the environment; or

(3) a nuisance has occurred.

Note:

Authority cited: Sections 40502, 43020, 43021 and 43209.1, <u>Public Resources Code</u>. Reference: Sections 43020, 43201 and 43209.1, <u>Public Resources Code</u>.

Requirement Type	Tier I	Tier II
	Tierr	i iei ii
Applicability	<ul> <li>Lots build support of</li> </ul>	
Activities not	<ul> <li>Agricultural Composting;</li> <li>Chinaing and gradies facilities and enceptions. This includes</li> </ul>	chicking and mindles facilities and executions at a composition
required to obtain		chipping and grinding facilities and operations at a composting
coverage under this	facility if located outside of the composting operations area. c. Lot clearing by local governmental agencies (i.e., grubbing, tr	the trimming ats ) for fire protection.
General Order	<ul> <li>c. concreating by local governmental agencies (i.e., grubbing, tr d. Composting activities that are within a fully-enclosed vessel;</li> </ul>	
	<ul> <li>composing activities that are within a fully-enclosed vessel,</li> <li>composing operations that receive, process, and store less</li> </ul>	
	any given time;	than 500 cubic yards (cy) of allowable materials ac
	f. Composting operations that receive, process, and store less t	han 5 000 cy per year of allowable Tier I or Tier II
	feedstocks, additives, and amendments, and implement the	
	(1) Completely cover materials during storm events as needed	÷ ÷ ·
	(2) Manage the application of water to reduce the generation	-
	(2) Manage the application of water to reduce the generation	in of wastewater.
Total Facility Capacity	< 25,000 cy (combination of Tier I allowable materials	> 25,000 cy (all allowable materials received, processed, and
,	received, processed, and stored: feedstocks, compost,	stored: feedstocks, compost, additives, and amendments) or
	additives, and amendments) and meets the siting criteria	< 25,000 cy which does not meet the site-specific hydrogeologic
	below.	conditions do not meet the Tier I percolation rate and depth to
		groundwater standards.
		-
Depth to	Dependent on Soil Percolation Rate as follows (minutes per	
Groundwater	inch - MPI using percolation test):	
	< 1 MPI : 50 feet	
	1 MPI - 5 MPI: 20 feet	
	> 5 MPI - 30 MPI: 8 feet	
Distance to Surface	> 30 MPI : 5 feet	
Water	≥ 100 feet	≥ 100 feet
Distance to nearest		
water supply well	<u>&gt;</u> 100 feet	<u>&gt;</u> 100 feet
Allowable Feedstocks	<ul> <li>Agricultural materials</li> </ul>	<ul> <li>Food materials (non-vegetative)</li> </ul>
	Green materials	<ul> <li>Biosolids (Class A, B, and/or EQ)</li> </ul>
	Paper materials	Manure
	<ul> <li>Vegetative food materials</li> </ul>	<ul> <li>Anaerobic digestate derived from allowable</li> </ul>
	<ul> <li>Anaerobic digestate derived from allowable Tier I</li> </ul>	Tier II feedstocks
	feedstocks	<ul> <li>A combination of allowable Tier I and Tier II</li> </ul>
	<ul> <li>Residentially co-collected or self-hauled food and green</li> </ul>	feedstocks
materials		
Prohibited Feedstocks	l Feedstocks a. Animal carcasses;	
	b. Liquid wastes other than those of food origin; b. Model wastes and finand in the Machine of Selecting Code, conting 117500;	
	<ul> <li>Medical wastes as defined in the Health and Safety Code, section 117690;</li> <li>Rediractive wastes</li> </ul>	
	d. Radioactive wastes; e. Septage;	
	f. Sludges, including but not limited to sewage sludge, water tro	eatment sludge, and industrial sludge:
	g. Wastes classified as "designated" as defined in Water Code s	
	<ul> <li>wastes classified as "hazardous" as defined in the Cal. Code Regs., title 22, section 66261.3;</li> </ul>	
<ul> <li>Wood containing lead-based paint or wood preservatives, or ash from such wood; or</li> </ul>		
	j. Any feedstock, additive, or amendment other than those specifically described in the General Order, unless approv	
	by the Regional Water Board.	
Additives	No more than 10 percent combined, on a total volume basis,	No more than 30 percent combined (other than liquid food
	of the total feedstocks for any given batch of compost, of the	material), on a total volume basis, of the total feedstocks for
	following: fertilizing material at rates that will be consumed or	any given batch of compost, of the following: fertilizing material
	fixed/immobilized during composting; manure; anaerobic	at rates that will be consumed or fixed/immobilized during
	digestate (solid) from other feedstocks not listed in this tier or	composting, liquid food material, anaerobic digestate (solid)
	under the Prohibitions section; and other materials approved	derived from any material other than allowable Tier I and Tier II
	by the Regional Water Board.	feedstocks, and other materials approved by the Regional
	Res Miles Law J Miles M. Scillaria and	Water Board.
Amendments	For Tier I and Tier II facilities, the type of amendments must be	specified in a NOI and/or a technical report.
Prohibited Additives	Use of biosolids as an additive or amendment is prohibited.	Use of biosolids as an additive or amendment is prohibited.
and Amendments	use or sicisonius as an auditive or amendment is prohibited.	use or prosonus as an auditive or amendment is prohibited.
ana Amenuments		

### Appendix F - General Waste Discharge Requirements for Composting Operations

Requirement Type	Tier I	Tier II
Construction		
Pads	Surfaces must be capable of preventing degradation of waters operated, and maintained to: (1) facilitate drainage and minim (2) reliably transmit any free liquid to a containment structure; pollution, or nuisance. Control and manage all run-on, runoff, and precipitation from a	ize ponding by sloping or crowning pads to reduce infiltration; ; and (3) prevent conditions that could lead to contamination, all areas used for receiving, processing, or storage, under
	conditions of a 25-year, 24-hour peak storm event. Protect are 24-hour peak storm event.	eas from inundation by surface flows associated with a 25-year,
		<ul> <li>Working surfaces must be capable of resisting damage from movement of operating equipment and weight of piles, have a hydraulic conductivity of 1.0 x 10<sup>-5</sup> cm/s or less, and consist of one of the following:</li> <li>(a) Compacted soils, with a minimum thickness of one foot;</li> <li>(b) Asphaltic concrete or Portland cement concrete; or</li> <li>(c) An equivalent engineered alternative approved by the Regional Water Board.</li> <li>In lieu of meeting the hydraulic conductivity requirement prescribed above, the applicant may propose to implement a groundwater protection monitoring program. If this choice is selected, the applicant must submit a Groundwater Protection</li> </ul>
Wastewater Handling System	Applicant must submit for approval a Water and Wastewater Management Plan that describes how the wastewater will be	Monitoring Program Plan in the Technical Report with the Notice of Intent. Applicant must submit for approval a Water and Wastewater Management Plan that describes how the wastewater will be
(e.g. pond, tanks)	managed to prevent discharge. The plan must describe the design, operations, and maintenance of the systems, including water balance calculations and assumptions.	water balance calculations and assumptions.
	Detention ponds, if used, must be designed, constructed, and maintained to prevent conditions contributing to, causing, or threatening to cause contamination, pollution, or nuisance, and must be capable of containing, without overflow or overtopping (taking into consideration the crest of wind- driven waves and water reused in the composting operation), all wastewater from the working surfaces in addition to precipitation that falls into the detention pond from a 25- year, 24-hour peak storm event at a minimum, or equivalent alternative approved by the Regional Water Board.	Detention ponds, if used, must be designed, constructed, and maintained to prevent conditions contributing to, causing, or threatening to cause contamination, pollution, or nuisance, and must be capable of containing, without overflow or overtopping (taking into consideration the crest of wind-driven waves and water reused in the composting operation), all wastewater from the working surfaces in addition to precipitation that falls into the detention pond from a 25-year, 24-hour peak storm event at a minimum, or equivalent alternative approved by the Regional Water Board.
		<ul> <li>Detention pond liners must meet a hydraulic conductivity of 1.0 x 10<sup>-6</sup> cm/s or less and include of one of the following:</li> <li>(a) A liner system consisting of a 40-mil synthetic geomembrane (60-mil if high-density polyethylene) underlain by either one foot of compacted clay, or a geosynthetic clay liner installed over a prepared base;</li> <li>(b) A liner system that includes Portland cement concrete underlain by a 40-mil synthetic geomembrane (60-mil if high-density polyethylene); or</li> <li>(c) An equivalent engineered alternative approved by the Regional Water Board.</li> </ul>
		Detention ponds must be designed and constructed with a pan lysimeter monitoring device under the lowest point of the pond or equivalent alternative approved by the Regional Water Board. In addition, ponds must be designed and operated to maintain a dissolved oxygen concentration of at least 1.0 mg/L to prevent anaerobic conditions.
		Tanks, if used (i.e. above or underground), must be designed, operated, maintained and monitored in accordance with applicable laws and regulations.

<b>Requirement Type</b>	Tier I	Tier II
Construction, conti		
Drainage/ Conveyance	Drainage conveyance systems must be designed, constructed, and maintained for conveyance of wastewater from the working surface in addition to direct precipitation from a 25- year, 24-hour peak storm event at a minimum. Ditches must be properly sloped to minimize ponding and kept free and clear of debris to allow for continuous flow of liquid. Ditches must be inspected and cleaned out prior to the rainy season every year.	Drainage conveyance systems must be designed, constructed, and maintained for conveyance of wastewater from the working surface in addition to direct precipitation from a 25- year, 24-hour peak storm event at a minimum and meet a hydraulic conductivity of 1.0 x10 <sup>-5</sup> cm/s or less, and consist of one of the following: (a) Compacted solls, with a minimum thickness of one foot; (b) Asphaltic concrete or Portland cement concrete; or (c) An equivalent engineered alternative approved by the Regional Water Board.
		Ditches must be properly sloped to minimize ponding and kept free and clear of debris to allow for continuous flow of liquid. Ditches must be inspected and cleaned out prior to the rainy season every year.
Berms	Berms must prevent run-on to and runoff from a 25-year, 24- hour peak storm event.	Berms must prevent run-on to and runoff from a 25-year, 24- hour peak storm event.
Storm Water/ Wastewater	Composting Operations may be required to enroll under the In (Industrial General Permit, new Industrial General Permit 2014 National Pollutant Discharge Elimination System (NPDES) wast	0057-DWQ will be effective July 1, 2015) or obtain appropriate
Monitoring	wadonar rollatant olsenarge climination system (wrocs) wast	ewater discharge permit.
Facility Inspections	The Discharger must regularly inspect and maintain all containment structures pursuant to this General Order, the Monitoring and Reporting Program, and Notice of Applicability. Inspection frequency must be sufficient to prevent discharges of feedstocks, additives, amendments, compost, or wastewater from creating or contributing to contamination, pollution or nuisance. Dischargers must perform quarterly site inspections of the working surface, berms, ditches, facility perimeter, erosion control best management practices, and any other operational surfaces.	
Water Quality Wastewater Management System: perform quarterly inspections of the system, est using a pond, conduct quarterly sampling of the liquid within the pond. (when there		ons of the system, estimate available capacity and volume. If
		The detention pond leak detection monitoring device (i.e., the pan lysimeter) must be checked monthly during the wet season for liquid. Upon detection of liquid, contact the Regional Water Board within 48 hours; collect a sample and analyze for the list of constituents below; remove liquid from the monitoring device; and continue to monitor weekly. If liquid reappears, collect and analyze the sample for the same list of constituents. If wastewater is confirmed, submit a <i>Response Action Plan</i> for review and approval by Regional Board staff.
		Tanks, if used, must be monitored in accordance with applicable laws and regulations.
Monitoring Requirements	**See below for revised Monitoring Requirements**	Monitoring is required if applicable.
- Pond	Quarterly Monitoring: pH, dissolved oxygen, total dissolved sol (electrical conductivity)	ids, fixed dissolved solids, total nitrogen, specific conductance
- Groundwater	Quarterly Monitoring: groundwater elevation, depth to ground sodium, chloride, total coliform organisms	water, gradient, gradient direction, pH, TDS, nitrate as nitrogen,
- Biosolids	Proof of compliance with ceiling concentrations of 40 CFR 503.	13, Table 1, or conduct testing for each load delivered

<b>Requirement Type</b>	Tier I	Tier II
Reporting		
Revised Notice of Intent	Submit a revised Notice of Intent at least 90 days prior to: (1) adding a new feedstock, additive, or amendment; (2) changing material or construction specifications; (3) changing a monitoring program; or (4) changing an operation or activity not described in the approved NOI and technical report.	
Technical Report	Submit a Technical Report prior to any new construction of any working surfaces, detention ponds, berms, ditches, or other water quality protection containment structure.	
Final Post- Construction Report	Submit a <i>Final Post-Construction Report</i> , including as-built plans and specifications, within 60 days of completing-construction activities, to document that structures were constructed in accordance with the Technical Report.	
Monitoring Report	Submit an Annual Monitoring and Maintenance Report no late	r than April 1st of each year.
Notification of Violations	If a violation of requirements of this Order or MRP occurs, the Discharger must notify the appropriate Regional Water Board staff by telephone or email, within 48-hours, once the Discharger has knowledge of the violation. This notification must include a description of the noncompliance and its cause, the period of noncompliance (providing exact dates and times); and if the noncompliance has not been corrected, the anticipated time to complete the corrective action. The notification must also include steps taken or planned to reduce, eliminate, or prevent recurrence of the noncompliance. Depending on the severity of the violation, the Regional Water Board staff may require the discharger to submit a separate technical report regarding the violation within 10 working days of the initial notification.	
Enrollment		
New Operations	Must file a complete Notice of Intent, filing fee, and technical r composting operations. The Regional Water Board will issue a Discharger's Tier, timeline for compliance, monitoring requiren	Notice of Applicability that, at a minimum, confirms the
Existing Operations	Must file a complete Notice of Intent, filing fee, and technical r technical report shall include a proposed schedule for full comp	eport within one year of adoption of the General Order. The pliance and must be as short as practicable but may not exceed Il issue a Notice of Applicability that, at a minimum, confirms the
Fees		
Annual Fees	The filing fee accompanying the NOI is the first year's annual fee. Annual fees are based on the threat to water quality (TTWQ) and complexity (CPLX) of the discharge. (Cal. Code Regs., tit. 23, § 2200.) The ratings are available at: http://www.waterboards.ca.gov/resources/fees/docs/fy1415_fee_schedule.pdf	

Appendix G - Report of Waste Discharge



### Machado and Sons Construction, Inc. West Main Compost Facility Report of Waste Discharge (ROWD)

February 2021

Submitted to: Machado and Sons Construction, Inc. 1000 South Kilroy Rd. Turlock, CA 95380

> Prepared by: WZI Inc. 1717 28th Street Bakersfield, CA 9330

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#### TABLE OF CONTENTS

#### CONTENTS

I.	Executive Summary 1
II.	Introduction & Background 1
III.	Facility Description
IV.	Aerated Static Pile Compost Process
	Feedstock
	ASP Process
	Compost Additives5
V.	Odor, Vector, and Noise Control
	Odor
	Vector
	Noise
VI.	Site Drainage
	Wastewater
	Stormwater
VII.	Facility Monitoring
VIII.	Climatology
	FEMA Floodplain
	Evapotranspiration
	Wind Rose
IX.	Soil Characteristics
X.	Groundwater Characteristics
XI.	Geology/Stratigraphy
XII.	Contacts
XIII.	References

#### **TABLES**

i

Table 1Facility Location	
--------------------------	--

- Table 2Onsite Material Volumes
- Table 3Compost Facility Parcel Location

- Table 4Feedstock Type and Daily Volume
- Table 5
   Representative Temperature and Precipitation Data: Modesto, California
- Table 6Zone 14 Monthly Average Reference Evapotranspiration
- Table 7Modesto Monthly Average Evapotranspiration
- Table 8West Main Compost Facility Soil Types

#### **EXHIBITS**

Exhibit 1 Facility Location Map Exhibit 2 Site Plan Map Exhibit 3 Zoning Map Exhibit 4 General Plan Map Exhibit 5 **Topographic Map** Exhibit 6 Water Well Location Map Exhibit 7 Facility Drainage Concept Map Exhibit 8 FEMA Flood Hazard Map Exhibit 9 Reference Evapotranspiration Map Wind Rose Diagram Exhibit 10 Exhibit 11 Soil Type Map Exhibit 12 Depth to Groundwater-Unconfined Aquifer Exhibit 13 Groundwater Surface Elevation Exhibit 14 Geologic Map

#### **APPENDICES**

- Appendix 1 Water Well Records
- Appendix 2 Compost VOC Emissions Report
- Appendix 3 NRCS Soil Report

Machado and Sons Construction, Inc. Report of Waste Discharge (ROWD) West Main Compost Facility

#### I. Executive Summary

Machado and Sons Construction, Inc. (Machado and Sons) is requesting a Stanislaus County use permit for the purposes of Aerated Static Pile composting (ASP) in an agriculturally-zoned parcel of land approximately 9-miles west of the City of Turlock. Machado and Sons is proposing to build the West Main Compost Facility in coordination with local organic waste managers and will receive up to 140 tons per day of landscape residue, vegetative food material, non-contaminated soil, and green waste Tier I feedstock. This Report of Waste Discharge applies to the land where ASP composting will be conducted. The proposed facility location is described in **Table 1** and shown in **Exhibit 1, Facility Location Map**.

Address	1236 West Main Ave.
	Crows Landing, CA 95313
S/T/R	Section 20, T5S, R9E, MDB&M
	Latitude: 37.492004
Longitude	Longitude: -121.011339

Table 1: Fa	cility I	Location
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This Report of Waste Discharge (ROWD) will apply to the facility location.

#### II. Introduction & Background

The West Main Compost Facility will be located in Stanislaus County approximately 9 miles west of the City of Turlock. It will be operated by Machado and Sons in conjunction with Starkey Farms, and other local farms, for offtake of agricultural compost material, which is consistent with the agricultural use of the property dictated by its current zoning designation. The facility will only receive Tier I feedstock as defined by the California State Water Resources Control Board and the Central Valley Regional Water Quality Control Board (State Water Resources Control Board, 2015).

The facility will enable local organic waste generators to comply with the SB 1383 recycling mandate. All of the organic waste that will be processed at the facility will be grown or processed in Stanislaus County and will consist of separated organics from municipal waste, produce processing waste, and local farm crop residue. The operation will provide local farms with access to the high-quality compost generated by the ASP system. All organic waste entering the facility will be subject to inspection to ensure that no waste containing greater than 1% contamination by dry-weight is accepted. It is expected that the facility will be operated by four full-time employees.

Aerial imagery shows that the land on which the facility is proposed to be constructed has been used exclusively for agricultural purposes. The surrounding land has also been used exclusively for agriculture.

This Report of Waste Discharge (ROWD) will apply to the facility location.

Machado and Sons Construction, Inc. Report of Waste Discharge (ROWD) West Main Compost Facility

#### III. Facility Description

The West Main Compost Facility will be located at 1236 West Main Avenue, Crows Landing, CA 95313 in Section 20, T5S, R9E, MDB&M (**Exhibit 1, Facility Location Map**). The facility will encompass approximately 23 acres of a 49-acre parcel and the volume of onsite material will not exceed 12,500 cubic yards at any given time, as specified by Title 14 regulations. **Table 2** includes a breakdown of the maximum expected volumes of different materials that will be delivered to the facility and stored onsite.

		Assu	mptions				
Max daily feedsto	ck	Deliv	eries	Feed	dstock average	density	
140 tons per day MAX 120 tons per day AVERAGE		6 days po 24 days p	40 lb. per cu. ft.				
		Onsit	e Volume				
Bulk Feedstock (3-day retention)	Active Compost (4-week retention)		Curing Piles (3-week retention)		Additives	Finished compost	
420 tons = 778 cu. yd.	3,360  tons = 6,222  cu. yd.		2,250  tons = 4,666  cu. yd.		500 cu. yd.	300 cu. yd.	

#### Table 2: Onsite Material Volumes

The West Main Compost Facility will consist of a parking area, scales, a feedstock unloading zone, a grinding slab and grinding equipment storage area, an ASP slab, a curing pile, amendment storage, a compost off-haul area, and a drainage pond. A facility layout diagram is included as **Exhibit 2, Site Plan Map**.

The surface parcel where the facility will be located and composting will occur is listed in **Table 3** below.

 Table 3: Compost Facility Parcel Location

Facility Name	Address	Zip	Latitude	Longitude	County Parcel Number	Zoning
West Main Compost Facility	1236 West Main Avenue, Crows Landing, CA	95380	37.492004	-121.011339	058-003-006	A-2

The facility will be constructed on land zoned as "A-2" or General Agriculture. A zoning map for the facility and the surrounding property can be seen in **Exhibit 3**, **Zoning Map.** The land use specified by the Stanislaus County General Plan is shown in **Exhibit 4**, **General Plan Map**.

Topographically, the West Main Compost Facility site will sit at approximately 60 feet above mean sea level. In the area of the proposed facility, the valley generally slopes from slightly higher elevations in the northeast to lower elevations in the southwest, as shown in **Exhibit 5**, **Topographic Map**.

The proposed site for the facility is surrounded by extensive farmland. As a result, there are numerous water supply wells. All of the domestic, industrial, and irrigation wells near the proposed facility location are shown in Exhibit 6, Water Well Location Map. The records for these wells are included in Appendix 1, Water Well Records.

There are several rural residential buildings located close to the proposed facility site. Two are located directly to the west of the proposed facility location at distances of approximately 50 feet and 400 feet. Another residence is located approximately 360 feet northeast of the proposed location. The site is also surrounded by several dairies which are located at distances of approximately 0.15 miles, 0.2 miles, and 0.18 miles to the north, west, and east, respectively.

#### IV. Aerated Static Pile Compost Process

#### <u>Feedstock</u>

The facility will only accept Tier I feedstock that originates from local farms, municipal waste haulers, and PG&E excavated soil containing less than 1% contamination by dry weight. The Tier I feedstock will be delivered daily by up to twenty 20-yard dump trucks. All Tier I feedstock will be accepted at the weigh station and dumped for inspection at the feedstock unloading zone to ensure it meets facility standards. Trained load checkers will perform inspections on all loads that enter the facility and reject feedstock that does not meet the standards. No loads will be accepted without an inspection. The facility will maintain records of training and load checks performed. **Table 4** shows the expected feedstock amounts that will be onsite on a daily basis.

#### Table 4: Feedstock Type and Daily Volume

Feedstock	Average Tons Per Day	Max Tons Per Day
Green Material	120	140
Amendments	30	50

Once the Tier I feedstock has passed inspection, it will be shredded to a size of approximately 2.5 inches and mixed to the proper C:N (carbon:nitrogen) ratio before being hauled to the ASP active compost pile. Feedstock will be processed within 72 hours of receipt in order to avoid odor and/or vector issues. Carbon sources and bulking agents, such as wood chips and soil amendments, will be stored in concrete block bins onsite.

#### ASP Process

Aerated Static Pile compost piles are constructed over a network of aeration pipes and induce airflow into the pile using an electric blower that is operated in conjunction with a pile temperature control system that cycles air into the pile. The piles are not turned during the first 30 days, a period referred to as the active phase of composting. Airflow to the piles can be adjusted to manage the pile temperatures and optimize the biology of the composting process.

A 2013 study titled "Greenwaste Compost Site Emissions Reductions from Solar-powered Aeration and Biofilter Layer" was funded by the San Joaquin Valley Air Pollution Control District and resulted in the following findings:

"The comparison of emissions from the 22-day active composting phase between the eASP and standard windrows demonstrated emissions reductions by the eASP of 99% for total non-methane, non- ethane VOCs, 70% for ammonia (average of field and lab), 88%

for nitrous oxide, and 13% for methane. The overall reduction for CO2 equivalents was nearly 65%. Diesel use in pile construction and active-phase management was 87% less for the eASP system, with commensurate reductions in criteria pollutant emissions associated with diesel fuel combustion. Water used during the composting process was reduced by 20%, and land necessary for active-phase composting is calculated to be reduced by 55.5%."

The study has been included as Appendix 2, Compost VOC Emissions Report.

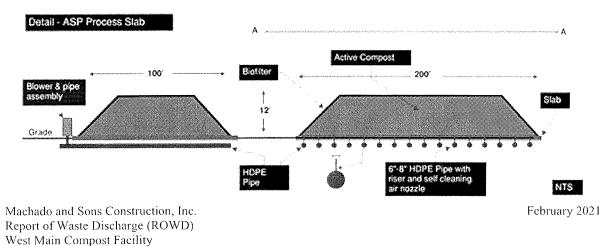
Table ES-1 from the study shows the reduction in VOCs (volatile organic compounds), NH3, and GHG in ASP composting versus windrow composting:

Table ES-1: Project Results		N	НЗ	GHG				
	voc	Field	Lab	CO2	CH4	N2O	CO2e	
Prototype ASP (22 Days)	0.099	0.017	0.007	205.70	5.05	0.010	315	
Baseline Windrow (22 days)	8.604	0.099	0.014	731.63	5.81	0.093	883	
% reduction from Baseline	-98.8%	-83.2%	-53.3%	-71.9%	-13.0%	-88.8%	-64.3%	

Table ES-1: Results of emissions testing in pounds of pollutant per ton of feedstock over the 22-day active composting period.

Aeration will be vital to the composting process at the West Main Compost Facility. It maintains aerobic conditions without turning the pile, optimizes the biology of the composting process, and manages pile temperatures to within a desired range to optimize the process. Moreover, ASP reduces offensive odors and expedites the rate of composting. When managed properly, this technique resolves odor impacts and controls vector problems which reduces nuisance issues and neighbor complaints. The operation will use less fuel per ton of compost produced than windrow composting, but more importantly reduces the amounts of VOCs and other harmful gases released into the atmosphere.

The ASP composting technique reduces the footprint of the active compost pad. Typically, this approach can significantly reduce the operational footprint when compared to standard windrow composting. The West Main Compost Facility plans to have one active ASP compost pile, located on a slab measuring 200' x 100' x 12' (LxWxH) as shown below. There will be one curing pile that will measure 200' x 100' x 12'.



The aeration plenum layer is a clean wood chip layer that extends around the perforated aeration pipes. This acts as a filter to distribute the air flow evenly and to keep the pipes free of debris and clogging. The active compost pile will be composed of a gradation of mixed organics ranging from 25:1 to 35:1 C:N ratio.

#### Compost Additives

Additives used in composting at the West Main Compost Facility will consist of bentonite, gypsum, diatomaceous earth, and non-hazardous soil. Onsite volume of these materials will not exceed 500 cubic yards at any given time.

#### V. Odor, Vector, and Noise Control

#### <u>Odor</u>

The facility will be required to have and maintain a written Odor Impact Minimization Plan. The primary means of odor mitigation will be the receipt of relatively benign feedstocks. Odor and vector impacts will be further minimized by the biofilter layer in the ASP piles. The biofilter is a 1-inch layer of unscreened compost that covers the entire ASP pile. It has active microorganisms within it which absorb, treat, and block VOCs and other gases from escaping the pile. Ammonia is sequestered chemically in the pile. The net result is an inoffensive mild organic odor which only becomes an issue if the anaerobic bacterial population inside the pile grows and begins consuming nutrients and releasing H2S (hydrogen sulfide) gas. The anaerobic bacteria in question would only thrive in a low oxygen environment resulting from improper ASP pile design or operation causing insufficient oxygen filtration through the pile.

The biofilter layer also acts as an insulative barrier and minimizes moisture losses during hot summer temperatures. The ASP piles start out with 60-65% water content and lose some of that moisture during the retention time.

#### <u>Vector</u>

The biofilter acts as a vector barrier to flies, insects, rodents, and birds. Any animal or insect curious or attracted to the pile will find the biofilter layer is difficult to penetrate and, if penetrated, the active compost is hot. Once the compost reaches the curing pile a large majority of the consumable nutrients are gone, reducing animal and insect interest.

#### <u>Noise</u>

There will be processing machinery, hauling equipment, and trucking noises emanating from the facility. To control noise, deliveries and processing work will only be allowed during the normal working hours of 6:30 a.m. to 4:00 p.m. Monday to Saturday. Machado and Sons also intends to further reduce the facility's noise impact by constructing a berm around the site and planting trees along the north end of the property.

#### VI. Site Drainage

Machado and Sons will submit for approval a Water and Wastewater Management Plan describing how wastewater will be managed at the West Main Compost Facility. The plan will include descriptions of the design, operation, and maintenance of the system.

Machado and Sons Construction, Inc. Report of Waste Discharge (ROWD) West Main Compost Facility

#### <u>Wastewater</u>

The West Main Compost Facility Wastewater Handling System will be built to comply with the specifications required by the General Waste Discharge Requirements for Composting Operations set forth by the State Water Resources Control Board. Machado and Sons will construct a drainage conveyance system to direct all wastewater runoff to a drainage pond located at the southwestern corner of the property. After collection, wastewater will be reapplied to the compost pile.

#### <u>Stormwater</u>

Machado and Sons will create and implement a Stormwater Pollution Prevent Plan at the West Main Compost Facility in order to comply with the requirements of the National Pollutant Discharge Elimination System (NPDES). Berms will be erected around the facility to prevent run-on and runoff in the event of a 25-year, 24-hour peak storm event. A schematic for onsite drainage is included as **Exhibit 7, Facility Drainage Concept Map**.

#### VII. Facility Monitoring

The West Main Compost Facility will perform regularly scheduled inspections and maintenance on all containment structures in order to prevent discharges of feedstocks, additives, amendments, compost, or wastewater from creating, or contributing, to contamination, pollution, or nuisance. Quarterly inspections will be required for all working surfaces, berms, ditches, etc. The facility will also comply with any applicable monitoring required for the drainage pond, groundwater, and biosolids.

#### VIII. Climatology

The San Joaquin Valley lies in the central region of the State of California; it is bounded to the east by the Sierra Nevada Mountain Range, to the west by the Coast Ranges and to the south by the Tehachapi Mountains. The proposed project site is located in the southwest portion of the San Joaquin Valley.

The climate of the northern San Joaquin Valley is classified as a hot Mediterranean type, and is characterized by hot summers, mild winters, and moderate amounts of precipitation. The major climatic controls in the San Joaquin Valley Air Basin are the surrounding mountains and the Pacific High-pressure system over the ocean. The Great Basin High pressure system to the east also affects the valley, primarily during winter months. These influences result in distinct seasonal weather characteristics.

The Pacific High is a semi-permanent, subtropical, high-pressure system located off the Pacific Coast. The Pacific High tends to migrate seasonally. During the summer, it moves northward and dominates the regional climate. This high produces persistent temperature inversions and a predominantly northwest airflow. Clear skies, high temperature, low humidity, and relatively good air circulation characterize this season. The Pacific High blocks migrating extra-tropical storms, therefore very little precipitation occurs in the summer months. Occasionally, tropical air moves into the area and thunderstorms may occur over the adjacent mountains.

As the Pacific High shifts southward during the fall, its dominance is diminished in the San Joaquin Valley. During this transition period, the storm belt and zone of strong westerlies also shifts southward, into California. Three weather regimes generally prevail during winter: (1) storm periods which are usually characterized by cloudiness, precipitation, and shifting, gusty

winds; (2) clear weather associated with cither a buildup of pressure through the interior of California following these storms or the influence of a well-developed Great Basin High pressure system; and (3) persistent fog or stratus clouds and temperature inversions associated with a weak influence of the Great Basin High trapping a layer of cool, moist air in the San Joaquin Valley. Thus sky, temperature, and humidity conditions are much more variable during winter. Air movement is also variable, with stagnant conditions occurring more frequently than during summer.

Radiative cooling at night, especially during clear conditions, results in a distinct down slope drainage flow. Thus, the mountains provide a distinct diurnal wind pattern of generally northerly winds during the day and a westerly drainage flow at night.

Diurnal wind regimes markedly affect the horizontal transport of air in the project area. During the summer, northeast winds dominate the daytime regime. These winds, generated by the Pacific High offshore, are enhanced by the San Joaquin Valley orientation and by the thermal low that develops in the central valley during this season. In response to this thermal low, air moves inland through passes in the coastal ranges, principally the Carquinez Strait near San Francisco, and flows to the south in the San Joaquin Valley as an up–valley northwesterly wind. This general northwest flow in the San Joaquin Valley is expressed locally as a more northeasterly wind under the influence of local terrain.

Dominant nighttime wind directions during summer are markedly different from those of the daytime. Winds with a northerly component have a low frequency of occurrence at night. The high frequency of west to southwest winds at night is due primarily to down slope drainage flow.

During the winter months, northerly to northeasterly winds remain dominant in the daytime. However, winds are more variable than during summer, due in part to: (1) the southward migration of the Pacific High and resultant storm passages; (2) the absence of a strong thermal trough; and (3) the varied influence of the Great Basin High. As in summer, winds during winter nights are predominantly from the west to southwest and are associated with drainage flow. Wind speeds are generally higher in summer than in winter in the project area. Calm conditions occur most often in winter but are relatively infrequent during either season.

The mountains to the east, south and west essentially block the region from transport of very cold air from the mid–continent in winter, and the relatively cool, marine air from the Pacific Ocean during summer. Transport of marine air through the Carquinez Strait during summer has a moderating effect on northern portions of the San Joaquin Valley, but this effect is not great in the southern portion of the valley. In this area, temperature regimes are influenced primarily by topography, the higher elevations generally experiencing cooler temperatures.

About 90 percent of the precipitation in the San Joaquin Valley occurs from November through April, generally in association with storms that move eastward from the Pacific Ocean during this period. Precipitation is low because the mountains to the west and south produce a rain shadow effect by intercepting prefrontal, moisture–laden west and south winds. The southern San Joaquin Valley receives precipitation primarily from cold, unstable, northwesterly flow that usually follows a frontal passage. **Table 5** presents climate data representative of the project area.

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Month	Avera; Temper	Average Rainfall (in)	
	Low	High	
January	40	55	2.61
February	43	63	2.38
March	46	69	2.04
April	49	75	0.97
May	55	83	0.63
June	60	90	0.12
July	62	94	0.00
August	62	94	0.02
September	59	89	0.26
October	53	79	0.68
November	45	65	1.36
December	40	56	2.04
Annual	51	76	13.11

Table 5: Representative Temperature and Precipitation Data: Modesto, California<sup>1</sup>

#### <u>FEMA Floodplain</u>

The area in which the West Main Compost Facility will be built is designated as Zone X (Exhibit 8, FEMA Flood Hazard Map), an area of minimal flood hazard, by FEMA. Thus, a 100-year, 24-hour Isohyetal Map was not prepared due to insufficient data available.

#### **Evapotranspiration**

Evapotranspiration (ET) is the combination of transpiration (precipitation loss to the atmosphere through plant surfaces) and evaporation. In agricultural operations, accurate estimates of evapotranspiration are often needed for irrigation schedules, system design, and other matters relating to water.

Temperatures, humidity, wind speeds, soil parameters and plant factors all affect ET. While ET can be accurately measured using lysimeters and other similar equipment, estimating ET (utilizing analytical and empirical equations) is far more common because measurement methods are often expensive and time consuming.

Formulating an equation for ET is difficult as there are so many factors to include. It is complicated to formulate an equation that can produce estimates of ET under so many different sets of conditions; therefore, the idea of reference crop evapotranspiration (ETo) was developed by researchers. Reference ET is the ET rate of a reference crop expressed in inches or millimeters.

<sup>1</sup> US Climate Data Historical Average – Modesto, CA

Machado and Sons Construction, Inc. Report of Waste Discharge (ROWD) West Main Compost Facility The California Irrigation Management Information System (CIMIS), governed by the State of California Department of Water Resources, has created a Reference Evapotranspiration Map (Exhibit 9, Reference Evapotranspiration Map) for California, dividing the state up into different zones. The West Main Compost Facility site falls into Zone 14 which is described as: Mid-Central Valley, Southern Sierra Nevada, Tehachapi & High Desert Mountains, high summer sunshine and wind in some locations. Zone 14 Average Evapotranspiration, by month, is shown on Table 6:

					-		0		-	-			
Zone	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Total
14	1.55	2.24	3.72	5.10	6.82	7.80	8.68	7.75	5.70	4.03	2.10	1.55	57.0

Values given are in inches/month Source: DWR, California Irrigation Management Information System (CIMIS)

CIMIS also provides more local evapotranspiration data using weather stations located throughout the state. The data from the Modesto CIMIS weather station can be found in **Table 7**.

#### **Table 7: Modesto Monthly Average Evapotranspiration**

N	Stn ame	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Total
Mo	odesto	1.12	1.95	3.63	5.27	6.96	7.93	7.99	6.93	5.14	3.46	1.74	1.12	53.24

Values given are in inches/month

Source: DWR, California Irrigation Management Information System (CIMIS)

#### <u>Wind Rose</u>

The appropriate wind rose diagram is included as **Exhibit 10**, **Wind Rose Diagram**. This wind rose diagram is a visual depiction of wind patterns at a particular site. This diagram depicts winds blowing from a direction to the weather station. Meteorological data obtained from Modesto, CA, shows wind speeds, direction and frequency. Winds originate predominantly from the west with a greater frequency of higher winds than from any other direction. Winds out of the northeast also make up a large portion of wind frequency in the area but at lower wind-speeds.

#### IX. Soil Characteristics

According to the United States Department of Agriculture, Natural Resources Conservation Service (NRCS), surficial soils present at the area of the West Main Compost Facility include the classifications presented in **Table 8** below. A soils map depicting the soil types present at the site and the surrounding areas is included as **Exhibit 11**, **Soil Type Map**.

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI		
DwA	Dinuba sandy loam, slightly saline-alkali, 0 to 1 percent slopes	6.8	29.3%		
HkbA	Hilmar loamy sand, slightly saline-alkali, 0 to 1 percent slopes	16.4	70.7%		
Totals for A	rea of Interest	23.2	100.0%		

#### **Table 8: West Main Compost Facility Soil Types**

Machado and Sons Construction, Inc. Report of Waste Discharge (ROWD) West Main Compost Facility

Hilmar loamy sand is present over approximately 70% of the West Main Compost Facility. The soil type is somewhat excessively drained and is derived from sandy and silty alluvium sourced from granite. Dinuba sandy loam is present over the remainder of the property. The soil type is moderately well drained and is typically derived from alluvium that is sourced from granite (NRCS, 2020). The full NRCS soil report is included as **Appendix 3**, **NRCS Soil Report**.

Percolation tests will be conducted at the site. Pending the result of the percolation tests, it is anticipated that the percolation rate for the soils at the facility will not exceed the maximum Minutes Per Inch (mpi) rate for the measured groundwater depth at the site (State Water Resources Control Board, 2015)

#### X. Groundwater Characteristics

Groundwater in the area of the site occurs in unconfined and confined aquifers within the Quaternary Age alluvial sediments. Depth-to-groundwater and groundwater surface elevation data were obtained from the California Department of Water Resources. The depth to groundwater in the area of the subject property is approximately 25 feet below ground surface **Exhibit 12, Depth to Groundwater-Unconfined Aquifer**). The groundwater surface elevation is approximately 42 feet above mean sea level (**Exhibit 13, Groundwater Surface Elevation**) (DWR, 2020).

The regional groundwater flow gradient is mapped as flowing generally to the southwest based upon the groundwater surface elevation map (DWR, 2020). Local groundwater gradients and direction of flow may vary due to local groundwater recharge from unlined irrigation canals or pumping from agricultural water supply wells.

#### XI. Geology/Stratigraphy

The project site is located in the northern area of the San Joaquin Valley within the Great Valley Geomorphic Province of California. The Great Valley Geomorphic Provence of the San Joaquin Valley consists of a thick accumulation of marine and nonmarine clastic rocks of Jurassic to early Pliocene age which were deposited in a forearc basin located between the Franciscan subduction complex to the west and the Sierran magmatic arc to the east (Bartow and Nilsen, 1990). Younger Quaternary-age alluvial deposits overlie the Great Valley sequence rocks.

The site is immediately underlain by several hundred feet of Quaternary-age alluvial deposits consisting of non-marine sands, silts, and clays and approximately 3,000 feet of non-marine continental beds of varicolored sand, clay, and gravel of the Pliocene-to-Miocene age Mehrten and Valley Springs Formations. The Mehrten and Valley Springs Formations are unconformably underlain by over 10,000 feet of predominantly Cretaceous-age marine sands and shales of the Moreno and Panoche Formations which are underlain by crystalline basement rocks of Jurrasic age (Bartow and Nilsen, 1990). Surface geologic units in the area of the site are depicted on **Exhibit 14, Geologic Map**.

Machado and Sons Construction, Inc. Report of Waste Discharge (ROWD) West Main Compost Facility

#### XII. Contacts

Name of Facility/ Operator	West Main Compost Facility – Machado and Sons Construction, Inc.
Phone Numbers	(916) 206-4342
······	
Current Operations	Composting Facility
Primary Contact - Facility	Sean Kilgrow
Correspondence Contact	Sean Kilgrow
	1000 South Kilroy Road
	Turlock, CA 95380

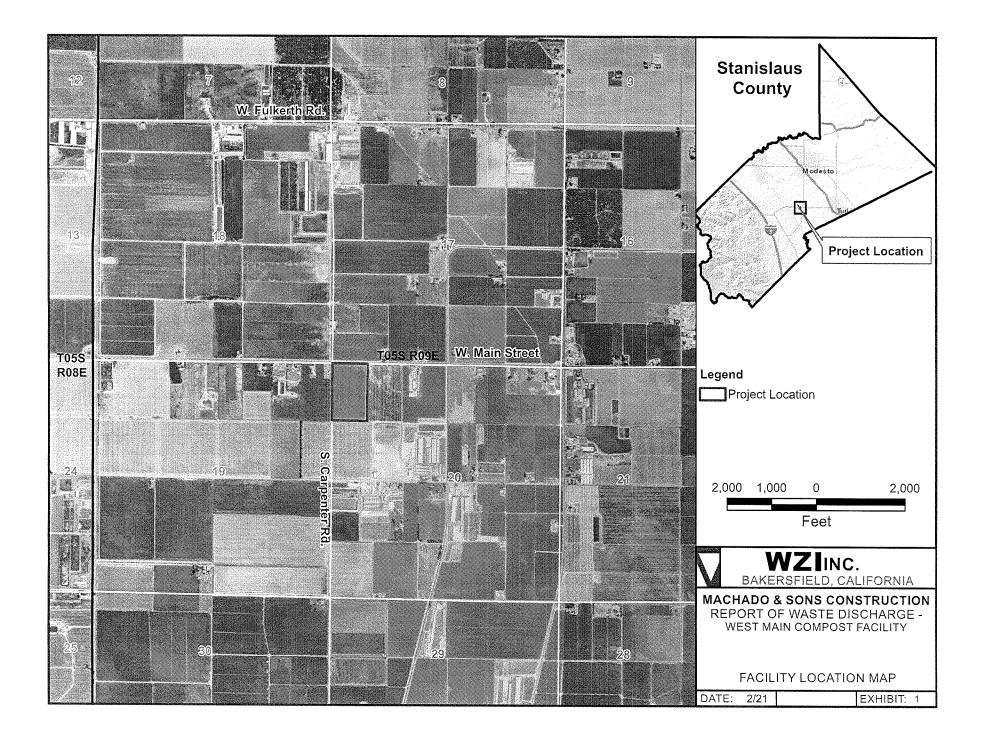
Machado and Sons Construction, Inc. Report of Waste Discharge (ROWD) West Main Compost Facility

February 2021

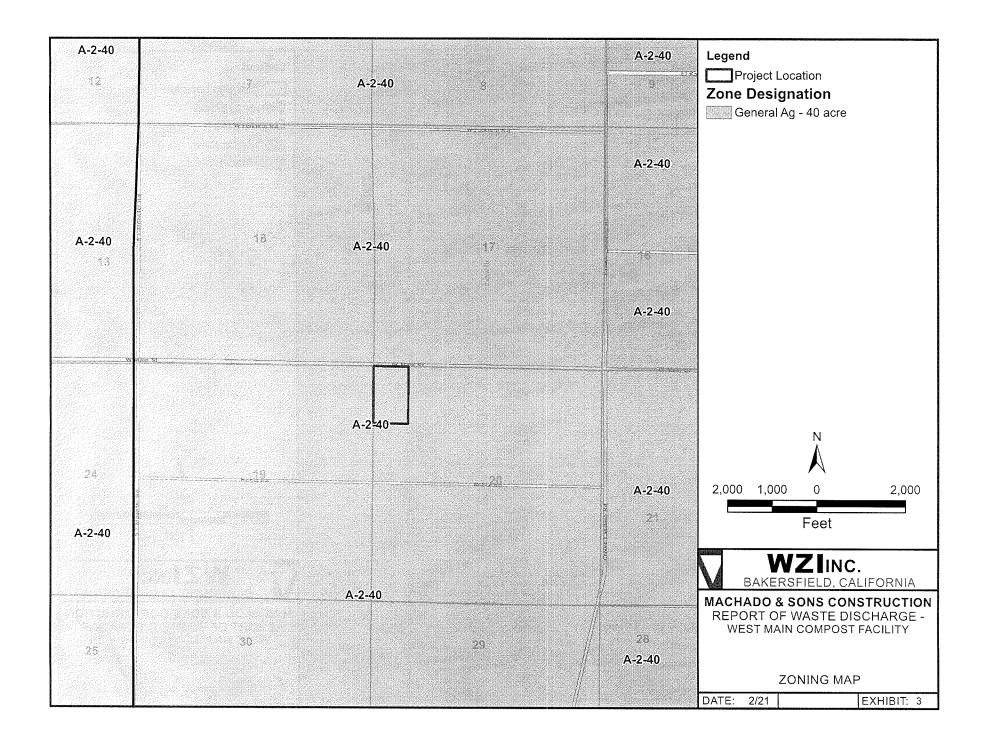
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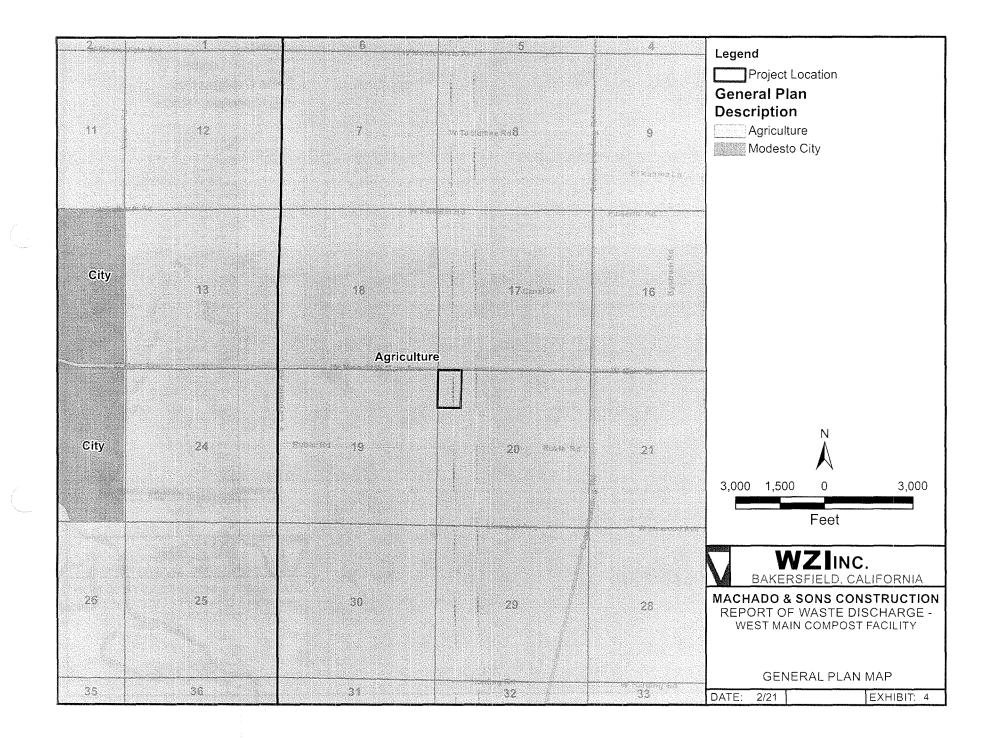
#### XIII. References

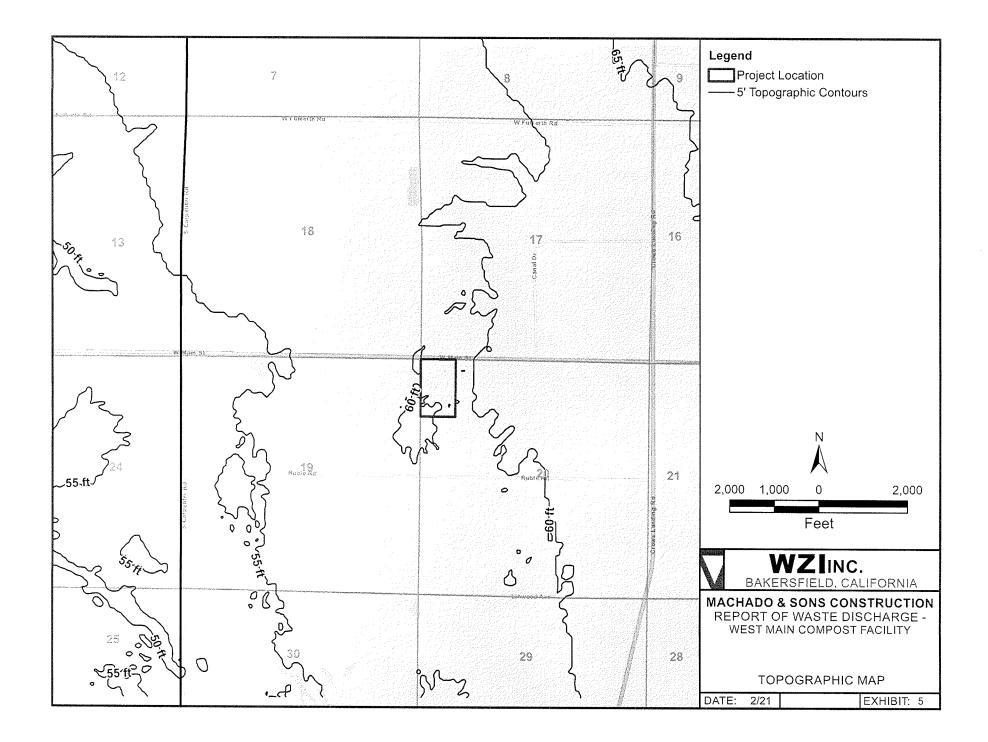
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- Natural Resources Conservation Service (NRCS), 2020, *Web Soil Survey*, <u>https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx</u>, accessed December 2020.
- State Water Resources Control Board, 2015, State Water Resources Control Board Order WQ 2015-0121-DWQ, General Waste Discharge Requirements for Composting Operations, August 4, 2015.

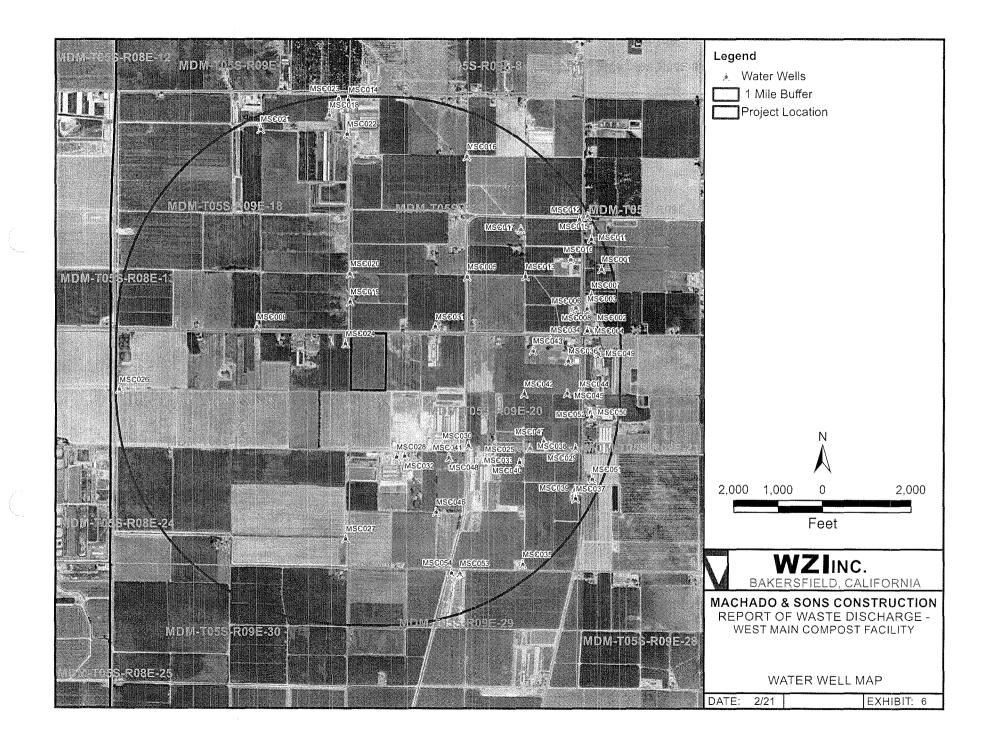


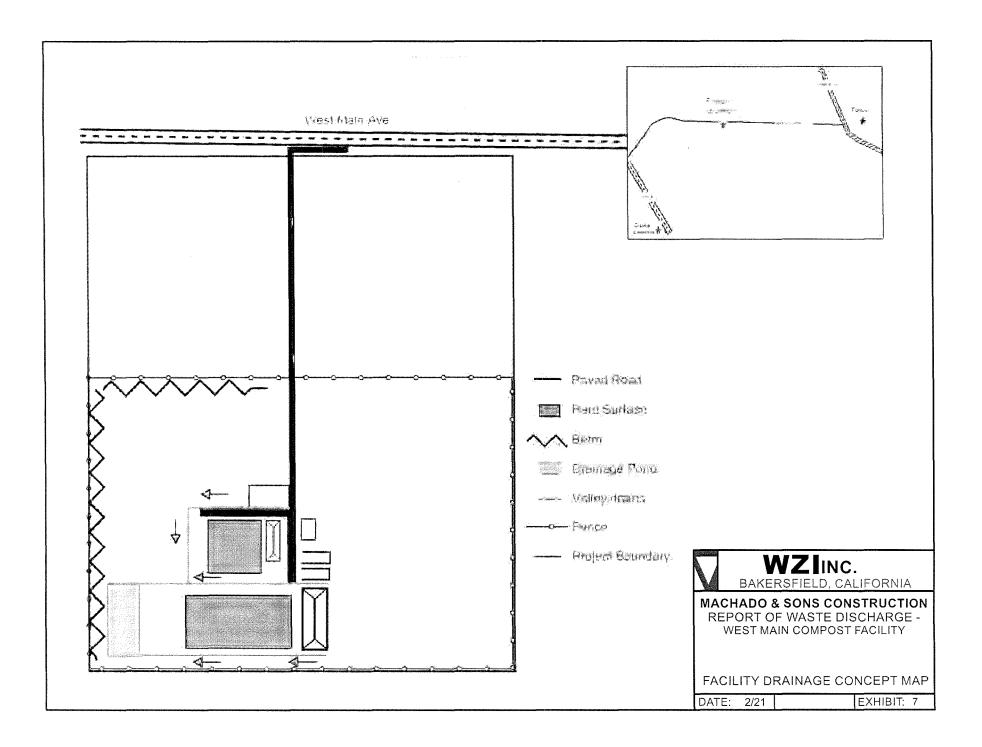


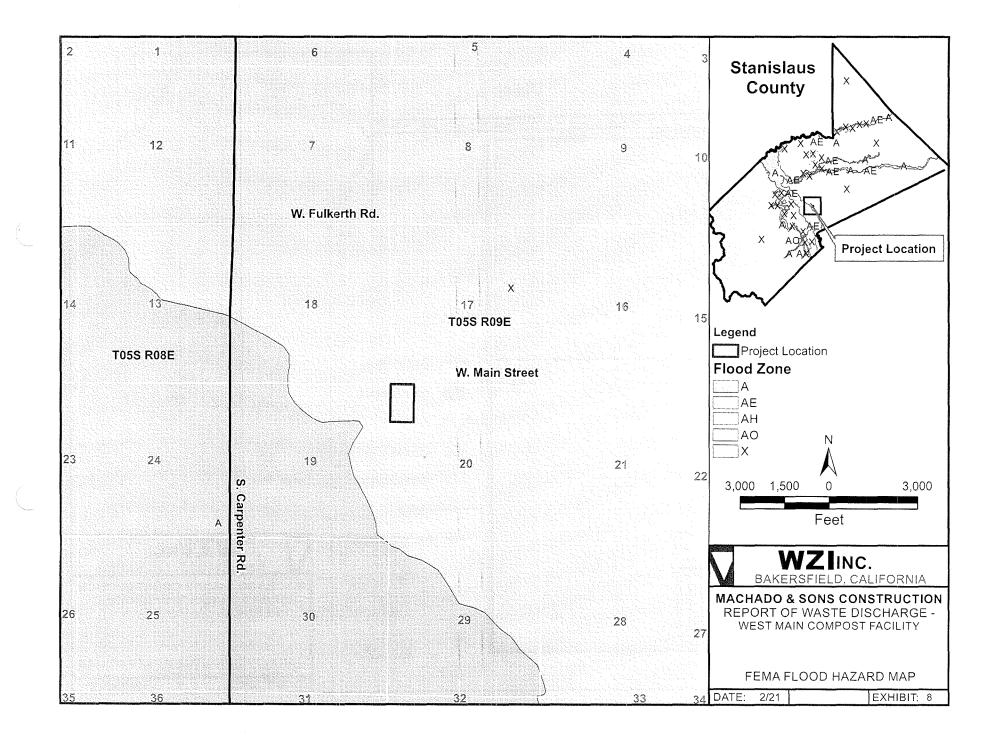


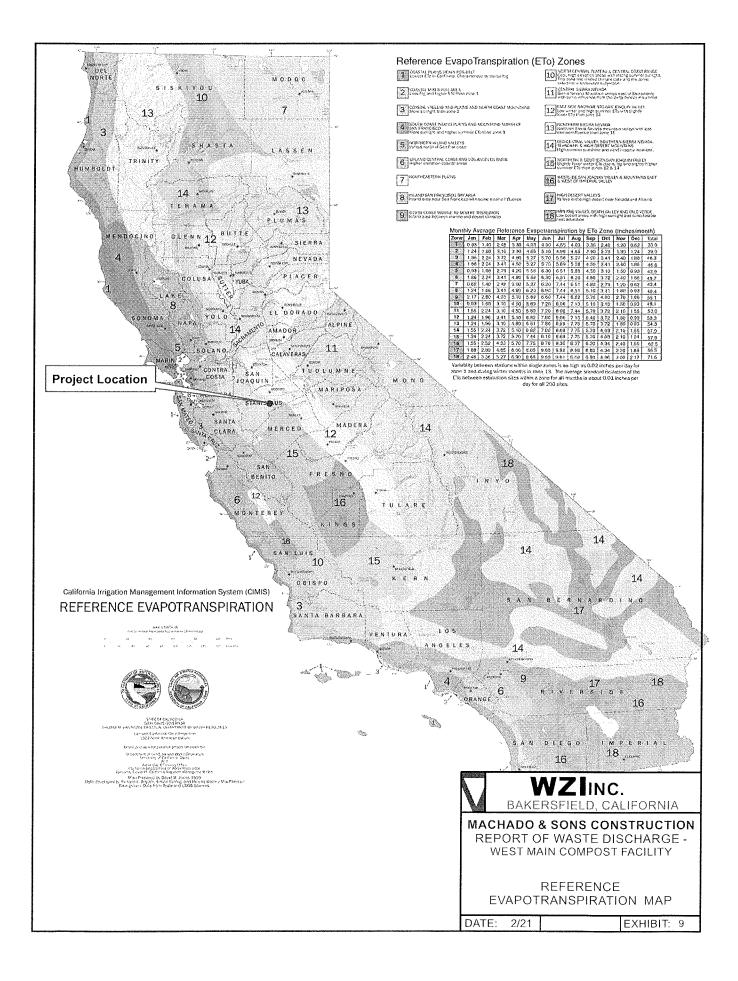


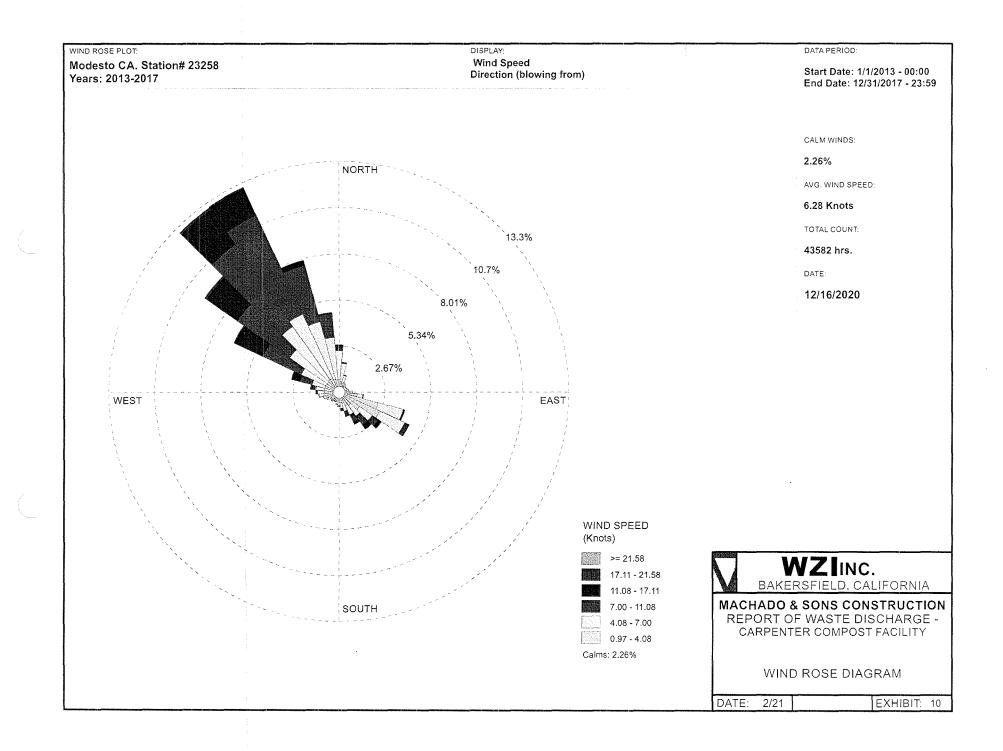


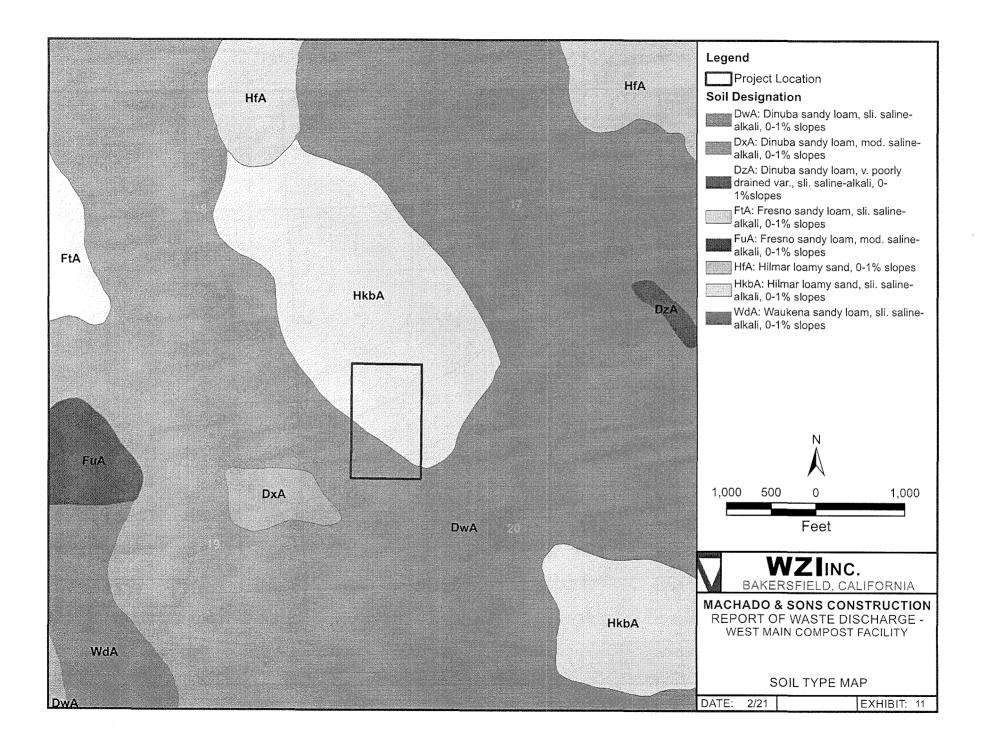


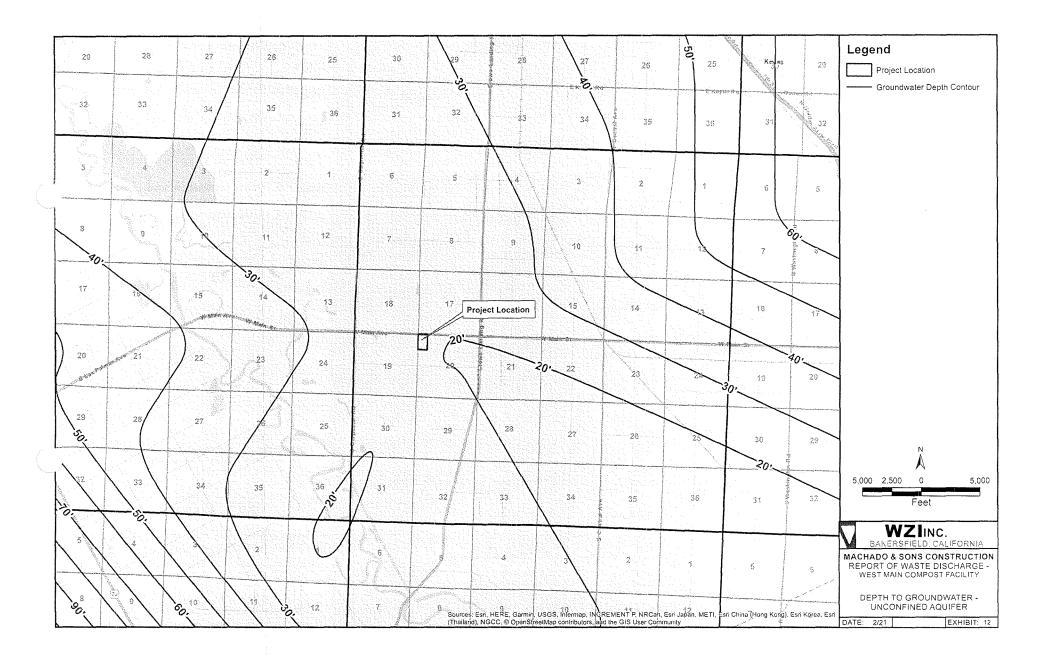


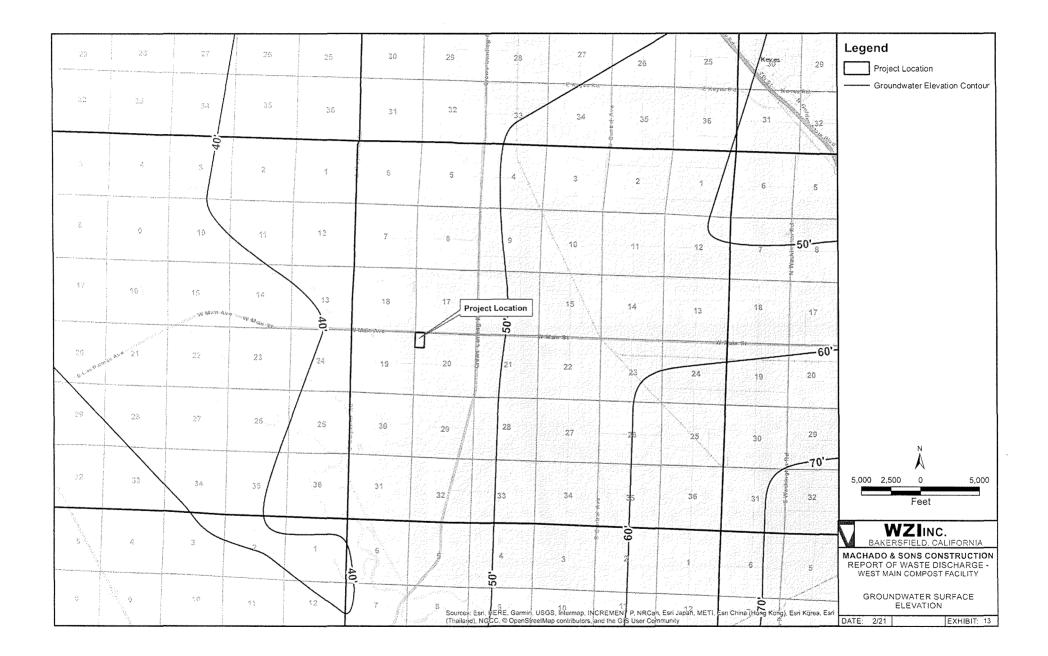


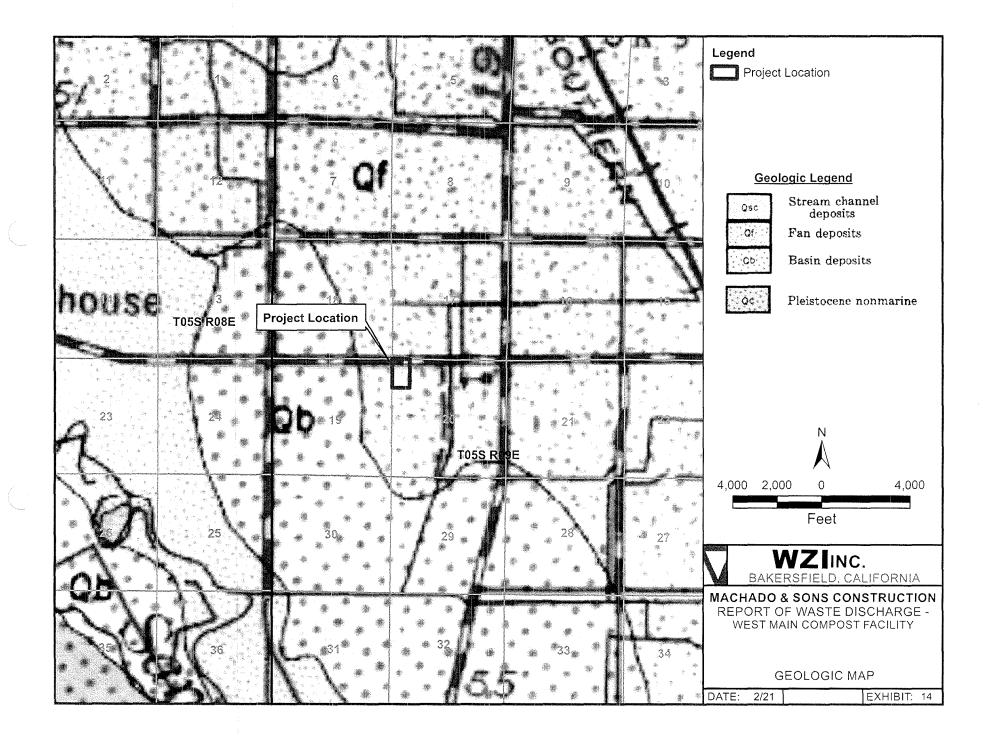












Appendix 1

## Water Well Table

Map_Nu	Well#	APN	Permit#	DWR_#	TWN	RNGE	SEC	Name	Total_Depth_(feet)	Compl_Depth_(feet)	Depth_of_Static_	Screen_Interv	Screen_Inte rval_2_(fee	Screen_Interval_3_(feet)	Purpose		Date_Compl	Location	Latitude	Longitude
mber	1			-					-		Water_(feet)	al_1_(feet)	t)	그는 승규는 영국을 받는		eal	eted	승규가 잘 하는 것을 가 많다.	l de la compañía	
MISC001	1		98-173	706224	55	9E	16	559616	184	165	17	145-165			Domestic	0-90	10/13/1998	9716 Crowslanding Road	37.497056*	·120.993155°
MISC002					55	9E	16	559E16	72	72					Domestic				37.493485*	-120.993477°
MISC003			17.220	WCR2018-007332	55	96	16	559E16	200	200		60-80	100-140		Domestic	0.20	7/6/2018	9912 N Crowslanding Road	37.494641°	·120.994249*
MSC004		022 035-005	12-133	E0159997	55	9E	16	559E16	222	200	24	180-200			Public		9/20/2012	9952 Crowslanding Road	37.493272°	·120.994236°
MSC005				33803	55	9E	17	559E17	435	435	7	100-150	255-305	355-365	Irrigation		5/16/1977		37.496555°	·121.003576*
MSC(006				98949	55	96	17	559E17	113	60	14	52-60			Domestic		6/20/1974	9907 Crowslanding Road	37.494495°	37.494495*
MISC007				548744	55	9E	16	5S9E16	140	133	17	113-133			Domestic	0-50	8/20/1994	9900 Crowslanding Road	37.495471*	·120.993943*
MISC008	Dicks Bar 1		02-1266	792133	55	98	17	5S9E17	175	136	20	116-136			Public	0-100	8/29/2002	9907 Crowslanding Road	37.494680°	-120.995140°
MSC009			07-103	966552	55	96	18	559E18	145	135	17	115-135			Domestic	0-42	6/19/2007	1343 W. Main St.	37.493427*	-121.019863*
MSC010			12.25	C0148642	55	96	17	SS9E17	280	220	18	200-220			Public	0-54	3/15/2012	9633 Crowslanding Road	37.497651*	-120.995535°
MSC011			12-77	E0152683	55	98	15	5S9E16	150	140	12	0-56			Domestic	0-56	5/21/2012	9467 Crowslanding Road	37.498897*	-120.993966"
MSC012	94602		15-19	e0269738	55	9E	17	5S9E17	205	210	20	130-210			Irrigation	0-20	2/10/2015		37.500109°	-120.994860*
MSC013					55	96	17	559E17	130	130		1			Irrigation	1	12/1/1925		37.496585*	-120.999051°
MSC014				41137	55	9E	18	559E18	60	60	16		[		Domestic		12/2/1958		37.507359*	-121.012902*
MSC015		····		73880	55	9E	16	559E16	130	130	21				Domestic		8/9/1962		37.500325°	-120.994219°
MSC016			84-259	153752	55	96	17	5S9E17	135	135	16	115-135	F		Domestic	1	12/14/1984		37.503941"	-121.003652*
MSC017			86-265	164313	55	9E	17	5\$9E17	170	124	7	104-124			Domestic		10/9/1986		37,499485*	-120.999406*
MSC018			16 268	WCR2018-007656	55	95	18	559618	200	200	10	80-100	120-200		Irrigation	0-30	1/31/2018	1500 Fulkerth	37.506425°	·121.014365°
MISC019		· · · · · · · · · · · · · · · · · · ·	13-364	E0205786	55	96	18	559E18	200	130		50-130			Irrigation	0-20	3/28/2014	1501 W Main Avenue	37,494986"	-121.012659*
MISC020		2036018	14-571	E0317377	55	96	18	559E18	360	360	4	240-360			Irrigation	0-20	3/31/2015	1501 W. Main Avenue	37,496710*	-121.012689°
MSC021	,	7050018	02-136	815357	55	9E	18	559E18	200	140	13	60-80	130-145		Dairy	0-50	6/14/2002	1866 West Fulkerth Road	37.505541*	-121.019650*
MISC022	1		98-210	813223	55	95	18	559E18	122	140	12	70-120	130-145		Dality	0-50	1/4/1999	1500 Fulkerth	37.505287*	-121.012972°
MISC022			5242	247057	55	9E	18	559E18	220	152	8	92-152			Domestic	0-50	12/29/1982	1300 Huikertin	37.507415*	-121.012572
			5242	96269			18	559E18 559E19	232	152		160-180			Domestic	0-50	8/19/1982		37.492415"	-121.013038
MISC024				158899	55	30	20	559E19 559E20	143	180	28	97-107	<u> </u>			0-80	8/26/1976		37,485310*	-121.002120*
MSC025					55	90				205	28	97-107			Domestic	0-80	8/26/19/0			-121.002120
MISC026				247078	55	95	19	559E19	205		25				Test Well		3/1/1994		37.489508*	-121.030475
MISCO27				495296	55	95	19	559E19	202	185		65-75	125-185		Irrigation	0.20	5/24/1977			
MSC028			1873	24612	55	96	20	559E20	114	68	15	58-68	L		Domestic	0-20	( · / / · · ·		37.485433°	-121.009003* -120.995077*
MSC029				29554	55	36	20	559E20	80	80	10				Domestic		10/5/1967		37.486049	
MISC030				38881	55	96	20	5S9E20	64	64	15				Domestic				37.486150*	-121.005445* -121.006042*
MSC031				146832	SS	98	17	5S9E17	120	117	24	105-117			Domestic	<u> </u>		707 West Main	37.493488*	
MSC032				219653	55	36	20	559E20	127	84		1			Domestic	+	9/12/1982		37.485489°	-121.008385"
MSC033				242850	55	96	20	559E20	156	150		130-150	L		Domestic	0-20	5/16/1984		37.485136°	-120.999438*
MSC034			5193	243201	55	96	20	559E20	113	104	16	84-104			Domestic	0-20	9/7/1982		37.492695*	-120.997062°
MSC035				243987	55	9E	20	5\$9E20	115	100	8	800-100	L		Domestic	0-20			37.478864"	-120.999138°
MSC036			89-398	376966	55	9F	20	559E20	162	130		110-130			Public	0-90	1/3/1990		37.491405°	-120.995701*
MSCD37			98 109	700185	55	9E	20	5S9E20	115	108	17	88-108			Domestic	0-33	7/22/1998		37.482924"	·120.995060*
MISC038	1		02 055	749718	55	9E	20	5\$9E20	160	140	32	130-148			Domestic	0-24	4/4/2002		37.486009"	·120.998619*
M5C039	95307		03-300	803431	55	9F	20	559E20	125	120	14	100-120			Domestic	0-40	11/28/2003	10625 Crowslanding Road	37.483473"	-120.995113°
MI\$C040	1		99-014	811812	55	9F	20	559F20	128	115	12	95-115			Domestic	0-42	1/30/1999	60D Ruble Rd	37.485242"	-121.001571°
MISC041	Mosier 1		02 180	815385	55	9E	20	559E20	120	105	16	85-105	L		Domestic	0-20	9/6/2002	731 Ruble Road	37.486162"	·121.003382*
MISC042	Ruble	58004012	12 152	E0159994	55	9E	20	559E20	175	144	30	94-144			Irrigation	0-50	8/31/2012	525 Ruble Road	37.489364°	-120.999097*
MSC043			14-246	23838	55	9E	20	559820										330 West Main	37.492023*	~120.998442°
MSC044				66834	55	90	20	559E20	280	255	40	80-255			Irrigation		5/21/1961		37.489369"	-120.994817°
MISC045			1	66836	55	9E	20	559820	270	225	40	40-145			Irrigation		7/13/1961		37.489403°	120.995765"
MSC046			89 67	287357	55	9E	20	559E20	310	300	30	100.180	260-300		Irrigation	0-20	4/11/1989		37.482053°	·121.005886°
MSC047			89-205	304019	55	96	20	559820	172	145		125-145			Domestic	0-50	5/22/1989		37.486418	-120.997554°
M5C048			94-179	\$47542	55	9E	20	559E20	157	112	18	92-112	T		Domestic	0-64	8/11/1994		37.485417"	-121.004921"
MISC049				73890	55	90	21	559E21	163	163	12	1	T		Domestic		10/3/1962		37.491876"	-120.993397*
MISC050	MENDES	,	03-202	803774	55	9E	21	559E21	155	107	22	87-107	+		Domestic	0-26	7/24/2003		37.488278°	-120.993972°
MISC051			05-069		SS	9E	21	559E21	1	1		1			Domestic	1	4/21/2005	10562 Crowslanding Road	37.484124°	-120.993767*
MSC052			07-135	1097589	55	95	21	559€21	180	140	20	100-140	+		Domestic	0-52	8/3/2007	10338 Crowslanding Road	37.487991*	-120.993879°
MISC053		1	85-99	173129	55	95	29	\$\$9E29	166	125	15	100-125	+		Domestic	0-60	5/17/1985	806 W. Linwood	37.478289"	-121.004016"
MSC054			85-99	700184	55		29	559E29	180	180	18	160-180	+		Domestic	0-82	7/25/1998	836 W. Linwood	37,478334*	·121.004677*
	L	L	1	1 ,00104	1 22	1 75	- t		1	1 100		, 100-100	<u> </u>		- voncatic		1.12012030	1 050 01. 00000		1

# Water Well Completion Reports

### **05S9E Section 16**

WATER WELL DRILLERS REPORT

1

#706224 055/09E-16 M MSC 001

WELL OWNER

Page 1 of 1 Owner's Well No. 1 Date Work Began 10/12/98, Ended 10/13/98 Local Permit Agency STANISLAUS COUNTY Permit No. 98-173 Permit Date 10/12/98 \_\_\_\_\_\_ GEOLOGIC LOG

Orientation VERTICAL

Dopth to First Water 17

From -	To -	Description		W	TELL LOCATION	
0 8	3	SAND	9716 CROWS	LANDING	RD	
8 1	7	CLRY	CROWS LANDIN	10		
17 2	11	BAND	STAN			
st 3	16	CLAY/SAND STREAKS	f and a second se			
36 4	6	BLUE CLAY	APN Book	Page	Parcel	
46 5	53	TAN CLAY	Township	Range	Bection	
53 5	56	SAND	Latitude		Longitude	
56 6	S 9	CLAY	Deg	MinSec	DegMinSe	sc
59 8	30	SAND/CLAY STREAKS	(			
90 S	90	CLAY		— ACTI	VITY & PLANNED USR(S)	
90 9	₹4	SAND				
94 1	101	CLAY	Activity:	NEW WE	LL.	
101 1	04	SAND				
104 1	110	CLAY	Water Supply		[ ] Monitoring	[] Injection
110 1	115	SAND/CLAY STREAKS	[X] Domestic		[] Test Well	( ) Vapor Ext
115 1	119	CLAY	[ ] Public		[ ] Cathodic Prot.	[] Sparging
119 1	36	SAND	[ [] Irrigatio	a	[] Heat Exchange	[] Remediati
136 1	46	WHITE CLAY	[] Industria	1	[ ] Direct Push	[ ] Other
146 1	53	SAND				
153 1	60	CLAY	I	<del></del>		
160 1	64	SAND	Drilling			
164 ]	170	CLAY	Method ROTA	RY	Fluid MUD	
170 1	.84	BLUE CLAY	1			
			WAIE	R LEVEL	& YIELD OF COMPLETED	WELL
			Depth of		Date	
			Static Water Leve	1 17	(Pt.) Measured 10	/13/98
			Estimated Yield		(GPM) & Test Type	
			(May not be repre	sentativ	e of a well's long-te	szu yield.)
			Test Length (H	irs.) To	tal Drawdown (Pt	z.)
			Depth of Boring 1	84 (Ft.	) Depth of Completed	Woll 165 (Pt.

			CASI	ing (S)			8	l		
Depth	Bore		[	1		1	Dep	th	ANNULAR	MATERIAL
Prom Surface	Hole		Material/	Internal	Gauge	Slot Size	From	Surface		1
	Dia.	Туре	Grade	Diameter	or Wall	if Any			Type	Filter Pa
Ft. to Ft.	(in.)		2	(in.)	Thickness	(in.)	Ft. t	o Ft.		(type/siz
0   145	13	BLANK	PVC	8 1	160	[	0	90	BENTONITE	1
145   165	1.3	SCREEN	PVC	8	160		90	165	I	6X12
						1	۱	.	. <u></u>	1
		,	I				l	.	<b></b>	
								.		
		Same and and the set	l			I		.	<u></u>	
Attachme	mtu		(			1	J			1
[ ] Geologic	Log									
[] Well Con	st. Diag	1	CALMATER DI	RILLING CO.	, INC.					
[ ] Geophysic	cal Log	1								
[ ] Soil/Wate	er Anal.	1	300 S. Kil:	roy	Turlock	CA CA	95380			
[]		8	Report Date	e 12/10/98	C 57 Li	cense No. 4	34218			

	Fite Orly DIVISION P. O. E	INAL Inal, Duplicals and Tripinal, Duplicals and Tripinal N OF WATER RESOURCE IOX 1079 MENTO 5. CALIFO	S	DIVISION OF WA	TER RESOURCE	1 ·	SHEET 1 7 15 7 1
		Address 309 Tur	(Sections 7076, st Olgon ) Canill clock, Calif.	DRILLERS R 7077, 7078, Water Code)	(2) Proposed a Domestic Irrigation Domestic au Irrigation	Other We Region see or uses (check): Municipal I Industrial I Test well	(3) Equipment used (3) Equipment used ( <i>c'beck</i> ): Rotary
	(5)	Address Well log: Total depth of we		Give details of formation stone, hardpan, rock. Incl of material, structure (lo	New well [ Deepening of s penetrated, such as ude size of gravel (d	A Recondi xisting well silt, peat, muck, sand ameter) and sand (fil	ne, medium, coarse), color
۲		Depth From (           "" <t< td=""><td></td><td>soil clay fine send sand and clay coarse sand sand and clay soft clay hard clay water sand</td><td></td><td></td><td></td></t<>		soil clay fine send sand and clay coarse sand sand and clay soft clay hard clay water sand			
-		9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	n     n       n <td>nuc on DWR Form No. 2</td> <td></td> <td><u>u u u i i p p</u> action 7076.1,</td> <td>report copies.</td>	nuc on DWR Form No. 2		<u>u u u i i p p</u> action 7076.1,	report copies.
	(6)	Casing left in w LENGTH FT. 	ell: DIAMETER INCHES 	SINGLE. DOUBLE. V OTHER Single Vie		BS. PER FOOT OR 2ASE OF CASING 14	SHATING BELOW GROUND BURFACE, FT.

#### State of California Well Completion Report Form DWR 188 Complete 10/16/2018 WCR2018-007332



Owner's Well Nun	nber Date Work Began 04/30/2018 Date Work Ended 07/06/2018
Local Permit Ager	Stanislaus County Department of Environmental Resources
Secondary Permit	Agency Permit Number 17-220 Permit Date 11/09/2018
Well Owner	(must remain confidential pursuant to Water Code 13752) Planned Use and Activity
Name XXXXX	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
Mailing Address	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
City XXXXXXX	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
<u> </u>	Well Location
Address 9912	N Crows Landing RD APN 002-039-020
City Crows La	Inding Zip 95313 County Stanislaus Township 05 S
Latitude	N Longitude W Range 09 E
Deg.	Min. Sec. Deg. Min. Sec. Beading Maining Maining Maining
Dec. Lat. 37.49	46270 Dec. Long120.9942680 Ground Surface Elevation
Vertical Datum	Horizontal Datum WGS84 Elevation Accuracy
Location Accurac	
[	Borehole Information Water Level and Yield of Completed Well
	Double to first water (Foot below surface)
	deal Depth to Static
Drilling Method	Direct Rotary Drilling Fluid Bentonite Water Level (Feet) Date Measured
Total Depth of Bo	ring 200 Feet Estimated Yield* (GPM) Test Type
Total Depth of Co	Test Length (Hours) Total Drawdown (feet)
	*May not be representative of a well's long term yield.
	Geologic Log - Free Form
Depth from Surface	Description
Feet to Feet	Description
0 20	Clay w/sand
20 40	Hard clay
40 55	Clay
55 60	Clay w/sand
60 80	Hard clay
80 120	Clay w/sand
120 140	Clay w/coarse sand
140 160	
	Hard clay
160 180	Hard clay Clay

					Casing	S				
Casing #		m Surface o Feet	Casing Ty	oe Material	Wall Thickness (inches)	Outside Diameter (inches)	Screen Type	Slot Size if any (inches)	Description	
1	0	60	Blank	PVC	OD: 8.625 in.   SDR: 21   Thickness: 0.410 in.	0.41	8.625			
1	60	80	Screen	PVC	OD: 8.625 in.   SDR: 21   Thickness: 0.410 in.	0.41	8.625	Bridge Slot	0.032	
1	80	100	Blank	PVC	OD: 8.625 in.   SDR: 21   Thickness: 0.410 in.	0.41	8.625			
1	100	140	Screen	PVC	OD: 8.625 in.   SDR: 21   Thickness: 0.410 in.	0.41	8.625	Bridge Slot	0.032	
1	140	200	Blank	PVC	OD: 8.625 in.   SDR: 21   Thickness: 0.410 in.	0.41	8.625			
					Annular Ma	terial				
Depth Suri Feet to		Fill		Fill	Type Details		Filter Pack	Size		Description
0	50	Bentor	nite Othe	r Bentonite					18 0/0	
0	200	Filter P	ack 8 x 1	6						

	В	orehole Specifications	Certification Statement									
Sur	n from face o Feet	Borehole Diameter (inches)	t, the under Name	signed, certify that this report is cor AAF		urale to the best of m L DRILLING IN	•	and belief				
0	200	10.63		Person, Firm or Corpora	ition	DENAIR	CA	95316				
				Address		City	State	Zip				
			Signed	electronic signature re C-57 Licensed Water Well (		08/29/2018 Date Signed		10560 ense Number				
				******								
				DV	NR Use	Only						
			CSG #	DV State Well Number		Only te Code	Local W	ell Number				

Page 1 of 2       Refr. to Instruction Pamphlet         Owner's Well No. CROWSLANDING       No. E0159997         Date Work Began 9/18/2012       Ended 9/20/2012         Local Permit Agency STANISLAUS CO DER       Permit Date 8/2/2012         Permit No. 12-133       Permit Date 8/2/2012         GEOLOGIC LOG       GEOLOGIC LOG         ORIENTATION (       Z VERTICAL HORIZONTAL ANGLE (SPECIFY)         DEPTH FROM       METHOD ROTARY         SIAND       DESCRIPTION         3       10         10       15         3       10         15       17         16       17         17       18         28       30         30       20         18       28         28       30         37       41         37       41         37       41         37       41         37       41         37       41         41       52         50       56         62       64         55       56         63       50         56       62         62       64	
Date Work Began 9/18/2012       Ended9/20/2012       LATITUDE       LATITUDE       LONGITUDE         Local Permit Agency STANISLAUS.CO.DER       Permit Date 8/2/2012       APNTRSJOTHER         Permit No. 12-133       GEOLOGIC LOG       Permit Date 8/2/2012       WELL OWNED         ORIENTATION (*)       VERTICAL       HORIZONTAL       ANGLE - (SPECIFY)         DEPTH FROM       METHOD ROTARY       FLUID MUD         SERRAGE       DESCRIPTION       CITY       STANE         0       3       SAND       Address 9952 CROWSLANDING RD       STAILE         0       3       SAND       Address 9952 CROWSLANDING CA       STAILE         0       3       SAND       City CROWSLANDING CA       STAILE         10       15       SAND       City CROWSLANDING CA       County STAINISLAUS         15       17       CLAY       APN Book 022       Page 035       Parcel 005         17       18       SAND       Locartion Sterret       ACTIVITY         32       30       SAND       Locartion Sterret       ACTIVITY         32       37       SAND       Locartion Sterret       MODIFICATION         32       37       SAND       Locartion Stere       MODIFICATION	
Local Permit Agency STANISLAUS CO DER Permit No. 12-133 GEOLOGIC LOG GEOLOGIC LOG GEOLOGIC LOG DEVENTATION (Y) DEVENTICAL HORIZONTAL ANGLE (SPECIFY) DESCRIPTION DESCRIPTION 0 3 SAND 0 3 SAND 0 3 SAND 0 15 SAND 10 HARD PAN 10 15 SAND 15 17 CLAY 18 28 CLAY SAND ST 28 30 SAND 18 28 CLAY SAND ST 28 30 SAND 18 28 CLAY SAND ST 28 30 SAND 19 41 CLAY SAND ST 10 42 CLAY 10 55 566 SAND 10 56 62 CLAY 10 55 SAND 10 56 62 CLAY 10 56 62 CLAY 10 56 62 CLAY 10 55 SAND 10 55 SAND 10 56 62 CLAY 10 55 SAND 10 5	21-
Permit No. 12-133 GEOLOGIC LOG GEOLOGIC LOGIC LOG GEOLOGIC LOGIC LOGIC GEOLOGIC LOGIC LOGIC GEOLOGIC LOGIC LOGIC LOGIC LOGIC GEOLOGIC LOGIC L	
GEOLOGIC LOG       WETTONVER         ORIENTATION (Y)       VERTICAL       HORIZONTAL       ANGLE       (SPECIFY)       MSC OOY         DEPTH FROM SURFACE       DESCRIPTION       DESCRIPTION       CITY       STATE         0       3       SAND       Describe material, grain, size, color, etc.       CITY       STATE         0       3       SAND       Address 9952 CROWSLANDING CA       STATE         0       10       15       SAND       City CROWSLANDING CA       County STANISLAUS         15       17       CLAY       APN Book 022       Page 035       Parcel 005         17       18       SAND       Township       Range       Section         18       28       CLAY       ADD       DESCRIM       ACTIVITY         32       37       SAND       CLAY       ACTIVITY         32       37       SAND       SAND       MONFIL       ACTIVITY         32       37       SAND       SAND       MONFIL       ACTIVITY         33       10       LAY       MONFIL       ACTIVITY       APN BOOK 022       Page 035       Pacel 005         17       18       SAND       SAND       MONFIL       V       NORT	
ORIENTATION (*) <u>✓ VERTICAL</u> HORIZONTAL ANGLE (SPECIFY) DRILLING ROTARY FLUID MUD <u>SURFACE</u> <u>DESCRIPTION</u> <u>DESCRIPTION</u> <u>DESCRIPTION</u> <u>DESCRIPTION</u> <u>DESCRIPTION</u> <u>DESCRIPTION</u> <u>Describe malerial, grain, size, color, etc.</u> <u>OIN</u> <u>Address 9952 CROWSLANDING RD</u> <u>SIALE</u> <u>Address 9952 CROWSLANDING RD</u> <u>CINY             <u>Address 9952 CROWSLANDING RD</u> <u>Township Range             Scction             <u>Latiude</u> <u>CINY             <u>Describe MNN             <u>Scction             Latiude             <u>VENN             NORTH             <u>VENNUME             NORTH            <u>VENNUME             NORTH             <u>V</u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u></u>	
DRILLING ROTARY       FLUID MUD         DEPTH FROM SURFACE       METHOD ROTARY         PI       0         3       Describe material, grain, size, color, etc.         0       3         3       10         10       15         15       17         16       Address 9952 CROWSLANDING RD         City CROWSLANDING CA         County STANISLAUS         15       17         18       28         20       32         37       41         23       30         37       41         41       55         56       62         62       65	
Description       Description       State         0       3       SAND       Address 9952 CROWSLANDING RD       State         0       3       10       HARD PAN       City CROWSLANDING CA       City CROWSLANDING CA         10       15       SAND       City CROWSLANDING CA       County STANISLAUS         15       17       CLAY       APN Book 022       Page 035       Parcel 005         17       18       SAND       Township       Range       Section         18       28       CLAY SAND ST       Latitude       DESC MIN       SEC       DESC MIN         30       32       CLAY       SAND       NORTH       ACTIVITY         32       37       SAND       SAND       NORTH       ACTIVITY         32       37       SAND ST       DES       MODIFICATION SKETCH       ACTIVITY         32       37       SAND ST       NORTH       MODIFICATION SKETCH       ACTIVITY         41       55       SAND ST       Des       MODIFICATION       NORTH       MODIFICATION         56       62       CLAY       GES SAND       DESTROY       Procedures       Under GEC         62       65       SAND       SAND<	
FI       Describe material, grain, size, color, etc.       CITY       STATE         0       3       SAND       Address 9952 CROWSLANDING RD       Address 9952 CROWSLANDING CA         3       10       HARD PAN       City CROWSLANDING CA       City CROWSLANDING CA         10       15       SAND       Cuty CROWSLANDING CA       County STANISLAUS         15       17       CLAY       APN Book 022       Page 035       Parcel 005         17       18       SAND       Township       Range       Section         18       28       CLAY SAND ST       Latitude	
3       10       HARD PAN         10       15       SAND         15       17       Clay         16       APN Book 022       Page 035         17       18       SAND         18       28       CLAY SAND ST         28       30       SAND         30       32       CLAY         37       41       CLAY SAND ST         37       41       CLAY SAND ST         41       55       SAND         56       62       CLAY         62       65       SAND	
3       10       HARD PAN       City CROWSLANDING CA         10       15       SAND       County STANISLAUS         15       17       Clay       APN Book 022       Page 035       Parcel 005         18       28       CLAY SAND ST       Dec. MIN       Sec.       Dec. MIN       Sec.         28       30       SAND       Dec. MIN       Sec.       Dec. MIN       Sec.         30       32       CLAY       NORTH       ACTIVITY       ACTIVITY         32       37       SAND       NORTH       MODIFICATION       MODIFICATION         37       41       CLAY SAND ST       MODIFICATION       MODIFICATION         41       55       SAND       SAND       Deeg       MODIFICATION         56       62       CLAY       DESTROY       Procedures       Deeg         62       65       SAND       PI ANNED       PI ANNED       PI ANNED	
15     17     CLAY     APN Book 022     Page 035     Parcel 005       17     18     SAND     Township     Range     Section       18     28     30     SAND     Latitude     Image     Section       28     30     SAND     DEG.     MN     Sec.     DEG.     MN       30     32     CLAY     CLAY     ACTIVITY     ACTIVITY       32     37     SAND     NORTH     Image     ACTIVITY       37     41     CLAY SAND ST     Image     MOOIFICATION/       41     55     SAND     SAND     Image     Image       55     56     SAND     SAND     Image     Image       56     62     CLAY     Image     Image     Image       62     65     SAND     Image     Image     Image	
15       17       CLAY       APN Book 022 Page 035 Parcel 005         17       18       SAND       Township       Range       Section         18       28       CLAY SAND ST       Latitude       Image       Section         28       30       SAND       DEG. MIN.       SEC.       DEG. MIN.         30       32       CLAY       AVTIVITY       ACTIVITY         32       37       SAND       NORTH       Image       ACTIVITY         32       37       SAND       MODIFICATION/       MODIFICATION/         41       55       SAND ST CLAY       Image       Image       Image         55       56       SAND       SAND       Image       Image       Image         56       62       CLAY       Image       Ima	
18     28     CLAY SAND ST     Iownship     Range     Section       28     30     SAND     Latitude     Image     Jeconomic       30     32     CLAY     DEG     Min.     SEC.     DEG     Min.       30     32     CLAY     ACTIVITY     ACTIVITY     ACTIVITY       32     37     SAND     SAND ST     MODIFICATION     MODIFICATION/       37     41     CLAY SAND ST     MODIFICATION/     MODIFICATION/       41     55     SAND     SAND     Desp       55     56     SAND     SAND     Desp       56     62     CLAY     Under "GEC     Desp       62     65     SAND     Desp     Desp	
28     30     SAND     DEG. MIN. SEC.     DEG. MIN. SEC.       30     32     CLAY     ACTIVITY       32     37     SAND     NORTH       37     41     CLAY SAND ST       41     55     SAND       55     56       62     65       SAND	er^
30     32     CLAY     ACTIVITY       32     37     SAND     NORTH       37     41     CLAY SAND ST     MODIFICATION/ Deep       41     55     SAND ST CLAY     Other       55     56     SAND     Destroy       56     62     CLAY     CLAY       62     65     SAND     Destroy	
32     37     SAND       37     41     CLAY SAND ST       41     55     SAND       55     56       56     62       62     65       SAND	
37     41     CLAY SAND ST       41     55     SAND ST CLAY       55     56       56     62       62     65       SAND	L
41     55     SAND ST CLAY     Other       55     56     SAND     DESTROY       56     62     CLAY     DESTROY       62     65     SAND     DIADA	
55         56         SAND           56         62         CLAY           62         65         SAND	
DZ: US; SAIND PLANNED I	· · · · · · · · · · · · · · · · · · ·
DZ: 03 OAND PLANNED I	(Describe and Mater
71 77 SAND CLAY ST	Y Public
	ORING -
80 88 SANU ST	WELL
88 92 CLAY	
92 98 SAND C HEAT EXC	
	r Push Ction
107         109         SAND         INJE           109         112         CLAY         SAND         SAND	
	RGING
112       114       0440       REMED         114       117       CLAY       Illustratic or Describe Distance of Well from Roads, Buildings, Fonces, Rivers, cic and attach a map Use additional paper if       OTHER (SP	ATION
117 118 SAND	
118 120 CLAY WATER LEVEL & YIELD OF COMPLETED WELL	
120 123 SAND FC DEPTH TO FIRST WATER (FL) BELOW SURFACE	
123         124         CLAY         DEP(H) OF STATIC           124         125         SAND FC         WATER LEVEL 24         (FL) & DATE MEASURED	
TOTAL DEPTH OF BORING 222 (Feet) ESTIMATED VIELD • (GPM) & TEST TYPE	
TOTAL DEPTH OF BORING	
DEPTH BORE - CASING (S) DEPTH ANNULAR MATERL	۱L
EL LA EL (Inchos) Z W 39 C GRADE DIAMETER OR WALL IF ANY	PACK
	SIZE)
0 180 14.5 V PLASTIC 6" SDR21 0 134 V	
180 200 14.5 V PLASTIC 6" SDR21 ,043 134 200 V 8X16 G	RAVEL
ATTACHMENTS ( * ) CERTIFICATION STATEMENT	
Geologic Log I, the undersigned, cartify that this report is complete and accurate to this bast of my knowledge and baller.	
Well Construction Diagram Geophysical Log(s) (PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)	
soll/Water Chemical Analysis 300 S. Kilroy Rd. Turlock CA 9531	30
Other CITY STATE ZIM	
ATTACH ADDITIONAL INFORMATION, IF IT EXISTS WELL DRILLER/AUTHORIZED REPRESENTATIVE DATE SIGNED C-55 LICENS	

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	Other											0.10					
ATTACH ADDITIONAL INFORMATION, IF IT EXISTS. SIGNED WELL WALLER, ANTHORIZED "BBS							CSEN 7	AIM		D	NE SEDE	<u>4/9</u>	4	668622 C-57 LICENSE NUMBER			
WR 188 REV. 7-90 IF ADDITIONAL SPACE IS NEEDED, USE NEX									SE NEXT	DATE SEDICE C.57 LICENSE NUMBER							

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Effe with DAVR     WELL     COMPLETION     REPORT       Owner's Well No. CROWSSADDING     Mc. E0/52683     Database     Database       Dotal Work Began     Ended521202     Database     Database       Dotal Work Began     Ended521202     Database     Database       Dotal Work Began     Ended521202     Will A. CROWSEADDING     Will A. CROWSEADDING       Dotal Work Began     Ended521202     Will A. CROWSEADDING     Will A. CROWSEADDING       Permit No. 227     CROUGOLOGUE JOO     Permit No. 226     Will A. CROWSEADDING       2     CrowseadDing     Andread     Bescher     Will A. CROWSEADDING       2     CROUGOLOGUE JOO     CrowseadDing     Andread     Bescher       2     CROWSEADDING     CROWSEADDING     CrowseadDing     Bescher       2     CROWSEADDING     CROWSEADDING     CROWSEADDING     CROWSEADDING       2     CROWSEADDING     CROWSEADDING     CROWSEADDING     CROWSEA	ORIGINAL File with DWR					<b>N TE J BIT E (8)</b>		OF CALIF							- <u>D</u> C	D NOT FILL IN
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SIGEACC         DESCRIPTION         DESCRIPTION         OF         STATE		DRILLI	VG R	ΟΤΑ	RY		THOSE	)	r			1	7 <			
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117         21         SAND, CLAY STREAKS         Dec. 1000         De	· · · · · · · · · · · · · · · · · · ·															
21         38         CLAY, SAND STREAKS BROWNPLUE         LOCATION SKITCH         ACTIVITY (C)           38         44         SAND         Month         ACTIVITY (C)         ACTIVITY (C)           38         44         SAND         Month         Month         Month         Month           44         64         CLAY         Month         Month         Month         Month           90         95         CLAY         Begin         COPY (DF)         Begin         Month         Decode         Begin         Decode         Begin         Decode         Begin         Decode         Begin         Decode         Begin         Begin <td>An antima and the second secon</td> <td></td> <td></td> <td>AY S</td> <td>ATE</td> <td>FAKS</td> <td></td> <td></td> <td>-</td> <td>Latitude</td> <td>MIN. S</td> <td>EG</td> <td></td> <td></td> <td>DEG</td> <td>MIN SEC</td>	An antima and the second secon			AY S	ATE	FAKS			-	Latitude	MIN. S	EG			DEG	MIN SEC
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44       04       CLAY         64       74       SAND         74       87       CLAY         87       90       VERY FINE SAND         90       95       CLAY         97       108       CLAY         109       111       CLAY         109       111       CLAY         109       111       CLAY         111       112       CLAY         120       121       FINE COARSE SAND         132       135       CLAY         132       136       CLAY         132       136       CLAY         132       136       CLAY         133       150       CLAY         134       150       CLAY         135       136       SAND         136       150       CLAY         137       150       CLAY         138       150       CLAY         13								*****	-		NORTI					NEW WELL
64         74         SAND           74         87         CLAY           95         97         SAND           97         108         CLAY           113         116         CLAY           113         118         CLAY           113         119         CLAY           113         119         CLAY           113         119         CLAY           114         CLAY         States           122         138         ISO           138         150         CLAY           138         ISO         States           138         ISO         States           138         ISO         States           140         DEPTH V REAL </td <td>44 6</td> <td>4 CLAY</td> <td></td> <td>MOD</td> <td></td>	44 6	4 CLAY													MOD	
87         90         VERY FINE SAND           90         95         CLAY           97         108         CLAY           109         111         CLAY           113         113         CLAY           113         113         CLAY           113         113         CLAY           113         113         CLAY           116         122         FINE COARSE SAND           113         135         CLAY           138         130         CLAY           138         150         CLAY           139         SAND         Plant or strate           138         Plant or strate         Plant or strate           138         RAND         Plant or strate	64 7	4 SAND														
90         95         CLAY         COPYOF         User "School Coole Coole"           97         108         CLAY         COPYOF         PLANED         PLANED         Vare "School Coole"         V	74 8	7 CLAY							1							
30       35       CLAY       COMPYOF       PLANED         97       108       CLAY       COMPYOF       PLANED       PLANED         108       108       SAND       PDETRIVE       PLANED       PLANED       PLANED         111       113       FINE COARSE SAND       ATTACHMENTS       ATTACHMENTS       ATTACHMENTS       PLANED       State         113       116       CLAY       ATTACHMENTS       CLAY       ATTACHMENTS       PLANED       State       State       State       State       State       PLANED       State       State <t< td=""><td>1</td><td></td><td>FIN</td><td>E S/</td><td>NC</td><td>)</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>Procedures and Materials</td></t<>	1		FIN	E S/	NC	)										Procedures and Materials
97       108       CLAY         108       109       SAND         109       111       CLAY         111       113       FINE COARSE SAND         113       116       CLAY         113       116       CLAY         113       116       CLAY         113       118       CAAY         132       135       CLAY         133       136       CLAY         135       138       SAND         138       150       CLAY EROW TO BLUE         Immune or During Dimme of Plat from Koak, Mulding, Proceeding Dimme of Plat from Koak, Mulding, Plat from Koak, Mulding, Plat from Koak, Mulding, Plat from Koak, Mulding, Plat from Koak, Mulding, Plat from Koak, Mulding, Plat from Koak, Mulding, Plat from K	1						·			(T) (1	MD	V m	TIT		pr a	
108       109       GAND       Infigure	\$										المراجع المكر	u v s	ĽĽ,		WAT	ER SUPPLY
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Ind         Ind <td>1</td> <td></td> <td></td> <td></td> <td></td> <td>·····</td> <td></td> <td>•••••••••••••••••••••••••••••••••••</td> <td>12</td> <td>&gt; IT</td> <td>巴武</td> <td>VIIII</td> <td></td> <td>u</td> <td></td> <td>MONITORING</td>	1					·····		•••••••••••••••••••••••••••••••••••	12	> IT	巴武	VIIII		u		MONITORING
113       116       CLAY       Heart EXCHANGE         113       116       122       FINE COARSE SAND       Heart EXCHANGE         122       135       CLAY       Heart EXCHANGE       DIRECT PUSH         135       136       CLAY       SPARANG       SPARANG         138       150       CLAY BROW TO BLUE       Hearter or Duscribe Diames of Heil Four Roads, Building, Provide Strange of Heil Four Roads, Building, Provi	1	and second s	200	nor						A province	1 m l		28 <sub>6</sub>			
116:       132       FINE COARSE SAND       DIRECT PUSH	· ·	,	JOA	RSE	5/	AINU					IPA 6	TIGH	71	E.	1	
132       135       CLAY       INJECTION       INJECTION       VAPOR EXTRACTION         138       ISO       CLAY BROW TO BLUE       Internet or Discribe Distance of IF4I from Roads, Enddlings, Perce, Rivers, etc., und statch map, Use Additional paper in excessor, PLEASE DE ACCINATE & COMPLETE.       VAPOR EXTRACTION       REMEDIATION         138       150       CLAY BROW TO BLUE       Internet or Discribe Distance of IF4I from Roads, Enddlings, Perce, Rivers, etc., und statch map, Use Additional paper in excessor, PLEASE DE ACCINATE & COMPLETE.       NOTHER (SPECIPY)         139       ISO       CLAY BROW TO BLUE       WASE DE ACCINATE & COMPLETE.       NOTHER (SPECIPY)         130       INTERNAL       DEPTH OF STATIC       (FL) BATE MEASURED       5/21/2012         131       ESTIMATED YIELD       ESTIMATED YIELD       (FL) BATE MEASURED       5/21/2012         131       ESTIMATED YIELD       ESTIMATED YIELD       (FL) BATE MEASURED       5/21/2012         133       ESTIMATED YIELD       ESTIMATED YIELD       (FL) BATE MEASURED       5/21/2012         133       ESTIMATED YIELD       ESTIMATED YIELD       (FL) BATE MEASURED       (FL)         133       TOTAL DEPTH OF BORING 150       (Feet)       INTERNAL       GAUGE       SLOT SIZE       FR NN         140       105/8"       PLASTIC       G"       SDR26	1		202	Dec	20					en se de f	a a De Ma	・月前月		9		
135       138       SAND         138       150       CLAY BROW TO BLUE       Warren of Well from Roads, Buildings, Precess Revers, Buildings, Precess, Revers, Buildings, Precess, Revers, Buildings, Precess, Revers, Buildings, Precess, Revers, Buildings, Precess, Revers, Buildings, Precess, Revers, Buildings, Precess, Revers, Buildings, Precess, Revers, Buildings, Precess, Revers, Buildings, Precess, Revers, Buildings, Precess, Revers, Buildings, Precess, Revers, Buildings, Precess, Revers, Precess,	\$		501	noc	. <i>Sr</i>	71413										1
138         150         CLAY BROW TO BLUE         South / monoch, publics         South / multics         South / monoch, publics         South / monoch, publics         South / multics         South	1	· · · · · · · · · · · · · · · · · · ·	~~~~~												VAF	3
Provide product of the product of t				W Ť	01	BLUE			L		SOUTH				_	
Image: Stars and Stars an										Illustrate or Describe. Fonces, Rivers, etc. and	Distance of We	I from Roads,	Building	ir		1
DEPTH OF FIRST WATER     (FL) BELOW SURFACE     1       DEPTH OF STATIC     (FL) A DATE MEASURED     5/21/2012       TOTAL DEPTH OF BORING     150     (Feet)       TOTAL DEPTH OF COMPLETED WELL     (Feet)       TYPE     (Cassing (s)       Marterial     (Inches)       TYPE     (Cassing (s)       Type     (Inches)       The FL     (Inches)       O     120       120     10       5/8"     PLASTIC       6"     SDR26       0.1     10       120     10       10     PLASTIC       6"     SDR26       0.1     10       10     10       11     (Inches)       Well Construction Diagram       Geologic Log       Well Construction Diagram       Geologic				·					L	necessary, PLEASE I	BE ACCURAT	E & COM	PLETE.		L	
DEPTH     DEPTH     OF IN TO FINE WATER     OF INTO			~~~~~							WATE	R LEVEL	& YIELD	OF C	OMPI	erei	
ESTIMATED VIELD *																
ESTIMATED VIELD *	i									DEPTH OF STATIC	>				5/21	12012
TOTAL DEPTH OF BORING 150       (Feet)         TEST LENGTH															* ; ; ; ; ; ;	
TOTAL DEPTH OF COMPLETED WELL 140 (Feet)       May not be representative of a well's long-term yield.         DEPTH FROM SURFACE       BORE HOLE DIA. (Inches)       CASING (S)       DEPTH SRADE       DEPTH DIA. (Inches)       ANNULAR MATERIAL SRADE       ANNULAR MATERIAL (Inches)         0.       120       10 5/8"       /       PLASTIC       6"       SDR26       0       56       /       CE       BEN. (TYPE/SIZE)         120       140       10 5/8"       /       PLASTIC       6"       SDR26       043       56       140       8X16 GRAVEL	TOTAL DEPTH O	BORING	150	)	(f	reet)			1							
DEPTH FROM SURFACE       BORE HOLE DIA, (inches)       TYPE (2) TYPE (2	TOTAL DEPTH O	F COMPLE	TED	WEL	<u>LÌ</u>	40 (Feet)									• •	
FROM SURFACE       BURE- HOLE       TYPE (2) black (inches)       Material / Stress       INTERNAL GRADE       GAUGE (inches)       SLOT SIZE (if ANY (inches)       FROM SURFACE       TYPE         Fit. to       Fit. (inches)       Y       Y       Y       PLASTIC       6"       SDR26       0       56       Y       Fit. to       Fit. (YPE)         120       140       10 5/8"       Y       PLASTIC       6"       SDR26       0       56       140       8X16 GRAVEL         120       140       10 5/8"       Y       PLASTIC       6"       SDR26       043       56       140       8X16 GRAVEL         Geologic Log       SolfWater Chamked Analysis       International Analysis       International Analysis       International Analysis       International Analysis       International Analysis       International Analysis         Other       Other       Other       ATTACH ADDITIONAL INFORMATION, IF IT EXISTS       Fit Exists       Signed       International Analysis       International Analysis	I	1	T						5 		r		1			
DIA. (inches)       X II. B       K II. B       MATERIAL / GRADE       INTERNAL DIAMETER (inches)       GAUGE OR WALL (inches)       SLOT SIZE IF ANY (inches)       CE- MENT FL       BEN- MENT TONTE       FILL FL       FILTER PACK (TYPE/SIZE)         0       120       10.5/8"       /       PLASTIC       6"       SDR26       0       56       /       /       FILTER PACK (TYPE/SIZE)         120       140       10.5/8"       /       PLASTIC       6"       SDR26       0.43       56       140       8X16 GRAVEL         120       140       10.5/8"       /       PLASTIC       6"       SDR26       .043       56       140       8X16 GRAVEL         1       Image: Signed control on plagram         Geologic Log       Image: Signed control on plagram       Image: Signed contron       Image: Signed control on pla	DEPTH	BORE -			1.5	<u>C</u>	ASING (S)				DE	PTH		ANN		
0       120       10       5/8"       ✓       PLASTIC       6"       SDR26       0       56       ✓         120       140       10       5/8"       ✓       PLASTIC       6"       SDR26       .043       56       140       8X16 GRAVEL         120       140       10       5/8"       ✓       9       8X16 GRAVEL         120       140       10       56       140       8X16 GRAVEL         120       140       10       56       140       8X16 GRAVEL         120       10       10       10       10       10       10         120       10       10       10       10       10       10       10         120       10			X			MATERIAL /	INTERNAL	GAUGE		SLOT SIZE	FROMS	URFACE		DEN.	<u> </u>	(PE
0       120       10       5/8"       ✓       PLASTIC       6"       SDR26       0       56       ✓         120       140       10       5/8"       ✓       PLASTIC       6"       SDR26       .043       56       140       8X16 GRAVEL         120       140       10       5/8"       ✓       9       8X16 GRAVEL         120       140       10       56       140       8X16 GRAVEL         120       140       10       56       140       8X16 GRAVEL         120       10       10       10       10       10       10         120       10       10       10       10       10       10       10         120       10	FL IO FL	(Inches)	P	E S		GRADE		OR WALL	t,		Et 1	n 5ł			FILL	
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ATTACHMENTS (∠)       CERTIFICATION STATEMENT         Geologic Log       I, the undersigned, catify that this report is complete and accurate to the best of my knowledge and belief.         Med Construction Diagram       I, the undersigned, catify that this report is complete and accurate to the best of my knowledge and belief.         Med Construction Diagram       I, the undersigned, catify that this report is complete and accurate to the best of my knowledge and belief.         MAME_CALWATED-Split LWG CO_INC       Inc.         Geophysical Log(s)       II. the undersigned, catify that this report is complete and accurate to the best of my knowledge and belief.         ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.       Signed         Well D       Object D         MELL D       DATE SIGNED         C.57 LICENSE NUMBER       C.57 LICENSE NUMBER			- ×-			1	1				1	,				
Geologic Log       1, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.         Well Construction Diagram	120 140	1000	╉┯╍┠╴	¥	+	PLASIC	6"	SDR2	26	.043	56	140	<u>}</u>			8X16 GRAVEL
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Geologic Log       1, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.         Well Construction Diagram	· · · · · · · · · · · · · · · · · · ·															
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CHORNAL         WATER WELL DATIONS         Device Within the measure of the second seco		5/9-	17	LOCATION, SUI, Chionau
REGRONAL WATER FOLLOTION       STATE OF CALIFORNIA       Yes Will No	Sile Addiest Auglicate and Intellecte with the			
STATE OF CALLPONING       One with the		(Sections 7076, 707	7, 1078, Water Code)	
(1) OWNER:         Name         Addersi         (2) OWNER:         Name         Addersi         (3) OUCATION OF WELL:         (2) LOCATION OF WELL:         (3) TYPE OF WORK (check):         norm stands 2 name status is if norm         b.8 in a transfer         mark B.M. View, school and access the court rest is if norm         b.7 in a transfer         (3) TYPE OF WORK (check):         (3) TYPE OF WORK (check):         (4) RONGED US2 (check):         (5) TYPE OF WORK (check):         (6) CASING INSTALLED:         (7) PROFIL         (7) PROFIL         (7) PROFIL         (7) PROFIL         (7) PROFIL         (7) PORTALIED:         (7) PROFIL         (8) CASING INSTALLED:         (9) WATER LEVELS         (10) ONSTRUCTIONS:         Trad dred states wolf and         From       (1) TYPE OF NORTALLED:         (10) ONSTRUCTIONS:         Trad dred states wolf and         Trad dred states wolf and <td></td> <td>STATE OF C</td> <td>CALIFORNIA</td> <td></td>		STATE OF C	CALIFORNIA	
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(2) LOCATION OF WELL:         Lease Shari[lang       Own*nested: Hay-         A: D a stories       Out and the store in the s	Address		1 í í í í í í í í í í í í í í í í í í í	
(2) LOCATION OF WELL:       12       14       14         Convert Standardian Elama       Overtionable (flags)       33       35       so off Clay         A A nation Mathematic Marging       Sandad       33       35       so off Clay         - pank Mit Fish and hool. and accoss the anal.       35       54       sand         - to the faired during of Clay				hard pan
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A. A. a function         para H. H. View school and across the canal         jost the farst durit read the turn right.         (3) TYPE OF WORK (cleark):         (3) TYPE OF WORK (cleark):         (4) Depending C Recoditioning (Asodet)         (5) CASING TISTALLED:         (6) CASING INSTALLED:         (7) PREOFORATIONS:         Type of induction and product (Asodet)         (7) PREOFORATIONS:         Type of induction of graded)         (7) PREOFORATIONS:         Type of induction of graded)         (7) PREOFORATIONS:         Type of induction of graded)         (6) CASING INSTALLED:         (7) PREOFORATIONS:         Type of induct side planed         (7) PREOFORATIONS:         Type of induct side planed         (7) WATER LEVELS:         (6) CASING INSTALLED:         (7) PREOFORATIONS:         Type of induct side planed (Transmithed)         (6) CONSTRUCTION:         Type of induct side planed (Transmithed)         (7) PREOFORATIONS:         Type of induct side planed (Transmithed)         (6) CONSTRUCTION:         Type of induct side planed (Transmithed)         (7) WATER LEVELS:         (7) WATER LEVELS:         (7) WATER LEVELS:		sny	22	······································
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10 the farst durit read fine turn Fights       68       80       olds and cold clay         (3) TYPE OF WORK (check):       105       107       Hard packed dand         (4) ROPCED USE (check):       106       107       Hard packed dand         (4) PROPCED USE (check):       112       Drawn med. sand         (4) PROPCED USE (check):       Reserve in the H.         (5) CASING INSTALLED:       If gravel packed         (check):       If gravel packed         (7) PREFORATIONS:       Trage and model of the reserve in the H.         (8) CONSTRUCTION:       Nor the reserve in the H.         (9) WATER LEVELS:       Discuss days of any the reserve in the H.         (6) CONSTRUCTION:       Nor the reserve in the H.         Wethod of Seeling       Nor the reserve in the H.         (10) WATER LEVELS:       Discuss days of any the reserve in the H.         (10) WELL TESTS:       The and was referred and the reserve in the head the reserve in the H.         (10) WELL TESTS:       NAME Oldoor Flambing and Moll Delling         (10) WELL TESTS:       Name Hand Hander of the flamed the refered in the flambor in the the flambor in the flambor i	past Mt View school and ac	ross the canal		
60       106       sand         (3) TYPE OF WORK (check):       Nor well [2], Durpting []       New well []       New well []       New well []       New well []       New well []       New well []       New well []       New well []       New well []       New well []       New well []       New well []       New well []	to the first durt road the	turn right.		clay and soft clay
(3) TYPE OF WORK ( <i>check</i> ): Now well [] Dependent of Reconditioning [] Abanden [] Headdanneard, <i>facrick matching and procedure in item 11.</i> (4) FROPOSED USE ( <i>check</i> ): [] (5) EQUIPMENT: [] 122 122 50ft 0.lay [] 125 126 50ft 0.lay [] 125 126 50ft 0.lay [] 126 126 127 127 127 127 127 127 127 127 127 127		······································		sand brown
New well Ck       Despender of liter 11.         If demaforment, deterthe material and procedure in liter 11.         If demaforment, deterthe material and procedure in liter 11.         If demaforment, deterthe material and procedure in liter 11.         Domestic (C)       Industrial (C)         Intrigation (C)       Celeber (C)         Cost (C)       Cost (C)         Domestic (C)       Cost (C)         Domes	La Construction and Alexander Latarts			
Interesting   Interesting </td <td></td> <td>tinning [] Ahandan []</td> <td></td> <td></td>		tinning [] Ahandan []		
(4) PROPOSED USE (clock):       (5) EQUIPMENT:         Domestic §] Industrial [] Municipal []       Retary         Cable       Dig Well         Irrigation [] Test Well [] Other       If gravel packed         Schole [] DoBEE []       Cable         If gravel packed       If gravel packed         If gravel packed	the second second second second second second second second second second second second second second second se		- <u>++5 ++7 -</u> -	
(r) PROFORD (1) Municipal       Retary         Irrigation       Test Well       Other         (f) CASING INSTALLED:       If gravel packed         (f) Particle inter diverse inter dinter diverse inter dinter diverse inter dinter		(5) EQUIPMENT:		
Irrigation     Text Well     Other     Cable       Construction     If gravel packed       Binori     from       Since I     Since I       Since I     Since I </td <td></td> <td></td> <td>122 " 126 "</td> <td></td>			122 " 126 "	
(6) CASING INSTALLED:       If gravel packed         instatu:       is gravel packed </td <td></td> <td>The Cable L</td> <td>126 " 130 "</td> <td>sand</td>		The Cable L	126 " 130 "	sand
SINGLE DOUDLE Construct of the first of the		J Dug Well	··· · · · · · · · · · · · · · · · · ·	
SINGLE DOUBLE C Gue Level from the from the from the from the former from the	(6) CASING INSTALLED:	If gravel packed	·• • • •	*******
From       tr. s       70       tr. from       at law in       at law in         i       i       i       i       i       i       i         i       i       i       i       i       i       i         i       i       i       i       i       i       i         i       i       i       i       i       i       i         i       i       i       i       i       i       i         i       i       i       i       i       i       i       i         i <t< td=""><td>SINGLE DOUBLE GAL</td><td>Dismeter (com 10</td><td>۲۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰</td><td>······································</td></t<>	SINGLE DOUBLE GAL	Dismeter (com 10	۲۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰۰	······································
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a       a       a         y       a       a         y       a       a         y       a       a         y       a       a         y       a       a         y       a       a         y       a       a         y       a       a         y       a       a         (7)       PERFORATIONS:       a         Type of dire of hear overling       in, leveth, by       is         Size of performation       in, leveth, by       is         a       a       a         a       a       a         a       a       a         a       a       a         a       a       a         a       a       a         a       a       a         a       a       a         a       a       a         a       a       a         a       a       a         a       a       a         b       a       a         c       a       a         b       a       a<				
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Type of performance         (7) Describe follow         Size       of performance	is as all in the state	•• ••	** **	
Derivation part         (7) PERFORATIONS:         Tree of preforminant         in       in         in       in <tr< td=""><td>Type and size of thee or well ting</td><td>Size of gravels</td><td>······································</td><td></td></tr<>	Type and size of thee or well ting	Size of gravels	······································	
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Profin       fr.       profin	Size of perforsions in., le	in, in,	n n	
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With a number of all provided?       Yrr       No       To what depth       fr.         Were any strate relid against pollution?       Yrr       No       If yere, nore depth of strates         From       ft.       ft.       """"""""""""""""""""""""""""""""""""				CEOST A
Were say stress resided against pollution?       Yro       No       H (yet, note depth of stress         From       fr.       fr.       fr.         Method of Scaling       fr.       fr.         Method of Scaling       fr.       fr.         (9) WATER LEVELS:       fr.       fr.         Depth st which water was first found       21 ft.       fr.         Standing herel before performing       fr.       fr.         Standing herel before performing       fr.       fr.         (10) WELL TESTS:       fr.       fr.         Was a pump test mide?       fr.       fr.         Yield       gst./min. with       fr. draw down sfirr       hr.         Yield       gst./min. with       fr. draw down sfirr       hr.         Traperature of water       Was a chemical analysis medet       Yr.       No		Lee depth 6		
Were any strate field against politicion / [16] [16] [16] [16] [16] [16] [16] [16]				
Method of Scaling         (9) WATER LEVELS:         Depth at which water was first found       21 ft.         10:       10:         Standing herel before performing       10:         Standing herel before performing       10:         (10) WELL TESTS:       Was a pump test mide?         Yield       10:         Yield       10:         Yield       10:         Yield       10:         Yield       Was a chemical analysis mode?         Yield       Was a chemical analysis mode?         Yield       No         10:       10:         Yield       Yes a chemical analysis mode?         Yes       Yes         Yes       No	177		······································	
(9) WATER LEVELS:         Depth at which water was first found       21 ft.»         10:       Standing herel before performing         (a)       21 ft.»         11:       Standing herel before performing         (b)       WELL DRILLER'S STATEMENT:         Standing herel before performing       ft.         Standing herel before performing       ft.         (10) WELL TESTS:       (11)         Was a pump test midel       Yei         Yield       yel/min. with         ft. draw down stim       here.         (Signerel).       Well Drilling         (Signerel).       Well Drilling         (Signerel).       Well Drilling         (10) WELL TESTS:       (Signerel).         Was a pump test midel       Yei O No 11 fro. by whom?         Yield       yel/min. with         te description of the pullic state of the pulli			21 27	
(9) WATER LEVELS:         Depth st which water was first found       21 ft •         ft       ft         Standing herel before performing       ft         Standing herel before performing       ft         (10) WELL TESTS:       This well was diffed under my jurisdiction and this report is true to the hest of my knowledge and belief.         Was + pump test mide?       Yes         Yield       gal./min. with         ft. data down after       hr.         Yield       Was + chemical smithylis mode?         Tampersture of where       Was + chemical smithylis mode?         Yes       Yes         Was + pump test mide?       Yes         Yes       Yes	Method of Scaling		Work storied AUG . 31	19 . Completed Aug. 9 1227
Weise pump test midel       21 ft.       10         This test which water was first found       21 ft.       10         Standing level before performing       10         Standing level before performing       10         (10) WELL TESTS:       1015 No. 99 highway         Wise pump test midel       Yee         Yield       xal./min. with         10. Jane test midel       Yee         Was echemical souly is madel       Yee         Yee and the deforming       106         Wise pump test midel       Yee         Yee and the deforming       1005 No. 99 highway         'Tybed or protect)       'Tybed or protect)         (Signere)       Will pump test midel         Yee and the midel and the deforming       'Tybed or protect)         Yield       xal./min. with         Transpersture of water       Was echemical souly is madel         Yee       No         110637       Dated         110637       Dated         110       Yee         Yee       No		And a second second second second second second second second second second second second second second second		
Lipping formed before performing       fr.         Standing level before performing       fr.         Standing level before performing       fr.         Standing level before performing       fr.         Standing level before performing       fr.         Standing level before performing       fr.         Standing level before performing       fr.         Standing level before performing       fr.         (10) WELL TESTS:       fr.         Wise pump test midt       Yr.         Yriddi       gal./min. with         fr.       fr.         Viddi       gal./min. with         fr.       fr.         Viddi       gal./min. with         fr.       fr.         Signer       No         Signer       Yr.         No       fr.         Signer       fr. </td <td></td> <td>'+su</td> <td></td> <td>y jurisdiction and this report is true to the best of</td>		'+su		y jurisdiction and this report is true to the best of
Signaling level after performing       (i.         (10) WELL TESTS:       (i) 1015 No. 99 highway         Weise pump test midel [] Yei [] No 16 yei, by whom?         Yield	(9) WATER LEVELS:		Di - ma Di umbi	ing and Wall Drilling
(10) WELL TESTS:       Turlock, Calif.         West pump test mide?       Yes       No       If yes, by whom?         Yield       gal./min. with       ft. date down after       hr.         Tampersture of water       Was a chemical smilysis mode?       Yes       No         License No.       Dated       Sept. 23, 1962	(9) WATER LEVELS: Depth at which water was first found 21 f		NAME OTSOULTIONOR	
(10) WELL AESAS:         Was a pump test midel [] Yei [] No If Jei, by whom?         Yield i       xil./min. with ft. driw down after br.         Tremperature of water       Was a chemical solity is mide? [] Yei [] No         License No.       110637         Dated       Sept. 23, 1962	(9) WATER LEVELS: Depth st which water was first found 21 f Scending level before perfueating	[t.	TOTE No. OC	
Yield:     git./min. *ith     It. draw down after     brr.       Temperature of water     Was a chemical analysis model     Yre     No	(9) WATER LEVELS: Depth st which water was first found 21 f Scandung level before performing Standung level after performing	[t.	Address 1015 No. 99	9 highway
Happerkups of water and a mail and a	(9) WATER LEVELS: Depth st which water was first found 21 f Scinding level before performing Standing level after performing (10) WELL TESTS:	[t.	Address 1015 No. 99	9 highway
Transition and the second se	(9) WATER LEVELS:         Depth st which water was first found       21 f         Standung level before performing         (10) WELL TESTS:         Was a pump test midt?       Yes         Yes       No 1( yes, by whom?)	ít. (t.	Address 1015 No. 99 Turlock, Ca	) highway alif.
	(9) WATER LEVELS:         Depth st which water was first found       21 f         Standing level before perforating         (10) WELL TESTS:         Was a pump test midel       Yes         Yield       gal./min. with	fr. (r. fr. dasw down sfire hre.	Address 1015 No. 99 Turlock, Ce [SIGNED]., 110637	V <sup>nil Driller</sup> Sept. 23, 1962

## **05S9E Section 17**

LINC005

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onioning ====	STATE OF C THE RESOUR	ALL PORT ALL	Do not fill in
file with DWR	DEPARTMENT OF W		No. 33803
SF-11	WATER WELL DI	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
Notion of Intent No	Impr. Dist. 128	The second second second second second second second second second second second second second second second s	Statio Well No. 5-0455-7
	- mp		
(1) 0		(12) WELL LOC:	Total depth_435_ft. Depth of completed well425ft.
Address.		from ft. 19 Romest	ca (Describe by color, character, size or material)
City			The salls
(2) LOCATION OF WELL (See i	instructions): When W 1509	<u>1- 19</u>	Gray clast Gaarse wind
004887,	wner's Well Number W 1209	20~ 29	Trempondy clay
Well address if different from above TownshipRange	Section SEA Sec 17		Coarse Cop
•		30	Oray clas
Distance from cities, roads, millroads, forces, etc. the intersection of W Main	and Crows Landing	33-49	atleky clay
ĸd,		49-51	Shirle sandy clay
	·	51-52	
	(3) TYPE OF WORK:	52,054	Soarse sand Brown clay
Fulkerth	Reconstruction	95-95	Costae sand
ر ۲ ۲		N 90-109	Mes X al av
	Horizontal Well	1909-104	
	Destruction (Describe destruction materials and procedures in Item 12	I ALL OF	ay Ray
· · · · · ·	CT procedures in Item 12	VI4-116	Source and
	E (4) PROPOSED USE	116-120-	Hare of Mclay
Well location X	E Domesnic	2 123-2000 2 123-2000 2 123-2000	
	industrial	AN 12008	Hard p m clay Concestering Franciskand Franciskand Hap day
	C Tost Well	TE EN	Loose sign
W. Main	5 Brook	()) 213 276 (Ca	THE CITY O
	Municipal	1712100	Course yand
WELL LOCATION SKETCH	Ordner O	Y and Y	Compare Fand w/layers of clay
(5) EQUIPMENT: (6) G	RATER PACK	12-12	Course gand
Rotary 🗆 Revense 🗟 💦 🖓 🗅			-Harcier
and the second s	ter of bors 2811	All and	And and w/ toyers clay
Other D Bucket D Car	A S. P. P. Contraction of the second s		
(7) CASING INSTALLED (8MP Steel Ex Plastic Contrats Type of	ERFORMENDING MOSS LOUVE		- Briter Bay
	all a thing	358-272	And gravel
From To Dia Cageor Fr	it and	373-34	Sender Clay
0 100 100 1/4 10	1500 1500 1491 3/32	303-395	Sand
150 255 25 1 25		301-1012	<u>Clay</u>
305 355 12 3/16 35		407-422	Internal pand sand
(9) TELL AND L: 11 11 4( Was appace support scale provided f Yos []	15 439 12 <sup>11</sup> No □ If yes, to depthft.	422-1035	Contraction and a second second second second second second second second second second second second second se
Were strata scaled against pollution? Yes	2 L		uurin oo oo oo oo oo oo oo oo oo oo oo oo oo
Method of sealar		Work stariad	1077 Completed 5416 1877
(10) WATER LEVELS:	که	WELL DARLER'S ST	
Depth of first wester, if known	ft. <u>1</u>	This well wer stilled wear knowledge	invisition and this report is true to the best of my
(11) WELL TESTS:	2007	SIGNER	Stational and a second s
Was well tost made? You T. No [] H	yes, by whom? <u>FFICO</u> siler O Air lift O	NAME E.E.Lubdar	ff to / Mysich of Lavne-Western
Depth to water at start of test_25_ft.	At end of testft	P.O. VOX 1	Stor or corporation) (Typed or printed)
Discharge 250Qual/min after 2 how	ura Water temperature		Zip_95659
	yes, by strict	Aslaar	
Was electric log made? Yes 👔 No 🗌 II	yes, attach copy to this report	License No. 159205	and a set of the set o

DWR 188 (REV. 7-78) IF ADDITIONAL SPACE IS NEEDED. USE NEXT CONSECUTIVELY NUMBERED FORM 43414-650 7-74 50H QUAD (DT 08P

Composite ( setty sate burning)

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						51	19-17	MS(001)
						$\sum_{n \in \mathbb{N}} I_n$		Do Not Fill In
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origin.				DEF	PARTME	NT OF V	VATER RESOURCES	Nº 98949
File wit	h dwr			WA	TER W	RILLERS REPORT	State Well No.	
				** ~&	~ ~~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	and had been all		Other Well No
(1) 0397	MCD.		······································				LUN TOTAL LOO	Catterster
(1) O₩	NEK:						(11) WELL LOG: "Co	· · · · · · · · · · · · · · · · · · ·
Name Address								. Death of completed well 60
Augress					an an chairpe a china an an		Formation: Describe by color, character,	
(2) 100	'A'EIG	N OF W	(KI.L.)				0-2	fr. 10 Sand
County S				)wner's number, i	if any		2.3	Clev
Township, Re			°58 .	R9E			3.7	Sand
				CrowsI		<u>; Rd</u>	7_15	Clay
				<u>t Main</u>	Ave	and the second second second second second second second second second second second second second second second	15-23	<u>Sand</u>
(3) IXE New Well [			, ,		Destant		23-52	Clay
				ditioning [] are in Item 11.	Destroyin	кЦ	60-80	<u>Sand</u> Clav & Shale
ACCOUNTS INCOMENTS IN A DESCRIPTION OF THE REAL PROPERTY OF THE REAT	******	D USE (	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	******	(S) EQUI	PMENT:	80-81	Sand
		lustrial 🗌			Rotary	X	81-90	Clav
Irrigation	Te	st Well 🗌	] 0	······ i	Cable		90-97	Sand
	10 10 10 10 10			r	Other	<u>, D</u>	97-113	Clay & Shale
· ·		NSTALL		TF	gravel pacl	rad		
STE			R	**	Braver baes			
<u>e</u>			i _					
From	'f o		Gage or	Diameter of	From	To		
fr.	<u>ft.</u>	Diam.	Wall	Bore	fr.	fr.		
0	60	<u>6-5/8</u>	10		30	60		
		<u> </u>	<u> </u>		I			۲//// ۱۰۰۰ - ۲۰۰۰ - ۲۰۰۰ - ۲۰۰۰ - ۲۰۰۰ - ۲۰۰۰ - ۲۰۰۰ - ۲۰۰۰ - ۲۰۰۰ - ۲۰۰۰ - ۲۰۰۰ - ۲۰۰۰ - ۲۰۰۰ - ۲۰۰۰ - ۲۰۰۰ - ۲
Size of shae or	well rise:		L	Size of gravel:	Dea	۱ »		
Describe jusat		welde	≥d			A		
(7) PER	FORA	TIONS O	OR SCF	EEN:				
Tyje af perfor	ation of AR	ime of screen		<u>_slot</u>			······································	
<b>r</b>			Perf.	Rows	,	<b></b>		
From fr.	1	To ft.	per row	per ft.	1	dize x in.		
52	6	0		1	1 /8	3 x 311		
27							·	
. 0								
****								
(8) CON	Jerpri	CTION:		1	<u>l</u>		*	
• •		al provided?	les 🔂 N	lo [] To	what depth	25 1.		****
		einst pollution)		No []		depth of strata		
From		to	<u>í</u> ft.					
From	ſt.		fs.					. Comeleted 19
Method of seel	ine Bo	ntonii	<u>.</u> e	<u> </u>			WELL DRILLER'S STATEMEN	T: jurisdiction and this report is true to the i
(9) WA			er k	N	<i>I</i> .		of my knowledge and belief.	jorrowichich won this report is true to the
		ese first found for the second		<i>š</i> ,	ír. fr.		NAME Henninge Ara	s. Drilling Co. Inc.
	(()<)	forating and d	*****	11			(Ferion, firm	S. Drilling Co. Inc.
(10) WE				**************************************			Address 2500 W. Ru	
Wes pump test			<u>X</u> 1	f fee, by whom?				lif. 95350 .
Yield:	<u>x</u>	al./min. wich		fc. drawdowi		bre.	[SIGNED]	(Well Decler)
Temperature o				al analysis madel		10 20	000010	(wall briller)
Fas electric lo	t made of	well?Yes 🗍	No 🕅	If yes, sto	iach cosy		License No. 290813	Dated6-2019_7

SKETCH LOCATION OF WELL ON REVERSE SIDE

800 A 100 
Page 14 11         No. 792/133         Control Page 14 1         Control Page 14 1           Owner's Wohn, DICKS BAR 1         No. 792/133         Control Page 14 1         Control Page 14 1 <th>ORIGINAL STATE OF CALIF File with DWR WELL COMPLETI</th> <th></th> <th></th>	ORIGINAL STATE OF CALIF File with DWR WELL COMPLETI							
Date Weak Began 3628/2002	Page 1 of 1 Refer to Instruction	Pamphies STATE WELL NO/ STATION	NO.					
Local Permit No. 07:21260         CEOLOGIC LONG         CEOLOGIC LONG         WELL OWNER           Permit No. 07:21260         CEOLOGIC LONG         Permit No. 07:21260         WELL OWNER           Destination No. 07:21260         CEOLOGIC LONG         Permit No. 07:21260         WELL OWNER           Destination No. 07:21260         Discrete Internation (Control of the Control of th	Owner's Well No. DICKS BAR 1 No. 792	133						
Permit No. 12-1266         Centrol Date #132002         APPEndixed           CBEHTATION (Z.)	Date Work Began <u>8/28/2002</u> , Ended <u>8/29/2002</u>	LATITUDE LONG	TUDE					
Premin No. Standards         GEOLOGIC Log         Premin Date & Disclock         WELLOWNER           ORBINATION (2)         Standards         ORBINATION (2)         Standards         Disclock         MCS         COSS           Standards         Disclock         Disclock         Disclock         MCS         COSS           Standards         Disclock         Disclock         Disclock         MCS         COSS           Standards         Disclock         Disclock         Disclock         Disclock         Disclock           Disclo	Local Permit Agency STANISLAUS CTY DER		<u>ll</u>					
ORGENTATION (2)         CASTRAL	Permit No. 02-1266 Permit Date 8/13/2002							
Base /rel         Description matrix/gran, size, color, sto.         1           B         Description matrix/gran, size, color, sto.         1           15         30 (LAV & GAND STREAKS         Address 9907, CROWSLANDING CA 55313           30         54         55 (SAND           25         30 (LAV SOME BLUE         CompStantialguas           300         54         55 (SAND           301         55 (SAND         Par.ed           303         54         55 (SAND           304         75 (SAND         Par.ed           305         1000 (SAND         Par.ed           1000         115 (CLAY         Par.ed           1001         115 (CLAY         Par.ed           1001         115 (CLAY         Par.ed           1001         125 (SAND, Note Bulle         Par.ed           172         175 (CLAY         Par.ed           172         175 (CLAY ELUE         Par.ed           176         CLAY ELUE         Par.ed								
Base // Description matrixity groups, size, color, etc.         i           B         Description matrixity groups, size, color, etc.         i           B         Description matrixity groups, size, color, etc.         i           Cluy GROWSLANDING CA \$5313         Cluy GROWSLANDING CA \$5313           30         54         555         Sol CLAY           Township         Parge         Parced           15         300 SAND         Cluy GROWSLANDING CA \$5313           1000 1115         CLAY         Township         Parge           1000 1115         CLAY         Township         Parge           1001 115         CLAY         Cluy GROWSLANDING CA \$5313         Cluy GROWSLANDING CA \$5313           1001 115         CLAY         Township         Parge         Parced           1001 115         CLAY         Cluy GROWSLANDING CA \$501714         Cluy GROWSLANDING CA \$501714         Cluy GROWSLANDING CA \$501714           1001 115         CLAY         Cluy GROWSLANDING CA \$501714         Cluy GROWSLANDING CA \$501714         Cluy GROWSLANDING CA \$501714           1001 115         CLAY         Cluy GROWSLANDING CA \$501714         Cluy GROWSLANDING CA \$501714         Cluy GROWSLANDING CA \$501714           1001 115         CLAY         CLAY         Cluy GROWSLANDING CA \$501714	ORIENTATION (1) VERTICAL HORIZONTAL ANGLE (SPECIFY)	21	1 X OC					
P. B. B. Decription material grain, size color, etc.         1           15         30         56         10         Charly SS AND STREAKS         Address 9307 CRCWWSLANDING CA 99313           30         56         10         County Standalus         County Standalus         County Standalus           56         30         56         SAND         County Standalus         Decription Standalus           100         115         123         SAND         County Standalus         Decription Standalus           100         116         CLAY SOME BLUE         County Standalus         Decription Standalus         Decription Standalus           100         116         CLAY SUBJECT         Decription Standalus         Decript			000					
0:         15: CLAY & SAND STREAKS         Address 9907 CRONSLANDING CA 95313           30:         54: CLAY SOME BLUE         County Standing (A 95313)           54:         55:         95: CLAY           30:         54: CLAY SOME BLUE         County Standing (A 95313)           30:         56:         100: SAND         Parcel           30:         100: SAND         County Standing (A 95313)           30:         100: SAND         County Standing (A 95313)           30:         116:         123: SAND         County Standing (A 95313)           100:         115: CLAY         County Standing (A 95313)         County Standing (A 95313)           123: ISSND, FINE BLUE         County Standing (A 95313)         County Standing (A 95313)           130: ISSND, FINE BLUE         County Standing (A 95313)         County Standing (A 95313)           130: ISSND, FINE BLUE         County Standing (A 95313)         County Standing (A 95313)           130: ISSND, FINE BLUE         County Standing (A 95313)         County Standing (A 95313)           130: ISSND, FINE BLUE         County Standing (A 95313)         County Standing (A 95313)           130: ISSND, FINE BLUE         County Standing (A 95313)         County Standing (A 95313)           130: ISSND, FINE BLUE         County Standing (A 95313)         Co								
15         30         SAND         City CROWSLANDING CA 95313           54         56         SAND         Comy Standaus         APN Book         Page         Parcel           55         95         100         SAND         APN Book         Page         Parcel         Comy Standaus           100         115         CLAY         Comy Standaus         APN Book         Page         Parcel         Comy Standaus         APN Book         Page         Parcel         Comy Standaus         Comy Standaus         APN Book         Page         Parcel         Comy Standaus		Address 9907 CROWSI ANDING RD 110N						
30:         54:         CLAY SOME BLUE         Commy Stantisture	15: 30 SAND	City CROWSLANDING CA 95313						
64         65         58         58         70         APN Book         Page         Parcel           95         100         54         55         58         70         Range         Section           100         115         CLAY         Latitude         Section         Bec         Dec / Min         Section           115         123         130         CLAY         LocATION SKETCH         MORTH         Constraints         Section	30 54 CLAY SOME BLUE							
301         351: CLAY         Township								
39:         100::SAND         Latitude         Sec.         De6.         Max.         Sec.           115:         123::SAND         LOCATION SKETCH         ACCIVITY (2)		Township Range Section						
1115       123       SAND       ACTIVITY (C)         123       130       CLAY         130       135       SAND         130       135       SAND         130       135       SAND         130       135       SAND         130       136       SAND         130       135       SAND         130       135       SAND         130       135       SAND         130       136       SAND         131       SAND       SAND         131       SAND       SAND         132       SAND       SAND         133       SAND       SAND         130       SAND       SAND         131       SAND       SAND         132       SAND       SAND         133       SAND       SAND         133       SAND       SAND         131       SAND       SAND         132       SAND       SAND         133       SAND       SAND         133       SAND       SAND         133       SAND       SAND         133       SAND       SAND <td></td> <td>Latitude</td> <td>,</td>		Latitude	,					
113         123         130         CA.RY         MORTH         AVEX.W. WELL           130         135         SAND         File         MORTH         MORTH         MORTH           130         135         SAND         File         MORTH         MORTH         MORTH           135         136         CLAY         ELUE         MORTH         MORTH         MORTH           135         SAND         FINE ELUE         MORTH         MORTH         MORTH         MORTH           135         SAND         FINE ELUE         MORTH								
136         136         SAND           135         180         CLAY         Depart           136         172         SAND, FINE BLUE								
135         160. [CLAY           160. [CLAY		MODIFICA	TION/REPAIR					
160         172         SAND, FINE BLUE								
172:       175 CLAY BLUE			Contar (opecaty)					
Image: Source of the source of the		<u>DES1</u>	ROY (Describe					
Image: State of the state		Unde	r "GEOLOGIC LOG"					
Domasic								
Montrorms     Test well       Image: solution of the product of			istic 🔍 Public					
Image: Source of the state		S S International S S S S S S S S S S S S S S S S S S S	Jon Industrial					
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SUIT:     SUIT:     SUIT:     NUECTON       BURGE     SUIT:     SUIT:     SUIT:     SUIT:       BURGE     SPARGING     Research     SPARGING       BURGE     Fester, River, etc. ad stand of With Unaddread input of the second of With Unaddread input of the second of the Unaddread input of the second of the Unaddread input of the second of the Unaddread input of the second of the Unaddread input of the second of the Unaddread input of the second of the Unaddread input of the second of the Unaddread input of the second of the Unaddread input of the second of the Unaddread input of the second of the Unaddread input of the second of the Unaddread input of the second of the Unaddread input of the second of the Unaddread input of the Second of the Unaddread input of the Second of the Unaddread input of the Second of the Unaddread input of the Second of the Unaddread input of the Second of the Unaddread input of the Second of the Unaddread input of the Second of the Unaddread input of the Second of the Unaddread input of the Second of the Unaddread input of the Second of the Unaddread input of the Second of the Unaddread input of the Second of the Unaddread input of the Second of the Unaddread input of the Second of the Unaddread input of the Second of the Second of the Unaddread input of the Second of the Unaddread input of the Second of the Seco		·						
SOUTH     SOUTH     SOUTH     SPARGING       Illustrate or Decrite Disease of Well from Roads, Buildings, Pesces, Rivers, ELASE BE ACCURATE & COMPLETE:     SPARGING       WATER LEVEL & YIELD OF COMPLETED WELL     DEFTH FOR STARCE     OTHER (SPECIFY)       UNITER LEVEL & YIELD OF COMPLETED WELL     DEFTH FOR STARCE     DEFTH FOR STARCE       UNITER LEVEL & YIELD OF COMPLETED WELL     DEFTH FOR STARCE     DEFTH FOR STARCE       UNITER LEVEL & YIELD OF COMPLETED WELL     DEFTH FOR STARCE     DEFTH FOR STARCE       UNITER LEVEL & YIELD OF COMPLETED WELL     DEFTH FOR STARCE     DEFTH FOR STARCE       UNITER LEVEL & THE     (FL) & DATE MEASURED     8/29/2002       TOTAL DEPTH OF BORING 175     (Feet)     May not be representive of a well's long-term yield.       TOTAL DEPTH OF COMPLETED WELL 136     (Feet)     May not be representive of a well's long-term yield.       FROM SURFACE     HOLE     Internal     GRADE       UDI 116     11     PLASTIC     SDR 26     058       01     116     11     PLASTIC     SDR 26     058       01     116     11     PLASTIC     SDR 26     058       01     116     11     PLASTIC     SDR 26     058       01     100     VEL     Internal     Internal       01     116     11     PLASTIC <t< td=""><td></td><td></td><td>IRECT PUSH</td></t<>			IRECT PUSH					
South     South     Sparking       Hubbrate or Decrife Distance if Relife     South     Relevantion       Preces, River, etc. and stack is supp. Use disident payer if ances, Buildings, Distances, and stack is supp.     Other (SPECIPY)       Other (SPECIPY)     Other (SPECIPY)     Other (SPECIPY)       Derth OF STATIC     WATTER LEVEL & YIELD OF COMPLETED WELL       Derth OF STATIC     WATTER LEVEL & YIELD OF COMPLETED WELL       Derth OF STATIC     WATTER LEVEL & YIELD OF COMPLETED WELL       DEPTH OF BORING. 175     (Feel)       TOTAL DEPTH OF COMPLETED WELL136     (Feel)       TOTAL DEPTH OF COMPLETED WELL136     (Feel)       TOTAL DEPTH OF COMPLETED WELL136     (Feel)       DEPTH OF COMPLETED WELL136     (Feel)       TYPE     (CASING (S)       TYPE (1)     Matterial       Matterial     Internal       Matterial     Internal       GRADE     Matterial       OI 116     11       Matterial     Internal       Grade     SDR 26       OI     100       ATTACHENERTS     (2)       Construction Degran     (Inches)       South and the this report is complete and accurate to the best of not nonvokedge and belief.       ATTACHENERT Construction Degran       Georgen Logi       Grade       Matterin	· · · · · · · · · · · · · · · · · · ·							
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DEPTH TO FIRST WATER-20								
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WATER LEVEL 18 (FL) & DATE MEASURED 8/29/2002         TOTAL DEPTH OF BORING 175 (Feet)         TOTAL DEPTH OF COMPLETED WELL 136 (Feet)         TOTAL DEPTH OF COMPLETED WELL 136 (Feet)         DEPTH FROM SURFACE         OEPTH FROM SURFACE         OEPTH FROM SURFACE         OEPTH FROM SURFACE         DEPTH DIA.       TYPE (X) State State S								
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TOTAL DEPTH OF COMPLETED WELL 36 (Feet)       May not be representative of a well's long-term yield.         DEPTH FROM SURFACE       BORE - HOLE DIA, (inches)       CASING (S) TYPE (2) BARETER DIAMETER BOARETER DIAMETER DIAMETER DIAMETER OR WALL SEADE       DEPTH OR WALL IF ANY (inches)       DEPTH FROM SURFACE       ANNULAR MATERIAL TYPE         0: 116       11       /       PLASTIC       6       SDR 26       0       100       /       /         116:       136       11       /       PLASTIC       6       SDR 26       058       100       136       8X16         ATTACEMENTS       (Z)       /       /       PLASTIC       6       SDR 26       058       100       136       8X16		. ,						
FROM SURFACE     BURE- HOLE     TYPE (2)       DIA. (inches)     TYPE (2)       VIET     VIET       FL. to     FL. (inches)       0:     116       116     111       VIET     PLASTIC       6     SDR 26       0:     116       111     VIET       PLASTIC     6       SDR 26     0       116     111       VIET     PLASTIC       6     SDR 26       0:     100       116     11       VIET     PLASTIC       6     SDR 26       0:     100       116     11       VIET     PLASTIC       6     SDR 26       0:     100       116     136       117     PLASTIC       6     SDR 26       0:     100       116     136       117     PLASTIC       6     SDR 26       0:     100       136     8X16       100     136       100     136       100     136       100     136       100     136       100     136       100     136<	TOTAL DEPTH OF COMPLETED WELL <u>136</u> (Feet)							
FROM SURFACE       BURE- HOLE       TYPE (2)         Image: Discrete the discrete term of the undersigned, certify that this report is complete and accurate to the best of my knowledge and better.       FROM SURFACE       TYPE         Image: Discrete term of the undersigned, certify that this report is complete and accurate to the best of my knowledge and better.       Image: Discrete term of the undersigned, certify that this report is complete and accurate to the best of my knowledge and better.         ATTACEMEENTS       (2)         Other       Attract AdDition AL INFORMATION, IF IT EXISTS.	CASING (S)							
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116       136       11       ✓       PLASTIC       6       SDR 26       .058       100       1.36       8X.16								
ATTACHMENTS (∠)       CERTIFICATION STATEMENT         Geologic Log       It the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.         MAME_CALWATER DRILLING CO., INC.       PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)         300 S. Kiltoy, Rd.       Turlock       CA         ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.       Signed       CITY			·····					
Geologic Log     Well Construction Diagram     Geophysical Log(s)     SolWater Chemical Analysis     Other     ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.     If the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.     NAME_CALWATER DRILLING CO., INC.     (PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)     30D S. Kilroy Rd.     Turlock     CA. 95380     CITY STATE ZIP     11/03/02 434218     Generation     Signed     Corr License Number			<u>, 10</u>					
Geologic Log     Well Construction Diagram     Geophysical Log(s)     SolWater Chemical Analysis     Other     ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.     If the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.     NAME_CALWATER DRILLING CO., INC.     (PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)     30D S. Kilroy Rd.     Turlock     CA. 95380     CITY STATE ZIP     11/03/02 434218     Generation     Signed     Corr License Number								
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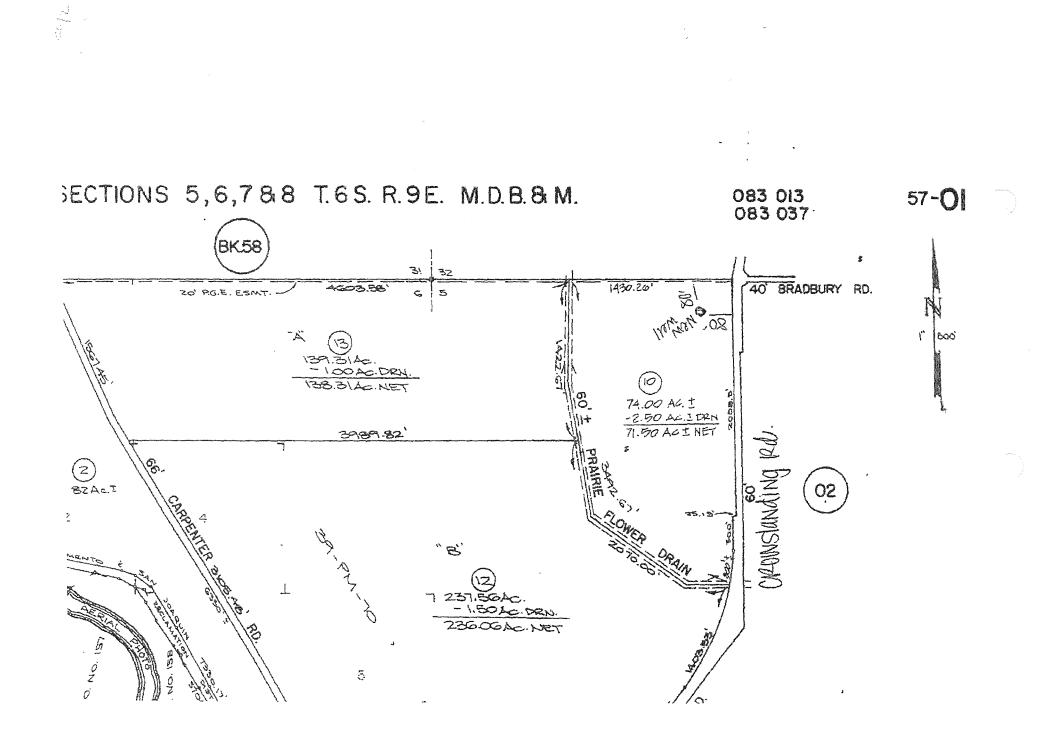
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-	ATTACH ADDITIONAL INFORMATION. IF IT EXIS	76	Signed		. , ,		_04/19/12
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IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

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						Hustrate or Describe   Fences, Rivers, etc. and	Distance of Well from Roads, 1 sttach & map. Use addition 1E ACCURATE & COM	<i>Buildings</i> , tal paper i	r	¢	THER (SPECIFY)
}									\$		
5 } ;							R LEVEL & YIELD				WELL
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						DEPTH OF STATIC WATER LEVEL 20	) (FL) & DATI	E MEASUI	RED	5/22/	2015
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OM SURFACE	BORE - HOLE DIA.	TYPE (V)		INTERNAL	GAUGE	SLOT SIZE	FROM SURFACE			ΤY	25
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IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM



	5/9-1751 (GS) DRAINAGE WELL NO. 60.
	LOWITLAR NO.4 J FFSOUTH DUSCH MUSDEL-1, ESCOT Sec 17-3-9) N NUMBER 100 59 NUSCOB
*	MAP <u>Senter 1*- 300</u>
	PROFILE  PROFILE  Conv Dunk With Trand Sol  SERGI RANCH  VI'd 20  Clay 6
×@	DERGI MANCH. LOCATION Sec. 17-5-9. In MEVA of SEVA
	DRILLED BY: T.I.D. 130' deep 100 DATE: Dec 1925. 500d
The second second second second second second second second second second second second second second second s	No pipe line. REMARKS: New well drilled by IILD 12'SWot old well 100 100 100 100 100 100 100 100 100 1
e	71 of 15° Met. Cosing     800       Tester will our pupping     100 mg       1251     33       1251     33       146     32.4       100     100       1251     33       146     32.4       100     100       100     100       100     100       100     100       100     100       100     100       100     100       100     100
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ORIGINAL

### File with DWR

#### STATE OF CALIFORNIA THE RESOURCES AGENCY DEPARTMENT OF WATER RESOURCES WATER WELL DRILLERS REPORT

Do not fill in No. 153752 State Well No.

1

Local Permit No. or Data 84-259

(1) OWNER: Name	(12) WELL LOG: Total depth 135 ft Depth of completed well 135ft.
Addross	from ft. to ft. Formation (Describe by color, character, size or material)
City	0 -2 Sandy Soil
(2) LOCATION OF WELL (See instructions).	2 - 5 Hard Pan
(2) LOCATION OF WELL (See instructions): CountyStanislausOwner's Well Number	5 - 15 Clay
Well address if different from above	15 - 19 Sand
TownshipRangeSection	19 - 20 Clay
Distance from cities, roads, railroads, fences, etc. 1/2 Mi. South of	20 - 25 Sans
Fulkerth Rd.	25 - 45 Clan
west side	45 - 53 (Sand )
	53 -65 GLAV
(3) TYPE OF WORK:	65 278 Savd
New Well 💢 Deepening 🗆	78 15 Clay & Shale
Reconstruction	115 - No Sand 🚫
Reconditioning	128 - 135 Shale
Horizontal Well	<u>612 - 141</u>
Destruction [] (Describe destruction materials and procedures in item 12	112-110 0
	Roll Roll
(4) PROPOSED USE	(GAR AHA
Domestic	
Irrigation	A Dia
Industrial D	
Ter Well	$\mathcal{W} = \mathcal{O}$
Stock	N - C N
Municipal)	
WELL LOCATION SKETCH	<u>~-2)</u> ~
(5) EQUIPMENT: (6) GRAVED PACK: SER (3)	
Rotary Reverse D Real No Size Shavel	
Cable Air Difference 13th	all'
Other D Bucket D Packed from 505 dw 135-	- INCONFILM
(7) CASING INSTALLED: (8) PERFORATIONS:	
Sizel Plastic [] Cobergo ( Type of personners or size of screen	
from To Dia. Gapa or From To Show	- HUN
0 135 8 160 115 135 Screen	
(9) WELL SEAL: Was surface sanitary seal provided? Yes X No [] If yes, to depth 50 ft.	
Were strate sealed against pollution? Yes No I Intervalft.	
Method of scaling	Work started DAC 14 19 84 Completed 19
(10) WATER LEVELS:	WELL DRILLER'S STATEMENT:
Depth of first water, if knownft.	This well was drilled under my jurisdiction and this report in frue to the best of my knowledge and ballet
Standing level after well completion16_ft.	
(11) WELL TESTS: Was well test made? Yes [] NoW If yes, by whom?	(Well Drillor)
Was well test made?     Yes []     No X     If yes, by whom?       Type of test     Pump []     Bailer []     Air lift []	NAME HENNINGS BROWGDRILLING CO. INC.
Depth to water at start of testft. At end of testft	(Person, firm, or corporation)' (Typed in actued)
Dischargegal/min afterhours Water temperature	
Chemical analysis made? Yes [] No [X If yes, by whom?	CityMODESTQCA-FH () () 199295356
Was electric log made? Yes 🗌 No 💢 If yes, attach copy to this report	License No. 2908 2 17 Dete of this report DEC. 19, 1984
NUM TO THE AND THE ADDRESS OF A STREND LADE A	EVT CONCECUTIVE STILLEDED FORM

DWR 188 (REV. 7-76) IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

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ORIGINAL	STATE OF C	ALIFORNIA		Do not fill in
Fil		CES AGENCY	NL	-
1		VATER RESOURCES	INO.	164313
06 065	WATER WELL D	RILLERS REPORT	State Well No	5/9-17
Local Permit No. of Date 00-205			Other Well No	<u> </u>
(1) OWNER: Nama		(12) WELL LOG: To		4 Ú A
Addross		from ft. to ft. Formation	tal depthi / U_ft. Depth of (Describe by color, characte	completed well <u>164</u> ft.
City			iy Soil	, size of material)
(2) LOCATION OF WELL (See instruc	tions):		<u>í Pan</u>	
County Stanislaus Owner's	Well Number	4 - 18 Clay		g <sup>1221</sup> 01-1
Well address if different from above		<u> 18 - 25 Sanc</u> 25 - 53 Clay		22au-auto-order-ord
TownshipRange Distance from cities, roads, railroads, fences, etc/4		53 - 57 Sand		
<u>Crows Landing Rd.</u>	MI, NOIC OF	57 - 110 Clay		
	south side	110 - 120 Fine		an an an an an an an an an an an an an a
	g	120 - 135 Quay	1	
	(3) TYPE OF WORK:	135 2144 Fibe		
	New Well Deepening	144 170 Clay	<u> </u>	
	Reconstruction		⇒ <sup>™</sup>	979998-A
	Horizontal Well	10 - 167	হ্য 🔨	9 <b>999 </b>
	Destruction [] (Describe destruction materials and procedures in Item 18	112-10		
,	procedures in Item 14	<u> </u>	RAVI	nanna a' nanna an an an
	(4) PROPOSED DEEX	all 5 m	AW	
	Domestic Irrigation			080000.4.0.0.00000000000000000000000000
	Irrigation Industrial	05.5	43	
	Teat Well		<u> </u>	
	Stock	D- Alla	>	and an an an an an an an an an an an an an
$\square$	Municipal A	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		
WELL LOCATION SEETCH	Other	<u> </u>		2000
(5) EQUIPMENT; (6) GRAVER Rotary D Revence A No				
Rotary 1 Revenue I Yea No Cable I Air I American of boo				
Other D Bucket D Packed from_	35 3 124 0	<u> </u>		**************************************
(7) CASING INSTALLED (8) PERPOR	110mg	<u></u>		<b>,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,</b>
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(9) WELL SEAL:	110	**	*****	
	If yes, to depth35_ft.			
	🗋 Intervalft.	Work started OCC. 9 1	- 86	
Method of realing <u>Bentonite</u> (10) WATER LEVELS:		Work started UCL: 9 1 WELL DRILLER'S STAT	<u>880</u> Completed EMENT:	19
Dopth of first water, if known		This well was drilled under my knowledge and helief		true to the best of my
Standing level after well completion(11) WELL TESTS:	<u> </u>	knowledge and helled SIGNED		
Was well test made? Yes 🗆 No 🗶 If yes, by	whom?		(Well Drillor)	
Type of test Pump D Bailer Depth to water at start of testft.	Air lift [] At end of testft		PROS. DRILLING	
Dischargegal/min afterhours	Water temperaturer		DALE AVE.	
Chemical analysis made? Yes D No X If yes, by		CityMODESTO, C	Α	71p 95356
Was electric log made? Yes D No X If yes, attu	sch copy to this report	License No. 290813	Date of this report(	<u>161, 22, 198</u> 6

DWR 188 (REV. 7.76) IF ADDITIONAL SPACE IS NEEDED. USE NEXT CONSECUTIVELY NUMBERED FORM

# 05S9E Section 18

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File with						WELL					₹T  2	23/6	<u>YE</u>	·/		
Page 1 of 1		05000	r				Refer to			-			SIALE		0.7 STA	TION NO.
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Permi	t No. 0	7-103	- CF	or	ocr	CLOG	it Date <u>5</u>	13072	2007				****	****************	0110	<u></u> 3
												- WELL (	OWNE	CR -		
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3		Clay		h						Address 1343	<u>vv. iviain s</u> ting CA	1.				
10		Sand								City Crowsland				······		
15		Clay								County Stanisla						
24		Sand								APN Book	Page_		Parce	:1		
30;		Clay								Township			Sectio	on		1
• 61		Sand								Latitude				-	DEG.	
63		Clay					~				CATION S	SKETCH				CTIVITY (2)
1021	****	Sand					······				NORTH	******	••••••		1_	NEW WELL
110	·····	Clay														FICATION/REPAIR
121!		Sand	•••••													Deepen Other (Specify)
130!		Clay													l	
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1				ta-034a												Under "GEOLOGIC LOG"
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i									{	Illustrate' or Describe . Fences, Rivers, etc. and	Distance of Well	fram Roads.	Bullding:	r, :e		REMEDIATION
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TOTAL DE						reet)				TEST LENGTH	(Hrs.) To	DTAL DRAV	VDOWN		(Fi.)	
TOTAL DE	PIHOF	COMPLE	TED	WE	:66	35 (Feel	:)		L	May not be repr	resentative c	f a well's l	ong-ter	rm yiel	<u>d.</u>	J
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	Well Con	struction D	lagram	١		NAME	MASELLIS	QRI	LLING				41			
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ATTACH ADD	NTIONAL IN	IFORMATIC	ON, IF	IT E	XISTS	Signed	VELL DRILLER	AUTH	HORIZED	REPRESENTATIVE			)6/19/( (TE SIGI			668622 C-57 LICENSE NUMBER
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DWR	188	REV.	11-97

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

5/9-	
OUGINAL WATER WELL D	RILLERS REPORT . Do Not Fill In
File Originst, Duplicale and Triplicale with the (Sections FOTE, 707); 707: REGIONAL WATER POLLUTION	Nº 41137
	CALIFORNIA State Well No.
CONTROL BOARD No. 5 STATE OF C	CALIFORNIA Other Well No. 55/25-17
(1) OWNER:	(11) WELL LOG:
Name	Tend douch 60 It. Dipic of exceptions well 60 It
Address	Formations Describe by color, observation, sist of material, and directions.
	<u>O www 4 w Top Soll</u> 4 " 8 " Hard Pan
	<u>9 16 Clav</u>
(2) LOCATION OF WELL:	<u>16 32 Sand</u>
County Stantolans Onour country if any-	<u>32 36 Clay</u>
Rear N. E. Corner of Sec. 17	<u>36 52 Sand</u>
T. 9 E., T. 5 S.	<u>52 60 Clay</u> 60 Sand
	<u> </u>
; 	
(3) TYPE OF WORK (check):	
New well I Deepening I Reconditioning I Alandan I	
If sbandonment, describe material and procedure in liem 13.	B C
(4) PROPOSED USE (cbeck): (5) EQUIPMENT:	
Domestic 🕅 Industrial 🗌 Municipal 🔲 Rotary	$\frac{1}{2} = \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}$
Irrigation Test Well O Other Dug Well	ан то таки таки таки таки таки таки таки таки
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Method of Scalling	Work Works 12/1/58 19 , Completed 12/2/68 13
	WELL DRILLER'S STATEMENT:
(9) WATER LEVELS:	This well was defilled under my jurisdiction and this seport is time to the best of
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#### State of California Well Completion Report Form DWR 188 Auto-Completed 11/5/2018 WCR2018-007565

MSCO18

Owner's '	Well Numi	ber			Date Work	Bega	n 01/17/20 <sup>-</sup>	18	Date Work Ended 01/31/2018
Local Pe	rmit Agend	cy Stanislaus County	Departn	nent of Envir	onmental Re	esour	ces		
Seconda	ry Permit /	Agency			Permit N	Vumb	er 16-268		Permit Date 10/28/2016
Well (	Owner	(must remain co	nfider	ntial purs	uant to	Wat	er Code 1	3752	Planned Use and Activity
Name	XXXXXX	****		******					Activity New Well
Mailing A	Adress	****	XXXXX						Planned Use Water Supply Irrigation -
		XXXXXXXXXXXXXXXXXX	XXXXX						Agriculture
City X	××××××	xxxxxxxxxxx			State	XX	Zip XX	XXX	
					Well	Lo	cation		
Address	1500 f	ulkerth							APN 022033005
City o	crows land	ling	Zip	95313	County	Sta	nislaus		Township 05 S
Latitude			N	Longitude	· ·		***	VV	Range 09 E
	Deg.	Min. Sec.		-	Deg.	Min.	Sec.		Section 18 Baseline Meridian Mount Diablo
Dec. Lat.	37.506	2654		Dec. Long.	-121.0142	309			Baseline Meridian Mount Diablo Ground Surface Elevation
Vertical [	Datum		Ho	rizontal Datu	m WGS8	4			Elevation Accuracy
Location	Accuracy		Location	Determinatio	on Method				Elevation Determination Method
		Borehole Info	ormati	on			Wa	ter L	evel and Yield of Completed Well
Orientatio	on Verti	cal		Speci	ifs <i>i</i>		Depth to firs		•
Drilling M	-		Drilling F	,			Depth to Sta	itic	
Draining in			unnigr		nec.		Water Level	-	10 (Feet) Date Measured 01/31/2018
Total Dep	oth of Bori	ng 200		Feet			Estimated Yi	ield*	500 (GPM) Test Type Air Lift
Total Dep	oth of Con	npleted Well 200		Feet			Test Length	roorer	2 (Hours) Total Drawdown (feet) entative of a well's long term yield.
						J [			
				Ge	eologic L	_og	- Free For	m	
Depth Surf Feet to	ace						Description	1	
0	60	fine sand						***	
60	120	fine/coarse sand and c	lay						
120	190	coarse sand							
190	200	blue clay							

					Casing	IS					
Casing #		m Surface o Feet	Casing Ty	oe Material	Casings Specificatons	Wal Thickn (inche	ess	Outside Diameter (inches)	Screen Type	Slot Size if any (inches)	Description
1	0	80	Blank	PVC	OD: 16.000 in.   SDR: 17   Thickness: 0.941 in.	0.94	\$1	16			
1	80	100	Screen	PVC	OD: 16.000 in.   SDR: 17   Thickness: 0.941 in.	0.94	£1	16	Milled Slots	0.05	
1	100	120	Blank	PVC	OD: 16.000 in. J SDR: 17   Thickness: 0.941 in.	0.94	41	16			
1	120	200	Screen	PVC	OD: 16.000 in.   SDR: 17   Thickness: 0.941 in.	0.94	\$1	16	Milled Slots	0.05	
					Annular Ma	aterial					
Sur	n from face to Feet	Fill		Fill <sup>-</sup>	Type Details		F	Filter Pack	Size		Description
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30	200	Filter P	ack Oth	er Gravel Pack			5/16	i		gravel	·
Other	Observ	ations:			90,0 <sup>90,0</sup> 10,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0						a da antina
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	E	Boreh	ole Specifications		Certification	Statement		
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0	200	25			Person, Firm or Corporation HADOW HILLS SOUTH EAST Address	TURNER City	OR State	97392 Zip
				Signed	electronic signature received C-57 Licensed Water Well Contractor	09/05/2018 Date Signed		17562 ense Number
					DWR Use	Only		

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ORIGINAL	×'* *	STATE OF CALL			E-ONLY	DO NOT FILL N
File with DWR	W1	ELL ·COMPLETI Refer to Instruction			AZICI	I/B III
Page 1 of 1 Owner's Well No	2	No. 815	~			
	06/12/02, Ende		1001			
Local Permit A	gency STANISLAUS COU	NTY DER				
Permit No. 02	2-136	Permit Date 06/10/02			APNARS	OTHER
[	GEOLOGIC LOG		T	WELL O	WNER -	
ORIENTATION (∠)	VERTICAL HORIZONT	AL ANGLE(SPECIFI		. 8	~	
1	DRILLING ROTARY	FLUID MUD	-	$(\lambda)$	66	
DEPTH FROM SURFACE	DLOURU	r HOINN		00	$\bigcirc$ $\bigcirc$	$\sim$ (
Ft to FL	Describe material, gi SOIL	ain, size, color, etc.			5-63 & & \Z1 >	
	BLUE CLAY			VEST FULKERTH		
\$	SAND	*****		ANDING CA 9531	3	
1	GRAY CLAY		_ County Stanisla		••••••••••••••••••••••••••••••••••••••	
1	RED CLAY		APN BOOK	Page : Range :	Parcel	
20 25	SAND	······································	Latitude		Secuon	······································
25 30	RED CLAY		DEG. N	IIN SEC.		DEG MIN SEC
30 40	BLUE CLAY			CATION SKETCH -		ACTIVITY (2) -
40; 63	, SAND	1				MODIFICATION/REPAIR
4	GRAY CLAY					Deepen
	SAND					Other (Specify)
	GRAY CLAY					DESTROY (Describe
	RED CLAY					Procedures and Materia s Under *GEOLOGIC LOG
1	SAND					PLANNED USES (1)
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i i	************************************		-			TEST WELL
	1					HEAT EXCHANGE
	3 1 :		-			DIRECT PUSH_
						INJECTION
1	y					VAPOR EXTRACTION SPARGING
	\$ \$ \$		When and the formation of	SOUTH	n	REMEDIATION
	1		Fences, Rivers, etc. and	Distance of Well from Roads, attach a map. Use additiona E ACCURATE & COMP	d baber if	OTHER (SPECIFY)
	: :		[			DAIRY
!	4	۵	1	R LEVEL & YIELD ( NATER 13 (FL) BEI		
	1 2 7					
			- WATER LEVEL	(FL) & DATE	MEASURED .	06/14/02
1	000			* (GPM) & T		
TOTAL DEPTH OF			TEST LENGTH	(Hrs.) TOTAL DRAW	DOWN	(FL)
TOTAL DEPTH OF	COMPLETED WELL 145	(Fæt)	May not be repr	esentative of a well's lo	mg-term yiel	1.
DEPTH		CASING (S)		(27)221	ANN	ULAR MATERIAL
FROM SURFACE	BORE - TYPE (<)			DEPTH FROM SURFACE		TYPE
		ERIAL / INTERNAL GAU			CE- BEN-	FILTER PACK
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130; 145	16 🔽 PLA	STIC 8 SD	<u>R26 .070</u>			
				2		
Geologic	HMENTS ( $\checkmark$ )	the undersigned certify that this re;		ATION STATEMENT		
Well Co	nstruction O agram	VAME CALWATER DRILLI	NG CO., INC.			
	er Chemical Analysis	(PERSON, FIRM, OR CORPO 300 S. Kilrov Rd.	KATION) (TYPED OR PR	INTED) Turlock		CA 95380
Other		DDRESS		CITY	0.04.000	STATE 21P
ATTACH ADDITIONAL	NFORMATION, IF IT EXISTS.	MELL BRILLERAUTHORIZ	ED REPRESENTATIVE		18/01/02 ATE SIGNED	434218 C-57 LICENSE NUMBER
DWR 188 REV. 11-97	IF ADDITIONAL	SPACE IS NEEDED, USE NEX	T CONSECUTIVELY N	IUMBERED FORM		

WATER WELL DRILLERS REPORT

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#813223 Oss/09E

37	40	VERY FINE TO COARSE SAND	Township Range	Section	
27 37	37 40	CLAY VERY FINE TO COARSE SAND	AFN Book Page Township Range	Farcel Section	
40	42	BLUE CLAY	Latitude	Longitude	
42	47	VERY FINE TO COARSE SAND	DegMinSec	DegMinSe	κ <b>σ</b>
47	50	CLAY	1		
50	52	SAND	ACTI:	VITY & PLANNED USE (S)	+
52	87	CLAY	1		
57	59	VERY FINE TO COARSE SAND	Activity: NEW WH	LL	
59	73	CLAY/SAND STREAKS	l		
73	79	VERY FINE SAND	Water Supply	() Monitoring	[] Injection
75	78	CLAY	[] Domestic	[] Test Well	[] Vapor Extr
78	81	SAND	[] Public	[] Cathodic Prot.	[ ] Sparging
81	84	CIYA	[] Irrigation	[] Heat Exchange	
84	85	SAND	[ ] Industrial	[ ] Direct Push	[] Other
85	86	CLAY	ł		• •
86	89	BAND			
89	95	CLAY	Drilling		
25	100	FINE SAND	Hethod ROTARY	Fluid WATER	
100	101	CLAY			
101	102	PINE BAND	WATER LEVEL	A VIELD OF COMPLETED	WRIA.
102	104	CLAY	Dopth of	Date	
104	108	FINE SAND	Static Water Level 12		/04/99
108	113	CLAY	Retimated Yield	(GPM) & Test Type	(f w m/ ##
123	114	SAND	(May not be representativ		i for the second
113	118	CLAY	Test Length (Hrs.) To		-
***	110	RED SAND	Depth of Boring 187 (Ft.		

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		Dia.	Type	Grade	Diameter	or Wall	if Any			Type	Filter Pa
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[]8	oil/Wate	er Anal.	1	300 S. Kilr	roy	Turlock	CA	95380			
[]			1	Report Date	02/22/99	C 57 L4	cense No. 4	34218			
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WATER WHIL DRILLERS REPORT

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Date Local		l No. Iegan i t Agen	12/04/98 , Endee ncy STANISLAUS (	COUNTY Date 12/23/98					97.1. OWNER		
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	122	126	CLAY			ł	1500 FULK	erth rd			
	126	128	RED SAND			Ì	CROWS LAND	ING			
	128	137	CLAY/SAND STRI	eaks		ĺ	STAN				
	137	138	SAND			I					
	138	140	CLAY			ì	APN Book	Page	Parcel		
	140	144	SAND			1	Township	Range	Section		
	144	187	BROWN CLAY			1	Latitude		Longitude		
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#### ORIGINAL

File with DWR Notice of Intent No...

Local Permit No. or Date.

5242

#### BTATE OF CALIFORNIA THE RESOURCES AGENCY DEPARTMENT OF WATER RESOURCES WATER WELL DRILLERS REPORT

Do not fill in Do not fill in No. 247057 RT State Well No. Other Well No.

(1) OWNER: Name_	(12) WELL LOG. Total depth 220 ft. Depth of completed well 152
Address	from ft. to ft. Formation (Describe by color, character, size or material)
City	0 - 9 Clay
	9 - 15 Sand
(2) LOCATION OF WELL (See instructions): CountyOwner's Well Number	15 - 18 Sand Clay
Well address if different from above	18 - 28 Sand
	28 - 45 Clay
Distance from cities, reads, railroads, fences, etc. W * Fulkerth Rd	45 - 55 Sand
1 mile east of Carpenter Rd., south	
side	
(3) TYPE OF WORK:	
New Well Deepening	
Reconstruction	120 - Na Fine sand
Reconditioning	183 - 128 Stall
Horizontal Well	(20) - 134 (Sand)
Destruction [] (Describe destruction materials and	134 - 140 2012 0
procedures in Item 18	140 - 195 Sand-fine
(4) PROPOSED USE	145 210 Shale & Day
Domestic	210 - 220 Blue clay
Irrigation	A City City
Industria!	CF-A Ma
Ten Well	AN 12- A
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WELL LOCATION SKETCH	
(5) EQUIPMENT: (6) CRAVEL PACK: SAIL OF	L
Rotary Revene No Size T. Collar Char 13	
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Other D Bucket D Property nom 50 152 4	SMD - CURE
(7) CASING INSTALLED: (6) PERFORATIONS:	<u>An</u>
Stoel Plastic Crowner Type of performing or size of screen	NCONFINED
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(9) WELL SEAL:	an an an ann an Anna an Anna an Anna an Anna an Anna an Anna an Anna an Anna an Anna an Anna an Anna an Anna an Anna an Anna an Anna an Anna an Anna an Anna an Anna an Anna an Anna an Anna an Anna an Anna an Anna an Anna an Anna an Anna an Anna an Anna an Anna an Anna an Anna an Anna an Anna an Anna an Anna an Anna an Anna an Anna an Anna an Anna an Anna an Anna an Anna an Anna an Anna an Anna an Anna an Anna
Was surface sanitary seal provided? Yes 2. No 🗆 If yes, to depth_50_ft.	
Were strain sealed against pollution? Yes No D Intervalft.	
Method of sealing Bentonite	Work started 12-29 19.82 Completed 19
(10) WATER LEVELS:	WELL DRILLER'S STATEMENT:
Depth of first water, if known ft.	This well was drilled under my juriediction and this report is true to the best of my
Standing level after well completion ft.	knowledge and
(11) WELL TESTS:	Sicned
Was well test made? Yes [] No [] If yes, by whom? Type of test Pump [] Bailer [] Air lift []	NAME Hennings Bros. Drilling Co., Inc.
Dents to water at start of iter ft. At end of testft	(Person firm, or connection) (Typed or printed)
	Address_ 3525 Pelandale Ave.
	city Modesto, Ca. zip 95356
Chemical analysis made? Yes [- No 2] If yes, by whom?	License No. 290813 Date of this report 1-17-83

DWR 188 (REV. 7-76) IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

## **05S9E Section 19**

			MSCORY
~~~ **** * * *	STATE OF (	CALIFORNIA	
ORIGINAL		CES AGENCY	Do not fill in
File with DWR	DEPARTMENT OF V	VATER RESOURCES	No. 096269
Notice of Intent No	WATER WELL D	RILLERS REPORT	State Well No. 5/9=/5
Local Permit No. or Date	•		Other Well No.
/ ]			420 (0)
		(12) WELL LOG: Total dep	oth 252 n. Depth of completed well ft.
Ad Cit		from ft. to ft. Formation (Desc	ribe, by color, character, size or material)
		2 - 17 Pay	
	s Well Number	17 - 23 Sch	d & Clay
Well address if different from above		23-35 \$	
	Section	35-48	$\sim$
Distance from cities, roads, railmads, fences, etc.		40	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
		Gu - Gen S VI	
		95-98	
	(3) TYPE OF WORK:	98 1106 5	Numero (1999) (1990) (1999) (199
	New Well Deepening	106 11 0	
a well	Reconstruction	111 - Ma S	2
I well	Reconditioning		×
	Destruction [] (Describe	130-152 (1)	<u>*</u>
I That I	destruction materials and procedures in Item 12	152 - Max Rule	Salla
1 though the	(4) PROPOSED DEE	168 -183 11 (	A VO
Nes	Domestic R	183 - 200 Jere	<u>E1</u>
	Irrigation Industrial	a de la si	<u>ð</u>
Commons Rd		124 S	· · ·
Commons r-a	Stock	1 5028 - 28 CPV	
	Municipal		
WELL LOCATION SKETCH	Dother 🔘 🗆		
(5) EQUIPMENT. (6) GRAVE	$\sim$		
$-\alpha N$	Io Size		CONFINED
Cable Air Department of Other Bucket Department	620 \$180 -	1 <del>61%-</del>	- IEHAP
(7) CASING INSTALLED	URAFIONS:		2014
Steel [] Plastic Caterine Type of peri	white or size of screen		
From To Dia. Care or From	To Kshar		
ft. ft. Wall ft	ft. size	*	
0 180 00 160 160	1000 1010	<b></b>	
	- all is		
(9) WELL SEAL:	100		<b></b>
Was surface sanitary seal provided? Yes W No	] If yes, to depth . ft.	- /	
Were strata sealed against patients? [Yes] is in Method of sealing	No 🔲 Intervalft.	Work startert 19	Replie P
(10) WATER LEVELS:		Work statted 19 G	South South States
Depth of first water, if known	ft.		liction and this report is true to the best of my
Standing level after well completion(11) WELL TESTS:	Ŕ.	SIGNED	
Was well test made? Yes D No D If yes,	by whom?		White Bankin Clarking
Type of test Pump [] Bailer [ Depth to water at start of testft.	Air lift At end of testft	NAME and a structure	(ilical control il)
Dischargegal/min_afterhours	Water temperature	Address	Inton CA CATO
Chemical analysis made? Yes [] No D If yes,		City	1512 (m) 8/22/A)
Was electric log made? Yes No 22-II yes,	attach copy to this report	License No.	

DWR 188 (REV 7.76) IF ADDITIONAL SPACE IS NEEDED. USE NEXT CONSECUTIVELY NUMBERED FORM

#### ORIGINAL

File with DWR

Local Permit No. or Date\_

#### STATE OF CALIFORNIA THE RESOURCES AGENCY DEPARTMENT OF WATER RESOURCES WATER WELL DRILLERS REPORT

MSC O Do not fill in No. 247078 State Well No. \_\_\_\_\_\_ Other Well No. \_\_\_\_\_\_

(1) OWNER: Nam	(12) WELL LOG: Total depth_205ft. Depth of completed wellft.
Address	from ft. to ft. Formation (Describe by color, character, size or material)
CityZip	0 - 10 Clay
	10 - 12 Sand
(2) LOCATION OF WELL (See instructions): County	12 - 17 Clay
Well address if different from above	17 - 25 Sand
TownshipRangeSectists	25 - 74 Blue sand?
Distance from cities, roads, railroads, fonces, etc. Carpenter Rd	74 - 78 CLAY
South of West Main	78 - 111 Broa sand-fine
ֈՠՠՠՠ֎֎ֈ֎ֈ֎֎֎֎֎֎֎֎֎֎֎֎֎֎֎֎֎֎֎֎֎֎֎֎֎֎֎֎	111 - 120 Bigg clay 120 - 169 Sand-fine
(3) TYPE OF WORK:	169 / 170 Clay
New Well Deepening	
	170 172 Blue sand
Reconstruction	172 - 188 Blue clay
Reconditioning ()	188 - 169 Ene sand
Horizontal Well	Page - 195 Black clay
Destruction D (Describe destruction materials april procedures in Item 127	199 Mille sand
	199 - 205 Biue chay
(4) PROPOSED DER	
Domestic	2110 01
Irrigation	
Industriel	
Ten Well Hold	
Stock	(1) - (1) - (1)
Municipal	
WELL LOCATION SKETCH	-64
(5) EQUIPMENT: (6) GEAVEL PACE:	
Rotary Reverse D No Sizo,	- Sta
Cable Air Conter of bore	
Other Bucket Darger worn	M/Y
(7) CASING INSTALLED: (8) PERFORATIONS:	DE THICONFINED
	9
From To Dia. Celear From To Shit	
it it wall it it save	
(9) WELL SEAL:	
Was surface sanitary real provided? Yes D No D If yes, to depthft.	aa M <sup>aa</sup>
Wore strata sealed against pollution? Yes 🗌 No 🗌 Intervalft.	
Method of resling	Work started 2001 19 0 Completed 19
(10) WATER LEVELS	WELL DRILLER'S STATEMENT:
Depth of first water, if knownft. Standing level after well completionft.	This well was drilled under my jurisdiction and this report is true to the best of my knowledge and bellej.
(11) WELL TESTS:	Signed
Was well test made? Yes D No D If yes, by whom?	(Well Driller)
Type of test Pump [] Baller [] Air lift []	NAME Hennings Bros. Drilling Co., Inc.
Depth to water at start of testft. At end of testft	Address 3525 Pelandale Ave.
Dischargagal/min aftarhours Water temperarust	Moderto Ca. 95356
Chemical entityed and the part of the part	nangen nin Ri
Was electric he makes I Flow 10 10 11 1ms, attach copy to this report	License No. 290013 Dut of this report C-1/-03

DWR 188 (RE 17 14) IF ADDITIONAL SPACE IS NEEDED. USE NEXT CONSECUTIVELY NUMBERED FORM

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NOT 1 1. 1.01

ORIGINA File with $P_{age} 1$	DWR •	5/9	<i>ĵ</i> .		9	WEL	STATE L COMI Refer to In		ON	REPOR	T			1			
Owner's W						Ended Marc	N 100/	o. 4(	35	296				1			
Date Work	k Began	St.	ani	slā	ūś <sup>ł</sup>	Co. Dept	t. of Er	IV. RE	LATITUDE LONGITUDE								
Perm	ermit Age it No.	94-64				Permi	t Date	-11-94					ll	11	APN/T	18/0714	<u>i i i i</u> £8
						.06		1		· · ·		ELL C	WNE	R			
ORIENTATK	DN (∠)					R(Ft			Na Ma			11<	(	Ń.	FT	52F	7
DEPTH I BURF	FROM	DEFIN	10 11	πωı		CRIPTION	-	VFACE				MS	>C	$\bigcirc$	YOU Y		· /
Ft. to	Ft.	Clay		scribe	mate	rial, grain size,	color, etc.		ਰਜਾ	**************************************	in sound	WEL	L LO	CAT	ION	61	ALE ZIP
7	14	Sanc								Iress	Sar	<u>1e</u>					
14	24	Clay	-	sar	nd					y inty	sta	anísla	2015				······
24	51					treaks				N Book				Parce	l		
51	66	Shal		ستسخصمه	and the same		<u> 2000 - 200</u>		To	vnshio	R	ange		Sectio	n	·····	
<u>66</u> 74 :	<u>74</u> 97	<u>Coar</u> Clay				sand	<del>ए एव</del> ह		Lat	itude	MIN.	SEC.	RTH	Longi	tude _	DEG.	WEST
	100 5	Sand		<u></u>				<b> </b>		CATI	ON SKE	тсн	·····			CTIVITY (∠) - New Well	
100	112	Clay	8					1							1	NEW WELL	
112;	117 ;	Sand		·····	- Charge - work	4.7 										-	Веерея
117 125	$\frac{125}{132}$	Clay				sand											Other (Specify)
132	196	Sand			****	www.mon.mon.mon.mon.mon.mon.mon.mon.mon.mon			1								DESTROY (Describe
136	145 154 Sand w/some cl				Contraction of the second second second second			]								Procedures and Material Under "GEOLOGIC LOG	
					elay			WEST						AST	FPL	ANNED USE(S) (ビ)	
172					sand			Å						ш		MONITORING	
180	185	Fine	bl	ue	sar	d w/clay			1								Domestic
185	202	Blue	<u>cl</u>	<u>ay</u>	w/f	ine blue	e sand										Public
<b> </b>	i	······															_X irrigation
Ì								1								Industrial	
														CATHOOIC PROTEC			
						~	华代君		Illustrate or Describe Distance of Well from Landmarks such as Roads, Buddings, Fences, Rivers, etc.      OTHER (Specify)         PLEASE BE ACCURATE & COMPLETE.      OTHER (Specify)         ORILLING Much rotary       Water         METHOD      FLUID						OTHER (Specify)		
						1001	44										
					~ {~	jos											
	1			f:	77				DEPTH OF STATIC 26 3-25-94								
									WATER LEVEL								
TOTAL DE	EPTH OF 1	ORING	202		(Feet										(Ft.)		
TOTAL DE	EPTH OF (	OMPLETI	D WI	ILL.	1.85	2 (Feet)			° M	ay not be repre	esentativ	ve of a rue	ell's lon	g-Lerm	yield.		······
DEP		500F					CASING(S)	}	1.4.4.4.4.4.4.4.4.4.4.4.4.4.4.4.4.4.4.4		]	DEPTH		[	ANNU	LAR	MATERIAL
FROM SL		BORE- HOLE DIA.		E ( 2		MATERIAL/	INTERNAL	GAUG		SLOT SIZE	FR	IOM SURF		CE-	BEN-	۲	YPE
Ft. to	Ft.	(inches)	BLANK	DUCTOR	ILM	GRADE	DIAMETER (Inches)	OR WA		IF ANY (Inches)	F	t. to	FI.	MENT	TONITE (ビ)		FILTER PACK (TYPE/SIZE)
	65	14"	X	Ħ	<u>ui</u>	PVC	8"	160				0	20	$\frac{1}{1}$	$\mathbf{X}$	<u>,)</u>	
65	75	11	<u>л</u> Х	ĿŢ.		n	11	n	······································	.062	1		185	1	t	[	4X12 sand
75	125	41 	X	Щ		11	11			062	11	<u>an kir</u>	<u></u>	1	e:	<b> </b>	ļ
125	185		<u> </u>	╢						<u>.062</u>	,			╞───	+	<u> </u>	
İ i				+			1	<u> </u>			1	( <b>1</b> - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -		15			
	ATTACHMENTS (2)				1				CERTIFICA	TION	STAT	EMEN	Υ				
		Log								eport is comp J CO., II					er op m	A KUOA	vledge and belief.
-	Well Construction Diagram     Geophysical Log(s)     Soll/Water Chemical Analyses					II (PER	lson, firm, or (	CORPORATION	) (TYP	ED OR PRINTED)			<u> </u>		iddi-	~~~	05300
							00 S. K	TTLOÀ						Turi	.ock		. 95380
						ADDREES							CITY Dela	1777	3-3	STATE	
	ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.											A 135 1	يع سقامو		-~~J≌	2 - 2 64 4- 4	

## 05S9E Section 20

original File whit dwr THE RESOURCES AGENCY DEPARTMENT OF WATER RESOURCES WATER WELL DRILLERS REPORT Do Not Fill In NO. 158899 State Well No.

MSCORS

Other Well No.

(1) OWN	IER:					(11) WELL	LOG: P	ermit #1347	۰	
Name						Total depth	11.3	fr. Depth of completed a	10'	7 11.
Address								cter, size of material, and stru		
				10.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.		_	)- <u>h</u>	1. 10 Top 90		h.
(2) 100	TION 6	of_well:			na an an an an an an an an an an an an a	Î	<u> </u>	Sand	A	
County Sta			Owner's number.	a staaren eta eta eta eta eta eta eta eta eta eta			5-20	Clay		
Township, King		Bitto # / X	R9E		**************************************		20-26	Sand	**************************************	<b></b>
		ilrasde, esc. RU		smi. 1	West of	1	26-30	Clay	20122-202-00-00-00-00-00-00-00-00-00-00-00-	50000000000000000000000000000000000000
Grows	landi	no Rd.				1.0000	10-33	Sand		•••••••••••
		ORK (cbeci					13-54	<u>Clay</u>	3	
New Well X		-	nditioning	Destroyin		r	54-66	Sand		
	-	eterial and proce			's L		6-71	<u> </u>		
According to the second se		JSE (cbeck	the second second second second second second second second second second second second second second second s		IPMENT:	1	$\frac{10-71}{1-73}$	Sand		*****
		rial 🔲 Muni		Rotary			13-76			
Irrigation (			Deher $\Box$	Cable		1	*	<u> </u>	······	
viriêarióii [		••••••••••••••••••••••••••••••••••••••		Other	<u>D</u>			Sand	****	
(6) CASI	NIC INTO	YATTED.		- Critici	غليا الم	4	30-05	Qlay		·
			Tf I	gravel pac	kad		<u>15-103</u>	Sand		
STEEL		OTHER:		Brater Pac			03=108	Cley		*****
BINGLE []	DOURLE	<b>cplasti</b>					08-110	Sand		
ľ	l	Gage	Diameter	1	1		10-113	<u>Cloy</u>		
From	fu	or	of	From ft.	To ft.	1	13-115	A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF A CONTRACTOR OF	·	immentering#00000
<u>fr.</u>		· · I	Bore	1	107	<u></u>	15-123	<u> </u>		
0	107	6 160	<u>n 11</u>	67	107	]]	23-126	Sand		
				<u> </u>		<u> </u>	26-130	Glay		
l				<u> </u>	1	1	30-135	Sand		dan di seda segunda dan serana se
Size of shoe or w			Size of gravel	pea	······	1	35-143	<u> </u>		
Describe juint	glu	ođ		······				·		
(7) PERF	ORATIC	ONS OR SC								
Type of perform	ion or name of	iccrea ha	<u>ad cut</u>							
		Perf.	Rows				······			
From	To	per	per		Size			······································		10000000000000000
fr.	fc.	row	fr.	in.	.x in.					
97	107				·		, i i i i i i i i i i i i i i i i i i i			
					i.		IIN	MANIE	t_ <i>X</i>	
		1					ON	CONFI	VFN	
	1							**	* * 100 EES	
·										· ·
(8) CONS	STRUCT	ION:				1			*****	*****
Was a surface sa			No [] To	what depth	80 <sub>fr.</sub>					anna ann ann an ann an ann an ann ann a
	******	pollution? Yet []	No []	10000000000000000000000000000000000000	depth of stress			******		Managara Militari an
From	ft. to	- ft.		×4 ; ×0, 2001	uppen of service					
						Work searted	8-21 10 7	6 , Completed	19	
Fram	ft. 10	n. ient	<u></u>	****		¥	LER'S STATE		17	
Method of reslin						4		r my jurisdiction and th	is report is true to t	be best
(9) WAT						of my knowled		·		
		st found, if know	1	ft.						
Standing level 1				28 ft.		NAME F	innings	Bros. Dril	id or printed)	inc.
3-11-2-11-11-1-1-1-1-1-1-1-1-1-1-1-1-1-1		ng and developing		<u>CO ft.</u>						
(10) WEI	LL TEST	S:					2500 W.	Rumble Rd.	5- AL - A	*******
Wes sums test o	nadel Yee 🗌	No 🕅	If yes, by whom?			1	<u>lodesta</u>	<u>Calif.</u> 9	5250	
Yield :	gst./m	ia. with	ít. deswdow	n sfrer	brs.	[SIGNED] :	21	1W		
Temperature of	water	Wee a cher	oicel ensigeis mede	) Yes 🗌 🗌	No 🛃 📃		0	(Wall Deiller)		
Was electric log	made of well?	Yes 🛛 No 🕽	) líyes, a	reach copy		License No	290813	Dated	9-24 1	976

SKETCH LOCATION OF WELL ON REVERSE SIDE

				· · · · · · · · · · · · · · · · · · ·	
ORIGINAL	STATE OF C	CALIFORNIA	:Y	HSC02	
File with DWR	DEPARTMENT OF V			s N	10.24612
Notice of Intent No	WATER WELL D			r.	510-20
Local Permit No. or Date 1873		an ang a a a a a a a a a a a a a a a a a	~~~~~	state well A	/ /
		T		Other Well M	Jo
(1) OV		(12) WEL	L LOG:	Total depth 11 to Der	oth of completed well 68 ft.
Address		from ft. to		ion (Describe by color, el	
City		0-	ěę.	Bandy so	
(2) LOCATION OF WELL (See instru-	ctions):	4-	8	Shale	
County BLA NISLANS Owner's		8-	18	······································	sand
Well address if different from abovu		18-	29	<u> </u>	
TownshipRange Distance from cities, roads, railroads, fences, etc. On	Section Rd. west	29-	40 54	Sahi	
of Crows Landing R	d. A mile sout		62	Blue cla Sand	Σ
of West MAAn.	as a serve and	62-	94	Clay	****
			160		<u>an</u> A
	(3) TYPE OF WORK:	101/3	1 80.	Band	5000042.
	New Wall C Deepening	100-1	14		nnd
	Reconstruction		1	<u> </u>	
	Reconditioning	- 1	V	QV2	
	Horizontal Well	<u>- 1117</u>	2	5	
	Destruction [] (Describe destruction materials	<u> </u>		D Q	
	procedures in Item 12	<u> </u>	$\overline{\otimes}$		
	(4) PROPOSED VSK	ā	-QJL_	<u> </u>	
	Domestic	<u> </u>	$H \cong$		17127777777777777777777777777777777777
	Irrigation I Industrial		<u>, ~ </u>	<u> </u>	
	Test Well	<u> (0) ~</u>	-		
	Stool		$\overline{\mathbb{C}}$	0	······································
0	Municipal		66	)	
WELL LOCATION SKETCH	Other O	<u>ک</u> (	$\mathbb{R}^{\vee}$		
(5) EQUIPMENT: (8) GRAPE	PACK:	12 -	2		
Rotury ID Reverse D Res No	Size blocks bye	alto	***************************************		***************************************
Ceble  Air  Ceble		$\forall D \lambda$		LINOO	URINIER
Other D Bucket Rickow Arom_	38 68 68	//// -		UNUU	NFINED
	hand cut	<u> </u>			
Steel Plastic B Charlen Type of perfo	abion oblize of screep	Ĕ			
From To Dia. Cadeor Free ft. ft. in. Wall ft		-			*****
How was a failed and	68	-			
	000	~			*******
	Tall 18				***************************************
(9) WELL SEAL:	- Mit -			****	
	If yes, to depth_20ft.	~-			
	D [] Intervalft.				***************************************
Method of sealing Bantonite			5-24	19_ <u>77</u> Complet	ted19
(10) WATER LEVELS: Depth of first water, if known	ft.	WELL DRI			
Standing level after well completion	<u>15</u> h	This well was knowledg <u>e and</u>	artiled under beliet.	my jurisdiction and this re	eport is true to the best of my
(11) WELL TESTS:	an an an an an an an an an an an an an a	Signed.			₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩
Was well test made? Yes Nove If yes, h Type of test Pump Bailer	y whom?	NOT THE	nninza	(Well Driller) Brogs Drilli	lmg Co., Inc.
Depth to water at start of testft.	At end of testft	1	(Person, f	Irm, or corporation) (Types	
Dischargegal/min_afterhours	Water temperantite	Address 35	the state of the s	andale Ave.	B. Of the 11th Th
Chemical analysis made? Yes 🗆 No 🎦 If yes, b	y whom?		desto. 290813	CA.	<u>z, 95350</u>
Was electric log made? Yes 🗋 No 🔁 If yes, at	tach copy to this report	License No.	<u>=7401)</u>	Date of this rep	port_8-8-977

DWR 188 (REV. 7-76) IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM 43818-880 7-76 80M 40/45 (DT 08P

an 11 (42

i

Burn Contraction		1	
ORIGINAL Filo with DWR	THE RESOUR	ax 7079, 7080, RCES AG	Image: Second State Well No.       Second State Well No.         Second State Well No.       State Well No.         State Well No.       State Well No.         State Well No.       State State Well No.
(1) OWNER. Name Addre	gunna <u>an i</u> nananan ang ang ang ang ang ang ang ang	<b></b>	(11) WELL LOG: Total denth <i>I</i> O f:. Depth of completed well It. Formation: Describe by color, observence, site of material, and structure
(2) LOCATION OF WELL: County ATackicalactics) Township, Range, and Section Distance from citics, reads, califordi, etc.	Owner's number, if any		Готания: Шененов орено, солини, ни ор тайтай, ала ни илини 11. 10 (1. 0-15. 27-р райс 15-42 13 5-инс 5-ли с. 42-60 Селад- 60-80 дагад Дала .
(6) CASING INSTALLED:	t): nditioning [] Destroyin lure in Item 11. ): (5) EQUI	PMENT:	CONFIDENTIAL Water Code Sec 7030
BTEEL:     OTHER:       BINGLE []     DOUBLE []       From     fro       ft.     ft.       Diam.     Wall       0     570       4     5/2	Diameter of From Bore ft.	Το ft.	
Size of these or well ting: Describe joint (7) PERFORATIONS OR SCI Type of perforation or name of screen	<u> </u>	······	
From To per f. ft. ft. row		ize x in.	
(8) CONSTRUCTION: Was a cutfice ranitery seal provided? Yes 2 Yes Were any strats steled spaines pollution? Yes Prom ft. to ft.	No 🗌 To what dipth No 🗍 If yes, note d	ft.	
Prom ft, to ft. Method of resting (9) WATER LEVELS: Denth tt which water was first found, if known Stending level before perforating, if known Stending level after perforating, and developing (10) WELL TESTS:	/ D tr. 56. 16.		Work usered 4/29 1967. Completed 10/5 1967. WELL DRILLER'S STATEMENT: This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief. NAME <u>Olsotic Pluselbirg</u> (Heatering (Person, firm, or corporation) (Typifor Vilaied) Address 10/5 Mar. 994 John-ce
Was pump seas snade? Yes No I I Yield: gal./min. with	f yee, by wham? [t. drawdown after 	hrs.	Signed (Well Diller) [Signed] License No. 1 1 0 6 3 7 Dated 1 0 / 19/67, 19
	SKETCH LOCAT	TION OF W	VELL ON REVERSE SIDE

DWR 188 (REV. 6.65)

88501.050 (0.63 50H TRIP () A OSP

5/9-		LOCATION NOT CHECKE
file Origioal, Duplicate and Triplicate with the fiscal sectors and sold and the fiscal sectors and sold and the fiscal sectors and the f	DRILLERS REPORT	Nº 3888 Juh
REGIONAL WATER FOLLUTION STATE OF	CALIFORNIA	State Well No.
CONTROL BOARD No STATE OF	646	Orber Well No. 3 To X Z - M
1) OWNER: (1)(02)	(11) WELL LOG:	
Name		of completed well 64
Address	Farmelas Deirite by roles, the grier, der	
	0 1.10 3 50 to 3 16 25 Bar	<u>y x011</u>
(a) X 40 1 TTONT OF TTOT 1.		ft cley & sand
(2) LOCATION OF WELL: Eventy Stanislaus Overs' Auster, Henry	36 60 - bI	le clay
R.Z. D. Stani Me. Ruble Road, Turlook.	60 61 20 sa	
California		-
	ε. °*	
A	د. 	
(3) TYPE OF WORK (cherk):	34 35	
New well 20 Deepening [] Reconditioning [] Abandon []	- • E	- 
If ibendonment, discribe material and procedure in Item 11. (4) PROPOSED USE (cback): (5) EQUIPMENT:		
Contraction of the second se		
Domiestic E material Cable R	-21/2	
Iragation Test Well Other Dug Well	- 0 · · · ·	·····
(6) CASING INSTALLED: If gravel packed	and an Hermitian and an an an an an an an an an an an an an	
	42	
From the is 10 in Dive 6n will of him in fi.	مرد عرب المراجع المراجع المراجع المراجع المراجع المراجع المراجع المراجع المراجع المراجع المراجع المراجع المراجع	
	55	
	95 1 <sup>3</sup>	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$	er: 7,8	
Type and size of these as well sing Size af stavel.	P Province	
Ducity piet		
(7) PERFORATIONS:	Section -	
(/) PERFURATIONST Typef enforcer web		016. 1 2 5 F
Size of performing the in-	-31. ^	Major 15 P
From In 19 St. Leil. per 12m Roms per lie	2 · · · · ·	- coda
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	x* 11	
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(8) CONSTRUCTION:	y1	
Was a varified rediting and provided) - Ves - No To when deput fr.	53 62 <sup>2</sup>	
Were sup strais sealed systam poliusion I Yes D No If per, note depth al second	23 .3	
Fram A. to A.	۰۰ اع جو رئ	
" Method of Scaling	Pork itsetted	. Camplered 11
van van de stander op de stander en en stander en en en en stander en en en en en en en en en en en en en	·	
(9) WATER LEVELS:	WELL DRILLER'S STATEMENT: This will was diffed under my jurisd	birthen and this report is true to the best of
Dooth se which wasse was first found 12	ray knowledge and bellef.	
Standing level before performing	NAME OLSON'S PLUMBIN	
Tailo Elevel alter parlocation fr.	Address 1015 NO. 99 HIG	
(10) WELL TESTS:	······	~~++++================================
Weispeep test midt) [] Yei [] No If yei, by whom)		
Yields Ast. Iman. with In draw dana after ben.		Well Driller
Temperature of masses Was a chemical analytic modol () Ver [] Nor	License No110637	Dond_January_16 1958
	43444 1.34 JON QUIN ( 440	DWR FORM NO. 240 (1887. 3-24)

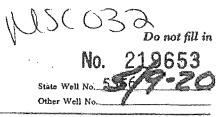
					5/	9 -	20	USIOSI	
				-		STATE OF C	ALIFORNIA	Do Not Fill Yu	
OBIOHIA							CES AGENCY	Nº 14683	29
Pilo viil	DWE			DEI	PARTME	INT OF V	VATER RESOURCES	TA: T4001	I baur
				WA	TER V	VELL D	RILLERS REPORT	State Well No	
							1)	Other Well No.	
(1) OW	NPR.					****	(11) WELL LOG:	ICONFINED	*******
	1							Permit #1025	
Name Address							1	11. Death of completed well 147	<u>h.</u>
Address					· · · · · · · · · · · · · · · · · · ·	***************************************	Formation: Describe by rolor, observer		
101 100		V OF			-		<u> </u>	ft. to Top soll	fr.
(2) LOC		N OF Lalau		) <del>wner's number</del> .	if me		<u> </u>	<u>Clay A shala</u> Sand	
Townshing Re			<u> </u>	ROR			18.20	Clay & chale	ar Marcolitin
				West N	ain.l.		30-36	Sand	
			andin		anne a start and a start and a start a start a start a start a start a start a start a start a start a start a		26.32	Blue clay	
			(cbeck)				37-43	Blue sand	
New Well	🔁 De	epening [	] Recon	dicioning 🔲	Destroyi	ча 🗅 —	kg.50	Rlue cley	
-solution and a solution of the solution of th		Press and a second second second second second second second second second second second second second second s	and the second	tre in Item 11.			<u> </u>	Clay	
			(cbeck)			IPMENT:	51-55	Sand <u>'X</u>	
					Rotary	E	55-66	Clay	
Irrigation	L Ies	st Well		ther	Cable Other	Ц	66-75	Sand	
(6) CAS	TATO T	NIGT A X	ren.		Juner		75-105		
` '				1f	gravel pac	ked	105-114		
STE		OTH	plasti		U		1-1-4-1-20	<u>Clay</u>	
	1	LJ ~					***************************************	*,*********************************	
From	To		Gage	Diameter of	From	То		······································	
ft.	fr.	Dizm.	Wall	Bore	ft.	fr.	· · · · · · · · · · · · · · · · · · ·	<u>fr</u>	
0	117	6	160	11	90	117			
	· · · ·				<u></u>	ļ			
1	L	L	_ <u>_</u>		<u> </u>	<u> </u>			
Size of shoe up		1104		Size of gravel	<u>pea</u>			-	
Describe juint		ued	OR SCF	DENT.				and the second second second second second second second second second second second second second second secon	
(1) PER Type of period				hand c	nt				
			*****	1		****	· · · · · · · · · · · · · · · · · · ·		
From	1 -	ro I	Perf. per	Rows per		Size			
ít.	1	r.	row	ft.		. x in.			
105	1	17							
			······································						
				<u> </u>					
·		<u> </u>	**	L	<u>     l                               </u>			:	<b></b>
(8) COI						#* #* -			
Wes a surface				·····	o what depth	<u>20 fr.</u>			********
Were an <u>é</u> stra From	is relied szi fi.		jr.	No 🛛	11 YEL, ROLL	depth of service			nationalise.
r rom F rom	II. (t.		<u>jr.</u> ft,			nnorm fördagförsta andarandense	Work started 8-18 1975	. Completed 19	
Method of sea		entor	······································				WELL DRILLER'S STATEME		
(9) WA					******		This well was drilled under m	sy jurisdiction and this report is true to the	best
(>) was Deput at whi					fı.		of my knowledge and belief.		
Sianding leve			······		<u>íı.</u>		NAME Hennings 1	Bros. Drilling Co., In m. ac corporation) (Typed or printed)	
Standing level				2	<b>ly.</b> ft.				
(10) WI	IL TI	STS:					Address 2500 W. R1		
Wes prime tes	medel Y			f yes, by whom?		·····	Modesto, (	Celif. 95350 /	
Yield:	R	l./min. wit	4	fi. drewdon	'a efter	bes.	[SIGNED]		011-1070-12/11
Temperature o				cal analysis med	1) Yrs []	No 💽		(Val Drill)	
Øpp electric la	of made of	well? Yes	No 🛐	lf yes, a	ersch co>y		License No. 290813	Dared9-18, 19.	-75

SKETCH LOCATION OF WELL ON REVERSE SIDE

ORIGIN	IAL
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File with DWR

#### STATE OF CALIFORNIA THE RESOURCES AGENCY DEPARTMENT OF WATER RESOURCES WATER WELL DRILLERS REPORT



Notice of Intent No.\_\_\_\_\_ Local Permit No. or Date\_\_\_\_\_

(1) 01	(12) WELL LOG: Total depth 127 ft. Depth of completed well 84 ft.
Addross	from ft. O to 127 Formation (Describe by color, character, size or material)
City	$0 - \delta$ Clay
(2) LOCATION OF WELL (See instructions):	<u>6 - 15 Sand</u>
CountyOwner's Well Number	15 - 35 Clay
Well address if different from above_1100_Huble_Rd;	35 - 37 Fine Blue Sand
Township Crows Landing Co;	37 - 21 Blue Cay
Distance from cities, roads, railwads, fences, etc.	41 - 73 (Clay
	73 - 80 Jand
	80 - 97 QLay
	97 - 105 Sand W/Clay Strata
(3) TYPE OF WORK:	105 127 Clay
Now Well 🎽 Deepening 🗆	
Reconstruction	
Reconditioning 🖸	
Horizonta) Well	Colla - Mal
Destruction [] (Describe	All all
destruction materials and procedures in Item 12.	V- O V- V
(4) PROPOSED USE	and a second sec
Domestic	N-AB AA
Irrigation	A B A A B
Industrial	05-10-11-
Test Well	a Citta
Stock	$\frac{1}{2}$
Municipal	
WELL LOCATION SKETCH	4- <u>6</u> 4
(5) EQUIPMENT: (6) GRAVED ALCK:	
Rotary Reverse Ver No Size	
Cable Air Distants of bore	
Other D Bucket D Pation Norm 0 10	AHHA CO.
(7) CASING INSTALLED: (8) PERFORATION	A B B B B B B B B B B B B B B B B B B B
Steel D Plastic For Coscience () Type of performing of screen	A - WHAT
	NCONFINED.
From To Dia. Gage of From To Stoll	••••••••••••••••••••••••••••••••••••••
	au
	₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩
(9) WELL SEAL:	๛๚๚๛๚๛๚๚๚๚๚๚๚๚๚๚๚๚๚๚๚๚๚๚๚๚๚๚๚๚๚๚๚๚๚๚๚๚
Was surface semitary soal provided? Yes No I if yes, to depthft.	στο στο στο φτολλαματική μεταγματική μεταγματική τη μεταγμ
War atom a sailed a solution in the last No ( Internet) it	- 55 /2/ #6
Method of suitar Bentonite	Work started 19 Completed 113. 19
(10) WATER LEVELS:	WEU
Depth of first water, if knownft.	This the true to the best of my
Standing level after well completionft.	KR0404
(11) WELL TESTS: Was well test made? Yes [] No [] If yes, by whom?	SIGHL
Was well test made? Yes [ No ] If yes, by whom? Type of test Pump [ Bailer ] Air hift []	NAM Galwatar Drivling Co., inc:
Dopth to water at start of testft. At end of testft	and a state of the
Dischargegul/min afterhours Water temperature	
Chemical analysis made? Yes 🗋 No 🗍 If yes, by whom?	
Was electric log made? Yes 🗋 No 🗋 If yes, sttach expr to this report	License No. 434218 Date of this my 26

DWR 188 (REV. 7-76) IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

ARIANIA		ALIFORNIA	n I C	1422	
ORIGINAL		CES AGENCY	$\mathcal{U}$	XUSS	Do not fill in
File with DWR	DEPARTMENT OF V	VATER RESOU	IRCES	No.	2,42850
Notice of Intent No.	WATER WELL D	RILLERS REI	PORT	State Well Nor	19-20
Local Permit No. or Date				Other Well No.	Y
(1) OM	••		00		450
Address	-	from ft. to ft.	OG: Total depti	h 120 ft. Depth of c	completed well_150 ft.
City		0 -	4	be by color, character topsoil	(, size or material)
(2) LOCATION OF WELL (See instruc	tions).	4 -		hardpan	
Uwner's	Well Number	8 -	17	sand	
Well address if different from abdie . E. of 624 Tourship 58	20 20	17 -	19	o av	
. ownship	Section	19 - 22 -	22	clay	
Distance from cities, roads, railroads, fences, etc.		29 -	33 10	Band	
		33 - 6	37-16	èlay	
· · · · · · · · · · · · · · · · · · ·		37 -	AS - P	sand	<b>*************************************</b>
	(3) TYPE OF WORK:	39	55	clay (blue)	***************************************
3	New Well 😭 Deepening []	55	78	clay (brn.)	
	Reconstruction	78 -	94 🚫	Sand (Set)	
10	Reconditioning	24	130 0	Vaay	
RUBLE RD	Destruction (Describe	1200-	- Children	sand	*****
	destruction materials and procedures in Item 12	146 - 6	148	clay() saadi (sect)	
	(4) PROPOSED DEE	1 (A)	N 56+	AL AL	
22	Domestic		9	11 2	and the design of the second second second second second second second second second second second second second
	Irrigation	1 - Fr	102	$\mathcal{D}_{\mathbf{r}}$	
2		- <u>~</u>	)		**************************************
	Ter Well	All A-	Room		
	Stock Municipal	$\rightarrow = $	<u></u>	······································	695%++++++++++++++++++++++++++++++++++++
WELL LOCATION SKETCH	Other	$\sim$	∽		
(5) EQUIPMENT: (8) GRAVE	fl	1-0	)		
Rotary Revense D	12 <sup>size</sup> Rept	ALL			******
Cable C Air C Delayer of b	30 12 150	O(0)			
		10)×		ONFIR	$\langle \mathcal{V}$
(7) CASING INSTALLED: (8) FERFOR Steel   Plastic   Concrete   Type of person	WIONE:	<u></u>			1K
	TAY AT THE		55, <i>6</i> 7	- AKI	****
From To Dia. Gasart From ft. ft. Wall ft.	ft.	-	(		••••••••••••••••••••••••••••••••••••••
0 150 6 PVC160 130	150 Baw	·	* 1 kg.	COLA.	
	ALLA -				
	1 OWI IN	-	19.419.019.419.479.479.479.479.479.479.479.479.479.47		**************************************
(9) WELL SEAL:	If yes, to depth 20 ft.		······		
	If yes, to depth <u>20</u> ft.		*********	- <u> </u>	
Method of seeing		Work mened 5/15	1984	Completed_5	/1619_84
(10) WATER LEVELS:		WELL DRILLEP	'S STATEMEN		Bannan an <sub>a a a a</sub> an a faith da <i>bannan a gu chathailte an an an an a</i> an airte
Depth of first water, if known Standing level after well completion	h	This well must dellad	1 under vom instali	attan and this senses i	true to the best of my
(11) WELL TESTS:		Sich			
Was well test made? Yes D No H yes, b Type of test Pump Baller		NUZ OSMER	BERG & STE	WARP, TNP	
Depth to water at start of testft.	At end of testfi	(1	Penson, firm, or con	ponation) (Typed or p	rinted)
Dischargegal/min afbrhours	Water temperature	1 Madaa	River Rd.	······	zin 95351
Chemical analysis made? Yes D NEX If yes, b		1 1466	<u>to, Ca.</u>		<u>92221</u> 5/16/84
Was electric log made? Yes No T If yes, at	ttach copy to this report	License No. 4400	//	Date of this report	21.19/04

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DWR 168 (REV. 7-76) IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

ORIGINAL

File with DWR

#### STATE OF CALIFORNIA THE RESOURCES AGENCY. DEPARTMENT OF WATER RESOURCES WATER WELL DRILLERS REPORT

MS(034) Do not fill in No. 243201 State Well No.

- . . .

Notice of Intent No. \_\_\_\_\_\_ Local Permit No. or Date 5193

(1) OWNI	(12) WELL LOG: Total depth 113 ft. Depth of completed well 104 ft.
Address	from ft. to ft. Formation (Describe by color, character, size or material)
CityZip	0 - 3 topsoil
(2) LOCATION OF WELL (See instructions):	<u>3 - 6 hardpan</u>
County_StanislausOwner's Well Number	6 - 15 sand
Well address if different from above	15 - 17 clay
TownshipRangeSection	17 - 22 sand
Distance from cities, roads, railroady, fences, etc. Ulest Main - 600'	22 - 27 (abay
West of Crowsharding - anothe side)	27 - 35 Seed & clay streaks
	35 - 45 CLAY
	45 - 47 sand
(3) TYPE OF WORK:	47 /63 Jolay
New Well 🕅 Deepening 🗋	63 - 67 sand
Reconstruction	67 - 68 clay
Reconditioning	8 - 85 Ane sand
Horizontal Well	8311 - 92 (CFO)
Destruction 🔲 (Describe	92 - 98 Jand ()
destruction materials and procedures in Item 12	98 -112 Clay 10
(4) PROPOSED USE	
Domestic	A A A A A A A A A A A A A A A A A A A
Irrigation	Child White
Industrial	elle A-LO
Teen Well	0110-0
Stock	U - Q = Q = Q
Municipal	
WELL LOCATION SKETCH	$\rightarrow$ - $\mathcal{C}$ $\rightarrow$ - $\mathcal{C}$
(5) EQUIPMENT: (6) GRAVEL PACK: ROOT ACK	
Rotary & Revore D No B Size CRAVEL	
Cable Air Air All All All All All All All All All Al	all.
Other D Bucket Photos from 20 104 9	ATT - ATEL
(7) CASING INSTALLED: (8) PERFORATIONS	ON FINED
Sisol D Plastic & Contarte Type of periodition or due of screen	
	- HWA
From To Dia Cage of From To Slow	
0 104 0 160 84 104 Screen	1999 - 199
(9) WELL SEAL:	+e-ben/1000/1000/0000/000/000/000/000/000/000
Was surface sanitary seal provided? Yes of No 🗆 If yes, to depth_20_ft.	na mana ana amin'ny fisiana >Ny fisiana amin'ny fisiana amin'ny fisiana amin'ny fisiana amin'ny fisiana amin'ny fisiana amin'ny fisiana amin'ny fisiana amin'ny fisiana amin'ny fisiana amin'ny fisiana amin'ny fisiana amin'ny fisiana amin'ny fisiana amin'ny fisiana amin'ny fi
Were strata sealed against pollution? Yes [] No K Intervalft.	маналата та станалата и предоктивни и пре
Method of sealing bentonite	Work started 9-7-82 19 Completed 19
(10) WATER LEVELS:	WELL DRILLER'S STATEMENT:
Depth of first water, if knownft	This well was drilled under my furiediction and this report is true to best of my
Staking level after well completionft.	knowledge Hills
(11) WELL TESTS: Was well test made? Yes 🗆 No 🕱 If yes, by whom?	SIGNED(Well Dallar)
Type of test Pump Bailer Air Lift	NAME Hennings Bros ADROUBER Co., Inc.
Depth to water at start of testft. At end of testft	(Pennon, finger or corporation) (Typed or printed)
Dischargegal/min afterhours Water temperature	Modesto BUCOCOC CIU 05356
Chemical analysis made? Yes [] No 🕅 If yes, by whom?	200022 51515121/11/2/100 02
Was electric log made? Yes 🗌 No 🙀 If yes, attach copy to this report	License No. 290013 Date of this inflort? The LU- OL

DWR 188 (NEV. 7-76) IF ADDITIONAL SPACE IS NEEDED. USE NEXT CONSECUTIVELY NUMBERED FORM

			1	61025
THE RESOURCES AGENCY         DETERTMENT OF WATER RESOURCES         Note of harm Non	ODIGINAL	STATE OF C		Da pat fill in
Netter function         WATER WELL DRILLERS REPORT         State Well No.           (1) OWNER: Name         (1) OWNER: Name         (1) OWNER: Name         (1) OWNER: Name           (2) LOCATION OF WELL (See Instructions):         (2) OWNER: Name         (2) LOCATION OF WELL (See Instructions):         (2) OWNER: Name         (		THE RESOUR	CES AGENCY	•
Leed Prendi No. or Date 54.52       Dotar With No.         (1) OWNER: No.et.       Addres.         Addres.       Control Control Const.         (2) CONTROP OF WELL (See instructions):       Control Control Const.         (3) OWNER: No.et.       Control Control Const.         (4) Control Control Const.       Control Control Const.         (2) LOCATION OF WELL (See instructions):       Control Control Const.         Comm. Status if different from show       Control Control Const.         Prend Max and Control Const.       Control Control Const.         Well Albert (See Control Const.):       Control Control Const.         Control From Other Well Number.       Control Control Const.         Well Albert (See Control Const.):       Control Control Control Const.         Well Albert (See Control Const.):       Control Control Control Const.         Well Albert (See Control Const.):       Control Control Control Const.         Well Albert (See Control Const.):       Control Control Control Const.         Well Albert (See Control Const.):       Control Control Control Const.         Well Albert (See Control Const.):       Control Co	· · · · · · · · · · · · · · · · · · ·			NO. 243381
(1) OWNER: Name.         Address	Notice of Intent No.	WATER WELL D	RILLERS REPORT	State Well No.
Address       from ft. w. ft. Formitien (Describer, size or (Dashud))         (2)       LOCATION OF WELL (See instructions):       5       -10       Clay         (3)       LOCATION OF WELL (See instructions):       0       -10       Sendor         (3)       LOCATION OF WELL (See instructions):       -0       -5       TOC. SO.1.1         (4)       -00       90       Blue Chard         (5)       -10       Clay       -40       -90         (5)       -115       Exercise       Sendor       -90         (5)       -115       Exercise       Sendor       -90         (6)       Sendor       -115       Clay       -115         (6)       Formitadion and the sendor of the sendor o	Local Permit No. or Date 24.22			Other Well No.
Address       from ft. w. ft. Formitien (Describer, size or (Dashud))         (2)       LOCATION OF WELL (See instructions):       5       -10       Clay         (3)       LOCATION OF WELL (See instructions):       0       -10       Sendor         (3)       LOCATION OF WELL (See instructions):       -0       -5       TOC. SO.1.1         (4)       -00       90       Blue Chard         (5)       -10       Clay       -40       -90         (5)       -115       Exercise       Sendor       -90         (5)       -115       Exercise       Sendor       -90         (6)       Sendor       -115       Clay       -115         (6)       Formitadion and the sendor of the sendor o	(1) OWNER: Name_		(12) WELL LOG: To	115
City			from ft. to ft. Formation	
(2) LUCATION OF WELL (See Instructions):       10       40       90         Well abless fram above       40       -90       Eline       Eline         Well abless fram above       90       95       Eline       Eline         Well abless fram above       90       95       Eline       Eline       Eline         Well abless       10       -00       Send       95       Eline	City		<u>0 - 5 To</u>	p Soil
Weil address of different from a hore     40     90     Blue Stand       Towardhy     Range     Section     90     95     Blue Clay       Weil Addati     Insertion for other costs, nationals, hance, etc.     1 Mis. SOuth. 01     95     115     Stand       Weil Addati     Insertion for other costs, nationals, hance, etc.     1 Mis. SOuth. 01     95     115     Stand       Weil Addati     Insertion for other costs, nationals, hance, etc.     1 Mis. South. 01     95     115     Insertion for other costs, nationals, hance, etc.       Weil Addation     Insertion for other costs, nationals, hance, etc.     Insertion for other costs, nationals, hance, etc.     Insertion for other costs, nationals, hance, etc.       Weil Addation     Insertion for other costs, nationals, hance, etc.     Insertion for other costs, nationals, hance, etc.     Insertion for other costs, nationals, hance, etc.       Weil Addation     Insertion for other costs, nationals, hance, etc.     Insertion for other costs, nationals, hance, etc.     Insertion for other costs, nationals, hance, etc.       Weil Addation     Insertion for other costs, nationals, hance, etc.     Insertion for other costs, nationals, hance, etc.     Insertion for other costs, nationals, hance, etc.       Weil Addation     Insertion for other costs, nationals, hance, etc.     Insertion for other costs, etc.     Insertion for other costs, etc.       Weil Addation     Insertion for other costs, et	(2) LOCATION OF WELL (See instruc	tions):		
Township		Well Number		
Diffuse for effer, med. milosét, tesse, etc 1 Mi - SOITH Of 95 - 115 Mile Sunti West Side West Side (3) TYPE OF WORK: New Well Depending Recaditating Hardsaud Well Perford 0 Profession Well, LOCATION SERTCH Well, LOCATION SERTCH Well, LOCATION SERTCH Well, LOCATION SERTCH Well, LOCATION SERTCH (0) CAN'S are also a set of a set of series To bla Control 100 Series (1) Source of box Profession Professi				
West side     115 -       West side     115 -       Other West Side     3) TYPE OF WORK:       Reconstruction     Reconstruction       Protection     Charles       West Location steric     Charles       West Steric     Charles       Charles     Charles       Data Construction     Charles       West Steric     Charles       Charles     Charles       Data Construct     Charles       West Steric     Charles       Charles     Charles       Data Construct     Charles       Charles     Charles       Charles     Charles       <	4			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
West side     (3) TYPE OF WORK:       New Well December D       Reconstruction       Reconstruction       Beconstruction		THE EVENING		Set from the second sec
New Walk Dependent I       Reconstitutions       Reconstitutions       Branchmark        Branchmark       Branchmark       Branchmark       Branchmark       Branchmark       Branchmark       Branchmark       Branchmark       Branchmark       Branchmark       Branchmark       Branchmark       Branchmark </td <td></td> <td></td> <td></td> <td>The second secon</td>				The second secon
New Walk Dependent I       Reconstitutions       Reconstitutions       Branchmark        Branchmark       Branchmark       Branchmark       Branchmark       Branchmark       Branchmark       Branchmark       Branchmark       Branchmark       Branchmark       Branchmark       Branchmark       Branchmark </td <td></td> <td></td> <td></td> <td></td>				
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Recruditioning       Bitchell (Bitchell			<u> </u>	<u> </u>
Hortzoatal Weil       Destruction □ OPerative proceedings in Kom 1/2         Weill LOCATION SKETCH       Comparing Industrial         Weill LOCATION SKETCH       Comparing         Weill LOCATION SKETCH       Comparing         Weill Control       Stock         Weill Control       Stock         Weill LOCATION SKETCH       Control         (b) EQUEMENT:       (a) CRAVEL SCAS.         (b) EQUEMENT:       (a) CRAVEL SCAS.         (b) EQUEMENT:       (a) CRAVEL SCAS.         (b) EQUEMENT:       (b) CRAVEL SCAS.         (cher □       Booken         (cher □       Top of bore         (d) Weill SEAL       Top of bore         (d) Weill SEAL       Top of bore         (e) Weill SEAL       Top of bore         (f) Weill SEAL       Top of bore         (g) Weill SEAL       Top of bore         (her of bore       Top of bore         (f) Weill SEAL       Top of bore				2 K
WELL LOCATION SERTCH       (4) PROPOSED Vistor         WELL LOCATION SERTCH       Umaicipat         WELL LOCATION SERTCH       Wonkipat         (5) EQUIPMENT:       (a) GRAVE MACK:         (b) EQUIPMENT:       (a) GRAVE MACK:         (c) EQUIPMENT:       (a) GRAVE MACK:         (b) EQUIPMENT:       (b) GRAVE MACK:         (c) EQUIPMENT:       (a) GRAVE MACK:         (b) EQUIPMENT:       (b) GRAVE MACK:         (c) EQUIPMENT:       (c) GRAVE MACK:         (c) EQUIPMENT:       (c) GRAVE MACK:         (c) EQUIPMENT:       (c) GRAVE MACK:         (c) EQUIPMENT:       (c) GRAVE MACK:         (c) EQUIPMENT:       (c) GRAVE MACK:         (c) EQUIPMENT:       (c) GRAVE MACK:         (c) EQUIPMENT:       (c) GRAVE MACK:         (c) EQUIPMENT:       (c) GRAVE MACK:         (c) EQUIPMENT:       (c) GRAVE MACK:         (c) EQUIPMENT:       (c) GRAVE MACK:         (c) EQUIPMENT:       (c) GRAVE MACK:         (c) EQUIPMENT:       (c) GRAVE MACK:         (c) EQUIPMENT:       (c) GRAVE MACK:         (c) ODE       (c)			Tr - 1127	NY
(4) FROPOSED Data         Domeric         Domeric         Industrial         Towell         No         Stability         O         100         Vertus         (a) FROPOSED Data         Industrial         Industrial         Towell         Numicipal         Other         Other         Backet         Promotion         (b) FERPORATION         Steel         Promotion         O         100         O         100         Steel         Promotion         O         100         Difficities         O         IO         O         IO         Promite         Difficities         O         IO         IO <td>*</td> <td>Destruction [] (Describe</td> <td>112-111</td> <td></td>	*	Destruction [] (Describe	112-111	
Domestic     Infestion       Infestion     Infestion       Infestion     Infestion       Tw Well     Stock       Stock     Infestion       (a) EQUIPMENT:     (b) CRAVER ACC:       (b) EQUIPMENT:     (c) CRAVER ACC:       (c) CASING INSTALLEDI     (c) CRAVER ACC:       (c) CASING INSTALLEDI     (c) CRAVER ACC:       (c) CASING INSTALLEDI     (c) CRAVER ACC:       From     To     Dia Context       From     To </td <td></td> <td>procedures in Item 17</td> <td></td> <td>Roll</td>		procedures in Item 17		Roll
WELL LOCATION SKETCH       Other         WELL LOCATION SKETCH       Other         Statistic       Cable         Atr       Other         Bucket       No         Statistic       Cable         Atr       Demonstration         Cable       Atr         Bucket       No         Prom       To         Prom<		1. 18	- QIP	A W
Industrial     Industrial       Twell     Stock       Municipal     Industrial       Well LOCATION SKETCH     Other       (5) EQUERMENT:     (1) GRAVEN CACK:       Industrial     Industrial       Other     Bucket       Industrial     Industrial       Other     Bucket       Industrial     Industrial       Other     Bucket       Industrial     Industrial       Industrial     Industrial<				
WELL LOCATION SEETCH     Other       WELL LOCATION SEETCH     Other       (3) EQUIPMENT:     (a) CRAVEL FACK:       Rowerse     (b) Roverse       (chier     (chier       (chier     (chier <td< td=""><td></td><td></td><td>OLY .</td><td>4 D</td></td<>			OLY .	4 D
WELL LOCATION SKETCH       WELL LOCATION SKETCH       Other       (3) EQUIPMENT:       (3) GRAVEN ACK:       The No B Size of the No B Size of the No B Size of the No B Size of the No B Size of the No B Size of the No B Size of the No B Size of the No B Size of the No B Size of the No B Size of the No B Size of the No B Size of the S		()	110-	
WELL LOCATION SKETCH       Other       -         (5) EQUIPMENT:       (e) GRAVEN FACK:         Rotary C       Reverse         (f) GRAVEN FACK:         Cable         Air         Deter of bore         Cher         Bucket         No         Size         (7) CASING INSTALLED:       (f) FERPORATION:       -         (7) CASING INSTALLED:       (f) FERPORATION:       -         Type of perfective or ble of screen       -       -         (7) CASING INSTALLED:       (f) FERPORATION:       -         Type of perfective or ble of screen       -       -         (f) CASING INSTALLED:       (f) FERPORATION:       -         Was surface sanilary scal provided? Yes E       No         I yes, to depth 20. ft.         (f) WELL SEAL:       -       -         Was surface sanilary scal provided? Yes E       No         I yes, to depth 20. ft.         (l) WATER LEVELS:       -       -         Depth of stree made?       Yes         No         I thereal ft.         Vas well ter made?       Yes         No         I yes, by whon?       -         Ywas well ter made?       Yes         No         I yes, by whon?       -         Yes out ter made?       Yes         No		Stock E	10 - 10	
(5) EQUIPMENT:       (6) CRAVE PACK:         Rotary C       Reverse []         Rotary C       Reverse []         Cable []       Atr         Cable []       Atr         Cite []       Bucket []         Place of bore       []         Chies []       Bucket []         Place of bore       []         Chies []       Bucket []         Place of bore       []         (7) CASING INSTALLED:       (8) PERFORATION:         Type of performance or Rec of screen       -         To       Cable         If the fit []       To         ft fit []       ft fit []         ft fit []       To         ft fit []       ft fit []         was surface sanitary scal provided? Yes []       No []         ft fit []       No []         was surface sanitary scal provided? Yes []       No []         ft fit []       ft fit []         wes surface sanitary scal provided? Yes []       No [] <td< td=""><td>1</td><td>Municipal A</td><td>-280</td><td></td></td<>	1	Municipal A	-280	
Retary E       Reverse       HS       No       Size       Size         Cable       Att       Dependence       Size       Size       Size         Cable       Att       Dependence       Size       Size       Size         Cher       Bucket       Dependence       Size       Size	WELL LOCATION SKETCH	Dother D	-50	
Cable _ Air _ Bucker of bore _ 20 m 100		$(M \mathcal{M})$	L	
Other       Bucket		(111)		
(7) CASING INSTALLED:       (8) PERPORATION:         Steel □       Plastic □       Countre 1         Type of perfection or nice of screen       -         From       To       Stop         ft.       ft.       ft.         0       100       Stop         (9) WELL SEAL:       -         Were strata scaled sgalast pollution? Yes []       No [] If yes, to depth 20 ft.         were strata scaled sgalast pollution? Yes []       No [] Interval ft.         (10) WATER LEVELS:       BERLORILE         0       10       Method of service after water, if known         5tanding level after water, if known       6,         (11) WELL TESTS:       Wes will det made? Yes []       No [] If yes, by whom?         Was well tet made? Yes []       No [] If yes, by whom?       NAME         Type of test       Punc []       Ar lift []         Depth to water at start of test_ft.       At end of test_ft.         NAME       HENNINCS       BRUESI PERSISE         West start at at of tes		20 100	( <u>())</u>	
0       100		IATIONS:		- NIF.
0       100	Stoel D Plastic Congrete Type of perfe	and a or size of screen	Par	AIFING
0       100		DTO READ	-	1CON
0       100	and the second second second second second second second second second second second second second second second		<u> </u>	
(9) WELL SEAL:       -         Was surface sanitary seal provided? Yes E       No □ If yes, to depth 20 ft.         Were strata sealed against pollution? Yes □       No □ Intervalft.         Method of sealing:       BE BLORIte         Work started NOV s       1983         Completed       19         (10) WATER LEVELS:       Work started NOV s         Depth of first water, if known       ft.         Standing level after well completion       6t.         Standing level after well completion       6t.         Was well test made?       Yes □         Was well test made?       Yes □         Type of test       Pump □         Bailer □       Air lift □         Depth to water at start of testft.       At end of testft.         NAME       HENNINCE MENCE:         Water temperatures       MODESTU, TA         Opth to water at start of test	0 100 0 160 80 *	100 Acreen		
Was surface sanitary seal provided? Yes E       No I If yes, to depth 20 ft.         Were strata sealed against pollution? Yes I       No Interval ft.         Method of seating       Bentonite         (10) WATER LEVELS:       Depth of Brit water, if known         (11) WELL TESTS:       Kincwledge and bellet.         Was well test made?       Yes I         No II If yes, by whom?       Air Uft I         Now at each of test       Pump I         Beller I       Air Uft I         Discharge       gal/min after.         bours       Water temperature.         Chemical analysis made? Yes I       No If yes, by whon?         Chemical analysis made? Yes I       No If yes, by whon?         Chemical analysis made? Yes I       No If yes, by whon?         Chemical analysis made? Yes I       No If yes, by whon?         Chemical analysis made? Yes I       No If yes, by whon?         Chemical analysis made? Yes I       No If yes, by whon?         City       20081311         City       20081311         Yes I       No If yes, by whon?         City       20081311		- All Bro-		<u> </u>
Was surface sanitary seal provided? Yes E       No I If yes, to depth 20_ft.         Were strata sealed against pollution? Yes I       No Interval ft.         Method of sealing       Bentonite         (10) WATER LEVELS:       Depth of Brit water, if known         (11) WELL TESTS:       Kit is well completion         Was well test made?       Yes I         No II If yes, by whom?       Air Uft I         NAME       HENNINCS         Was well test made?       Yes I         No II If yes, by whom?       Air Uft I         Depth to water at start of test       ft.         Discharge       gal/min after         bischarge       gal/min after         No II If yes, by whon?       Completion         Chemical analysis made? Yes I       No II If yes, by whon?         Chemical analysis made? Yes I       No II If yes, by whon?         Chemical analysis made? Yes I       No II If yes, by whon?         City       MODESTIVE ICA         OPEN STIVE       If yes, by whon?         City       COMPLEXTIVE ICA         City       COMPLEXTIVE ICA         City       COMPLEXTIVE ICA	(9) WELL SEAL:	1 Maria	-	₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩
Method of sesting       Bentonite         Method of sesting       Bentonite         (10) WATER LEVELS:       Work started NOV s       1983       Completed       19         (10) WATER LEVELS:       Depth of first water, if known       ft       Well DRILLER'S STATEMENT:       19         Standing level after well completion       6t       ft       Well was drilled under my jurisdiction and this report is tree to the best of my knowledge and bellet.         (11) WELL TESTS:       No M If yes, by whom?       Stoned       Stoned       Stoned         Was well test made?       Yes I       No M If yes, by whom?       NAME       HENNINGS Helder (1) for the best of my knowledge and bellet.         Depth to water at start of test       ft       At end of test       ft         Discharge       gal/min after.       hours       Water temperature.       NAME       (10, 10, 10, 10, 10, 10, 10, 10, 10, 10,		If yes, to depth_20_ft.		
(10) WATER LEVELS:         Depth of Brst water, if known         Standing level after well completion         (11) WELL TESTS:         Was well test made?         Yes         No       If yes, by whom?         Air lift         Depth to water at start of test         ft.         Discharge         gal/min after         how is if yes, by whom?         Chemical analysis made?         Yes         No         Mater temperature         Chemical analysis made?         Yes         No         Mater temperature         Chemical analysis made?         Yes         No         Mater temperature         City         2008131         Moders         2008131         Yes         No         Mater temperature         City         2008131         Yes         No         Yes         No         Yes         No         Yes         No         Yes         No         Yes </td <td></td> <td>o 🗋 Intervalft.</td> <td></td> <td></td>		o 🗋 Intervalft.		
Depth of Brst water, if knownft       ft         Standing level after well completion8       ft         (11) WELL TESTS:				
Standing level after well completion       8         (11) WELL TESTS:       (11) WELL TESTS:         Was well test made?       Yes []       No []       If yes, by whom?         Type of test       Pump []       No []       If yes, by whom?         Depth to water at start of testft.       At end of testft.       At end of testft.         Dischargegal/min afterhours       Water temperature       (11) WOLLSTO, (12, 12, 12, 12, 12, 12, 12, 12, 12, 12,		ft.	1	
Was well test made?       Yes       No M If yes, by whom?       Air lift         Type of test       Pump       No M If yes, by whom?       Air lift         Depth to water at start of test       ft       At end of test       ft         Discharge       gal/min after       hours       Water temperatures       (Person Arm. on supportion)       (Discharge State)         Chemical analysis made?       Yes       No M If yes, by whom?       City       2208131       City       2008131       City       City       2008131       City	Standing level after well completion	<u> </u>	-i	
Type of test Pump Bailer Air lift Air and of test ft. At end of test f		v whom?	2	11 Well Part Dio Luck
Dischargegal/min afterhours Water tempersture Chemical analysis made? Yes D No M If yes, by whom?City20081311 10 10 10 10 10 10 10 10 10 10 10 10 1	Type of test Pump	Air Uft	IVAND	······································
Dischargegal/min afterhours Water tempersture Chemical analysis made? Yes D No M If yes, by whom?City20081311 10 200813111 10	· · · · · · · · · · · · · · · · · · ·		Address 3525 PE	AND ALE AVE
2908131 (1) Circle 1, String 7, 198	**	- · ·	CityMODESTD	1PA
	<b>*</b> *		License No 290813	12 Dite of the rout 1 Nov. 7, 1983

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DWR 188 (REV. 7-76) IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

	STATE OF		(03V
ORIGINAL		CES AGENCY	Do not fill in
File with DWR	DEPARTMENT OF V	VATER RESOURCES	
9 88 <i>0</i> ° (1,2,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,	WATER WELL D	RILLERS REPORT	No. 326966
Mation of Farma NT-			C/G_2_
Notice of Intent No Local Permit No. or Date <u>89-398</u>			State Well No.
(1) OWNER: Name		(12) WELL LOG: Total	depth 162 ft. Completed depth 130 ft.
Address		from ft. to ft. Formatio	n (Describe by color, character, size or material)
City		0 - 4 Sand	
(2) LOCATION OF WELL (See instru	ca.	4 – 8 Clay	
County Stanislaus Owne	r's Well Number	8 - 17 Sand	-
Well address if different from above		<u> 17 – 58 Clay</u>	
Township Crows Landinglange	Section	<u>58 - 61 Sand</u>	
Distance from cities, roads, railroads, fences, etc.		<u>61 - 89 Clay</u> 89 - 92 Sand	
		<u>89 - 92 Sand</u> 92 - 95 Clay	
		95 -100 Sand	
1		100 -113 Clay	
	(3) TYPE OF WORK:	113 -115 Sand	
	New Well 😰 Deepening 🗆	115 -113 Clay	<u>.</u>
	Reconstruction	117 -123 Sand	7
	Reconditioning	123 -128 Slav a	andsaud streaks
	Destruction [] (Describe	128 -162 Clay	(C)
	destruction materials and pro-	(71 N	12 A
	cedures in Item 12)		S) AND
	(4) PROPOSED USE	$\sim \gamma - C$	
	Domestic Public	$\nabla - \partial \beta $	ovil e
	Irrigation		LUGV
	Industrial Test Well	() <u>-</u>	Ma
	Municipal D	A/18	
	Ojkjer L	1978) <u>- (1</u> 176	2
	(Desocibe)	$\chi \rightarrow - \chi \rightarrow$	
WELL LOCATION SKETCH	$\vee$	$\sim$	
	VER AUCK		
Rotary Reverse	No 2 Stat 5 12 Sa	nd (1)/2	
Cable Air Datamete		(CHV)	
Other D Buckey Reduced I			
(7) CASING INSTALLED: (8) PER	PORATIONS:	ナーー	NEINED
Steel   Plastic XX Operate   Type of	performition or size of scriber		With the second second
From To Dia Gage or Ro	n Ion Kastot		
ft ft if Wall	v di Vsize		
0 130 8 160 11	0 601382		MA
PVC	SHULL	<u> </u>	
			and and a second s
(9) WELL SEAL:	If yes to depth 90 ft		
Were strate sealed against pollution? Yes No C Method of sealing		•••• •••	19 Completed 1-3 19 90
(10) WATER LEVELS:	13.27 <b>.28</b>	Work started. WELL DRILLER'S STA	
Depth of first water, if known	ft.		
Standing level after well completion	ft.	This well was drilled under m best of my bounded as and belie	y jurisdiction and this report is true to the
(11) WELL TESTS:			Delema
Was well test made? Yes 🗌 No 🗍 If yes,	by whom?	Signed	(Well Driller)
Type of test Pump A Baller Baller		NAME Calwater Dril	ren or corporation) (Typed or printed)
Depth to water at start of test it. Discharge gal/min after bours	At end of test ft Water temperature	Address 300 S. Kilroy	
	by whom?	City Turlock, Ca.	zip_ <u>95380</u>
	attach rupy to this report	License No. <u>321252</u>	Date of this report _1-16-90
DWR 168 (REV. 12-86) IF ADDITION	AL SPACE IS NEEDED, USE I	NEXT CONSECUTIVELY NUMB	ERED FORM 86 96355

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Page Owner' Date W	IAL h DWR <u>1</u> of <u>1</u> s Well No ork Began	1	17	<u>9</u> ह	3		WELL	COMP	struction	ON Pam	N REPOR		51/19		- 12	JSTATI	
~~~~~~	Permit Ag mit No.	<u>78-103</u>	9				Permit	Date		*****				AF	N/TR\$/	 ОТНЕВ	
ORIENT	ATION (ビ)		RTIC/	AL			ORIZONTAL				Ì	JSC	03.	7			
DEP SU	TH FROM						F DESCRIPTION				I	•					
FL O	10 FL	Soil	)esc	rib	)e n	nate	erial, grain size	e, color, etc	<u>.</u>	<u>}</u>	ddress 1062		WELL LO	CATIO	DN-	67-	**************************************
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10		Sand					·				ounty Star	islau	S	*****	******		
13	18	Clay	********	BY GLOGIAN				· · · · ·			PN Book	Page		Parcel		*****	
18		Sand								1 To	ownship 🚞	Range					
22	50	Clay		·····						Ľ	atitude		NORTH				
50		Sand								ļ		MIN. SE CATION S	C. KETCH ·			AC	TIVITY (~)
58		Clay			· · ·			•				NORTH				.X. 1	EW WELL
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<u>81</u> 83		Clay Sand					· · · · · · · · · · · · · · · · · · ·			1							Deopen Other (Speci
<u>86</u>		Clay								1						*****	
<u>95</u>		Sand														P	ESTROY (Describ rocedures and Ma
108		Clay					**************************************	····		1							nder "GEOLOGIC NNED USES
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	1	1	ACCORD/10144					·····	***************************************	WEST					EAST	11	MONITORING
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		; ; ;								]							HEAT EXCHANGE DIRECT PUSH
	!	; ;								-							INJECTION
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	1	1				~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~				ļ		SOUTH					SPARGING
		1	6,679,e, a traver								lustrate or Describe ences, Rivers, etc. ar vcessary, PLEASE I	Distance of V	ell from Roa	ds, Build	ings,		REMEDIATION OTHER (BRECIFY)
<b></b>		1 		••••••			20097922-343			ne	cessary. PLEASE I	BE ACCURA	E & COMP	LETE.	er y		
		·				******			······	1	WATE	R LEVEL	& YIELD	OF C	OMPL	ETED	WELL
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		1							a.a		EPTH OF STATIC						
	1	1								8	STIMATED YIELD					<b>**</b> **********************************	
TOTAL	DEPTH OF	BORING 1	11	5		(F	'eet)			1	EST LENGTH					(12) )	
	DEPTH OF				err					8	May not be repri						
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FROM	EPTH SURFACE	BORE- HOLE	F	YP	E ( :	2)	<u> </u>	Charine (a)	, 		· · · · · · · · · · · · · · · · · · ·	FROM S	PTH IURFACE		WIATA		PE
agaag KANA (a tala ta manaan		DIA.	¥	Ā	18	H.	MATERIAL /	INTERNAL	GAUGE		SLOT SIZE			- CE-	BEN-		FILTER PAG
FL.	to FL	(Inches)	BLA	SCR	CON CON	IL P	GRADE	DIAMETER (Inches)	OR WAI		IF ANY (inches)	Ft.	o Ft.	MENT (∠)	TONITE (上)	FILL (스)	(TYPE/SIZE
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	Well Co	nstruction Di	agra	អា				RSON, FIRM, OR	CORPORATION	m	PED OR PRINTED)						
*****	Well Co Geophy	sical Log(s)	-				PE			m	PED OR PRINTED)	Mode	sto		1	CA	95357
	Well Co Geophyr Soll/Wel		Ana	alyse			PE	RSON, FIRM, OR			ped or printed)	Mode	sto city			CA	95357 2P

DWR 188 REV. 11-97

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IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMPERED FORM

ORIGINAL File with DWR	STATE OF C WELL COMPLE			~ ~	- <u>Do</u> - 01	NOT FILL IN
Page 1 of 1	Refer to Instruct			ATE WELL NO		ION NO.
Owner's Well No	No. 7	49718			• • •	
Date Work Began	04/03/02 Ended04/04/02		LATITUDE		LO	NGITUDE
	Agency Stanislaus Co DER			111		
Permit No. 0	2-055 GEOLOGIC LOG Permit Date 03/11/0	2	L	APN/TRS	OTHER	
(	GEOLOGIC LOG		WELL O	WNER -	410.400 (alara	
ORIENTATION (⊥)	VERTICAL HORIZONTAL ANGLE (SPE	CIEYN			0	
	DRILLING ROTARY FLUID MUD			(03	X	
DEPTH FROM SURFACE	DESCRIPTION		$\sim$	C - 4	) 0	
Fl. to Fl.	Describe material, grain, size, color, etc.			r / & ->>> + > m +		
J	sand	Address 337A Rul	ole Rd	CALLON		
	clay	City Crows Landi	ng CA 95313			······
}	sand	County Stanislaus			·····	
£	; clay	APN Book	_Page ?	Parcel		
1	coarse sand	Township	Range	Section		
	blue clay	Latitude	1		<u> </u>	
\$~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	fine blue sand	DEG. MIN.	SEC. TION SKETCH -		DEG.	MIN. SEC. TIVITY (2)
	firm clay		NORTH			IEW WELL
{	gray clay					CATION/REPAIR
	very fine blow sand/coarse				- 1	Ceepen
	clay/very fine sand streaks					Oiner (Specify)
L	very fine blow sand				n	ESTROY (Describe
	; clay				ρ υ	ESTROY (Describe rocedures and Materials inder "GEOLOGIC LOG"
	blow sand/clay streaks					NED USES ( $\angle$ )
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	i 1					DIRECT PUSH
1	1 1				VADA	
						SPARGING
<u>i</u>	- 5 1	Illustrate or Describe Dist.	- SOUTH	Building +		REMEDIATION
		Fences, Rivers, etc. and all necessary. PLEASE BE 2	ach a map. Use additiona	l paper if	c	THER (SPECIFY)
					L	
	F T T	1	LEVEL & YIELD C			
		DEPTH TO FIRST WAT	TER_3U (Ft.) BEI	OW SURFAC	E	1
	۲ ۲ ۱ ۱	CEPTH OF STATIC WATER LEVEL 32		1010000	04/04	W02
	t	ESTIMATED YIELD *				
TOTAL DEPTH OF	BORING 160 (Feet)	TEST LENGTK			15+1	
	COMPLETED WELL 148 (Feet)	1	ntative of a well's lo			
L						
DEPTH	BORE - CASING (S)		DEPTH	ANN	ULAR	MATERIAL
FROM SURFACE	BORE TYPE (/)	1 11	FROM SURFACE		TY	PE
	(Inches) Z W ZH GRADE DIAMETER O	SAUGE SLOT SIZE		CE- BEN- MENT TONIT	E FILL	FILTER PACK
Fi. to Ft.	H (inches) TH	ICKNESS (Inches)	Fit. to Fit.	$(\mathcal{L})$ $(\mathcal{L})$	1	(TYPE/SIZE)
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}	HMENTS (Z)		ION STATEMENT			
Geologie Well Cr	c Log I, the undersigned, certify that the natruction Diagram NAME CALWATER DRI	s report is complete and accurate to	o the best of my knowled	ige and belief.		
1	sical Log(s) NAME ORCHARD (PERSON, FIRM, OR CO	RPORATION) (TYPED OR PRINT	ED)			
1	ter Chemical Analysis <u>300 S. Kilroy Rd</u>		Turlock CITY		CA	95380 ZiP
1	INFORMATION, IF IT EXISTS. Signed WELL INCLUSES	. Marine John	0	4/18/02		34218
1		NOVED REPERTSENTATION	ma.	TE SIGNEO	(	2.5711の広いの詳 お目れおなびの

DWR 185 REV. 11-97

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

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Page 1 of 1								Refer to In					S	TATE V	VELL NO	)./ STAT	ION NO.
Owner's W								No	×803	4	31						
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Local Per	rmit Ag	gency E	nvir	on	me	nta	LResources		~~~~~~~			-  [		L_1			
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5:		Clay Sand			·····			·····	~	3	County <u>Stanislau</u>		·····				
25		Clay	******			·····				- 7	APN Book	Page		Parce	]		
35		Sand						U- 01,*Werene age////// mag factoria		-11	Cownship	Range		Sectio	m		······································
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	Other		<b></b>				- ADDRES Signed -	° 1					CITY	12/03/	03	STAT	e ZIP 668622
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### PLOT PLAN

(Indicate Distances in Feet)

- 1. Name of street and distance from nearest cross roads to well site.
- 2. Outline of the property, easements.
- 3. Outlines and locations of all existing and proposed structures, including covered areas such as patios, driveways, and walks.
- 4. Location of house sewer outlet, public sewer, sewage disposal system, or proposed sewage disposal system, proposed expansion of sewage disposal system, industrial waste pond, or any other possible source of contamination.
- 5. Location of other wells within radius of 300 feet on the property or adjoining property.
- 6. Location of sewage disposal system on adjoining property or within a radius of 100 ft. (private well) 150 ft. (public well).

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Written description of well location (if not visible from road):

I HEREBY CERTIFY THAT I HAVE PREPARED THIS APPLICATION AND THAT THE WORK WILL BE DONE IN ACCORDANCE WITH THE PROVISIONS OF THE LAWS OF THE STATE OF CALIFORNIA, THE ORDINANCES OF THE COUNTY OF STANISLAUS AND THE RULES AND REGULATIONS OF THE STANISLAUS COUNTY DEPARTMENT OF ENVIRONMENTAL RESOURCES (DER). DER WILL BE CONTACTED FOR INSPECTION OF ANNULAR SEAL INSTALLATION, AND AFTER WELL WORK HAS BEEN COMPLETED.

1. All existing wells within a 300 foot radius of the proposed new well(s) on the property or adjoining property have been located and so indicated.

 Proposed well(s) will be located at least 50-100 feet from any sewage disposal system on property or adjoining property. Public well requires a distance of 100-150 feet from disposal system (100 ft. septic tank and leach lines, 150 ft. pits).
 Submit d, as notice of well work completion.

SIGNED:

DATE: 7-27-12

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OF BORING. OF BORING. OF COMPLE DIA. (Inches) 04 18" 14 18" ACHMENTS Dylo Loy Construction D hysical Log(s) Water Chemical				4 (Feet) C/ MATERIAL / GRADE PLASTIC PLASTIC	ASING (S) INTERNAL DIAMETER (Inches) 10" 10" 10" 10" LWATER	GAUGE OR WALL THICKNES SDR2 SDR2 SDR2	DEPTH TO FIRST W DEPTH OF STATIC WATER LEVEL 30 ESTIMATED YIELD ' TEST LENGTH May not be repre SLOT SIZE IF ANY (inches) 26	(FI.) (GF (GF)) TOTAL Sentative of a 11 FROM SURFA FL to F 0 50 50 FION STATE/ to the best of my	(FL) BELC & DATE N PM) & TE . DRAWD <u>rell's lor</u> ACE FL N 144 MENT knowledge	IEASUREC ST TYPE_ OWN	8/31 (FL) ield. T i+ i+ i+ i+ i= fiLt ) (∠)	MATERIAL YPE FILTER PACK (TYPE/SIZE) 6 X 12 GRAVE 95380													
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	an 8/30/20 t Agency 3 12-152 → ) → ∨ V DRILLIN METHO 5 TOP S 6 HARD 21 SAND 34 CLAY 45 CLAY 53 BLUE 55 SAND 60 SHALE 73 COAR 90 CLAY 92 SAND	NoRUBLE an 8/30/2012 t Agency STAN , 12-152 GEO ✓ DRILLING METHOD RO Descrit 5 TOP SOIL 6 HARD PAN 21 SAND SMAI 34 CLAY & SAI 45 CLAY BROV 53 BLUE CLAY 55 SAND 60 SHALE BRC 73 COARSE S/ 90 CLAY & SH/ 92 SAND	No. RUBLE an 8/30/2012 ( Agency STANISL , 12-152 GEOLO ✓ VERTICAL DRILLING BOTAF METHOD BOTAF 0 5 TOP SOIL 6 HARD PAN 21 SAND SMALL C 34 CLAY & SAND 45 CLAY BROWN 53 BLUE CLAY 55 SAND 60 SHALE BROWN 73 COARSE SAND 90 CLAY & SHALE	No. RUBLE an 8/30/2012 t Agency STANISLAUS , 12-152 GEOLOGIC ✓ VERTICAL H DRILLING ROTARY METHOD ROTARY 1 Describe main 5 TOP SOIL 6 HARD PAN 21 SAND SMALL CLA 34 CLAY & SAND 45 CLAY BROWN 53 BLUE CLAY 55 SAND 60 SHALE BROWN 73 COARSE SAND 90 CLAY & SHALE BF 92 SAND	NoRUBLE         gan 8/30/2012	R     WELL     COMP Refer       No., RUBLE     N       No., RUBLE     N       gan 8/30/2012     Ended 8/31/2012       t     Agency     STANISLAUS CO.DER       . 12-152     Permit     Date       GEOLOGIC LOG     Permit     Date       ✓     VERTICAL     HORIZONTAL     ANGLE       DRILLING     ROTARY     FLUID     MUD       DESCRIPTION     DESCRIPTION       Describe     material, grain, size, color, e.       5     TOP SOIL       6     HARD PAN       21     SAND SMALL CLAY STREAKS       34     CLAY & SAND       45     CLAY BROWN       53     BLUE CLAY       55     SAND       60     SHALE BROWN       73     COARSE SAND       90     CLAY & SHALE BROWN       92     SAND	R       WELL       COMPLETIO         No.       Refer to Instruction         No.       RUBLE       No.         Ian       8/30/2012       Ended 8/31/2012         t       Agency       STANISLAUS CO.DER         .       12-152       Permit       Date       8/21/2012         GEOLOGIC LOG       GEOLOGIC LOG       Method       NO.       B/21/2012         ✓       VERTICAL       HORIZONTAL       ANGLE       (SPECIFY)         DRILLING       ROTARY       FLUID       MUD         Describe       material, grain, size, color, etc.       5         5       TOP SOIL       6       HARD PAN         21       SAND SMALL CLAY STREAKS       34         34       CLAY & SAND       53         55       SAND       60         60       SHALE BROWN       73         73       COARSE SAND       90         90       CLAY & SHALE BROWN       92         92       SAND       93	Refer to Instruction Pomphéti       NoRUBLE     No. E0159994       gan 8/30/2012 Ended8/31/2012	R       WELL COMPLETION REPORT Refer to Instruction Promphilet         No. RUBLE       No. E0159994         gan \$/30/2012       Ended\$/31/2012         t Agency STANISLAUS CO.DER	R       WELL COMPLETION REPORT Reproduct No. EURphildt       No. E0159994         No. RUBLE       No. E0159994         gan \$/30/2012       Ended\$/31/2012         GEOLOGIC LOG       Permit Date \$/21/2012         GEOLOGIC LOG       Permit Date \$/21/2012         Methoo RotTary       Fluid MUD         DESCRIPTION       DESCRIPTION         Describe material, grain, size, color, etc.       Address 525 RUBLE RD         5       TOP SOIL         61       HARD PAN         21       SAND SMALL CLAY STREAKS         23       BLUE CLAY         53       BLUE CLAY         53       BLUE CLAY         53       BLUE CLAY         53       SAND         60       SHALE BROWN         73       COARSE SAND         90       CLAY & SHALE BROWN         92       SAND         92       CLAY BROWN         93       SUM         94       CLAY BROWN         95       SUM         90       CLAY & SHALE BROWN         92       SAND         93       CLAY BROWN         94       Method and method and methor the mage Undage and the mage and the mage and the mage and the	R       WELL COMPLETION REPORT Refer to Instruction Tampholdt       Iou Si Si O 19 E State Well State Well State Well In Linit I Internet State State Well Internet State State Well Internet State State Well Internet Well Internet State Well Internet Well Intern	R       WELL COMPLETION REPORT Refer to Instruction Panghlet No. RUBLE       No. EC0159994         Intervettion 2000       STATE VELL NO./ST STATE VELL NO./ST STATE VELL NO./ST Intervettion/State Intervettion/St Inte													

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Stanislaus		DEPAI	RTMENT OF ENVIRONMENTAL RESOURCES 3800 Comucopia Way, Suite C, Modesto, CA 95358-9492 Phone: 209.525.6700 • Fax: 209.525.6774 www.stancounty.com
Siriving to be the dest		Permit No. 20 14 - 21	14 Nes (044 ONK# 61909
	APPLICATION F	OR WELL CONSTRUCTIO	NOR DESTRUCTION PH 73838
construct and/or des	troy the work herein	aus County Department of Enviro rescribed. PLEASE NOTIFY TH EN WELL WORK IS COMPLETE	nmental Resources (D.E.R.) for a permit to IS DEPARTMENT (USING PERMIT # AND D
Job Address/Locatio	n: 330 W.	west MAin	City: <u>CROWS/Anding</u> CROWS/Anding
Distance & Directior	from the Nearest Cro	ss Streets: Yy W. o.	Acrowslanding
Property Owner's Na			77
Water Agency: DY	es TENTO Water An	ency Name:	
		1	
Address.	advert a Do	Minol Transmith	City/State:
Contractor's Name;	MULLICK NR.	VI, MP ( & LAZ LICENSE #:	<u>57218</u> Phone: <u>6611152</u>
	few Well ☐ Destru Imber of new wells to		e proximity now or within 6 months(
Intended Use: 🗌 Ir	idustrial @Domes eothermal Heat Exch	tic/Prívate ☐ Domestic/Publi ange ☐ Agricultural	c
*	1	relocated from parcel of origin? relocated to out-of-county?	Yes Yes Yes* Provide water agency authorization
Existing Well Prese	nt: 🗗 Yes 🗌 No	Status: 24 Active	To be destroyed  Inactive
Community Service	District:	Within C.S.D. of	
Nearest: Pit I	tic tank 100 <sup>+</sup> Privy <u>11/19</u> y Lagoons <u>11/14</u>	Disposal Field <u>105</u> Animal Enclosure <u></u> Dwellings <u>977</u>	beepage Pit <u>MA</u> Dry Well <u>MA</u> ther Well <u>Property Lines</u>
Specifications: Dia Esti Sea Proj	Drilled Cable T meter of Excavation mated GPM <u>3</u> ling Material <u>Brate</u> posed Depth of Grout I Method: Free Fa	Diameter of Well Casi Estimated Finished Well Grout Manufacturer w Seal SO'	Depth $170'$ TO $B = N$ Grout name $G \text{Kout well}$ roposed # of bags
Specifications: Sea	I Method: 🗌 Free 🖡	Grout Manufacturer	
/ envenen			

,

549-	20	DO NO PHILT CHECKE
	PRILLERS REPORT	Nº 66834
REGIONAL WATER POLLUTION		State Well No.
CONTROL BOARD No	CALIFORNIA 20	Other Well No. 55/95
(1) OWNED.	(11) WELL LOG:	
Name Address USCO4C		a completed well 255 ft.
Address (C) C - 1 - 1	Descriptions Describe by color, cherester, star o O fr. 10 30 tr. San	
ng gananang ng kang ng	<u>30 40 San</u>	d & clay streaks
(2) LOCATION OF WELL:	<u>40 - 46 - Cla</u>	¥
County Owner's number, If any-	<u>46 59 San</u> 59 70 San	
R. F. D. or Street No.	70 - 83 - 5an	d & clay d
See other side.	83 87 Cla	
	<u>87 100 San</u>	d
\$\$4,\$94,\$1,	<u>100 ° 106 ° San</u>	
(a) MUDD OF WORK (alask)		d & clay
(3) TYPE OF WORK (check):	<u>116 130 San</u> 130 134 Cla	······································
New well 10 Deepening [] Reconditioning [] Abandoo [] If abandonment, describe material and procedure in Item 11.	134 160 San	······································
(4) PROPOSED USE (check): (5) EQUIPMENT:	160 175 San	a
Domestic 🗋 Industrial 🗋 Municipal 🗍 Rotary 🕅	<u>175 - 182 - Clay</u>	У
Cable	<u>182 191 San</u>	
Irrigation [2] Test well U Unter U Dug Well		d & clay
(6) CASING INSTALLED: If gravel packed	<u>200 ° 206 ° Clay</u> 206 ° 219 ° San	
SINGLE M DOUBLE Gage Diemeter , from 10	219 " 245 " San	
From O(1. 1255 1.1611iam. 1/411will Dirmeter 2411 fr. 0-255	245 " 249 " Blue	s clay
		e clay
	<u>274 * 280 * Sanc</u>	l & clay
	۰۰ ۰۰	
	1. 63	۲۰۰۰ میں اور اور اور اور اور اور اور اور اور اور
Type and use of those or will ring wow wo wow on a Size of gravel: 2/411 pock		
Desceibe joine Welded collar	۹۱ er	
(7) PERFORATIONS:	14 F)	
Trpe of perforator used Mill perforator, (slots)		
Size of performione 3/16 <sup>11</sup> in., length, by 2 1/2 <sup>11</sup> in.	17 Ex	
From 80 <sub>11,10</sub> 255 it. 8 Perf. per raw 3 Raws per It.	52 67	
		******
	24 kl	
	<u>ر ماند میں معامل میں معامل میں معامل میں معامل میں معامل میں معامل میں معامل میں معامل میں معامل میں معامل میں</u> 16 H	N 8
	0 G	
(8) CONSTRUCTION:	9e 51	
Wes a surface conitary real provided?  Yes X No To when depth ft.  Were any strate scaled against pollution?  Yes X No 11 yes, sort depth of strates	+1 44	
From fr. to fc.	H H	
	11 11	
Method of Sesling	Work started 5/8 1961	. Cumpleted 5/21 19 61
(9) WATER LEVELS:	WELL DRILLER'S STATEMENT:	
Depth at which waiter was first found 40 fe.	This well was deilled under my jurise my knowledge and belief.	liction and this report is true to the best of
Standing level before perforating 40 /e.	NAME HOWK Well & E	quipment Co.
Scending level stee perforeting 40 ft.	(Person, firm, or curpersti	where we have a second
(IA) WEET TPETE.	**************************************	0-210
(10) WELL TESTS:	Crows Landing	valliornia
Wes a pump text mide? XI Yes D No If yes, by whom? Yields: 2.,450 gsl./min. wish 50 ft. draw down after 4	(SIGNED]	W 201 1///11/2
Temperature of water 70 Was e chemical analysis mader D Yes & No	License No. 195628	Dated8/219.61

5/9	20
ORIGINAL WATER WELL D	DRILLERS REPORT
	Nº. 66836
REGIONAL WATER FOLLUTION STATE OF (	CALIFORNIA State Well No.
CONTROL BOARD No (Intest appropriate number)	CALIFORNIA Other Well No. 5-725-25
(1) 0	(11) WELL LOG:
Name	Total depth _ 270 ft. Depth of completed well 225 ft
	Formation: Describe by color, character, slat of material, and signature.
Addres MSCO45	0' (1. 10 40 11. Sand
۲ - ۲۵۵۵ ۱۹۹۵ - ۲۹۹۵ ۱۹۹۵ - ۲۹۹۵ ۱۹۹۵ - ۲۹۹۵ ۱۹۹۹ - ۲۹۹۹ ۱۹۹۹ - ۲۹۹۹ ۱۹۹۹ - ۲۹۹۹ ۱۹۹۹ - ۲۹۹۹ ۱۹۹۹ - ۲۹۹۹ ۱۹۹۹ - ۲۹۹۵ ۱۹۹۹ - ۲۹۹۵ ۱۹۹۹ - ۲۹۹۵ ۱۹۹۹ - ۲۹۹۹ ۱۹۹۹ br>۱۹۹۹ - ۲۹۹۹ ۱۹۹۹ br>۱۹۹۹ - ۲۹۹۹ ۱۹۹۹ - ۲۹۹۹ ۱۹۹۹ - ۲۹۹۹ ۱۹۹۹ - ۲۹۹۹ ۱۹۹۹ - ۲۹۹۹ ۱۹۹۹ - ۲۹۹۹ ۱۹۹۹ ۱۹۹۹ ۱۹۹۹ ۱۹۹۹ - ۲۹۹۹ ۱۹۹۹ - ۲۹۹۹ ۱۹۹۹ - ۲۹۹۹ ۱۹۹۹ ۱۹۹۹ ۱۹۹۹ ۱۹۹۹ - ۲۹۹۹ ۱۹۹۹ - ۲۹۹۹ ۱۹۹۹ - ۲۹۹۹ ۱۹۹۹ - ۲۹۹۹ ۱۹۹۹ ۱۹۹۹ ۱۹۹۹ ۱۹۹۹ - ۲۹۹۹ ۱۹۹۹ - ۲۹۹۹ ۱۹۹۹ ۱۹۹۹ ۱۹۹۹ ۱۹۹۹ ۱۹۹۹ ۱۹۹۹ ۱۹۹۹	40 69 Sand
(2) LOCATION OF WELL:	<u>69 74 Sand</u> 74 83 Clay
County Owner's number, if any-	83 100 Sand
R. F. D. or Stitet No.	100 " 105 " Sand
	105 109 Clay
See other side,	109 117 Sand
۳۰۰٬۰۰۵٬۰۰۰٬۰۰۰٬۰۰۰٬۰۰۰٬۰۰۰٬۰۰۰٬۰۰۰٬۰۰۰٬	<u>117 130 Clay</u>
	130 160 Sand & small gravel stk:
(3) TYPE OF WORK (cbeck):	160 178 Sand
New Well B Deepening C Reconditioning Abandon C	<u>178 190 Coarse sand</u> <u>190 216 Coarse sand</u>
11 abandonment, describe material and procedure in Item 11. (4) PROPOSED USE (check): (5) EQUIPMENT:	<u>216 "236 "Blue clay</u>
	236 " 249 " Sand
Domestic 🗌 Industrial 🗌 Municipal 🗌 Rotary 🖾 Cable	249 * 269 * Clav
Irrigation 🙀 Test Well 🗌 Other 🗌 Cable 🛄	269 " 270 " Sand
(6) CASING INSTALLED: If gravel packed	
SINGLE DOUBLE G Gage Diameter From 0 1. 10 180 1. 1801. 1/4 11 will of Date 301 11. 0-225	
From U fr. to I OU fr. I Oblam. 174 with	
is the state of th	Automation (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)
	ρομιατική ματολογία το ματολ
1 (2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	n ri
Type and are of shoe or well ring - Size of gravel: 3/411 TOC	
Describe Jular Wolded collar	
(7) PERFORATIONS:	1 11 1 11 1 11
Type of perforance used Mill perforator (slots)	
Size of performance 3/16 <sup>11</sup> in., length, by 2 7/2 <sup>11</sup> in.	41 41
From 40r in 145 (1. 8 Perf. per row 7 Rows per fe.	
2) (j (j (j (j (j (j (j (j (j (j (j (j (j	
(8) CONSTRUCTION:	
Was sourface sanitary seal provided? [] Yes [] Na Ta what depth fr.	4 et
Were any areata scaled against pollution? D Yes II No 18 yes, note depth of areata	and the second sec
From (1. 10 ft.	
Method of Scaling	Work started 6/27 19 61, Completed 7/13 19 61.
	WELL DRILLER'S STATEMENT:
	الأساسية المتحالية والمعالية والمتحالية والمتحالية والمتحالية والمحالية وال
(9) WATER LEVELS:	This well was drilled under my jurisdiction and this report is true to the best of my knowledge and heltel.
(9) WATER LEVELS: Depth at which water was first found 40 fr.	my knowledge and heltel.
(9) WATER LEVELS: Depth at which water was first found 40 fr. Standing level before perforating 40 fr.	my knowledge and heltef. NAME Howk Well & Equipment Co. (Perton, firm, of corporation) (Typed or printed)
(9) WATER LEVELS: Depth at which water was first found 40 fr. Standing level before perforating 40 fr.	my knowledge and heltef. NAME Howk Well & Equipment Co. (Ferror, firm, or corperation) Address P.O. Box 248
(9) WATER LEVELS:         Depth at which water wat first found       40         ft.         Standing level before perforating       40         ft.         tranding level after perforating       40         (10) WELL TESTS:	my knowledge and heltef. NAME Howk Well & Equipment Co. (Perton, firm, of corporation) (Typed or printed)
(9) WATER LEVELS: Depth at which water was first found 40 fr. Standing level before perforating 40 fr. Itanding level after perforating 40 fr. (10) WELL TESTS: Fas a pump tere made? © Yes □ No 16 yes, by whom? Same	my knowledge and heltef. <u>NAME Howk Well &amp; Equipment Co.</u> (Ferton, frm. of caperation) (Typed or printed) Address P.O. Box 248 <u>Crows Landing</u> , California (Signed)
<ul> <li>(9) WATER LEVELS:</li> <li>Depth at which water was first found</li> <li>40</li> <li>fr.</li> <li>itanding level before perforating</li> <li>40</li> <li>fr.</li> <li>itanding level after perforating</li> <li>40</li> <li>ft.</li> <li>(10) WELL TESTS:</li> <li>Taxa pump test mide? G: Yes □ No 1f yes, by whom?</li> <li>Same</li> <li>itande</li> td--><td>my knowledge and heltef. NAME Howk Well &amp; Equipment Co. (Frina, film, of cape (situa) Address P.O. Box 248 Crows Landing, California [SIGNED] Well Delling</td></li></ul>	my knowledge and heltef. NAME Howk Well & Equipment Co. (Frina, film, of cape (situa) Address P.O. Box 248 Crows Landing, California [SIGNED] Well Delling
(9) WATER LEVELS: Depth at which water var first found 40 fr. Standing level before perforating 40 fr. tranding level after perforating 40 fr. (10) WELL TESTS: Fare pump tere mide? © Yes □ No 1f yes, by whom? Same	my knowledge and heltef. <u>NAME Howk Well &amp; Equipment Co.</u> (Ferton, frm. of caperation) (Typed or printed) Address P.O. Box 248 <u>Crows Landing</u> , California (Signed)

ORIGINAL			USCOUV Do not fill in
File with DWR	DEPARTMENT OF V	VATER RESOURCES	007057
	WATER WELL D	RILLERS REPORT	No. 281301
Notice of Intent No.			State Well No State
Local Permit No. or Date <u>89-67</u>			Other Well No.
(1) OWNER: Name		(12) WELL LOG: Total	depth 310 ft. Completed depth 300 ft.
Address			(Limited by color, there dur, size or material)
City		COLUMN STATES OF THE STATES OF	Soil
(2) LOCATION OF WELL (See instru	ections):	<u>3 -9 Clay</u>	
County Stanislaus Owne	r's Well Number	<u>9 - 18 Sand</u>	
Well address if different from above		18 - 24 Clay	
Township Range	Section		Sand
Distance from cities, roads, railroads, fences, etc.		<u>52 - 53 Blue</u> 53 - 68 Sand	Clar
Hest Nain	west side	68 - 80 Clay	
	<u></u>	<u>80 -83 Sand</u>	
	(3) TYPE OF WORK:	83 - 89 Way	
	New Well X Deepening	00 444 00	
	Reconstruction	111 - 1/15 CIRA	
	Reconditioning 🗍		Sand-fine
	Horizontal Well	123 - 126 Blue	
	Destruction 🗌 (Describe		By Sand
	destruction materials and pro- cedures in Item 12)	5159-163 Ckay	
	(4) PROPOSED USE	169 166 Sand	U AND
	Domestic	160 - 230 Clay	
	Irrigation	286 291 Blue	- FOLAL
	Industrial	283 - 310 Clav	Card a
	Test Well	2001-410 0103	- Az
	Municipal 🗸 🗆	$\left[ \frac{1}{\sqrt{2}} \right] = \frac{1}{\sqrt{2}} \left[ \frac{1}{\sqrt{2}} \right]$	<u> </u>
	Oxper S	D. A	
WELL LOCATION SKETCH	(Deparibe)	1 - 616	aanaanaanaa ahaa ahaa ahaa ahaa ahaa ah
(5) EQUIPMENT: (& CR	IVEL MCK:	10-0	
	Not six Conting		<u> </u>
	Not bore 6	GWV	
Other D Bucket Q Recked		<u> </u>	<u> </u>
(7) CASING INSTALLED: (6) PER	PORATIONS	₩ <u> </u>	
Steel [X Plastic ] Sontrate Type of	performition or size of series		<u></u>
		-	
From To Dia. Gage or Free ft. ft Wall H	in To Shot		
0 300 6 1/1 100		¥	y 
			*********
(9) WELL SEAL:			
Was surface sanitary seal provided? Yes 🕅 No 🗆	If yes, to depth ft.		
Were strata sealed against pollution? Yes No [	interval ít.		
Method of sealing 30"x20' CAN CEMENT		Work started Mar. 31	19.89 Completed Apr. 11 19.89
(10) WATER LEVELS:		WELL DRILLER'S STA	TEMENT:
Depth of first water, if known	/t 30 n	This well was drilled under m	y jurisdiction and this report is true to the
Remains four share will any 1 M.	<u>vV</u> ft.	best of my knowledge and belie	<i>t</i> . ()
Standing level after well completion			
(11) WELL TESTS	huwhom? HENNINGS	Signed	(Well Driller)
(11) WELL TESTS: Was well test made? Yes (2) No I If yes, Type of test Pump (2) SEE Bailer		NAME HENNINGS B	ROS. DRILLING CO., INC.
(11) WELL TESTS: Was well test made? Yes (2) No I if yes, Type of test Pump (2) SEE Bailer Depth to water at start of test I TACHE	At end of test ft.	NAME HENNINGS B	irm or corporation) (Typed or printed)
(11) WELL TESTS: Was well test made? Yes (2) No I if yes, Type of test Pump (2) SEE Bailer Depth to water at start of test it TTACHE Discharge gal/min after hours	Alr lift     Alr lift     Alt end of test ft.     Water temperature	NAME HENNINGS B (Person, fi Address 3525 PELAN MODESTO	irm, or corporation) (Typed or printed)
(11) WELL TESTS: Was well test made? Yes (2) No I if yes, Type of test Pump (2) SEE Bailer Depth to water at start of test IA TTACHE Discharge gal/min after hours Chemical analysis made? Yes No XX If yes,	Alr lift     Alr lift     Alt end of test ft.     Water temperature	NAME HENNINGS B (Person, fi Address 3525 PELAN	irm or corporation) (Typed or printed)

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ORIGINAL File with DWR	THE RESOUR DEPARTMENT OF V	CALIFORNIA RCES AGENCY WATER RESOURCES RILLERS REPORT	USCOUT Do not fill in No. 304,019
Notice of Intent No Local Permit No. or Date <u>89–205</u>			State Well No.
(1) OWNER: Name	ene ene		al depth <u>172</u> ft. Completed depth <u>145</u> ft. tion (Describe by color, character, size or material)
City (2) LOCATION OF WELL (See instru	ca.	0 - 21 Sand 21 - 48 Clay	
County Stanislaus Owner	er's Well Number	<u>48 - 50 Sand</u>	
Well address if different from above Township <u>Crows Landingtange</u>	Soution	<u>50 - 86 Clay</u> 86 - 89 Sand	
Distance from cities, roads, railroads, fences, etc.		<u>89 - 134 Clay</u>	
		<u>134 - 140 Sand</u>	
		<u>140 – 172 Clay</u>	
	(3) TYPE OF WORK:	<u> </u>	12
	New WellXX Despening		<u></u>
	Reconstruction		↔ <u> </u>
	Reconditioning		
	Destruction [] (Describe		
	destruction materials and pro- cedures in Item 12)	2 <i>[ [ [ [ [ [ [ [ [ [</i>	le le le le le le le le le le le le le l
	(4) PROPOSED USE		2 auto
	Domestic Priv.		
	Irrigation	A	1 By
	Industrial	<u>A-12</u>	40
	Test Well	Q Q/P	2
	Municipal Diher	2/1) - 2/1/2	
WELL LOCATION SKETCH	(Describe)	$\mathcal{R} \longrightarrow \mathcal{R}$	/
	IVEL BACK:		
		nd	<u> </u>
	x of bore		-16.V
	rom 50 145 A	<u>(()) ~</u>	
(7) CASING INSTALLED. (8) PER	POBATIONS	∫	- Nr
Steel Plastic XX Spressee Type of	participation or size of scriptor		-,09,
From The Dia Gage or Ette	CAN CAN		NAA
ft. ft fa Wall	Size		
0 145 6 160 12	25 11125		
PVC	allin	unan	
	<u> </u>		
(9) WELL SEAL: Was surface sanitary seal provided? Yes 🕅 No 🗌	If yes, to depth50ft		
Were strata sealed against pollution? Yes No {	a july to page the constant and a state of the		
Method of sealing Bento		Work started	Completed 19
(10) WATER LEVELS:	***************************************	WELL DRILLER'S ST	ATEMENT:
Depth of first water, if known		This well was drilled under	my jurisdiction and this report is true to the
Standing level after well completion		best of my knowledge and he	
(11) WELL TESTS: Was well test made? Yes No I If yes,	by whom?	Signed	(Well Driller)
Type of test Pump Baller Baller		NAME Calwater Dr	illing Co., Inc.
Depth to water at start of test ft.	At end of test ft.	Address 300 S. Kiln	, firm, or corporation) (Typed or printed) DV
Discharge gal/min after hours Chemical analysis made? Yes 🗌 No 🗔 If yes,	Water temperature by whom?	City Turlock, Ca	
	attach copy to this report	License No. <u>321252</u>	Date of this report <u>5-25-89</u>
DWR 188 (REV. 12-86) IF ADDITION	AL SPACE IS NEEDED. USE	NEXT CONSECUTIVELY NUN	BERED FORM 80 96333

ORIGINAL File with DWR					WELL		of calif		REPORT	r TP	25S	EOM	ÝTY	DO N	ZD Z
Page of						Refer to In						STATE	WELL	VO./STA	TION NO.
Owner's Well No.					and the second second second second second second second second second second second second second second second	N	°. 54	175	510					1	
Date Work Began _	8/11	/94			Ended 8/1	1/94					LATITUDE			£.(	ONGITUDE
Local Permit Age	ency	Stai	115	sla	us co. Der	n a or a	Env. R	leso	urces	[L					
Permit No.		9			Permit	Date	8/10/9	14		. L		***************************************	APNITA	IS/OTHE	R
		GEOI	001	SIC	LOG	*********	1	<u> </u>	<u> </u>	>	WELL (	WNE	R		
ORIENTATION (ビ)	X very	TICAL	·	, HOI	RIZONTAL AN	(GLE (	SPEC FY)	Nam	ę:	XI I	1.1	NV	1		
DEPTH FROM	DEPTH	TO F	IRST	ŴĂ	TER(Ft.)	BELOW SUP	IFACE	Mail	inį lit	イント	~ () <sup>~</sup>	- C	>		
SURFACE					ESCRIPTION										410 <u>(</u> 17
Ft. to Ft.	171.000	$\rightarrow$ SO:			uerial, grain size, co	nor, eic.				V	VELL	CATI	0N		1 C
		wn (			114	<u>a Nan Chi</u> Ny Tsina		Addı	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	Same		2			
6 8		d pa		<u>чу</u>	<u>(</u> 1973) 1. 2		<u></u>	City	<b>*</b>	<u></u>	<u> </u>		·		
8 17	Cla	~~~~~~	24.1		<u>~~~</u>	یں <sup>ر</sup> اس <sub>میں</sub> اس کا رکھ		Cour				Stani			
17: 24	San		- Ci	2		and the second s		APN	Book	Page .		Parcel			
24 36	Cla			<u>ुस्य २</u> २				Tow. Latit	nship	Range		Section			
36 56	Contraction of the local division of the loc	ie`c.	Tay	<u>, , , , , , , , , , , , , , , , , , , </u>	<u>in an an an an an an an an an an an an an</u>	and the second s	e 1635	Latit	ude'	MIN. SEC	NORTH	Longi	tude	DEG.	I WE MIN. SEC.
56 95		wn (		<u> </u>	<u>ک آب کا کی کی ۔</u> ایک کی کار	the de	1 400 1 - Kasi		LO'C	ATION	SKETCH	*****		A	CTIVITY (2)
95 97	San		<u></u>	<u> </u>		<u>ar</u> See				NORTI	1				NEW WELL
97 104	Cla		nin.	liter l	Nor (C									1	ICATION/REPAIR
104 107	San		$\overline{\sqrt{2}}$		and the second se	<u>NY</u>									Deepen
107 - 157	and the second se		šł	nal	estrèaks										Other (Specify)
		2 2		3	$\overline{\langle \langle \cdot \rangle}$									1	
		77	<u>منتخب من</u>	Ś	nt de la companya de la companya de la companya de la companya de la companya de la companya de la companya de La companya de la companya de la companya de la companya de la companya de la companya de la companya de la comp									1 8	DESTROY (Describe Procedures and Mater
	<u> </u>	195	and the second s					<u>}.~</u>					سر		Under "GEOLOGICLO
1 1	रकेंट	244	7980 (MARCA)					WES					EAST		(∠) _ MONITORING
1 1														-	R SUPPLY
i 1							<i>*</i>								X Domestic
1 1															Public
1 1															Irrigation
( i 1 1															Industrial
1 1				~											
۱ ا															CATHODIC PROTI
1 1								Il!us	trate or Descri	SOUTI be Distance	af Well from	n Landi	marks	1 _	TION OTHER (Specify)
, , , , , , , , , , , , , , , , , , ,								such PLE	trate or Descri os Roads, But ASE BE ACC	dings, Fenc URATE &	es, Rivers, el COMPLET	с. Е.			
i i								DRILL			******	*****		.L	000000 <sup>101</sup> *****************************
<u> </u>								METH	00	d rota			FLUID .		
· · · · · · · · · · · · · · · · · · ·			<u>.                                    </u>					neeT	- WATER H OF STATIC						
								WATE	R LEVEL	T0	(Ft.) & D	ATE ME	EASURE	iD	
								ESTIN	ATED YIELD						
TOTAL DEPTH OF I		15			eet)				LENGTH					(	F1.)
TOTAL DEPTH OF (	COMPLET	ED W	ELL		<u>LL2(Feet)</u>	s		* Ma	y not be repres	sentative of	a well's lor	ig-term	yield.		·
00071		Γ		*****	С	ASING(S)							ANNU	JLAR	MATERIAL
DEPTH FROM SURFACE	BORE- HOLE	TYP	E (2	2)	[	T			ii	FROM	PTH SURFACE			Tì	/PE
	DIA,				MATERIAL/	INTERNAL DIAMETER	GAUGI OR WA		SLOT SIZE	<u> </u>		CE-	BEN-		FILTER PACK
	(inches)	BLANK	CON	ann.	GRADE	(Inches)	THICKNE		(inches)	Ft.	to Fl.		TONITE		(TYPE/SIZE)
Ft. to Ft.	14"	x	+	$t^{-}$	PVC	8"	160			0	64	1	X	1	1
Ft. to Ft.	14	1 2	đ	1	¥I	11			.062		112		1	1	4X12 sanc
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0; 92			+-	Τ		1	*****	مىلىت <u>ى مىرىسى</u> ا		1		• • • • • • • • • • • • • • • • • • • •	1	1	1
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0' 92 92 112 ATTACH Geologic Well Con Geophys	ff I MENTS Log Istruction Dis Joel Log(s)	agram	•		NAME (PERS	alwate	r Dril	this re Llin:	port is compl g CO., 1	lete and a	curate to			A.	l vledge and belie 95380
0' 92 92 112	ff I MENTS Log Istruction Dis Ical Log(s) ter Chemical	agram	•		NAME (PERS	Calwate	r Dril	this re Llin:	port is compl g CO., 1	lete and a	curate to	The bes		A.	vledge and balief 95380 21P

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# 05S9E Section 21

BC04M -9-21 5/ Do Not Fill In WATER WELL DRILLERS REPORT No 73890 (Sections 2076, 7077, 7078, Water Code) State Well No ...... STATE OF CALIFORNIA 148 -Other Well No. (11) WELL LOG: 163 163 Total Jepsh ft. Depth of completed well Formation: Describe by color, character, size of material, and structure. 11. 10 6 ton soil ...0 fe, 6 19 Coarse sand 33 Med fine sand 19 .33 35 Sand and soft blue clay Ownee's number, if any-46 Soft clay and fine sand \_35 46 53 fine cand Left off W. Main on crowslanding Highway 56 Med clay 53 First house on the left. Softer clay 1st landing 70 \_56 -70-74 sand. -74 108 sand (3) TYPE OF WORK (check): clay and sand -108 110 Reconditioning [] Abandon 🗍 346 -110 and If abandonment, describe material and procedure in Hem 11. \_\_\_\_\_ay -146 158 (5) EQUIPMENT: (4) PROPOSED USE (check): -198 brown\_sand <u> 16</u>2 ..... Domestic 🖅 Industrial 🗋 Municipal 🗍 Rotary Cable Irrigation 🔲 Test Well 🗍 Other  $\square$ Dug Well If gravel packed Gig from ft, Dismeter of Bore 10 12 ••• Well ..... Ľ. .... ... ... 54 ·... ... .... 15 ... Size of gravels ••• ٠. ,, in., length, by ła. •, . Peel, per row Rowe per ft. ... • ( • .... · · · · 0 • < . . •• ۰, \*\* ., ٤t. fr. Wark started Sept. 23 Completed Oct. 3, 1982 19

• • ... (8) CONSTRUCTION: Was a surface unitary seal provided? [] Yes [] No. To what depth Were any strein realed against pollucion? [] Yes [] No If yes, aute deprh af strata From f1. to Method of Sealing WELL DRILLER'S STATEMENT: (9) WATER LEVELS: This well was deilled nuder my jurisdiction and this report is true to the best of ٠,٠ īi. Depth at which water was first found 12 my knowledge and belief. ſ٤. NAME OI SONG Plumbing and Vell Drilling Standing level before perforating f. Standing level after perforating Address 1

[SIGNED]. ft, drew dawn after hrs. License No. 110637 Dated Feb. 5, 1963 War a chemical analysis made? 🔲 Yea 🗌 No

No If yes, by whom?

*		
10)	WELL	TESTS:

	~	· ·		~~~~~		~			~	•	
F##		pump			de?		D	Ye	1	D	

pump	1612	mager	1	368	4.1	140	21	121	٤
							~~~~		
				1./1	nín.	w]s}	,		
		*****			,		***	*******	~~~

Yield Temperature of water

ORIGINAL

Name

Address

......

FUo Original, Duplicate and Triplicate with the REGIONAL WATER POLLUTION

(2) LOCATION OF WELL:

(6) CASING INSTALLED:

• •

ft

..

SINGLE DOUBLE

From fi. to 150 ft.

Type and size of shoe or well ring

(7) PERFORATIONS:

11. 10

~~

77

Describe joint

From

Type of perforator used Size of perforations Deepening

б nism.

CONTROL BOARD No ....

Countr Stanislaus

R. F. D. or Street No.

New well

(1) OWNED.

Was elesseic log made of well? [] Yes [] No

57028 0.57 50H QUIN 🛆 840 

Well Diller

DWR 188 INEV. 3-54

3 4 Jun 14

ORIGINAL File with DWR		OF CALIFO		1 80	E ONLY -	DO NOT FILL IN					
Page 1 of 1	WELL COM	PLEIN. Instruction I			TATE WELL NO	DJ STATION NO.					
Owner's Well No		10.803	774								
Date Work Began						LONGITUDE					
Local Permit A Permit No. 0	gency STANISLAUS CTY DER 3-202 Barmit Data 7/	24/2003			APN/TRS	/OTHER					
remmi ivo	GEOLOGIC LOG	E-772000	here	WELLO	WNFR -						
ORIENTATION (⊥)	VERTICAL HORIZONTAL ANGLE	(SPECIFY)				$\sim$					
DEPTH FROM	METHOD ROTARY FLUID MUL	2	WS(050								
SURFACE Ft. to FL	DESCRIPTION Describe material, grain, size, color, a	etc.		1000-	-						
0: 25	SAND		Address 10336 C	ROWS L'ANDING	TROAD						
	CLAY, GRAY		City CROWS LA		13						
\$	CLAY, BLUE		County Stanislaus								
	SAND		APN Book Township								
	CLAY, GRAY		Latitude			DEG. MIN. SEC.					
	SAND			(, SEC. ATION SKETCH-		DEG. MIN. SEC.					
· · · · · · · · · · · · · · · · · · ·	CLAY & SAND CLAY, GRAY			- NORTH							
	SAND					MODIFICATION/REPAIR					
Sand de ser and the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second sec	CLAY, RED					Other (Specify)					
140 155	CLAY, GRAY					DESTROY (Describe Procedures and Materials					
						Under "GEOLOGIC LOG"					
1			WEST WEST		AST	Domestic Public Industrial					
			>		ш	MONITORING					
	1 					TEST WELL					
	;					HEAT EXCHANGE					
						DIRECT PUSH, INJECTION					
1						VAPOR EXTRACTION					
				- SOUTH		SPARGING REMEDIATION					
			Illustrate or Describe Dis Fences, Rivers, etc. and an necessary. PLEASE BE	tech a map. Use additiona	d paper if	OTHER (SPECIFY).					
	2 2 2 2		WATER LEVEL & YIELD OF COMPLETED WELL								
			DEPTH TO FIRST WATER 22 (FL) BELOW SURFACE 1								
			DEPTH OF STATIC WATER LEVEL 22	(Fi ) & DATE		8/7/2003					
( ) 						1					
TOTAL DEPTH OF			1	(Hrs.) TOTAL DRAW							
TOTAL DEPTH OF	COMPLETED WELL107 (Feet)		May not be repres	entative of a well's l	ong-term yie	<u>ld.</u>					
DEPTH	BORF. CASING (S	5)		DEPTH	ANNI	ULAR MATERIAL					
FROM SURFACE	BORE - TYPE (~)   HOLE DIA.	L GAUGE	SLOT SIZE	FROM SURFACE		Түре					
FI. to FI.	HOLE DIA. VI VI VI VI VI VI VI VI VI VI VI VI VI	R OR WAL	L IF ANY	Ft. to Ft.	CE- BEN- MENT TONIT						
0: 87					(4) (4)						
87: 107		S <u>SDR</u> SSDR		0 <u>26</u> 26 107		8 x 16					
······											
				2 4							
ATTACI	IMENTS ( )		CERTIFICAT	ION STATEMENT	[						
Geologic Well Co	Log I, the undersigned, certify nstruction Diagram NAME_CALWATE	that this report	t is complete and accurate G CO., INC,	to the best of my knowled	ige and belief.						
Geophys	ical Log(s) (PERSON) FIRM,	OR CORPOR	ATION) (TYPED OR PRIN	TED) Turlock		CA 05200					
Sol/Wat	ADD			CITY	0/40/02	CA 95380 STATE ZIP					
		//////////////////////////////////////	DREPRESENTATIVE	DA	8/12/03 TE SIGNED	434218 C-57 LICENSE NUMBER					
DWR 188 REV. 11-97	IF ADDITIONAL SPACE IS NEEDED	, USE NEXT	CONSECUTIVELY NU	MBERED FORM							

MS(05) 055/09E-21 2/2

	101		•
Lat: Long: <sup>s</sup> T!RSec ¼ Sec	STANISLAU DEPARTMENT OF ENVIRO 3800 CORNUCOPIA WAY, SUITE (209) 52	DNMENTAL RESOURCES E C, MODESTO, CA 95358-9492	Permit No. <u>05-1069</u> Date Issued <u>4-21-05</u>
Quad A.P.N	APPLICATION FOR WELL CO	NSTRUCTION OR DESTRUCTIO	N CK4232 Rock
	THIS PERMIT EXPIRES 1 YE/	AR FROM DATE ISSUED	
construct and/or destr	made to the Stanislaus County Depart roy the work herein describedPLEAS ERS REPORT) WHEN WELL WORK	BE NOTIFY THIS DEPARTMENT	
OB ADDRESS/LOCATION_	10562 CROWS LAN	DING RU City C	ROW LANDING
istance & Direction from Nea	arest Cross Streets 1/2 Mr. 50	OTH OF LIFST MARIN	ON EBST SINE
contractor's Name	WATER DRILLING, IN	L License # <u>4-34216</u>	Phone 667-7932
			DESTRUCTION
			, 
O NEAREST: OTH DRY	TIC TANK <u>1005</u> SEWER LINES ER WELL SEWAGE WELL MAL ENCLOSURE	E DISPOSAL FIELDOOF7OTHER	IT PRIVY
INTENDED USE	TYPE OF WELL	CONSTRUCTION / DESTR	UCTION SPECIFICATIONS
Industrial         Domestic / Private         Domestic / Public         Irrigation         Cathodic protection         Other_DAIR G	□ Cable Tool □ Drilled ☑ Gravel Pack ■ Rotary □ Other	Dia. of Well Excavation Dia. of Well Casing Gauge of Casing Depth Conductor Casing Depth of Grout Seal Type of Grout BEATON Grout Manufacturer	0R26 #Bags_9 REN
Vell Destruction: Describe m	nethod if different than minimum state s		
Existing well present?	NO Status: Active 🚜	To Be Destroyed	Inactive
Densit leaved by	D.E.R/USE	E ONLY	12,105
Permit Issued by: Permit Denied by:		Date:Date:	(See Attached)
	d by:	Date:	
PLOT CARD ON			OK P

File with D	ŴR				WELL	COMF		N REPO		10	191E	-	NOT FILL I
Page 1 of 2 Owner's W	Vall No	CROV	NSI AN	הואנ	~		nstruction i 0. <b>109</b>	-		STATE		OJ STA	TION NO.
					, Ended 8/3/2			1000	LATITU	I I IDE		L i	ONGITUDE
					S CO DER					[	1	1	
Permit		<u>7-135</u>			Permi	t Date _7/1	0/2007		L		APN/TRS	IOTHEI	3
	***************		GEOL	OGI	CLOG			[	WELL	OWN	ER –		
ORIENTATIO			RTICAL	H \ <u>RY</u>	HORIZONTAL	ANGLE	_(SPECIFY)		MISCO	5	$\mathcal{A}$		
DEPTH FR SURFAC				]	DESCRIPTION	I			MUCC				
Ft. to		SAND	Describe	mai	terial, grain, si	ze, color, e	ic.	GIT	WELL	LOCAT	nov—	\$7	rate zip
13		CLAY							B CROWSLANDI		DAD.		
17.		SAND	·····	······					ANDING CA 953	13			
19		CLAY						County STANK				·•····	
22		SAND	·					APN Book	Page	_ Parc	el		
29		CLAY						Township	Range	_ Secti	ion		
33			STREA	KSI	CLAY-BLUE			Latitude	MIN. SEC.		~	DEG.	MIN CCC
40		SAND	31 X 4						CATION SKETCI	]		T A	MIN. SEC. CTIVITY (⊻)
43			ROW	NISA	ND STREAK	S			NORTH			1	NEW WELL
63		SAND	21(011)	100									FICATION/REPAIR
66		CLAY										8	Deepen Other (Speci
68		SAND											
70		CLAY		·			a va	DPY (	ЭW.				DESTROY (Descril Procedures and Ma Under *GEOLOGIC
82		SAND	have 1.0			********							Linder *GEOLOGIC
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96		CLAY					Att	AUI	A L'IN				TEST WELL DIC PROTECTION
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118	119	SAND			······	······································		ugh ers 1979 ann al ann a "Mill I Millin Wall Quera ann ann a' Millin	SOUTH				REMEDIATION
119	120	CLAY						Riustrate or Describe Fences, Rivers, etc. and	Distance of Well from Roads 3 attach a map. Use adding	, <i>Bulldinş</i> mal paçer	35. if	6	THER (SPECIFY)
120	124	SAND						necessary. PLEASE I	s attach a map. Use addition BE ACCURATE & COM	ipléte.			
124	134	CLAY/S	AND S	TRE	AKS			WATE	R LEVEL & YIELI	OF C	OMPLI	ETED	WELL
134	135	SAND		······				DEPTH TO FIRST	WATER	ELOW S	SURFACE	E	1
135	138	CLAY						DEPTH OF STATIC	20(FL) & DAT		6	lat.	a <b>'7</b>
138	139	SAND				······						121	07
	TH OF F	ORING	180	(F)	(144				* (GPM) &			····	
							1		(Hrs.) TOTAL DRA				
TOTAL DEPT	TH OF C						L	May not be repl	resentative of a well's	1072-16	rm vieic	2	
TOTAL DEPT	TH OF C				0						ANNU	LAR	MATERIAL
OTAL DEPT		0005			<u>ب</u>	ASING (S)			DEPTH			ŝ	PE
IOTAL DEPT IOTAL DEPT DEPTH		BORE -	TYPE		200 <sup>1</sup>				DEPTH FROM SURFACE		······		
OTAL DEPT OTAL DEPT DEPTH FROM SURF	ACE	BORE - HOLE DIA, (inches)	TYPE	PIPE	MATERIAL /	INTERNAL DIAMETER	GAUGE OR WALL	SLOT SIZE		ČE-	BEN-		
OTAL DEPT COTAL DEPT DEPTH FROM SURF		HOLE DIA.	BLANK SCREEN Ad CON-	FILL PIPE	200 <sup>1</sup>	INTERNAL	GAUGE OR WALL THICKNESS	IF ANY	FL to FL	CE- MENT	TONITE	FILL	
TOTAL DEPT TOTAL DEPT DEPTH FROM SURF	ACE FL	HOLE DIA.		FILL PIPE	MATERIAL /		OR WALL	IF ANY 3 (Inches)		MENT	TONITE		
TOTAL DEPT TOTAL DEPT DEPTH FROM SURF Ft. to 1	ACE FL 100	HOLE DIA. (inches)	BLANK SCREEN	FILL PIPE	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	OR WALL THICKNES	s (inches)	Ft. to Ft.	MENT	TONITE	FILL	(TYPE/SIZE)
IOTAL DEPT IOTAL DEPT DEPTH FROM SURFA Ft. to 1	ACE FL 100	HOLE DIA, (inches) 12 1/4	SCREEN CON-	- Duccion	MATERIAL / GRADE PLASTIC	INTERNAL DIAMETER (Inches)	OR WALL THICKNES: SDB2	s (inches)	Ft to Ft 0 52	MENT	TONITE	FILL	FILTER PAC (TYPE/SIZE) 8X16 GRAV
IOTAL DEPT IOTAL DEPT DEPTH FROM SURFA Ft. to 1	ACE FL 100	HOLE DIA, (inches) 12 1/4	SCREEN CON-		MATERIAL / GRADE PLASTIC	INTERNAL DIAMETER (Inches)	OR WALL THICKNES: SDB2	s (inches)	Ft to Ft 0 52	MENT	TONITE	FILL	(TYPE/SIZE)
TOTAL DEPT TOTAL DEPT DEPTH FROM SURF/ FL to 1	ACE FL 100	HOLE DIA, (inches) 12 1/4	SCREEN CON-	- DUCION N	MATERIAL / GRADE PLASTIC	INTERNAL DIAMETER (Inches)	OR WALL THICKNES: SDB2	s (inches)	Ft to Ft 0 52	MENT	TONITE	FILL	(TYPE/SIZE
IOTAL DEPT IOTAL DEPT DEPTH FROM SURFA Ft. to 1	ACE FL 100	HOLE DIA, (inches) 12 1/4	SCREEN CON-		MATERIAL / GRADE PLASTIC	INTERNAL DIAMETER (Inches)	OR WALL THICKNES: SDB2	s (inches)	Ft to Ft 0 52	MENT	TONITE	FILL	(TYPE/SIZE)
COTAL DEPT COTAL DEPTH FROM SURFA FL to 1 0: 100:	ACE FL 100 140	HOLE DIA. (inches) 12 1/4 12 1/4 12 1/4 WENTS (	SCREEN SCREEN CON-		MATERIAL / GRADE PLASTIC PLASTIC	INTERNAL DIAMETER (inches) 8 8	OR WALL THICKNESS SDR2 SDR2	s (Inches) 6	Ft         to         FL           0         52         140           1         1         1           1         1         1           1         1         1           1         1         1           1         1         1           1         1         1           1         1         1           1         1         1           1         1         1           1         1         1           1         1         1           1         1         1           1         1         1           1         1         1           1         1         1           1         1         1           1         1         1           1         1         1           1         1         1           1         1         1           1         1         1           1         1         1           1         1         1           1         1         1 <tr tr="">          1         1</tr>	MENT (42)		FILL	(TYPE/SIZE)
TOTAL DEPT TOTAL DEPTH FROM SURF/ FL to 1 0 100 100 6 6 6	ACE FL 100 140 TIACHD Seologic L	HOLE DIA. (inches) 12 1/4 12 1/4 12 1/4	CON-		MATERIAL / GRADE PLASTIC PLASTIC	INTERNAL DIAMETER (Inches) 8 8 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	OR WALL THICKNES: SDR2 SDR2	s (Inches) 6	Ft to Ft 0 52 52 140	MENT (42)		FILL	(TYPE/SIZE)
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FL to 1 0 100 FL to 1 0 100 100 6 6 7 6 7 6 7 7 7 7 7 7 7 7 7 7 7 7 7	ACE Ft 100 140 TTACH Seologic I Vell Corris Seophysics Soli/Water	HOLE DIA. (inches) 12 1/4 12 1/4 12 1/4 VLENTS ( Log struction Dia	Landon Con-		MATERIAL / GRADE PLASTIC PLASTIC	INTERNAL DIAMETER (Inches) 8 8 8 9 9 9 9 9 9 9 9 0 0 9 1 9 1 9 1 9 1 9 1	OR WALL THICKNESS SDR2 SDR2 at this report in DRILLING	s (Inches) 6	FL to FL 0 52 52 140 TION STATEMEN TO the best of my knowledge	MENT (42)		FILL	(TYPE/SIZE)

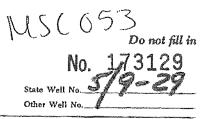
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# **05S9E Section 29**

#### ORIGINAL

File with DWR Notice of Intent No.

#### STATE OF CALIFORNIA THE RESOURCES AGENCY DEPARTMENT OF WATER RESOURCES WATER WELL DRILLERS REPORT



Local Permit No. or Date 85-99

(1	(12) WELL LOG: Total depth 166 ft. Depth of completed well 125 ft.
Adc	from ft. to ft. Formation (Describe by color, character, size or material)
City	<u>0 -5 Top Soil</u>
(2) LOCATION OF WELL (See instructions).	<u>5 -20 Clay &amp; Shale</u>
(2) LOCATION OF WELL (See instructions): County Stanislaus Owner's Well Number	20 -27 Sand
Well address if different from above 806 W. Linwood	27 -50 Clay
Township Turlock Bange Section	50 -60 Sand
Distance from cities, roads, railroads, fences, etc. 1/2 Mi. Uest of	60 -70 Claw
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(9) WELL SEAL: Was surface sanitary seal provided? Yes ☑ No □ If yes, to depth <u>50</u> . ft.	
Were strate seeled against pollution? Yes [] No [] Intervalft. Method of scaling <u>Baptopits</u>	
(10) WATER LEVELS:	Work started May 1/ 19.45 Completed 19 19 19 19
Depth of first water, if known ft.	This well was drilled under my jurisdiction and this report is true to the best of my
Standing level after well completion15_ft.	knowledge
(11) WELL TESTS:	(Well Driller)
Was well test made?     Yes []     No []     If yes, by whom?       Type of test     Pump []     Bailer []     Air lift []	NAME HENNINGS BROS, DRILLING CO., INC.
Depth to water at start of testft. At end of testft	(Person, firm, or corporation) (Typed or printed)
Dischargegal/min afterhours Water temperatura	Address 3525 PELANDALE AVE.
Chemical analysis made? Yes D No X If yes, by whom?	CityMODESTO, CAZIP95356
Was electric log made? Yes D No X If yes, attach copy to this report	License No. 290813 Date of this report MAY 31, 1905

DWR 188 (REV. 7-76) IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

PLOT PLAN (Indicate Distances in Feet)

055/09==29 2/2

- Name of street and distance from nearest cross roads to well site. 1.
- 2. Outline of the property, easements.
- 3. Outlines and locations of all existing and proposed structures, including covered areas such as patios, driveways, and walks.
- Location of house sewer outlet, public sewer, sewage disposal system, or proposed sewage disposal system, proposed 4. expansion of sewage disposal system, industrial waste pond, or any other possible source of contamination.
- 5. Location of other wells within radius of 300 feet on the property or adjoining property.
- Location of sewage disposal system on adjoining property or within a radius of 100 ft. (private well) 150 ft. (public well). 6. NORTH 1

Written description of well location (if not visible from road):

I HEREBY CERTIFY THAT I HAVE PREPARED THIS APPLICATION AND THAT THE WORK WILL BE DONE IN ACCORDANCE WITH THE PROVISIONS OF THE LAWS OF THE STATE OF CALIFORNIA, THE ORDINANCES OF THE COUNTY OF STANISLAUS AND THE RULES AND REGULATIONS OF THE STANISLAUS COUNTY DEPARTMENT OF ENVIRONMENTAL RESOURCES (DER). DER WILL BE CONTACTED FOR INSPECTION OF ANNULAR SEAL INSTALLATION, AND AFTER WELL WORK HAS BEEN COMPLETED.

- 1. All existing wells within a 300 foot radius of the proposed new well(s) on the property or adjoining property have been located and so indicated.
- Proposed well(s) will be located at least 50-100 feet from any sewage disposal system on property or adjoining property. 2. Public well requires a distance of 100-150 feet from disposal system (100 ft. septic tank and leach lines, 150 ft. pits). lotice of well work completion.
- 3. Submit v

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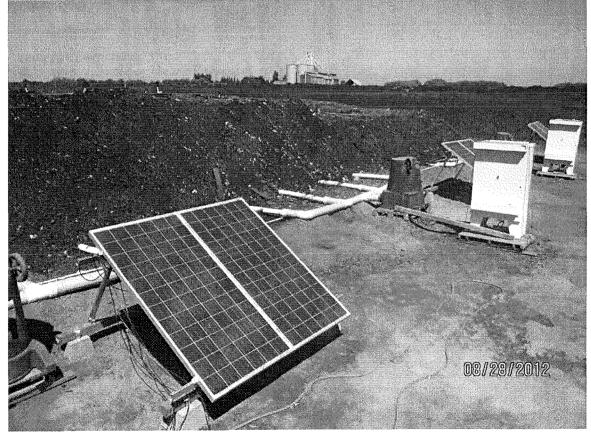
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# Greenwaste Compost Site Emissions Reductions from Solar-powered Aeration and Biofilter Layer

Report from the contract team

Funded by and prepared for the San Joaquin Valley Technology Advancement Program



<sup>5/14/2013</sup> 

# Table of Contents

Abstract	2
Acknowledgements	3
Required Statement	3
Executive Summary	3
Introduction	6
The Technology Advancement Program	8
Project Components	9
Conveyorization of the construction of the eASP	9
Moisture management1	2
Feedstock	4
Aeration System	5
Photovoltaic System	8
Temperatures and pathogen reduction2	0
Curing and testing2	1
Diesel Emissions Reductions	4
Land Use Reductions	5
Discussion	6
Conclusions	8
List of Appendices	9

# Abstract

This project was proposed as a technology development and testing project to evaluate an innovative extended aerated static pile (eASP) compost system design at commercial scale. The purpose was to determine whether the innovative design could produce compost of acceptable quality while reducing air emissions. The eASP was compared to standard windrow composting conducted at the same facility using the same feedstock. The eASP was tested in a single selected configuration; therefore, the results of this project do not establish optimal operational parameters, such as blower speeds or water application rates, but results are sufficient to establish proof of concept.

A prototype commercial-scale Aerated Static Pile (ASP) compost system was built using electric conveyors in place of diesel trucks and loaders. Three ASPs were built abutting each other to create an extended design which we define as an eASP. The eASP piles were deeper and wider than a typical windrow, were placed on a foundation of aeration tubing and chipped material, and were capped with a 1-foot-thick layer of finished, unscreened compost acting as a biofilter layer or "compost cap." The three static piles of the eASP were aerated using power provided by an on-site photovoltaic array. The intent of this design was to take advantage of emissions reductions previously demonstrated by biofilters and ASPs with a design footprint more similar to existing windrow methods.

Windrows of identical greenwaste feedstock and of industry typical dimensions were created nearby with a loader and turned with a diesel-powered mechanical turner, which is the normal method of composting in much of the United States. No biofilter caps were applied to the windrow, as that is not the normal practice at this facility, nor is it required by air district regulation.

A series of three ASP zones and three windrows were built approximately one week apart. This allowed the in-the-field measurement period to be shorter while still collecting measurements representative of the full 22 day active composting period. Emissions of VOCs, ammonia and greenhouse gases from both sets of piles were sampled using the USEPA-approved flux chamber method, as modified for composting emissions by the South Coast Air Quality Management District. Emissions reductions from reduced diesel use were calculated by using the estimated time necessary to accomplish standard tasks, multiplied by the allowable tailpipe emissions for equipment normally found at commercial scale composting sites, such as trucks and loaders.

The comparison of emissions from the 22-day active composting phase between the eASP and standard windrows demonstrated emissions reductions by the eASP of 99% for total non-methane, non-ethane VOCs, 70% for ammonia (average of field and lab), 88% for nitrous oxide, and 13% for methane. The overall reduction for CO2 equivalents was nearly 65%. Diesel use in pile construction and active-phase management was 87% less for the eASP system, with commensurate reductions in criteria pollutant emissions associated with diesel fuel combustion. Water used during the composting process was reduced by 20%, and land necessary for active-phase composting is calculated to be reduced by 55.5%.

Samples of finished compost at 30 days of composting from the eASP and standard windrows were sent to an accredited laboratory for industry-standard testing. Maturity and stability of the eASP materials were equal to or better than their windrow counterparts.

### Acknowledgements

This project was funded by the San Joaquin Valley Air Pollution Control District under Agreement C-15636 and consisted of the following team:

- Ross Badertscher, SJVUAPCD, grant manager
- Kevin Barnes, City of Bakersfield, conveyorization and diesel/water use calculations
- Tom Card, consultant, emissions calculations
- David Crohn, UC Riverside, science advisor
- John Jones, Harvest Power, compost site manager
- Robert Horowitz, CalRecycle: principal study author
- Peter Moon, O2 Compost, eASP design and solar array specification
- Dan Noble, Association of Compost Producers: project manager
- Chuck Schmidt, consultant: emissions study design and sampling

Special thanks to Brian Stalker, Elena Yates and Janelle Auyeung: CalRecycle; Paul Sellew, Wayne Davis, Antonio Cardenas, Samuel Villalobos, Alex Rivera, Velente Rivera: Harvest Power; Harold Ruppert and Derrick Santos, O2 Compost, and the City of Bakersfield.

# **Required Statement**

The statements and conclusions in this report are those of the Contractor and not necessarily those of the San Joaquin Valley Air Pollution Control District or its employees. The mention of commercial products, their source, or their use in connection with material reported herein is not to be construed as actual or implied endorsement of such products.

# **Executive Summary**

A prototype extended Aerated Static Pile (eASP) composting process was assembled and operated to test both ability to produce quality compost and to quantify air emissions. EASP differ from ASP only in that consecutive zones are laid alongside each other along the long axis. The eASP utilized ambient air blown into the pile from the bottom; the blowers were powered by photovoltaic panels and associated batteries. The eASP had a biofiltration layer added to the surface as an air pollution control measure. A series of compost windrows were built concurrent with the eASP using the same feedstock. The air emissions from the eASP were compared to the on-site measured air emissions of the current industry-standard windrow composting method.

Emissions were measured using the standard methods and techniques used for San Joaquin Valley Air Pollution Control District (SJVAPCD) regulatory compliance. This includes the use of the USEPA flux

3 | Page

chamber as modified under South Coast Air Quality Management District (SCAQMD) Rule 1133, and analysis using SCAQMD Method 25.3 and 207.1. In addition to these traditional methods, nitrous oxide (N2O) was measured using NIOSH 6600 and organic species were measured using USEPA TO-15.

Table ES-1 provides a summary of the emissions using the emission factor of pounds of pollutant emitted per ton of compost mix in the pile or windrow over the 22-day active composting period, as specified by SJVUAPCD Rule 4566. VOC reductions of 98.8% were achieved when compared to the control windrows. Reductions in ammonia emissions were 83% using tubes in the field, and 53% from the laboratory, when the eASP was compared to the control windrows. Reductions in emissions of greenhouse gases ranged from 13% for methane up to nearly 89% for N2O for the eASP system when compared to the controls.

Table ES-1: Project Results									
		N	НЗ		· · · · · · · · · · · · ·				
	voc	Field	Lab	CO2	CH4	N20	CO2e		
Prototype ASP (22 Days)	0.099	0.017	0.007	205.70	5.05	0.010	315		
Baseline Windrow (22 days)	8.604	0.099	0.014	731.63	5.81	0.093	883		
% reduction from Baseline	-98.8%	-83.2%	-53.3%	-71.9%	-13.0%	-88.8%	-64.3%		

Table ES-1: Results of emissions testing in pounds of pollutant per ton of feedstock over the 22-day active
composting period.

To normalize the analysis of windrow (on-site control) emissions being higher than expected, project results were also compared to adopted emissions factors from the SJVUAPCD and the SCAQMD.

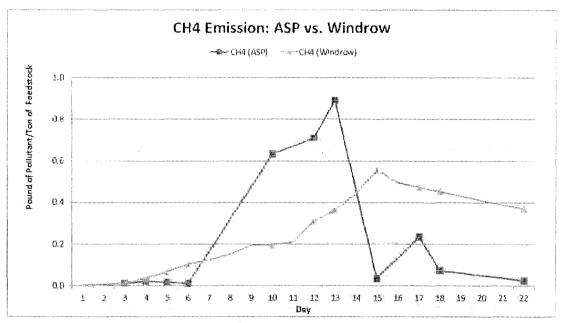
Table ES-2 Comparison to SCAQMD and SJVUAPCD VOC Emissions Factor							
	Prototype ASP	SJVUAPCD	SCAQMD				
	22 days	22 days	life cycle				
Emissions Factor	0.10	5.14	3.76				
% Reduction		-98.1%	-97.4%				

Table ES-2: VOC emissions reductions from 22-day active composting in pounds of pollutant per ton of materials using eASP system compared to emissions factors adopted by SJVUAPCD and SCAQMD.

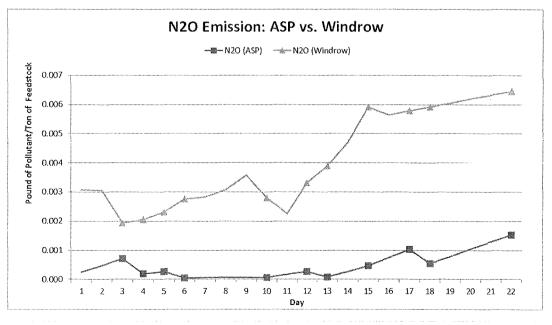
As with any composting emissions test, sampling opportunities seem limited when compared to the vast size of the composting piles and the time necessary to complete the composting process. A total of 92 samples were taken, including 84 samples and 8 quality control blanks. Sampling during the composting cycle ranged from day 3-to-day 23 for the eASP and day 2-to-day 29 for control windrows. For the eASP, pre-planned sampling locations were demarcated on top of all three zones to ensure those locations were neither walked upon nor perforated with the temperature probe. Because each sampling event takes approximately two hours, and the eASP blowers were set to operate two minutes out of every 20, eASP sampling included multiple blower-on and blower-off cycle conditions.

An additional sample was taken of a 63-day-old windrow. It was later revealed that this windrow contained a significant amount of food waste. Those data are reported in the appendices.

22-day emissions were graphed to look for differences in air emission for key target species over the composting cycle. Total non-methane non-ethane organic carbon emissions for the control windrows followed established trends; an initial spike followed by rapid decline. The eASP emissions line is nearly flat. Methane emissions from both the eASP and the windrow are greatest toward the middle of the active compost period, while N20 emissions from both piles tend to increase toward the end.



Graph ES-1: Time-series comparison of methane (CH4) emissions between the eASP and control windrows. Methane is an important greenhouse gas with a climate warming potential no less than 21 times greater than carbon dioxide.



5 | Page

Graph ES-2: Time-series comparison of nitrous oxide (N2O) emissions between the eASP and control windrows. Nitrous oxide is an important greenhouse gas with a climate warming potential no less than 298 times greater than carbon dioxide.

Total emissions and emissions per ton of feedstock were also calculated for 30-day and 60-day cycles. 60-day results for the eASP are necessarily extrapolated beyond day 23. 30-day totals require much less extrapolation. A complete accounting for all emissions testing is reported in Appendices A and B. In general, the longer calculation periods show greater benefits from using the eASP, particularly with regard to methane; VOC reduction benefits are virtually unchanged. These calculations and graphs are available in Appendix A.

Reductions in diesel use were calculated for pile construction and management during the active phase. For windrows this includes mechanized turning, but the eASP was not turned for the first 30 days. The overall reduction in diesel use was 87%. A commensurate 87% reduction in criteria pollutants from diesel emissions was also calculated. These data and calculations are discussed further in the body of the report as well as in Appendix C.

Water use reductions were also calculated. The initial watering of ASP feedstock and 30-days of timed sprinkling of the eASPs used approximately 20 percent less water than the traditional windrows, which were watered by a 4,000-gallon watering truck with a sprayer on the back. For a theoretical 100,000 ton per year facility, this would save about one million gallons of water per year, with commensurate GHG reductions from eliminating the water truck fuel use. These calculations are discussed in the body of the report.

EASP piles can be built wider and taller than windrows, which can be no larger than the largest windrow turning machine on site. This gives the piles a smaller surface area, potentially reducing both evaporation and emissions. Larger piles can also reduce the amount of land needed for a composting operation, thereby reducing costs to purchase land or to build working pads. For active composting, we calculate the EASP system can accommodate approximately 3,552 tons of material per acre, while a typical windrow system would handle around 1,580 tons per acre, an advantage of 55% for the eASP.

#### Introduction

The San Joaquin Valley (SJV) is an extreme non-attainment area for ground-level ozone, according to the United States Clean Air Act 8-hour ozone standard. Air quality officials in the SJV must reduce ozone precursors such as Volatile Organic Compounds (VOCs) and oxides of Nitrogen (NOx) as expeditiously as practical, as technologically feasible, and as economically reasonable. The SJV is home to numerous commercial-scale composting facilities that process urban organic wastes, including several that handle more than 100,000 tons of feedstock per year and one that handles more than 500,000 tons annually. Two large facilities import compostable feedstock from other air basins, including Los Angeles to the south and the San Francisco Bay Area, to the northwest. Because the SJV contains extensive agricultural operations, a local market exists for the finished compost products. The finished compost products are applied to farm fields generally less than 25 miles from the composting site, providing a source of nutrients and organic matter for SJV farmers and nourishing some of the most productive farmland on Earth.

6 | Page

During the natural process of organic degradation, compost piles emit VOCs. The SJV has a large inventory of man-made and natural VOCs and a much smaller inventory of NOx emissions. Ozone production in the SJV is considered "NOx limited" because of the lesser amount of NOx. Internal combustion engines, including heavy duty diesel engines, are the SJV's primary source of NOx. When mixed with VOCs, NOx forms ground level ozone, particularly in the presence of the strong sunlight which blankets the SJV more than 300 days a year.

To facilitate a regional approach to air pollution problems, seven California Counties and part of an eighth county joined to form the San Joaquin Valley Unified Air Pollution Control District (the District), which covers more than 25,000 square miles from Stockton to Bakersfield. In 2011, the District adopted Rule 4566, which seeks to reduce emissions from commercial composting facilities. Existing composting facilities in the SJV were required to adopt a series of Best Management Practices which are scaled based on a facility's annual throughput.

Because it is an extreme non-attainment area for ozone, any new facility in the SJV emitting more than 10 tons of VOC per year is classified as a Major Stationary Source. Using the SJV's life-cycle composting emissions factor of 5.71 pounds of VOCs per ton of composting feedstock, a facility handling less than 4,000 tons per year would be considered a Major Stationary Source. Per Title 1 of the Federal Clean Air Act, all new major sources must go through New Source Review in order to be permitted to operate. This means that all new composting facilities in the SJV must implement Best Available Control Technologies (BACT) that reduce VOC emissions from materials handling and the composting process. BACT specifications for new compost facilities have not yet been determined. The impact of New Source Review has been to stifle the growth of new composting facilities in the SJV, as the current cost of VOC reduction systems exceeds the ability to recoup those costs through tipping fees and finished product sales. Composting facilities cannot raise tipping fees without losing feedstock to lower-cost alternatives, such as landfilling or direct land application.

In 2011, the California Legislature passed AB 341 (Chapter 476, statutes of 2011), which requires the State to achieve a 75% solid waste recycling, composting and reuse rate by 2020. The California Department of Resources Recycling and Recovery (CalRecycle) is charged with coordinating efforts to reach that goal. According to CalRecycle, organic materials--in particular food--comprise up to 50% of the remaining disposed waste stream. Therefore, the 75% goal will not be attainable without more composting facilities.

Large facilities in the SJV and around North America manage materials in windrows: long, narrow piles that can be as much as 20 feet wide, 8 feet tall, and hundreds or even more than 1000 feet long. Windrows are turned using a specialized machine called a windrow turner, which straddles the pile; the exact height and width of the windrows are determined by the size of the turning machine. All windrow turning machines are powered by diesel engines, with 450-600 horsepower being typical engine sizes for moderate to large machines. Generally, piles are built using diesel trucks and bucket loaders.

According to California regulation (14 CCR, Section 17868.3), compost piles must reach a temperature of 131 degrees Fahrenheit in order to reduce pathogens. Windrows must maintain that temperature for

15 days, during which the pile must be turned at least five times in order to ensure all materials in the windrow reach temperature. Static piles with an insulation layer at least 6 inches thick only need to attain that temperature for three days. Although attainment of pathogen destruction may occur any time during the composting process, it typically occurs early in the cycle, to ensure feedstocks have sufficient energy to meet the temperatures requirement. Most operators report turning piles 8-10 times during a complete compost process of between 60 to 90 days. Previous research indicates that the vast majority of composting emissions occur during the first three weeks of the composting process, hence the focus on "active phase" composting in Rule 4566 and in this research project. Per Rule 4566, several SJV compost facilities are required to put a fresh blanket of finished compost on top of a windrow following all turns during the first 22 days. Compost caps are effective on windrows, but applying so many caps is both labor and diesel intensive.

# The Technology Advancement Program

The TAP program is administered by the San Joaquin Valleywide Air Pollution Study Agency (the Study Agency), which was "formed to commission and administer scientifically sound air quality studies to improve understanding of the contributing factors and conditions that result in poor air quality in our local area and in the surrounding areas of central California and to develop technical tools for use by decision makers to guide the development of policies, procedures, plans, rules and regulations necessary to fulfill the state and federal air quality mandates." The Study Agency is a Joint Powers Authority with its fiscal authority vested in a governing board.

In 2011 the Study Agency put out a Request for Proposals for the Technology Advancement Program with the objective to "demonstrate new and innovative emission reduction technologies that have the potential for broad applicability in the San Joaquin Valley." A portion of the available funding comes from collaboration with the USEPA's Clean Air Technology Initiative.

Specifically, the RFP sought "projects that demonstrate bold, innovative, and creative new emission reduction technologies" in three areas, renewable energy, waste solutions and mobile sources. The accepted proposal met all three criteria in the following ways:

- Focus Area I: Renewable Energy—This demonstration project proposed to overcome the barrier to utilizing renewable energy by installing solar energy/storage systems to power air blower motors to be used to aerate static compost piles, and to maintain aeration throughout the high-emissions active-composting phase.
- Focus Area II: Waste Solutions—Project used technology which had not been operationally
  demonstrated on a commercial scale, to minimize VOC and GHG emissions from existing
  compost production systems and processes. This technology was non-proprietary and created
  with components which should be available to any compost operator, thereby reducing costs of
  emissions reductions.
- Focus Area III: Mobile Sources—Project demonstrated the replacement of large diesel-powered compost loaders with electric powered conveyors, and demonstrated replacing diesel-powered

composting windrow turners with solar powered air blowers to reduce particulate matter and NOX emissions from those sources on compost operations in the San Joaquin Valley.

This project included construction of three abutted aerated static piles, each with its own aeration manifold and photovoltaic powered blower. This type of ASP System is referred to as an Extended Aerated Static Pile (eASP). In addition to the expected air emissions benefits and reducing the use of diesel power during the composting process, three key benefits of this approach include: 1) smaller footprint and therefore a greater production capacity for a given compost pad; 2) reduced exposure to the elements; and 3) improved retention of process heat.

# **Project Components**

#### Conveyorization of the construction of the eASP

Construction of windrows or static compost piles is traditionally done with diesel truck and loaders.

We built the eASP using electric-powered conveyors. The heart of the system was an electric-powered potato piler. Pilers are used for placing harvested potatoes into storage sheds. This potato piler had the ability to move the terminal end of the conveyor left and right up to 57 feet, as well as up and down approximately 27 feet. The terminal end of the piler also telescopes up to 18 feet. These maneuvers are accomplished using a remote joystick, much like a video game. This adaptability allows for the anchoring of one end of the piler, and connection to intermediate conveyors, while constructing a pile which was up to 35 feet wide and as much as 10 feet tall. It also allows for the feedstock to be switched after the base pile is formed, to allow for application of the one-foot-thick pseudo-biofilter compost cap made from finished, unscreened compost atop the entire surface of the previously constructed pile.

The potato piler is on wheels, and the spacing of those wheels allows for the pile to be set up within the aeration piping for the pile, and wheeled backward when needed, along with the rest of the electric conveyor train. The 90-foot-long eASP zones were constructed in three stages of about 30' each, then the conveyor train was rolled backward and the process of constructing the pile and placing the cap layer began anew.

The potato piler used in this experiment (Double L Manufacturing, Model 811) was smaller than some models used in the potato industry. The belt width was 30 inches and the rated capacity was 225 tons per hour. A commercial composting set up would likely use the largest available model, with a belt width of 42 inches. If the methodology described in this report were widely adopted, manufacturers of potato pilers might be persuaded to create composting-specific machines, which might feature larger wheels, wider belts, higher throughputs, and built in water sprayers at the terminus to ensure materials are properly moistened during pile construction. The smaller device was the only unit available locally for rent, because potatoes are not an important crop in the SJV. Larger devices would have needed to be shipped down from potato growing regions, and shipped back in time for the fall harvest, an added expense and constraint.

9 | Page

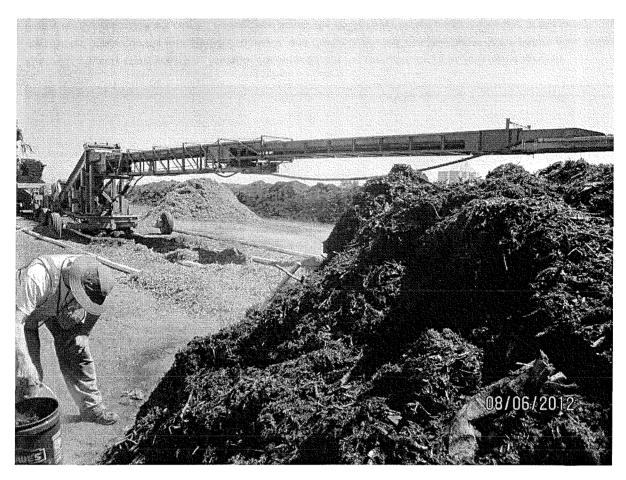


Photo 1: Potato piler at or near full extension. Pile under construction in foreground. Plenum material and aeration pipes are partially visible.

One problem encountered early on was the ability to match the output of the grinder with the capacity of the conveyance system. In a professionally engineered system, these would be balanced. In this case, the conveyors and potato piler were smaller than optimal. In addition, the existing on-site grinder at the Tulare compost site was designed for high-volume throughput, and the output was not variable. It was clear that the available grinder would overwhelm the conveyors. Because larger conveyors and pilers were not available, a decision was made to rent a slow-speed, variable output shredder. Although the shredder was able to keep a steady stream of materials on the conveyors, volume was slower than ideal, and eASP construction took most of the day.

At 446 horsepower, the shredder has an engine half as large as the typical grinders found at large composting sites. This particular unit, the Komptech Crambo 5000, was certified ARB Tier 4. The variable output solved the problem of matching grinder output to conveyance. Although there are emissions savings from moving to a smaller horsepower engine, those are beyond the purview of this project. This would be a moot point in an operation that uses electric powered grinders.

Grinders are essential equipment at compost operations, and it was not a goal of this project to replace the grinder. The same slow-speed shredder was used to prepare the feedstock for both the eASP and the windrows. Any composting operation that receives raw feedstock will still need to grind their materials. Electric grinders are becoming more commonplace, as greater emission reductions are needed

Conveyors and the potato piler can run off whatever voltage is available on site. 480 volt AC power is the most efficient and commonly used in potato storage and at compost facilities that have electrified their grinders. In this case, the conveyors were run off a diesel-powered generator. In a permanent setup, conveyors and pilers would be run off of the electric grid. The generator was equipped with a meter to measure electricity usage.

Also rented was an excavator to feed the shredder. This could also have been accomplished with loaders. Although the excavator is a large piece of equipment, its engine is generally smaller than those found in loaders. This is because loaders drive to and fro, while excavators can stay in one place and swing only their boom. Again, there must be a means to move materials into the grinder/shredder. It was not a focus of this project to calculate emissions reductions from using an excavator for this purpose, but it was an opportunity to model an optimum equipment configuration.



Photo 2: Complete conveyor train. Material discharged from the shredder, far right, falls into a specially constructed hopper on the intermediate conveyor, and then is deposited into the hopper of the potato piler, center. From here the materials are carried upward and across the potato piler before being discharged at the far left,

where the piler is being operated by joystick. This is the very early morning of the first pile build. Plenum materials in foreground.

### Moisture management

Moisture management was another key challenge identified early in the process. Because the eASP would not be disturbed for the entire 22-day active compost phase, there would be no way to deliver moisture into the core of the pile. Due to the action of the aeration system, as well as the hot and dry summer SJV climate, water would be needed to prevent the drying out of the eASP, which could slow the compost process or potentially lead to excessive heat buildup and fire.

An early idea to embed drip tape within the pile, just above the aeration pipes, was deemed unfeasible. Instead, a two-pronged approach was taken. The first phase was to wet all feedstocks during the eASP build. This was accomplished by the addition of a moisture system to the discharge of the potato piler. The system consisted of two 1 ¼" nozzles attached to a 1 ½"inch diameter water hose. The resulting system sprayed water at both sides of the feedstock discharge chute. The water was pumped out of the back of the on-site, 4,000-gallon water truck. In a real production scenario, the water truck would be eliminated by plumbing a flexible water supply to the piler conveyor.



Photo 3: Water sprayer system wetting composting feedstock as they are discharged from the potato piler.

The second half of the moisture solution was to design a series of sprinklers which would be placed on top of the eASP and run off a timer. One irrigation "sled" was used for every 30' of eASP length. Because of the time of year and the excessively hot conditions, the sprinklers were run on a cycle of an average of six minutes per cycle, six times per day.-The sprinklers were successful in keeping the top of the eASP moist. Because the aeration system tends to blow the water back up to the top, it was not clear how deep the water penetrated; however, field investigations indicated the water was seeping down more than two feet.

Rain gauges were used on the top of the eASP zones to measure the amount of water delivered, and as the basis for adjustment. The water delivered ranged from 1-5" per day, depending on location and timing of the irrigation system. Over and under-watering was a challenge in this project. An average of approximately 3" per day would likely be ideal, depending on the moisture content of the original feedstock and ambient conditions.

In this project, the combination of feedstock which were not uniformly wet, and occasional overwatering, caused the pile to weep water at the lower end. A French drain was constructed to capture that water and re-introduce it to the piles. A run off capture system should be an integral part of any eASP composting system.

Despite the potential that the eASPs were over-watered, actual water use for the eASP was nearly 17% less than a comparable windrow system per cubic yard of feedstock. Potential reasons for this include a lower ratio of surface area to pile volume, and the lack of turning, which tends to cause a visible spike in evaporation.

Table One - Windrow Turning Method	:					
(Water applied to normal 2,962 cubic yard windrows in Bakersfield)	Gallons	# Loads		# of	at a	
	per	per	Gallons	Events	Gallons	Gallons
Note: Windrows are watered within 3 hours prior to turning	Water Truck	Watering	per	per	per	per
to achieve ball test for moisture per air district rule 4566.	Load	Event*	<u>Event</u>	Pile	Pile	Cubic Yard
. Hydrate newly formed windrow with water truck	4,000	4	16,000	1	16,000	5
. Hydrate windrow prior to 6 turnings (5 in 15 days PFRP and 1 @ day 22)	4,000	3	12,000	6	72,000	24
Total for 22 day active phase:			-		88,000	30
	: : :	*averaged f	or seasona	I variation		
Table Two - Extended Aerated Static Pile Method						- -
(Water applied to each 506 cubic yard pile in Tulare)	Gallons	Minutes		# of		
	per	per	Gallons	Events	Gallons	Gallons
Note: Item 2 (compost cover water) could be reduced since	Minute	Watering	per	per	per	per
there was significant extra water runoff during pilot program.	Flow	Event*	Event	<u>Pile</u>	Pile	Cubic Yard
. Hydrate incoming feedstock with 1 1/4" fire hose as pile is built	35	240	8,400	1	8,400	17
2. Moisten compost cover with 3 lawn sprinklers 6x/day till day 22	11	6	66	63	4,158	<u>8</u>
Total for 22 day active phase:				···· ··	12,558	25
		*averaged f	or seasona	l variation		

Table 1: Comparison of water use between eASP and traditional windrow method as modified by SJVUAPCD Rule 4566.

#### 13 | Page

At 2 cubic yards per ton, a 100,000 ton-per-year facility would save a minimum of 1 million gallons of water annually using the eASP system. Using the ARB estimate of 1.5 thousand tons of CO2 equivalents (MTCO2e) for every acre foot of water saved in California, the potential GHG savings is slightly more than 4.5 MTCO2e per 100,000 tons of feedstock. These savings are probably underestimated at compost facilities, where water tends to be delivered via 400-500 hp, 4,000-gallon diesel water trucks. The savings rise, both in terms of water and GHG, when one considers the inefficiencies inherent in the water truck system, including water loss when filling the truck and water running off the sides of the windrows. The water at this composting site, and many others, is pumped from a well. GHG equivalents are generally higher for groundwater than the statewide average; however, this depends on the depth and flow of the well. If the well is powered by a diesel pump, criteria pollutants are reduced when less water is used.

The water use reductions provided in Table 1 are provided as an Excel Spreadsheet in Appendix H.

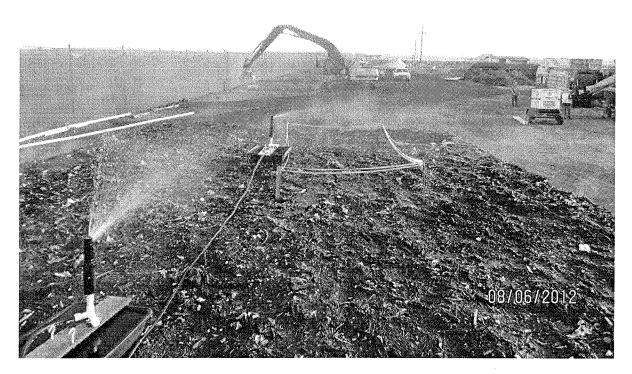


Photo 4: Irrigation sleds wetting top of prototype eASP. Note- test areas cordoned off for air emissions sampling.

#### Feedstock

Feedstock for this project consisted of municipally sourced greenwaste from the Visalia-Tulare area. Effort was made to get the freshest possible greenwaste feedstock for the project. The feedstock used arrived at the facility the day before the pile-building events. After the materials were tipped, they were spread out and handpicked for large trash or hazardous materials, then brought to the grinding area. The same protocol is used for all feedstock at this site.

During pile construction, the team from O2 Compost measured bulk density and water-holding pore space using bucket tests which are standard in the composting business. Moisture percentage of the feedstock was measured using a simple postage scale and an electric heat gun to dry the materials. The materials are weighed wet, and then are dried and weighed until the sample weight stabilizes. The process takes more than one hour to complete. Composite grab samples were taken for each zone constructed, and sent to a laboratory to measure carbon-to-nitrogen ratio on a dry and wet basis.

The overall parameters of the starting feedstock mix for the three zones are as follows.

	Bulk Density wet	Free Air Space (FAS)	Moisture content	C/N
Zone 1 - Composite #1	828 lbs/cy	40.4%	45%	25.9
Zone 1 - Composite #2	822 lbs/cy	51.0%	50%	16.3
Zone 2 - North End	1004 lbs/m	41 E0/	AC0/	17.6
Zone 2 - South End	1004 lbs/cy	41.5%	46%	19.5
Zone 3 - North End		44,20%		20.5
Zone 3 - South End	980 lbs/cy	44.20%		26.6

#### eASP FEEDSTOCK SUMMARY

Table 2: Parameters for the starting eASP compost feedstock.

Laboratory tests for the initial C:N measurements are available in Appendix F.

#### **Aeration System**

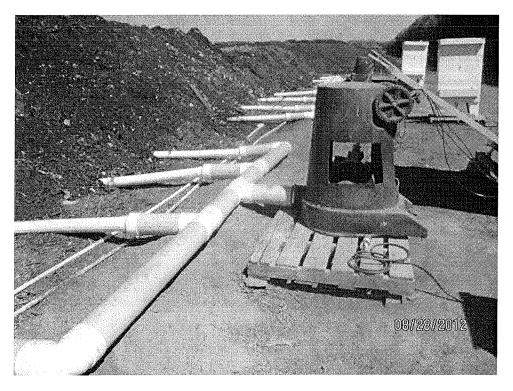
Each of the three ASP zones had its own blower, manifold and pipes. The aeration piping was standard 4" drain pipes, such as can be purchased at any hardware store. These white PVC pipes come in standard 10' sections and are flanged on one end so they may easily be attached. There are two kinds of pipes, perforated and not perforated. Each aeration line starts and finishes with 10 feet of non-perforated pipe, so air does not leak out from the sides of the piles. In between were seven sections of perforated pipe, with the holes pointed down. Each pipe section is tacked to the ones before and after using one screw, to ensure they are not pulled apart during pile construction. The aeration pipes were buried in a plenum of coarse-ground wood chips approximately 1 foot deep. The use of chips ensures the air coming out of the perforated pipes is not blocked by dense material compacted by the weight of the pile

The standard manifold for each ASP branches off to four 90' long aeration pipes, each five feet apart. The manifold was constructed of 6" diameter PVC sewer pipe, again, standard at most large hardware stores. These pipes are green and are also sold in 10' sections. For this project, the pipes were cut with a hand saw to construct the manifold. Standard T and elbow connections were used to assemble the pieces, and were tapped together using a rubber mallet. The 6" sewer pipe was stepped down to the 4" sewer pipe using standard connectors. The blower was connected to the manifold using a rubber fitting, which was purchased from the blower vendor.

With every Aerated Static Pile (ASP) Compost System, a key design objective is to provide uniform airflow across the base of the pile (side to side and end to end). The aeration zone is located beneath the core of the pile and consists of perforated pipe overlain by a layer of coarse woody material (referred to as the "plenum layer"). As the ASP System is constructed, the aeration zone is sealed on all sides by the overlying mix of materials to prevent short-circuiting of airflow to the atmosphere.

When the aeration blower turns on, the plenum layer pressurizes; the air first flows laterally across the base of the pile and then vertically up through the compost mix. By controlling the frequency and duration of airflow, the operator is able to maintain aerobic conditions throughout the pile and optimize the biology of the composting process.

For this project, each zone was aerated using independent solar powered blowers. Each system included a pair of photovoltaic panels, charge controller, inverter, batteries, and a 1.5 hp 3-phase blower).



*Photo 5: Completed aeration manifold showing 6" pipes, connectors and step down to 4" pipes. The blower is protected inside the modified trash container.* 

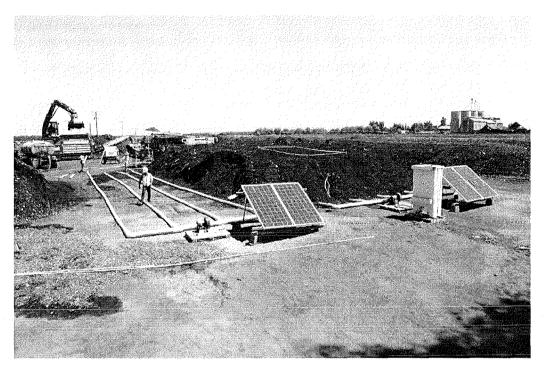


Photo 6: View of project with completed eASP zone 1 on right, and aeration pipes in place for Zone 2. Zone 1 photovoltaic system is complete; panels are in place for Zone 2.

Two sets of field tests were conducted on each of the three aeration manifolds to confirm that: 1) the airflow was balanced within the aeration system; and 2) sufficient air volume was delivered to the compost mix. These tests evaluated static pressure and airflow velocity. For the two tests, 3/8-inch diameter holes were drilled into the PVC aeration manifold at five junctions (pressure and velocity) and at the down-stream ends of each of the four lateral aeration pipes (pressure only). Figure 1 provides a schematic drawing of one aeration system to illustrate the layout of the aeration pipes and the locations for the two sets of tests.

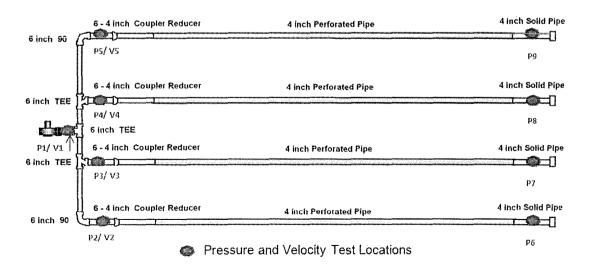


Figure 1: Schematic of an ASP manifold system, with the blower and manifold at the left and testing locations noted with blue dots and red numbers.

The pressure at nine different locations in each of the three aeration systems was determined using a magnehelic pressure gauge. The velocity of airflow was determined using a hot-wire anemometer. An example of each monitoring device is shown below.





Photo 7: Magnehelic pressure gauge and hot-wire anemometer.

Extended	Aerated S	tatic Pile	1	2	3	4	5	6	7	8	9
Zana 1	Pressure	(in-sp)	3.0	2.5	2.2	2.2	2.4	2.2	2.4	2.4	2.3
Zone 1	Velocity	(ft/min)	3200	2100	1950	1900	2200				
Zone 2	Pressure	(in-sp)	2.8	2.6	2.4	2.4	2.8	1.6	1.4	1.3	0.7
Zone z	Velocity	(ft / min)	2600	2200	1850	2100	800				
7000 3	Pressure	(in-sp)	1.5	1.5	1.7	1.6	1.7	1.3	1.3	1.3	1.2
Zone 3	Velocity	(ft/min)	3300	1700	1750	1800	2100				

Table 3: Results of pressure and velocity tests for all 3 eASP zones. Velocity readings are not taken at the ends of the aeration lines (sites 6-9).

These test results confirmed that uniform airflow and sufficient air volume was delivered to the EASP System to meet the objectives of the project.

# **Photovoltaic System**

Recent advances in photovoltaic (PV) technology make powering small motors at remote locations more feasible than ever before. The blower motors weigh about 90 pounds, and produce a maximum of 1.5 horsepower each. The blowers run directly from the four deep-cycle flooded lead acid batteries which

were placed inside the white cabinets. The PV panels charge the batteries. The white cabinets also contain the inverter, which converts the direct current power produced by the panel into alternating current, as well as the timers, switches and the wiring harness, which limited the electrical operations in the field to basically a plug-and-play situation.

Item	Manufacturer	Model	Specification
Panels Astroenergy		CHSM 6612-290	290 watt, 24 volt DC panel; 2 per
		Crystalline PV module	zone
Inverter	Samlex	Pure Sine Wave SA	Converts 24 Volts DC to 2000 watts
		2000K-124	AC power at 120 Volts, 60 Hz
Charge Controller	Samlex	PR 3030	30 amp, 12 or 24 volt, fully
			programmable with LCD display
Batteries	U.S. Battery	AGM L16	390 amp hour 6V; 4 per zone
Blower	New York Blower	Compact GI 105	1.5 max HP; 3500 max rpm.

Specifications of the major components of each individual PV system are as follows:

Table 4: Major components of the photovoltaic array.

The full PV systems were specified by O2 Compost and shipped to the site by Automation Electric and Controls of Mt. Vernon, Washington. The arrays were assembled on site by the study team. The hard cost for the complete units, including panels, batteries, inverter, timers, switches and blowers, as well as all piping, was about \$10,000 each.

The PV panels were mounted on specially constructed aluminum frames. The frames were bolted to standard 4 x 4 wooden posts with lag screws. The posts were nailed to standard concrete/metal footings available at any hardware store. The panels were angled 45 degrees to the south. Because the summer sun in the SJV is so strong, and there was no shade at the site, it was not necessary for the panels to track the movement of the sun, or to match the angle of the panels with the angle of the sun. These steps may be necessary for winter operations.

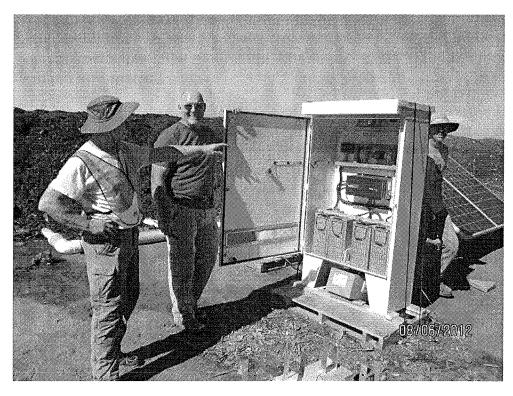


Photo 8: Interior of the power array box. From bottom to top: batteries, inverter, timer and switches, and exhaust fan at very top. From left to right: Harold Ruppert and Peter Moon of 02 Compost, and Kevin Barnes, City of Bakersfield.

The blowers were cycled to operate 2 minutes out of every 20, easily achievable with summer sunlight in California. The only problem with the PV system concerned the small exhaust fan which was used to cool the components inside the white metal cabinet. August 2012 was an extremely hot month in the southern SJV, with nominal daytime temperatures above 100 degrees F nearly every day the project was in operation. This caused the exhaust fan to work overtime, drawing down the batteries. The thermostat on the exhaust fan ultimately had to be raised to its maximum level, potentially exposing the batteries and inverter to damaging heat buildup. Although the system continued to function throughout the life of the project, the batteries were degraded. For a permanent system, care should be given to place sensitive electronics in the shade.

# Temperatures and pathogen reduction

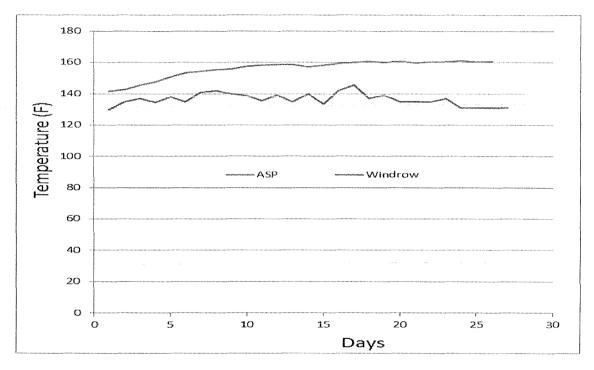
Section 17868.3 of Title 14 of the California Code of Regulations sets minimum temperature standards for pathogens reductions during composting. These standards, known as PFRP, are as follows:

- If the operation or facility uses a windrow composting process, active compost shall be maintained under aerobic conditions at a temperature of 55 degrees Celsius (131 degrees Fahrenheit) or higher for a pathogen reduction period of 15 days or longer. During the period when the compost is maintained at 55 degrees Celsius or higher, there shall be a minimum of five (5) turnings of the windrow.
- If the operation or facility uses an aerated static pile composting process, all active compost shall be covered with 6 to 12 inches of insulating material, and the active compost shall be maintained at a

temperature of 55 degrees Celsius (131 degrees Fahrenheit) or higher for a pathogen reduction period of 3 days.

These temperature standards are backed up by pathogen testing at the end of the curing stage, before finished compost may be sold.

A five-foot long temperature probe was purchased in order to take temperature readings. Temperatures for the eASP were taken at three different depths (2', 3' and 5' down) and at two locations on the pile. For control windrows, temperatures were taken at two locations per pile. Control windrows were turned on the operator's regular turning schedule, but were not turned on the basis of the age of any individual control.



Graph 1: Comparison of temperature readings between eASP and windrow over 22-day active composting period.

All eASP and control windrows met or exceeded state minimum temperature requirements for pathogen reduction. On average, eASPs ran hotter than windrows in this experiment. This is likely due to the larger pile size and the thick blanket of finished compost, both of which tend to hold in heat. Full temperature data is available in Appendix G.

# **Curing and testing**

All eASP zones and windrows were allowed to compost for 30 days. At 30 days, composite samples were taken of each eASP zone and control windrow using the process described in California regulations (14 CCR, Section 17868.1) and were sent to Soil Control Laboratories in Watsonville, CA. Soil Control

**21** | Page

Labs is one of two laboratories in California approved by the U.S. Compost Council's Seal of Testing Assurance (STA) program. The program was created in 2000 by the leading compost research scientists in the United States. The science behind the development of the STA Program and the various tests that are used is contained in 'Test Methods for the Examination of Composting & Compost', a publication which includes a suite of physical, chemical and biological tests. STA testing can be performed by a group of independent, certified labs across the U.S. and Canada.

30 DAY	rs	Zone 1	Control 1	Zone 2	Control 2		Zone 3	Control 3
	Sampled Date	9/7,	9/7/2012		9/12/2012		9/17/201	
	Unit Measures							
Moisture Content	%, Wet weight	43.3	42.3	37.8	39.8	ΓΓ	38.5	43.3
Organic Matter	%, Dry weight	43	44.9	46.5	42.6	1 [	42.9	46.5
C/N Ratio	Ratio	18	18	17	19		18	17
рН		5.37	5.72	6.2	6.32		6.28	5.03
Particle Size	Max aggregate size, Inches	0.38	0.64	0.64	0.64		0.64	0.64
Nitrogen - Total	Total N, % dry weight	1.3	1.4	1.6	1.3		1.4	1.5
Nitrogen - Organic	%, dry weight	1.2	1.2	1.5	1.1		1.3	1.3
Maturity								
*Ammonia	NH4-N, mg/kg dry weight	1300	1800	1200	1500		670	2000
Nitrate	NO3-N, mg/kg dry weight	33	16	38	9.6		10	51
+Vigor (bio-assay)	Avg. % of Control	90	91.7	91.7	91.7		86.7	81.7
Stability		1						
+CO2 Evolution	mg CO2-C/g OM/day	7.9	9.1	7.9	10		7.5	13
Potassium	K2O, % dry weight	1.2	1.2	1.4	1.3		1.3	1.4
Carbon - Organic	lb/ton	23	24	27	25		25	25
Soluble Salts	EC5, dS/m (mmhos/cm)	9.9	11	7.4	9.7		5.8	11
Safety							S. 889.5	
+Fecal Coliform	Pass/Fail	Pass	Pass	Pass	Pass		Pass	Pass
◆Salmonella	Pass/Fail	Pass	Pass	Pass	Pass		Pass	Pass
<ul> <li>Trace Metals</li> </ul>	Pass/Fail	Pass	Pass	Pass	Pass		Pass	Pass
Iron	Fe, mg/kg dry weight	11,000	9000	9300	8600		9700	9300
Bulk Density	lbs/cu ft dry weight	25	22	22	22		25	22
Agindex	Ratio	10	8	9	8		10	9

Results of the 30-day STA testing are below.

Table 5: Comparison of 30-day laboratory results for all three eASP zones and control windrows.

In order to reach maturity, the compost process generally needs to run 60 days or more. So it comes as no surprise that all 30-day-old samples show an immature product. In nearly all maturity measurements, however, the eASP appears to be slightly more mature or more stable than its windrow counterpart, despite the lack of turning. In terms of CO2 evolution--the stability measurement--the eASP is superior in all 3 pairings. Therefore, we may conclude that the eASP will have a beneficial impact for operators on compost production issues; that is; we see no evidence of a time penalty for switching to the no-turn active compost method.

We should note that starting C:N ratios were below what is considered optimum. Composting experts agree an ideal C:N ratio for initial feedstock is between 25 and 35 parts carbon to one part nitrogen. This is particularly important for small manure facilities. Practically speaking, it is very difficult for large-scale operators to change the C:N ratio of large volumes of material. Sampling bias in C:N

measurements is inherent because large particles are filtered out before final testing, and larger particles tend to be high in carbon, so actual stating C:N is likely higher than reported.

After 30 days, the control windrows moved into the regular composting operation on site. They were not sampled again. The three eASP zones were treated differently, as follows:

- Zone 1: Scooped up and placed into a windrow, treated the same as other curing piles on the site
- Zone 2: Flipped over onto Zone 1 and aerated for an additional 30 days
- Zone 3: Left in place and aerated for an additional 30 days

After 60 days, the three zones were again sampled, and the composite sample was sent to Soil Control Labs for a second round of STA testing.

Results of the 60-day STA testing are below.

60 DAY	'S	Zone 1 - Cure	Zone 2 - Cure	Zone 3 - Cure
Sai	mpled Date			
	Unit Measures			
Moisture Content	%, Wet weight	33.7	27.6	33.1
Organic Matter	%, Dry weight	37.3	32.9	53.8
C/N Ratio	Ratio	15	14	18
pН		6.12	7.33	4.71
Particle Size	Max aggregate size, Inches			
Nitrogen - Total	Total N, % dry weight	1.4	1.2	1.5
Nitrogen - Organic %, dry weight		1.3	1.2	1.3
Maturity				
◆Ammonia	NH4-N, mg/kg dry weight	690	290	1,500
Nitrate	NO3-N, mg/kg dry weight	6.1	5.7	43
<ul> <li>Vigor (bio-assay)</li> </ul>	Avg. % of Control	100	100	88
Stability				
CO2 Evolution	mg CO2-C/g OM/day	7.5	6.2	23
Potassium	K2O, % dry weight	1.4	1.4	1.4
Carbon - Organic	lb/ton	21	17	28
Soluble Salts	EC5, dS/m (mmhos/cm)	7.5	4.2	10
Safety				<ul> <li>State of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the protocol of the prot</li></ul>
◆Fecal Coliform	Pass/Fail	Fail	Pass	Pass
+Salmonella	Pass/Fail	Pass	Pass	Pass
<ul> <li>Trace Metals</li> </ul>	Pass/Fail	Pass	Pass	Pass
Iron	Fe, mg/kg dry weight	11,000	12,000	8,000
Bulk Density	lbs/cu ft dry weight	22	28	18
AgIndex	Ratio	>10	>10	9

Table 6: 60-day laboratory results for three eASP zones.

The complete tests for 30 and 60 days are found in Appendix D. Zone 1 failed the pathogen test at 60 days, even though it passed a similar test at 30 days. Per state law, this material could not be sold until it was re-composted and passed a subsequent test. Contamination of previously pathogen reduced materials is not uncommon at large composting sites. It can come from many sources, including handling by equipment that comes into contact non-pathogen-reduced materials, as well as external sources such as birds. The failure to achieve criteria is not believed to be related to the eASP composting technology employed, as this pile did pass its pathogen test at 30 days.

The complete 30-day laboratory tests are available in Appendix D. The 60-day tests are available in Appendix E.

# **Diesel Emissions Reductions**

Reducing diesel emissions are important for mitigating the air quality impacts of composting. The VOCs emitted from the degradation of organic materials are much more voluminous than equipment emissions, but are biogenic in nature and comprised primarily of light alcohols (Kumar et al 2009). Light alcohols are not strongly implicated in ozone or secondary aerosol formation. (Carter et al 1995). NOx from diesel engines is implicated in both. Any process changes which reduce overall diesel use on the compost site are real, permanent reductions which will lead to reduced criteria pollutant levels in the SJV.

The project resulted in an average reduction in diesel use per ton of feedstock of approximately 87%, with commensurate reductions in all criteria pollutants and greenhouse gases associated with diesel use. When compared against older equipment, this could result in a reduction of as much as 7.5 tons of NOx and 2.5 tons of non-methane hydrocarbons per year per 100,000 tons processed. Savings against newer equipment generally run less than one ton of pollutant per 100,000 tons. Based on the estimates, and assuming two cubic yards per ton, diesel savings are calculated to be 2,940 gallons per year for the theoretical 100,000-ton-per-year facility. Lower density materials actually increase the diesel savings.

Cleaner diesel engines, electrification of grinders and other diesel equipment on compost sites, and the potential future advent of hybrid diesel-electric or natural-gas-powered heavy duty equipment will all contribute to a gradual shift toward less diesel use. However, bringing three-phase power to remote composting sites can be very expensive; costs exceeded \$1 million for the Mt. Vernon composting site in Bakersfield. Newer loaders and trucks will be phased in under mobile source programs run by the SJV and the ARB, and are also expensive propositions for compost operators. Natural gas and hybrid loaders are still not commercially available, and will likely remain cost prohibitive for some time.

This project measures the reductions in diesel use from conveying materials directly from a grinder output to a pile. In a typical composting site, these tasks would be performed by diesel loaders, typically working in concert with diesel powered end-dump or side-dump trucks. For the purposes of this exercise, we measured only a short run covered by one telescopic-transfer conveyor that was available to rent for the project. However, a full scale production would realize much greater diesel reductions.

Facility-wide reductions could be estimated on a facility-by-facility basis, using a point half the distance from the site's grinder to the property line, as an average distance materials would need to be moved, and then calculate the amount of diesel hours needed to perform that operation.

We also measured the amount of time necessary to operate a water truck in order to maintain moisture in composting windrows. With the eASP, these functions were provided during pile build, and thereafter by a sprinkler system. One of the main drawbacks of using sprinklers on windrows is the potential for them to become ensnared in windrow turning equipment, resulting in their destruction and loss of valuable turner time. This is not a problem with the no-turn eASP system.

Even with extensive use of conveyors, loaders will remain indispensable equipment at compost site because of their speed, maneuverability and versatility. However, it may be possible to significantly reduce their use, which represents a cost savings and an air pollution benefit. Compared to grinders, conveyors use relatively little electricity, and can easily be powered by generators if necessary.

This project used a slow-speed shredder instead of a high speed grinder to prepare the feedstock for composting. The shredder uses an engine roughly half the size of a comparable grinder. It was also a newer model, with a Tier 4 compliant engine. The emissions reductions gained from this type of replacement are not considered as benefits from this project.

Overall, the eASP resulted in an 87% reduction in diesel fuel use per ton of production, and a corresponding reduction in the amount of criteria pollutants and GHGs from equipment use. The amount of actual pollutants reduced depends on the age of the diesel equipment in question. For the purposes of this project, pollutant reductions were calculated for both 1996 (Tier 0) engines and 2007 (Tier 3) engines.

The full diesel use calculations, and the calculations of reduced emissions from diesel use, are available in Appendix C.

## Land Use Reductions

Taller, wider extended ASPs can process more materials per acre of land than traditional windrow. To the extent that many piles are laid parallel to one another, this advantage is increased. Larger piles can be moved or even cured using turner devices that rely on small conveyors rather than the spinning shaft typically used for windrows.

Land purchase is typically a concern when building a new compost site, but can also come into play if an existing operator was forced to construct a water-impermeable pad for active-phase composting. Based on the experiment, and compared to standard windrows at the Mt. Vernon compost facility in Bakersfield, the eASP can process approximately 3,552 tons per acre, while windrows (using some of the largest machines available) can process 1,580 tons per acre, an advantage of some 55.5% for the eASP.

For the theoretical 100,000 ton-per year-facility, the amount of acreage needed for active phase composting is also reduced by 55%. The amount of acreage necessary vary depending upon whether a

composter uses a 70-day compost period or allows materials to cure to 90 days without being moved off the pad. The full calculations are available in Appendix I.

	Low acreage estimate (70-day compost cycle, 5 cycles per year)	High acreage estimate (90-day compost cycle, 4 cycles per year)
Extended ASP	5.63	7.03
Windrow	12.65	15.8

Table 7: Calculation of acres needed for active composting for theoretical 100,000 tons per year composting facility with 70-day or 90-day compost cycle. These calculations do not include land needed for feedstock receiving, grinding, screening, mixing or finished product storage.

# Discussion

Composting is widely viewed as an inherently sustainable activity. The process of recycling nutrients and organic matter back into the soil will grow in importance over the coming years as the world's farmers struggle to feed billions of people. Composting is a critical part of California's efforts to achieve75% recycling and composting, as mandated by AB 341 (Chesbro, Statutes of 2011). In fact, attainment of the AB 341 standard is widely viewed as impossible without a rough doubling of composting capacity in California. This comes at a time when compost facilities are increasingly difficult and expensive to site, primarily due to air pollution issues.

The primary composting process used in California and much of North America, open windrows, may not be inherently sustainable. The process and profitability of operators heavily depends on the wide availability of relatively inexpensive diesel fuel. Composting facilities have little ability to raise their tipping fees or the prices for their finished product without losing market share to low-priced landfilling and relatively inexpensive manufactured fertilizer. If diesel fuel prices were to rise significantly in the future, compost facilities would find their profit margins squeezed and some may go out of business.

Composting facilities are difficult to site because of odor issues. Odor is most commonly associated with receiving and mechanical turning of relatively fresh feedstock. Rapid handling of fresh, odoriferous feedstock can be achieved by most operators; however, it is not always possible to reduce or alter turning schedules. Eliminating the need to turn during the odorous active composting phase may allow compost facilities to site closer to urban areas that generate feedstock, thus reducing diesel-intensive feedstock hauling.

As California increases its efforts to reduce landfilling and greenhouse gas generation, food waste composting will increase. Unlike green waste, food waste qualifies for GHG credits when composted. Food waste putrefies rapidly; however, often creating intense odors. No odorous emissions from the eASP built for this project were ever detected. Composting methods which reduce handling activities during the active phase seem likely to reduce odor issues, again, potentially allowing siting of composting facilities closer to the places where both food and green wastes are generated.

Previous emissions studies where foodwaste was a significant part of the feedstock suggest that VOC emissions could be significantly higher compared to green-waste -only piles, but this question has not been adequately researched. The South Coast AQMD already requires large foodwaste composting operators to install VOC capture systems. The high cost of these systems has limited food waste composting opportunities within the four counties of the SCQAMD.

Emissions reductions for VOCs (primarily non-methane, non-ethane organic compounds, or NMNEOC) from the eASP were expected in this study, but the measured reductions exceeded all expectations. In searching for potential explanations for the high rate of control, several factors come to the fore.

- EASPs reduce surface area. In a 2009 study for the San Joaquin Valley Unified Air Pollution Control District, very small windrows with high surface areas were shown to have higher emissions rates than the ordinary sized control windrow.
- The eASP surface was kept wet. In the same previous study for the San Joaquin Valley Unified Air Pollution Control District, wetting the surface of the windrow prior to turning reduced overall emissions by 19%. This study supports that finding and suggests that a consistently wet surface may produce even higher emissions control. With a smaller surface area, the eASP is less prone to drying out during hot SJV summers.
- The biofilter layer was 12" or more thick. In two previous studies, one by the California Integrated Waste Management Board and the aforementioned 2009 air district study, 6" thick compost caps delivered emissions reductions of 75% and 53%, respectively. Commercial biofilters are commonly 3' thick or greater, depending on the application. This study suggests that thicker biofilter compost cap layers are more capable of degrading NMNEOCs and other undesirable compounds.
- More uniform air and water. Aeration is applied uniformly to the greenwaste, maximizing aerobic decomposition and reducing anaerobic pockets. The other primary ingredient, water, is also applied regularly so that overly dry conditions never suppress microbial activity, further enhancing rapid and efficient aerobic decomposition. Controlling the aerobic activity is a key ingredient in maintaining more efficient and favorable aerobic decomposition regarding both the type of compounds generated and the amount of compound air emissions released per ton of greenwaste.

The main component of the compost cap, unscreened finished compost, is available at all composting sites. Methods to apply the cap on conventional windrows tend to be diesel intensive; however, conveyorization can be used to apply the layer on static piles with set site configurations. SJVUAPCD Rule 4566 requires the biofilter compost cap to be replenished after windrow turning at the very largest facilities, increasing their diesel footprint. State regulations require windrows to be turned five times in 15 days for pathogen reduction. However, state regulation does not require static piles with a one-foot-thick insulation layer to be turned for pathogen reduction purposes. By using the eASP system, operators can apply just one cap for the entire active composting phase.

The solar powered eASP system reduces dependency on diesel, and reduces feedstock handling during the critical active composting period, when odor and emissions potential is at its highest. The use of

solar power means aeration systems can be located where they are needed, in remote locations, without expensive grid connections. In the SJV, available sunshine year-round is more than adequate for the relatively small motors needed for aeration, and with adequate battery backup such systems should be operable even during the rare prolonged foggy or rainy winter periods.

A drawback for the prototype eASP system was the, above-ground aeration pipes, which were destroyed during pile deconstruction. This problem can be overcome by substituting thick, durable pipes made of heavy plastic (typically used for water mains) in place of the thinner, low-cost pipes used in this project. Also, low-cost methods to embed aeration pipes in the ground should be technologically feasible for most operators, and are available commercially from some vendors.

Another challenge was setting proper moisture levels. Though the temporary eASP sprinkler system rigged for this project worked remarkably well, it was not as precise or as consistent as desirable. Once a compost operator configures an eASP site, designing a more effective, permanent system providing near-ideal moisture management should not prove a significant challenge. A similar situation occurred for the initial watering of the feedstock; the temporary system designed for this project proved adequate. However, permanent, engineered systems—perhaps integrated with the conveyor—would certainly provide more uniform feedstock moisture and would quite possibly save additional water.

A final drawback for larger pile sizes is the difficulty of monitoring conditions deep within the pile. The five-foot-long temperature probe purchased for this project is the longest readily available. However, it is not always possible or advisable to force the probe the full 5' into a pile. Also, this probe did not measure relative moisture. Technology is rapidly solving these problems. Low-cost remote data loggers are now available. These can be buried within piles, and can record a variety of parameters, including temperature and moisture, over the life of the project. Future projects should include the use of these devices.

### Conclusions

This project compared standard windrow composting to an eASP design to compare emissions. The result of this project does establish that the eASP design tested reduces both water use and air emissions. The eASP was tested in a single selected configuration; therefore, the results of this project do not establish optimal blower speeds or water application rates. Additional testing would be required to establish a user guide to ensure minimum operating costs, best quality of product and minimum water use and air emissions.

The solar powered eASP with a biofilter compost cap appears to be a viable method for commercialscale composting. The demonstrated NMNEOC, ammonia and GHG emissions reductions achieved in this project from the piles of decomposing organic materials were significant, in the range of 98%, 95% and 70% respectively. These levels of control match or exceed commercially available systems costing many times more. The practical effect of using electric conveyors instead of diesel-powered trucks and loaders to build the pile, and of using solar-powered aeration instead of diesel-powered windrow turners, creates additional emissions reductions of NOx and other criteria pollutants which are important in non-attainment air basins such as the San Joaquin Valley. The emission reductions cited are the result of a closely managed demonstration project and should not be considered as the expected performance of and "achieved in practice" permanent facility. Achieved in practice results might be less than the closely managed demonstration project; however additional reductions might be achieved by further work to establish optimal operating conditions.

In addition to the diesel reductions and the greatly reduced emissions from decomposing organic wastes, conversion to eASP systems has the potential to save operators money and reduce GHG impacts through process water savings and shrinking the amount of land needed to conduct active-phase composting.

In terms of product quality and maturity, the eASP appears to be at least as good as windrow systems.

# **List of Appendices**

- Appendix A: Technical Emissions Testing Memo from Chuck Schmidt and Tom Card
- Appendix B: Emissions samples fluxes, calculations and charts
- Appendix C: Diesel fuel use reductions and calculated reductions of associated criteria pollutants and GHG emissions
- Appendix D: STA testing results on 30-day-old material
- Appendix E: Laboratory testing results on 60-day-old materials
- Appendix F: Carbon and nitrogen testing of initial feedstock
- Appendix G: ASP and windrow temperature readings
- Appendix H: Water use calculations
- Appendix I: Land-use calculations

San Joaquin Valley Air Pollution Control District Technology Advancement Program (TAP) 11-01

Aerated Static Pile Composting with Surface Biofiltration Layer Air Emissions Control

# **Air Emissions Assessment**

Summary of VOC and Greenhouse Gas Air Emissions with Comparison to Windrow Composting Emissions



Report Revision 1

January 2012

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#### **Table of Contents**

1.	SUMMARY	1
2.	PROJECT OVERVIEW	3
3.	PROCESS DESCRIPTION	3
	PROTOTYPE ASP WINDROW	3 5
4.	EMISSIONS MEASUREMENT	6
5.	EMISSIONS CALCULATIONS	9
	ASP Emissions	9
	WINDROW EMISSIONS	9
6.		
	Comparative Emissions	10
	GREENHOUSE GAS EMISSIONS	12
	TOTAL EMISSIONS	13
	Discussion	14

#### Figures

Figure 1.1 Emissions Reduction Summary (as compared to tested control windrow).

Figure 3.1 Plan and Section of ASP Piles.

Figure 3.2 Plan and Section of Typical Site Windrows.

Figure 6.1 VOC Emissions (#/ton mix) for Each Process Day.

Figure 6.2 NH3 Emissions (#/ton mix) for Each Process Day.

Figure 6.3 CO2 Emissions (#/ton mix) for Each Process Day.

Figure 6.4 CH4 Emissions (#/ton mix) for Each Process Day.

Figure 6.5 N2O Emissions (#/ton mix) for Each Process Day.

Figure 6.6 CO2 Equivalent Emissions (#/ton mix) for Each Process Day.

Figure 6.7 Emissions Reduction Summary (as compared to tested control windrow).

#### Tables

Table 1.1 ASP Air Emissions (pounds per ton compost mix) for a 22 day compost period with extrapolated estimates for 30 day and 60 day periods.

Table 1.2 Windrow Air Emissions (pounds per ton compost mix) for 22 day, 30 day, and 60 day periods.

Table 1.3 Emissions Reduction Summary (as compared to tested control windrow).

Table 1.4 Emissions Reduction Summary (pounds per ton mix) in a Regulatory Context.

Table 4.1 Summary ASP Emission Measurement Data (flux in mg/m-m2).

Table 4.2 Summary Windrow Emission Measurement Data (flux in mg/m-m2).

- Table 5.1 ASP Air Emissions (pounds per ton compost mix) for a 22 day compost period with extrapolated estimates for 30 day and 60 day periods.
- Table 5.2 Windrow Air Emissions (pounds per ton compost mix) for 22 day, 30 day, and 60 day periods.
- Table 6.1 Emissions Reduction Summary (as compared to tested control windrow).

Table 6.2 Emissions Reduction Summary (pounds per ton mix) in a Regulatory Context.

# Photos

Photo 3.1 Compost Pile Configuration. Photo 3.2 Windrow Configuration. Photo 4.1 Typical Emissions Measurement.

# Appendices

1. Detailed Calculations Tables 1A and 1B

# 1. Summary

A prototype Aerated Static Pile (ASP) composting process was assembled and operated to test both ability to produce quality compost and to quantify air emissions. The ASP utilized ambient air blown into the pile from the bottom; the blowers were powered by photovoltaic panels and associated batteries. The ASP had a biofiltration layer added to the surface to reduce air emissions. A series of compost windrows were built concurrent with the ASP using the same materials. The air emissions from the ASP were compared to the on-site measured air emissions of the current industry-standard windrow composting method.

Emissions were measured using the standard methods and techniques used for San Joaquin Valley Air Pollution Control District (SJVAPCD) regulatory compliance. This includes the use of the USEPA flux chamber as modified under South Coast Air Quality Management District (SCAQMD) Rule 1133, and analysis using SCAQMD Method 25.3 for VOC and 207.1 for ammonia (NH3). In addition to these traditional methods, nitrous oxide (N2O) was measured using NIOSH 6600 and organic species were measured using USEPA TO-15.

Tables 1.1 and 1.2 provide the measured and extrapolated emissions for the ASP and window (respectively) for the cycle periods of 22 days (all measurements) as well as 30 days and 60 days (both measured and extrapolated). The units are pounds of emitted compound per ton of initial compost mix.

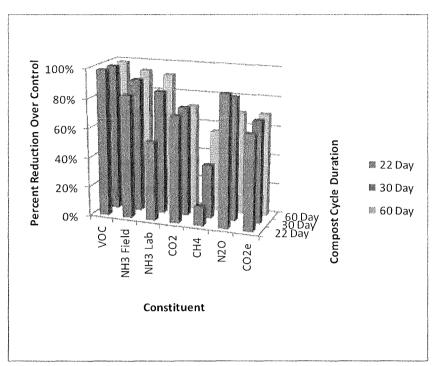
Cycle Length		NI	13		-	ouse Gas	
	VOC	Field	Lab	CO2	CH4	N2O	CO2e
22 Day	0.10	0.02	0.01	206	5.1	0.01	315
30 Day	0.13	0.02	0.01	271	5.2	0.02	387
60 Day	0.22	0.02	0.01	517	5.6	0.08	658

# Table 1.1 ASP Air Emissions (pounds per ton compost mix) for a 22 day compost period with extrapolated estimates for 30 day and 60 day periods.

Table 1.2 Windrow Air Emissions (pounds per ton compost mix) for 22 day, 30 day, and 60 day periods.

		NH3			Greenho	ouse Gas	
Cycle Length	VOC	Field	Lab	CO2	CH4	N2O	CO2e
22 Day	8.6	0.10	0.01	732	5.8	0.09	883
30 Day	10.4	0.19	0.04	1,036	8.1	0.15	1,253
60 Day	19.9	0.38	0.11	1,816	12.4	0.26	2,158

Figure 1.1 and Table 1.3 provides a summary of the emissions reduction (ASP emissions as compared to the on-site measured windrow) for the measured emissions duration of the ASP of 22 days as well as extrapolated ASP emissions for 30 day and 60 day cycle periods.



### Figure 1.1 Emissions Reduction Summary (as compared to tested control windrow).

Cycle Length		NI	-13	Greenhouse Gas						
	voc	Field	Lab	CO2	CH4	N2O	CO2e			
22 Day	98.8%	83%	53%	72%	13%	89%	64%			
30 Day	98.8%	91%	84%	74%	36%	83%	69%			
60 Day	98.9%	94%	92%	72%	55%	70%	70%			

Table 1.4 provides the measured emissions in a regulatory context. The measured 22 day ASP emissions were compared to regulatory emission factors (nominally for windrow composting) from SJVAPCD and SCAQMD.

Test Condition	VOC	NH3	CH4
Prototype ASP (22 Days)	0.10	0.01	5.05
SCAQMD (full life cycle)	3.76	0.82	0.87
% Reduction from SCAQMD Factor	97%	99%	-481%
SJVUAPCD (22-day active phase)	5.14		
% Reduction from SJV active phase	98%		

The VOC reduction achieved was greater than 97% when compared to any benchmark, and equal to or better than all known commercial VOC reduction technologies regardless of price. The windrow (on-site control) emissions were higher than expected, but even using the SJVAPCD emission factor, the control was still and impressive 98%.

Ammonia emission reductions were also substantial. However these varied based on the compared cycle time. For the complete cycle the ASP ammonia emissions, based on laboratory measurement, showed a 92% reduction over the on-site windrow. Greenhouse gas emissions were also reduced, but not as significantly as VOC and ammonia

The documentation for the emissions measurement and analysis is contained in this report as well as the attached Data Validation Technical Memorandum. All field notes and laboratory reports are attached following the technical memorandum.

# 2. Project Overview

This project was funded by a grant from the San Joaquin Valley Air Pollution Control District (SJVAPCD) to demonstrate the feasibility of a commercial-scale positively aerated, ASP compost system. The project was co-managed by the Association of Compost Producers and CalRecycle, with help from the City of Bakersfield and O2 Compost.

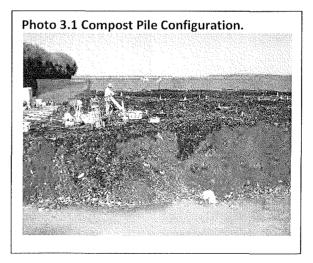
There were several facets to this project, including diesel fuel reduction and renewable energy, which were met by the use of electric conveyors to form the pile and photovoltaic power to run the blowers aerating the ASP. Our team was retained to sample and calculate the air emissions from the ASP compost system, and compare those emissions with those emitted by industry-standard composting windrows which were built out of the same materials on the same day.

The ASP was covered by a biofiltration layer of finished compost to control air emissions. The ASP was operated in a positive ventilation mode, meaning that the air to supply cooling, moisture control, and metabolic oxygen was blown into the pile with exhaust leaving the pile surface. Emissions sampling occurred during one hour cycles. Blowers generally ran two minutes out of every 20, meaning that one emissions sampling event would capture three full blower cycles.

# 3. Process Description

### **Prototype ASP**

Figure 3.1 shows a plan and section of the prototype ASPs. There were three separate zones constructed to represent three different ages of compost. The starting feedstock was placed on top of previously installed air distribution piping and a plenum of large nominal diameter wood chips roughly one foot deep. After the compost was placed to approximately 8 feet of average depth, a nominal 12 inches of finished, unscreened compost was placed on the top of the pile as a biofilter compost cap. The cap acts much like a biofilter, reducing pollutants as they migrate up to the surface of the pile.



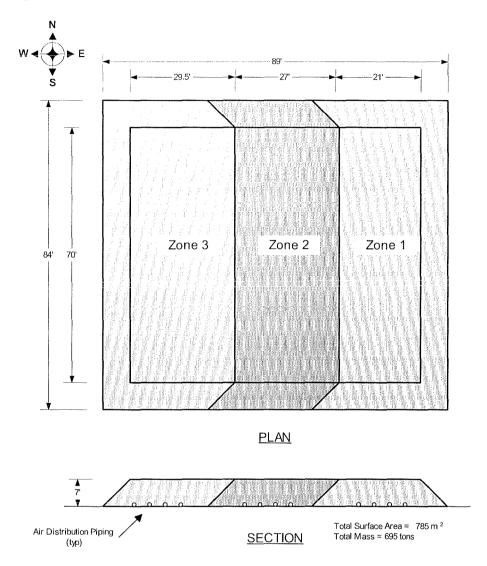


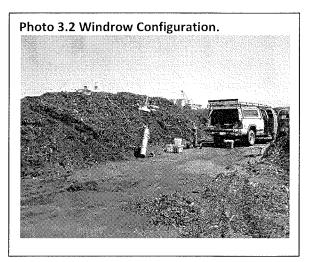
Figure 3.1 Plan and Section of ASP Piles.

The compost pile with biofilter was used to calculate total surface area. The mass of biofilter material was not used in the compost mix mass calculation.

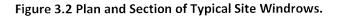
The total surface area of the ASP was 785  $m^2$  and the total mass of compost mix in the cells was 695 tons. The mass value of the compost cells was supplied by O2Compost. For emissions calculation purposes the ASP pile was assumed to be operational for a 21 day compost cycle.

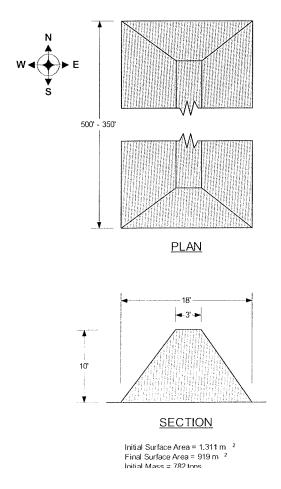
## Windrow

The host site normally composts in windrows. Windrows are the standard technology currently used in the United States to compost greenwaste. Figure 3.2 shows the layout of the windrows being tested for this study. The windrows shrink significantly during the compost duration. The initial area of a windrow was calculated to be 1,311 m2. At the end of cycle, this shrinks to 919 m2. For emissions calculation purposes it was assumed the shrinkage occurred linearly over the compost cycle. The site operator, Harvest Power, provided the mass of typical windrow as 782 tons of compost. Photo 3.2 shows a typical windrow on the site. The normal operating cycle for windrows at this site



is 65 days or longer. The windrows are turned using a specialized mechanical device approximately eight times during the process cycle.





# 4. Emissions Measurement

All emissions measurements were made using USEPA validated flux chamber technology modified per SCAQMD Rule 1133 for measurement of composting air emissions. Photo 4.1 shows a typical measurement. The testing was conducted at pre-determined locations per zone (up to four measurements per zone and test condition) as a function of process day in the life cycle of the composting technology.

Emissions were sampled and analyzed per SCAQMD Method 25.3 for VOC (total non-methane, non-ethane hydrocarbon), carbon dioxide (CO2), and methane (CH4). Ammonia (NH3) was sampled and analyzed using SCAQMD Method 207.1. Nitrous oxide (N2O) was sampled and analyzed using NIOSH Method 6600 (FTIR). Speciated organics were sampled and analyzed using USEPA Method TO-15.

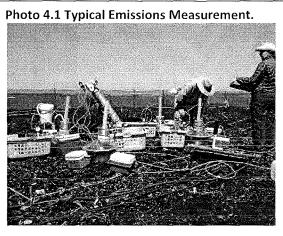
Every test location completed measurements for Method 25.3. Only 25% of the test locations had the analysis completed for Method 207.1 (NH3), NIOSH 6600 (N2O), and TO-15.

For the ASPs, samples were taken on process days 3, 4, 5, 6, 10, 12, 13, 15, 17, 18, and 23. For the windrows, samples were taken on process days 0 (feed stock), 2, 3, 9, 11, 15, 29, and 63.

In general samples were taken in clusters of four representing near-field spatial variability for the ASPs and top/sides for the windrows. Far-field spatial measurements, that is measurements on the opposite end of the pile/windrow were taken on process day 4 for the ASPs and process day 15 for the windrows. These measurements were taken to determine if there were differences in emissions in different parts of the pile. In addition, a mixing event for the windrows was measured on process day 11.

A summary of the data is provided (in flux units) for the ASP (Table 4.1) and windrows/feedstock (Table 4.2). Complete data is provided in the Appendix. The accompanying Data Validation Technical Memorandum contains the complete data set, including QA/QC.

For emissions reporting purposes, only the laboratory ammonia data was used.



SOURCE	DAY	Iary ASP Emis	Metha		CO2		NH3/Tube		NH3/Lab		TNMN	EOC	N2O	
in the second second			Flux	T	Flux				Flux		Flux		Flux	
ASP ZONE 3	3	NW	2.49		2126		1.67		NA	1	3.00		NA	
ASP ZONE 3	3	SW	0.827		0.226		0.283	-	NA	1	0.48	5	NA	
ASP ZONE 3	3	NE	7.22		3644		0.485		0.439		1.06	_	0.201	
ASP ZONE 3	3	SE	1.97		2794		1.39				3.37		NA	1
				<u>†                                    </u>						<u> </u>		1	1	
ASP ZONE 3	4	NW	2.76	+	3173		0.858		NA	<u> </u>	14.2	,	NA	
ASP ZONE 3	4	SW	1.58		2256		0.436		NA		3.3		NA	-
ASP ZONE 3	4	NE	9.18		3122		0.603		0.118	1-	2.02		0.0520	<
ASP ZONE 3	4	SE	1.90		1918		0.741		NA	+	2.50		NA	
ASP ZONE 3	4	Top NW- Spatial	16.6		3768		1.73		NA	+	3.25	_	NA	
ASP ZONE 3	4	Side SE- Spatial	3.49		4174	{	1.01		NA		18.9		NA	
ASP ZONE 3	4	QC- Replicate	3.05		4.39		0.847		NA	+	16.6		NA	
ASF ZONE 3	4	QC- Replicate	3.05		4.55		0.047			+	10.0			-
		NW	2.50		2024		0.0872		0.0318		0.000		0.0707	
ASP ZONE 3	5				2031					<u> </u>	0.333		0.0767	
ASP ZONE 3	5	SW	1.94		1888		0.0561		NA	┣─	0.270	-	NA	+
ASP ZONE 3	5	NE	11.8		3537		0.0569		NA		0.939		NA	
ASP ZONE 3	5	SE	2.17	-	2279		0.3302		NA		0.726	2	NA	
							0.00		-	┣—		<u> </u>		-
ASP ZONE 3	6	NW	1.68		2115		0.00272	<	0.0378	<b> </b>	0.708		0.0141	<
ASP ZONE 3	6	SW	1.31	-	1530		0.0845		NA	ļ	0.339		NA	
ASP ZONE 3	6	NE	8.39		2877		0.00556	<	NA		0.458		NA	
ASP ZONE 3	6	SE	1.80	ļ	2708		0.262		NA	L	1.17	1	NA	
ASP ZONE 2	10	NW	297		6329		0.371		0.0377	<	2.50		0.0192	<
ASP ZONE 2	10	SW	5.53		846		0.418		NA		0.415	5	NA	
ASP ZONE 2	10	NE	382		4360		0.257		NA		0.821		NA	
ASP ZONE 2	10	SE	20.7		0.290		0.317		NA		0.838		NA	
100000000000000000000000000000000000000														
ASP ZONE 2	12	NW	489		6608		0.00580	<	0.0386	<	2.15		0.0751	
ASP ZONE 2	12	SW	16.06		740		0.00477	<	NA		0.345		NA	·   ····
ASP ZONE 2	12	NE	275		3892		0.0313		NA	<u> </u>	0.439		NA	
ASP ZONE 2	12	SE	11.7		1721		0.133		NA		0.429		NA	
		~_					0.100					<u> </u>		
ASP ZONE 2	13	NW	369		10633		0.0158		0.0801	<u> </u>	6.36		0.0204	<
ASP ZONE 2	13	SW	85.1		1515		0.0780		NA		0.351		NA	+
ASP ZONE 2	13	NE	405		6452		0.00499	<	NA	<u> </u>	1.22	-	NA	
ASP ZONE 2	13	SE	134		3935		0.00507	~	NA	<u> </u>	0.318		NA	
AGI 20112 2	13	<u> </u>	154		3333		0.00007		1973		0.510			
ASP ZONE 1	15	NW	3.80		672		0.0450		0.023	_	0.0846		0.133	-
ASP ZONE 1		SW	12.6		791		0.0430		NA 0.023	<u> </u>	0.0518		0.135	+
ASP ZONE 1	15 15	NE	2.13		1	$\rightarrow$	0.220	<	NA	<u> </u>	0.0518		NIA	
					497	+							NA	
ASP ZONE 1	15	SE	20.3		1669	$\rightarrow$	0.0948		NA		0.0973		NA	+
A O D 701/5									0.0000		0.71-		0.000	-
ASP ZONE 1	17	NW	39.6		2725	$\rightarrow$	0.0877		0.0322	< .	0.747		0.288	-
ASP ZONE 1	17	SW	62.7		1784		0.0313		NA		0.288		NA	
ASP ZONE 1	17	NE	28.0		2144		0.00414	<	NA		0.561	t	NA	.
ASP ZONE 1	17	SE	133		5274		0.0926		NA		1.39		NA	ļ
					ļ									ļ
ASP ZONE 1	18	NW	13.4		3067		0.00237	<	0.0985		1.11		0.151	1
ASP ZONE 1	18	SW	20.7		2323		0.00499	<	NA		0.871		NA	
ASP ZONE 1	18	NE	4.94		2004		0.00553	<	NA		1.09		NA	
ASP ZONE 1	18	SE	42.2		4659		0.00321	<	NA		1.17		NA	
ASP ZONE 1	23	NW	3.67		2725		0.00229	<	0.0140	<	1.05		0.500	
ASP ZONE 1	23	SW	5.13		2279		0.00550		NA		0.792		NA	
ASP ZONE 1	23	NE	2.41		1847		0.143		NA		0.918		NA	1
						-+								1
Media Blank	NA	QC-Blank	0.0256	ND	0.888	IN	VA		NA		0.0256	ND	NA	
Media Blank	NA		0.0256		#######	_	VA		NA		0.0256		NA	1
	1 17 1					_						····		+
	NA	OC-Blank	0 00511		2 281	10	I AL		1 (III/64)	< '	0.0367		NΔ	
Media Blank Medial Blank	NA NA		0.0951	ND	2.38				0.00769 NA	<	0.0367		NA 0.00705	<

Table 4.1 Summary ASP Emission Measurement Data (flux in mg/m-m2).

SOURCE	DAY	LOCATION			CO2		lH3/Tu		NH3/La		TNMN		N2O	<u></u>
			Flux		Flux	F	lux		Flux		Flux		Flux	7
ESH DAY OLD CH	1	Тор	0.0895		3012		0.0242		NA		35.4		NA	
FRESH CHOP	0	Тор	0.0916		5145		0.00262	<	NA	_	81.7		NA	
FRESH CHOP	0	QC- Replicate	0.0906		5157		0.00256	<	NA		75.3		NA	
WINDROW WR-1	2	Top-West	0.448		3534		0.0975		0.0320	<	54.1		0.548	
WINDROW WR-1	2	Top- East	0.527		4699		0.107		NA		56.8		NA	Τ
WINDROW WR-1	2	Side- North	0.495		5644		0.379		NA		44.9		NA	T
WINDROW WR-1	2	Side- South	0.689		6267		0.110		NA		83.4		NA	
														_
WINDROW WR-1	3	Top- West	3.02		7566		0.00504	<	0.0300	<	167		0.324	4-
WINDROW WR-1	3	Top- East	0.519		4823		0.155		NA		204		NA	ļ
WINDROW WR-1	3	Side- North	3.57		4363		0.00496	<			135		NA	$\bot$
WINDROW WR-1	3	Side- South	0.469		3204		2.01		NA	<u> </u>	143		NA	
WINDROW WR-2	9	Top- West	48.9		1264	-+-	0.00349	<	0.0206	<	77.7		0.616	┼─
WINDROW WR-2	9	Top-East	65.0		2320		0.640		NA		76.5		NA	┼──
WINDROW WR-2	9	Side- North	15.1		1199	-+-	0,463		NA		15.9		NA	+
WINDROW WR-2	9	Side- South	4.68		2712		0.632		NA		5.29		NA	+
		Cido Couli					0.001							┼──
WINDROW WR-2	11	Тор	63.8		8834		0.0379		0.0595		105		0.422	$\top$
WINDROW WR-2	11	Side- South	15.3		7687		0.387		NA		48.0		NA	T
WR-2 POST MIX	11	Тор	36.6		4062		0.0314		NA		165		NA	-
WR-2 POST MIX	11	QC-Replicate	31.2		4011		0.0258		0.0467	<	163		0.255	1
WR-2 POST MIX	11	Side- South	11.5		5686		0.0183		NA		110		NA	T
														1
WINDROW WR-3	15	Top- East	63.1		6383		4.38		NA		47.4		NA	T
WINDROW WR-3	15	Top-West	70.0		7075		0.371		0.0692	<	27.5		1.05	Τ
WINDROW WR-3	15	Side- North	104		11061		0.845		NA		51.3		NA	
WINDROW WR-3	15	Side-South	206		14227		0.680		NA		62.1		NA	T
WINDROW WR-3	15	Side- N. Spat.	158		6725		0.616		NA		13.6		NA	T
WINDROW WR-3	15	Top- Spatial	43.8		4582		0.714		NA		64.0		NA	T
WINDROW WR-3	15	QC-Replicate	45.0		4931		0.768		NA		71.0		NA	L_
											ļ			<u> </u>
WINDROW WR-3	29	Top-West	44.2		8529		4.88		0.853		50.2		1.50	+
WINDROW WR-3	29	Top-East	58.0		7108		0.00381	<	NA		53.4		NA	
WINDROW WR-3	29	Side- South	39.4		6871		2.84		NA		22.8		NA	
WINDROW WR-4	63	Top- North	22.8		3349	-+-	0.0341		0.0347	<	76.9		0.0176	-
WINDROW WR-4	63	Top- South	16.1		5420	-+-	0.0499		NA		76.0		NA	+
WINDROW WR-4	63	Side-West	4.80		1396	-+-	0.216		NA		96.4		NA	+-
WINDROW WR-4	63	Side-East	2.89	<u> </u>	1625		0.105		NA		67.9		NA	+
						-†-	0.100		····		1			+
Media Blank	NA	QC-Blank	0.0256	ND	0.888		NA		NA		0.0256	ND	NA	
Media Blank	NA	QC-Blank	0.0256	ND	0.0282		NA		NA		0.0256	ND	NA	T
Media Blank	NA	QC-Blank	0.0951		2.38		NA		NA		0.0367		NA	T
Medial Blank	NA	QC- Blank	0.0256	ND	1340		NA		0.00769	<	0.0256	ND	0.00705	<
Media Blank	NA	QC-Blank	· ····				NA						NA	1

Table 4.2 Summary Windrow Emission Measurement Data (flux in mg/m-m2).

# 5. Emissions Calculations

In order to calculate emissions for the complete process cycle, a process cycle was simulated using the data collected on the specific process days. The process cycle days that were not tested had the emissions estimated based on linear interpolation of the test data.

## **ASP Emissions**

The simulated emissions in pounds per ton per day for each cycle day are provided in Attachment 1. The program design for the ASP anticipated that the primary composting process would take 22 days. However emissions estimates were extrapolated to both a 30 day period and a 60 day period. Table 5.1 presents the results of the 22 day measured period as well as the extrapolated longer periods.

# Table 5.1 ASP Air Emissions (pounds per ton compost mix) for a 22 day compost period with extrapolated estimates for 30 day and 60 day periods.

		NI	-13	· · · · · · · ·	Greenh	ouse Gas	
Cycle Length	VOC	Field	Lab	CO2	CH4	N2O	CO2e
22 Day	0.10	0.02	0.01	206	5.1	0.01	315
30 Day	0.13	0.02	0.01	271	5.2	0.02	387
60 Day	0.22	0.02	0.01	517	5.6	0.08	658

# Windrow Emissions

The windrow emissions were calculated in the same manner as the ASP emissions. The only exception is that windrow emissions included mixing events. The measured mixing event data showed that mixing increased the daily emissions by 8% on the mix day. Therefore, for the simulated emissions profile, each mix day emissions were multiplied by a factor of 1.08.

Windrow emissions estimates were calculated for a 22 day period, a 30 day period and a 60 day period. Table 5.2 presents the results of the windrow emissions calculations

Table 5.2 Windrow Air Emissions (pounds per ton compost mix) for 22 day, 30 day, and 60 day	
periods.	

		Nł	-13		Greenho	ouse Gas	
Cycle Length	VOC	Field	Lab	CO2	CH4	N2O	CO2e
22 Day	8.6	0.10	0.01	732	5.8	0.09	883
30 Day	10.4	0.19	0.04	1,036	8.1	0.15	1,253
60 Day	19.9	0.38	0.11	1,816	12.4	0.26	2,158

# 6. Data Analysis and Discussion

#### **Comparative** Emissions

Figures 6.1 through 6.5 shows how each emissions species compares for ASPs and windrows. The emissions beyond Day 22 for the ASP were extrapolated based on the last measurement.

Figure 6.1 VOC Emissions (#/ton mix) for Each Process Day.

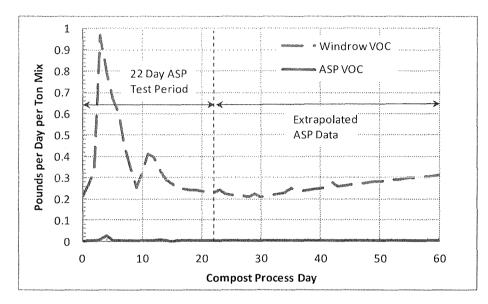
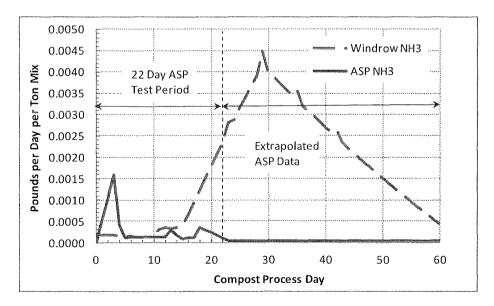


Figure 6.2 NH3 (Laboratory Data Only) Emissions (#/ton mix) for Each Process Day.



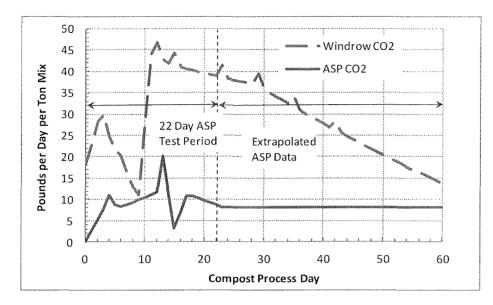
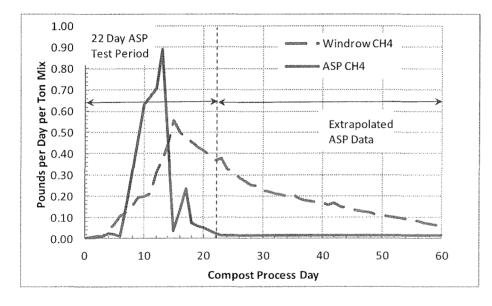


Figure 6.3 CO2 Emissions (#/ton mix) for Each Process Day.

Figure 6.4 CH4 Emissions (#/ton mix) for Each Process Day.



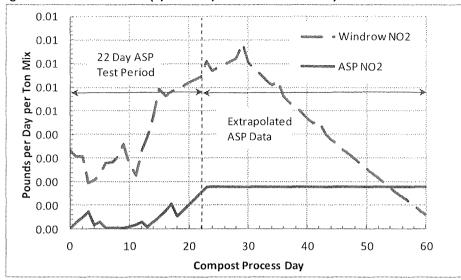


Figure 6.5 N2O Emissions (#/ton mix) for Each Process Day.

### **Greenhouse Gas Emissions**

Using the CARB (40 CFR Part 98) CO<sub>2</sub> equivalency factors for the 100 yr planning horizon of

Methane 21 Nitrous Oxide 310

the CO2 equivalency of the all the greenhouse gases were calculated as are shown as a comparison of windrow to ASP in Figure 6.6. The ASP is shown to be significantly lower than windrow composting using this metric.

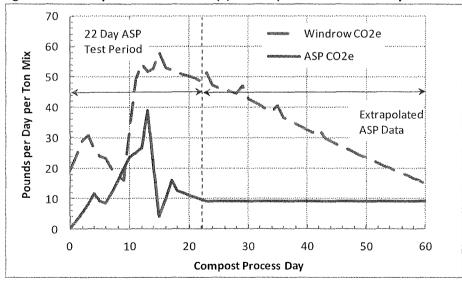
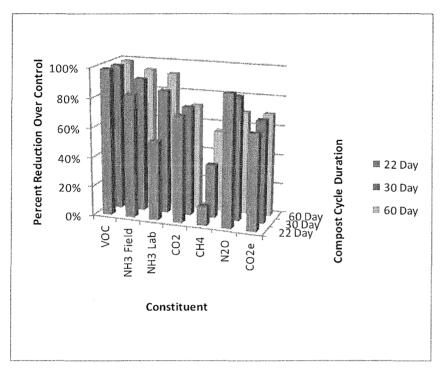


Figure 6.6 CO2 Equivalent Emissions (#/ton mix) for Each Process Day.

## **Emissions Reductions by ASP Technology**

Figure 6.7 shows the emissions reductions for the ASP technology as compared to the control windrow technology. The calculation was made for the 22 day design period as well as extrapolated to 30 day and 60 day periods. Table 6.1 provides the quantitative data used to generate Figure 6.7.



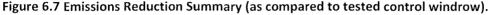


Table 6.1 Emissions Reduction Summary (as compared to tested control windrow).

		NI	43		Greenho	ouse Gas	
Cycle Length	VOC	Field	Lab	CO2	CH4	N2O	CO2e
22 Day	98.8%	83%	53%	72%	13%	89%	64%
30 Day	98.8%	91%	84%	74%	36%	83%	69%
60 Day	98.9%	94%	92%	72%	55%	70%	70%

VOC emission reduction from ASP composting was nearly 99% based on the control windrows for all the cycle periods evaluated. The cycle period did affect both ammonia emissions reduction and methane emissions significantly. This is because the windrow ammonia emissions occurred late in the cycle and the ASP methane emissions occurred early in the cycle.

Table 6.2 presents the emissions reductions as compared to current regulatory emission factors from SJVAPCD and SCAQMD. VOC and ammonia emission reductions were ranged from 97% to 99%. The methane emissions from the ASP prototype were significantly higher than the current SCAQMD emission factor.

Test Condition	VOC	NH3	CH4
Prototype ASP (22 Days)	0.10	0.01	5.05
SCAQMD (full life cycle)	3.76	0.82	0.87
% Reduction from SCAQMD Factor	97%	99%	-481%
SJVUAPCD (22-day active phase)	5.14		
% Reduction from SJV active phase	98%		

#### Table 6.2 Emissions Reduction Summary (pounds per ton mix) in a Regulatory Context.

### Discussion

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The combination of better process control and the surface biofilter layer produced far lower emissions from the ASP as compared to the current industry-standard windrow. The degree of control for both VOCs and windrows exceeded that expected with even synthetic cover technologies. The relatively high level of control of greenhouse gas emissions was a surprise. It is important to note that this is the first thorough test of this technology, and further testing and evaluation should be completed before these high levels of control can be assured on an industry-wide basis.

Appendix 1

# **Detailed Calculation Spreadsheets**

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### Table 1A – ASP Calculations.

Flux

Emissions (pounds)

Emissions (pounds/ton)

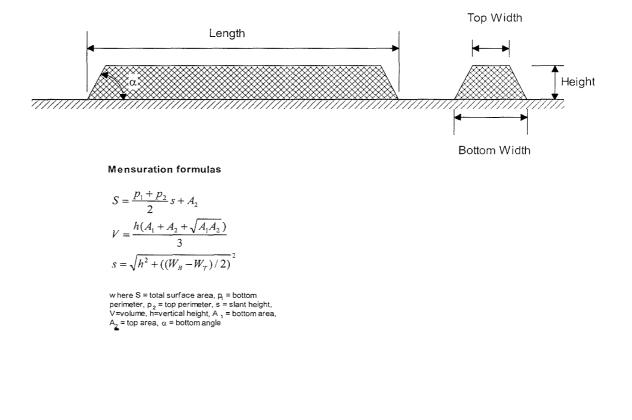
Day	CH4	CO2 M	H3 T	NH3 L	voc	N2O	Area	CH4	CO2	NH3 T	NH3 L	voc	N20	CH4	CO2	<b>NH</b> 3 T	NH3 L	voc	N2O	CO2e
0	0	0	0	0	0	0.00	785											0.0000		
1	1.0	713.6	0.3	0.1	0.7	0.07	785	3	1,778	0.79	0.36	1.64	0.17	0.0037				0.0024		
2	2.1	1427.2	0.6	0.3	1.3	0.13	785	5	3,556	1.59	0.73	3.28	0.33	0.0075				0.0047		
3	3	2,141	0.96	0.44	1.98	0.20	785	8	5.335	2.38	1.09	4.93	0.50	0.0112				0.0071		
4 5	6 5	3,069 2,434	0.90 0.13	0.12	7.37 0.57	0.05 0.08	785 785	15 11	7.647 6.065	2.23 0.33	0.29 0.08	18.36 1.41	0.13 0.19	0.0212				0.0264		2 11.4984
5 6	3	2,434	0.09	0.03	0.57	0.08	785		5.750	0.33	0.08	1.41	0.19	0.0165 0.0118				0.0020		
7	46.6	2,306	0.09	0.04	0.07	0.01	785	8 116	6.109	0.22	0.09	1.96	0.04	0.0118				0.0024		8.5314 12.3047
8	89.8	2595.7	0.2	0.04	0.9	0.0	785	224	6.468	0.53	0.09	2.26	0.04	0.3219				0.0028		16.0779
9	133.1	2739.8	0.3	0.04	1.0	0.0	785	332	6.827	0.69	0.09	2.55	0.04	0.4769						19.8512
10	176	2,884	0.34	0.04	1.14	0.02	785	439	7,186	0.85	0.09	2.85	0.05	0.6319				0.0041		23.6244
11	187.2	3062.2	0.2	0.0	1.0	0.0	785	466	7.630	0.48	0.10	2.47	0.12	0.6706				0.0036		25.1072
12	198	3,240	0.04	0.04	0.84	0.08	785	493	8,075	0.11	0.10	2.10	0.19	0.7093	11.61	0.0002	0.0001	0.0030	0.0003	26.5900
13	248	5,634	0.03	0.08	2.06	0.02	785	619	14.038	0.06	0.20	5.14	0.05	0.8903	20.19	0.0001	0.0003	0.0074	0.0001	38.9050
14	129.1		0.1	0.1	1.1	0.1	785	322	8,149	0.15	0.13	2.67	0.19	0.4626	11.72	0.0002	0.0002	0.0038	0.0003	3 21.5170
15	<b>10</b>		0.09			0.13	785	24	2,261	0.23	0.06	0.19	0.33	0.0348				0.0003		
16	37.7	1944.5	0.1	0.0	0.4	0.2	785	94	4,845	0.18	0.07	1.03	0.52	0.1351				0.0015		3 10.0382
17	66	2,982	0.05	0.03	0.75	0.29	785	164	7.430	0.13	0.08	1.86	0.72	0.2354						15.9473
18	20	3,013	0.00	0.10	1.06	0.15	785	51	7,509	0.01	0.25	2.64	0.38	0.0728				0.0038		12.4929
19 20	17.0	2867.4	0.0	0.1	1.0 1.0	0.2	785	42 34	7,145 6.782	0.03	0.20	2.57 2.50	0.55	0.0609				0.0037		
20 21	13.7 10.4	2721.5 2575.6	0.0	0.1	1.0	0.3 0.4	785 785	34 26	6,418	0.08	0.16	2.50	0.72	0.0490				0.0036		11.1032 10.4084
22	7.0	2429.6	0.0	0.0	0.9	0.4	785	18	6,054	0.00	0.12	2.36.	1.07	0.0371				0.0035		
23	4	2,284	0.05	0.01	0.92	0.50	785	.0	5,691	0.13	0.03	2.29	1.25	0.0134				0.0033		
24	4	2284	0.05	0.01	0.9	0.5	785	9	5,691	0.13	0.03	2.29	1.25	0.0134				0.0033		
25	4	2284	0.05	0.01	0.9	0.5	785	9	5,691	0.13	0.03	2.29	1.25	0.0134				0.0033		
26	4	2284	0.05	0.01	0.9	0.5	785	9	5,691	0.13	0.03	2.29	1.25	0.0134				0.0033		
27	4	2284	0.05	0.01	0.9	0.5	785	9	5,691	0.13	0.03	2.29	1.25	0.0134	8.18	0.0002	0.0001	0.0033	0.0018	9.0187
28	4	2284	0.05	0.01	0.9	0.5	785	9	5,691	0.13	0.03	2.29	1.25	0.0134	8.18	0.0002	0.0001	0.0033	0.0018	9.0187
29	4	2284	0.05	0.01	0.9	0.5	785	9	5,691	0.13	0.03	2.29	1.25	0.0134					0.0018	9.0187
30	4	2284	0.05	0.01	0.9	0.5	785	. 9	5,691	0.13	0.03	2.29	1.25	0.0134				0.0033		
31	4	2284	0.05	0.01	0.9	0.5	785	9	5.691	0.13	0.03	2.29	1.25	0.0134				0.0033		
32	4	2284	0.05	0.01	0.9	0.5	785	9	5,691	0.13	0.03	2.29	1.25	0.0134				0.0033		
33 34	4	2284 2284	0.05	0.01	0.9	0.5	785	9	5,691	0.13 0.13	0.03	2.29 2.29	1.25	0.0134		an an a' dana		0.0033		
35	4	2284	0.05 0.05	0.01 0.01	0.9	0.5	785 785	. 9	5,691 5,691	0.13	0.03	2.29	1.25	0.0134				0.0033	0.0018	
36	4	2284	0.05	0.01	0.9	0.5	785	9	5,691	0.13	0.03	2.29	1.25	0.0134				0.0033		
37	4	2284	0.05	0.01	0.9	0.5	785	9	5,691	0,13	0.03	2.29	1.25	0.0134					0.0018	
38	4	2284	0.05	0.01	0.9	0.5	785	9	5,691	0.13	0.03	2.29	1.25	0.0134					0.0018	
39	4	2284	0.05	0.01	0.9	0.5	785	9	5,691	0,13	0.03	2.29	1.25	0.0134					0.0018	
40	4	2284	0.05	0.01	0.9	0.5	785	9	5,691	0.13	0.03	2.29	1.25	0.0134	8.18	0.0002	0.0001	0.0033	0.0018	9.0187
41	4	2284	0.05	0.01	0.9	0.5	785	9	5,691	0.13	0.03	2.29	1.25	0.0134	8.18	0.0002	0.0001	0.0033	0.0018	9.0187
42	4	2284	0.05	0.01	0.9	0.5	785	9	5,691	0.13	0.03	2.29	1.25	0.0134	8.18		0.0001	0.0033	0.0018	9.0187
43	4	2284	0.05	0.01	0.9	0.5	785	9	5,691	0.13	0.03	2.29	1.25	0.0134				0.0033		
44	4	2284	0.05	0.01	0.9	0.5	785	9	5,691	0.13	0.03	2.29	1.25	0.0134				0.0033		
45	4	2284	0.05	0.01	0.9	0.5	785	9	5,691	0.13	0.03	2.29	1.25	0.0134				0.0033		
46	4	2284	0.05	0.01	0.9	0.5	785	9	5,691	0.13	0.03	2.29	1.25	0.0134					0.0018	
47 48	4	2284 2284	0.05 0.05	0.01 0.01	0.9	0.5 0.5	785 785	9 9	5,691 5,691	0.13	0.03 0.03	2.29 2.29	1.25 1.25	0.0134 0.0134				0.0033		
48 49	4	2284	0.05	0.01	0.9	0.5	785	9	5,691	0.13	0.03	2.29	1.25	0.0134				0.0033		
50	4	2284	0.05	0.01	0.9	0.5	785	. 9	5,691	0.13	0.03	2.29	1.25	0.0134				0.0033		
51	4	2284	0.05	0.01	0.9	0.5	785	9	5,691	0.13	0.03	2.29	1.25	0.0134				0.0033		
52	4	2284	0.05	0.01	0.9	0.5	785	9	5,691	0.13	0.03	2.29	1.25	0.0134				0.0033		
53	4	2284	0.05	0.01	0.9	0.5	785	9	5,691	0.13	0.03	2.29	1.25	0.0134				0.0033		
54	4	2284	0.05	0.01	0.9	0.5	785	9	5,691	0.13	0.03	2.29	1.25	0.0134	8.18	0.0002	0.0001	0.0033	0.0018	9.0187
55	4	2284	0.05	0.01	0.9	0.5	785	9	5,691	0.13	0.03	2.29	1.25	0.0134	8.18	0.0002	0.0001	0.0033		9.0187
56	4	2284	0.05	0.01	0.9	0.5	785	9	5,691	0.13	0.03	2.29	1.25	0.0134				0.0033		
57	4	2284	0.05	0.01	0.9	0.5	785	9	5,691	0.13	0.03	2.29	1.25	0.0134				0.0033		
58	4	2284	0.05	0.01	0.9	0.5	785	9	5,691	0.13	0.03	2.29	1.25	0.0134					0.0018	
59	4	2284	0.05	0.01	0.9	0.5	785	9	5,691	0.13	0.03	2.29	1.25	0.0134				0.0033		
60	4	2284	0.05	0.01	0.9	0.5	785	9	5,691	0.13	0.03	2.29	1.25	0.0134	8.18	0.0002	0.0001	0.0033	0.0018	9.0187
								Tota 3,868	350 200	16	6	156	cc 7	Pounda	2				: •	ere
								1016 3,606 6	517 State	0.02	0.01	0.22		≠uunus #ton mix						658
						1		v					0.00 /							

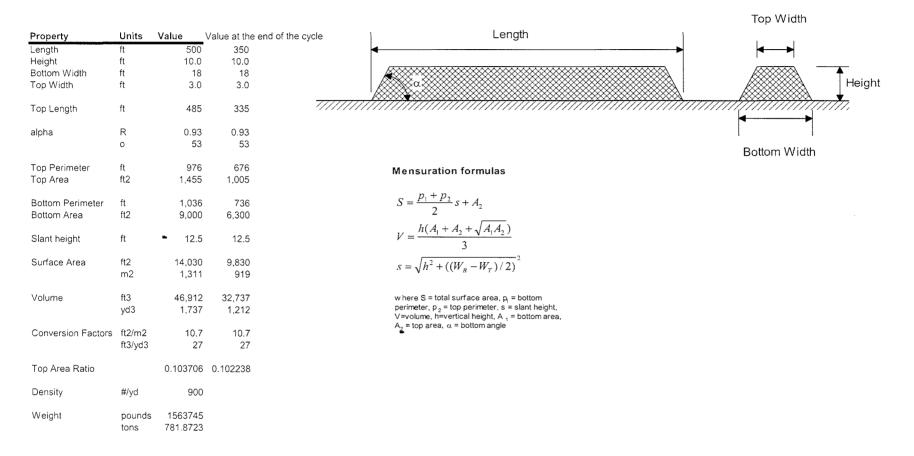
### Table 1B – Windrow Calculations.

	Flux								E	missio	ns (poun	ds)				Emissi	ons (po	unds per	ton)			
Day	CH4	CO2	NH3 T	NH3 I	voc	N2O	Area	MF	c	CH4 (	CO2	NH3 T	NH3 L	voc	N2O	CH4	CO2	NH3 T	NH3 L	voc	N2O	CO2e
0	·		0	0	35	1	1311	1.08		0	13,486	0.11	0.14	158,36	2.45		18	0.0001				19.3018
1			0.1	0.0			1305	1.00		1	16,675	0.41	0.13	197.15 246.58		0.002		0.0006				23.5687 29.1371
2			0.2 1	0.0	59.8 162	0.5 0	1299 1293	1.00 1.08		2 8	20,772 22,028	0.72 2.40	0.13	715.72	2.26 1.43	0.003		0.0033				30.6640
4			0.5	0.0		0.4	1287	1.00		29	18,265	2.15	0.12	581.86	1.52	0.040	25	0.0029				26.1999
5		<ol> <li>T.T. B. C. C. M.</li> </ol>	0.5		122.7	0.4	1281	1.00		50	16,067	2.07	0.11	498.97	1.71	0.068		0.0028		0.676		23.9078 23.2687
6			0.5	0.0	103.0 83.3		1275 1269	1.08		77 92	14,938 11,732	2.13 1.90	0.11 0.10	448.30 335.47		0.104 0.125		0.0029		0.607		19.3849
8			0.5	0.0			1263	1.00		113	9,594	1.82	0.09	254.85	2.27	0.153	13	0.0025	0.0001	0.345		17.1541
9		1873.5	0.4	0.0	43.9	0.6	1257	1.08		143	8,040	1.87	0.09	188.19	2.64	0.194		0.0025		0.255		16.0714 32.2296
10			0.3 0.2	0.0 0.1	60.2 76,5		1251 1245	1.00 1.00		145 156	20,122 32,646	1.29 0.84	0.16 0.24	239.03 302.45	2.06 1.67	0.196		0.0017	0.0002	0.324 0.410		49.3478
12			0.5	0.1	69.4		1239	1.08		230	34,510	1.94	0.26	293.65		0.311		0.0026	0.0004	0.398		54.2874
13			0.7	0.1	62.3		1233	1.00		270	31,535	2.76	0.25	243.91	2.88	0.366		0.0037		0.330		51.5956
14			0.9 1	0.1 0	55.2 48	0.9 1	1227 1221	1.00		327 411	30,986 32,737	3.70 4.98	0.26	215.04 200.52	3.48	0.442		0.0050	0.0004	0.291		52.6995 57.8490
15 16			1.3	0.1	47.7	1,1	1215	1.00		366	30,192	4.99	0.48	183.88		0.496		0.0068		0.249		53.0417
17			1.4	0.2	47.3	1.1	1209	1.00		350	29,946	5.34	0.69	181.32		0.474		0.0072		0.246		52.2981
18			1.5	0.2	46.8	1.1	1203 1196	1.00		334 319	29,700 29,455	5.69 6.04	0.91 1.11	178.78 176.26		0.453		0.0077		0.242		51.5594 50.8254
19 20			1.6 1.7	0.3 0.3	46.4 46.0	1.2 1.2	1190	1.00		303	29,212	6.38	1.32	173.75		0.402		0.0086		0.235		50.0962
21			1.8	0.4	45.5	1.2	1184	1.00		288	28,969	6.72		171.26		0.390		0.0091	0.0021	0.232		49.3718
22			1.9	0.5		1.3	1178	- <u>207</u> - 1		273 277	28,727 30,636	7.06	1.72	168.79 178.88	4.77 5.23	0.369		0.0096		0.229		48.6523 51.5548
23 24			2.0 2.1	0.5 0.6		1.3 1.3	1172 1166	1.08 1.00		243	28,246	7.71	2.07			0.375		0.0100		0.242		47.2275
25		7603.2	2.2	0.6			1160	1.00		228	28,007	8.04	2.32	161.47		0.309		0.0109		0.219		46.5223
26			2.3	0.7			1154	1.00		213	27,769	8.36	2.51	159.06		0.289		0.0113		0.215		45.8219 45.1263
27			2.4 2.5	0.7 0.8			1148 1142	1.00		199 184	27,532 27,296	8.67 8.99	2.70	156.67 154.29	5.23 5.31	0.268		0.0112		0.212		44.4355
29		7503	3	1	42.0	1.5	1136	1.08		183	29,103	10.00		163.40		0.248	39	0.0135				47.0508
30			2.5	0.8			1130	1.00		166	26,437	8.98		155.05		0.224		0.0122				42.6939 41.6471
31 32			2.4 2.4	0.8			1124 1118	1.00 1.00		161 156	25,817 25,203	8.68 8.37	2.87 2.77	158.12		0.218		0.0117		0.214		40.6091
33			2.3	0.8			1112	1.00		152	24,594	8.07	2.67	164.14		0.206		0.0109				39.5799
34	42.0	6832.7	2.2	0.7			1106	1.00		147	23,990	7.77	2.57	167.09		0.200		0.0105				38.5595
35			2.1	0.7	48.7 49.8	1.2 1.2	1100 1094	1.08 1.00		154 138	25,156 22,798	8.04 7.18	2.66 2.38	182.82		0.208		0.0109				40.3812 36.5451
30			2.1	0.7	50.9		1084	1.00		134	22,209	6.89		175.68		0.182		0.0093		0.238		35.5510
38	37.8	6296.8	1.9	0.6			1082	1.00		130	21,626	6.60	2,18	178.46		0.176		0.0089		0.242		34.5658
. 39		6162.8	1.8	0.6 0.6		1.1 1.0	1076 1070	1.00		125 121	21,047 20,474	6.31 6.03	2.09	181.20	3.63 3.46	0.170 0.164		0.0085		0.245		33.5894 32.6218
40 41			1.8 1.7	0.6			1064	1.00		117	19,906	5.75		186.54		0.158		0.0078				31.6630
42			1.6	0.5	56.3	0.9	1058	1.08		121	20,803	5.89			3.36	0.164		0.0080				33.0305
43			1.6	0.5			1052 1046	1.00 1.00		109 105	18,786 18,233	5.20 4.93		191.73 194.25	2.96 2.80	0.147 0.142		0.0070				29.7717 28.8392
44 45			1.5 1.4	0.5 0.5			1046	1.00		103	17,686	4.66		196.74		0.136		0.0063		0.266		27.9156
46			1.3	0.4	60.7	0.8	1033	1.00		97	17,143	4,39		199.18		0.131		0.0059		0.270		27.0007
47			1.3	0.4			1027 1021	1.00		93 89	16,606 16,074	4.13	1.37	201.59 203.95	2.33 2.17	0.125 0.120		0.0056		0.273		26.0947 25.1974
48 49			1.2 1.1	0.4	62.9 64.0		1021	1.00			15,547	3.61	1.20	205.95	2.02	0.120		0.0032		0.279		24,3090
50	25.2	4689.1	1.0	0.3	65.1	0.6	1009	1.00		81	15,025	3.36		208.54	1.87	0.110		0.0045				23.4293
51			1.0	0.3			1003 997	1.00		77	14,509 13,997	3.10 2.86	1.03	210.78	1.72 1.57	0.104		0.0042	0.0014			22.5585 21.6964
52 53			0.9 0.8	0.3			997	1.00		73	13,997	2.61	0.95	212.97	1.57	0.095		0.0039				20.8431
54			0.8	0.3			985	1.00		66	12,990	2.37	0.79	217.23	1.28	0.089		0.0032		0.294		19.9986
55			0.7	0.2			979	1.00		62	12,494	2.12		219.29	1.14 1.00	0.084		0.0029		0.297		19.1630 18.3361
56 57	19.0		0.6 0.5	0.2 0.2		0.3	973 967	1.00 1.00		59 55	12,003 11,517	1.89 1.65			0.86	0.075		0.0026		0.300		17.5180
58		0.0.0	0.5	0.2		0.2	961	1.00		51	11,036	1.42	0.47	225.24	0.72	0.070	15	0.0019	0.000		0	16.7087
59	15.8		0.4	0.1	74.9		955	1.00		48	10,561	1.19	0.40		0.58 0.45	0.065			0.0005	0.308		15.9082 15.1165
60 61			0.3 0.2	0.1	76.0 77.1		949 943	1.00 1.00		45 41	10,090 9,625	0.96 0.74	0.32 0.25	229.00 230.81	0.45	0.060		0.0013		0.310		14.3336
62			0.2	0.1	78.2		937	1.00		38	9,165	0.52		232.59	0.18	0.051	12	0.0007	0.0002	0.315	0.0000	13.5595
63	12	2947	0	0	79		931	1.00		34	8,710	0.30		234.32	0.05	0.047		0.0004		0.317		12.7942
64 65	12		0 0	0	79 79	0.02	925 919	1.00 1.00		34 34	8,653 8,597	0.30 0.29		232.80 231.28	0.05 0.05	0.046 0.046		0.0001	0.0001	0.315		12.7112 12.6282
00	12	2347	0	0	10		515													- 0		
									Total		1,341,525	284		14,728		Pot 12 #/ton mix	1,816				0	2,158
										12	1,816.47	0.38	0.11	19.94	Ų.20	moon mix						

ACP Final Report fo Valley Air TAP Program, May 2013, Appendix B, ASP Area Calculation

ft	
	84
ft	7.0
	89 75.0
i.	70.0
ft	70
R	0.79
0	45
ft	290
ft2	5,250
ft	346
ft2	7,476
ft	<b>•</b> 9.9
ft2	8,398
m2	785
ft3	44,312
yd3	1,641
ft2/m2	10,7
ft3/yd3	27
	0.625146
#/yd	900
pounds	1477070
tons	738.5351
	ft ft ft ft ft ft ft ft ft ft ft ft ft f





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8202012 916	ASP ZONE 1	15	NW	0.5	G-101	A-101	T-101	N-101	63	10.09	3.06	0,303	0.0165	98	87	90	91	79	ASP Zone 1 constructed on 08/05/2012
8202012 916	ASP ZONE 1	15	SW	4	G-102	NA	NA	NA	42	10.09	5.01	0,497	0.0101	94	88	90	91	84	
8202012 915	ASP ZONE 1	15	NE	<0.05	G-103	NA	NA	N	50	10.07	3.32	0,330	0.0152	91	85	87	91	80	
8202012 915	ASP ZONE 1	15	SE	1	G-100	NA	NA	N	61	10.07	2.90	0.288	0.0174	94	88	90	87	82	
8202012 1105	ASP ZONE 2	10	NW	5	G-105	A-102	T-102	N-102	48	10.09	3.70	0.367	0.0136	109	97	99	93	88	ASP Zone 2 constructed on 08/10/2012
8202012 1105	ASP ZONE 2	10	SW	3	G-106	NA	NA	NA	63	10.09	1,97	0.195	0.0256	108	95	94	97	88	
8202012 1105	ASP ZONE 2	10	NE	2	G-107	NA	NA	NA	99	10.03	2.13	0.212	0.0236	109	97	100	97	89	
8202012 1105	ASP ZONE 2	10	SE	3	G-108	NA	NA	NA	69	10.07	2.60	0.212	0.0230	105	97	98	97	88	
8202012 1244	ASP ZONE 3	3	NW	6.5	G-109	NA	NA	NA	92	10.07	1.07	0,106	0.0471	121	102	105	101	93	ASP Zone 3 constructed on 08/17/2012
8202012 1245	ASP ZONE 3	3	SW	4.0	G-110	NA	NA	NA	41	10.07	3.87	0.384	0.0130	115	102	107	96	92	AG1 2016 3 CONSTRUCTED ON DOF 17/2012
8202012 1245	ASP ZONE 3	3	NE	3	G-111	A-103	T-103	N-103	75	10.09	1.70	0.168	0.0297	116	103	103	99	92	
8202012 1245	ASP ZONE 3	3	SE	9	G-112	NA	NA	NA	65	10.09	1.78	0.176	0.0283	121	105	103	123	94	
8202012 1243	WINDROW WR-3	15	Top- East	22	G-112 G-113	NA	NA	NA	112	9.70	1.33	0,137	0.0365	131	107	109	112	98	Windrow WR-3 constructed on 08/05/2012
8202012 1453	WINDROW WR-3	15	Top- West	3	G-113 G-114	A-104	T-104	N-104	94	9.70	2.14	0.137	0.0365	133	107	109	112	98	Windrow WR-3 constructed on 08/05/2012
8202012 1454	WINDROW WR-3	15	Side- North	5	G-114 G-115	NA NA	NA	NA NA	94 80	9.70	1.57	0.162	0.0227	152	108	122	112	97	
	WINDROW WR-3	15	Side- South	6		NA	NA	NA	81	10.09	2.43	0.102		132	131	134	123	103	
8202012 1506 8202012 1634	WINDROW WR-3	15	Side- N. Spatial	5	G-116 G-117	NA	NA	NA	88	9.72	2.43	0.241	0.0208	117	107	110	107	96	Spatial test: One side test and one top test
									79										
8202012 1630	WINDROW WR-3	15	Top- Spatial	5	G-118	NA	NA	NA		9.70	1.85	0.191	0.0262	116	107	108	101	100	Spatial test: One side test and one top test
8202012 1630	WINDROW WR-3	15	QC-Replicate	5	G-119	NA	NA	NA	79	9.70	1.72	0.177	0.0282	116	107	108	101	100	Replicate sample
8202012 1755	Media Blank	NA	QC-Blank	NA	G-120	NA	NA	NA	NA	10.07	9.86	0.979	98%	NA	NA	NA	NA	NA	UHP air in clean canister- media blank sample
8212012 752	WINDROW WR-2	9	Top-West	<0.05	G-201	A-201	T-201	N-201	34	9.72	3.81	0.392	0.0128	123	89	97	91	75	Windrow WR-2 constructed on 08/12/2012
8212012 752	WINDROW WR-2	9	Top- East	5	G-202	NA	NA	NA	53	9.72	2.07	0.213	0.0235	119	93	101	109	75	
8212012 754	WINDROW WR-2	9	Side- North	5	G-203	NA	NA	NA	71	9.70	2.85	0.294	0.0170	131	100	110	91	76	
8212012 756	WINDROW WR-2	9	Side- South	5	G-204	NA	NA	NA	65	10.09	2.17	0.215	0.0232	96	90	96	89	63	
8212012 941	WINDROW WR-1	2	Top- West	1	G-205	A-202	T-202	N-202	36	9.72	2.72	0.280	0.0179	100	89	89	91	84	Windrow WR-1 constructed on 08/20/2012
8212012 941	WINDROW WR-1	2	Top- East	. 1	G-206	NA	NA	NA	53	9.72	2.48	0.255	0.0196	106	91	. 94	93	89	
8212012 942	WINDROW WR-1	2	Side- North	4	G-207	NA	NA	NA	55	10.09	2.90	0.287	0.0174	97	88	90	96	81	
8212012 942	WINDROW WR-1	2	Side- South	1	G-208	NA	NA	NA	49	9.70	2.40	0.247	0.0202	103	92	96	86	85	
8212012 1200	WINDROW WR-4	63	Top- North	0.5	G-209	A-203	T-203	N-203	42	9.72	3.90	0.401	0.0125	115	110	115	110	89	Windrow WR-4 constructed on 06/19/12
8212012 1211	WINDROW WR-4	63	Top- South	0.5	G-210	NA	NA	NA	65	9.72	2.65	0.273	0.0183	120	105	110	109	95	
8212012 1217	WINDROW WR-4	63	Side- West	2	G-211	NA	NA	NA	68	9.70	2.45	0.253	0.0198	117	99	111	110	100	
8212012 1220	WINDROW WR-4	63	Side- East	1.C	G-212	NA	NA	NA	71	10.12	2.63	0.260	0.0192	114	113	114	107	91	
8212012 1402	ASP ZONE 3	4	NW	7	G-213	NA	NA	NA	63	9.70	2.16	0.223	0.0225	108	NA	107	108	98	
8212012 1402	ASP ZONE 3	4	SW	5	G-214	NA	NA	NA	56	9.70	3.04	0.313	0.0160	113	109	114	107	99	
8212012 1403	ASP ZONE 3	4	NE	3	G-215	A-204	T-204	N-204	160	10.12	1.37	0.135	0.0369	112	103	102	105	98	
8212012 1404	ASP ZONE 3	. 4	SE	5	G-216	NA	NA	NA	90	10.12	1.86	0.184	0.0272	117	103	107	106	97	
8212012 1537	ASP ZONE 3	4	Top NW- Spatial	19	G-217	NA	NA	NA	73	9.70	2.90	0.299	0.0167	112	106	106	102	99	Spatial test: One side test and one top test
8212012 1537	ASP ZONE 3	4	Side SE- Spatial	5	G-218	NA	NA	NA	90	9.70	1.31	0,135	0.0370	110	107	109	105	100	Spatial test: One side test and one top test
8212012 1537	ASP ZONE 3	4	QC- Replicate	5	G-219	NA	NA	NA	90	9.70	1.56	0.161	0.0311	110	107	109	105	100	Replicate sample
8212012 1645	Media Blank	NA	QC-Blank	NA	G-220	NA	NA	NA	NA	10.12	10.2	1,008	101%	NA	NA	NA	NA	NA	UHP air in clean canister- media blank sample
															1				
8222012 745	ASP ZONE 1	17	NW	1	G-301	A-301	T-301	N-301	51	10.12	3.15	0.311	0.0161	92	80	79	82	76	
8222012 745	ASP ZONE 1	17	SW	0.5	G-302	NA	NA	NA	64	10.12	4.40	0,435	0.0115	82	77	79	78	76	
8222012 745	ASP ZONE 1	17	NE	<0.05	G-303	NA	NA	NA	51	9.72	3.20	0.329	0.0152	86	80	84	88	76	
8222012 745	ASP ZONE 1	17	SE	0.5	G-304	NA	NA	N	112	9.72	1.43	0.147	0.0340	85	80	80	80	77	
8222012 918	ASP ZONE 2	12	NW	<0.05	G-305	A-302	T-302	N-302	81	10.12	2.38	0,235	0.0213	94	88	90	88	78	Blower fan not functioning properly
8222012 918	ASP ZONE 2	12	SW	< 0.05	G-306	NA	NA	NA	58	10.12	2.89	0,286	0.0175	94	91	91	88	83	
8222012 918	ASP ZONE 2	12	NE	0.5	G-307	NA	NA	NA	66	9.92	4.33	0.436	0.0115	92	88	87	83	83	
8222012 918	ASP ZONE 2	12	SE	1	G-308	NA	NA	NA	74	9.92	2.03	0.205	0.0244	87	86	86	87	81	
8222012 1101	ASP ZONE 3	5	NW	1	G-309	A-303	T-303	N-303	60	10.12	3.16	0.312	0.0160	116	99	104	103	87	
8222012 1104	ASP ZONE 3	5	SW	1	G-310	NA	NA	NA	22	10.12	4.90	0.484	0.0103	112	104	104	105	90	
8222012 1104	ASP ZONE 3	5	NE	0.5	G-311	NA	NA	NA	62	9,92	2.37	0.239	0.0209	109	104	107	108	93	
8222012 1109	ASP ZONE 3	5	SE	3	G-312	NA	NA	NA	64	9.92	2.46	0.235	0.0203	119	104	100	108	90	
				,					¥	<u>,,,,</u>	4.40	0,240	0.0202	119	1.55	107	107	30	

ACP Final Report fo Valley Air TAP Program, May 2013, Appendix B, Sample Data ASP and Windrow

 DATE
 TIME
 Source
 Day
 Location
 NH3
 25.3
 207.1
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 M-6600
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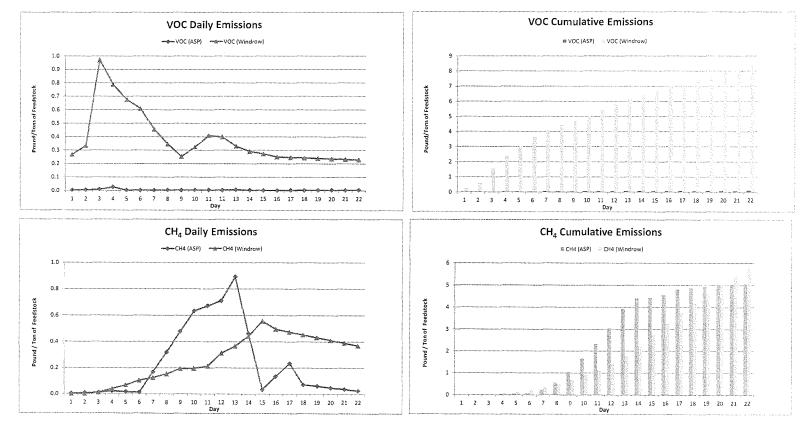
Table 1. Summary of Field Sample Collection Information and Field Data for ACP Valley Air TAP Compost Research Program; August 2012.

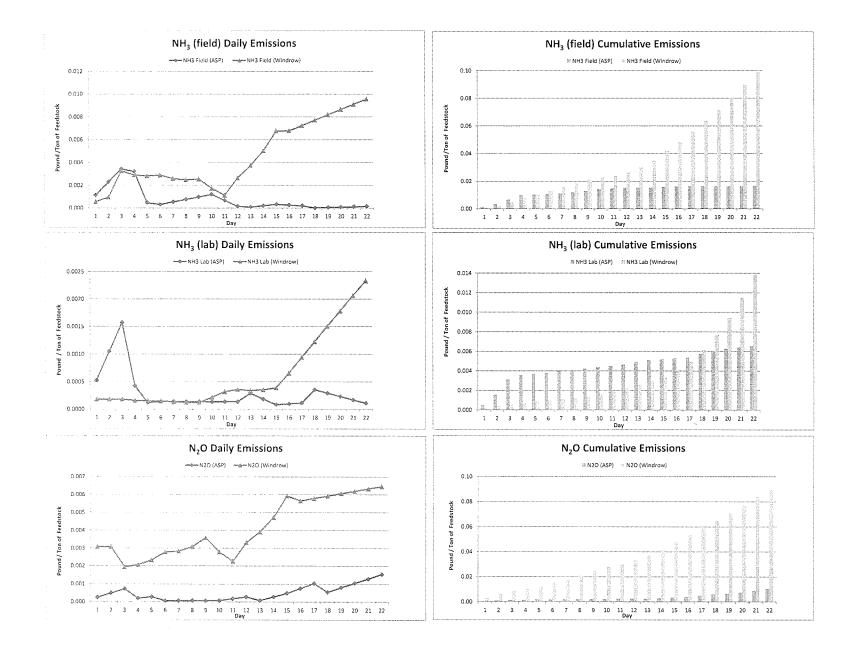
Table 1. Summary of Field Sample Collection Information and Field Data for ACP Valley Air TAP Compost Research Program; August 2012.

DATE	TIME	SOURCE	DAY	LOCATION	NH3	25.3	207.1	TO-15	N-6600	FLOW	HELIUM	HELIUM	HELIUM	FLOW	IN SURF	STACK	IN AIR	OUT SURF	OUT AIR	COMMENT
					(ppmv)	ID	15	۱D	ID	(ft/min)	ADDED (%)	REC (%)	RATIO	(m3/min)						
8222012	1315	WINDROW WR-1	3	Top- West	< 0.05	G-313	A-304	T-304	N-304	60	9.91	2.68	0.270	0.0185	116	106	108	105	95	
8222012	1318	WINDROW WR-1	3	Top- East	1	G-314	NA	NA	NA	88	9.91	1.74	0.176	0.0285	111	101	103	101	90	
8222012	1322	WINDROW WR-1	3	Side- North	< 0.05	G-315	NA	NA	NA	89	9.89	2.71	0.274	0.0182	112	106	106	93	96	
8222012	1333	WINDROW WR-1	3	Side- South	13	G-316	NA	NA	NA	88	9.93	1.75	0.176	0.0284	120	102	112	117	97	
8222012	1028	RESH DAY OLD CHO	1	Тор	0.5	G-317	NA	NA	NA	NA	9.89	5.55	0.561	0.0089	98	NA	99	102	86	Representative of fresh chop used to build piles, about 1 day old
8222012	1230	FRESH CHOP	0	Тор	NA	G-318	NA	NA	NA	NA	9.92	5.18	0.522	0.0096	NA	NA	NA	NA	NA	Representative of fresh chop, about 2 hours old
8222012	1230	FRESH CHOP	0	QC- Replicate	NA	G-319	NA	NA	NA	NA	9.92	5.30	0.534	0.0094	NA	NA	NA	NA	NA	Replicate sample
8222012	1437	Media Blank	NA	QC-Blank	NA	G-320	NA	NA	NA	NA	9.92	3.41	0.344	34%	NA	NA	NA	NA	NA	UHP air in clean canister- media blank sample
											1									
8232012	747	ASP ZONE 1	18	NW	< 0.05	G-401	A-401	T-401	N-401	42	9.93	5.71	0.575	0.0087	81	74	76	78	70	Blower cycle is short due to power level
8232012	749	ASP ZONE 1	18	SW	<0.05	G-402	NA	NA	NA	61	9.93	2.72	0.274	0.0183	84	74	74	82	70	
8232012	730	ASP ZONE 1	18	NE	<0.05	G-403	NA	NA	NA	63	9.89	2.43	0.246	0.0203	79	75	75	80	71	
8232012	730	ASP ZONE 1	18	SE	<0.05	G-404	NA	NA	NA	49	9.89	4.18	0.423	0.0118	82	75	77	79	70	
8232012	907	ASP ZONE 2	13	NW	0.2	G-405	A-402	T-402	N-402	47	9.89	3.41	0.345	0.0145	85	83	87	85	74	
8232012	907	ASP ZONE 2	13	SW	0.8	G~406	NA	NA	NA	89	9.89	2.76	0.279	0.0179	81	85	82	80	84	
8232012	907	ASP ZONE 2	13	NE	<0.05	G-407	NA	NA	NA	60	9.93	2.72	0.274	0.0183	95	87	90	85	80	
8232012	907	ASP ZONE 2	13	SE	<0.05	G-408	NA	NA	NA	63	9.93	2.67	0.269	0.0186	90	89	93	92	81	
8232012	1037	ASP ZONE 3	6	NW	<0.05	G-409	A-403	T-403	N-403	37	9.93	4.98	0.502	0.0100	110	96	104	100	88	
8232012	1037	ASP ZONE 3	ô	SW	1	G-410	NA	NA	NA	51	9.93	3.21	0.323	0.0155	113	97	101	119	90	
8232012	1037	ASP ZONE 3	6	NE	<0.05	G-411	NA	NA	NA	67	9.89	2.42	0.245	0.0204	103	100	102	105	90	
8232012	1037	ASP ZONE 3	6	SE	4	G-412	NA	NA	NA	37	9.89	4.11	0.416	0.0120	122	104	107	110	90	
8232012	1235	WINDROW WR-2	11	Тор	0.3	G-413	A-404	T-404	N-404	71	9.92	2.14	0.216	0.0232	127	110	112	109	95	Pile watered on site schedule (08/23/2012, 1015); A/T/N replicate '405'
8232012	1235	WINDROW WR-2	11	Side- South	3	G-414	NA	NA	NA	81	9.91	2.09	0.211	0.0237	143	122	128	110	95	
8232012	1409	WR-2 POST MIX	11	Тор	0.2	G-415	NA	NA	NA	60	9.92	1.72	0.173	0.0288	138	111	116	126	98	Scarab mixing at 1325-1335; test started 4 minutes post mixing
8232012	1409	WR-2 POST MIX	11	OC-Replicate	0.2	G-416	A-405	T-405	N-405	60	9.92	2.09	0.211	0.0237	138	111	116	126	98	Ammonia, VOCs, and nitrogen oxide replicates of '404' series
8232012	1412	WR-2 POST MIX	11	Side- South	0.2	G-417	NA	NA	NA	65	9.91	2.95	0.298	0.0168	137	123	126	119	97	Scarab mixing at 1325-1335; test started 4 minutes post mixing
8232012	1512	Medial Blank	NA	QC- Blank	NA	G-418	A-406	T-406	N-406	NA	10.07	10.02	0.995	100%	NA	NA	NA	NA	NA	UHP air in clean canister- media blank sample
					1							[			1	1		1		
8282012		ASP ZONE 1	23	NW	<0.05	G-501	A-501	T-501	N-501	26	9.76	5.80	0.594	0.0084	91	81	89	93	78	
8282012	808	ASP ZONE 1	23	SW	0.1	G-502	NA	NA	NA	37	9.91	4.89	0.493	0.0101	96	84	92	97	73	
8282012		ASP ZONE 1	23	NE	1	G-503	NA	NA	NA	61	9.91	1.89	0.191	0.0262	95	84	87	93	74	
8282012		WINDROW WR-3	29	Top- West	40	G-504	A-502	T-502	N-502	60	9.76	2.18	0.223	0.0224	146	107	112	118	89	1
8282012	1030	WINDROW WR-3	29	Top- East	<0.05	G-505	NA	NA	NA	51	9.76	3.49	0.358	0.0140	119	103	110	115	86	
8282012	1030	WINDROW WR-3	29	Side- South	30	G-506	NA	NA	NA	47	9.91	2.84	0.287	0.0174	140	114	120	122	84	
L					1							L								
8292012	1154	Media Blank	NA	OC-Blank	NA	G-605	NA	NA	NA	NA	9.91	L	0.000	1	NA	NA	NA	NA	NA	Media blank in BOC testing data set for the batch

#### ACP Final Report fo Valley Air TAP Program, May 2013, Appendix B, Daily and Cumulative Emissions

		С	H4			V	oc			NH3	Field			NH3	Lab		1	Ň	20	
	Da		Cumu	lative	Da	aily	Cumu	lative		aily		lative		aily		lative	Di	aily	Cumu	ulative
		CH4		CH4		voc		VOC	NH3 Field		NH3 Field	NH3 Field	NH3 Lab	NH3 Lab	NH3 Lab	NH3 Lab		N20		N20
Day	CH4 (ASP)	(Windrow)	CH4 (ASP)	(Windrow)	VOC (ASP)	(Windrow)	VOC (ASP)	(Windrow)	(ASP)	(Windrow)	(ASP)	(Windrow)	(ASP)	(Windrow)	(ASP)	(Windrow)	N2O (ASP)	(Windrow)	N2O (ASP)	(Windrow)
1	0.0037	0.002	0.0037	0.002	0.0024	0.267	0.0024	0.267	0.0011	0.001	0.0011	0.001	0.0005	0.000	0.0005	0.000	0.0002	0.003	0.0002	0.003
2	0.0075	0.003	0.0112	0.005	0.0047	0.334	0.0071	0.601	0.0023	0.001	0.0034	0.002	0.0010	0.000	0.0016	0.000	0.0005	0.003	0.0007	0.006
3	0.0112	0.011	0.0224	0.016	0.0071	0.969	0.0142	1.570	0.0034	0.003	0.0069	0.005	0.0016	0.000	0.0031	0.001	0.0007	0.002	0.0014	0.008
4	0.0212	0.040	0.0436	0.056	0.0264	0.788	0.0406	2.358	0.0032	0.003	0.0101	0.008	0.0004	0.000	0.0036	0.001	0.0002	0.002	0.0016	0.010
5	0.0165	0.068	0.0601	0.124	0.0020	0.676	0.0426	3.033	0.0005	0.003	0.0105	0.010	0.0001	0.000	0.0037	0.001	0.0003	0.002	0.0019	0.012
6	0.0118	0.104	0.0719	0.228	0.0024	0.607	0.0450	3.640	0.0003	0.003	0.0109	0.013	0.0001	0.000	0.0038	0.001	0.0001	0.003	0.0020	0.015
7	0.1668	0.125	0.2387	0.353	0.0028	0.454	0.0478	4.095	0.0005	0.003	0.0114	0.016	0.0001	0.000	0.0040	0.001	0.0001	0.003	0.0020	0.018
8	0.3219	0.153	0.5606	0.506	0.0032	0.345	0.0511	4.440	0.0008	0.002	0.0122	0.018	0.0001	0.000	0.0041	0.001	0.0001	0.003	0.0021	0.021
9	0.4769	0.194	1.0375	0.700	0.0037	0.255	0.0547	4.695	0.0010	0.003	0.0132	0.021	0.0001	0.000	0.0042	0.001	0.0001	0.004	0.0021	0.025
10	0.6319	0.196	1.6694	0.896	0.0041	0.324	0.0588	5.018	0.0012	0.002	0.0144	0.023	0.0001	0.000	0.0044	0.002	0.0001	0.003	0.0022	0.027
11	0.6705	0.212	2.3400	1.108	0.0036	0.410	0.0624	5.428	0.0007	0.001	0.0151	0.024	0.0001	0.000	0.0045	0.002	0.0002	0.002	0.0024	0.030
12	0.7093	0.311	3.0493	1.419	0.0030	0.398	0.0654	5.825	0.0002	0.003	0.0152	0.026	0.0001	0.000	0.0046	0.002	0.0003	0.003	0.0026	0.033
13	0.8903	0.366	3.9396	1.785	0.0074	0.330	0.0728	6.156	0.0001	0.004	0.0153	0.030	0.0003	0.000	0.0049	0.003	0.0001	0.004	0.0027	0.037
14	0.4625	0.442	4.4022	2.227	0 0038	0.291	0.0766	6.447	0.0002	0.005	0.0155	0.035	0.0002	0.000	0.0051	0.003	0.0003	0.005	0.0030	0.042
15	0.0343	0.556	4.4370	2.783	0 0003	0.272	0.0769	6.718	0.0003	0.007	0.0159	0.042	0.0001	0.000	0.0052	0.003	0.0005	0.006	0.0035	0.048
16	0.1351	0.496	4.5721	3.279	0 0015	0.249	0.0784	6.967	0.0003	0.007	0.0161	0.049	0.0001	0.001	0.0053	0.004	8000.0	0.006	0.0042	0.053
17	0.2354	0.474	4.8076	3.753	0.0027	0.246	0.0810	7.213	0.0002	0.007	0.0163	0.056	0.0001	0.001	0.0054	0.005	0.0010	0.006	0.0052	0.059
18	0.0723	0.453	4.8803	4.206	0.0038	0.242	0.0848	7.455	0.0000	0.008	0.0163	0.064	0.0004	0.001	0.0058	0.006	0.0005	0.006	0.0058	0.065
19	0.0603	0.432	4.9412	4.637	0.0037	0.239	0.0885	7.694	0.0000	0.008	0.0164	0.072	0.0003	0.002	0.0060	0.008	8000.0	0.006	0.0066	0.071
20	0.0490	0.411	4.9903	5.048	0.0036	0.235	0.0921	7.929	0.0001	0.009	0.0165	0.080	0.0002	0.002	0.0063	0.009	0.0010	0.006	0.0076	0.077
21	0.0371	0.390	5.0274	5.438	0.0035	0.232	0.0956	8,161	0.0001	0.009	0.0166	0.090	0.0002	0.002	0.0065	0.012	0.0013	0.006	0.0089	0.084
22	0.0253	0.369	5.0526	5.807	0.0034	0.229	0.0990	8.389	0.0001	0.010	0.0167	0.099	0.0001	0.002	0.0066	0.014	0.0015	0.006	0.0105	0.090

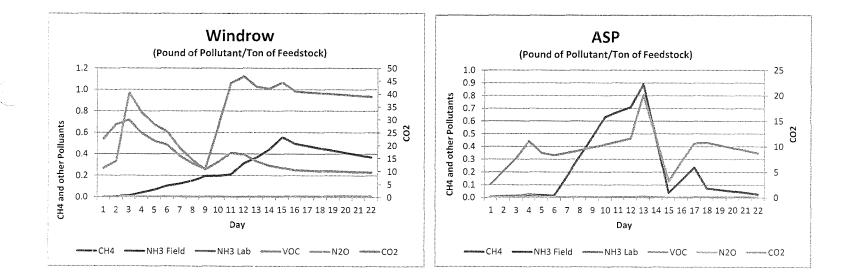




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			Α	SP	فارعدوا اغتما ومعروب بجبب ففات الارتمار		Т			Wind	lrow		
Day	CH4	CO2	NH3 Field	NH3 Lab	VOC	N2O		CH4	CO2	NH3 Field	NH3 Lab	VOC	N2O
1	0.0037	2.56	0.0011	0.0005	0.0024	0.0002	Γ	0.002	22.579	0.001	0.000	0.267	0.003
2	0.0075	5.11	0.0023	0.0010	0.0047	0.0005	- [	0.003	28.125	0.001	0.000	0.334	0.003
3	0.0112	7.67	0.0034	0.0016	0.0071	0.0007	Γ	0.011	29.827	0.003	0.000	0.969	0.002
4	0.0212	11.00	0.0032	0.0004	0.0264	0.0002		0.040	24.731	0.003	0.000	0.788	0.002
5	0.0165	8.72	0.0005	0.0001	0.0020	0.0003		0.068	21.756	0.003	0.000	0.676	0.002
6	0.0118	8.27	0.0003	0.0001	0.0024	0.0001	E	0.104	20.226	0.003	0.000	0.607	0.003
7	0.1668	8.78	0.0005	0.0001	0.0028	0.0001		0.125	15.885	0.003	0.000	0.454	0.003
8	0.3219	9.30	0.0008	0.0001	0.0032	0.0001	E	0.153	12.990	0.002	0.000	0.345	0.003
9	0.4769	9.82	0.0010	C.0001	0.0037	0.0001		0.194	10.886	0.003	0.000	0.255	0.004
10	0.6319	10.33	0.0012	C.0001	0.0041	0.0001		0.196	27.246	0.002	0.000	0.324	0.003
11	0.6706	10.97	0.0007	C.0001	0.0036	0.0002		0.212	44.204	0.001	0.000	0.410	0.002
12	0.7093	11.61	0.0002	0.0001	0.0030	0.0003		0.311	46.728	0.003	0.000	0.398	0.003
13	0.8903	20.19	0.0001	0.0003	0.0074	0.0001		0.366	42.700	0.004	0.000	0.330	0.004
14	0.4626	11.72	0.0002	0.0002	0.0038	0.0003		0.442	41.956	0.005	0.000	0.291	0.005
15	0.0348	3.25	0.0003	0.0001	0.0003	0.0005		0.556	44.327	0.007	0.000	0.272	0.006
16	0.1351	6.97	0.0003	0.0001	0.0015	0.0008	E	0.496	40.881	0.007	0.001	0.249	0.006
17	0.2354	10.68	0.0002	0.0001	0.0027	0.0010		0.474	40.547	0.007	0.001	0.246	0.006
18	0.0728	10.80	0.0000	0.0004	0.0038	0.0005		0.453	40.215	0.008	0.001	0.242	0.006
19	0.0609	10.27	0.0000	0.0003	0.0037	0.0008		0.432	39.883	0.008	0.002	0.239	0.006
20	0.0490			0.0002	0.0036	0.0010		0.411	39.553	0.009	0.002	0.235	0.006
21	0.0371			0.0002	0.0035	0.0013	_ [	0.390	39.225	0.009	0.002	0.232	0.006
22	0.0253	8.71	0.0001	0.0001	0.0034	0.0015		0.37	38.8973	0.0096	0.0023	0.2285	0.0065

ACP Final Report fo Valley Air TAP Program, May 2013, Appendix B, Combo Time Series Emissions (pounds/ton)



#### Fable 2. Summary of ASP Flux Testing Data, Concentration Data (genetic, ingenita, and Calculated Flux (mg/m2 min-t),

#### ACP Final Report to Valley Air TAP Program, May 2013, Appendix B, Sample Data for ASP

											Data for ASP		0.00	and the second second	- Internet	The second second second	1	and Internet		H3 Vol IN	0000 - 6	Total Flow	100 million (100 million)	1002		INDER AN	TNMNEOC	lund	SOURCE	DAY	COMMENT
SOURCE E	DAY	LOCATE									Methane	CO2	CO2		TNMNEOC				2		(H3/Lab	(m3/min)						Flux		DAIL	COMMENT
										{ppmvC}		(ppmvC)		(ppmvC)	(mg/m3)	(vmqq)	(ppmv)	(mg)	1 [[0											la internet	
ASP ZOAL 3	3	207	16	1000 10	NA.	ΝA	- 6.5	1 4	411	10.3	6.47	3200	5867	12.4	8.27	1.87	1	0.5 NA		NA: N	A	0.0471	2,49	2126	1,67	NA.	3.00		ASP ZONE 3		
ASP ZONE 3	3	SUM	i Ce				40			12.4	8.27	1.23	226	7.28	4.85	1.67	5	61 NA		NALIN	A	0.0130	0.827	0.226	0.283	NA	0.485	NA	ASP ZONE 3	3 C	02% 22
ASP ZONE 1	4										316	8700			4.64	2.04			0.016	0.00432		0.0297	7.22	3644					ASP ZONE 3		
		NE										871/1	10,000						0.016				44.1		0.485						
ASP ZONE 3	3	SE	1.5	12 A/	NA NA	NA	<u>ч</u>	1 .	64	13.6	9.07	7000	12833	23.2	15.5	1 72	2	1.5 NA		NA N	(A	0.0283	1,97	2794	1.39	1	3.37	NA	ASP ZONE 3	3	
						1	1												- 11	1		1		1			1 1			1 1	
ASP ZONE 3	- +	NS2	10	20.2 1.2	NA	1 NA		-	1.0	23.9	15.0	10000	18733	123	82.0	88.0	2	54 NA		NA NA	44	0.0225	2.76	3173	0.858	NA	14.2	NA	ASP ZONE 3	6	
Har LONG 3				*··· 15/	- 100	2 10/1	-					10000			142.0			54 NA		NA N		0.0160	1.58	2256	0.435		3.31		ASP ZONE 3		
	1	597	160	717 N/	NA 1-72	<u>{ NA</u>	5		3.5	19.2	17.8	10/00	18,33		26.9	37.9	2														
ASP /ONE 3	4	NP							21 1	48.5	32 3	6060		10.7	7.13	5 49			0.008	0.0193	0.415	0.0369	0.18	3122	0.603				< ASP ZONE 3		
ASP ZONE 3	-	54	1.iv	2165 M	NA.	NA	5		3.5	13.6	0.07	5000	9167	17.9	119	8.30	9	60 NA	11	NA N	44 A I	0.0272	1.90	1918	0 741	NA	2.50	NA	ASP ZONE 3	4	
	4	of MA + 5	Contral Co	1.71 N.	A:6	NA	16	1-1-1	111.	196	1.29	16000	29333	37.9	25.3	4.52	2	3.4 INA		NAL	44	0.0167	16.6	3768	1.73	NA.	3.25	NA	ASP ZONE 3	4 5	satial variability (rist
												8000			66.5	7.65		2.2 NA		NALIN		0.0370	3,49	6174	1.01						patial variability test
ASP ZONE 1										35.4	12.3																				
ASP ZONE 3	4	Oct- Rent	sale lie	219 N	NA.	NA.	5	1 .	3.5	89.1	1 12.7	1 10	0 183	104	69.3	5.99	3	8.0 NA		NA N	A i	0.0311	3.05	4.39	0.847	NA	16.6	NA	ASP ZONE 3	4 0	C+ reploate
																1 1	1														
the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second secon					2. 1 1 4 1	1		+-+			-	9000	16500	4.06				.06 (	0.004 <	0.0155 <	0.0701	0.0160	2 50	2031	0.0872	0.0318	0.122	0.0767	ASP ZÓNÉ 3		
ASP ZONE 3	<u>.</u>	N21			01140				6.71	30.5	20.3								0.096				1.94	1688	0.0561			0.0101	ASP ZONE 3		
ASP ZONE 3	4	SW			NA I				C71	36.7	24.5	13000				3 44		58 N.A		NA N		0.0103	1,94								
ASP 20NE 31	6	NL	G	311 NJ	NA NA	NA.	1 05	- n	n	1 10	133	12006	220/00	8.76	5.84	2.74	0	.02 NA		NA N	AL AL	0.0209	11.8	3537	0.0569	NA	0,939		ASP ZONE 3		
ASP ZUME 3		9		117 81	1 1.4	N:A	1 3		25	20.9	13.9	800	14667	7.01	4.67	1.98		04 NA		NA IN	45	0.0202	2.17	2279	0.3302	NA	0 726	NA	ASP ZONE 3	5	
-0. 2744. 3			1.7						<u> </u>		1.0 -	1000	14701	1.07		1.00			-++				-frances - frances				+		1		
				_		1	_	1.5		L							1									+	++++++++++++++++++++++++++++++++++++++	_			
ASP ZONE 1	51	N.5	0	400 600	0.14302	N-10	11 0.05	<5 0	0.035 <	12.7	21.8	15/00	N 27500		9.20	8.28	1 6	.63	0.009	0.0183	0.492	0.0100	1.68	2115					< ASP ZONE 3		
ASP ZONE 3	-	999	1:	410 NJ	NA	NA.	1	10	0.71	16.5	11 D	7/00	12833	4.26	2.84	3.75	1	1.0 < NA		NA IN	A	0.0155	1.31	1530	0.0845	NA	0.339	NA	ASP ZONE 3	6	
ASP ZONE 3		NE					0.05			+0.2	53.5	10000				0.5		38 NA		NA		0.0204	8.39	2877					ASP ZONE 3		
																	N 4														
ASP ZONE 3	. 6 [	SL	[G	432 N	NA NA	I NA	. 4	11:	2.8	29.2	19.5	16000	29.43	19.0	12.7	5.77	1 1	3.2 NA		NA I	NA	0.0120	1.80	2708	0.262	INA	3 [ 1.17]	I NA	ASP ZONE 3	161	
	T												1											1				-	11	1 1	1
ASP ZONE 2	101	M.1.		100 5 1	2 1 101	M 10	12 5	1 .	16	4264	2843	33000	60500	35.8	23.9	0.51-	- 1	58 1 1	0.004 <	0.01114	0.369	0.0136	207	6329	0.371	0.0377	/161 2.50	0.0102	< ASP ZONE 2	1 10	
																			0.0004				5.53	846					ASP ZONE 2		
ASP ZONE 2		SVC					. 3			42.1	28 :	2344				3.09		1.0 < NA		NA N		0.0256				NA	0.415	NA	ASP ZONE Z	1 10	
ASP ZONE 2	10	NI	G	107 N	LE NA	N/A	. 2	11	14	3155	2103	13100	24017	5,78	4.52	0.5	< 6	76 NA	11	NA N	A	0.0236	382	4360		NA	0.821		ASP ZONE 2		
A'SP ZONE 2	10	57	C.	103 N	1 NA	NA	1 3	11-	21	218	139	1.06	5 194	8.42	5,61	1.36	1	.05 INA	11	NA I	XA A	0.0194	20.7	0.290	0.317	NA	0,838)	NA	ASP ZONE 2	10 10	02% ??
The factor and	10 1					+			·						-+							-					++++-	_		1 1	
	_		_					-+-}					-										-				+++		+++++++++++++++++++++++++++++++++++++++		
ASP ZONE 2	. 12.1	N.S					0.7 0.05				2397	2200	40.133						0.004 <	0.0170 <		0.0213	489	6608			2.15	0.0751	ASP ZONE 2	12	
ASP ZONE 2	12	SW	G	3/45 No	NA NA	1 NA	0.05	1 0	0.035 <	179	1 19	3/0	0 5500	3.84	2.56	2,71		14 NA	11	NA	N.A.	0.0175	16.06	740	0.00477	< NA	0.345	NA	ASP ZONE 2	12	
ASP ZONE :		NC					0.6			6550	3105	2400	44900	7.45	4.97	0.5		45 NA		NA	Sit.	0.0115	275	3892	0.0313	NA	0,439	NA	ASP ZONE 2	121	
							1			93.6	62.4	500						.21 NA		NA		0.0244	11.7	1721					ASP ZONE Z		
ASP ZONE 2	12	SL	15.	526 K	· N/5	- 20	<u> </u>	-	20.1	9,05	52.43	200	<u>101 - 102</u>	3.43		2.22		194		NA S	N/A	0.0244	11.7	1121	0.1333	INA	0.429	NA.	1 1201 2010 2	4-15-4-	
1 1													1		1 1		1		- U.								11 1		1.1.		
ASP ZOME /	13	NA	10	Atr. 4.6	0.2 T-503	N-R	02 07	1 7	0.54	4958	3312	5200	0 95333	85.5	57.0	0.5	< 7	5.5 1	0.013	0.0181	0.718	0.0145	359	10633	0.0158	0.0801	6.36	0.0204	< ASP ZONE 2	13	
ASP ZONE 2		51M					0.8			9.7		600				3.82		1.0 ND INA	0.010	NA		0.0179	85.1	1515					ASP ZONE 2		
																										- INA					
ASP ZONE 2		NB					0.05				2877	2500				0.5		2.6 NA		NA		0.0183	405	6452					ASP ZONE 2		
ASP ZONE 2	1.1	SF	10	-308 N	A NA	NA	0.05	10 0	0.035	1410	940	1500	0 27500	3.33	2.22	0.5	<	33 NA	- 11	NA	NA	0.0186	134	3935	0.00507	< NA	0.316	NA	ASP ZONE 2	131	
														1			1			11								_			
ASP ZONE 1		957			n:11.10		61 0.5	-		44.9	29.9	289	0 5258	1.0	0.67 <	0.91		1.0 ND	0.004 <	0.0222 <	0.1801<	0.0165	3.80	672	0.0450	0.023		0 400	LACO YOUR A	1 10 10	wer watered: not representative
	15								0.35							0.91	-		0.004												
	15	SW .	10	102 N	N NA	1 10	1 4		2.8	2431	162	345						1.0 ND NA		NA I		0.0101	12,5	291	0.220		0.0518 <				wer watered; not representative
ASP //ONE 1	15.1	NE	10	JOJ N	N NA	N	0.05	< 0	0.0.6	27.3	18.2	231	7 424	1.0	0.67 <	0.78		1.0 NO NA		NA	NA	0.0152	2.13	497	0.00414	< NA	0.0779 <	NA NA	ASP ZONE 1	15 C	iver watered; not representative
ASP ZONE 1		212								228	15.2	630				0.50		1.0 < NA		NA		0.0174	20.3	1669	0.0948	NA	0.0973	NIA	ASP ZONE 1	1 15 0	iver watered; not representative
COP ZUNE 1		SP	16	B	1 60	IN IN	<u> </u>	++-	5.77	+			17.003	1.09	4.73	1 0.50	4	1,0 - 104	-++				20.3	,003	0.0346		0.0373		+ France Conte	+	ing india ca, nor febreachaine
					-	-	_			+						-								1				+	+	+	
ASP ZONE 1		N7.	C	.101 A	01 T-30	1 N-35	01 1	1 3	071	480	320	1200				0.5			0.004 <		0.260 <		39.6	2725	0.0877				ASP ZONE 1		
ASP ZONE 1	17	SW	0	10:0 A	S NA	NA	V 0.5	1 0	4.15	1053	7091	1100	0 20161	4.89	3.26	0.5	< .	.89 NA		NA	NA	0.0115	62.7	1784	0.0313	NA	0.288	NA	ASP ZONE 1	17	
5'9', 'ONE 1		NC			N N A	310	0.05	1.	0.006	359						2.79		41 NA		NAL		0.0152	28.0	2144			0.561		ASP ZONE 1		
			14	- 14 N	1 00		1 0.03	1 1	a d.00 K		239	0:01																			
ASE ZONE 1	17	SF	0	304 N	NA	N 1	0 :	- i	9.35	7.40	507	1100	0 20161	7.99	5.33	2.80		.20 NA	- 11	NA I	NA	0.0340	533	5274	0.0926	NA	1.39	NA .	ASP ZONE 1	1 17	
1	T				1				· · · · · ·	1						1						1		1				_		1	
ASP 20NE 1	1//	NU:	0	401 0.0	01 1.40	1 Not	01 0.05	121 0	0.035	3000	200.0	2500	0 4583	24.9	16.6	9.14		57	0.024	0.0163	1 47	0.0087	13.4	3067	0.00237	< 0.098	5 1.11	0.151	ASP ZONE 1	1 18	
																							20.7	2323					ASP ZONE 1		
ASP ZONE 1		ŞW					0.05					ana			6.19	6.55		.73 NA		NA		0.0183	20.7				0.871	NA	I NOP ZONE 1	1 18 1	
A SP ZONE 1		NC					0.05			3/5	31.7	700				7.69		.78 NA		NA		0.0203	4.94	2004					ASP ZONE 1		
ASP / 0NL 1		SI					\$ 1.0.05			4(547	465	2800				0.5		9.0 NA		NA		0.0118	42.2	4659			1,17	NA NA	ASP ZONE 1	1 18	
1					- +			- <del>1-1-</del>		1 2.0				t		0.0						1 -10/10			310004		+++++++++++++++++++++++++++++++++++++++	manine	1 10000 000000	1 1	
h										+				<u> </u>	16.3												+++	<u> </u>	1	++-	
ASP ZONE 1		N37					C1 0.05									1,17			0.004 <	0.0185 <		< 0.0084	3.67	2725	0.00229			0.500	ASP ZONE 1	23	
ASP ZONE 1	24	547	1	-902 N	N I NA	N	1 01	10	0.071	99.02	66.0	1600	0 29333	15.3	10.2	2.57		2.8 NA		NA	NA	0.0101	5.13	2279	0.00550	NA	0,792	NA	ASP ZONE 1	23	
ASP ZONE 1		*41					1.			17.9						2.77		.06 NA		NA		0.0262	2.41	1847			0.918		ASP ZONE 1		
TOP ZONE 1	1.5	-42	0	seor N	NA NA	1 165	<u></u>	1,1	0.43	1 1/9		500	op 9163									0.0262		1847	0.143	poles.	U.918	NA	1 Mar LUNE T	+ 62 +	
	1			_	1	1	-	11											1										11	1 1	
Alvelia Blank	ICA I	00.51	rek li	-1.4) N	A I NA	I NJ	A NA		NA I	18	3) 0.67 N	10 12	5 23	1.0	NDI 9.67 N	ID 0.8		1 NO NA		NA	NA Î	0.005	0.0256 N	D 0.655	NA	NA	0.6256 N	ND NA	Media Blank	NA	
Ahaaa Bhesh		00.94		100 1	0 N0	N P	N NA		MA	110						/D 0.51		1 NO NA	- 11	NA		0.005	0.0256 N			NA	0.0355	IDI NA	Media Slank	NA	
															3247	0.51															
Medica Filler N		QC-81					A NG		NA	2,71						0.75		1 <	0.004 <			< 0.005	0.0951			0,0076			Media Blank		
Midual Blank	NA	N 62	aris   1	-11H A.	06 1.00	N-1	QE NA	11	NA T	1 6	D 847 N	0 1900	0 3483,	1.0	ND 0.67 N	D 0.6	1	1 NO NA		NA	NA	0.005	0.0256 N	D 1340	NA	NA	0.0256	4D 0.0070	5 < Medical Gilonik	I NA IC	02 ppmv ??
Motin Black		OC SI					A NA									-	1					0.005			NA		1		Media Slank		
			· · · · ·	aa.u - 0		+				+				1			h-1					3.003					+++	<u> </u>	++	++	
	1 1			E.		_				1 i	1	1		1 1		1	1.1				1	1	1		1		3.1	1 .	1.5	1 1	

PMERNE De Techniseren media por reconstructor aquant, surbare reportant as meditaming carbon (# 2-1). El las missione entratores inspirada tipas, en Denny generatore antes (C-13 m2) miniping/menol.

#### ACP Final Report fo Valley Air TAP Program, May 2013, Appendix B, ASP Daily Simulation

	Flux (mg/m		L							is (pounds					Emission						-
Day	CH4	CO2	NH3 T	NH3 L	VOC I	120	Area		CH4	CO2	NH3 T	NH3 L	VOC	N2O	CH4	CO2	NH3 T	NH3 L	voc	N20	CC
0	0					0.00	785			1									0.0000		1
1	1.0					0.07	785		3	1,778	0.79	0.36	1.64	0.17	0.0037	2.56	0.0011	0.0005			
							703					0.30	1.64 3.28	0.17	0.0037	2.00	0.0011	0.0005	0.0024		
2	2.1		0.6			0.13	785		. 5		1.59		3.28	0.33	0.0075	5.11	0.0023	0.0010			2
3	3		0.95		1.98	0.20	785		8	5,335	2.38	1.09	4.93	0.50	0.0112	7.67	0.0034	0.0016	0.0071	0.0007	1
4	6		0.90	C.12	7.37	0.05	785		15			0.29	18.36	0.13	0.0212	11.00	0.0032	0.0004			2
5	5				0.57	0.08	785		11			0.08	1 /1	0.19	0.0165	8.72	0.0006	0.0001	0.0020		
												0.06	1.41	0.19			0.0005	0.0001			4
6	3		0.09			0.01	785		8			0.09		0.04	0.0118	8.27	0.0003		0.0024		
7	46.6	2451.6	0.2	C.04	0.8	0.0	785		116	6,109	0.38	0.09	1.96	0.04	0.1668	8.78	0.0005	0.0001	0.0028	0.0001	Γ
8	89.8	2595.7	0.2	0.04		0.0	785		224	6,468		0.09	2.26 2.55 2.85	0.04	0.3219	9.30	0.0008	0.0001	0.0032		
9	133.1		0.3	0.04		0.0	785		332				0.55	0.04	0.4769	9.82	0.0000	0.0001	0.0037		
													2.55	0.04			0.0010				
10	176		0.34	0.04		0.02	785		439		0.85	0.09	2.85	0.05	0.6319	10.33	0.0012	0.0001	0.0041		
11	187.2	3062.2	0.2	0.0	1.0	0.0	785		466	7,630	0.48	0.10	2.47	0.12	0.6706	10.97	0.0007	0.0001	0.0036	0.0002	2
12	198			0.04		0.08	785		493	8,075	0.11	0.10	2.10	0.19	0.7093	11.61	0.0002	0.0001	0.0030	0.0003	
			0.0	0.04	0.00	0.02	785				0.00		<u> </u>	0.15	0.8903	20.19	0.0001	0.0003	0.0074	0.0001	
13	248		0.03	0.08	2.06	0.02			619	14.038	0.06	0.20	5.14	0.05	0.8903	20.19	0.0001	0.0003			
14	129.1		0.1			0.1	785		322	8,149				0.19	0.4626	11.72	0.0002	0.0002	0.0038		1
15	10	907	0.09	0.02	0.08	0.13	785		24	2,261	0.23	0.06	0.19	0.33	0.0348	3.25	0.0003	0.0001	0.0003	0.0005	5
16	37.7		0.1	0.0		0.2	785		94	4,845		0.07	1.03	0.52	0.1351	6.97	0.0003	0.0001	0.0015		
					0.4					4,045	0.10			0.32	0.1001		0.0003	0.000	0.0015	0.0000	
17	66		0.05	0.03	0.75	0.29	785	1	164	7,430	0.13	0.08	1.86	0.72	0.2354	10.68	0.0002	0.0001	0.0027	0.0010	
18	20		0.00		1.06	0.15	785		51	7,509	0.01	0.25	2.64	0.38 0.55 0.72	0.0728	10.80	0.0000	0.0004	0.0038	0.0005	
19	17.0		0.0	D.1	1.0	0.2	785		42	7,145	0.03	0.20	2.57	0.55	0.0609	10.27	0.0000	0.0003	0.0037	0.0008	
20	13.7		0.0	2.1	10	0.3	785	<u>  </u>	34	6,782	0.06	0.16	2 50	0.72	0.0490	9.75	0.0001	0.0002	0.0036	0.0010	
			0.0	3.0	1.0		/00	} I	26	0,762		0.10	2.64 2.57 2.50 2.43	0.74	0.0490		0.0001		0.0030	0.0010	1
21	10.4		0.0			0.4	785					0.12	2.43	0.90	0.0371	9.23	0.0001	0.0002	0.0035	0.0013	
22	7.0		0.0			0.4	785		18			0.08 0.03 0.03 0.03	2.36 2.29	1 07	0.0253	8.71	0.0001 0.0002 0.0002	0.0001			
23	4		0.05			0.50	785		9	5,691	0.13	0.03	2,29	1.25	0.0134	8.18	0.0002	0.0001	0.0033	0.0018	
24	4		0.05	0.01		0.5	785		9			0.02	2.29	1.25 1.25 1.25	0.0134	8.18	0.0002	0.0001	0.0033	0.0018	
												0.03	2.28	1.2.5			0.0002	0.0001			
25	4		0.05			0.5	785		9		0.13	0.03	2.29	1.25	0.0134	8.18	0.0002	0.0001	0.0033		
26	4		0.05			0.5	785		9		0.13	0.03	2.29	1.25	0.0134	8.18	0.0002		0.0033	0.0018	
27	4		0.05			0.5	785		9		0.13	0.03	2.29		0.0134	8.18	0.0002		0.0033	0.0018	
28	4		0.05			0.5	785				0.13	0.03	2.29		0.0134	8.18	0.0002		0.0033	0.0018	
												0.03	2.23	1.20							
29	4		0.05			0.5	785		9			0.03	2.29	1.25	0.0134	8.18	0.0002		0.0033	0.0018	
30	4		0.05	0 0 1		0.5	785		9	5,691	0.13		2.29	1.25	0.0134	8.18	0.0002	0.0001	0.0033	0.0018	1
31	4		0.05	0.01	0.9	0.5	785		9			0.03	2.29	1.25	0.0134	8.18	0.0002	0.0001	0.0033	0.0018	1
32	4					0.5	785		ġ			0.03	2.29		0.0134	8.18	0.0002	0.0001	0.0033	0.0018	
				0.01	0.8	0.0						0.03	4.29	1.40			0.0002	0.0001	0.0033		
33	4			0.01		0.5	785		9			0.03	2.29		0.0134	8,18	0.0002	0.0001	0.0033	0.0018	
34	4	2284	0.05	0.01	0.9	0.5	785	1 1	9	5.691	0.13	0.03	2.29	1.25	0.0134	8.18	0.0002	0.0001	0.0033	0.0018	1
35	4			0.01	0.9	0.5	785		9			0.03	2.29	1.25	0.0134	8.18	0.0002	0.0001	0.0033	0.0018	
36	4		0.05	0.01		0.5	785		9		0.13	0.03	2.29	1.25	0.0134	8.18	0.0002	0.0001	0.0033	0.0018	
			0.03	0.01	0.9	0.5						0.03	4.29	1.20			0.0002	0.0001	0.0033	0.0018	
37	4		0.05			0.5	785		9	0.001		0.03	2.29	1.25	0.0134	8.18	0.0002		0.0033	0.0018	
38	4		0.05	0.01		0.5	785		9	5,691	0.13	0.03	2.29	1 25	0.0134	8.18	0.0002	0.0001	0.0033	0.0018	
39	4		0.05	0.01		0.5	785		9			0.03	2.29	1.25	0.0134	8.18	0.0002	0.0001	0.0033	0.0018	
40	4		0.05			0.5	785		9			0.00	2.29	1.25			0.0002	0.0001	0.0000	0.0010	
			0.00	0.01		0.5						0.03	4.29	1.25	0.0134	8.18	0.0002	0.0001	0.0033	0.0018	
41	4		0.05	0.01		0.5	785		9			0.03	2.29	1.25 1.25 1.25	0.0134	8.18	0.0002 0.0002 0.0002 0.0002 0.0002 0.0002 0.0002 0.0002	0.0001	0.0033	0.0018	
42	4	2284	0.05	0.01	0.9	0.5	785		9	5,691	0.13	0.03	2,29	1.25 1.25	0.0134	8.18	0.0002	0.0001	0.0033	0.0018	
43	4		0.05			0.5	785		9			0.03	2.29	1 25	0.0134	8.18	0.0002	0.0001	0.0022	0.0018	
44														1.20			0.0002	0.0001	0.0033	0.0010	
	4					0.5	785		9	5,691		0.03	2.29	1.25	0.0134	8.18	0.0002	0.0001	0.0033	0.0018	
45	4					0.5	785		9	5.691		0.03		1.25	0.0134	8.18	0.0002	0.0001	0.0033	0.0018	
46	4	2284	0.05	0.01	0.9	0.5	785		9	5.691	0.13	0.03			0.0134	8.18	0.0002	0.0001	0.0033	0.0018	
47	4		0.05			0.5	785		9			0.03		1.25	0.0134	8.18	0.0002	0.0001	0.0033	0.0018	+
48									· · · · · · · · · · · · · · · · · · ·	0,001				1.4.5			0.0002	0.0001	0.0033	0.0018	1
	4					0.5	785		9			0.03		1.25	0.0134	8.18	0.0002	0.0001	0.0033	0.0018	1
49	4 4		0.05			0.5	785		9			0.03		1.25	0.0134	8.18	0.0002	0.0001	0.0033	0.0018	
50	4	2284	0.05			0.5	785		9	5,691	0.13	0.03	2.29	1.25	0.0134	8.18	0.0002	0.0001	0.0033	0.0018	
51	4					0.5	785		9			0.03		1.25	0.0134	8.18	0.0002	0.0001	0.0033	0.0018	
52	4					0.5			ğ					1.20	- 0.0134		0.0002	0.0001	0.0033	0.0010	
							785				0.13	0.03	2.29	1.25	0.0134	8.18	0.0002	0.0001	0.0033	0.0018	
53	4		0.05			0.5	785		9		0.13	0.03	2.29	1.25	0.0134	8.18	0.0002	0.0001	0.0033	0.0018	
54	4	2284	0.05	0.01	0.9	0.5	785	ī	9	5,691	0.13	0.03	2.29	1.25 1.25 1.25 1.25 1.25 1.25 1.25 1.25	0.0134	8.18	0.0002 0.0002 0.0002 0.0002 0.0002 0.0002 0.0002 0.0002	0.0001	0.0033	0.0018	
55	4		0.05			0.5	785		9		0.13	0.03	2.29	1.25	0.0134	8.18	0.0002	0.0001	0.0033	0.0018	+
56	4							<b>├</b> ───┤	9	5,091	- 0.13		2.29	1.20	0.0134	0,18	0.0002	0.0001	0.0033		1
			0.05	0.01		0.5	785	ļ			0.13	0.03	2.29	1.25	0.0134	8.18	0.0002	0.0001		0.0018	1
57	4		0.05			0.5	785		9		0.13	0.03		1.25	0.0134	8.18	0.0002	0.0001	0.0033	0.0018	Γ
58	4	2284	0.05	0.01	0.9	0.5	785		9		0.13	0.03	2.29	1.25	0.0134	8.18	0.0002	0.0001		0.0018	1
59	4		0.05			0.5	785	11	9		0.13	0.03		1.25	0.0134	8.18	0.0002	0.0001		0.0018	+
60	4					0.5	705	<u>├</u>					2.23				0.0002				1-
00	4	2284	0.05	0.01	0.9	0.5	785		9	5,691	0.13	0.03	2.29	1.25	0.0134	8.18	0.0002	0.0001	0.0033	0.0018	
	1		_		I T					1					1				1		1
	1	Simulation	is - 60 Da	v				Total	3,868	359,300	16	6	156	55 Pounds	1 1				1		1-
	1			1	<u>├</u>				6			0.01	156 0.22	0.08 #/ton mix	1				[		+
		•		·	<u>↓</u>			↓↓	6	1	0.02	0.01	0.22	U.U8 #/ton mix	+					ļ	1
										1					1						1
		1		30 Day					3,588	188,582	13	5	87	17 Pounds	1						1
				1					5	271		0.01	0.13	0.02 #/ton mix							+
					┟────┼				j.	<u> </u>	0.02	0.01	0.13	0.02 (#1011131X						ļ	+
			Ļ		L			L		l								L I			L
	1	1		22 Day	1		1		3,514	143,058	12	5	69	7	1						1

1

Process Day	CH4	CO2	NH3 T	NH3 L	VOC	N2O
3	3	2,141	0.96	0.44	1.98	0.20
4	6	3,069	0.90	0.12	7.37	0.05
5	5	2.434	0.13	0.03	0.57	0.08
6	3	2.308	0.09	0.04	0.67	0.01
10	176	2,884	0.341	0.038	1.142	0.019
12	198	3.240	0.044	0.039	0.841	0.075
13	248	5,634	0.026	0.080	2.061	0.020
15	10	907	0.091	0.023	0.078	0.133
17	66	2.982	0.054	0.032	0.747	0.288
18	20	3,013	0.004	0.099	1.061	0.151
23	4	2,284	0.050	0.014	0.920	0.500

Prototype Cell Dimensions					NH3		Greenhouse Gas			
Total Cell Area	785	m2	Cycle Len	VOC	Field	Lab	CO2	CH4	N2O	CO2e
			22 Day	0.10	0.017	0.007	206	5.1	0.01	335
Zone 1 Mass	405.000	Pounds	30 Day	0.13	0.018	0,007	271	5.2	0.02	407
Zone 2 Mass	490,000	Pounds	60 Day	0.22	0.024	0.008	517	5.6	0.08	679
Zone 3 Mass	495,924	Pounds								
Total	1.390.924	Pounds								
	695.462	tons								

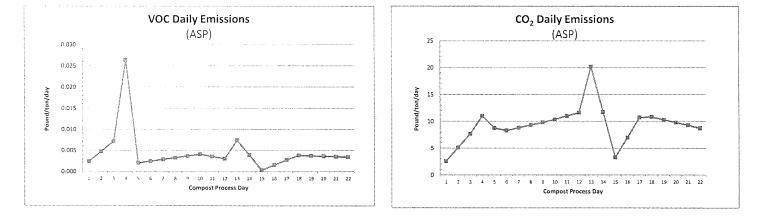


Table 3. Summary of Windrow Data; Concentration Data (ppmvC, mg/m3) and Flux Data (mg/m2,min-1).

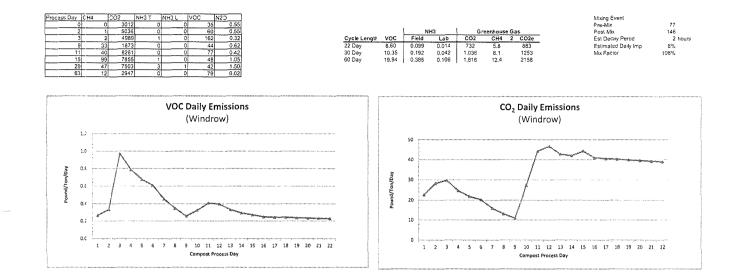
SOURCE	DAY	LOCATION		CO2	NH3/Tub		NH3/La	TNMN		N20		SOURCE	DAY	COMMENT
na esta la presión la Sec	<u>, , , , , , , , , , , , , , , , , , , </u>		Flux	Flux	Flux		Flux	Flux		Flux				
SH DAY OLD CH	1	Тор	0.0895		0.0242		NA	35.4		NA		FRESH DAY OLD CHOP	1	Less than 24 hours old
FRESH CHOP	0	Тор	0.0916	5145			NA	81.7		NA		FRESH CHOP	0	About 2 hours old post chop
FRESH CHOP	0	QC- Replicate	0.0906	5157	0.00256	; <	NA	75.3		NA		FRESH CHOP	0	QC- Replicate
VINDROW WR-1		Top-West	0.448	3534	0.0975		0.0320 <	54.1	┼──┤	0.548		WINDROW WR-1	2	
WINDROW WR-1	22	Top- West Top- East	0.448	4699	0.0975		NA	56.8		0.546 NA		WINDROW WR-1	2	
VINDROW WR-1	2	Side-North	0.527	5644	0.107		NA	44.9		NA		WINDROW WR-1	2	
VINDROW WR-1			0.495	6267			NA	83.4		NA		WINDROW WR-1	2	
VINDROW WR-T	2	Side- Scuth	0.669	0207	0.110	4	NA	03.4		NA		WINDROW WR-1	2	
VINDROW WR-1	3	Top- West	3.02	7566	0.00504	<	0.0300 <	167		0.324		WINDROW WR-1	3	
VINDROW WR-1	3	Top-East	0.519	4823	0.155		NA	204		NA		WINDROW WR-1	3	
VINDROW WR-1	3	Side- North	3.57	4363	0.00496		NA	135		NA		WINDROW WR-1	3	
WINDROW WR-1	3	Side- South	0,469	3204	2.01	-	NA	143		NA		WINDROW WR-1	3	
		<u> </u>												
VINDROW WR-2	9	Top- West	48.9	1264	0.00349	) <	0.0206 <	77.7		0.616		WINDROW WR-2	9	
VINDROW WR-2	9	Top-East	65.0	2320	0.640	)	NA	76.5		NA		WINDROW WR-2	9	
WINDROW WR-2	9	Side- North	15.1	1199	0.463	3	NA	15.9		NA		WINDROW WR-2	9	
WINDROW WR-2	9	Side- South	4.68	2712	0.632	2	NA	5.29		NA		WINDROW WR-2	9	
VINDROW WR-2	11	Тор	53.8	8834	0.0379		0.0595	105		0.422		WINDROW WR-2	11	
VINDROW WR-2	11	Side- South	15.3	7687	0.387		NA	48.0		NA		WINDROW WR-2	11	
WR-2 POST MIX	11	Тор	36.6	4062	0.0314		NA	165		NA		WR-2 POST MIX	11	
WR-2 POST MIX	11	QC-Replicate	31.2	4011	0.0258		0.0467 <	163		0.255		WR-2 POST MIX	11	QC- Replicate
WR-2 POST MIX	11	Side- South	11.5	5686	0.0183	3	NA	110	<u> </u>	NA		WR-2 POST MIX	11	
WINDROW WR-3	15	Top- East	63.1	6383	4.38		NA	47.4		NA		WINDROW WR-3	15	
WINDROW WR-3	15	Top- West	70.0	7075	0.371		0.0692 <	27.5		1.05		WINDROW WR-3	15	
WINDROW WR-3	15	Side- North	104	11061	0.845		NA	51.3		NA		WINDROW WR-3	15	
WINDROW WR-3	15	Side- North	206	14227	0.680		NA	62.1		NA		WINDROW WR-3	15	
WINDROW WR-3	15	Side- N. Spat.	158	6725	0.616		NA	13.6		NA		WINDROW WR-3		On a Kaling state 12 to at
WINDROW WR-3	15	Top- Spatial	43.8	4582	0.714		NA	64.0		NA			15	Spatial variability test
WINDROW WR-3	15	QC-Replicate	45.0	4931	0.714		NA	71.0		NA		WINDROW WR-3 WINDROW WR-3	15	Spatial variability test
MINDROW WR-5	15	QC-Replicate	45.0	4931	0.768	4		71.0		NA		WINDROW WR-3	15	QC-Replicate
VINDROW WR-3	29	Top-West	44.2	8529	4.88		0.853	50.2		1.50		WINDROW WR-3	29	
VINDROW WR-3	29	Top-East	58.0	7108	0.00381			53.4		NA		WINDROW WR-3	29	
WINDROW WR-3	29	Side- South	39.4	6871	2.84		NA	22.8		NA		WINDROW WR-3	29	
VINDROW WR-4	63	Top- North	22.8	3349	0.0341		0.0347 <	76.9		0.0176	<	WINDROW WR-4	63	
WINDROW WR-4	63	Top- South	16.1	5420	0.0499		NA	76.0		NA		WINDROW WR-4	63	
WINDROW WR-4	63	Side-West	4.80	1396	0.216		NA	96.4		NA		WINDROW WR-4	63	
VINDROW WR-4	63	Side- East	2.89	1625	0.105	;	NA	67.9		NA		WINDROW WR-4	63	
Madia Black	NIA		0.0050	NID 0.000		+	<u></u>							
Media Blank Media Blank	NA	QC-Blank QC-Blank	0.0256		NA NA		NA	0.0256		NA		Media Blank	NA	QC-Blank
	NA				NA		NA	0.0256		NA		Media Blank	NA	QC-Blank
Media Blank	NA	QC-Blank	0.0951	2.38	NA		NA	0.0367		NA		Media Blank	NA	QC-Blank
Medial Blank	NA	QC-Blank	0.0256	ND 1340	NA		0.00769 <	0.0256	ND	0.00705	<	Medial Blank	NA	QC- Blank
Media Blank	NA	QC-Blank			NA					NA		Media Blank	NA	QC-Blank

ram, May 2013, Appendix B, Sample Data for Windrow

TNMNEO- Total non-methane non-ethane organic carbon reported as methane (carbon # = 1) Flux = (concentration, mg/m3)(total flow, m3/min)/(surface area, 0.13 m2) = mg/m2,min-1

ACP Final Report to Valley Air TAP Program, May 2013, Appendix B, Daily Windrow Simulation

	Flux									Emissions (	pounds)					E	missions (	pounds per	tonì						738 6	1 4 200.4	4 163
Day	CH4	CO2		ST NH			0	Area Mf							20			02 NH				roc M	120	COZe	TAP		Site 1
	0		3012 024.2	0.1	0.0	35 47.6	0.5	1311 1305	1.08	0	13,486 16,675	0.11	0.14	158.36	2.45	0	0	18		0.0001	0.0002	0.214	0.0033	19.3018	0.2		
	2		036.0	0.2	0.0	59.8	0.5	1299	1.00	2	20,772	0.41	0.13 0.13	197.15 246.58	2.27 2.26	2	0.002	23 28		0.0006	0.0002	0.267 0.334	0.0031	23.5687 29,1371	0.2		
	3		4989	1	0	162	0	1293	1.08	8	22,028	2,40	0.13	715,72	1.43	3	0.003	28		0.0033	0.0002	0.334	0.0031 0.0019		0.3		
	4		469.9	0.5	0.0	142.4	0.4	1287	1.00	29	18,265	2.15	0.12	581.86	1.52	4	0.040	25		0.0029	0.0002	0.788	0.0021	26,1999	0.7		
			950.6	0.5	0.0	122.7	0.4	1281	1.00	50	16.067	2.07	0.11	498.97	1.71	5	0.068	22		0.0028	0.0001	0.676	0.0023		0.6	8 0	0 1
			431,3 912,0	0.5 0.5	0.0 0.0	103.0 83.3	0.5 0.5	1275 1269	1.08	77	14,938	2.13	0.11	448.30	2.04	6	0.104	20		0.0029	0.0001	0.607	0.0028		0.6		
			392.7	0.5	0.0	63.6	0.5	1269	1.00	92 113	11,732 9,594	1.90 1.82	0.10 0.09	335.47 254.85	2.09 2.27	7	0.125 0.153	16 13		0.0026	0.0001	0.454	0.0028		0.4		
			873.5	0.4	0.0	43.9	0.6	1257	1.08	143	8,040	1.87	0.09	188.19	2.64	9	0.155	13		0.0025	0.0001	0.345	0.0031 0.0036	17.1541 16.0714	0.3		
			067.0	0.3	0.0	60.2	0.5	1251	1.00	145	20,122	1.29	0.16	239.03	2.06	10	0.196	27		0.0017	0.0002	0.324	0.0028	32.2296	0.2		
			260.6	0.2	0.1	76.5	0.4	1245	1.00	156	32,646	0.84	0.24	302.45	1.67	11	0.212	44		0.0011	0.0003	0.410	0.0023	49.3478	0.4		
			159.1	0.5	0.1	69.4 62.3	0.6	1239 1233	1.08 1.00	230 270	34,510	1.94	0.26	293.65	2.45	12	0.311	47		0.0026	0.0004	0.398	0.0033	54.2874	0.4		
			956.2	0.9	0.1	55.2	0.9	1227	1.00	327	31,535 30,986	2.76 3.70	0.25	243.91 215.04	2.88 3.48	13 14	0.366	43 42		0.0037	0.0003	0.330	0.0039 0.0047	51.5956 52.6995	0.0		
	15		7855	1	0	48	1	1221	1.08	411	32,737	4,98	0.29	200.52	4.38	15	0.556	44		0.0067	0.0004	0.272	0.0059	57.8490	0.2		
			829.6	1.3	0.1	47.7	1.1	1215	1.00	366	30,192	4.99	0.48	183.88	4.17	16	0.496	41		0.0068	0.0007	0.249	0.0056		0.2		
			804.4 779.2	1,4 1,5	0.2	47.3 46.8	1.1	1209	1,00	350	29.946	5.34	0.69	181.32	4.27	17	0.474	41		0.0072	0.0009	0.246	0.0058	52.2981	0.3		
			754.1	1.6	0.2	46.4	1,1 1,2	1203 1196	1.00	334 319	29,700 29,455	5.69 6.04	0.91	178.78 176.26	4.37 4.47	18	0.453	40		0.0077	0.0012	0.242	0.0059		0.1		
			728.9	1.7	0.3	46.0	1.2	1190	1.00	303	29,433	6.38	1.32	173.75	4.57	19 20	0.432	40 40		0.0082	0.0015	0.239	0.0061	50.8254 50.0962	0.3		
			703.8	1.8	0.4	45.5	1.2	1184	1.00	288	28,969	6.72	1.52	171.26	4.67	21	0.390	39		0.0091	0.0021	0.232	0.0063		0.2		
			678.6	1.9	0.5	45.1	1.3	1178	1.00	273	28,727	7.06	1.72	168.79	4.77	22	0.369	39		0.0096	0.0023	0.229	0.0065	48.6523	0.2		
			653.5 628.3	2.0 2.1	0.5 0.6	44.7 44.3	1.3 1.3	1172 1166	1.08 1.00	277 243	30,636 28,246	7.94	2.07	178.88	5.23	23	0.375	41		0.0108	0.0028	0.242			0.2		
			603.2	2.1	0.6	44.3	1.3	1160	1.00	243	28,246 28,007	7.71 8.04	2.12 2.32	163.89 161.47	4.95 5.04	24 25	0.329 0.309	38 38		0.0104	0.0029 0.0031	0.222 0.219	0.0067 0.0068	47.2275 46.5223	0.2		
			578.0	2.3	0.7	43.4	1.4	1154	1.00	213	27,769	8.36	2.51	159.06	5.14	25	0.289	38		0.0109	0.0034	0.219	0.0058		0.1		
			552.9	2.4	0.7	43.0	1,4	1148	1.00	199	27,532	8.67	2,70	156.67	5.23	27	0.269	37		0.0117	0.0037	0.212	0.0071		0.1		
			527.7	2.5	0.8	42.6	1.5	1142	1.00	184	27,296	8.99	2.89	154.29	5.31	28	0.250	37		0.0122	0.0039	0.209	0.0072		0.1	1 (	
	29 30		7503	3 2.5	0.8	42 43.2	1.5 1.5	1136 1130	1.08	183 166	29,103 26,437	10.00 8.98	3.31 2.97	163.40 155.05	5.81 5.22	29	0.248	39		0.0135	0.0045	0.221	0.0079	47.0508	0.3		
	31	45.1 7	234.6	2.0	0.8	44.3	1.5	1124	1,00	161	25,817	8.98	2.97	155.05	5.22	30 31	0.224 0.218	36 35		0.0122	0.0040 0.0039	0.210 0.214	0.0071	42.6939 41.6471	0.1		
			100.6	2.4	0.8	45.4	1,4	1118	1.00	156	25,203	8.37	2.77	161.15	4.85	32	0.213	34		0.0113	0.0039	0.214	0.0068	40.6091	0.1		
			965.7	2.3	0.8	46.5	1.3	1112	1.00	152	24,594	8.07	2.67	164.14	4.67	33	0.205	33		0.0109	0.0036	0.222	0.0063		0.1		
			832.7	2.2	0.7	47.6	1.3	1106	1.00	147	23,990	7.77	2.57	167.09	4.49	34	0.200	32		0.0105	0.0035	0.226	0.0061	38.5595	0.2		
			696.7 564.7	2.1	0.7	48.7 49.8	1.2	1100 1094	1.08 1.00	154 138	25,156 22,798	8.04 7.18	2.66 2.38	182.82 172.86	4.64 4.14	35 36	0.208	34 31		0.0109	0.0036	0.248	0.0063	40.3812	0.1		
			430.8	2.0	0.7	50.9	3.1	1088	1.00	134	22.209	6.89	2.38	175.68	3.97	35	0.182	30		0.0097	0.0032	0.234	0.0056	36.5451 35.5510	0.2		
			296.8	1.9	0.5	52.0	1.1	1082	1.00	130	21,626	6.60	2.18	178.46	3.80	38	0.176	29		0.0089	0.0030	0.242	0.0051	34.5658	0.2		
			162.8	1.8	0.5	53.1	1.1	1076	1.00	125	21,047	6.31	2.09	181.20	3.63	39	0.170	28		0.0085	0.0028	0.245	0.0049	33.5894	0.2	5 1	0 0
			028.8 894.9	1.8 1.7	0.6 0.6	54.1 55.2	1.0 1.0	1070 1064	1.00 1.00	121 117	20,474	6.03	2.00	183.89	3.46	40	0.164	28		0.0082	0.0027	0.249	0.0047	32.6218	0.3		
			760.9	1.6	0.5	56.3	0.9	1064	1.08	121	19.906 20.803	5.75 5.89	1.90 1.95	186.54 203.43	3.29 3.36	41 42	0.158 0.164	27 28		0.0078 0.0080	0.0026	0.253	0.0045		0.1		
			626.9	1.6	0.5	57.4	0.9	1052	1.00	109	18,786	5.20	1.72	191.73	2.96	43	0,147	25		0.0080	0.0028	0.275	0.0048		0.1		
			492.9	1.5	0.5	58.5	0.8	1046	1.00	105	18,233	4.93	1.63	194.25	2.80	44	0.142	25		0.0067	0.0022	0.263	0.0038		0.2		
			359.0 225.0	1,4	0.5	59.6 60.7	0.8	1039	1.00	101	17.686	4.66	1.54	196.74	2.64	45	0.136	24		0.0063	0.0021	0.266	0.0036		0.3		
			091.0	1.3	0.4	61.8	0.8 0,7	1033 1027	1.00 1.00	97 93	17,143 16,606	4.39 4.13	1.46 1.37	199.18 201.59	2.49 2.33	46 47	0.131	23		0.0059	0.0020	0.270	0.0034		0.1		
			957.1	1.2	0.4	62.9	0.7	1021	1.00	89	16,030	3.87	1.28	203.95	2.33	48	0.125 0.120	22 22		0.0056 0.0052	0.0019 0.0017	0.273 0.276	0.0032		0.1		
			823.1	1.1	0.4	64.0	0.6	1015	1.00	85	15,547	3.61	1.20	206.26	2.02	49	0.115	21		0.0049	0.0016	0.279	0.0027	24.3090	0.1		
			689.1 555.1	1.0	0.3	65.1	0.6	1009	1.00	81	15,025	3.36	1,11	208.54	1.87	50	0.110	20		0.0045	0.0015	0.282	0.0025	23.4293	0.1		D O
			421.2	1.0 0.9	0.3 0.3	66.2 67.3	0.5	1003 997	1.00	77 73	14,509 13,997	3.10	1.03	210.78	1.72	51	0.104	20		0.0042	0.0014	0.285	0.0023		0.1		
			287.2	0.8	0,3	68.4	0.5	991	1.00	70	13 491	2.86 2.61	0.95	212.97 215.12	1.57	52 53	0.099 0.094	19 18		0.0039	0.0013	0.288	0.0021	21.6964 20.8431	0.0		
			153.2	0.8	0.3	69.5	0,4	985	1.00	66	12,990	2.37	0.79	217.23	1.28	54	0.089	18		0.0032	0.0011	0.294	0.0017	19.9986	0.1		
			019.2	0.7	0.2	70.5	0,4	979	1.00	62	12,494	2.12	0.71	219.29	1.14	55	0.084	17		0.0029	0.0010	0.297	0.0015		0.3		
			885,3 751,3	0.6 0.5	0.2	71.6 72.7	0.3	973 967	1.00 1.00	59	12,003	1.89	0.63	221.32	1.00	56	0.079	16		0.0026	0.0008	0.300	0.0013		0.3		
			617,3	0.5	0.2	73.8	0.3	961	1.00	55 51	11.517 11.036	1.65 1.42	0,55 0,47	223.30 225.24	0.86	57 58	0.075 0.070	16 15		0.0022	0.0007 0.0006	0.302		17.5180	0.0		
	59	15.8 3	483.3	0.4	0.1	74.9	0.2	965	1.00	48	10,561	1,19	0.40	227,14	0.58	59	0.065	15		0.0019	0.0005	0.305	0.0010 0.0008		0.0		
			349.4	0.3	0.1	76.0	0.1	949	1.00	45	10.090	0.96	0.32	229.00	0.45	60	0.060	14		0.0013	0.0004	0.310	0.0006		0.3		5. O
			215.4	0.2 0.2	0.1	77.1 78.2	0.10	943 937	1.00 1.00	41 38	9,625	0.74	0.25	230.81	0.31	61	0.056	13		0.0010	0.0003	0.313	0.0004	14.3336	0.3	a i	•
	52 53		2947	0.2	0.1	78.2	0.05	937	1.00	38 34	9,165 8,710	0.52	0.17	232.59 234.32	0.18 0.05	62 63	0.051 0.047	12 12		0.0007 0.0004	0.0002	0.315	0.0002		0.:		
	34		2947	0	ő	79	0.02	925	1.00	34	8,653	0.30	0.10	232.80	0.05	64	0.047	12		0.0004	0.0001	0.317	0.0001 0.0001	12.7942 12.7112	0.0		
•	35	12	2947	0	C	79	0.02	919	1.00	34	8,597	0.29	0.10	231.28	0.05	65	0.046	12		0.0004	0.0001	0.313	0.0001	12.6282	0.0		
						60	Day		Total	9,184	1,341,525	284	78	14,728	191 Pounds		12	1,816					0	2.158			
										12	1,816.47	0.38	0.11	19.94	0.26 #/ton mix		,						v	2.00			
						30	Oay			5,982	765.362	142	31	7.647	111												
										8	1.036.32	0.19	0.04	10.35	0.15 #/ton mix												
						22	Day			4.289	540,334	73	10	6.354	69												
										6	731.63	0.10	0.01	8.60	0.09												



# ACP Final Report fo Valley Air TAP Program, May 2013, Appendix C, Emissions from Fuel Use

California Emissions Standard for Heavy Duty Diesel Engines	NMHC	NOx	PM
1996 Emission Standard in grams/bhp/hour	1.2	4	0.05
2007 Emission Standard in grams/bhp/hour	0.14	0.2	0.01

# Table One - Conventional Windrow Operation

(operation begins at grinder discharge point)

				Pollution production in pounds			inds		
	Equipment	Hrs Oper	Average	1996	1996	1996	2007	2007	2007
Task Performed	<u>Type</u>	<u>per Pile</u>	<u>bhp</u>	NMHC	<u>Nox</u>	<u>PM</u>	NMHC	Nox	PM
1. Push ground feedstock from grinder output into stockpile	Loader	5.2	250	3.4	. 11	0.14	0.4	0.6	0.03
2. Load feedstock from stockpile into dump truck	Loader	10.5	250	6,9	23	0.29	0.8	1.2	0.06
3. Truck feedstock from stockpile to windrow space	Truck	12.6	450	15.0	50	0.63	1.8	2.5	0.13
4. Push up feedstock to shape and size windrow	Loader	0.5	250	0.3	<b>1</b> 1155	0.01	0.0	0.1	0.00
5. Drive water truck during windrow formation	Truck	0.3	450	0.4	1	0.01	0.0	0.1	0.00
6. Drive water truck to re-water windrow prior to turning	Truck	3.5	450	4.2	14	0.17	0.5	0.7	0.03
7. Turn windrow (7 turns: 1 mixing, 5 for PFRP in 15 days, 1 at day 22)	Turner	1.7	500	2.2	7	0.09	0.3	0.4	0.02
Total pounds of pollutant for 1260 cy windrow/22 day active phase	:			32.49	108.29	1.35	3.79	5.41	0.27
Total pounds of pollutant per ton of feedstock @ 2cy/tor	n			0.052	0.172	0.002	0.006	0.009	0.000
Tons of pollutant for 100,000 tons per year/22 day active phase	2			2.58	8.59	0.11	0.30	0.43	0.02

# Table Two - Extended Aerated Static Pile Operation

(operation begins at grinder discharge point)

				Pollution production in pounds					
	Equipment	Hrs Oper	Average	1996	1996	1996	2007	2007	2007
Task Performed	Туре	<u>per Pile</u>	bhp	<u>NMHC</u>	<u>Nox</u>	<u>PM</u>	<u>NMHC</u>	<u>Nox</u>	<u>PM</u>
1. Place wood chip plenum layer on ASP bed	Loader	0.3	250	0.20	0.66	0.01	0.02	0.03	0.00
2. Convey ground feedstock from grinder to ASP	Conveyor	6.7	0	0.00	0.00	0.00	0.00	0.00	0.00
3. Load finished compost from stockpile into dump truck	Loader	0.3	250	0.20	0.66	0.01	0.02	0.03	0.00
4. Truck finished compost from stockpile to conveyor station	Truck	0.6	450	0.71	2.38	0.03	0.08	0.12	0.01
5. Load finished compost into conveyor	Loader	0.8	250	0.53	1.76	0.02	0.06	0.09	0.00
6. Convey finished compost to ASP	Conveyor	0.8	0	0.00	0.00	0.00	0.00	0.00	0.00
Totals pounds of pollutants for 506 cy eASP / 22 day active phase:				1.640	5.467	0.068	0.191	0.273	0.014
Total pounds of pollutant per ton of feedstock @ 2cy/ton	I			0.006	0.022	0.000	0.001	0.001	0.000
Tons of pollutant for 100,000 tons per year/22 day active phase				0.324	1.081	0.014	0.038	0.054	0.003
Percent reduction over windrow system	I	•		-87%	-87%	-87%	-87%	-87%	-87%
Tons savec	l .			2.25	7.51	0.09	0.26	0.38	0.02

# ACP Final Report fo Valley Air TAP Program, May 2013, Appendix C, Diesel Fuel Use Comparison

Composting in Extended Aerated Static Piles vs. Windrows

Table One - Conventional Windrow Operation	Windrow Di	mensions:	425	feet long	20	feet wide	8	feet high
(operation begins at grinder discharge point)	Windrow	v Volume:	1,260	cubic yards	per pile			
	Equipment	Diesel	Cubic Yd	Cubic Yd	Hrs Oper	Number	Hrs Oper	Fuel Use
Task Performed	Type	<u>Gal/Hr</u>	<u>Per Hr</u>	<u>Per Pile</u>	<u>per Task</u>	of Reps	<u>per Pile</u>	per Pile
1. Push ground feedstock from grinder output into stockpile	Loader	3.9	240	1,260	5.2	1	5.2	20.2
2. Load feedstock from stockpile into dump truck	Loader	3.9	120	1,260	10.5	1	10.5	40.4
3. Truck feedstock from stockpile to windrow space	Truck	1.6	100	1,260	12.6	1	12.6	19.8
4. Push up feedstock to shape and size windrow	Loader	3.9	200	100	0.5	1	0.5	1.9
5. Drive water truck during windrow formation	Truck	1.6	NA	NA	0.25	1	0.3	0.4
6. Drive water truck to re-water windrow prior to turning	Truck	1.6	NA	NA	0.5	7	3.5	5.5
7. Turn windrow (7 turns: 1 mixing, 5 for PFRP in 15 days, 1 at day 22)	Turner	20.3	5,040	1,260	0.2	7	<u>1.7</u>	<u>35.5</u>
Totals for 22 day active phase	:						34.3	123.7
Averages for 22 day active phase	37	Cubic Yard	s per Opera	ator Hour	10	Cubic Yar	ds per Gall	on of Fuel
Table Two - Extended Aerated Static Pile Operation	Pile Di	mensions:	Test piles a	veraged 85	' long x 35'	wide x app	rox 8' high	
(operation begins at grinder discharge point)	Pil	e Volume:	506	average cu	bic yards of	feedstock	per test pi	le
	Equipment	Diesel	Cubic Yd	Cubic Yd	Hrs Oper	Number	Hrs Oper	Fuel Use
Task Performed	Type	<u>Gal/Hr</u>	<u>Per Hr</u>	<u>Per Pile</u>	per Task	of Reps	per Pile	per Pile
1. Place wood chip plenum layer on ASP bed	Loader	3.9	120	40	0.33	1	0.3	1.3
2. Convey ground feedstock from grinder to ASP	Conveyor	0.0	75	506	6.75	1	6.7	0.0
3. Load finished compost from stockpile into dump truck	Loader	3.9	200	60	0.30	1	0.3	1.2
4. Truck finished compost from stockpile to conveyor station	Truck	1.6	100	60	0.60	1	0.6	0.9
5. Load finished compost into conveyor	Loader	3.9	75	60	0.80	1	0.8	3.1
6. Convey finished compost to ASP	Conveyor	0	75	60	0.80	1	<u>0.8</u>	0.0
Totals for 22 day active phase	:						9.6	6.5
Averages for 22 day active phase	: 53 (	Cubic Yard	s per Opera	itor Hour	78	Cubic Yar	ds per Gall	on of Fuel

34Tons per gallon extra using ASP2941.176gallons saved per 100,000 tons100000e 38 \* e 39



Seal of Testing Assurance TCCBI - Harvest Power John Jones 24487 Rd. 140 Tulare CA 93274 Product Identification Compost

Zone 1

Date Sampled/Received: 07 Sep. 12 / 14 Sep. 12

# **COMPOST TECHNICAL DATA SHEET**

LABORATORY: Soil Control Lab	; 42 Hangar Way; Watsonville, CA 9507	76 <i>tel:</i> 831.724.5422	fax: 831.724.3188		
Compost Parameters	Reported as (units of measure)	Test Results	Test Results		
Plant Nutrients:	%, weight basis	Not reported	Not reported		
Moisture Content	%, wet weight basis	43.3			
Organic Matter Content	ent %, dry weight basis 43.0				
pН	units	5.37			
Soluble Salts (electrical conductivity EC 5)	dS/m (mmhos/cm)	9.9			
Particle Size or Sieve Size	maxium aggregate size, inches	0.38			
Stability Indicator (respirometry	· ·)	· · · · · · · · · · · · · · · · · · ·	Stability Rating:		
CO <sub>2</sub> Evolution	mg CO <sub>2</sub> -C/g OM/day	7.9	Moderately Un-Stable		
	mg CO <sub>2</sub> -C/g TS/day	3.4	Moderatery On-Stable		
Maturity Indicator (bioassay)					
Percent Emergence	average % of control	100.0			
Relative Seedling Vigor	average % of control	90.0			
Select Pathogens	PASS/FAIL: per US EPA Class A standard, 40 CFR § 503.32(a)	Pass	Fecal coliform		
		Pass	Salmonella		
Trace Metals	PASS/FAIL: per US EPA Class A	Dens	As,Cd,Cr,Cu,Pb,Hg		
	standard, 40 CFR § 503.13, Tables 1 and 3.	Pass	Mo,Ni,Se,Zn		

Laboratory Group:	Sep.12 B	Laboratory Number: 2090380-1/2
Analyst: Assaf Sadeh		
		www.compostlab.com



Seal of Testing Assurance TCCBI - Harvest Power John Jones 24487 Rd. 140 Tulare CA 93274

Date Sampled/Received: 07 Sep. 12 / 14 Sep. 12

# Product Identification Compost

# **COMPOST TECHNICAL DATA SHEET**

LABORATORY: Soil Control Lab	; 42 Hangar Way; Watsonville, CA 9507	<i>tel:</i> 831.724.5422	fax: 831.724.3188	
Compost Parameters	Reported as (units of measure)	Test Results	Test Results	
Plant Nutrients:	%, weight basis	%, wet weight basis	%, dry weight basis	
Nitrogen	Total N		1.3	
Phosphorus	P <sub>2</sub> O <sub>5</sub>	0.32	0.57	
Potassium	K <sub>2</sub> O	0.69	1.2	
Calcium	Са	1.1	2.0	
Magnesium	Mg	0.24	0.42	
Moisture Content	%, wet weight basis	43.3		
Organic Matter Content	%, dry weight basis	43.0		
рН	units	5.37	· · · · · · · · · · · · · · · · · · ·	
Soluble Salts (electrical conductivity EC 5)	dS/m (mmhos/cm)	9.9	······································	
Particle Size or Sieve Size	% under 9.5 mm, dw basis	100.0		
Stability Indicator (respirometry	)		Stability Rating:	
CO <sub>2</sub> Evolution	mg CO <sub>2</sub> -C/g OM/day	7.9	Moderately Un-Stable	
	mg CO <sub>2</sub> -C/g TS/day	3.4		
Maturity Indicator (bioassay)			water water water 100 million water a particular determinantes at the measurements	
Percent Emergence	average % of control	100.0		
Relative Seedling Vigor	average % of control	90.0		
Select Pathogens	PASS/FAIL: per US EPA Class A standard, 40 CFR § 503.32(a)	Pass	Fecal coliform	
		Pass	Salmonella	
Trace Metals	PASS/FAIL: per US EPA Class A		As,Cd,Cr,Cu,Pb,Hg	
	standard, 40 CFR § 503.13, Tables 1 and 3.	Pass	Mo,Ni,Se,Zn	

Laboratory Group:	Sep.12 B	Laboratory Number: 2090380-1/2
Analyst: Assaf Sadeh		www.compostlab.com

	US COMPOSTING Seal of Testing Assurance	<b>TCCBI - Harvest Power</b> John Jones - 24487 Rd. 140 Tulare CA 93274							
	a a w w ve 1 34 30 % %	Product Identification:							
C-IL-		Zone 1							
Caltr	ans	Date Sampled/Received:	07 Sep. 12 / 14 Sep. 12						
Сомра	<b>DST TECHNICA</b>	L DATA SHEE	Γ for Caltrans						
LABORATORY: Soil Control Lab, 42	Hangar Way, Watsonville, CA 95076	5 tel (831) 724-5422 fax (831) 724-	3188 www.compostlab.com						
Compost Parameters	Test Results	Reported as (units of measure)	TMECC Test						
			Method						
рН	5.37	Unitless	04.11-A 1:5 Slurry pH						
Soluble Salts	9.9	dS/m (mmhos/cm)	04.10-A 1:5 Slurry Method						

(electrical conductivity)	9.9	dS/m (mmhos/cm)	Mass Basis
Moisture content	43.3	%, wet weight basis	03.09-A - Total Solids and Moisture
Organic Matter Content	43.0	%, dry weight basis	05.07-A Loss-on-Ignition
	13.0		Organic Matter Method (LOI)
Maturity Indicator (bioassay)			
Percent Emergence	100.0	average % of control	05.05-A Germination and vigor
Relative Seedling Vigor	90.0	average % of control	
			05.08-B Carbon Dioxide
Stability Indicator	7.9	mg CO2-C/g OM/day	Evoultion Rate
		%, dry weight passing through	02.02-B Sample Sieving for
Particle Size	100.0	9.5 mm	Aggregate Size Classification
Pathogens	Pass	PASS/FAIL: Per US EPA Class A standard, 40 CFR 503.32(a)	07.01-B Fecal coliforms
Pathogens	Pass	PASS/FAIL: Per US EPA Class A standard, 40 CFR 503.32(a)	07.02 Samonella
Physical Contaminants	None Detected	%, dry weight basis	02.02-C - Man-Made Inerts Total content
Physical Contaminants	None Detected	%, dry weight basis	02.02-C - Man-Made Inerts Sharps content
	D	PASS/FAIL: Per US EPA Class A	04.06-Heavy Metals standard,
Heavy Metals Content	Pass	40 CFR 503.13, tables 1 and 3.	and Hazardous Elements

Participants in the US Composting Council's Seal of Testing Assurance Program have shown the commitment to test their compost products on a prescribed basis and provide this data, along with compost end use instructions, as a means to better serve the needs of their compost customers.

For additional information pertaining to compost use, the specific compost parameters tested for within the Seal of Testing assurance Program, or the program in general, log on to the US Composting Council's TMECC web-site at http://www.tmecc.org.

This compost product has been sampled and tested as required by the Seal of Testing assurance Program on the United States Composting Council (USCC), using certain methods from the "Test Methods for the Examination of Compost and Composting" manual. Test results are available upon request by contacting the compost producer (address at top of page). The USCC makes no warranties regarding this product or its content, quality. or suitability for any particular use.

Laboratory Group:	Sep.12 B	Laboratory Number:	2090380-1/2	
Analyst: Assaf Sadeh		www.compostlab.com		
		www.compostao.com		

ANALYTICAL CHEMISTS and BACTERIOLOGISTS Approved by State of California

**TCCBI - Harvest Power** 

24487 Rd. 140 Tulare, CA 93274 Attn: John Jones

TEL: 831-724-5422 FAX: 831-724-3188 www.compostlab.com

# SOIL CONTROL LAB AD HANIGAP WAY WATSORWILE EAUFORULA 95075 184

Account #: 2090380-1/2-6908 Group: Sep.12 B #27 Reporting Date: September 26, 2012

Date Received: Sample Identification: Sample ID #:	14 Sep. 12 Zone 1 2090380 - 1	1/2					
Nutrients	Dry wt.	As Rcvd.	units	Stability Indic			Biologically
Total Nitrogen:	1.3	0.75	%	CO2 Evolutio		Respirometery	Available C
Ammonia (NH₄-N):	1300	760	mg/kg	mg CO <sub>2</sub> -C/g C	)M/day	7.9	10
Nitrate (NO <sub>3</sub> -N):	33	18	mg/kg	mg CO <sub>2</sub> -C/g T	S/day	3.4	4.4
Org. Nitrogen (OrgN):	1.2	0.68	%	Stability Ra		moderately unstable	unstable
Phosphorus (as $P_2O_5$ ):	0.57	0.32	%		0		i
Phosphorus (P):	2500	1400	mg/kg				
Potassium (as K <sub>2</sub> O):	1.2	0.68	%	Maturity Indic	ator: Cucum	iber Bioassay	
Potassium (K):	10000	5700	mg/kg	Compost:Vern		1:1	1:3
Calcium (Ca):	2.0	1.1	%	Emergence (%		100	100
Magnesium (Mg):	0.42	0.24	%	Seedling Vigo		90	93
Sulfate (SO <sub>4</sub> -S):	1900	1100	mg/kg	Description		fungus	fungus
Boron (Total B):	27	15	mg/kg			Jung	July
Moisture:	0	43.3	%				
Sodium (Na):	0.11	0.063	%	Pathogens	Results	Units	Rating
Chloride (CI):	0.21	0.12	%	Fecal Coliform		MPN/g	pass
pH Value:	NA	5.37	unit	Salmonella	< 3	MPN/4g	pass
Bulk Density :	25	44	lb/cu ft	Date Tested: 14			,
Carbonates (CaCO <sub>3</sub> ):	<0.1	<0.1	lb/ton				
Conductivity (EC5):	9.9	NA	mmhos/cm				
Organic Matter:	43.0	24.4	%	Inerts	% by weigh	t	
Organic Carbon:	23.0	13.0	%	Plastic	< 0.5		
Ash:	57.0	32.3	%	Glass	< 0.5		
C/N Ratio	18	18	ratio	Metal	< 0.5		
AgIndex	10	10	ratio	Sharps	ND		
Metals		EPA Limit	units	Size & Volum		······································	
Aluminum (Al)	Dry wt. 6700		mg/kg	MM		t % by volume	BD g/cc
Arsenic (As):	3.4	- 41	mg/kg	> 50	0.0	0.0	0.00
Cadmium (Cd):	< 1.0	39	mg/kg	25 to 50	0.0	0.0	0.00
Chromium (Cr):	14	1200	mg/kg	16 to 25	0.0	0.0	0.00
Cobalt (Co)	3.7	-	mg/kg	9.5 to 16	0.0	0.0	0.00
Copper (Cu):	60	1500	mg/kg	6.3 to 9.5	2.7	2.6	0.41
Iron (Fe):	11000	_	mg/kg	4.0 to 6.3	6.0	6.2	0.39
Lead (Pb):	25	300	mg/kg	2.0 to 4.0	13.7	17.0	0.32
Manganese (Mn):	200		mg/kg	< 2.0	77.6	74.2	0.42
Mercury (Hg):	< 1.0	17	mg/kg			35 Light Materials	
Molybdenum (Mo):	1.8	75	mg/kg			erials, >.60 Heav	
Nickel (Ni):	10	420	mg/kg	••••••			Assaf Sadeh
Selenium (Se):	< 1.0	36	mg/kg				
Zinc (Zn):	160	2800	mg/kg				

 Image: Line (Zn):
 160
 2800
 mg/kg
 Image: Mission Science

 \*Sample was received and handled in accordance with TMECC procedures.

Account No	.:	Date Received	14 Sep. 12	2
2090380 - 1	/2 - 6908	Sample i.d.	Zone 1	
Group:	Sep.12 B No. 27	Sample I.d. No.	1/2	2090380

#### Is Your Compost Stable?

Page one of three

Respiration Rate	Biodegradation Rate of Your Pile
7.9 mg CO2-C/	+++++++++++++++++++++++++++++++++++++++
g OM/day	< Stable > Moderately Unstable> < Unstable > High For Mulch
Biologically Available Carb	on (BAC) Optimum Degradation Rate
10 mg CO2-C/	+++++++++++++++++++++++++++++++++++++++
g OM/day	< Stable >  <moderately unstable=""> &lt; Unstable &gt; &lt; High For Mulch</moderately>

### Is Your Compost Mature?

39 Ratio			***********
	VeryMature>(<	Mature	> < Immature
Ammonia N ppm			
<b>1300</b> mg/kg	++++++++++++++++++++++++++++++++++++++	+ <b>+++</b> + <b>+</b> ++++++++++++++++++++++++++++	*****
dry wt.	VeryMature> <	Mature	> < Immature
litrate N ppm			
33 mg/kg	. <del>╃┼╡╋╪╪╪╋╋╋</del> ╋╋	****	
dry wt.	< Immature	><	< Mature
H value			
5.37 units	++++++++++++++++++++++++++++++++++++++	+++++++++++++++++++++++++++++++++++++++	****
	< Immature		> < Mature > < Immature
ucumber Emergence			
100.0 percent	++++++++++++++++++++++++++++++++++++++	+++++++++++++++++++++++++++++++++++++++	***** <mark>**********************</mark> *********
	< Immature		>I< Mature

### Is Your Compost Safe Regarding Health?

Fecal Coliform	
< 1000 MPN/g dry wt.	+++++
0.1	< Safe > < High Fecal Coliform
Salmonella	
Less than 3 /4g dry wt.	+++++
	<safe (none="" detected)=""> &lt; High Salmonella Count(&gt; 3 per 4 grams)</safe>
Metals US EPA 503	
Pass dry wt.	+++++
	<all metals="" pass=""> &lt; One or more Metals Fail</all>

#### Does Your Compost Provide Nutrients or Organic Matter?

Nutrients (N+P2O5+K2O)	
3.1 Percent	+++++++++++++++++++++++++++++++++++++++
dry wt.	<low> &lt; Average &gt; &lt; High Nutrient Content</low>
AgIndex (Nutrients / Sodiu	um and Chloride Salts) ((N+P2O5+K2O) / (Na + Cl))
10 Ratio	+++++++++++++++++++++++++++++++++++++++
	Na & CI > < Nutrient and Sodium and Chloride Provider > < Nutrient Provider
Plant Available Nitrogen (F	PAN) Estimated release for first season
6 lbs/ton	+++++++++++++++++++++++++++++++++++++++
wet wt.	Low Nitrogen Provider> < Average Nitrogen Provider >  <high nitrogen="" provider<="" td=""></high>
C/N Ratio	
18 Ratio	+++++++++++++++++++++++++++++++++++++++
	< Nitrogen Release >>< N-Neutral >< N-Demand>< High Nitrogen Demand
Soluble Available Nutrients	s & Salts (EC5 w/w dw)
9.9 mmhos/cm	+++++++++++++++++++++++++++++++++++++++
dry wt.	SioRelease>  < Average Nutrient Release Rate >  <high available="" nutrients<="" td=""></high>
Lime Content (CaCO3)	
0 Lbs/ton	+
dry wt.	< Low >< Average >< High Lime Content (as CaCO3)

#### What are the physical properties of your compost?

Percent Ash				
57.0 Percent	++++++			
dry wt. < High Organic Matter > < Average > < High Ash Content				
Sieve Size % > 6.3 MM (0.25	")			
2.7 Percent	+++++++++++++++++++++++++++++++++++++++			
dry wt.	All Uses > Size May Restrict Uses for Potting mix and Golf Courses			

Account No	D.:	Date Received	14 Sep.	12	
2090380 -	1/2 - 6908	Sample i.d.	Zone 1		
Group:	Sep.12 B No. 27	Sample I.d. No.	1/2	2090380	

Is Your Compost Stable?

Respiration Rate

10

Page two of three

7.9 Moderate-selected use mg CO2-C/g OM/day The respiration rate is a measurement of the biodegradation rate of the organic matter in the sample (as received).

The respiration rate is determined by measuring the rate at which CO2 is released under optimized moisture and temperature conditions.

#### **Biologically Available Carbon**

Moderate-selected use mg CO2-C/g OM/day

Biologically Available Carbon (BAC) is a measurement of the rate at which CO2 is released under optimized moisture, temperature, porosity, nutrients, pH and microbial conditions. If both the RR and the BAC test values are close to the same value, the pile is optimized for composting. If both values are high the compost pile just needs more time. If both values are low the compost has stabilized and should be moved to curing. BAC test values that are higher than RR indicate that the compost pile has stalled. This could be due to anaerobic conditions, lack of available nitrogen due to excessive air converting ammonia to the unavailable nitrate form, lack of nitrogen or other nutrients due to poor choice of feedstock, pH value out of range, or microbes rendered non-active. *Is Your Compost Mature?* 

#### is your compost wature?

AmmoniaN:NitrateN ratio 39 immature

		0
		t
Ammonia N	ppm	s
1300	immature	i
Nitrate N pp	m	a
33	immature	а
pH value		F
5.37	immature	c
		c

Composting to stabilize carbon can occur at such a rapid rate that sometimes phytotoxins remain in the compost and must be neutralized before using in high concentrations or in high-end uses. This step is called curing. Typically ammonia is in excess with the break-down of organic materials resulting in an increase in pH. This combination results in a loss of volatile ammonia (it smells). Once this toxic ammonia has been reduced and the pH drops, the microbes convert the ammonia to nitrates. A low ammonia + high nitrate score is indicative of a mature compost, however there are many exceptions. For example, a compost with a low pH (<7) will retain ammonia, while a compost with high lime content can lose ammonia before the organic fraction becomes stable. Composts must first be stable before curing indicators apply.

### Cucumber Bioassay

100.0 Percent

Cucumbers are chosen for this test because they are salt tolerant and very sensitive to ammonia and organic acid toxicity. Therefore, we can germinate seeds in high concentrations of compost to

measure phytotoxic effects without soluble salts being the limiting factor. Values above 80% for both percent emergence and vigor are indicative of a well-cured compost. Exceptions include very high salts that affect the cucumbers, excessive concentrations of nitrates and other nutrients that will be in range when formulated to make a growing media. In addition to testing a 1:1 compost: vermiculite blend, we also test a diluted 1:3 blend to indicate a more sensitive toxicity level.

### Is Your Compost Safe Regarding Health?

#### Fecal Coliform

< 1000 / g dry wt. Fecal coliforms can survive in both aerobic and anaerobic conditions and is common in all initial compost piles. Most human pathogens occur from fecal matter and all fecal matter is loaded in fecal coliforms. Therefore fecal coliforms are used as an indicator to determine if the chosen method for pathogen reduction (heat for compost) has met the requirements of sufficient temperature, time and mixing. If the fecal coliforms are reduced to below 1000 per gram dry wt. it is assumed all others pathogens are eliminated. Potential problems are that fecal coliform can regrow during the curing phase or during shipping. This is because the conditions are now more favorable for growth than during the composting process.</p>

Less than 3 3 / 4g dry wt. Salmonella is not only another indicator organism but also a toxic microbe. It has been used in the case of biosolids industry to determine adequate pathogen reduction.

### Metals

Pass The ten heavy metals listed in the EPA 503 regulations are chosen to determine if compost can be applied to ag land and handled without toxic effects. Most high concentrations of heavy metals are derived from woodwaste feedstock such as chrome-arsenic treated or lead painted demolition wood. Biosolids are rarely a problem. *Does Your Compost Provide Nutrients or Organic Matter?* 

#### Nutrients (N+P2O5+K2O)

3.1 Average nutrient content

This value is the sum of the primary nutrients Nitrogen, Phosphorus and Potassium. Reported units are consistent with those found on fertilizer formulations. A sum greater than 5 is indicative of a compost with high nutrient content, and best used to supply nutrients to a receiving soil. A sum below 2 indicates low nutrient content, and is best-used to improve soil structure via the addition of organic matter. Most compost falls between 2 and 5.

Account No.:		Date Received	14 Sep. 12	
2090380 - 1/2	- 6908	Sample i.d.	Zone 1	
Group:	Sep.12 B No. 27	Sample I.d. No.	1/2	2090380

AgIndex (Nutrients/Na+Cl)

Page three of three

10 Average nutrient ratio Composts with low AgIndex values have high concentrations of sodium and/or chloride compared to nutrients. Repeated use of a compost with a low AgIndex (< 2) may result in sodium and/or chloride acting as the limiting factor compared to nutrients, governing application rates. These composts may be used on well-draining soils and/or with salt-tolerant plants. Additional nutrients form another source may be needed if the application rate is limited by sodium or chloride. If the AgIndex is above 10, nutrients optimal for plant growth will be available without concern of sodium and/or chloride toxicity. Composts with an AgIndex of above 10 are good for increasing nutrient levels for all soils. Most composts score between 2 and 10. Concentrations of nutrients, sodium, and chloride in the receiving soil should be considered when determining compost application rates. The AgIndex is a product of feedstock quality. Feedstock from dairy manure, marine waste, industrial wastes, and halophytic plants are likely to produce a finished compost with a low AgIndex.

#### Plant Available Nitrogen (lbs/ton)

6 Average N Provider Plant Available Nitrogen (PAN) is calculated by estimating the release rate of Nitrogen from the organic fraction of the compost. This estimate is based on information gathered from the BAC test and measured ammonia and nitrate values. Despite the PAN value of the compost, additional sources of Nitrogen may be needed during he growing season to offset the Nitrogen demand of the microbes present in the compost. With ample nutrients these microbes can further breakdown organic matter in the compost and release bound Nitrogen. Nitrogen demand based on a high C/N ratio is not considered in the PAN calculation because additional Nitrogen should always be supplemented to the receiving soil when composts with a high C/N ratio are applied. C/N Ratio

18 Indicates immaturity As a guiding principal, a C/N ratio below 14 indicates maturity and above 14 indicates immaturity, however, there are many exceptions. Large woodchips (>6.3mm), bark, and redwood are slow to breakdown and therefore can result in a relatively stable product while the C/N ratio value is high. Additionally, some composts with chicken manure and/or green grass feedstocks can start with a C/N ratio below 15 and are very unstable. A C/N ratio below 10 supplies Nitrogen, while a ratio above 20 can deplete Nitrogen from the soil. The rate at which Nitrogen will be released or used by the microbes is indicated by the respiration rate (BAC). If the respiration rate is too high the transfer of Nitrogen will not be controlable. Soluble Nutrients & Salts (EC5 w/w dw - mmhos/cm)

9.9 High salts This value refers to all soluble ions including nutrients, sodium, chloride and some soluble organic compounds. The concentration of salts will change due to the release of salts from the organic matter as it degrades, volatilization of ammonia, decomposition of soluble organics, and conversion of molecular structure. High salts + high AgIndex is indicative of a compost high in readily available nutrients. The application rate of these composts should be limited by the optimum nutrient value based on soil analysis of the receiving soil. High Salts + low AgIndex is indicative of a compost low in nutrients with high concentrations of sodium and/or chloride. Limit the application rate according to the toxicity level of thesodium and/or chloride. Low salts indicates that the compost can be applied without risking salt toxicity, is likely a good source of organic matter, and that nutrients will release slowly over time.

#### Lime Content (lbs. per ton)

0 Low lime content Compost high in lime or carbonates are often those produced from chicken manure (layers) ash materials, and lime products. These are excellent products to use on a receiving soil where lime has been recommended by soil analysis to raise the pH. Composts with a high lime content should be closely considered for pH requirements when formulating potting mixes.

#### Physical Properties

Percent Ash

57.0 Average ash content Ash is the non-organic fraction of a compost. Most composts contain approximately 50% ash (dry weight basis). Compost can be high in ash content for many reasons including: excess minerilzation(old compost), contamination with soil base material during turning, poor quality feedstock, and soil or mineral products added. Finding the source and reducing high ash content is often the fastest means to increasing nutrient quality of a compost.

#### Particle Size % > 6.3 MM (0.25")

2.7 May restrict use Large particles may restrict use for potting soils, golf course topdressings, seed-starter mixes, and where a fine size distribution is required. Composts with large particles can still be used as excellent additions to field soils, shrub mixes and mulches.

#### Particle Size Distribution

Each size fraction is measured by weight, volume and bulk density. These results are particularly relevent with decisions to screen or not, and if screening, which size screen to use. The bulk density indicates if the fraction screened is made of light weight organic material or heavy mineral material. Removing large mineral material can greatly improve compost quality by increasing nutrient and organic concentrations.

Appendix:			
		Estimated available nutrients for use wher	a calculating application rates
Plant Availal	ole Nitrogen (PAN) calculations:		lbs/ton (As Rcvd.)
PAN = (X * (	organic N)) + ((NH4-N) + (NO3-N))		
X value =	If BAC < 2 then $X = 0.1$	Plant Available Nitrogen (PAN)	6.4
	If BAC =2.1 to 5 then X = 0.2	Ammonia (NH4-N)	1.52
	If BAC =5.1 to 10 then X = 0.3	Nitrate (NO3-N)	0.04
	If BAC > 10 then $X = 0.4$	Available Phosphorus (P2O5*0.64)	4.1
Note: If C/N	ratio > 15 additional N should be applied.	Available Potassium (K2O)	13.7



Seal of Testing Assurance TCCBI - Harvest Power John Jones 24487 Rd. 140 Tulare CA 93274 Product Idantification Comm

Date Sampled/Received: 07 Sep. 12 / 14 Sep. 12

*Product Identification* Compost Zone 1 Control

# **COMPOST TECHNICAL DATA SHEET**

LABORATORY: Soil Control Lab	; 42 Hangar Way; Watsonville, CA 9507	<i>tel:</i> 831.724.5422	fax: 831.724.3188
Compost Parameters	Reported as (units of measure)	Test Results	Test Results
Plant Nutrients:	%, weight basis	Not reported	Not reported
Moisture Content	%, wet weight basis 42.3		
Organic Matter Content	%, dry weight basis	44.9	
pH	units	5.72	
Soluble Salts (electrical conductivity EC <sub>3</sub> )	dS/m (mmhos/cm)	11	
Particle Size or Sieve Size	maxium aggregate size, inches	maxium aggregate size, inches 0.64	
Stability Indicator (respirometry	y)		Stability Rating:
CO <sub>2</sub> Evolution	mg CO <sub>2</sub> -C/g OM/day	9.1	Un-Stable
	mg CO <sub>2</sub> -C/g TS/day	4.1	
Maturity Indicator (bioassay)			
Percent Emergence	mergence average % of control 100.0		
Relative Seedling Vigor	average % of control	91.7	
Select Pathogens	elect Pathogens PASS/FAIL: per US EPA Class A standard, 40 CFR § 503.32(a)		Fecal coliform
		Pass	Salmonella
Trace Metals	PASS/FAIL: per US EPA Class A	1 2 4	
	standard, 40 CFR § 503.13, Tables 1 and 3.	Pass	Mo,Ni,Se,Zn

Laboratory Group:	Sep.12 B	Laboratory Number: 2090380-2/2
Analyst: Assaf Sadeh		
		www.compostlab.com



Seal of Testing Assurance TCCBI - Harvest Power John Jones 24487 Rd. 140 Tulare CA 93274

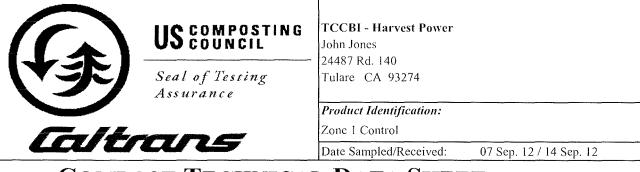
Date Sampled/Received: 07 Sep. 12 / 14 Sep. 12

Product Identification Compost Zone 1 Control

# **COMPOST TECHNICAL DATA SHEET**

LABORATORY: Soil Control Lab	o; 42 Hangar Way; Watsonville, CA 9507	6 <i>tel:</i> 831.724.5422	fax: 831.724.3188
Compost Parameters	Reported as (units of measure)	Test Results	Test Results
Plant Nutrients:	%, weight basis	%, wet weight basis	%, dry weight basis
Nitrogen	Total N	0.78	1.4
Phosphorus	P <sub>2</sub> O <sub>5</sub>	0.32	0.57
Potassium	K <sub>2</sub> O	0.71	1.2
Calcium	Са	1.2	2.0
Magnesium	Mg	0.24	0.42
Moisture Content	%, wet weight basis	42.3	
Organic Matter Content	%, dry weight basis	· 44.9	
рН	units	5.72	
Soluble Salts (electrical conductivity EC <sub>3</sub> )	dS/m (mmhos/cm)	11	
Particle Size or Sieve Size	% under 9.5 mm, dw basis	97.8	
Stability Indicator (respirometry	v)		Stability Rating:
CO <sub>2</sub> Evolution	mg CO <sub>2</sub> -C/g OM/day	9.1 4.1 Un-Stable	
	mg CO <sub>2</sub> -C/g TS/day		
Maturity Indicator (bioassay)			
Percent Emergence	average % of control	100.0	
Relative Seedling Vigor	average % of control	91.7	
Select Pathogens	PASS/FAIL: per US EPA Class A standard, 40 CFR § 503.32(a)	Pass	Fecal coliform
		Pass	Salmonella
Trace Metals	PASS/FAIL: per US EPA Class A standard, 40 CFR § 503.13, Tables 1 and 3.		As,Cd,Cr,Cu,Pb,Hg Mo,Ni,Se,Zn

Laboratory Group:	Sep.12 B	Laboratory Number: 2090380-2/2
Analyst: Assaf Sadeh		
		www.compostlab.com



# **COMPOST TECHNICAL DATA SHEET for Caltrans**

LABORATORY: Soil Control Lab, 42 Hangar Way, Watsonville, CA 95076 tel (831) 724-5422 fax (831) 724-3188 www.compostlab.com

Compost Parameters	Test Results	Reported as (units of measure)	TMECC Test	
			Method	
pН	5.72	Unitless	04.11-A 1:5 Slurry pH	
Soluble Salts (electrical conductivity)	11	dS/m (mmhos/cm)	04.10-A 1:5 Slurry Method Mass Basis	
Moisture content	42.3	%, wet weight basis	03.09-A - Total Solids and Moisture	
Organic Matter Content	44.9	%, dry weight basis	05.07-A Loss-on-Ignition Organic Matter Method (LOI)	
Maturity Indicator (bioassay)				
Percent Emergence	100.0	average % of control	05.05-A Germination and vigor	
Relative Seedling Vigor	91.7	average % of control		
Stability Indicator	9.1	mg CO2-C/g OM/day	05.08-B Carbon Dioxide Evoultion Rate	
Particle Size	97.8	%, dry weight passing through 9.5 mm	02.02-B Sample Sieving for Aggregate Size Classification	
Pathogens	Pass	PASS/FAIL: Pcr US EPA Class A standard, 40 CFR 503.32(a)	07.01-B Fecal coliforms	
Pathogens	Pass	PASS/FAIL: Per US EPA Class A standard, 40 CFR 503,32(a)	07.02 Samonella	
Physical Contaminants	None Detected	%, dry weight basis	02.02-C - Man-Made Inerts Total content	
Physical Contaminants	None Detected	%, dry weight basis	02.02-C - Man-Made Inerts Sharps content	
Heavy Metals Content	Pass	PASS/FAIL: Per US EPA Class A 40 CFR 503.13, tables 1 and 3.	04.06-Heavy Metals standard, and Hazardous Elements	

Participants in the US Composting Council's Seal of Testing Assurance Program have shown the commitment to test their compost products on a prescribed basis and provide this data, along with compost end use instructions, as a means to better serve the needs of their compost customers.

For additional information pertaining to compost use, the specific compost parameters tested for within the Seal of Testing assurance Program, or the program in general, log on to the US Composting Council's TMECC web-site at http://www.tmecc.org.

This compost product has been sampled and tested as required by the Seal of Testing assurance Program on the United States Composting Council (USCC), using certain methods from the "Test Methods for the Examination of Compost and Composting" manual. Test results are available upon request by contacting the compost producer (address at top of page). The USCC makes no warranties regarding this product or its content, quality. or suitability for any particular use.

Laboratory Group:	Sep.12 B	Laboratory Number:	2090380-2/2
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ANALYTICAL CHEMISTS and BACTERIOLOGISTS Approved by State of California TEL: 831-724-5422 FAX: 831-724-3188 www.compostlab.com

# SOIL CONTROL LAB

Account #: 2090380-2/2-6908 Group: Sep.12 B #28 Reporting Date: September 26, 2012

TCCBI - Harvest Power 24487 Rd. 140 Tulare, CA 93274 Attn: John Jones

Date Received: Sample Identification: Sample ID #:	14 Sep. 12 Zone 1 Co 2090380 -	ntrol 2/2					
Nutrients	Dry wt.	As Rcvd.	units	Stability Indica			Biologically
Total Nitrogen:	1.4	0.78	%	CO2 Evolution	1	Respirometery	Available C
Ammonia (NH₄-N):	1800	1100	mg/kg	mg CO <sub>2</sub> -C/g OI	M/day	9.1	12
Nitrate (NO <sub>3</sub> -N):	16	9.3	mg/kg	mg CO <sub>2</sub> -C/g TS	S/day	4.1	5.3
Org. Nitrogen (OrgN):	1.2	0.69	%	Stability Rat	ing	unstable	unstable
Phosphorus (as $P_2O_5$ ):	0.57	0.33	%		•		
Phosphorus (P):	2500	1400	mg/kg				
Potassium (as K <sub>2</sub> O):	1.2	0.70	%	Maturity Indica	ator: Cucum	ber Bioassav	
Potassium (K):	10000	5900	mg/kg	Compost:Verm		1:1	1:3
Calcium (Ca):	2.0	1.2	%	Emergence (%		100	100
Magnesium (Mg):	0.42	0.24	%	Seedling Vigor		92	93
Sulfate $(SO_4-S)$ :	2500	1400	mg/kg	Description		fungus	fungus
Boron (Total B):	32	18	mg/kg			rangao	languo
Moisture:	0	42.3	%				
Sodium (Na):	0.12	0.067	%	Pathogens	Results	Units	Rating
Chloride (Cl):	0.12	0.15	%	Fecal Coliform	< 2.0	MPN/g	pass
pH Value:	NA	5.72	unit	Salmonella	< 3	MPN/4g	pass
Bulk Density :	22	38	lb/cu ft	Date Tested: 14 S	-	Wir Wirtig	pass
Carbonates (CaCO <sub>3</sub> ):	<0.1	<0.1	lb/ton	Date rested. 14 C	ep. 12		
Conductivity (EC5):	11	NA	mmhos/cm				
Organic Matter:	44.9	25.9	%	Inerts	% by weight		
Organic Carbon:	24.0	14.0	%	Plastic	< 0.5		
° '	24.0 55.1	31.8	%	Glass	< 0.5 < 0.5		
Ash: C/N Ratio	18	18	ratio	Metal	< 0.5		
	8	8	ratio	Sharps	< 0.5 ND		
AgIndex		· · · · · · · · · · · · · · · · · · ·					
Metals	Dry wt.	EPA Limit	units	Size & Volume			
Aluminum (Al)	6600	-	mg/kg	MM > 50		% by volume	BD g/cc
Arsenic (As):	3.6	41	mg/kg		0.0	0.0	0.00
Cadmium (Cd):	< 1.0 15	39 1200	mg/kg	25 to 50	0.0 0.0	0.0	0.00
Chromium (Cr):	3.5	1200	mg/kg	16 to 25 9.5 to 16	2.2	0.0 1.6	0.00
Cobalt (Co) Copper (Cu):	3.5 53	1500	mg/kg mg/kg	6.3 to 9.5	2.2 3.9	4.6	0.47 0.29
Iron (Fe):	9000	-	mg/kg	4.0 to 6.3	3.9 9.3	4.0	0.29
Lead (Pb):	22	300	mg/kg	2.0 to 4.0	18.3	24.8	0.27
Manganese (Mn):	210	-	mg/kg	< 2.0	66.3	57.4	0.39
Mercury (Hg):	< 1.0	17	mg/kg			5 Light Materials	
Molybdenum (Mo):	2.3	75	mg/kg			rials, >.60 Heavy	
Nickel (Ni):	10	420	mg/kg				Assaf Sadeh
Selenium (Se):	< 1.0	36	mg/kg				
Zinc (Zn):	170	2800	mg/kg				
*Sample was received a				ECC procedures			

\*Sample was received and handled in accordance with TMECC procedures.

Account No	0.1	Date Received	14 Sep. 12	2
2090380 - 2	2/2 - 6908	Sample i.d.	Zone 1 Co	ontrol
Group:	Sep.12 B No. 28	Sample I.d. No.	2/2	2090380

# Is Your Compost Stable?

Page one of three

Respiration Rate	Biodegradation Rate of Your Pile				
9.1 mg CO2-C/	+++++++++++++++++++++++++++++++++++++++				
g OM/day	< Stable >  <moderately unstable=""> &lt; Unstable &gt; &lt; High For Mulch</moderately>				
Biologically Available Carb	con (BAC) Optimum Degradation Rate				
12 mg CO2-C/	+++++++++++++++++++++++++++++++++++++++				
g OM/day < Stable > < Moderately Unstable> < Unstable > < High For Mu					

### Is Your Compost Mature?

AmmoniaN/NitrateN ratio				
110 Ratio	<b>**</b> +++++++++++++++++++++++++++++++++++	*++++++++++++++++++++++++++++++++++++++	+++++++++++++++++++++++++++++++++++++++	+ <del>+</del> ++++++++++++++++++++++++++++++++++
	VeryMature> <	Mature	><	Immature
Ammonia N ppm				
1800 mg/kg	**+++++++++++++++++++++++++++++++++++++	+++++++++++++++++++++++++++++++++++++++	+++++++++++++++++++++++++++++++++++++++	+ <del>+ + + + + + + + + + + + + + + + + + </del>
dry wt.	VeryMature> <	Mature	> < lmi	mature
Nitrate N ppm				
16 mg/kg	<b>*+++++++++</b> +			
dry wt.	< Immature	>	< Mature	
pH value				
5.72 units	*** <b>*</b> * <b>**</b> * <b>*********</b>	<del>`````````````````````````````````````</del>	+++++++	
	< Immature		> < Mature	> < Immature
Cucumber Emergence				
100.0 percent	+++++++++++++++++++++++++++++++++++++++	+++++++++++++++++++++++++++++++++++++++	* + + + + + + + + + + + + + + + + + + +	+++++++++++++++++++++++++++++++++++++++
	< Immature			> < Mature

### Is Your Compost Safe Regarding Health?

Fecal Coliform	
< 1000 MPN/g dry wt.	++++++
	< Safe > < High Fecal Coliform
Salmonella	
Less than 3 /4g dry wt.	+++++
0.1	Safe (none detected) > < High Salmonella Count(> 3 per 4 grams)
Metals US EPA 503	
Pass dry wt.	++++++
-	<all metals="" pass=""> &lt; One or more Metals Fail</all>

### Does Your Compost Provide Nutrients or Organic Matter?

Nutrients (N+P2O5+K2O)				
3.2 Percent	+++++++++++++++++++++++++++++++++++++++	+++		
dry wt.	<low>&lt; Average</low>	> < High Nutrient Content		
AgIndex (Nutrients / Sodium	and Chloride Salts)	((N+P2O5+K2O) / (Na + CI))		
8 Ratio	+++++++++++++++++++++++++++++++++++++++	*++++++++++++++++++++++++++++++++++++++		
	Na & Cl > < Nutrient and S	odium and Chloride Provider > < Nutrient Provider		
Plant Available Nitrogen (PA	N) Estimated relea	ase for first season		
8 lbs/ton	+++++++++++++++++++++++++++++++++++++++	****		
wet wt.	Low Nitrogen Provider> <	Average Nitrogen Provider >  <high nitrogen="" provider<="" td=""></high>		
C/N Ratio				
18 Ratio	+++++++++++++++++++++++++++++++++++++++	*****		
	< Nitrogen Release >> < N-N	eutral > < N Domand> < High Nitrogen Demand		
Soluble Available Nutrients	& Salts (EC5 w/w dw)			
11 mmhos/cm	+++++++++++++++++++++++++++++++++++++++			
dry wt.	SIoRelease> < Average Nutrient Release Rate >  <high available="" nutrients<="" td=""></high>			
Lime Content (CaCO3)				
0 Lbs/ton	+			
dry wt.	< Low > < Average	>I< High Lime Content (as CaCO3)		

### What are the physical properties of your compost?

Percent Ash	
55.1 Percent	+++++++++++++++++++++++++++++++++++++++
dry wt.	< High Organic Matter > < Average > < High Ash Content
Sieve Size % > 6.3 MM (0.2	5")
6.1 Percent	+++++++++++++++++++++++++++++++++++++++
dry wt.	All Uses > < Size May Restrict Uses for Potting mix and Golf Courses

Account No.: 2090380 - 2/2 - 6908 Group: Sep.12 B No. 28 Date Received Sample i.d. Sample I.d. No. 14 Sep. 12 Zone 1 Control 2/2 2090380

#### INTERPRETATION:

#### Is Your Compost Stable?

#### **Respiration Rate**

mg CO2-C/g OM/dav Moderate-selected use

91 The respiration rate is a measurement of the biodegradation rate of the organic matter in the sample (as received). The respiration rate is determined by measuring the rate at which CO2 is released under optimized moisture and temperature conditions.

#### **Biologically Available Carbon** 12

#### mg CO2-C/g OM/day Moderate-selected use

Biologically Available Carbon (BAC) is a measurement of the rate at which CO2 is released under optimized moisture, temperature. porosity, nutrients, pH and microbial conditions. If both the RR and the BAC test values are close to the same value, the pile is optimized for composting. If both values are high the compost pile just needs more time. If both values are low the compost has stabilized and should be moved to curing. BAC test values that are higher than RR indicate that the compost pile has stalled. This could be due to anaerobic conditions, lack of available nitrogen due to excessive air converting ammonia to the unavailable nitrate form, lack of nitrogen or other nutrients due to poor choice of feedstock, pH value out of range, or microbes rendered non-active. Is Your Compost Mature?

AmmoniaN:NitrateN ratio 110 immature

		C
		tł
Ammonia N p	opm	s
1800	immature	ir
Nitrate N ppn	n	a
16	immature	а
pH value		F
5.72	immature	c

Composting to stabilize carbon can occur at such a rapid rate that sometimes phytotoxins remain in he compost and must be neutralized before using in high concentrations or in high-end uses. This step is called curing. Typically ammonia is in excess with the break-down of organic materials resulting n an increase in pH. This combination results in a loss of volatile ammonia (it smells). Once this toxic ammonia has been reduced and the pH drops, the microbes convert the ammonia to nitrates. A low ammonia + high nitrate score is indicative of a mature compost, however there are many exceptions. For example, a compost with a low pH (<7) will retain ammonia, while a compost with high lime content can lose ammonia before the organic fraction becomes stable. Composts must first be stable before curing indicators apply.

#### **Cucumber Bioassay**

100.0 Percent

Cucumbers are chosen for this test because they are salt tolerant and very sensitive to ammonia and organic acid toxicity. Therefore, we can germinate seeds in high concentrations of compost to

measure phytotoxic effects without soluble salts being the limiting factor. Values above 80% for both percent emergence and vigor are indicative of a well-cured compost. Exceptions include very high salts that affect the cucumbers, excessive concentrations of nitrates and other nutrients that will be in range when formulated to make a growing media. In addition to testing a 1:1 compost: vermiculite blend, we also test a diluted 1:3 blend to indicate a more sensitive toxicity level,

#### Is Your Compost Safe Regarding Health?

### Fecal Coliform

< 1000 Fecal coliforms can survive in both aerobic and anaerobic conditions and is common in all initial / g dry wt. compost piles. Most human pathogens occur from fecal matter and all fecal matter is loaded in fecal coliforms. Therefore fecal coliforms are used as an indicator to determine if the chosen method for pathogen reduction (heat for compost) has met the requirements of sufficient temperature, time and mixing. If the fecal coliforms are reduced to below 1000 per gram dry wt. it is assumed all others pathogens are eliminated. Potential problems are that fecal coliform can regrow during the curing phase or during shipping. This is because the conditions are now more favorable for growth than during the composting process. Salmonella Bacteria

Less than 3 3 / 4g dry wt. Salmonella is not only another indicator organism but also a toxic microbe. It has been used in the case of biosolids industry to determine adequate pathogen reduction.

#### Metals

The ten heavy metals listed in the EPA 503 regulations are chosen to determine if compost Pass can be applied to ag land and handled without toxic effects. Most high concentrations of heavy metals are derived from woodwaste feedstock such as chrome-arsenic treated or lead painted demolition wood. Biosolids are rarely a problem. Does Your Compost Provide Nutrients or Organic Matter?

# Nutrients (N+P2O5+K2O)

Average nutrient content 3.2

This value is the sum of the primary nutrients Nitrogen, Phosphorus and Potassium. Reported units are consistent with those found on fertilizer formulations. A sum greater than 5 is indicative of a compost with high nutrient content, and best used to supply nutrients to a receiving soil. A sum below 2 indicates low nutrient content, and is best-used to improve soil structure via the addition of organic matter. Most compost falls between 2 and 5.

Page two of three

Account No.:		Date Received	14 Sep. 12	
2090380 - 2/2	- 6908	Sample i.d.	Zone 1 Cont	rol
Group:	Sep.12 B No. 28	Sample I.d. No.	2/2	2090380

AgIndex (Nutrients/Na+CI)

Page three of three

8 Average nutrient ratio Composts with low AgIndex values have high concentrations of sodium and/or chloride compared to nutrients. Repeated use of a compost with a low AgIndex (< 2) may result in sodium and/or chloride acting as the limiting factor compared to nutrients, governing application rates. These composts may be used on well-draining soils and/or with salt-tolerant plants. Additional nutrients form another source may be needed if the application rate is limited by sodium or chloride. If the AgIndex is above 10, nutrients optimal for plant growth will be available without concern of sodium and/or chloride toxicity. Composts with an AgIndex of above 10 are good for increasing nutrient levels for all soils. Most composts score between 2 and 10. Concentrations of nutrients, sodium, and chloride in the receiving soil should be considered when determining compost application rates. The AgIndex is a product of feedstock quality. Feedstock from dairy manure, marine waste, industrial wastes, and halophytic plants are likely to produce a finished compost with a low AgIndex.

# Plant Available Nitrogen (Ibs/ton)

8 Average N Provider Plant Available Nitrogen (PAN) is calculated by estimating the release rate of Nitrogen from the organic fraction of the compost. This estimate is based on information gathered from the BAC test and measured ammonia and nitrate values. Despite the PAN value of the compost, additional sources of Nitrogen may be needed during he growing season to offset the Nitrogen demand of the microbes present in the compost. With ample nutrients these microbes can further breakdown organic matter in the compost and release bound Nitrogen. Nitrogen demand based on a high C/N ratio is not considered in the PAN calculation because additional Nitrogen should always be supplemented to the receiving soil when composts with a high C/N ratio are applied. **C/N Ratio** 

18 Indicates immaturity As a guiding principal, a C/N ratio below 14 indicates maturity and above 14 indicates immaturity, however, there are many exceptions. Large woodchips (>6.3mm), bark, and redwood are slow to breakdown and therefore can result in a relatively stable product while the C/N ratio value is high. Additionally, some composts with chicken manure and/or green grass feedstocks can start with a C/N ratio below 15 and are very unstable. A C/N ratio below 10 supplies Nitrogen, while a ratio above 20 can deplete Nitrogen from the soil. The rate at which Nitrogen will be released or used by the microbes is indicated by the respiration rate (BAC). If the respiration rate is too high the transfer of Nitrogen will not be controlable. Soluble Nutrients & Salts (EC5 w/w dw - mmhos/cm)

11 High salts This value refers to all soluble ions including nutrients, sodium, chloride and some soluble organic compounds. The concentration of salts will change due to the release of salts from the organic matter as it degrades, volatilization of ammonia, decomposition of soluble organics, and conversion of molecular structure. High salts + high AgIndex is indicative of a compost high in readily available nutrients. The application rate of these composts should be limited by the optimum nutrient value based on soil analysis of the receiving soil. High Salts + low AgIndex is indicative of a compost low in nutrients with high concentrations of sodium and/or chloride. Limit the application rate according to the toxicity level of thesodium and/or chloride. Low salts indicates that the compost can be applied without risking salt toxicity, is likely a good source of organic matter, and that nutrients will release slowly over time.

#### Lime Content (lbs. per ton)

0 Low lime content Compost high in lime or carbonates are often those produced from chicken manure (layers) ash materials, and lime products. These are excellent products to use on a receiving soil where lime has been recommended by soil analysis to raise the pH. Composts with a high lime content should be closely considered for pH requirements when formulating potting mixes.

#### **Physical Properties**

#### Percent Ash

55.1 Average ash content Ash is the non-organic fraction of a compost. Most composts contain approximately 50% ash (dry weight basis). Compost can be high in ash content for many reasons including: excess minerilzation(old compost), contamination with soil base material during turning, poor quality feedstock, and soil or mineral products added. Finding the source and reducing high ash content is often the fastest means to increasing nutrient quality of a compost.

#### Particle Size % > 6.3 MM (0.25")

6.1 May restrict use Large particles may restrict use for potting soils, golf course topdressings, seed-starter mixes, and where a fine size distribution is required. Composts with large particles can still be used as excellent additions to field soils, shrub mixes and mulches.

#### Particle Size Distribution

Each size fraction is measured by weight, volume and bulk density. These results are particularly relevent with decisions to screen or not, and if screening, which size screen to use. The bulk density indicates if the fraction screened is made of light weight organic material or heavy mineral material. Removing large mineral material can greatly improve compost quality by increasing nutrient and organic concentrations.

Appendix:		
	Estimated available nutrients for use wher	n calculating application rates
Plant Available Nitrogen (PAN) calculations:		lbs/ton (As Rcvd.)
PAN = (X * (organic N)) + ((NH4-N) + (NO3-N))		
X value = If BAC < 2 then X = 0.1	Plant Available Nitrogen (PAN)	8.4
If BAC =2.1 to 5 then X = 0.2	Ammonia (NH4-N)	2.20
If BAC =5.1 to 10 then X = 0.3	Nitrate (NO3-N)	0.02
If BAC > 10 then $X = 0.4$	Available Phosphorus (P2O5*0.64)	4.1
Note: If C/N ratio > 15 additional N should be applied.	Available Potassium (K2O)	14.2



Seal of Testing Assurance TCCBI - Harvest Power John Jones 24487 Rd. 140 Tulare CA 93274 Product Identification Compost

Date Sampled/Received: 12 Sep. 12 / 14 Sep. 12

# **COMPOST TECHNICAL DATA SHEET**

Zone 2

LABORATORY: Soil Control Lab	; 42 Hangar Way; Watsonville, CA 9507	76 <i>tel:</i> 831.724.5422	fax: 831.724.3188
Compost Parameters	Reported as (units of measure)	Test Results	Test Results
Plant Nutrients:	%, weight basis	Not reported	Not reported
Moisture Content	%, wet weight basis	37.8	
Organic Matter Content	%, dry weight basis	46.5	
рН	units	6.20	
Soluble Salts (electrical conductivity EC 5)	dS/m (mmhos/cm)	7.4	
Particle Size or Sieve Size	maxium aggregate size, inches	0.64	
Stability Indicator (respirometry	ı)	-	Stability Rating:
CO <sub>2</sub> Evolution	mg CO <sub>2</sub> -C/g OM/day	7.9	Moderately Un-Stable
	mg CO <sub>2</sub> -C/g TS/day	3.7	
Maturity Indicator (bioassay)			
Percent Emergence	average % of control	100.0	
Relative Seedling Vigor	average % of control	91.7	
Select Pathogens	PASS/FAIL: per US EPA Class A standard, 40 CFR § 503.32(a)	Pass	Fecal coliform
		Pass	Salmonella
Trace Metals	PASS/FAIL: per US EPA Class A		As,Cd,Cr,Cu,Pb,Hg
	standard, 40 CFR § 503.13, Tables 1 and 3.	Pass	Mo,Ni,Se,Zn

Laboratory Group:	Sep.12 B	Laboratory Number: 2090381-1/2
Analyst: Assaf Sadeh		
		www.compostlab.com
	/	



Seal of Testing Assurance

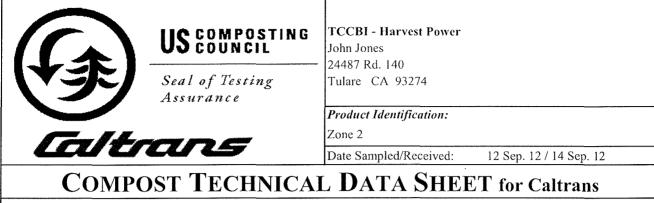
**TCCBI - Harvest Power** John Jones 24487 Rd. 140 Tulare CA 93274 Product Identification Compost

Zone 2

# **COMPOST TECHNICAL DATA SHEET**

LABORATORY: Soil Control Lab	; 42 Hangar Way; Watsonville, CA 9507	6 <i>tel:</i> 831.724.5422	fax: 831.724.3188
Compost Parameters	Reported as (units of measure)	Test Results	Test Results
Plant Nutrients:	%, weight basis	%, wet weight basis	%, dry weight basis
Nitrogen	Total N	0.99	1.6
Phosphorus	P <sub>2</sub> O <sub>5</sub>	0.39	0.64
Potassium	K <sub>2</sub> O	0.89	1.4
Calcium	Са	1.3	2.1
Magnesium	Mg	0.30	0.48
Moisture Content	%, wet weight basis	37.8	
Organic Matter Content	%, dry weight basis	46.5	98 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199 fearrann an 199
рН	units	6.20	
Soluble Salts (electrical conductivity EC <sub>5</sub> )	dS/m (mmhos/cm)	7.4	анал
Particle Size or Sieve Size	% under 9.5 mm, dw basis	94.7	
Stability Indicator (respirometry	<i>,</i> )	<u> </u>	Stability Rating:
CO <sub>2</sub> Evolution	mg CO <sub>2</sub> -C/g OM/day	7.9	Moderately I In Stable
	mg CO <sub>2</sub> -C/g TS/day	3.7	Moderatery On-Stable
Maturity Indicator (bioassay)			
Percent Emergence	average % of control	100.0	
Relative Seedling Vigor	average % of control	91.7	
Select Pathogens	PASS/FAIL: per US EPA Class A standard, 40 CFR § 503.32(a)	Pass	Fecal coliform
		Pass	Salmonella
Trace Metals	PASS/FAIL: per US EPA Class A		As, Cd, Cr, Cu, Pb, Hg
	standard, 40 CFR § 503.13, Tables 1 and 3.	Pass	2.1 0.48 Stability Rating: Moderately Un-Stable Fecal coliform Salmonella

Laboratory Group:	Sep.12 B	Laboratory Number: 2090381-1/2
Analyst: Assaf Sadeh		unum compositor com
		www.compostlab.com



LABORATORY: Soil Control Lab, 42 Hangar Way, Watsonville, CA 95076 tel (831) 724-5422 fax (831) 724-3188 www.compostlab.com

Compost Parameters	Test Results	Reported as (units of measure)	TMECC Test	
			Method	
рН	6.20	Unitless	04.11-A 1:5 Slurry pH	
Soluble Salts (electrical conductivity)	7.4	dS/m (mmhos/cm)	04.10-A 1:5 Slurry Method Mass Basis	
Moisture content	37.8	%, wet weight basis	03.09-A - Total Solids and Moisture	
Organic Matter Content	46.5	%, dry weight basis	05.07-A Loss-on-Ignition Organic Matter Method (LOI)	
Maturity Indicator (bioassay) Percent Emergence Relative Seedling Vigor	100.0 91.7	average % of control average % of control	05.05-A Germination and vigor	
Stability Indicator	7.9	mg CO2-C/g OM/day	05.08-B Carbon Dioxide Evoultion Rate	
Particle Size	94.7	%, dry weight passing through 9.5 mm	02.02-B Sample Sieving for Aggregate Size Classification	
Pathogens	Pass	PASS/FAIL: Per US EPA Class A standard. 40 CFR 503.32(a)	07.01-B Fecal coliforms	
Pathogens	Pass	PASS/FAIL: Per US EPA Class A standard, 40 CFR 503.32(a)	07.02 Samonella	
Physical Contaminants	None Detected	%. dry weight basis	02.02-C - Man-Made Inerts Total content	
Physical Contaminants	None Detected	%, dry weight basis	02.02-C - Man-Made Inerts Sharps content	
Heavy Metals Content	Pass	PASS/FAIL: Per US EPA Class A 40 CFR 503.13, tables 1 and 3.	04.06-Heavy Metals standard, and Hazardous Elements	

Participants in the US Composting Council's Seal of Testing Assurance Program have shown the commitment to test their compost products on a prescribed basis and provide this data, along with compost end use instructions, as a means to better serve the needs of their compost customers.

For additional information pertaining to compost use, the specific compost parameters tested for within the Seal of Testing assurance Program, or the program in general, log on to the US Composting Council's TMECC web-site at http://www.tmecc.org.

This compost product has been sampled and tested as required by the Seal of Testing assurance Program on the United States Composting Council (USCC), using certain methods from the "Test Methods for the Examination of Compost and Composting" manual. Test results are available upon request by contacting the compost producer (address at top of page). The USCC makes no warranties regarding this product or its content, quality. or suitability for any particular use.

Laboratory Group: Analyst: Assaf Sadeh Sep.12 B

Laboratory Number:

2090381-1/2

www.compostlab.com

ANALYTICAL CHEMISTS and BACTERIOLOGISTS Approved by State of Celifornia

TCCBI - Harvest Power

24487 Rd. 140 Tulare, CA 93274 Attn: John Jones TEL: 831-724-5422 FAX: 831-724-3188 www.compostlab.com

# SOIL CONTROL LAB

Account #: 2090381-1/2-6908 Group: Sep.12 B #29 Reporting Date: September 26, 2012

Date Received: 14 Sep. 12 Sample Identification: Zone 2 Sample ID #: 2090381 - 1/2 Nutrients Dry wt. As Rcvd. units **Stability Indicator:** Biologically Total Nitrogen: 1.6 0.99% **CO2** Evolution Respirometerv Available C Ammonia (NH₄-N): 1200 760 mg/kg mg CO<sub>2</sub>-C/g OM/day 7.9 9.5 Nitrate (NO<sub>3</sub>-N): 38 24 mg/kg mg CO<sub>2</sub>-C/g TS/day 3.7 4.4 Org. Nitrogen (Org.-N): 0.93 % Stability Rating 1.5 unstable moderately unstable Phosphorus (as  $P_2O_5$ ): 0.39 % 0.63 mg/kg Phosphorus (P): 2800 1700 Potassium (as K<sub>2</sub>O): 0.89 Maturity Indicator: Cucumber Bioassay 1.4 % Potassium (K): 12000 7400 mg/kg Compost:Vermiculite(v:v) 1:1 1:3Calcium (Ca): 2.1 1.3 % Emergence (%) 100 100 % Seedling Vigor (%) Magnesium (Mg): 0.48 0.30 92 93 Sulfate (SO<sub>4</sub>-S): 1000 620 mg/kg Description of Plants mushroom mushroom mg/kg Boron (Total B): 34 21 % Moisture: 0 37.8 0.080 % Sodium (Na): 0.13 Pathogens Results Units Rating % Fecal Coliform < 2.0 Chloride (CI): 0.26 0.16 MPN/a pass pH Value: NA 6.20 unit Salmonella < 3 MPN/4a pass Bulk Density : 22 36 lb/cu ft Date Tested: 14 Sep. 12 Carbonates (CaCO<sub>3</sub>): lb/ton < 0.1 < 0.1 Conductivity (EC5): 7.4 NA mmhos/cm 46.5 28.9 % Inerts Organic Matter: % by weight 27.0 % Plastic Organic Carbon: 17.0 < 0.5 % Ash: 53.5 33.2 Glass < 0.5 C/N Ratio 17 17 ratio Metal < 0.5 AgIndex 9 9 ratio Sharps ND Metals Dry wt. **EPA** Limit Size & Volume Distribution units % by weight % by volume Aluminum (AI) 6300 mg/kg MM BD g/cc 41 > 50 Arsenic (As): 2.8 mg/kg 0.0 0.0 0.00 Cadmium (Cd): 39 25 to 50 0.0 0.0 < 1.0 mg/kg 0.00 16 to 25 0.0 Chromium (Cr): 14 1200 mg/kg 0.0 0.00 9.5 to 16 5.3 Cobalt (Co) 3.7 mg/kg 3.1 0.66 Copper (Cu): 1500 mg/kg 6.3 to 9.5 9.8 10.8 61 0.34 Iron (Fe): 9300 mg/kg 4.0 to 6.3 8.8 10.8 0.31 Lead (Pb): 300 20 mg/kg 2.0 to 4.0 14.4 0.25 21.5 Manganese (Mn): 230 mg/kg < 2.0 61.6 0.43 53.8 mg/kg Bulk Density Description: <.35 Light Materials, 17 Mercury (Hg): < 1.0 Molybdenum (Mo): 75 mg/kg .35-.60 medium weight materials, >.60 Heavy Materials 2.7 Nickel (Ni): 420 mg/kg Analyst: Assaf Sadeh 12 Selenium (Se): < 1.0 36 mg/kg 170 2800 mg/kg Zinc (Zn):

\*Sample was received and handled in accordance with TMECC procedures.

Account No	u:	Date Received	14 Sep. 12	2
2090381 - 1	/2 - 6908	Sample i.d.	Zone 2	
Group:	Sep.12 B No. 29	Sample I.d. No.	1/2	2090381

# Is Your Compost Stable?

Page one of three

Respiration Rate	Biodegradation Rate of Your Pile	
7.9 mg CO2-C/	*****	٦
g OM/day	Stable >  <moderately unstable=""> &lt; Unstable &gt; &lt; High For Mulch</moderately>	
Biologically Available Carb	n (BAC) Optimum Degradation Rate	
9.5 mg CO2-C/	+++++++++++++++++++++++++++++++++++++++	
g OM/day	< Stable >  <moderately unstable=""> &lt; Unstable &gt; &lt; High For Mulch</moderately>	

### Is Your Compost Mature?

AmmoniaN/NitrateN ratio					
32 Ratio	+++++++++++++++++++++++++++++++++++++++	+++++ <b>+</b> ++++++++++++++++++++++++++++++	• <b>++++++</b> ++++++++++++++++++++++++++++++	****	****
	VeryMature>/<	Mature		> < Immature	
Ammonia N ppm					
1200 mg/kg	+++++++++++++++++++++++++++++++++++++++	+++++++++++++++++++++++++++++++++++++++	+++++++++++++++++++++++++++++++++++++++	<del>*************************</del>	++++++++++
dry wt.	VeryMature> <	Mature	><	Immature	
Nitrate N ppm					
38 mg/kg	*****	****			
dry wt.	< Immature		> < Mature		
pH value					
6.20 units	+++++++++++++++++++++++++++++++++++++++	*****	+++++++++++++++++++++++++++++++++++++++		
	< Immature		> < Mati	ure > < Immature	
Cucumber Emergence					
100.0 percent	*++*	****	+++++++++++++++++++++++++++++++++++++++	*******	++++++
	< Immature			> < Mature	

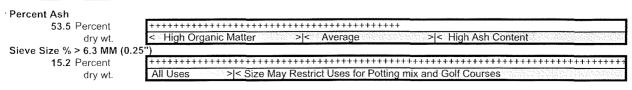
### Is Your Compost Safe Regarding Health?

Fecal Coliform	
< 1000 MPN/g dry wt.	+++++
÷ •	< Safe > < High Fecal Coliform
Salmonella	
Less than 3 /4g dry wt.	+++++
5	<safe (none="" detected)=""> &lt; High Salmonella Count(&gt; 3 per 4 grams)</safe>
Metals US EPA 503	
Pass dry wt.	+++++++
	<all metals="" pass=""> One or more Metals Fail</all>

#### Does Your Compost Provide Nutrients or Organic Matter?

Nutrients (N+P2O5+K2O)	
3.7 Percent	+++++++++++++++++++++++++++++++++++++++
dry wt.	<low> &lt; Average &gt; &lt; High Nutrient Content</low>
AgIndex (Nutrients / Sodiu	m and Chloride Salts) ((N+P2O5+K2O) / (Na + CI))
9 Ratio	+++++++++
	Na & Cl >  < Nutrient and Sodium and Chloride Provider >  < Nutrient Provider
Plant Available Nitrogen (P	AN) Estimated release for first season
8 lbs/ton	+++++++++++++++++++++++++++++++++++++++
wet wt.	Low Nitrogen Provider> < Average Nitrogen Provider >  <high nitrogen="" provider<="" td=""></high>
C/N Ratio	
17 Ratio	+++++++++++++++++++++++++++++++++++++++
	< Nitrogen Release > < N-Neutral > < N-Demand> < High Nitrogen Demand
Soluble Available Nutrients	s & Salts (EC5 w/w dw)
7.4 mmhos/cm	+++++++++++++++++++++++++++++++++++++++
dry wt.	SloRelease> < Average Nutrient Release Rate >  <high available="" nutrients<="" td=""></high>
Lime Content (CaCO3)	
0 Lbs/ton	+
dry wt.	< Low > < Average > < High Lime Content (as CaCO3)

### What are the physical properties of your compost?



Account No	.:	Date Received	14 Sep. 13	2
2090381 - 1	/2 - 6908	Sample i.d.	Zone 2	
Group:	Sep.12 B No. 29	Sample I.d. No.	1/2	2090381

Is Your Compost Stable?

#### Respiration Rate

Page two of three

7.9 Moderate-selected use mg CO2-C/g OM/day

The respiration rate is a measurement of the biodegradation rate of the organic matter in the sample (as received). The respiration rate is determined by measuring the rate at which CO2 is released under optimized moisture and temperature conditions.

#### Biologically Available Carbon 9.5 Moderate-selected use

mg CO2-C/g OM/day

Biologically Available Carbon (BAC) is a measurement of the rate at which CO2 is released under optimized moisture, temperature, porosity, nutrients, pH and microbial conditions. If both the RR and the BAC test values are close to the same value, the pile is optimized for composting. If both values are high the compost pile just needs more time. If both values are low the compost has stabilized and should be moved to curing. BAC test values that are higher than RR indicate that the compost pile has stalled. This could be due to anaerobic conditions, lack of available nitrogen due to excessive air converting ammonia to the unavailable nitrate form, lack of nitrogen or other nutrients due to poor choice of feedstock, pH value out of range, or microbes rendered non-active. *Is Your Compost Mature?* 

# AmmoniaN:NitrateN ratio

32 immature

		C
		th
Ammonia N	ppm	st
1200	immature	in
Nitrate N pp	m	ar
38	immature	ar
pH value		Fo
6.20	immature	ca
		cı

Composting to stabilize carbon can occur at such a rapid rate that sometimes phytotoxins remain in the compost and must be neutralized before using in high concentrations or in high-end uses. This is the compost and must be neutralized before using in high concentrations or in high-end uses. This is called curing. Typically ammonia is in excess with the break-down of organic materials resulting in an increase in pH. This combination results in a loss of volatile ammonia (it smells). Once this toxic immonia has been reduced and the pH drops, the microbes convert the ammonia to nitrates. A low immonia + high nitrate score is indicative of a mature compost, however there are many exceptions. For example, a compost with a low pH (<7) will retain ammonia, while a compost with high lime content can lose ammonia before the organic fraction becomes stable. Composts must first be stable before using indicators apply.

#### Cucumber Bioassay

100.0 Percent

Cucumbers are chosen for this test because they are salt tolerant and very sensitive to ammonia and organic acid toxicity. Therefore, we can germinate seeds in high concentrations of compost to

measure phytotoxic effects without soluble salts being the limiting factor. Values above 80% for both percent emergence and vigor are indicative of a well-cured compost. Exceptions include very high salts that affect the cucumbers, excessive concentrations of nitrates and other nutrients that will be in range when formulated to make a growing media. In addition to testing a 1:1 compost: vermiculite blend, we also test a diluted 1:3 blend to indicate a more sensitive toxicity level.

### Is Your Compost Safe Regarding Health?

**Fecal Coliform** 

< 1000 / g dry wt. Fecal coliforms can survive in both aerobic and anaerobic conditions and is common in all initial compost piles. Most human pathogens occur from fecal matter and all fecal matter is loaded in fecal coliforms. Therefore fecal coliforms are used as an indicator to determine if the chosen method for pathogen reduction (heat for compost) has met the requirements of sufficient temperature, time and mixing. If the fecal coliforms are reduced to below 1000 per gram dry wt. it is assumed all others pathogens are eliminated. Potential problems are that fecal coliform can regrow during the curing phase or during shipping. This is because the conditions are now more favorable for growth than during the composting process.</p>

Less than 3 3 / 4g dry wt. Salmonella is not only another indicator organism but also a toxic microbe. It has been used in the case of biosolids industry to determine adequate pathogen reduction.

### Metals

Pass The ten heavy metals listed in the EPA 503 regulations are chosen to determine if compost can be applied to ag land and handled without toxic effects. Most high concentrations of heavy metals are derived from woodwaste feedstock such as chrome-arsenic treated or lead painted demolition wood. Biosolids are rarely a problem. *Does Your Compost Provide Nutrients or Organic Matter?* 

### Nutrients (N+P2O5+K2O)

3.7 Average nutrient content

This value is the sum of the primary nutrients Nitrogen, Phosphorus and Potassium. Reported units are consistent with those found on fertilizer formulations. A sum greater than 5 is indicative of a compost with high nutrient content, and best used to supply nutrients to a receiving soil. A sum below 2 indicates low nutrient content, and is best-used to improve soil structure via the addition of organic matter. Most compost falls between 2 and 5.

Account No.:		Date Received	14 Sep. 12	
2090381 - 1/2	- 6908	Sample i.d.	Zone 2	
Group:	Sep.12 B No. 29	Sample I.d. No.	1/2	2090381

AgIndex (Nutrients/Na+Cl)

Page three of three

9 Average nutrient ratio Composts with low AgIndex values have high concentrations of sodium and/or chloride compared to nutrients. Repeated use of a compost with a low AgIndex (< 2) may result in sodium and/or chloride acting as the limiting factor compared to nutrients, governing application rates. These composts may be used on well-draining soils and/or with salt-tolerant plants. Additional nutrients form another source may be needed if the application rate is limited by sodium or chloride. If the AgIndex is above 10, nutrients optimal for plant growth will be available without concern of sodium and/or chloride toxicity. Composts with an AgIndex of above 10 are good for increasing nutrient levels for all soils. Most composts score between 2 and 10. Concentrations of nutrients, sodium, and chloride in the receiving soil should be considered when determining compost application rates. The AgIndex is a product of feedstock quality. Feedstock from dairy manure, marine waste, industrial wastes, and halophytic plants are likely to produce a finished compost with a low AgIndex.

#### Plant Available Nitrogen (lbs/ton)

8 Average N Provider Plant Available Nitrogen (PAN) is calculated by estimating the release rate of Nitrogen from the organic fraction of the compost. This estimate is based on information gathered from the BAC test and measured ammonia and nitrate values. Despite the PAN value of the compost, additional sources of Nitrogen may be needed during he growing season to offset the Nitrogen demand of the microbes present in the compost. With ample nutrients these microbes can further breakdown organic matter in the compost and release bound Nitrogen. Nitrogen demand based on a high C/N ratio is not considered in the PAN calculation because additional Nitrogen should always be supplemented to the receiving soil when composts with a high C/N ratio are applied. C/N Ratio

17 Indicates immaturity As a guiding principal, a C/N ratio below 14 indicates maturity and above 14 indicates immaturity, however, there are many exceptions. Large woodchips (>6.3mm), bark, and redwood are slow to breakdown and therefore can result in a relatively stable product while the C/N ratio value is high. Additionally, some composts with chicken manure and/or green grass feedstocks can start with a C/N ratio below 15 and are very unstable. A C/N ratio below 10 supplies Nitrogen, while a ratio above 20 can deplete Nitrogen from the soil. The rate at which Nitrogen will be released or used by the microbes is indicated by the respiration rate (BAC). If the respiration rate is too high the transfer of Nitrogen will not be controlable. Soluble Nutrients & Salts (EC5 w/w dw - mmhos/cm)

7.4 Average salts This value refers to all soluble ions including nutrients, sodium, chloride and some soluble organic compounds. The concentration of salts will change due to the release of salts from the organic matter as it degrades, volatilization of ammonia, decomposition of soluble organics, and conversion of molecular structure. High salts + high AgIndex is indicative of a compost high in readily available nutrients. The application rate of these composts should be limited by the optimum nutrient value based on soil analysis of the receiving soil. High Salts + low AgIndex is indicative of a compost low in nutrients with high concentrations of sodium and/or chloride. Limit the application rate according to the toxicity level of thesodium and/or chloride. Low salts indicates that the compost can be applied without risking salt toxicity, is likely a good source of organic matter, and that nutrients will release slowly over time.

#### Lime Content (lbs. per ton)

0 Low lime content Compost high in lime or carbonates are often those produced from chicken manure (layers) ash materials, and lime products. These are excellent products to use on a receiving soil where lime has been recommended by soil analysis to raise the pH. Composts with a high lime content should be closely considered for pH requirements when formulating potting mixes.

#### Physical Properties

Percent Ash

53.5 Average ash content Ash is the non-organic fraction of a compost. Most composts contain approximately 50% ash (dry weight basis). Compost can be high in ash content for many reasons including: excess minerilzation(old compost), contamination with soil base material during turning, poor quality feedstock, and soil or mineral products added. Finding the source and reducing high ash content is often the fastest means to increasing nutrient quality of a compost.

#### Particle Size % > 6.3 MM (0.25")

15.2 May restrict use Large particles may restrict use for potting soils, golf course topdressings, seed-starter mixes, and where a fine size distribution is required. Composts with large particles can still be used as excellent additions to field soils, shrub mixes and mulches.

#### Particle Size Distribution

Each size fraction is measured by weight, volume and bulk density. These results are particularly relevent with decisions to screen or not, and if screening, which size screen to use. The bulk density indicates if the fraction screened is made of light weight organic material or heavy mineral material. Removing large mineral material can greatly improve compost quality by increasing nutrient and organic concentrations.

Appenaix:		
	Estimated available nutrients for use when calculating application rates	
Plant Available Nitrogen (PAN) calculations:		lbs/ton (As Rcvd.)
PAN = (X * (organic N)) + ((NH4-N) + (NO3-N))		· · · · · ·
X value = If BAC < 2 then X = 0.1	Plant Available Nitrogen (PAN)	7.7
If BAC =2.1 to 5 then X = 0.2	Ammonia (NH4-N)	1.52
If BAC =5.1 to 10 then X = 0.3	Nitrate (NO3-N)	0.05
If BAC > 10 then $X = 0.4$	Available Phosphorus (P2O5*0.64)	4.9
Note: If C/N ratio > 15 additional N should be applied.	Available Potassium (K2O)	17.8



Seal of Testing Assurance TCCBI - Harvest Power John Jones 24487 Rd. 140 Tulare CA 93274

Date Sampled/Received: 12 Sep. 12 / 14 Sep. 12

*Product Identification* Compost Zone 2 Control

# **COMPOST TECHNICAL DATA SHEET**

LABORATORY: Soil Control Lab	; 42 Hangar Way; Watsonville, CA 9507	76 <i>tel:</i> 831.724.5422	fax: 831.724.3188	
Compost Parameters Reported as (units of mea		Test Results	Test Results	
Plant Nutrients:	%, weight basis	Not reported Not reported		
Moisture Content	%, wet weight basis	39.8		
Organic Matter Content	%, dry weight basis	42.6		
pH	units	6.32		
Soluble Salts (electrical conductivity EC <sub>3</sub> )	dS/m (minhos/cm)	9.7		
Particle Size or Sieve Size	maxium aggregate size, inches	0.64		
Stability Indicator (respirometry	;)		Stability Rating:	
CO <sub>2</sub> Evolution	mg CO <sub>2</sub> -C/g OM/day	10 Un-Stable		
	mg CO <sub>2</sub> -C/g TS/day	4.3		
Maturity Indicator (bioassay)				
Percent Emergence	average % of control	100.0		
Relative Seedling Vigor	average % of control	91.7		
Select Pathogens	PASS/FAIL: per US EPA Class A standard, 40 CFR § 503.32(a) Pass		Fecal coliform	
	Pass Sal		Salmonella	
Trace Metals	PASS/FAIL: per US EPA Class A		As, Cd, Cr, Cu, Pb, Hg	
standard, 40 CFR § 503.13, Tables 1 and 3.		Pass	Mo,Ni,Se,Zn	

Laboratory Group:	Sep.12 B	Laboratory Number: 2090381-2/2
Analyst: Assaf Sadeh		
1		www.compostlab.com



Seal of Testing Assurance

Date Sampled/Received: 12 Sep. 12 / 14 Sep. 12

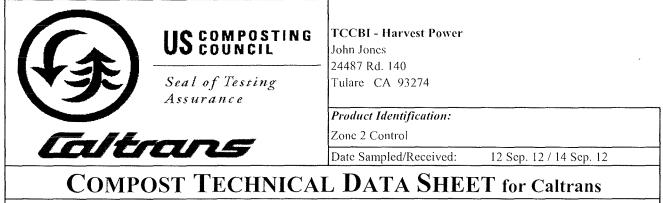
TCCBI - Harvest Power John Jones 24487 Rd. 140 Tulare CA 93274

*Product Identification* Compost Zone 2 Control

# **COMPOST TECHNICAL DATA SHEET**

LABORATORY: Soil Control Lab	; 42 Hangar Way; Watsonville, CA 95076	5 <i>tel:</i> 831.724.5422	fax: 831.724.3188	
Compost Parameters Reported as (units of measure)		Test Results	Test Results	
Plant Nutrients:	%, weight basis	%, wet weight basis	%, dry weight basis	
Nitrogen	Total N	0.80	1.3	
Phosphorus	P <sub>2</sub> O <sub>5</sub>	0.34	0.55	
Potassium	K <sub>2</sub> O	0.79	1.3	
Calcium	Са	1.6	2.6	
Magnesium	Mg	0.26	0.43	
Moisture Content	%, wet weight basis	39.8		
Organic Matter Content	%, dry weight basis	42.6		
рН	units	6.32		
Soluble Salts (electrical conductivity EC 3)	dS/m (mmhos/cm)	9.7		
Particle Size or Sieve Size	% under 9.5 mm, dw basis	99.1		
Stability Indicator (respirometry	γ)	· · · · · · · · · · · · · · · · · · ·	Stability Rating:	
CO <sub>2</sub> Evolution	mg CO <sub>2</sub> -C/g OM/day	10	Un-Stable	
	mg CO <sub>2</sub> -C/g TS/day	4.3		
Maturity Indicator (bioassay)		······································		
Percent Emergence	average % of control	100.0		
Relative Seedling Vigor	average % of control	91.7		
Select Pathogens	PASS/FAIL: per US EPA Class A standard, 40 CFR § 503.32(a)	Pass	Fecal coliform	
		Pass	Salmonella	
Trace Metals PASS/FAIL: per US EPA Class A standard, 40 CFR § 503.13, Tables 1 and 3.		Pass	As, Cd, Cr, Cu, Pb, Hg Mo, Ni, Se, Zn	

Laboratory Group:	Sep.12 B	Laboratory Number: 2090381-2/2
Analyst: Assaf Sadeh		www.compostlab.com



LABORATORY: Soil Control Lab, 42 Hangar Way, Watsonville, CA 95076 tel (831) 724-5422 fax (831) 724-3188 www.compostlab.com

Compost Parameters	Test Results	Reported as (units of measure)	TMECC Test
			Method
pH	6.32	Unitless	04.11-A 1:5 Slurry pH
Soluble Salts (electrical conductivity)	9.7	dS/m (mmhos/cm)	04.10-A 1:5 Slurry Method Mass Basis
Moisture content	39.8	%, wet weight basis	03.09-A - Total Solids and Moisture
Organic Matter Content	42.6	%, dry weight basis	05.07-A Loss-on-Ignition Organic Matter Method (LOI)
Maturity Indicator (bioassay) Percent Emergence Relative Seedling Vigor	100.0 91.7	average % of control average % of control	05.05-A Germination and vigor
Stability Indicator	10	mg CO2-C/g OM/day	05.08-B Carbon Dioxide Evoultion Rate
Particle Size	ticle Size 99.1 %, dry weight passing 9.5 mm		02.02-B Sample Sieving for Aggregate Size Classification
Pathogens	Pass	PASS/FAIL: Pcr US EPA Class A standard, 40 CFR 503.32(a)	07.01-B Fecal coliforms
Pathogens	Pass	PASS/FAIL: Per US EPA Class A standard, 40 CFR 503.32(a)	07.02 Samonella
Physical Contaminants	None Detected	%, dry weight basis	02.02-C - Man-Made Inerts Total content
Physical Contaminants	None Detected	%, dry weight basis	02.02-C - Man-Made Inerts Sharps content
Heavy Metals Content Pass		PASS/FAIL: Per US EPA Class A 40 CFR 503.13, tables 1 and 3.	04.06-Heavy Metals standard, and Hazardous Elements

Participants in the US Composting Council's Seal of Testing Assurance Program have shown the commitment to test their compost products on a prescribed basis and provide this data, along with compost end use instructions, as a means to better serve the needs of their compost customers.

For additional information pertaining to compost use, the specific compost parameters tested for within the Seal of Testing assurance Program, or the program in general, log on to the US Composting Council's TMECC web-site at http://www.tmecc.org.

This compost product has been sampled and tested as required by the Seal of Testing assurance Program on the United States Composting Council (USCC), using certain methods from the "Test Methods for the Examination of Compost and Composting" manual. Test results are available upon request by contacting the compost producer (address at top of page). The USCC makes no warranties regarding this product or its content, quality. or suitability for any particular use.

Laboratory Group:	Sep.12 B	Laboratory Number:	2090381-2/2
Analyst: Assaf Sadeh		 www.compostlab.com	
		 • 	

ANALYTICAL CHEMISTS and BACTERIOLOGISTS Approved by State of California

**TCCBI - Harvest Power** 

24487 Rd. 140 Tulare, CA 93274 Attn: John Jones

TEL: 831-724-5422 FAX: 831-724-3188 www.compostlab.com

# SOIL CONTROL LAB 32 HANGAR WAY WATECHVILLE

CAUFORNIA 25076 USA

Account #: 2090381-2/2-6908 Group: Sep.12 B #30 Reporting Date: September 26, 2012

Date Received: 14 Sep. 12 Zone 2 Control Sample Identification: Sample ID #: 2090381 - 2/2 As Rcvd. **Stability Indicator:** Nutrients Dry wt. units Biologically Total Nitrogen: **CO2** Evolution 1.3 0.80 % Respirometery Available C Ammonia (NH₄-N): 1500 900 mg/kg mg CO<sub>2</sub>-C/g OM/day 10 11 mg CO<sub>2</sub>-C/g TS/day 48 Nitrate (NO<sub>3</sub>-N): 9.6 5.8 mg/kg 4.3 Org. Nitrogen (Org.-N): 1.1 0.66 % Stability Rating unstable unstable Phosphorus (as  $P_2O_5$ ): 0.55 0.33 % 2400 1500 mg/kg Phosphorus (P): Potassium (as K<sub>2</sub>O): 0.79 % Maturity Indicator: Cucumber Bioassay 1.3 Compost:Vermiculite(v:v) Potassium (K): 11000 6600 mg/kg 1:1 1:3 2.6 1.6 % Emergence (%) 100 100 Calcium (Ca): 0.43 0.26 % Seedling Vigor (%) 92 93 Magnesium (Mg); Description of Plants Sulfate (SO<sub>4</sub>-S): 2400 1400 ma/ka healthv healthv 28 17 mg/kg Boron (Total B): 39.8 Moisture: 0 % % Pathogens 0.12 0.069 Results Units Sodium (Na): Rating % Fecal Coliform < 2.0 Chloride (CI): 0.26 0.15 MPN/q pass pH Value: NA 6.32 unit Salmonella < 3 MPN/4g pass 37 lb/cu ft Bulk Density : 22 Date Tested: 14 Sep. 12 Carbonates (CaCO<sub>3</sub>): <0.1 < 0.1 lb/ton NA 9.7 mmhos/cm Conductivity (EC5): Organic Matter: 42.6 25.6 % Inerts % by weight Organic Carbon: 25.0 15.0 % Plastic < 0.5 34.5 % Glass < 0.5 Ash: 57.4 C/N Ratio 19 19 ratio Metal < 0.58 8 Sharps ND AgIndex ratio Metals Dry wt. EPA Limit units Size & Volume Distribution Aluminum (AI) 6200 mg/kg MM % by weight % by volume BD g/cc Arsenic (As): 3.1 41 mg/kg > 50 0.0 0.0 0.00 25 to 50 Cadmium (Cd): < 1.0 39 mg/kg 0.0 0.0 0.00 Chromium (Cr): 15 1200 mg/kg 16 to 25 0.0 0.0 0.00 Cobalt (Co) 3.6 mg/kg 9.5 to 16 0.91.0 0.30 1500 mg/kg 6.3 to 9.5 4.9 5.8 0.29 Copper (Cu): 37 8600 mg/kg 4.0 to 6.3 7.9 9.1 0.30 Iron (Fe): Lead (Pb): 20 300 mg/kg 2.0 to 4.0 16.4 22.0 0.26 Manganese (Mn): 200 mg/kg < 2.0 69.9 62.1 0.39 Mercury (Hg): < 1.0 17 mg/kg Bulk Density Description: <.35 Light Materials. Molybdenum (Mo): 2.4 75 mg/kg .35-.60 medium weight materials, >.60 Heavy Materials 420 mg/kg Analyst: Assaf Sadeh Nickel (Ni): 11 Selenium (Se): < 1.0 36 mg/kg 2800 mg/kg Zinc (Zn): 430

Sample was received and handled in accordance with TMECC procedures.

Account No	). <b>:</b>	Date Received	14 Sep. 12	2
2090381 - 2/2 - 6908		Sample i.d.	Zone 2 Control	
Group:	Sep.12 B No. 30	Sample I.d. No.	2/2	2090381

#### Is Your Compost Stable?

Page one of three

Respiration Rate	Biodegradation Rate of Your Pile
10 mg CO2-C/	+++++
g OM/day	< Stable >  <moderately unstable=""> &lt; Unstable &gt; &lt; High For Mulch</moderately>
Biologically Available Carb	bon (BAC) Optimum Degradation Rate
11 mg CO2-C/	+++++++++++++++++++++++++++++++++++++++
g OM/day	< Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > S

### Is Your Compost Mature?

AmmoniaN/NitrateN ratio						
160 Ratio	+++++++++++++++++++++++++++++++++++++++	·++++++	+++++++++++++++++++++++++++++++++++++++	+++++++++++++++++++++++++++++++++++++++	***+**	**++++++
	VeryMature> <	Mature		><	Immature	
Ammonia N ppm						
1500 mg/kg	+++++++++++++++++++++++++++++++++++++++	·+++++++++++++++++++++++++++++++++++++	+++++++++++++++++++++++++++++++++++++++	+++++++++++++++++++++++++++++++++++++++	*****	++++++++++
dry wt.	VeryMature> <	Mature		> < .Imm	nature	
Nitrate N ppm						
9.6 mg/kg	++++++					
dry wt.	< Immature		> < Mature			
pH value						
6.32 units	++++++++++++++++++++++++++++++++++++++	• <del>•</del> • • + • + • + • + + + + + + + + + + +	* * * * * * * * * * * * * * * * * * *	•++		
	< Immature		>	> < Mature	> < Immature	
Cucumber Emergence						
100.0 percent	+++++++++++++++++++++++++++++++++++++++	*****	+++++++++++++++++++++++++++++++++++++++	****	+++++++++++++++++++++++++++++++++++++++	++++++++
	< Immature				> < Mature	

### Is Your Compost Safe Regarding Health?

Fecal Coliform	
< 1000 MPN/g dry wt.	+++++
	< Safe > < High Fecal Coliform
Salmonella	
Less than 3 /4g dry wt.	+++++
	Safe (none detected) > < High Salmonella Count(> 3 per 4 grams)
Metals US EPA 503	
Pass dry wt.	+++++
-	<all metals="" pass=""> &lt; One or more Metals Fail</all>

### Does Your Compost Provide Nutrients or Organic Matter?

Nutrients (N+P2O5+K2O)			
3.2 Percent	++++++++++++++++++++++++++++++++++++++	+++	
dry wt.	<low> &lt; Average</low>	>I< High Nutrient Content	
AgIndex (Nutrients / Sodium	and Chloride Salts)	((N+P2O5+K2O) / (Na + Cl))	
8 Ratio	++++++++++++++++++++++++++++++++++++++	+++++++++++++++++++++++++++++++++++++++	
	Na & Cl > < Nutrient and S	Sodium and Chloride Provider > < Nutrient Provider	
Plant Available Nitrogen (PA	N) Estimated relea	ase for first season	
8 lbs/ton	++++++++++++++++++++++++++++++++++++++	****	
wet wt.	Low Nitrogen Provider> <	Average Nitrogen Provider >  <high nitrogen="" provider<="" td=""></high>	
C/N Ratio			
19 Ratio	+++++++++++++++++++++++++++++++++++++++	**+**	
	< Nitrogen Release > < N-N	Voutral > <- N-Demand> <- I ligh Nitrogen Demand	
Soluble Available Nutrients &	& Salts (EC5 w/w dw)		
9.7 mmhos/cm	+++++++++++++++++++++++++++++++++++++++		
dry wt.	SloRelease> < Average Nutrient Release Rate >  <high available="" nutrients<="" td=""></high>		
Lime Content (CaCO3)			
0 Lbs/ton	+		
dry wt.	< Low > < Average	> < High Lime Content (as CaCO3)	

### What are the physical properties of your compost?

Percent Ash	
57.4 Percent	+++++++++++++++++++++++++++++++++++++++
dry wt.	High Organic Matter > < Average > < High Ash Content
Sieve Size % > 6.3 MM (0.2	5")
5.8 Percent	+++++
dry wt.	All Uses > < Size May Restrict Uses for Potting mix and Golf Courses

Account No.: 2090381 - 2/2 - 6908 Group: Sep.12 B No. 30 Date Received Sample i.d. Sample I.d. No. 14 Sep. 12 Zone 2 Control 2/2 2090381

### INTERPRETATION:

# Is Your Compost Stable?

# Respiration Rate

Moderate-selected use mg CO2-C/g OM/day

The respiration rate is a measurement of the biodegradation rate of the organic matter in the sample (as received). The respiration rate is determined by measuring the rate at which CO2 is released under optimized moisture and temperature conditions.

# Biologically Available Carbon

#### Moderate-selected use mg CO2-C/g OM/day

Biologically Available Carbon (BAC) is a measurement of the rate at which CO2 is released under optimized moisture, temperature, porosity, nutrients, pH and microbial conditions. If both the RR and the BAC test values are close to the same value, the pile is optimized for composting. If both values are high the compost pile just needs more time. If both values are low the compost has stabilized and should be moved to curing. BAC test values that are higher than RR indicate that the compost pile has stalled. This could be due to anaerobic conditions, lack of available nitrogen due to excessive air converting ammonia to the unavailable nitrate form, lack of nitrogen or other nutrients due to poor choice of feedstock, pH value out of range, or microbes rendered non-active. *Is Your Compost Mature?* 

### AmmoniaN:NitrateN ratio

160 immature

		C
		th
Ammonia N	ppm	st
1500	immature	in
Nitrate N pp	m	ar
9.6	immature	ar
pH value		Fo
6.32	immature	ca
		CL

Composting to stabilize carbon can occur at such a rapid rate that sometimes phytotoxins remain in the compost and must be neutralized before using in high concentrations or in high-end uses. This step is called curing. Typically ammonia is in excess with the break-down of organic materials resulting in an increase in pH. This combination results in a loss of volatile ammonia (it smells). Once this toxic ammonia has been reduced and the pH drops, the microbes convert the ammonia to nitrates. A low ammonia + high nitrate score is indicative of a mature compost, however there are many exceptions. For example, a compost with a low pH (<7) will retain ammonia, while a compost with high lime content can lose ammonia before the organic fraction becomes stable. Composts must first be stable before curing indicators apply.

#### Cucumber Bioassay

100.0 Percent

Cucumbers are chosen for this test because they are salt tolerant and very sensitive to ammonia and organic acid toxicity. Therefore, we can germinate seeds in high concentrations of compost to

measure phytotoxic effects without soluble salts being the limiting factor. Values above 80% for both percent emergence and vigor are indicative of a well-cured compost. Exceptions include very high salts that affect the cucumbers, excessive concentrations of nitrates and other nutrients that will be in range when formulated to make a growing media. In addition to testing a 1:1 compost: vermiculite blend, we also test a diluted 1:3 blend to indicate a more sensitive toxicity level.

#### Is Your Compost Safe Regarding Health?

#### **Fecal Coliform**

< 1000 / g dry wt. Fecal coliforms can survive in both aerobic and anaerobic conditions and is common in all initial compost piles. Most human pathogens occur from fecal matter and all fecal matter is loaded in fecal coliforms. Therefore fecal coliforms are used as an indicator to determine if the chosen method for pathogen reduction (heat for compost) has met the requirements of sufficient temperature, time and mixing. If the fecal coliforms are reduced to below 1000 per gram dry wt. it is assumed all others pathogens are eliminated. Potential problems are that fecal coliform can regrow during the curing phase or during shipping. This is because the conditions are now more favorable for growth than during the composting process.</p>

Less than 3 3 / 4g dry wt. Salmonella is not only another indicator organism but also a toxic microbe. It has been used in the case of biosolids industry to determine adequate pathogen reduction.

#### Metals

Pass The ten heavy metals listed in the EPA 503 regulations are chosen to determine if compost can be applied to ag land and handled without toxic effects. Most high concentrations of heavy metals are derived from woodwaste feedstock such as chrome-arsenic treated or lead painted demolition wood. Biosolids are rarely a problem. *Does Your Compost Provide Nutrients or Organic Matter?* 

# Nutrients (N+P2O5+K2O)

### 3.2 Average nutrient content

This value is the sum of the primary nutrients Nitrogen, Phosphorus and Potassium. Reported units are consistent with those found on fertilizer formulations. A sum greater than 5 is indicative of a compost with high nutrient content, and best used to supply nutrients to a receiving soil. A sum below 2 indicates low nutrient content, and is best-used to improve soil structure via the addition of organic matter. Most compost falls between 2 and 5.

Page two of three

Account No.:		Date Received	14 Sep. 12	
2090381 - 2/2 - 6908		Sample i.d.	Zone 2 Control	
Group:	Sep.12 B No. 30	Sample I.d. No.	2/2	2090381

AgIndex (Nutrients/Na+CI)

Page three of three

8 Average nutrient ratio Composts with low AgIndex values have high concentrations of sodium and/or chloride compared to nutrients. Repeated use of a compost with a low AgIndex (< 2) may result in sodium and/or chloride acting as the limiting factor compared to nutrients, governing application rates. These composts may be used on well-draining soils and/or with salt-tolerant plants. Additional nutrients form another source may be needed if the application rate is limited by sodium or chloride. If the AgIndex is above 10, nutrients optimal for plant growth will be available without concern of sodium and/or chloride toxicity. Composts with an AgIndex of above 10 are good for increasing nutrient levels for all soils. Most composts score between 2 and 10. Concentrations of nutrients, sodium, and chloride in the receiving soil should be considered when determining compost application rates. The AgIndex is a product of feedstock quality. Feedstock from dairy manure, marine waste, industrial wastes, and halophytic plants are likely to produce a finished compost with a low AgIndex.

# Plant Available Nitrogen (lbs/ton)

8 Average N Provider Plant Available Nitrogen (PAN) is calculated by estimating the release rate of Nitrogen from the organic fraction of the compost. This estimate is based on information gathered from the BAC test and measured ammonia and nitrate values. Despite the PAN value of the compost, additional sources of Nitrogen may be needed during he growing season to offset the Nitrogen demand of the microbes present in the compost. With ample nutrients these microbes can further breakdown organic matter in the compost and release bound Nitrogen. Nitrogen demand based on a high C/N ratio is not considered in the PAN calculation because additional Nitrogen should always be supplemented to the receiving soil when composts with a high C/N ratio are applied. **C/N Ratio** 

19 Indicates immaturity As a guiding principal, a C/N ratio below 14 indicates maturity and above 14 indicates immaturity, however, there are many exceptions. Large woodchips (>6.3mm), bark, and redwood are slow to breakdown and therefore can result in a relatively stable product while the C/N ratio value is high. Additionally, some composts with chicken manure and/or green grass feedstocks can start with a C/N ratio below 15 and are very unstable. A C/N ratio below 10 supplies Nitrogen, while a ratio above 20 can deplete Nitrogen from the soil. The rate at which Nitrogen will be released or used by the microbes is indicated by the respiration rate (BAC). If the respiration rate is too high the transfer of Nitrogen will not be controlable. Soluble Nutrients & Salts (EC5 w/w dw - mmhos/cm)

9.7 High salts This value refers to all soluble ions including nutrients, sodium, chloride and some soluble organic compounds. The concentration of salts will change due to the release of salts from the organic matter as it degrades, volatilization of ammonia, decomposition of soluble organics, and conversion of molecular structure. High salts + high AgIndex is indicative of a compost high in readily available nutrients. The application rate of these composts should be limited by the optimum nutrient value based on soil analysis of the receiving soil. High Salts + low AgIndex is indicative of a compost low in nutrients with high concentrations of sodium and/or chloride. Limit the application rate according to the toxicity level of thesodium and/or chloride. Low salts indicates that the compost can be applied without risking salt toxicity, is likely a good source of organic matter, and that nutrients will release slowly over time.

#### Lime Content (lbs. per ton)

0 Low lime content Compost high in lime or carbonates are often those produced from chicken manure (layers) ash materials, and lime products. These are excellent products to use on a receiving soil where lime has been recommended by soil analysis to raise the pH. Composts with a high lime content should be closely considered for pH requirements when formulating potting mixes.

#### **Physical Properties**

### Percent Ash

57.4 Average ash content Ash is the non-organic fraction of a compost. Most composts contain approximately 50% ash (dry weight basis). Compost can be high in ash content for many reasons including: excess minerilzation(old compost), contamination with soil base material during turning, poor quality feedstock, and soil or mineral products added. Finding the source and reducing high ash content is often the fastest means to increasing nutrient quality of a compost.

#### Particle Size % > 6.3 MM (0.25")

5.8 May restrict use Large particles may restrict use for potting soils, golf course topdressings, seed-starter mixes, and where a fine size distribution is required. Composts with large particles can still be used as excellent additions to field soils, shrub mixes and mulches.

#### **Particle Size Distribution**

Each size fraction is measured by weight, volume and bulk density. These results are particularly relevent with decisions to screen or not, and if screening, which size screen to use. The bulk density indicates if the fraction screened is made of light weight organic material or heavy mineral material. Removing large mineral material can greatly improve compost quality by increasing nutrient and organic concentrations.

Appendix:		
	Estimated available nutrients for use wher	n calculating application rates
Plant Available Nitrogen (PAN) calculations:		lbs/ton (As Rcvd.)
PAN = (X * (organic N)) + ((NH4-N) + (NO3-N))		, , , , , , , , , , , , , , , , , , ,
X value = If BAC < 2 then X = 0.1	Plant Available Nitrogen (PAN)	8.2
If BAC =2.1 to 5 then X = 0.2	Ammonia (NH4-N)	1.80
If BAC =5.1 to 10 then X = 0.3	Nitrate (NO3-N)	0.01
If BAC > 10 then $X = 0.4$	Available Phosphorus (P2O5*0.64)	4.4
Note: If C/N ratio > 15 additional N should be applied.	Available Potassium (K2O)	15.9



Seal of Testing Assurance

TCCBI - Harvest Power					
John Jones	John Jones				
24487 Rd. 140					
Tulare					
CA 93274	(559) 686-1622				
Product Identification	Compost				
Zone 3					

Date Sampled/Received: 17 Sep. 12 / 19 Sep. 12

# **COMPOST TECHNICAL DATA SHEET**

LABORATORY: Soil Control Lab	LABORATORY: Soil Control Lab; 42 Hangar Way; Watsonville, CA 95076 tel: 831.724.5422 fax: 831.724.3188			
Compost Parameters Reported as (units of measure)		Test Results	Test Results	
Plant Nutrients: %, weight basis		Not reported	Not reported	
Moisture Content	%, wet weight basis	38.5		
Organic Matter Content	%, dry weight basis	42.9		
pН	units	6.28		
Soluble Salts (electrical conductivity EC 5)dS/m (mmhos/cm)6.8				
Particle Size or Sieve Size	maxium aggregate size, inches	0.64		
Stability Indicator (respirometry	·)		Stability Rating:	
CO <sub>2</sub> Evolution	mg CO <sub>2</sub> -C/g OM/day	7.5	Moderately Un-Stable	
mg CO <sub>2</sub> -C/g TS/day 3.2		moderatery on Stable		
Maturity Indicator (bioassay)				
Percent Emergence average % of control		100.0		
Relative Seedling Vigor average % of control		86.7		
Select Pathogens	PASS/FAIL: per US EPA Class A standard, 40 CFR § 503.32(a)	Pass	Fecal coliform	
		Pass	Salmonella	
Trace Metals	PASS/FAIL: per US EPA Class A		As, Cd, Cr, Cu, Pb, Hg	
standard, 40 CFR § 503.13, Pass Tables 1 and 3.		Pass	Mo,Ni,Se,Zn	

Laboratory Group:	Sep.12 C_1	Laboratory Number: 2090507-1/2
Analyst: Assaf Sadeh		.1.1
	·	www.compostlab.com



Seal of Testing Assurance

Date Sampled/Received: 17 Sep. 12 / 19 Sep. 12

TCCBI - Harvest Po	wer
John Jones	
24487 Rd. 140	
Tulare	
CA 93274	(559) 686-1622
Product Identification	Compost
Zone 3	

# **COMPOST TECHNICAL DATA SHEET**

LABORATORY: Soil Control Lab	; 42 Hangar Way; Watsonville, CA 9507	6 <i>tel:</i> 831.724.5422	fax: 831.724.3188	
Compost Parameters	Reported as (units of measure)	Test Results	Test Results	
Plant Nutrients:	%, weight basis	%, wet weight basis	%, dry weight basis	
Nitrogen	Total N	0.83	1.4	
Phosphorus	P <sub>2</sub> O <sub>5</sub>	0.36	0.57	
Potassium	K <sub>2</sub> O	0.83	1.3	
Calcium	Са	1.2	2.0	
Magnesium	Mg	0.31	0.50	
Moisture Content	%, wet weight basis	38.5		
Organic Matter Content	%, dry weight basis	42.9		
pH	units	6.28		
Soluble Salts (electrical conductivity EC <sub>3</sub> )	dS/m (mmhos/cm)	6.8		
Particle Size or Sieve Size	% under 9.5 mm, dw basis	99.5		
Stability Indicator (respirometry	<i>)</i>		Stability Rating:	
CO <sub>2</sub> Evolution	mg CO <sub>2</sub> -C/g OM/day	7.5	Moderately Un-Stable	
	mg CO <sub>2</sub> -C/g TS/day	3.2	Moderatery On-Stable	
Maturity Indicator (bioassay)				
Percent Emergence	average % of control	100.0		
Relative Seedling Vigor	average % of control	86.7		
Select Pathogens	PASS/FAIL: per US EPA Class A standard, 40 CFR § 503.32(a)	Pass	Fecal coliform	
		Pass	Salmonella	
Trace Metals	PASS/FAIL: per US EPA Class A	n	As,Cd,Cr,Cu,Pb,Hg	
	standard, 40 CFR § 503.13, Tables 1 and 3.	Pass	Mo,Ni,Se,Zn	

Laboratory Group:	Sep.12 C_1	 Laboratory Number:	2090507-1/2
Analyst: Assaf Sadeh		 www.compostlab.com	

	US COMPOSTING Seal of Testing Assurance	TCCBI - Harvest Power         John Jones         -       24487 Rd. 140         Tulare       CA 93274       (559) 686-1622				
			Product Identification:			
[~!!+		Zone 3				
	Caltrans		Date Sampled/Received: 17 Sep. 12 / 19 Sep. 12			
Сомра	<b>DST TECHNICA</b>	L DATA SHEE'	<b>Γ</b> for Caltrans			
LABORATORY: Soil Control Lab, 4	2 Hangar Way, Watsonville, CA 95076	5 tel (831) 724-5422 fax (831) 724-	3188 www.compostlab.com			
Compost Parameters	Test Results	Reported as (units of measure)	TMECC Test Method			
рН	6.28	Unitless	04.11-A 1:5 Slurry pH			
Soluble Salts (electrical conductivity)	6.8	dS/m (mmhos/cm)	04.10-A 1:5 Slurry Method Mass Basis			
Moisture content	38.5	%, wet weight basis	03.09-A - Total Solids and Moisture			
Organic Matter Content	42.9	%, dry weight basis	05.07-A Loss-on-Ignition Organic Matter Method (LOI)			
Maturity Indicator (bioassay	/)		1 / 10/ / 10 Salary California			
Percent Emergence	100.0	average % of control	05.05-A Germination and vigor			
Relative Seedling Vigor	86.7	average % of control				
Stability Indicator	7.5	mg CO2-C/g OM/day	05.08-B Carbon Dioxide Evoultion Rate			
Particle Size	99.5	%, dry weight passing through 9.5 mm	02.02-B Sample Sieving for Aggregate Size Classification			
Pathogens	Pass	PASS/FAIL: Pcr US EPA Class A standard, 40 CFR 503.32(a)	07.01-B Fecal coliforms			
Pathogens	Pass	PASS/FAIL: Per US EPA Class A standard, 40 CFR 503.32(a)	07.02 Samonella			
Physical Contaminants	None Detected	%, dry weight basis	02.02-C - Man-Made Inerts Total content			
Physical Contaminants	None Detected	%, dry weight basis	02.02-C - Man-Made Inerts Sharps content			
Heavy Metals Content	Pass	PASS/FAIL: Per US EPA Class A	04.06-Heavy Metals standard,			

Participants in the US Composting Council's Seal of Testing Assurance Program have shown the commitment to test their compost products on a prescribed basis and provide this data, along with compost end use instructions, as a means to better serve the needs of their compost customers.

For additional information pertaining to compost use, the specific compost parameters tested for within the Seal of Testing assurance Program, or the program in general, log on to the US Composting Council's TMECC web-site at http://www.tmecc.org.

This compost product has been sampled and tested as required by the Seal of Testing assurance Program on the United States Composting Council (USCC), using certain methods from the "Test Methods for the Examination of Compost and Composting" manual. Test results are available upon request by contacting the compost producer (address at top of page). The USCC makes no warranties regarding this product or its content, quality. or suitability for any particular use.

 Laboratory Group:
 Sep.12 C\_1
 Laboratory Number:
 2090507-1/2

 Analyst: Assaf Sadeh
 www.compostlab.com

ANALYTICAL CHEMISTS and BACTERIOLOGISTS Approved by State of California

TCCBI - Harvest Power

24487 Rd. 140 Tulare, CA 93274 Attn: John Jones TEL: 831-724-5422 FAX: 831-724-3188 www.compostlab.com

## SOIL CONTROL LAB

Account #: 2090507-1/2-6908 Group: Sep.12 C\_1 #8 Reporting Date: October 5, 2012

Date Received: 19 Sep. 12 Sample Identification: Zone 3 Sample ID #: 2090507 - 1/2 Nutrients Dry wt. As Rcvd. units **Stability Indicator:** Biologically **CO2** Evolution Total Nitrogen: 1.4 0.83% Respirometery Available C Ammonia (NH₄-N): 670 410 mg/kg mg CO<sub>2</sub>-C/g OM/day 7.5 7.9 Nitrate (NO<sub>3</sub>-N): 10 6.4 mg/kg mg CO<sub>2</sub>-C/g TS/day 3.2 3.4 Org. Nitrogen (Org.-N): % Stability Rating 1.3 0.80 moderately unstable moderately unstable Phosphorus (as  $P_2O_5$ ): % 0.58 0.36 mg/kg Phosphorus (P): 2500 1600 Potassium (as K<sub>2</sub>O): Maturity Indicator: Cucumber Bioassay 1.3 0.82 % Potassium (K): 11000 6900 mg/kg Compost:Vermiculite(v:v) 1:1 1:3 2.0 Calcium (Ca): 1.2 % Emergence (%) 100 100 % Seedling Vigor (%) Magnesium (Mg): 0.50 0.31 87 87 Sulfate  $(SO_4-S)$ : 640 390 mg/kg Description of Plants fungus fungus 30 mg/kg Boron (Total B): 18 % Moisture: 0 38.5 0.073 % Sodium (Na): 0.12 Pathogens Units Results Rating Chloride (CI): % Fecal Coliform < 2.0 MPN/a 0.22 0.14 pass pH Value: NA 6.28 unit Salmonella < 3 MPN/4a pass Bulk Density : 25 40 lb/cu ft Date Tested: 19 Sep. 12 Carbonates (CaCO<sub>3</sub>): lb/ton 6.9 4.2 Conductivity (EC5): 6.8 NA mmhos/cm 42.9 26.4 % % by weight Organic Matter: Inerts % Plastic < 0.5 Organic Carbon: 25.0 15.0 Ash: 57.1 35.1 % Glass < 0.5 C/N Ratio 18 18 ratio Metal < 0.5 AgIndex 10 10 ratio Sharps ND Size & Volume Distribution **EPA Limit** Metals Dry wt. units Aluminum (AI) 6900 mg/kg MM % by weight % by volume BD g/cc 41 mg/kg > 50 0.00 Arsenic (As): 3.1 0.0 0.0 25 to 50 Cadmium (Cd): 39 mg/kg 0.0 0.0 0.00 < 1.0 16 to 25 0.0 0.0 0.00 Chromium (Cr): 14 1200 mg/kg 9.5 to 16 Cobalt (Co) 3.8 mg/kg 0.5 0.4 0.50 Copper (Cu): 49 1500 mg/kg 6.3 to 9.5 2.7 2.9 0.41 Iron (Fe): 9700 mg/kg 4.0 to 6.3 5.1 5.7 0.39 Lead (Pb): 300 12.6 20 mg/kg 2.0 to 4.0 0.29 19.3 mg/kg 79.0 Manganese (Mn): 220 < 2.0 0.48 71.6 mg/kg 17 Bulk Density Description: <.35 Light Materials, Mercury (Hg): < 1.0 Molybdenum (Mo): 75 mg/kg .35-.60 medium weight materials, >.60 Heavy Materials 1.6 Nickel (Ni): 11 420 mg/kg Analyst: Assaf Sadeh Selenium (Se): < 1.0 36 mg/kg 170 2800 mg/kg Zinc (Zn):

\*Sample was received and handled in accordance with TMECC procedures.

Account No	e:	Date Received	19 Sep. 12	2
2090507 - 1	/2 - 6908	Sample i.d.	Zone 3	
Group:	Sep.12 C_1 No. 8	Sample I.d. No.	1/2	2090507

#### Is Your Compost Stable?

Page one of three

Respiration Rate	Biodegradation Rate of Your Pile		
7.5 mg CO2-C/	+++++++++++++++++++++++++++++++++++++++		
g OM/day	< Stable >  <moderately unstable=""> &lt; Unstable &gt; &lt; High For Mulch</moderately>		
Biologically Available Carb	on (BAC) Optimum Degradation Rate		
<b>7.9</b> mg CO2-C/	+++++++++++++++++++++++++++++++++++++++		
g OM/day	< Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > S		

#### Is Your Compost Mature?

AmmoniaN/NitrateN ratio				
67 Ratio	****	+++++++++++++++++++++++++++++++++++++++	+++++++++++++++++++++++++++++++++++++++	<b>+ + + + + + + + + + + + + + + + + + + </b>
	VeryMature> <	Mature	><	Immature
Ammonia N ppm				
670 mg/kg	+++++++++++++++++++++++++++++++++++++++	****	<b>▶</b> + + + + + + + + + + + + + + + + + + +	<b>F <del>T</del> <del>T</del> <del>T</del> <del>T</del> <del>T</del> <del>T</del> <del>T</del> <del>T</del> <del>T</del> <del>T</del></b>
dry wt.	VeryMature> <	Mature	> < Imr	mature
Nitrate N ppm				
10 mg/kg	++++++			
dry wt.	< Immature	>	< Mature	
pH value				
6.28 units	+++++++++++++++++++++++++++++++++++++++	+++++++++++++++++++++++++++++++++++++++	+++++++++++	
	< Immature		> < Mature	> < Immature
Cucumber Emergence				
100.0 percent	+++++++++++++++++++++++++++++++++++++++	****	+++++++++++++++++++++++++++++++++++++++	<b>++++++</b> ++++++++++++++++++++++++++++++
·	< Immature			> < Mature

#### Is Your Compost Safe Regarding Health?

Fecal Coliform	
< 1000 MPN/g dry wt.	+++++
	< Safe > < High Fecal Coliform
Salmonella	
Less than 3 /4g dry wt.	+++++
	<safe (none="" detected)=""> &lt; High Salmonella Count(&gt; 3 per 4 grams)</safe>
Metals US EPA 503	
Pass dry wt.	+++++
-	<ali metals="" pass=""> &lt; One or more Metals Fail</ali>

#### **Does Your Compost Provide Nutrients or Organic Matter?**

Nutrients (N+P2O5+K2O)	· · · ·		
3.3 Percent	****		
dry wt.	<low> &lt; Average &gt; &lt; High Nutrient Content</low>		
AgIndex (Nutrients / Sodium	n and Chloride Salts) ((N+P2O5+K2O) / (Na + CI))		
10 Ratio	+++++++++++++++++++++++++++++++++++++++		
	Na & Cl > < Nutrient and Sodium and Chloride Provider > < Nutrient Provider		
Plant Available Nitrogen (P	AN) Estimated release for first season		
6 lbs/ton	+++++++++++++++++++++++++++++++++++++++		
wet wt.	Low Nitrogen Provider> < Average Nitrogen Provider >  <high nitrogen="" provider<="" td=""></high>		
C/N Ratio			
18 Ratio	+++++++++++++++++++++++++++++++++++++++		
	< Nitrogen Release > < N-Neutral > < N-Demand> < High Nitrogen Demand		
Soluble Available Nutrients	& Salts (EC5 w/w dw)		
6.8 mmhos/cm	+++++++++++++++++++++++++++++++++++++++		
dry wt.	SloRelease> < Average Nutrient Release Rate >  <high available="" nutrients<="" td=""></high>		
Lime Content (CaCO3)			
6.9 Lbs/ton	+++++		
dry wt.	< Low > < Average > < High Lime Content (as CaCO3)		

#### What are the physical properties of your compost?

Percent Ash	
57.1 Percent	+++++++++++++++++++++++++++++++++++++++
dry wt.	< High Organic Matter > < Average > < High Ash Content
Sieve Size % > 6.3 MM (0.2	5")
3.2 Percent	+++++++++++++++++++++++++++++++++++++++
dry wt.	All Uses > < Size May Restrict Uses for Potting mix and Golf Courses

Account No	).1	Date Received	19 Sep.	12	
2090507 - 1	1/2 - 6908	Sample i.d.	Zone 3		
Group:	Sep.12 C_1 No. 8	Sample I.d. No.	1/2	2090507	

Is Your Compost Stable?

**Respiration Rate** 

Page two of three

7.5 Moderate-selected use mg CO2-C/g OM/day The respiration rate is a measurement of the biodegradation rate of the organic matter in the sample (as received). The respiration rate is determined by measuring the rate at which CO2 is released under optimized moisture and temperature conditions.

#### **Biologically Available Carbon**

Moderate-selected use 7.9

mg CO2-C/g OM/day

Biologically Available Carbon (BAC) is a measurement of the rate at which CO2 is released under optimized moisture, temperature, porosity, nutrients, pH and microbial conditions. If both the RR and the BAC test values are close to the same value, the pile is optimized for composting. If both values are high the compost pile just needs more time. If both values are low the compost has stabilized and should be moved to curing, BAC test values that are higher than RR indicate that the compost pile has stalled. This could be due to anaerobic conditions, lack of available nitrogen due to excessive air converting ammonia to the unavailable nitrate form, lack of nitrogen or other nutrients due to poor choice of feedstock, pH value out of range, or microbes rendered non-active. Is Your Compost Mature?

AmmoniaN:NitrateN ratio 67 immature

		С
		tł
Ammonia N	ppm	s
670	immature	ir
Nitrate N pp	m	a
10	immature	а
pH value		F
6.28	immature	c
		c

Composting to stabilize carbon can occur at such a rapid rate that sometimes phytotoxins remain in he compost and must be neutralized before using in high concentrations or in high-end uses. This tep is called curing. Typically ammonia is in excess with the break-down of organic materials resulting n an increase in pH. This combination results in a loss of volatile ammonia (it smells). Once this toxic ammonia has been reduced and the pH drops, the microbes convert the ammonia to nitrates. A low mmonia + high nitrate score is indicative of a mature compost, however there are many exceptions. or example, a compost with a low pH (<7) will retain ammonia, while a compost with high lime content an lose ammonia before the organic fraction becomes stable. Composts must first be stable before curing indicators apply.

#### Cucumber Bioassay

100.0 Percent Cucumbers are chosen for this test because they are salt tolerant and very sensitive to ammonia and organic acid toxicity. Therefore, we can germinate seeds in high concentrations of compost to

measure phytotoxic effects without soluble salts being the limiting factor. Values above 80% for both percent emergence and vigor are indicative of a well-cured compost. Exceptions include very high salts that affect the cucumbers, excessive concentrations of nitrates and other nutrients that will be in range when formulated to make a growing media. In addition to testing a 1:1 compost: vermiculite blend, we also test a diluted 1:3 blend to indicate a more sensitive toxicity level.

#### Is Your Compost Safe Regarding Health?

Fecal Coliform

Fecal coliforms can survive in both aerobic and anaerobic conditions and is common in all initial < 1000 / a drv wt. compost piles. Most human pathogens occur from fecal matter and all fecal matter is loaded in fecal coliforms. Therefore fecal coliforms are used as an indicator to determine if the chosen method for pathogen reduction (heat for compost) has met the requirements of sufficient temperature, time and mixing. If the fecal coliforms are reduced to below 1000 per gram dry wt. it is assumed all others pathogens are eliminated. Potential problems are that fecal coliform can regrow during the curing phase or during shipping. This is because the conditions are now more favorable for growth than during the composting process. Salmonella Bacteria

3 / 4g dry wt. Salmonella is not only another indicator organism but also a toxic microbe. It has been used in the Less than 3 case of biosolids industry to determine adequate pathogen reduction.

#### Metals

The ten heavy metals listed in the EPA 503 regulations are chosen to determine if compost Pass can be applied to ag land and handled without toxic effects. Most high concentrations of heavy metals are derived from woodwaste feedstock such as chrome-arsenic treated or lead painted demolition wood. Biosolids are rarely a problem. Does Your Compost Provide Nutrients or Organic Matter?

#### Nutrients (N+P2O5+K2O)

3.3 Average nutrient content

This value is the sum of the primary nutrients Nitrogen, Phosphorus and Potassium. Reported units are consistent with those found on fertilizer formulations. A sum greater than 5 is indicative of a compost with high nutrient content, and best used to supply nutrients to a receiving soil. A sum below 2 indicates low nutrient content, and is best-used to improve soil structure via the addition of organic matter. Most compost falls between 2 and 5.

Account No.:		Date Received	19 Sep. 12	
2090507 - 1/2	- 6908	Sample i.d.	Zone 3	
Group:	Sep.12 C_1 No. 8	Sample I.d. No.	1/2	2090507

AgIndex (Nutrients/Na+CI)

Page three of three

10 Average nutrient ratio Composts with low AgIndex values have high concentrations of sodium and/or chloride compared to nutrients. Repeated use of a compost with a low AgIndex (< 2) may result in sodium and/or chloride acting as the limiting factor compared to nutrients, governing application rates. These composts may be used on well-draining soils and/or with salt-tolerant plants. Additional nutrients form another source may be needed if the application rate is limited by sodium or chloride. If the AgIndex is above 10, nutrients optimal for plant growth will be available without concern of sodium and/or chloride toxicity. Composts with an AgIndex of above 10 are good for increasing nutrient levels for all soils. Most composts score between 2 and 10. Concentrations of nutrients, sodium, and chloride in the receiving soil should be considered when determining compost application rates. The AgIndex is a product of feedstock quality. Feedstock from dairy manure, marine waste, industrial wastes, and halophytic plants are likely to produce a finished compost with a low AgIndex.

#### Plant Available Nitrogen (lbs/ton)

6 Average N Provider Plant Available Nitrogen (PAN) is calculated by estimating the release rate of Nitrogen from the organic fraction of the compost. This estimate is based on information gathered from the BAC test and measured ammonia and nitrate values. Despite the PAN value of the compost, additional sources of Nitrogen may be needed during he growing season to offset the Nitrogen demand of the microbes present in the compost. With ample nutrients these microbes can further breakdown organic matter in the compost and release bound Nitrogen. Nitrogen demand based on a high C/N ratio is not considered in the PAN calculation because additional Nitrogen should always be supplemented to the receiving soil when composts with a high C/N ratio are applied. C/N Ratio

18 Indicates immaturity As a guiding principal, a C/N ratio below 14 indicates maturity and above 14 indicates immaturity, however, there are many exceptions. Large woodchips (>6.3mm), bark, and redwood are slow to breakdown and therefore can result in a relatively stable product while the C/N ratio value is high. Additionally, some composts with chicken manure and/or green grass feedstocks can start with a C/N ratio below 15 and are very unstable. A C/N ratio below 10 supplies Nitrogen, while a ratio above 20 can deplete Nitrogen from the soil. The rate at which Nitrogen will be released or used by the microbes is indicated by the respiration rate (BAC). If the respiration rate is too high the transfer of Nitrogen will not be controlable. Soluble Nutrients & Salts (EC5 w/w dw - mmhos/cm)

6.8 Average salts This value refers to all soluble ions including nutrients, sodium, chloride and some soluble organic compounds. The concentration of salts will change due to the release of salts from the organic matter as it degrades, volatilization of ammonia, decomposition of soluble organics, and conversion of molecular structure. High salts + high AgIndex is indicative of a compost high in readily available nutrients. The application rate of these composts should be limited by the optimum nutrient value based on soil analysis of the receiving soil. High Salts + low AgIndex is indicative of a compost low in nutrients with high concentrations of sodium and/or chloride. Limit the application rate according to the toxicity level of thesodium and/or chloride. Low salts indicates that the compost can be applied without risking salt toxicity, is likely a good source of organic matter, and that nutrients will release slowly over time.

#### Lime Content (lbs. per ton)

6.9 Average lime content Compost high in lime or carbonates are often those produced from chicken manure (layers) ash materials, and lime products. These are excellent products to use on a receiving soil where lime has been recommended by soil analysis to raise the pH. Composts with a high lime content should be closely considered for pH requirements when formulating potting mixes.

#### Physical Properties

Percent Ash

57.1 Average ash content Ash is the non-organic fraction of a compost. Most composts contain approximately 50% ash (dry weight basis). Compost can be high in ash content for many reasons including: excess minerilzation(old compost), contamination with soil base material during turning, poor quality feedstock, and soil or mineral products added. Finding the source and reducing high ash content is often the fastest means to increasing nutrient quality of a compost.

#### Particle Size % > 6.3 MM (0.25")

3.2 May restrict use Large particles may restrict use for potting soils, golf course topdressings, seed-starter mixes, and where a fine size distribution is required. Composts with large particles can still be used as excellent additions to field soils, shrub mixes and mulches.

#### Particle Size Distribution

Each size fraction is measured by weight, volume and bulk density. These results are particularly relevent with decisions to screen or not, and if screening, which size screen to use. The bulk density indicates if the fraction screened is made of light weight organic material or heavy mineral material. Removing large mineral material can greatly improve compost quality by increasing nutrient and organic concentrations.

Appendix:		
	Estimated available nutrients for use wher	calculating application rates
Plant Available Nitrogen (PAN) calculations:		lbs/ton (As Rcvd.)
PAN = (X * (organic N)) + ((NH4-N) + (NO3-N))		
X value = If BAC < 2 then X = 0.1	Plant Available Nitrogen (PAN)	5.9
If BAC =2.1 to 5 then X = 0.2	Ammonia (NH4-N)	0.82
If BAC =5.1 to 10 then X = 0.3	Nitrate (NO3-N)	0.01
If BAC > 10 then $X = 0.4$	Available Phosphorus (P2O5*0.64)	4.7
Note: If C/N ratio > 15 additional N should be applied.	Available Potassium (K2O)	16.6



### US COMPOSTING

Seal of Testing Assurance

## TCCBI - Harvest PowerJohn Jones24487 Rd. 140TulareCA 93274(559) 686-1622Product IdentificationZone 3 Control

Date Sampled/Received: 17 Sep. 12 / 19 Sep. 12

## **COMPOST TECHNICAL DATA SHEET**

LABORATORY: Soil Control Lab	o; 42 Hangar Way; Watsonville, CA 9507	76 <i>tel:</i> 831.724.542.	2 <i>fax:</i> 831.724.3188
Compost Parameters	Reported as (units of measure)	Test Results	Test Results
Plant Nutrients:	%, weight basis	Not reported	Not reported
Moisture Content	%, wet weight basis	43.3	
Organic Matter Content	%. dry weight basis	46.5	
pH	units	5.03	
Soluble Salts (electrical conductivity EC 3)	dS/m (mmhos/cm)	11	
Particle Size or Sieve Size	cicle Size or Sieve Size maxium aggregate size, inches 0.64		
Stability Indicator (respirometry	y)		Stability Rating:
CO <sub>2</sub> Evolution	mg CO <sub>2</sub> -C/g OM/day	13	Un-Stable
	mg CO <sub>2</sub> -C/g TS/day	6.2	011-312010
Maturity Indicator (bioassay)			
Percent Emergence	average % of control	100.0	
Relative Seedling Vigor	average % of control	81.7	
Select Pathogens	PASS/FAIL: per US EPA Class A standard, 40 CFR § 503.32(a)	Pass	Fecal coliform
		Pass	Salmonella
Trace Metals	PASS/FAIL: per US EPA Class A		As,Cd,Cr,Cu,Pb,Hg
	standard, 40 CFR § 503.13, Tables 1 and 3.	Pass	Mo,Ni,Se,Zn

Participants in the US Composting Council's Seal of Testing Assurance Program have shown the commitment to test their compost products on a prescribed basis and provide this data, along with compost end use instructions, as a means to better serve the needs of their compost customers.

Laboratory Group:	Sep.12 C_1	Laboratory Number: 2090507-2/2
Analyst: Assaf Sadeh		www.compostlab.com



### US COMPOSTING

Seal of Testing Assurance TCCBI - Harvest Power John Jones 24487 Rd. 140 Tulare CA 93274 (559) 686-1622 *Product Identification* Compost Zone 3 Control

Date Sampled/Received: 17 Sep. 12 / 19 Sep. 12

## **COMPOST TECHNICAL DATA SHEET**

LABORATORY: Soil Control Lab	; 42 Hangar Way; Watsonville, CA 9507	6 <i>tel:</i> 831.724.5422	fax: 831.724.3188
Compost Parameters	Reported as (units of measure)	Test Results	Test Results
Plant Nutrients:	%, weight basis	%, wet weight basis	%, dry weight basis
Nitrogen	Total N	0.85	1.5
Phosphorus	P <sub>2</sub> O <sub>5</sub>	0.36	0.61
Potassium	K <sub>2</sub> O	0.82	1.4
Calcium	Са	0.86	1.5
Magnesium	Mg	0.25	0.44
Moisture Content	%, wet weight basis	43.3	******
Organic Matter Content	%, dry weight basis	46.5	
pH	units	5.03	
Soluble Salts (electrical conductivity EC 5)	dS/m (mmhos/cm)	11	
Particle Size or Sieve Size	% under 9.5 mm, dw basis	98.4	······································
Stability Indicator (respirometry	)		Stability Rating:
CO <sub>2</sub> Evolution	mg CO <sub>2</sub> -C/g OM/day	13	Un-Stable
	mg CO <sub>2</sub> -C/g TS/day	6.2	UII-Stable
Maturity Indicator (bioassay)			••• ##################################
Percent Emergence	average % of control	100.0	
Relative Seedling Vigor	average % of control	81.7	
Select Pathogens	PASS/FAIL: per US EPA Class A standard, 40 CFR § 503.32(a)	Pass	Fecal coliform
		Pass	Salmonella
Trace Metals	PASS/FAIL: per US EPA Class A standard, 40 CFR § 503.13,	Pass	As,Cd,Cr,Cu,Pb,Hg
	Tables 1 and 3.	1 000	Mo,Ni,Se,Zn

Participants in the US Composting Council's Seal of Testing Assurance Program have shown the commitment to test their compost products on a prescribed basis and provide this data, along with compost end use instructions, as a means to better serve the needs of their compost customers.

Laboratory Group:	Sep.12 C 1	Laboratory Number: 2090507-2/2
Analyst: Assaf Sadeh		
		www.compostlab.com



Compost Parameters	Test Results	Reported as (units of measure)	TMECC Test
			Method
pH	5.03	Unitless	04.11-A 1:5 Slurry pH
Soluble Salts (electrical conductivity)	11	dS/m (mmhos/cm)	04.10-A 1:5 Slurry Method Mass Basis
Moisture content	43.3	%, wet weight basis	03.09-A - Total Solids and Moisture
Organic Matter Content	46.5	%, dry weight basis	05.07-A Loss-on-Ignition Organic Matter Method (LOI)
Maturity Indicator (bioassay)			
Percent Emergence	100.0	average % of control	05.05-A Germination and vigor
Relative Seedling Vigor	81.7	average % of control	
Stability Indicator	13	mg CO2-C/g OM/day	05.08-B Carbon Dioxide Evoultion Rate
Particle Size	98.4	%, dry weight passing through 9.5 mm	02.02-B Sample Sieving for Aggregate Size Classification
Pathogens	Pass	PASS/FAIL: Pcr US EPA Class A standard, 40 CFR 503.32(a)	07.01-B Fecal coliforms
Pathogens	Pass	PASS/FAIL: Per US EPA Class A standard, 40 CFR 503.32(a)	07.02 Samonella
Physical Contaminants	None Detected	%, dry weight basis	02.02-C - Man-Made Inerts Total content
Physical Contaminants	None Detected	%, dry weight basis	02.02-C - Man-Made Inerts Sharps content
Heavy Metals Content	Pass	PASS/FAIL: Per US EPA Class A 40 CFR 503.13, tables 1 and 3.	04.06-Heavy Metals standard, and Hazardous Elements

Participants in the US Compositing Council's Seal of Testing Assurance Program have shown the commitment to test their compost products on a prescribed basis and provide this data, along with compost end use instructions, as a means to better serve the needs of their compost customers.

For additional information pertaining to compost use, the specific compost parameters tested for within the Seal of Testing assurance Program, or the program in general, log on to the US Composting Council's TMECC web-site at http://www.tmecc.org.

This compost product has been sampled and tested as required by the Seal of Testing assurance Program on the United States Composting Council (USCC), using certain methods from the "Test Methods for the Examination of Compost and Composting" manual. Test results are available upon request by contacting the compost producer (address at top of page). The USCC makes no warranties regarding this product or its content, quality. or suitability for any particular use.

Laboratory Group:	Sep.12 C 1	Laboratory Number:	2090507-2/2	
Analyst: Assaf Sadeh				
		www.compostlab.com		

ANALYTICAL CHEMISTS

and BACTERIOLOGISTS Approved by State of California

TEL: 831-724-5422 FAX: 831-724-3188 www.compostlab.com

## SOIL CONTROL LAB AZ HANIGAR WAY WAINSOWUNIE CALIFORNIA PRO78 16A

19 Sep. 12

Account #: 2090507-2/2-6908 Group: Sep.12 C 1 #9 Reporting Date: October 5, 2012

**TCCBI - Harvest Power** 24487 Rd. 140 Tulare, CA 93274 Attn: John Jones

Date Received:

NutrientsDry wt.As Rcvd.unitsTotal Nitrogen:1.50.85%Ammonia (NH <sub>4</sub> -N):20001200mg/kgNitrate (NO <sub>3</sub> -N):5129mg/kgOrg. Nitrogen (OrgN):1.30.74%Phosphorus (as $P_2O_5$ ):0.620.35%Phosphorus (P):27001600mg/kgPotassium (AS $L_2O$ ):1.40.81%Potassium (K):120006800mg/kgCalcium (Ca):1.50.86%Sulfate (SO <sub>4</sub> -S):840470mg/kgBoron (Total B):2313mg/kgPi Value:NA5.03unitBuk Density :2238lb/cu ftCarbonates (CaCO <sub>3</sub> ):<0.1<0.1lb/tonConductivity (EC5):11NAmmhos/cmOrganic Matter:46.526.4%Organic Matter:46.526.4%Organic Matter:46.526.4%Organic Carbon:25.014.0%Conductivity (EC5):11NAmmhos/cmOrganic Matter:46.526.4%Organic Carbon:25.014.0%Conductivity (EC5):11NAConductivity (EC5):11NAConductivity (EC5):14.0%Metal< 0.5Matter:46.526.4Matter:%by weightPrested:19 Sep. 12	Sample Identification:	Zone 3 Co	ntrol					
Total Nitrogen:       1.5       0.85       %         Ammonia (NH <sub>4</sub> -N):       2000       1200       mg Kg       mg CO <sub>2</sub> -C/g OM/day       13       14         Nitrate (NO <sub>4</sub> -N):       51       29       mg/kg       mg CO <sub>2</sub> -C/g OM/day       6.2       6.7         Org. Nitrogen (OrgN):       1.3       0.74       %       mg CO <sub>2</sub> -C/g TS/day       6.2       6.7         Phosphorus (as P <sub>2</sub> O <sub>2</sub> ):       0.62       0.35       %       Maturity Indicator: Cucumber Bioassay       Compost: Vermiculite(v:v)       1:1       1:3         Potassium (K):       12000       6800       mg/kg       Gorgort (%)       82       83         Sulfate (SO <sub>4</sub> -S):       840       470       mg/kg       Maturity Indicator: Cucumber Bioassay       Compost: Vermiculite(v:v)       1:1       1:3         Boron (Total B):       23       13       mg/kg       Mostrite:       N       43.3       %         Collorid (CI):       0.29       0.16       %       Salmonella       < 3	Sample ID #:	2090507 -	2/2					
Ammonia (NH <sub>4</sub> -N):       2000       1200       mg/kg       mg CO <sub>2</sub> -C/g OM/day       13       14         Nitrate (NO <sub>3</sub> -N):       51       29       mg/kg       mg CO <sub>2</sub> -C/g OM/day       6.2       6.7         Org. Nitrogen (OrgN):       1.3       0.74       %       Stability Rating       unstable       unstable       unstable       unstable       unstable       unstable       unstable       unstable       unstable       unstable       unstable       unstable       unstable       unstable       unstable       unstable       unstable       unstable       unstable       unstable       unstable       unstable       unstable       unstable       unstable       unstable       unstable       unstable       unstable       unstable       unstable       unstable       unstable       unstable       unstable       unstable       unstable       unstable       unstable       unstable       unstable       unstable       unstable       unstable       unstable       unstable       unstable       unstable       unstable       unstable       unstable       unstable       unstable       unstable       unstable       unstable       unstable       unstable       unstable       unstable       unstable       unstable       unstable       unstabl	Nutrients	Dry wt.	As Rcvd.	units	Stability Indica	itor:		Biologically
Nitrate (NÔ <sub>3</sub> -N):       51       29       mg/kg         Org. Nitrogen (OrgN):       1.3       0.74       %         Phosphorus (as P_Q.):       0.62       0.35       %         Phosphorus (P):       2700       1600       mg/kg         Potassium (as K_Q):       1.4       0.81       %         Potassium (K):       12000       6800       mg/kg         Calcium (Ca):       1.5       0.86       %         Sulfate (SQS):       840       470       mg/kg         Boron (Total B):       23       13       mg/kg         Sodium (Na):       0.12       0.688       %         Chloride (CI):       0.29       0.16       %         Sodium (Na):       0.12       0.688       %         Chorote (CGO.):       -0.29       0.16       %         Sodium (Na):       0.12       0.688       %         Chorote (CD):       0.29       0.16       %         Salk Density :       CO.31       <0.11	Total Nitrogen:	1.5	0.85	%	CO2 Evolution		Respirometery	Available C
Nitrate (NO <sub>3</sub> -N):       51       29       mg/kg         Org. Nitrogen (OrgN):       1.3       0.74       %         Phosphorus (as P,O_5):       2700       1600       mg/kg         Phosphorus (P):       2700       1600       mg/kg         Potassium (as K <sub>2</sub> O):       1.4       0.81       %         Potassium (K):       12000       6800       mg/kg         Calcium (Ca):       1.5       0.86       %         Sulfate (SO,-S):       840       470       mg/kg         Moisture:       0       43.3       %         Sodium (Na):       0.12       0.068       %         Chloride (CI):       0.29       0.16       %         Sodium (Na):       0.12       0.068       %         Chloride (CI):       0.29       0.16       %         Saluk Density :       22       38       lb/cu ft         Carbonates (CaCO_3):       <0.1	Ammonia (NH₄-N):	2000	1200	mg/kg	mg CO <sub>2</sub> -C/g ON	Л/day	13	14
Org. Nitrogen (OrgN):       1.3       0.74       %       Stability Rating       unstable       unstable         Phosphorus (as P <sub>2</sub> O <sub>3</sub> ):       0.62       0.35       %       Maturity Indicator: Cucumber Bioassay       Compositivermiculie(v:v)       1:1       1:3         Potassium (K):       12000       6800       mg/kg       Gompositivermiculie(v:v)       1:1       1:3         Calcium (Ca):       1.5       0.86       %       Berregence (%)       100       100         Sulfate (SO <sub>4</sub> -S):       840       470       mg/kg       Gompositivermiculie(v:v)       1:1       1:3         Boron (Total B):       23       13       mg/kg       Description of Plants       mushroom       fungus         Solditate (SO <sub>4</sub> -S):       840       470       mg/kg       Pathogens       Results       Units       Rating         Moisture:       0       43.3       %       Salimonella       <3		51	29	mg/kg	mg CO <sub>2</sub> -C/g TS	/day	6.2	6.7
$\begin{array}{c c c c c c c c c c c c c c c c c c c $			0.74			•	unstable	unstable
Phosphorus (P):       2700       1600       mg/kg         Potassium (as K <sub>2</sub> O):       1.4       0.81       %         Potassium (K):       12000       6800       mg/kg         Calcium (Ca):       1.5       0.86       %         Calcium (Ca):       1.5       0.86       %         Sulfate (SO <sub>4</sub> -S):       840       470       mg/kg         Boron (Total B):       23       13       mg/kg         Moisture:       0       43.3       %         Sodium (Na):       0.12       0.068       %         Pathogens       Results       Units       Rating         Fecal Coliform       <2.0								
$\begin{array}{l c c c c c c c c c c c c c c c c c c c$								
Potassium (K):       12000       6800       mg/kg       Compost:Verniculite(v:v)       1:1       1:3         Calcium (Ca):       1.5       0.86       %       100       100       100         Magnesium (Mg):       0.44       0.25       %       Seediing Vigor (%)       82       83         Sulfate (SO <sub>4</sub> -S):       840       470       mg/kg       mg/kg       Seediing Vigor (%)       82       83         Moisture:       0       43.3       %       Sodium (Na):       0.12       0.068       %         Choride (CI):       0.29       0.16       %       Pathogens       Results       Units       Rating         Bulk Density :       22       38       IbCurt       Topas:       Salmonella       <3					Maturity Indica	tor: Cucum	her Bioassav	
Calcium (Ca):       1.5       0.86       %         Magnesium (Mg):       0.44       0.25       %         Sulfate (SO <sub>4</sub> -S):       840       470       mg/kg         Boron (Total B):       23       13       mg/kg         Moisture:       0       43.3       %         Sodium (Na):       0.12       0.068       %         Chloride (Cl):       0.29       0.16       %         Fecal Coliform       <2.0							-	1.3
Magnesium (Mg): $0.44$ $0.25$ %Sulfate (SQ_4-S):840470mg/kgBoron (Total B):2313mg/kgMoisture:043.3%Sodium (Na): $0.12$ $0.068$ %Chloride (CI): $0.29$ $0.16$ %Bulk Density :2238 $1b/cu$ ftBulk Density :2238 $1b/cu$ ftCarbonates (CaCO <sub>3</sub> ):<0.1								
Sulfate (SO <sub>4</sub> -S):       840       470       mg/kg         Boron (Total B):       23       13       mg/kg         Moisture:       0       43.3       %         Sodium (Na):       0.12       0.068       %         Chloride (CI):       0.29       0.16       %         pH Value:       NA       5.03       unit         Bulk Density :       22       38       Ib/cu ft         Carbonates (CaCO <sub>3</sub> ):       <0.1								
Boron (Total B):         23         13         mg/kg           Moisture:         0         43.3         %           Sodium (Na):         0.12         0.068         %           Choride (Cl):         0.29         0.16         %           pH Value:         NA         5.03         unit           Bulk Density :         22         38         lb/cu ft           Carbonates (CaCO <sub>3</sub> ):         <0.1						· /		
Moisture:         0         43.3         %           Sodium (Na):         0.12         0.068         %           Chloride (CI):         0.29         0.16         %           pH Value:         NA         5.03         unit           Bulk Density :         22         38         lb/cut ft           Carbonates (CaCO <sub>3</sub> ):         <0.1					Description	Di Fiants	musmoom	iungus
Sodium (Na):         0.12         0.068         %         Pathogens         Results         Units         Rating           Choride (Cl):         0.29         0.16         %         Fecal Coliform         <.0								
Chloride (Cl):       0.29       0.16       %         pH Value:       NA       5.03       unit         Bulk Density :       22       38       Ib/cu ft         Carbonates (CaCO <sub>3</sub> ):       <0.1					Dethermon	Desults	1.1 14	Dettern
pH Value:       NA       5.03       unit       Salmonella       < 3       MPN/4g       pass         Bulk Density :       22       38       lb/cu ft       Date Tested: 19 Sep. 12       Date Tested: 19 Sep. 12       Date Tested: 19 Sep. 12         Organic Matter:       46.5       26.4       %       Plastic       < 0.5								-
Bulk Density :       22       38       lb/cu ft         Carbonates (CaCO <sub>3</sub> ):       <0.1	· · ·						÷	
Carbonates (CaCO <sub>3</sub> ):       <0.1							MPN/4g	pass
Conductivity (EC5):       11       NA       mmhos/cm         Organic Matter:       46.5       26.4       %         Organic Carbon:       25.0       14.0       %         Ash:       53.5       30.3       %         Glass       < 0.5					Date Tested: 19 S	ep. 12		
Organic Matter:       46.5       26.4       %       Inerts       % by weight         Organic Carbon:       25.0       14.0       %       Plastic       < 0.5				lb/ton				
Organic Carbon:25.014.0%Plastic< 0.5Ash:53.530.3%Glass< 0.5								
Ash:53.530.3%Glass< 0.5C/N Ratio1717ratioMetal< 0.5	Organic Matter:					<i>,</i> ,		
C/N Ratio1717ratioMetal< 0.5AgIndex99ratioSharpsNDMetalsDry wt.EPA LimitunitsSize & Volume DistributionAluminum (Al)6600-mg/kgMM% by weight % by volumeBD g/ccArsenic (As):2.741mg/kg>500.00.00.00Cadmium (Cd):< 1.039mg/kg25 to 500.00.00.00Chromium (Cr):131200mg/kg16 to 250.00.00.00Cobalt (Co)3.4-mg/kg6.3 to 9.54.63.40.40Iron (Fe):9300-mg/kg4.0 to 6.38.59.10.28Lead (Pb):15300mg/kg2.0 to 4.019.925.10.24Mercury (Hg):< 1.017mg/kgBulk Density Description:<.35 Light Materials, .3560 medium weight materials, >.60 Heavy MaterialsNickel (Ni):13420mg/kg3560 medium weight materials, >.60 Heavy MaterialsZinc (Zn):1402800mg/kg3636	Organic Carbon:				Plastic			
AgIndex         9         9         ratio         Sharps         ND           Metals         Dry wt.         EPA Limit         units         Size & Volume Distribution           Aluminum (Al)         6600         -         mg/kg         MM         % by weight % by volume         BD g/cc           Arsenic (As):         2.7         41         mg/kg         > 50         0.0         0.0         0.00           Cadmium (Cd):         <1.0	Ash:	53.5	30.3	%	Glass	< 0.5		
Metals         Dry wt.         EPA Limit         units           Aluminum (Al)         6600         -         mg/kg           Arsenic (As):         2.7         41         mg/kg           Cadmium (Cd):         <1.0	C/N Ratio	17	17	ratio	Metal	< 0.5		
Aluminum (Al) $6600$ -mg/kgMM% by weight % by volumeBD g/ccArsenic (As):2.741mg/kg> 500.00.00.00Cadmium (Cd):<1.0	AgIndex	9	9	ratio	Sharps	ND		
Arsenic (As):2.741mg/kg> 500.00.00.00Cadmium (Cd):<1.0	Metals	Dry wt.	EPA Limit	units	Size & Volume	Distributior	 1	
Cadmium (Cd):       < 1.0			-			% by weight		
Chromium (Cr):       13       1200       mg/kg       16 to 25       0.0       0.0       0.00         Cobalt (Co)       3.4       -       mg/kg       16 to 25       0.0       0.0       0.00         Copper (Cu):       38       1500       mg/kg       16 to 25       0.0       0.0       0.00         Iron (Fe):       9300       -       mg/kg       6.3 to 9.5       4.6       3.4       0.40         Lead (Pb):       15       300       mg/kg       4.0 to 6.3       8.5       9.1       0.28         Manganese (Mn):       190       -       mg/kg       2.0 to 4.0       19.9       25.1       0.24         Molybdenum (Mo):       1.6       75       mg/kg       Bulk Density Description:<.35 Light Materials,	Arsenic (As):			mg/kg				
Cobalt (Co)       3.4       -       mg/kg         Copper (Cu):       38       1500       mg/kg         Iron (Fe):       9300       -       mg/kg         Lead (Pb):       15       300       mg/kg         Manganese (Mn):       190       -       mg/kg         Mercury (Hg):       <1.0	Cadmium (Cd):				25 to 50		0.0	
Copper (Cu):       38       1500       mg/kg       6.3 to 9.5       4.6       3.4       0.40         Iron (Fe):       9300       -       mg/kg       4.0 to 6.3       8.5       9.1       0.28         Lead (Pb):       15       300       mg/kg       2.0 to 4.0       19.9       25.1       0.24         Manganese (Mn):       190       -       mg/kg       2.0 to 4.0       19.9       25.1       0.24         Mercury (Hg):       <1.0	Chromium (Cr):	13	1200	mg/kg	16 to 25	0.0	0.0	0.00
Iron (Fe):       9300       -       mg/kg         Lead (Pb):       15       300       mg/kg         Manganese (Mn):       190       -       mg/kg         Mercury (Hg):       <1.0	Cobalt (Co)			mg/kg				0.52
Lead (Pb):       15       300       mg/kg       2.0 to 4.0       19.9       25.1       0.24         Manganese (Mn):       190       -       mg/kg                         0.24	Copper (Cu):		1500	mg/kg	6.3 to 9.5			
Manganese (Mn):       190       -       mg/kg         Mercury (Hg):       < 1.0			-					
Mercury (Hg):< 1.017mg/kgMolybdenum (Mo):1.675mg/kgNickel (Ni):13420mg/kgSelenium (Se):< 1.0			300					
Molybdenum (Mo):1.675mg/kg.3560 medium weight materials, >.60 Heavy MaterialsNickel (Ni):13420mg/kgSelenium (Se):< 1.0			-					
Nickel (Ni):         13         420         mg/kg         Analyst: Assaf Sadeh           Selenium (Se):         < 1.0								
Selenium (Se): < 1.0 36 mg/kg Zinc (Zn): 140 2800 mg/kg					.3560 medium	weight mate		
Zinc (Zn): 140 2800 mg/kg							Analyst	: Assaf Sadeh

\*Sample was received and handled in accordance with TMECC procedures.

Account No	).:	Date Received	19 Sep. 1	2
2090507 - 2	2/2 - 6908	Sample i.d.	Zone 3 C	ontrol
Group:	Sep.12 C_1 No. 9	Sample I.d. No.	2/2	2090507

#### Is Your Compost Stable?

Page one of three

Respiration Rate	Biodegradation Rate of Your Pile
13 mg CO2-C/	+++++++++++++++++++++++++++++++++++++++
g OM/day	<stable> <moderately unstable=""> &lt; Unstable &gt; &lt; High For Mulch</moderately></stable>
Biologically Available Carb	oon (BAC) Optimum Degradation Rate
14 mg CO2-C/	+++++++++++++++++++++++++++++++++++++++
g OM/day	< Stable > < Moderately Unstable> < Unstable > < High For Mulch

#### Is Your Compost Mature?

AmmoniaN/NitrateN ratio				
39 Ratio		·+++++++++++++++++++++++++++++++++++++		
	VeryMature> <	Mature	> < Im	nmature
Ammonia N ppm				
<b>2000</b> mg/kg	<b>++++++++++++</b> ++++++++++++++++++++++++	·+++++++++++++++++++++++++++++++++++++	* + + + + + + + + + + + + + + + + + + +	<b>· + + + + + + + + + + + + + + + + + + +</b>
dry wt.	VeryMature> <	Mature	> < Immatu	Ire
Nitrate N ppm				
<b>51</b> mg/kg	****	· <del>* * * * * * * * * * * * * * * * * * *</del>	++	
dry wt.	< Immature	>	< Mature	
pH value				
5.03 units	++++++++++++++++++++++++++++++++++++++	· <del>* * * * * * * * * * * * * * * * * * *</del>	ł	
	< Immature		> < Mature	> < Immature
Cucumber Emergence				
100.0 percent	<b>++++</b> ++++++++++++++++++++++++++++++++	• <b>+</b> ++ <b>+**</b> ++ <b>+**</b> + <b>*************</b>	+++++++++++++++++++++++++++++++++++++++	++++++++++++++++++++++++++++++++++++++
1	< Immature			< Mature

#### Is Your Compost Safe Regarding Health?

Fecal Coliform	
< 1000 MPN/g dry wt.	++++++
	< Safe > < High Fecal Coliform
Salmonella	
Less than 3 /4g dry wt.	+++++
	<safe (none="" detected)=""> &lt; High Salmonella Count(&gt; 3 per 4 grams)</safe>
Metals US EPA 503	
Pass dry wt.	++++++
-	<all metals="" pass=""> &lt; One or more Metals Fail</all>

#### Does Your Compost Provide Nutrients or Organic Matter?

Nutrients (N+P2O5+K2O)	
3.6 Percent	+++++++++++++++++++++++++++++++++++++++
dry wt.	<low> &lt; Average &gt; &lt; High Nutrient Content</low>
AgIndex (Nutrients / Sodium	n and Chloride Salts) ((N+P2O5+K2O) / (Na + Cl))
9 Ratio	++++++
	Na & Cl >   < Nutrient and Sodium and Chloride Provider >   < Nutrient Provider
Plant Available Nitrogen (PA	AN) Estimated release for first season
9 lbs/ton	+++++++++++++++++++++++++++++++++++++++
wet wt.	Low Nitrogen Provider> < Average Nitrogen Provider >  <high nitrogen="" provider<="" td=""></high>
C/N Ratio	
17 Ratio	+++++++++++++++++++++++++++++++++++++++
	< Nitrogen Release > < N Ncutral > < N-Demand> < 1 ligh Nitrogen Demand
Soluble Available Nutrients	& Salts (EC5 w/w dw)
11 mmhos/cm	+++++++++++++++++++++++++++++++++++++++
dry wt.	SloRelease> < Average Nutrient Release Rate >  <high available="" nutrients<="" td=""></high>
Lime Content (CaCO3)	
0 Lbs/ton	+
dry wt.	< Low > < Average> < High Lime Content (as CaCO3)

#### What are the physical properties of your compost?

Percent Ash	
53.5 Percent	+++++++++++++++++++++++++++++++++++++++
dry wt.	< High Organic Matter > Average > < High Ash Content
Sieve Size % > 6.3 MM (0.2	15")
6.2 Percent	+++++++++++++++++++++++++++++++++++++++
dry wt.	All Uses > Size May Restrict Uses for Potting mix and Golf Courses

Account No.: 2090507 - 2/2 - 6908 Group: Sep.12 C 1 No. 9 Date Received Sample i.d. Sample I.d. No. 19 Sep. 12 Zone 3 Control 2090507 212

#### INTERPRETATION:

#### Is Your Compost Stable?

#### **Respiration Rate** 13 High-for mulch

#### mg CO2-C/g OM/dav

The respiration rate is a measurement of the biodegradation rate of the organic matter in the sample (as received). The respiration rate is determined by measuring the rate at which CO2 is released under optimized moisture and temperature conditions.

#### **Biologically Available Carbon** 14 High-for mulch

#### mg CO2-C/g OM/day

Biologically Available Carbon (BAC) is a measurement of the rate at which CO2 is released under optimized moisture, temperature. porosity, nutrients, pH and microbial conditions. If both the RR and the BAC test values are close to the same value, the pile is optimized for composting. If both values are high the compost pile just needs more time. If both values are low the compost has stabilized and should be moved to curing. BAC test values that are higher than RR indicate that the compost pile has stalled. This could be due to anaerobic conditions, lack of available nitrogen due to excessive air converting ammonia to the unavailable nitrate form, lack of nitrogen or other nutrients due to poor choice of feedstock, pH value out of range, or microbes rendered non-active. Is Your Compost Mature?

AmmoniaN:NitrateN ratio

immature 39

		<u> </u>
		t
Ammonia N	l ppm	s
2000	immature	ir
Nitrate N pp	om	a
51	mature	a
pH value		F
5.03	immature	c
		c

Composting to stabilize carbon can occur at such a rapid rate that sometimes phytotoxins remain in the compost and must be neutralized before using in high concentrations or in high-end uses. This step is called curing. Typically ammonia is in excess with the break-down of organic materials resulting n an increase in pH. This combination results in a loss of volatile ammonia (it smells). Once this toxic ammonia has been reduced and the pH drops, the microbes convert the ammonia to nitrates. A low ammonia + high nitrate score is indicative of a mature compost, however there are many exceptions. For example, a compost with a low pH (<7) will retain ammonia, while a compost with high lime content can lose ammonia before the organic fraction becomes stable. Composts must first be stable before curing indicators apply.

#### **Cucumber Bioassay**

100.0 Percent Cucumbers are chosen for this test because they are salt tolerant and very sensitive to ammonia and organic acid toxicity. Therefore, we can germinate seeds in high concentrations of compost to

measure phytotoxic effects without soluble salts being the limiting factor. Values above 80% for both percent emergence and vigor are indicative of a well-cured compost. Exceptions include very high salts that affect the cucumbers, excessive concentrations of nitrates and other nutrients that will be in range when formulated to make a growing media. In addition to testing a 1:1 compost: vermiculite blend, we also test a diluted 1:3 blend to indicate a more sensitive toxicity level.

#### Is Your Compost Safe Regarding Health?

#### Fecal Coliform

Fecal coliforms can survive in both aerobic and anaerobic conditions and is common in all initial < 1000 / g dry wt. compost piles. Most human pathogens occur from fecal matter and all fecal matter is loaded in fecal coliforms. Therefore fecal coliforms are used as an indicator to determine if the chosen method for pathogen reduction (heat for compost) has met the requirements of sufficient temperature, time and mixing. If the fecal coliforms are reduced to below 1000 per gram dry wt. it is assumed all others pathogens are eliminated. Potential problems are that fecal coliform can regrow during the curing phase or during shipping. This is because the conditions are now more favorable for growth than during the composting process. Salmonella Bacteria

Less than 3 3 / 4g dry wt. Salmonella is not only another indicator organism but also a toxic microbe. It has been used in the case of biosolids industry to determine adequate pathogen reduction.

#### Metals

The ten heavy metals listed in the EPA 503 regulations are chosen to determine if compost Pass can be applied to ag land and handled without toxic effects. Most high concentrations of heavy metals are derived from woodwaste feedstock such as chrome-arsenic treated or lead painted demolition wood. Biosolids are rarely a problem. Does Your Compost Provide Nutrients or Organic Matter?

#### Nutrients (N+P2O5+K2O)

Average nutrient content 3.6

This value is the sum of the primary nutrients Nitrogen, Phosphorus and Potassium. Reported units are consistent with those found on fertilizer formulations. A sum greater than 5 is indicative of a compost with high nutrient content, and best used to supply nutrients to a receiving soil. A sum below 2 indicates low nutrient content, and is best-used to improve soil structure via the addition of organic matter. Most compost falls between 2 and 5.

Page two of three

Account No.:		Date Received	19 Sep. 12	
2090507 - 2/2	- 6908	Sample i.d.	Zone 3 Cont	rol
Group:	Sep.12 C_1 No. 9	Sample I.d. No.	2/2	2090507

AgIndex (Nutrients/Na+CI)

Page three of three

9 Average nutrient ratio Composts with low AgIndex values have high concentrations of sodium and/or chloride compared to nutrients. Repeated use of a compost with a low AgIndex (< 2) may result in sodium and/or chloride acting as the limiting factor compared to nutrients, governing application rates. These composts may be used on well-draining soils and/or with salt-tolerant plants. Additional nutrients form another source may be needed if the application rate is limited by sodium or chloride. If the AgIndex is above 10, nutrients optimal for plant growth will be available without concern of sodium and/or chloride toxicity. Composts with an AgIndex of above 10 are good for increasing nutrient levels for all soils. Most composts score between 2 and 10. Concentrations of nutrients, sodium, and chloride in the receiving soil should be considered when determining compost application rates. The AgIndex is a product of feedstock quality. Feedstock from dairy manure, marine waste, industrial wastes, and halophytic plants are likely to produce a finished compost with a low AgIndex.

#### Plant Available Nitrogen (lbs/ton)

9 Average N Provider Plant Available Nitrogen (PAN) is calculated by estimating the release rate of Nitrogen from the organic fraction of the compost. This estimate is based on information gathered from the BAC test and measured ammonia and nitrate values. Despite the PAN value of the compost, additional sources of Nitrogen may be needed during he growing season to offset the Nitrogen demand of the microbes present in the compost. With ample nutrients these microbes can further breakdown organic matter in the compost and release bound Nitrogen. Nitrogen demand based on a high C/N ratio is not considered in the PAN calculation because additional Nitrogen should always be supplemented to the receiving soil when composts with a high C/N ratio are applied. C/N Ratio

17 Indicates immaturity As a guiding principal, a C/N ratio below 14 indicates maturity and above 14 indicates immaturity, however, there are many exceptions. Large woodchips (>6.3mm), bark, and redwood are slow to breakdown and therefore can result in a relatively stable product while the C/N ratio value is high. Additionally, some composts with chicken manure and/or green grass feedstocks can start with a C/N ratio below 15 and are very unstable. A C/N ratio below 10 supplies Nitrogen, while a ratio above 20 can deplete Nitrogen from the soil. The rate at which Nitrogen will be released or used by the microbes is indicated by the respiration rate (BAC). If the respiration rate is too high the transfer of Nitrogen will not be controlable. Soluble Nutrients & Salts (EC5 w/w dw - mmhos/cm)

11 High salts This value refers to all soluble ions including nutrients, sodium, chloride and some soluble organic compounds. The concentration of salts will change due to the release of salts from the organic matter as it degrades, volatilization of ammonia, decomposition of soluble organics, and conversion of molecular structure. High salts + high AgIndex is indicative of a compost high in readily available nutrients. The application rate of these composts should be limited by the optimum nutrient value based on soil analysis of the receiving soil. High Salts + low AgIndex is indicative of a compost low in nutrients with high concentrations of sodium and/or chloride. Limit the application rate according to the toxicity level of thesodium and/or chloride. Low salts indicates that the compost can be applied without risking salt toxicity, is likely a good source of organic matter, and that nutrients will release slowly over time.

#### Lime Content (lbs. per ton)

0 Low lime content Compost high in lime or carbonates are often those produced from chicken manure (layers) ash materials, and lime products. These are excellent products to use on a receiving soil where lime has been recommended by soil analysis to raise the pH. Composts with a high lime content should be closely considered for pH requirements when formulating potting mixes.

#### Physical Properties

#### Percent Ash

53.5 Average ash content Ash is the non-organic fraction of a compost. Most composts contain approximately 50% ash (dry weight basis). Compost can be high in ash content for many reasons including: excess minerilzation(old compost), contamination with soil base material during turning, poor quality feedstock, and soil or mineral products added. Finding the source and reducing high ash content is often the fastest means to increasing nutrient quality of a compost.

#### Particle Size % > 6.3 MM (0.25")

6.2 May restrict use Large particles may restrict use for potting soils, golf course topdressings, seed-starter mixes, and where a fine size distribution is required. Composts with large particles can still be used as excellent additions to field soils, shrub mixes and mulches.

#### **Particle Size Distribution**

Each size fraction is measured by weight, volume and bulk density. These results are particularly relevent with decisions to screen or not, and if screening, which size screen to use. The bulk density indicates if the fraction screened is made of light weight organic material or heavy mineral material. Removing large mineral material can greatly improve compost quality by increasing nutrient and organic concentrations.

Appendix:			
	Estimated available nutrients for use when calculating application rates		
Plant Available Nitrogen (PAN) calculations:		lbs/ton (As Rcvd.)	
PAN = (X * (organic N)) + ((NH4-N) + (NO3-N))		. ,	
X value = If BAC < 2 then X = 0.1	Plant Available Nitrogen (PAN)	9.3	
If BAC =2.1 to 5 then X = 0.2	Ammonia (NH4-N)	2.40	
If BAC =5.1 to 10 then X = 0.3	Nitrate (NO3-N)	0.06	
If BAC > 10 then $X = 0.4$	Available Phosphorus (P2O5*0.64)	4.7	
Note: If C/N ratio > 15 additional N should be applied.	Available Potassium (K2O)	16.4	

ANALYTICAL CHEMISTS and BACTERIOLOGISTS Approved by State of California TEL: 831-724-5422 FAX: 831-724-3188 www.compostlab.com

# SOIL CONTROL LAB

Account #: 2100583-1/2-6908 Group: Oct.12 C #26 Reporting Date: November 1, 2012

TCCBI - Harvest Power 24487 Rd. 140 Tulare, CA 93274 Attn: John Jones

Date Received: Sample Identification: Sample ID #:	19 Oct. 12 Zone #1- C 2100583 - 1	1/2					
Nutrients	Dry wt.	As Rcvd.	units	Stability Indic			Biologically
Total Nitrogen:	1.4	0.94	%	CO2 Evolution	า	Respirometery	Available C
Ammonia (NH₄-N):	690	460	mg/kg	mg CO <sub>2</sub> -C/g O	M/day	7.5	8.8
Nitrate (NO <sub>3</sub> -N):	6.1	4.0	mg/kg	mg CO <sub>2</sub> -C/g T	S/day	2.8	3.3
Org. Nitrogen (OrgN):	1.3	0.86	%	Stability Ra	ting	moderately unstable	unstable
Phosphorus (as $P_2O_5$ ):	0.65	0.43	%		-		
Phosphorus (P):	2800	1900	mg/kg				
Potassium (as K <sub>2</sub> O):	1.4	0.92	%	Maturity Indic	ator: Cucum	ber Bioassay	
Potassium (K):	11000	7600	mg/kg	Compost:Verm		1:1	1:3
Calcium (Ca):	2.3	1.5	%	Emergence (%		100	100
Magnesium (Mg):	0.47	0.31	%	Seedling Vigor	•	100	100
Sulfate (SO <sub>4</sub> -S):	2000	1300	mg/kg	Description		healthy	healthy
Boron (Total B):	19	13	mg/kg	ľ		,	
Moisture:	0	33.7	%				
Sodium (Na):	0.13	0.086	%	Pathogens	Results	Units	Rating
Chloride (CI):	0.19	0.13	%	Fecal Coliform	> 1200	MPN/g	fail
pH Value:	NA	6.12	unit	Salmonella	< 3	MPN/4g	pass
Bulk Density :	22	34	lb/cu ft	Date Tested: 19 (	Oct. 12	5	<i>i</i>
Carbonates (CaCO <sub>3</sub> ):	1.8	1.2	lb/ton				
Conductivity (EC5):	7.5	NA	mmhos/cm				
Organic Matter:	37.3	24.7	%	Inerts	% by weight		
Organic Carbon:	21.0	14.0	%	Plastic	< 0.5		
Ash:	62.7	41.6	%	Glass	< 0.5		
C/N Ratio	15	15	ratio	Metal	< 0.5		
AgIndex	> 10	> 10	ratio	Sharps	ND		
Metals	Dry wt.	EPA Limit	units	Size & Volume	Distribution	)	
Aluminum (AI)	8300	-	mg/kg	MM		% by volume	BD g/cc
Arsenic (As):	3.0	41	mg/kg	> 50	0.0	0.0	0.00
Cadmium (Cd):	< 1.0	39	mg/kg	25 to 50	0.0	0.0	0.00
Chromium (Cr):	15	1200	mg/kg	16 to 25	0.0	0.0	0.00
Cobalt (Co)	2.7	-	mg/kg	9.5 to 16	2.1	4.0	0.23
Copper (Cu):	69	1500	mg/kg	6.3 to 9.5	3.7	4.0	0.42
Iron (Fe):	11000	-	mg/kg	4.0 to 6.3	10.2	11.1	0.41
Lead (Pb):	17	300	mg/kg	2.0 to 4.0	18.1	25.4	0.31
Manganese (Mn):	160	-	mg/kg	< 2.0	65.8	55.6	0.52
Mercury (Hg):	< 1.0	17	mg/kg			5 Light Materials	
Molybdenum (Mo):	1.5	75	mg/kg	.3560 medium	n weight mate	rials, >.60 Heavy	
Nickel (Ni):	10	420	mg/kg			Analyst	: Assaf Sadeh
Selenium (Se):	< 1.0	36	mg/kg				
Zinc (Zn):	140	2800	mg/kg				

\*Sample was received and handled in accordance with TMECC procedures.

Account No	.:	Date Received	19 Oct. 12	
2100583 - 1	/2 - 6908	Sample i.d.	Zone #1- (	Cure
Group:	Oct.12 C No. 26	Sample I.d. No.	1/2	2100583

#### Is Your Compost Stable?

Page one of three

Respiration Rate	Biodegradation Rate of Your Pile
7.5 mg CO2-C/	+++++++++++++++++++++++++++++++++++++++
g OM/day	< Stable >  <moderately unstable=""> &lt; Unstable &gt; &lt; High For Mulch</moderately>
Biologically Available Carbo	on (BAC) Optimum Degradation Rate
8.8 mg CO2-C/	+++++++++++++++++++++++++++++++++++++++
g OM/day	< Stable > < Moderately Unstable> < Unstable > < High For Mulch

#### Is Your Compost Mature?

AmmoniaN/NitrateN ratio				
110 Ratio	++++++++++++++++++++++++++++++++++++++	++++++++++++++++++++++++++++++++++++++		++++++++++++++++++++++++++++++++++++++
Ammonia N ppm	Verywature=15	Malaic	<u> </u>	
690 mg/kg	+++++++++++++++++++++++++++++++++++++++	<del>****</del> ********	·+++++++++++++++++++++++++++++++++++++	****
dry wt.	VeryMature> <	Mature	> < Imm	ature
Nitrate N ppm				
6.1 mg/kg	++++			
dry wt.	< Immature	><	Mature	
oH value				
6.12 units	++++++++++++++++++++++++++++++++++++++	++++++++++++++++++++++++++++++++++++++	-++++++++	
	< Immature		> < Mature	> < Immature
Cucumber Emergence				
100.0 percent	*****	* * * * * * * * * * * * * * * * * * * *	***	+++++++++++++++++++++++++++++++++++++++
	< Immature			> < Mature

#### Is Your Compost Safe Regarding Health?

Fecal Coliform	
> 1000 MPN/g dry wt.	┼╫┼╫┼╫┼╫┼╫╫╫╫╫╫╫╫╫╫╫╫╫╫╫╫╫╫╎╎╎╎╎
Ŭ I	< Safe > < High Fecal Coliform
Salmonella	
Less than 3 /4g dry wt.	<b>+</b> +++++
	Safe (none detected) > < High Salmonella Count(> 3 per 4 grams)
Metals US EPA 503	
Pass dry wt.	+++++++
-	All Metals Pass > < One or more Metals Fail

#### Does Your Compost Provide Nutrients or Organic Matter?

Nutrients (N+P2O5+K2O)					
3.4 Percent	****	·++++++++++++	·+++		
dry wt.	<low< th=""><th>&gt; &lt; Average</th><th></th><th>&gt; &lt; High Nutrient Co</th><th>ntent</th></low<>	> < Average		> < High Nutrient Co	ntent
AgIndex (Nutrients / Sodium	and Chloride	Salts)	((N+	P2O5+K2O) / (Na +	CI))
11 Ratio	+++++++++++	*******	· <del>* * * * * + + * * * * * * * * * * * * </del>	+++++++++++++++++++++++++++++++++++++++	++++
	Na & Cl > <	Nutrient and S	Sodium and Chlorid	de Provider >	< Nutrient Provider
Plant Available Nitrogen (PA	.N)	Estimated relea	ase for fi <u>rst</u> seasor		
7 lbs/ton	**+++++++++	·+++++++++++++	·+++		
wet wt.	Low Nitrogen	Provider> <	Average Nitroge	n Provider	>  <high nitrogen="" provider<="" td=""></high>
C/N Ratio				_	
15 Ratio	+++++++++++	·++++++++++++	·+++++		
	< Nitrogen Re	lease> < N-N	Neutral > < N Dom	and> < High Nitroge	n Demand
Soluble Available Nutrients	& Salts (EC5 v	v/w dw)			
7.5 mmhos/cm	++++++++++++	****	****	+++	
dry wt.	SloRelease>	< Average Nut	rient Release Rate	>  <high availabl<="" td=""><td>e Nutrients</td></high>	e Nutrients
Lime Content (CaCO3)					
1.8 Lbs/ton	++				
dry wt.	< Low ><	Average	s> < High	Lime Content (as C	aCO3)

#### What are the physical properties of your compost?

Percent Ash	
62.7 Percent	+++++++++++++++++++++++++++++++++++++++
dry wt.	< High Organic Matter > < Average > < High Ash Content
Sieve Size % > 6.3 MM (0.2	
5.9 Percent	******
dry wt.	All Uses > Size May Restrict Uses for Potting mix and Golf Courses

Account No.: 2100583 - 1/2 - 6908 Group: Oct.12 C No. 26 Date Received Sample i.d. Sample I.d. No. 19 Oct. 12 Zone #1- Cure 1/22100583

#### INTERPRETATION:

#### Is Your Compost Stable?

**Respiration Rate** 7.5

mg CO2-C/g OM/dav

Moderate-selected use The respiration rate is a measurement of the biodegradation rate of the organic matter in the sample (as received). The respiration rate is determined by measuring the rate at which CO2 is released under optimized moisture and temperature conditions.

#### **Biologically Available Carbon** 88

#### Moderate-selected use mg CO2-C/g OM/day

Biologically Available Carbon (BAC) is a measurement of the rate at which CO2 is released under optimized moisture, temperature. porosity, nutrients, pH and microbial conditions. If both the RR and the BAC test values are close to the same value, the pile is optimized for composting. If both values are high the compost pile just needs more time. If both values are low the compost has stabilized and should be moved to curing. BAC test values that are higher than RR indicate that the compost pile has stalled. This could be due to anaerobic conditions, lack of available nitrogen due to excessive air converting ammonia to the unavailable nitrate form, lack of nitrogen or other nutrients due to poor choice of feedstock, pH value out of range, or microbes rendered non-active. Is Your Compost Mature?

#### AmmoniaN:NitrateN ratio

110 immature

		- C0		
		the		
Ammonia N	ppm	ste		
690	immature	in a		
Nitrate N ppm				
6.1	immature	am		
pH value		Fo		
6.12	immature	ca		
		cu		

Composting to stabilize carbon can occur at such a rapid rate that sometimes phytotoxins remain in e compost and must be neutralized before using in high concentrations or in high-end uses. This ep is called curing. Typically ammonia is in excess with the break-down of organic materials resulting an increase in pH. This combination results in a loss of volatile ammonia (it smells). Once this toxic nmonia has been reduced and the pH drops, the microbes convert the ammonia to nitrates. A low nmonia + high nitrate score is indicative of a mature compost, however there are many exceptions. pr example, a compost with a low pH (<7) will retain ammonia, while a compost with high lime content an lose ammonia before the organic fraction becomes stable. Composts must first be stable before iring indicators apply.

#### **Cucumber Bioassay**

100.0 Percent Cucumbers are chosen for this test because they are salt tolerant and very sensitive to ammonia and organic acid toxicity. Therefore, we can germinate seeds in high concentrations of compost to

measure phytotoxic effects without soluble salts being the limiting factor. Values above 80% for both percent emergence and vigor are indicative of a well-cured compost. Exceptions include very high salts that affect the cucumbers, excessive concentrations of nitrates and other nutrients that will be in range when formulated to make a growing media. In addition to testing a 1:1 compost: vermiculite blend, we also test a diluted 1:3 blend to indicate a more sensitive toxicity level.

#### Is Your Compost Safe Regarding Health?

#### Fecal Coliform

Fecal coliforms can survive in both aerobic and anaerobic conditions and is common in all initial > 1000 / g dry wt. compost piles. Most human pathogens occur from fecal matter and all fecal matter is loaded in fecal coliforms. Therefore fecal coliforms are used as an indicator to determine if the chosen method for pathogen reduction (heat for compost) has met the requirements of sufficient temperature, time and mixing. If the fecal coliforms are reduced to below 1000 per gram dry wt. it is assumed all others pathogens are eliminated. Potential problems are that fecal coliform can regrow during the curing phase or during shipping. This is because the conditions are now more favorable for growth than during the composting process. Salmonella Bacteria

Less than 3 3 / 4g dry wt. Salmonella is not only another indicator organism but also a toxic microbe. It has been used in the case of biosolids industry to determine adequate pathogen reduction.

#### Metals

The ten heavy metals listed in the EPA 503 regulations are chosen to determine if compost Pass can be applied to ag land and handled without toxic effects. Most high concentrations of heavy metals are derived from woodwaste feedstock such as chrome-arsenic treated or lead painted demolition wood. Biosolids are rarely a problem. Does Your Compost Provide Nutrients or Organic Matter?

#### Nutrients (N+P2O5+K2O)

Average nutrient content 34

This value is the sum of the primary nutrients Nitrogen, Phosphorus and Potassium. Reported units are consistent with those found on fertilizer formulations. A sum greater than 5 is indicative of a compost with high nutrient content, and best used to supply nutrients to a receiving soil. A sum below 2 indicates low nutrient content, and is best-used to improve soil structure via the addition of organic matter. Most compost falls between 2 and 5.

Page two of three

Account No.:			Date Received	19 Oct. 12	
2100583 - 1/2 - 6908		Sample i.d.	Zone #1- Cure		
Group:	Oct.12 C No. 26		Sample I.d. No.	1/2	2100583

AgIndex (Nutrients/Na+CI)

Page three of three

11 High nutrient ratio Composts with low AgIndex values have high concentrations of sodium and/or chloride compared to nutrients. Repeated use of a compost with a low AgIndex (< 2) may result in sodium and/or chloride acting as the limiting factor compared to nutrients, governing application rates. These composts may be used on well-draining soils and/or with salt-tolerant plants. Additional nutrients form another source may be needed if the application rate is limited by sodium or chloride. If the AgIndex is above 10, nutrients optimal for plant growth will be available without concern of sodium and/or chloride toxicity. Composts with an AgIndex of above 10 are good for increasing nutrient levels for all soils. Most composts score between 2 and 10. Concentrations of nutrients, sodium, and chloride in the receiving soil should be considered when determining compost application rates. The AgIndex is a product of feedstock quality. Feedstock from dairy manure, marine waste, industrial wastes, and halophytic plants are likely to produce a finished compost with a low AgIndex.

#### Plant Available Nitrogen (lbs/ton)

7 Average N Provider Plant Available Nitrogen (PAN) is calculated by estimating the release rate of Nitrogen from the organic fraction of the compost. This estimate is based on information gathered from the BAC test and measured ammonia and nitrate values. Despite the PAN value of the compost, additional sources of Nitrogen may be needed during he growing season to offset the Nitrogen demand of the microbes present in the compost. With ample nutrients these microbes can further breakdown organic matter in the compost and release bound Nitrogen. Nitrogen demand based on a high C/N ratio is not considered in the PAN calculation because additional Nitrogen should always be supplemented to the receiving soil when composts with a high C/N ratio are applied. **C/N Ratio** 

15 Indicates immaturity As a guiding principal, a C/N ratio below 14 indicates maturity and above 14 indicates immaturity, however, there are many exceptions. Large woodchips (>6.3mm), bark, and redwood are slow to breakdown and therefore can result in a relatively stable product while the C/N ratio value is high. Additionally, some composts with chicken manure and/or green grass feedstocks can start with a C/N ratio below 15 and are very unstable. A C/N ratio below 10 supplies Nitrogen, while a ratio above 20 can deplete Nitrogen from the soil. The rate at which Nitrogen will be released or used by the microbes is indicated by the respiration rate (BAC). If the respiration rate is too high the transfer of Nitrogen will not be controlable. Soluble Nutrients & Salts (EC5 w/w dw - mmhos/cm)

7.5 Average salts This value refers to all soluble ions including nutrients, sodium, chloride and some soluble organic compounds. The concentration of salts will change due to the release of salts from the organic matter as it degrades, volatilization of ammonia, decomposition of soluble organics, and conversion of molecular structure. High salts + high AgIndex is indicative of a compost high in readily available nutrients. The application rate of these composts should be limited by the optimum nutrient value based on soil analysis of the receiving soil. High Salts + low AgIndex is indicative of a compost low in nutrients with high concentrations of sodium and/or chloride. Limit the application rate according to the toxicity level of thesodium and/or chloride. Low salts indicates that the compost can be applied without risking salt toxicity, is likely a good source of organic matter, and that nutrients will release slowly over time.

#### Lime Content (lbs. per ton)

1.8 Low lime content Compost high in lime or carbonates are often those produced from chicken manure (layers) ash materials, and lime products. These are excellent products to use on a receiving soil where lime has been recommended by soil analysis to raise the pH. Composts with a high lime content should be closely considered for pH requirements when formulating potting mixes.

#### **Physical Properties**

#### Percent Ash

62.7 High ash content Ash is the non-organic fraction of a compost. Most composts contain approximately 50% ash (dry weight basis). Compost can be high in ash content for many reasons including: excess minerilzation(old compost), contamination with soil base material during turning, poor quality feedstock, and soil or mineral products added. Finding the source and reducing high ash content is often the fastest means to increasing nutrient quality of a compost.

#### Particle Size % > 6.3 MM (0.25")

5.9 May restrict use Large particles may restrict use for potting soils, golf course topdressings, seed-starter mixes, and where a fine size distribution is required. Composts with large particles can still be used as excellent additions to field soils, shrub mixes and mulches.

#### Particle Size Distribution

Each size fraction is measured by weight, volume and bulk density. These results are particularly relevent with decisions to screen or not, and if screening, which size screen to use. The bulk density indicates if the fraction screened is made of light weight organic material or heavy mineral material. Removing large mineral material can greatly improve compost quality by increasing nutrient and organic concentrations.

Appendix.		
	Estimated available nutrients for use wher	calculating application rates
Plant Available Nitrogen (PAN) calculations:		lbs/ton (As Rcvd.)
PAN = (X * (organic N)) + ((NH4-N) + (NO3-N))		. ,
X value = If BAC < 2 then X = 0.1	Plant Available Nitrogen (PAN)	6.6
If BAC =2.1 to 5 then X = 0.2	Ammonia (NH4-N)	0.92
If BAC =5.1 to 10 then X = 0.3	Nitrate (NO3-N)	0.01
If BAC > 10 then X = 0.4	Available Phosphorus (P2O5*0.64)	5.5
Note: If C/N ratio > 15 additional N should be applied.	Available Potassium (K2O)	18.3

ANALYTICAL CHEMISTS and BACTERIOLOGISTS Approved by State of California

TCCBI - Harvest Power

24487 Rd. 140 Tulare, CA 93274 Attn: John Jones TEL: 831-724-5422 FAX: 831-724-3188 www.compostlab.com

## SOIL CONTROL LAB

CAUPORNIA

9507A

Account #: 2100583-2/2-6908 Group: Oct.12 C #27 Reporting Date: November 1, 2012

19 Oct. 12 Date Received: Zone #2- Cure Sample Identification: Sample ID #: 2100583 - 2/2 Stability Indicator: Nutrients Dry wt. As Rcvd. units Biologically Total Nitrogen: CO2 Evolution 1.2 0.90 % Respirometery Available C Ammonia (NH₄-N): 290 210 mg/kg mg CO<sub>2</sub>-C/g OM/day 6.2 7.1 mg/ka Nitrate (NO<sub>3</sub>-N): 5.7 4.1 mg CO<sub>2</sub>-C/g TS/day 2.1 2.3 Org. Nitrogen (Org.-N): 0.87 % Stability Rating 1.2 moderately unstable moderately unstable Phosphorus (as  $P_2O_5$ ): % 0.72 0.52 Phosphorus (P): 3200 2300 mg/kg Potassium (as K<sub>2</sub>O): 0.98 % Maturity Indicator: Cucumber Bioassay 1.4 8100 Compost:Vermiculite(v:v) Potassium (K): 11000 mg/kg 1:1 1:3 100 Emergence (%) 100 Calcium (Ca): 2.4 1.7 % Magnesium (Mg): 0.61 0.45 % Seedling Vigor (%) 100 100 Sulfate (SO₄-S): 1300 910 Description of Plants ma/ka healthv healthy Boron (Total B): 28 20 mg/kg 27.6Moisture: 0 % Sodium (Na): 0.11 0.080 % Pathogens Results Units Rating 0.19 0.14 % Fecal Coliform 340 MPN/q Chloride (CI): pass Salmonella pH Value: NA 7.33 unit < 3 MPN/4g pass Bulk Density : 28 38 lb/cu ft Date Tested: 19 Oct. 12 Carbonates (CaCO<sub>3</sub>): 15 11 lb/ton Conductivity (EC5): 4.2 NA mmhos/cm % 23.8 Organic Matter: 32.9 Inerts % by weight 17.0 13.0 % Plastic < 0.5 Organic Carbon: % Glass 67.1 48.6 < 0.5 Ash: C/N Ratio 14 14 ratio Metal < 0.5 > 10 > 10 Sharps ND AgIndex ratio Size & Volume Distribution Metals Drv wt. **EPA** Limit units mg/kg IMM % by weight % by volume Aluminum (Al) 9100 BD g/cc 3.0 41 mg/kg |> 500.0 0.0 0.00 Arsenic (As): 25 to 50 Cadmium (Cd): 39 mg/kg 0.0 0.0 0.00 < 1.01200 mg/kg 16 to 25 0.0 Chromium (Cr): 13 0.0 0.00 Cobalt (Co) 4.0 ma/ka 9.5 to 16 0.0 0.00.00 1500 mg/kg 6.3 to 9.5 Copper (Cu): 54 1.7 1.8 0.55Iron (Fe): 12000 mg/kg 4.0 to 6.3 3.9 5.3 0.42 300 2.0 to 4.0 Lead (Pb): 20 mg/kg 10.8 17.5 0.36 < 2.0 75.4 230 mg/kg 83.6 Manganese (Mn): 0.64 17 Bulk Density Description: <.35 Light Materials. Mercury (Ha): < 1.0mg/kg Molybdenum (Mo): 75 mg/kg .35-.60 medium weight materials, >.60 Heavy Materials 1.7 Nickel (Ni): 11 420 mg/kg Analyst: Assaf Sadeh < 1.036 Selenium (Se): mg/kg 170 2800 mg/kg Zinc (Zn):

\*Sample was received and handled in accordance with TMECC procedures.

Account No		Date Received	19 Oct. 12	
2100583 - 2	2/2 - 6908	Sample i.d.	Zone #2- (	Cure
Group:	Oct.12 C No. 27	Sample I.d. No.	2/2	2100583

#### is Your Compost Stable?

Page one of three

Respiration Rate	Biodegradation Rate of Your Pile		
6.2 mg CO2-C/	+++++++++++++++++++++++++++++++++++++++		
g OM/day	< Stable >  <moderately unstable=""> &lt; Unstable &gt; &lt; High For Mulch</moderately>		
Biologically Available Carb	n (BAC) Optimum Degradation Rate		
7.1 mg CO2-C/	+++++++++++++++++++++++++++++++++++++++		
g OM/day	< Stable >  <moderately unstable=""> &lt; Unstable &gt; &lt; High For Mulch</moderately>		

#### Is Your Compost Mature?

AmmoniaN/NitrateN ratio				
51 Ratio	+++++++++++++++++++++++++++++++++++++++	+++++++++++++++++++++++++++++++++++++++	<b>++</b> ++++ <b>+</b> +++++++++++++++++++++++++++	********
	VeryMature> <	Mature		> < Immature
Ammonia N ppm				
<b>290</b> mg/kg	+++++++++++++++++++++++++++++++++++++++	+++++++++++++++++++++++++++++++++++++++		
dry wt.	VeryMature> <	Mature	>	< Immature
Nitrate N ppm				
5.7 mg/kg	++++			
dry wt.	< Immature		> < Mature	
pH value				
7.33 units	+++++++++++++++++++++++++++++++++++++++	*****	++ <b>+++</b> +++++++++++++++++++++++++++++++	+++++
	< Immature		> < Ma	ture > < Immature
Cucumber Emergence				
100.0 percent	<b>+++++++++++++++</b> +++++++++++++++++++++	++++++++++++++++++++++++++++++++++++++	+++++++++++++++++++++++++++++++++++++++	*+******
	< Immature			> < Mature

#### Is Your Compost Safe Regarding Health?

Fecal Coliform	
< 1000 MPN/g dry wt.	+++++
	< Safe > < High Fecal Colliform
Salmonella	
Less than 3 /4g dry wt.	+++++
	Safe (none detected) > Salmonella Count(> 3 per 4 grams)
Metals US EPA 503	
Pass dry wt.	+++++++++
	<all metals="" pass=""> &lt; One or more Metals Fail</all>

#### Does Your Compost Provide Nutrients or Organic Matter?

Nutrients (N+P2O5+K2O)	
3.3 Percent	+++++++++++++++++++++++++++++++++++++++
dry wt.	<low> &lt; Average &gt; &lt; High Nutrient Content</low>
AgIndex (Nutrients / Sodium	n and Chloride Salts) ((N+P2O5+K2O) / (Na + Cl))
11 Ratio	+++++++++++++++++++++++++++++++++++++++
	Na & Cl > < Nutrient and Sodium and Chloride Provider > < Nutrient Provider
Plant Available Nitrogen (PA	AN) Estimated release for first season
6 lbs/ton	+++++++++++++++++++++++++++++++++++++++
wet wt.	Low Nitrogen Provider> < Average Nitrogen Provider >  <high nitrogen="" provider<="" td=""></high>
C/N Ratio	
14 Ratio	+++++++++++++++++++++++++++++++++++++++
	< Nitrogen Release > < N-Neutral > < N-Demand> < High Nitrogen Demand
Soluble Available Nutrients	& Salts (EC5 w/w dw)
4.2 mmhos/cm	+++++++++++++++++++++++++++++++++++++++
dry wt.	SloRelease> < Average Nutrient Release Rate >  <high available="" nutrients<="" td=""></high>
Lime Content (CaCO3)	
15 Lbs/ton	+++++++++++++++++++++++++++++++++++++++
dry wt.	< Low > < Average > < High Lime Content (as CaCO3)

#### What are the physical properties of your compost?

Percent Ash	
67.1 Percent	+++++++++++++++++++++++++++++++++++++++
dry wt.	High Organic Matter > < Average > < High Ash Content
Sieve Size % > 6.3 MM (0.2	5")
1.7 Percent	+++++++++++
dry wt.	All Uses > < Size May Restrict Uses for Potting mix and Golf Courses

Account No.: 2100583 - 2/2 - 6908 Group: Oct.12 C No. 27 Date Received Sample i.d. Sample I.d. No. 19 Oct. 12 Zone #2- Cure 2/2 2100583

#### INTERPRETATION:

#### Is Your Compost Stable?

#### **Respiration Rate**

6.2 Moderate-selected use mg CO2-C/g OM/day

The respiration rate is a measurement of the biodegradation rate of the organic matter in the sample (as received). The respiration rate is determined by measuring the rate at which CO2 is released under optimized moisture and temperature conditions.

#### Biologically Available Carbon 7.1 Moderate-selecte

#### Moderate-selected use mg CO2-C/g OM/day

Biologically Available Carbon (BAC) is a measurement of the rate at which CO2 is released under optimized moisture, temperature, porosity, nutrients, pH and microbial conditions. If both the RR and the BAC test values are close to the same value, the pile is optimized for composting. If both values are high the compost pile just needs more time. If both values are low the compost has stabilized and should be moved to curing. BAC test values that are higher than RR indicate that the compost pile has stalled. This could be due to anaerobic conditions, lack of available nitrogen due to excessive air converting ammonia to the unavailable nitrate form, lack of nitrogen or other nutrients due to poor choice of feedstock, pH value out of range, or microbes rendered non-active. **Is Your Compost Mature?** 

#### AmmoniaN:NitrateN ratio

51 immature

		C
		the
Ammonia N	ppm	ste
290	mature	in
Nitrate N pp	m	an
5.7	immature	an
pH value		Fc
7.33	mature	ca
		cu
Cucumber F	liosecou	

Composting to stabilize carbon can occur at such a rapid rate that sometimes phytotoxins remain in the compost and must be neutralized before using in high concentrations or in high-end uses. This step is called curing. Typically ammonia is in excess with the break-down of organic materials resulting in an increase in pH. This combination results in a loss of volatile ammonia (it smells). Once this toxic ammonia has been reduced and the pH drops, the microbes convert the ammonia to nitrates. A low ammonia + high nitrate score is indicative of a mature compost, however there are many exceptions. For example, a compost with a low pH (<7) will retain ammonia, while a compost with high lime content can lose ammonia before the organic fraction becomes stable. Composts must first be stable before curing indicators apply.

#### Cucumber Bioassay

100.0 Percent

Cucumbers are chosen for this test because they are salt tolerant and very sensitive to ammonia and organic acid toxicity. Therefore, we can germinate seeds in high concentrations of compost to

measure phytotoxic effects without soluble salts being the limiting factor. Values above 80% for both percent emergence and vigor are indicative of a well-cured compost. Exceptions include very high salts that affect the cucumbers, excessive concentrations of nitrates and other nutrients that will be in range when formulated to make a growing media. In addition to testing a 1:1 compost: vermiculite blend, we also test a diluted 1:3 blend to indicate a more sensitive toxicity level.

#### Is Your Compost Safe Regarding Health?

#### **Fecal Coliform**

< 1000 / g dry wt. Fecal coliforms can survive in both aerobic and anaerobic conditions and is common in all initial compost piles. Most human pathogens occur from fecal matter and all fecal matter is loaded in fecal coliforms. Therefore fecal coliforms are used as an indicator to determine if the chosen method for pathogen reduction (heat for compost) has met the requirements of sufficient temperature, time and mixing. If the fecal coliforms are reduced to below 1000 per gram dry wt. it is assumed all others pathogens are eliminated. Potential problems are that fecal coliform can regrow during the curing phase or during shipping. This is because the conditions are now more favorable for growth than during the composting process.</p>
Salmonella Bacteria

Less than 3 3 / 4g dry wt. Salmonella is not only another indicator organism but also a toxic microbe. It has been used in the case of biosolids industry to determine adequate pathogen reduction.

#### Metals

Pass The ten heavy metals listed in the EPA 503 regulations are chosen to determine if compost can be applied to ag land and handled without toxic effects. Most high concentrations of heavy metals are derived from woodwaste feedstock such as chrome-arsenic treated or lead painted demolition wood. Biosolids are rarely a problem. *Does Your Compost Provide Nutrients or Organic Matter?* 

#### Nutrients (N+P2O5+K2O)

#### 3.3 Average nutrient content

This value is the sum of the primary nutrients Nitrogen, Phosphorus and Potassium. Reported units are consistent with those found on fertilizer formulations. A sum greater than 5 is indicative of a compost with high nutrient content, and best used to supply nutrients to a receiving soil. A sum below 2 indicates low nutrient content, and is best-used to improve soil structure via the addition of organic matter. Most compost falls between 2 and 5.

Page two of three

Account No.:		Date Received	19 Oct. 12	
2100583 - 2/2 - 6908		Sample i.d.	Zone #2- Cure	
Group:	Oct.12 C No. 27	Sample I.d. No.	2/2	2100583

#### Page three of three

#### INTERPRETATION: AgIndex (Nutrients/Na+CI)

High nutrient ratio Composts with low AgIndex values have high concentrations of sodium and/or chloride 11 compared to nutrients. Repeated use of a compost with a low AdIndex (< 2) may result in sodium and/or chloride acting as the limiting factor compared to nutrients, governing application rates. These composts may be used on well-draining soils and/or with salt-tolerant plants. Additional nutrients form another source may be needed if the application rate is limited by sodium or chloride. If the AgIndex is above 10, nutrients optimal for plant growth will be available without concern of sodium and/or chloride toxicity. Composts with an AgIndex of above 10 are good for increasing nutrient levels for all soils. Most composts score between 2 and 10. Concentrations of nutrients, sodium, and chloride in the receiving soil should be considered when determining compost application rates. The AgIndex is a product of feedstock quality. Feedstock from dairy manure, marine waste, industrial wastes, and halophytic plants are likely to produce a finished compost with a low AgIndex.

#### Plant Available Nitrogen (lbs/ton)

Average N Provider Plant Available Nitrogen (PAN) is calculated by estimating the release rate of Nitrogen from 6 the organic fraction of the compost. This estimate is based on information gathered from the BAC test and measured ammonia and nitrate values. Despite the PAN value of the compost, additional sources of Nitrogen may be needed during he growing season to offset the Nitrogen demand of the microbes present in the compost. With ample nutrients these microbes can further breakdown organic matter in the compost and release bound Nitrogen. Nitrogen demand based on a high C/N ratio is not considered in the PAN calculation because additional Nitrogen should always be supplemented to the receiving soil when composts with a high C/N ratio are applied. C/N Ratio

As a guiding principal, a C/N ratio below 14 indicates maturity and above 14 indicates Indicates maturity 14 immaturity, however, there are many exceptions. Large woodchips (>6.3mm), bark, and redwood are slow to breakdown and therefore can result in a relatively stable product while the C/N ratio value is high. Additionally, some composts with chicken manure and/or green grass feedstocks can start with a C/N ratio below 15 and are very unstable. A C/N ratio below 10 supplies Nitrogen, while a ratio above 20 can deplete Nitrogen from the soil. The rate at which Nitrogen will be released or used by the microbes is indicated by the respiration rate (BAC). If the respiration rate is too high the transfer of Nitrogen will not be controlable. Soluble Nutrients & Salts (EC5 w/w dw - mmhos/cm)

This value refers to all soluble ions including nutrients, sodium, chloride and some 42 Average salts soluble organic compounds. The concentration of salts will change due to the release of salts from the organic matter as it degrades, volatilization of ammonia, decomposition of soluble organics, and conversion of molecular structure. High salts + high AgIndex is indicative of a compost high in readily available nutrients. The application rate of these composts should be limited by the optimum nutrient value based on soil analysis of the receiving soil. High Salts + low AgIndex is indicative of a compost low in nutrients with high concentrations of sodium and/or chloride. Limit the application rate according to the toxicity level of thesodium and/or chloride. Low salts indicates that the compost can be applied without risking salt toxicity, is likely a good source of organic matter, and that nutrients will release slowly over time.

#### Lime Content (lbs. per ton)

15 Average lime content Compost high in lime or carbonates are often those produced from chicken manure (layers) ash materials, and lime products. These are excellent products to use on a receiving soil where lime has been recommended by soil analysis to raise the pH. Composts with a high lime content should be closely considered for pH requirements when formulating potting mixes.

#### **Physical Properties**

#### Percent Ash

High ash content Ash is the non-organic fraction of a compost. Most composts contain approximately 50% 67.1 ash (dry weight basis). Compost can be high in ash content for many reasons including: excess minerilzation(old compost), contamination with soil base material during turning, poor quality feedstock, and soil or mineral products added. Finding the source and reducing high ash content is often the fastest means to increasing nutrient quality of a compost.

#### Particle Size % > 6.3 MM (0.25")

Large particles may restrict use for potting soils, golf course topdressings, seed-starter May restrict use 17 mixes, and where a fine size distribution is required. Composts with large particles can still be used as excellent additions to field soils, shrub mixes and mulches.

#### Particle Size Distribution

Each size fraction is measured by weight, volume and bulk density. These results are particularly relevent with decisions to screen or not, and if screening, which size screen to use. The bulk density indicates if the fraction screened is made of light weight organic material or heavy mineral material. Removing large mineral material can greatly improve compost guality by increasing nutrient and organic concentrations.

Appenaix:		
	Estimated available nutrients for use wher	calculating application rates
Plant Available Nitrogen (PAN) calculations:		lbs/ton (As Rcvd.)
PAN = (X * (organic N)) + ((NH4-N) + (NO3-N))		
X value = If BAC < 2 then X = 0.1	Plant Available Nitrogen (PAN)	5.8
If BAC =2.1 to 5 then X = 0.2	Ammonia (NH4-N)	0.42
If BAC =5.1 to 10 then X = 0.3	Nitrate (NO3-N)	0.01
If BAC > 10 then $X = 0.4$	Available Phosphorus (P2O5*0.64)	6.7
Note: If C/N ratio > 15 additional N should be applied.	Available Potassium (K2O)	19.5

ANALYTICAL CHEMISTS and BACTERIOLOGISTS Approved by State of California

**TCCBI - Harvest Power** 

24487 Rd. 140

SOIL CONTROL LAB 42 HANGAR WAT WATSOPPOLE

CAUFORNIA 95076 1654

TEL: 831-724-5422 FAX: 831-724-3188 www.compostlab.com

Biologically

Available C

23

12

1:3

100

93

fungus

Rating

pass

pass

Account #: 2100765-1/2-6908 Group: Oct,12 D #22 Reporting Date: November 6, 2012

Respirometery

23

12

1:1

100

83

fungus

Units

MPN/g

MPN/4g

very unstable very unstable

Tulare, CA 93274 Attn: John Jones 26 Oct. 12 Date Received: Zone-3 Cure Sample Identification: 2100765 - 1/2 Sample ID #: **Stability Indicator: Nutrients** Dry wt. As Rcvd. units 1.5 1.0 % **CO2** Evolution Total Nitrogen: 1500 1000 mg CO<sub>2</sub>-C/g OM/day Ammonia ( $NH_4$ -N): mg/kg Nitrate (NO<sub>3</sub>-N): 43 29 mg/kg mg CO<sub>2</sub>-C/g TS/day Org. Nitrogen (Org.-N): 1.3 0.87 % Stability Rating % Phosphorus (as  $P_2O_5$ ): 0.63 0.42 Phosphorus (P): 2800 1900 mg/kg Potassium (as K<sub>2</sub>O): Maturity Indicator: Cucumber Bioassay 1.4 0.94 % Compost:Vermiculite(v:v) 12000 7800 mg/kg Potassium (K): Emergence (%) Calcium (Ca): 1.8 1.2 % Magnesium (Mg): 0.44 0.29 % Seedling Vigor (%) Sulfate (SO<sub>4</sub>-S): 1300 900 mg/kg Description of Plants 27 18 mg/kg Boron (Total B): % 0 33.1 Moisture: % 0.13 0.085 Pathogens Results Sodium (Na): 0.27 0.18 % Fecal Coliform < 2.0 Chloride (CI): < 3 4.71 Salmonella pH Value: NA unit Bulk Density : 18 27 lb/cu ft Date Tested: 26 Oct. 12 Carbonates (CaCO<sub>3</sub>): < 0.1 < 0.1 lb/ton Conductivity (EC5): 10 NA mmhos/cm % % by weight 53.8 36.0 Inerts Organic Matter: 19.0 % Plastic Organic Carbon: 28.0 % Glass 46.2 30.9 Ash: C/N Ratio 18 18 ratio Metal

< 0.5 < 0.5 < 0.5Sharps ND AgIndex 9 9 ratio Size & Volume Distribution Metals Dry wt. EPA Limit units MM % by weight % by volume BD q/cc Aluminum (AI) 5700 mg/kg 2.7 41 mg/kg > 50 0.0 0.0 0.00 Arsenic (As): 25 to 50 0.0 < 1.0 39 mg/kg 0.0 0.00 Cadmium (Cd): 12 1200 mg/kg 16 to 25 0.0 0.0 0.00 Chromium (Cr): Cobalt (Co) 2.7 mg/kg 9.5 to 16 2.5 2.5 0.35 1500 mg/kg 6.3 to 9.5 7.5 Copper (Cu): 58 8.4 0.32 Iron (Fe): 8000 mg/kg 4.0 to 6.3 8.7 10.9 0.28 300 2.0 to 4.0 Lead (Pb): mg/kg 15.5 21.0 0.26 19 < 2.0 170 mg/kg 65.9 0.41 Manganese (Mn): 57.1 -17 Bulk Density Description: <.35 Light Materials. Mercurv (Ha): < 1.0 mg/kg 75 mg/kg .35-.60 medium weight materials, >.60 Heavy Materials Molybdenum (Mo): 1.8 Nickel (Ni): 8.9 420 mg/kg Analyst: Assaf Sadeh Selenium (Se): < 1.036 mg/kg 160 2800 mq/kg Zinc (Zn):

Sample was received and handled in accordance with TMECC procedures.

Account No	.:	Date Received	26 Oct. 12	)
2100765 - 1	/2 - 6908	Sample i.d.	Zone-3 Cι	ure
Group:	Oct.12 D No. 22	Sample I.d. No.	1/2	2100765

#### Is Your Compost Stable?

Page one of three

Respiration Rate	Biodegradation Rate of Your Pile
23 mg CO2-C/	<u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u>
g OM/day	< Stable > [< Moderately Unstable>   < Unstable > [< High For Mulch
Biologically Available Carb	on (BAC) Optimum Degradation Rate
23 mg CO2-C/	<u>+++++++++++++++++++++++++++++++++++++</u>
g OM/day	< Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > Stable > S

#### Is Your Compost Mature?

AmmoniaN/NitrateN ratio			
35 Ratio	+++++++++++++++++++++++++++++++++++++++	· + + + + + + + + + + + + + + + + + + +	+++++++++++++++++++++++++++++++++++++++
	VeryMature> <	Mature	> < Immature
Ammonia N ppm			
1500 mg/kg	++++++++++++++++++++++++++++++++++++++	+++ <b>+</b> +++++ <b>+</b> ++++++++++++++++++++++++	+++++++++++++++++++++++++++++++++++++++
dry wt.	VeryMature> <	Mature	>< Immature
Nitrate N ppm			
43 mg/kg	+++++++++++++++++++++++++++++++++++++++	+++++++++++++++++++++++++++++++++++++++	
dry wt.	< Immature	> < Matur	e
pH value			
4.71 units	<b>┊</b> ╋╋┿╋╋╋╋╋╋	<b>\ <del>\</del> + <del>\ + + + + + + + + + + + + + + + + + </del></b>	
	< Immature		> < Mature > < Immature
Cucumber Emergence			
100.0 percent	*****	<b>\+++++++++</b> +++++++++++++++++++++++++++	******
	< Immature		> < Mature

#### Is Your Compost Safe Regarding Health?

Fecal Coliform	
< 1000 MPN/g dry wt.	+++++
	< Safe > < High Fecal Coliform
Salmonella	
Less than 3 /4g dry wt.	+++++
	<safe (none="" detected)=""> &lt; High Salmonella Count(&gt; 3 per 4 grams)</safe>
Metals US EPA 503	
Pass dry wt.	+++++++
-	<all metals="" pass=""> &lt; One or more Metals Fail</all>

#### Does Your Compost Provide Nutrients or Organic Matter?

Nutrients (N+P2O5+K2O)					
3.6 Percent	*********				
dry wt.	<low>&lt; Average &gt;&lt; High Nutrient Content</low>				
AgIndex (Nutrients / Sodiun	n and Chloride Salts) ((N+P2O5+K2O) / (Na + Cl))				
9 Ratio	+++++++++++++++++++++++++++++++++++++++				
	Na & Cl >   < Nutrient and Sodium and Chloride Provider >   < Nutrient Provider				
Plant Available Nitrogen (P/	AN) Estimated release for first season				
10 lbs/ton	+++++++++++++++++++++++++++++++++++++++				
wet wt.	Low Nitrogen Provider> < Average Nitrogen Provider >  <high nitrogen="" provider<="" td=""></high>				
C/N Ratio					
18 Ratio	+++++++++++++++++++++++++++++++++++++++				
	< Nitrogen Release > < N-Neutral > < N-Demand> < High Nitrogen Demand				
Soluble Available Nutrients	& Salts (EC5 w/w dw)				
10 mmhos/cm	+++++++++++++++++++++++++++++++++++++++				
dry wt.	SloRelease>]< Average Nutrient Release Rate >] <high available="" nutrionts<="" td=""></high>				
Lime Content (CaCO3)					
0 Lbs/ton	+				
dry wt.	< Low > < Average _> < High Lime Content (as CaCO3)				

#### What are the physical properties of your compost?

Percent Ash	
46.2 Percent	+++++++++++++++++++++++++++++++++++++++
dry wt.	< High Organic Matter > < Average > < High Ash Content
Sieve Size % > 6.3 MM (0.2	5")
10.0 Percent	╅┿┿┿┿┿┿┿┿┿┿┿┿┿┿┿┿┿┿┿┿┿┿┿┿┿┿┿┿┿┿┿┿┿┿┿┿┿┿
dry wt.	All Uses > < Size May Restrict Uses for Potting mix and Golf Courses

Account No.: 2100765 - 1/2 - 6908 Group: Oct.12 D No. 22 Date Received Sample i.d. Sample I.d. No. 26 Oct. 12 Zone-3 Cure 1/2 2100765

#### INTERPRETATION:

#### Is Your Compost Stable? Respiration Rate

23 High-for mulch

mg CO2-C/g OM/dav

The respiration rate is a measurement of the biodegradation rate of the organic matter in the sample (as received). The respiration rate is determined by measuring the rate at which CO2 is released under optimized moisture and temperature conditions.

#### Biologically Available Carbon 23 High-for mulch

#### mg CO2-C/g OM/day

Biologically Available Carbon (BAC) is a measurement of the rate at which CO2 is released under optimized moisture, temperature, porosity, nutrients, pH and microbial conditions. If both the RR and the BAC test values are close to the same value, the pile is optimized for composting. If both values are high the compost pile just needs more time. If both values are low the compost has stabilized and should be moved to curing. BAC test values that are higher than RR indicate that the compost pile has stalled. This could be due to anaerobic conditions, lack of available nitrogen due to excessive air converting ammonia to the unavailable nitrate form, lack of nitrogen or other nutrients due to poor choice of feedstock, pH value out of range, or microbes rendered non-active. *Is Your Compost Mature?* 

#### AmmoniaN:NitrateN ratio

35 immature

		C
		tł
Ammonia N	ppm	s
1500	immature	ir
Nitrate N pp	om	а
43	immature	a
pH value		F
4.71	immature	c
		c

Composting to stabilize carbon can occur at such a rapid rate that sometimes phytotoxins remain in the compost and must be neutralized before using in high concentrations or in high-end uses. This step is called curing. Typically ammonia is in excess with the break-down of organic materials resulting in an increase in pH. This combination results in a loss of volatile ammonia (it smells). Once this toxic ammonia has been reduced and the pH drops, the microbes convert the ammonia to nitrates. A low ammonia + high nitrate score is indicative of a mature compost, however there are many exceptions. For example, a compost with a low pH (<7) will retain ammonia, while a compost with high lime content can lose ammonia before the organic fraction becomes stable. Composts must first be stable before curing indicators apply.

#### **Cucumber Bioassay**

100.0 Percent

Cucumbers are chosen for this test because they are salt tolerant and very sensitive to ammonia and organic acid toxicity. Therefore, we can germinate seeds in high concentrations of compost to

measure phytotoxic effects without soluble salts being the limiting factor. Values above 80% for both percent emergence and vigor are indicative of a well-cured compost. Exceptions include very high salts that affect the cucumbers, excessive concentrations of nitrates and other nutrients that will be in range when formulated to make a growing media. In addition to testing a 1:1 compost: vermiculite blend, we also test a diluted 1:3 blend to indicate a more sensitive toxicity level.

#### Is Your Compost Safe Regarding Health?

#### Fecal Coliform

< 1000 / g dry wt. Fecal coliforms can survive in both aerobic and anaerobic conditions and is common in all initial compost piles. Most human pathogens occur from fecal matter and all fecal matter is loaded in fecal coliforms. Therefore fecal coliforms are used as an indicator to determine if the chosen method for pathogen reduction (heat for compost) has met the requirements of sufficient temperature, time and mixing. If the fecal coliforms are reduced to below 1000 per gram dry wt. it is assumed all others pathogens are eliminated. Potential problems are that fecal coliform can regrow during the curing phase or during shipping. This is because the conditions are now more favorable for growth than during the composting process.</p>
Salmonella Bacteria

Less than 3 3 / 4g dry wt. Salmonella is not only another indicator organism but also a toxic microbe. It has been used in the case of biosolids industry to determine adequate pathogen reduction.

#### Metals

Pass The ten heavy metals listed in the EPA 503 regulations are chosen to determine if compost can be applied to ag land and handled without toxic effects. Most high concentrations of heavy metals are derived from woodwaste feedstock such as chrome-arsenic treated or lead painted demolition wood. Biosolids are rarely a problem. *Does Your Compost Provide Nutrients or Organic Matter?* 

#### Nutrients (N+P2O5+K2O)

3.6 Average nutrient content

This value is the sum of the primary nutrients Nitrogen, Phosphorus and Potassium. Reported units are consistent with those found on fertilizer formulations. A sum greater than 5 is indicative of a compost with high nutrient content, and best used to supply nutrients to a receiving soil. A sum below 2 indicates low nutrient content, and is best-used to improve soil structure via the addition of organic matter. Most compost falls between 2 and 5.

Page two of three

Account No.:		Date Received	26 Oct. 12	
2100765 - 1/2	- 6908	Sample i.d.	Zone-3 Cure	
Group:	Oct.12 D No. 22	Sample I.d. No.	1/2	2100765

AgIndex (Nutrients/Na+CI)

Page three of three

9 Average nutrient ratio Composts with low AgIndex values have high concentrations of sodium and/or chloride compared to nutrients. Repeated use of a compost with a low AgIndex (< 2) may result in sodium and/or chloride acting as the limiting factor compared to nutrients, governing application rates. These composts may be used on well-draining soils and/or with salt-tolerant plants. Additional nutrients form another source may be needed if the application rate is limited by sodium or chloride. If the AgIndex is above 10, nutrients optimal for plant growth will be available without concern of sodium and/or chloride toxicity. Composts with an AgIndex of above 10 are good for increasing nutrient levels for all soils. Most composts score between 2 and 10. Concentrations of nutrients, sodium, and chloride in the receiving soil should be considered when determining compost application rates. The AgIndex is a product of feedstock quality. Feedstock from dairy manure, marine waste, industrial wastes, and halophytic plants are likely to produce a finished compost with a low AgIndex.

#### Plant Available Nitrogen (lbs/ton)

10 Average N Provider Plant Available Nitrogen (PAN) is calculated by estimating the release rate of Nitrogen from the organic fraction of the compost. This estimate is based on information gathered from the BAC test and measured ammonia and nitrate values. Despite the PAN value of the compost, additional sources of Nitrogen may be needed during he growing season to offset the Nitrogen demand of the microbes present in the compost. With ample nutrients these microbes can further breakdown organic matter in the compost and release bound Nitrogen. Nitrogen demand based on a high C/N ratio is not considered in the PAN calculation because additional Nitrogen should always be supplemented to the receiving soil when composts with a high C/N ratio are applied. **C/N Ratio** 

18 Indicates immaturity As a guiding principal, a C/N ratio below 14 indicates maturity and above 14 indicates immaturity, however, there are many exceptions. Large woodchips (>6.3mm), bark, and redwood are slow to breakdown and therefore can result in a relatively stable product while the C/N ratio value is high. Additionally, some composts with chicken manure and/or green grass feedstocks can start with a C/N ratio below 15 and are very unstable. A C/N ratio below 10 supplies Nitrogen, while a ratio above 20 can deplete Nitrogen from the soil. The rate at which Nitrogen will be released or used by the microbes is indicated by the respiration rate (BAC). If the respiration rate is too high the transfer of Nitrogen will not be controlable. Soluble Nutrients & Salts (EC5 w/w dw - mmhos/cm)

10 High salts This value refers to all soluble ions including nutrients, sodium, chloride and some soluble organic compounds. The concentration of salts will change due to the release of salts from the organic matter as it degrades, volatilization of ammonia, decomposition of soluble organics, and conversion of molecular structure. High salts + high AgIndex is indicative of a compost high in readily available nutrients. The application rate of these composts should be limited by the optimum nutrient value based on soil analysis of the receiving soil. High Salts + low AgIndex is indicative of a compost low in nutrients with high concentrations of sodium and/or chloride. Limit the application rate according to the toxicity level of thesodium and/or chloride. Low salts indicates that the compost can be applied without risking salt toxicity, is likely a good source of organic matter, and that nutrients will release slowly over time.

#### Lime Content (lbs. per ton)

0 Low lime content Compost high in lime or carbonates are often those produced from chicken manure (layers) ash materials, and lime products. These are excellent products to use on a receiving soil where lime has been recommended by soil analysis to raise the pH. Composts with a high lime content should be closely considered for pH requirements when formulating potting mixes.

#### **Physical Properties**

#### Percent Ash

46.2 Average ash content Ash is the non-organic fraction of a compost. Most composts contain approximately 50% ash (dry weight basis). Compost can be high in ash content for many reasons including: excess minerilzation(old compost), contamination with soil base material during turning, poor quality feedstock, and soil or mineral products added. Finding the source and reducing high ash content is often the fastest means to increasing nutrient quality of a compost.

#### Particle Size % > 6.3 MM (0.25")

10.0 May restrict use Large particles may restrict use for potting soils, golf course topdressings, seed-starter mixes, and where a fine size distribution is required. Composts with large particles can still be used as excellent additions to field soils, shrub mixes and mulches.

#### **Particle Size Distribution**

Each size fraction is measured by weight, volume and bulk density. These results are particularly relevent with decisions to screen or not, and if screening, which size screen to use. The bulk density indicates if the fraction screened is made of light weight organic material or heavy mineral material. Removing large mineral material can greatly improve compost quality by increasing nutrient and organic concentrations.

Appendix:		
	Estimated available nutrients for use when	n calculating application rates
Plant Available Nitrogen (PAN) calculations:		lbs/ton (As Rcvd.)
PAN = (X * (organic N)) + ((NH4-N) + (NO3-N))		
X value = If BAC < 2 then X = 0.1	Plant Available Nitrogen (PAN)	9.9
If BAC =2.1 to 5 then X = 0.2	Ammonia (NH4-N)	2.00
If BAC =5.1 to 10 then X = 0.3	Nitrate (NO3-N)	0.06
If BAC > 10 then $X = 0.4$	Available Phosphorus (P2O5*0.64)	5.5
Note: If C/N ratio > 15 additional N should be applied.	Available Potassium (K2O)	18.8

## Valley Tech

2120 South 'K' Street Tulare, California 93274 Office: 559 - 688-5684 Fax: 559 - 688-5768

AGRICULTURAL LABORATORY SERVICES

## REPORT of ANALYSIS

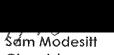
Client:	HARVEST POWER CALIFORNIA, LLC	
	24478 ROAD 140	
	TULARE, CALIFORNIA 93274	

Lab No.: 08-08M167 Sampled Date: 08-08-12 Report Date: 08-14-12 Submitted By: JOHN JONES

Material: COMPOST

	* * * * * *	- As Recei	ved Basis -	na ya wa 10 Ay ka	]	00% D.M.	8asis
	%	%	%		%	%	%
Sample Description	H <sub>2</sub> O	Carbon	Nitrogen	C/N	H <sub>2</sub> O	Carbon	Nitrogen
1. Zone 1 Composite #1 08/06/12	48.1	14.7	0.56	25.9	*	28.2	1.09
2. Zone 1 Composite #2 08/07/12	39.0	15.6	0.96	16.3	-	25.6	1.57

If you should have any questions, please call. Thank you.



Chemist

Analysis by TMECC Method 03.09

TMECC - "Test Methods for the Examination of Composting and Compost," US Composting Council, June 2002



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AGRICULTURAL LABORATORY SERVICES

## REPORT of ANALYSIS

Client:	HARVEST POWER CAL	IFORNIA,	LLC
	24478 ROAD 140		
	TULARE, CALIFORNIA	93274	

Lab No.: 08-13M298 Sampled Date: 08-13-12 Report Date: 08-24-12 Submitted By: JOHN JONES

#### Material: COMPOST LOCATION: SJVAPCD

	As Received Basis				100% D.M. Basis		
Town Mary Car	%	%	%		%	%	%
Sample Description	H <sub>2</sub> O	Carbon	Nitrogen	C/N	H <sub>2</sub> O	Carbon	Nitrogen
1. SJVAPCD - North	35.8	18.7	1.06	17.6	÷	29.1	1.65
2. SJVAPCD - South	53.1	15.0	0.77	19.5	**	31.9	1.64

e any questions, please call. Thank you.



Søm Modesif Chemist

Analysis by TMECC Method 03.09

TMECC - "Test Methods for the Examination of Composting and Compost," US Composting Council, June 2002



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AGRICULTURAL LABORATORY SERVICES

## REPORT of ANALYSIS

Client:	HARVEST POWER CALIFORNIA, LLC
	24478 ROAD 140
	TULARE, CALIFORNIA 93274

Lab No.: 08-20M549 Sampled Date: 08-17-12 Report Date: 08-24-12 Submitted By: JOHN JONES

Material:	COMPOST
LOCATION:	ZONE 3

	As Received Basis				100% D.M. Basis			
	%	%	%		%	%	%	
Sample Description	H <sub>2</sub> O	Carbon	Nitrogen	C/N	H <sub>2</sub> O	Carbon	Nitrogen	
1. Zone 3 - North End	56.6	11.9	0.58	20.5	-	27.3	1.34	
2. Zone 3 - South End	57.2	16.5	0.62	26.6	-	38.6	1.44	

If you should have any questions, please call. Thank you.

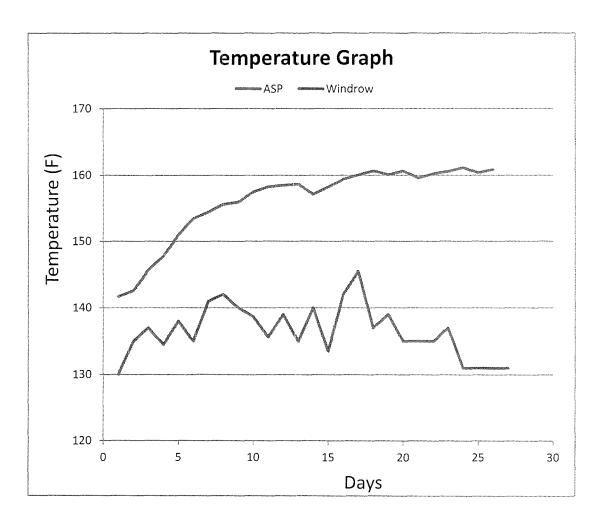


Chemist

Analysis by TMECC Method 03.09

TMECC - "Test Methods for the Examination of Composting and Compost." US Composting Council. June 2002

	ASP	Control
Day	ASF	
0		125
1	142	130
2	143	135
3	146	137
4	148	135
5	151	138
6	153	135
7	154	141
8	156	142
9	156	140
10	157	139
11	158	136
12	158	139
13	159	135
14	157	140
15	158	134
16	159	142
17	160	146
18	161	137
19	160	139
20	161	135
21	160	135
22	160	135
23	161	137
24	161	131
25	160	131
26	161	131
27		131
28		131



ACP Final Report fo Valley Air TAP Program, May 2013, Appendix G, Temperature Graph

	ACP Final	Report fo	Valley Air TAP Program, May	2013, Appendix G, Windrow	Temperatures
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F		T	T	Y		
Day	Zone	Temp 1	Temp 2		# of Values	1
0	3	124	126	250	2	125
1	3	126	134	260	2	130
2	3	138	132	270	2	135
3	3	136	138	274	2	137
4	2	134	138	272	2	136
4	3	134	132	266	2	133
5	2	144	144	288	2	144
5	3	134	136	270	2	135
6	2	138	132	270	2	135
7	2	138	136	274	2	137
7	3	146	144	290	2	145
8	1	138	136	274	2	137
8	3	148	146	294	2	147
9	1	140	142	282	2	141
9	2	140	142	282	2	141
9	3	136	140	276	2	138
10	1	138	138	276	2	138
10	2	144	146	290	2	145
10	3	132	134	266	2	133
11	1	133	133	266	2	133
11	2	140	142	282	2	141
11	3	132	134	266	2	133
12	2	142	144	286	2	143
12	3	136	134	270	2	135
13	1	132	134	266	2	133
13	2	138	136	274	2	137
14	1	134	136	270	2	135
14	2	146	144	290	2	145
15	1	134	136	270	2	135
15	3	132	132	264	2	132
16	1	136	138	254	2	137
16	2	156	158	314	2	157
17	1	138	134	272	2	136
17	2	154	156	310	2	155
18	1	136	134	270	2	135
18	2	138	140	278	2	139
19	2	138	140	278	2	139
20	1	134	136	270	2	135
20	2	134	136	270	2	135
21	1	134	138	274	2	137
21	2	130	130	266	2	133
22	1	134	134	270	2	135
23	1	136	134	274	2	135
23	1	130	132	266	2	133
24	2	128	132	258	2	129
24	1	130	130	258	2	131
23	1	130	132	262	2	131
40	1	130	132	202	4	101

Day	Temp Sum	# of Values	Average Temp
0	125	1	125
1	130	1	130
2	135	1	135
3	137	1	137
4	269	2	135
5	279	2	140
6	135	1	135
7	282	2	141
8	284	2	142
9	420	3	140
10	416	3	139
11	407	3	136
12	278	2	139
13	270	2	135
14	280	2	140
15	267	2	134
16	294	2	147
17	291	2	146
18	274	2	137
19	139	1	139
20	270	2	135
21	270	2	135
22	135	1	135
23	137	1	137
24	262	2	131
25	131	1	131
26	131	1	131
27	131	1	131
28	131	1	131

#### ACP Final Report fo Valley Air TAP Program, May 2013, Appendix G, ASP Temperatures

			T-X-1			T-X-2			T-X-3	L			ombined		<b> </b>
Zone	Day	2'	3'	5'	2'	3'	5'	2'	3'	5'	Average	Day	Sum	# of Days	Average
1	0												0 341	1	140
	1												1 143	1	142
	2												2 287	2	14
	3												3 289	2	144
	4	138	154	154	140	151	158	166	164	146	152		4 448	3	
		110		1.54	140	1.51	130	100	104	140	1.52			2	
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#### ACP Final Report fo Valley Air TAP Program, May 2013, Appendix H, Water Use Calculations

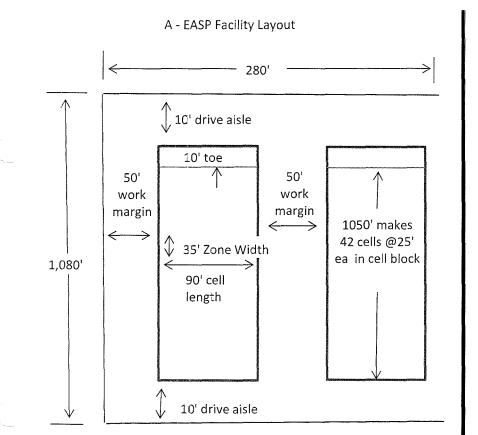
Composting in Windrows vs. Extended Aerated Static Piles EASP data is from the 2012 TAP research project in Tulare, CA. Windrow data is from the City of Bakersfield's normal operation for reference.

#### Table One - Windrow Turning Method

(Water applied to normal 2,962 cubic yard windrows in Bakersfield) Note: Windrows are watered within 3 hours prior to turning to achieve ball test for moisture per air district rule 4566.	Gallons per Water Truck <u>Load</u>	# Loads per Watering <u>Event*</u>	Gallons per <u>Event</u>	# of Events per <u>Pile</u>	Gallons per <u>Pile</u>	Gallons per <u>Cubic Yard</u>
1. Hydrate newly formed windrow with water truck	4,000	4	16,000	1	16,000	5
2. Hydrate windrow prior to 6 turnings (5 in 15 days PFRP and 1 @ day 22)	4,000	3	12,000	6	<u>72,000</u>	<u>24</u>
Total for 22 day active phase:					88,000	30

\*averaged for seasonal variation

(Water applied to each 506 cubic yard pile in Tulare)	Gallons per	Minutes per	Gallons	# of Events	Gallons	Gallons
Note: Item 2 (compost cover water) could be reduced since	Minute	Watering	per	per	per	per
there was significant extra water runoff during pilot program.	<u>Flow</u>	Event*	Event	<u>Pile</u>	<u>Pile</u>	Cubic Yard
Hydrate incoming feedstock with 1 1/4" fire hose as pile is built	35	240	8,400	1	8,400	17
Moisten compost cover with 3 lawn sprinklers 6x/day till day 22	11	6	66	63	<u>4,158</u>	<u>8</u>
Total for 22 day active phase:					12,558	25

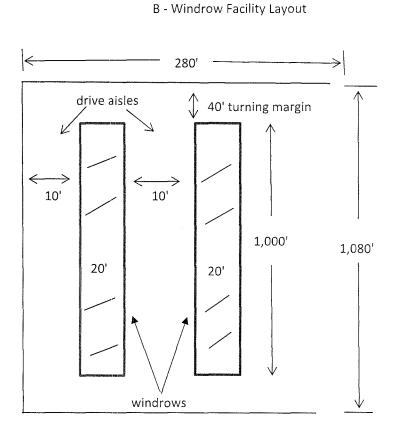


ACP Final Report fo Valley Air TAP Program, May 2013, Appendix I, Facility Layour Comparison

#### Footprint:

• 1080' X 140' = 151,200 sq.ft. / 43,560 ft  $^{2}$ /acre = 3.5 acres per cell block Volume/Acre:

- 740 yd/cell X 42 cells/cell block = 31,080 cu yd per cell block
- Divide 3.5 acres per cell block = 8,880 cu.yd/acre



#### Footprint:

- 1080' X 30' = 32,400 sq.ft. / 43,560 ft per acre = 0.75 acres per row Volume/Acre:
  - 2,963 cu.yd/row
  - Divide 0.75 acres/row = 3,950 cu.yd/acre

#### ACP Final Report fo Valley Air TAP Program, May 2013, Appendix I, 100,000 TPY Facility Calculation

100,000 Ton/Year Facility Example

Number of cycles or turn over per year is facility specific. Therefore, assume range of four cycles (90 days) or five cycles (70 days)

#### Extended Aerated Static Pile (EASP)

8,880 cu yd/acre	
2.5 cu yd/ton	= 3,552 tons/acre
<u>90 day</u> (4 cycles year)	:
100,000 tons/year	
4 cycles/year	= 25,000 tons/cycle
25,000 tons/cycle	
3,552 tons/acre	= 7.03 acre/cycle
<u>70 day</u> (5 cycles year):	
100,000 tons/year	
5 cycles/year	= 20,000 tons/cycle
20,000 tons/cycle	
3,552 tons/acre	= 5.63 acre/cycle

#### Windrow

	3,950 cu yd/acre 2.5 cu yd/ton	= 1,580 tons/acre
den and a second	<u>90 day</u> (4 cycles year	-):
	100,000 tons/year	_
	4 cycles/year	= 25,000 tons/cycle
	25,000 tons/cycle	_
	1,580 tons/acre	= 15.8 acre/cycle
	<u>70 day</u> (5 cycles year):	
	100,000 tons/year	
	5 cycles/year	= 20,000 tons/cycle
	20,000 tons/cycle	
	1,580 tons/acre	= 12.65 acre/cycle

#### ACP Final Report fo Valley Air TAP Program, May 2013, Appendix I, Formula for Land Use Reduction

100,000 Ton/Year Facility Example (Short Formula)

#### Extended Aerated Static Pile (EASP)

8,880 cu yd/acre

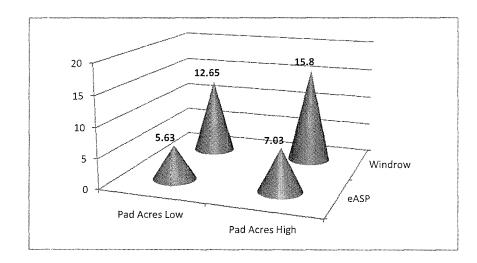
	1	Pad Acres	Pad Acres
2.5 cu yd/ton = 3,552 tons/acre	l	ow	High
90 day (4 cycles year): <b>7.03 acre/cycle</b>	eASP	5.63	7.03
70 day (5 cycles year): <b>5.63 acre/cycle</b>	Windrow	12.65	15.8

#### Windrow

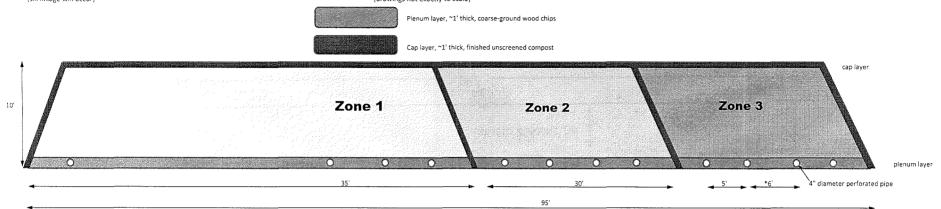
3,950 cu yd/acre	
2.5 cu yd/ton = 1,580 tons/acre	
90 day (4 cycles year): 15.8 acre/cycle	
70 day (5 cycles year): 12.65 acre/cycle	

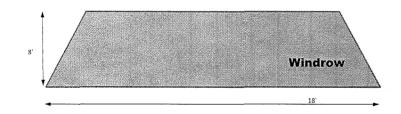
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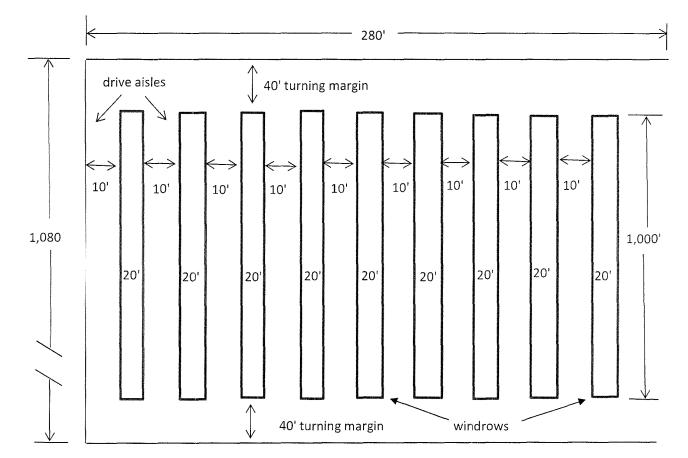
ACP Final Report fo Valley Air TAP Program, May 2013, Appendix I, Starting cross-section dimensions for ASP and Windrow (shrinkage will occur) (drawings not exactly to scale)





\* Center two aeration pipes tend to be slightly farther apart due to presence of blower and T-connector.

ACP Final Report fo Valley Air TAP Program, May 2013, Appendix I, Windrow Facility Layout



#### Footprint:

• 1080' X 30' = 32,400 sq.ft. / 43,560 ft per acre = 0.75 acre per row

#### Volume/Acre:

- 2,963 cu.yd/row
- Divide 0.75 acres/row = 3,950 cu.yd/acre

Appendix 3

Soil Survey for Soils Within Project Boundary



United States Department of Agriculture

Natural Resources Conservation Service A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

## Custom Soil Resource Report for Eastern Stanislaus Area, California

West Main Compost Facility



## Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/? cid=nrcs142p2 053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey Information.

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# Contents

Preface	2
How Soil Surveys Are Made	
Soil Map	8
Soil Map	
Legend	10
Map Unit Legend	11
Map Unit Descriptions	11
Eastern Stanislaus Area, California	13
DwA—Dinuba sandy loam, slightly saline-alkali, 0 to 1 percent slopes	13
HkbA—Hilmar loamy sand, slightly saline-alkali, 0 to 1 percent slopes	14
References	16

4

## How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

# Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

8



	MAP LEGEND			MAP INFORMATION	
	Area of Interest (AOI) Area of Interest (AOI)		oil Area The soil su ony Spot 1:24,000.	The soil surveys that comprise your AOI were mapped at 1:24,000.	
	Soil Map Unit Polygons Soil Map Unit Lines Soil Map Unit Points ial Point Features Blowout Borrow Pit Dlay Spot Dlosed Depression Gravel Pit Gravelly Spot Landfill Lava Flow Marsh or swamp Mine or Quarry Miscellaneous Water Perennial Water Rock Outcrop Saline Spot Sancy Spot Severely Eroded Spot	Very S Wet Sp Wet Sp Other Specia Water Features Stream Transportation HH Rails US Ro US Ro Kajor H Cocal F Background	itony Spot pot al Line Features hs and Canals ate Highways nutes Roads	<ul> <li>1:24,000.</li> <li>Warning: Soil Map may not be valid at this scale.</li> <li>Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.</li> <li>Please rely on the bar scale on each map sheet for map measurements.</li> <li>Source of Map: Natural Resources Conservation Service Web Soil Survey URL: Coordinate System: Web Mercator (EPSG:3857)</li> <li>Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.</li> <li>This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.</li> <li>Soil Survey Area: Eastern Stanislaus Area, California Survey Area Data: Version 14, May 29, 2020</li> <li>Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.</li> </ul>	
d } Ø	Slide or Slip			Date(s) aerial images were photographed: Jun 19, 2015—Oct 29, 2017 The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.	

Map Unit Symbol	Map Unit Name	Acres in AOI	ercent of AOI
DwA	Dinuba sandy loam, slightly saline-alkali, 0 to 1 percent slopes	6.8	29.3%
HkbA	Hilmar loamy sand, slightly saline-alkali, 0 to 1 percent slopes	16.4	70.7%
Totals for Area of Interest		23.2	100.0%

## **Map Unit Legend**

## **Map Unit Descriptions**

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The

delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An association is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

### Eastern Stanislaus Area, California

#### DwA—Dinuba sandy loam, slightly saline-alkali, 0 to 1 percent slopes

#### **Map Unit Setting**

National map unit symbol: hjbq Elevation: 100 to 500 feet Mean annual precipitation: 12 inches Mean annual air temperature: 63 degrees F Frost-free period: 250 days Farmland classification: Prime farmland if irrigated

#### **Map Unit Composition**

*Dinuba and similar soils:* 85 percent *Minor components:* 15 percent *Estimates are based on observations, descriptions, and transects of the mapunit.* 

#### **Description of Dinuba**

#### Setting

Landform: Alluvial fans Landform position (two-dimensional): Toeslope Landform position (three-dimensional): Talf Down-slope shape: Linear Across-slope shape: Linear Parent material: Alluvium derived from granite

#### **Typical profile**

H1 - 0 to 10 inches: sandy loam

- H2 10 to 30 inches: sandy loam
- H3 30 to 60 inches: very fine sand, silt loam

#### **Properties and qualities**

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Slightly saline to moderately saline (4.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum: 5.0
Available water capacity: Low (about 5.4 inches)

#### Interpretive groups

Land capability classification (irrigated): 2w Land capability classification (nonirrigated): 4s Hydrologic Soil Group: C Hydric soil rating: No

#### **Minor Components**

#### Hanford

Percent of map unit: 5 percent

Hydric soil rating: No

#### Hilmar

*Percent of map unit:* 5 percent *Hydric soil rating:* No

#### Fresno

*Percent of map unit:* 5 percent *Hydric soil rating:* No

#### HkbA—Hilmar loamy sand, slightly saline-alkali, 0 to 1 percent slopes

#### Map Unit Setting

National map unit symbol: hjd7 Elevation: 300 to 900 feet Mean annual precipitation: 11 inches Mean annual air temperature: 63 degrees F Frost-free period: 230 to 300 days Farmland classification: Not prime farmland

#### **Map Unit Composition**

*Hilmar and similar soils:* 85 percent *Minor components:* 15 percent *Estimates are based on observations, descriptions, and transects of the mapunit.* 

#### **Description of Hilmar**

#### Setting

Landform: Fan skirts Landform position (two-dimensional): Toeslope Landform position (three-dimensional): Talf Down-slope shape: Linear Across-slope shape: Linear Parent material: Wind modified sandy alluvium derived from granite over silty alluvium derived from granite

#### Typical profile

H1 - 0 to 7 inches: loamy sand

H2 - 7 to 21 inches: sand

H3 - 21 to 29 inches: sandy loam

H4 - 29 to 60 inches: very fine sandy loam, silt loam

#### **Properties and qualities**

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare

*Frequency of ponding:* None *Calcium carbonate, maximum content:* 5 percent *Maximum salinity:* Slightly saline to moderately saline (4.0 to 8.0 mmhos/cm) *Sodium adsorption ratio, maximum:* 5.0 *Available water capacity:* Moderate (about 7.2 inches)

#### Interpretive groups

Land capability classification (irrigated): 3w Land capability classification (nonirrigated): 4s Hydrologic Soil Group: C Hydric soil rating: No

#### **Minor Components**

#### Dinuba

Percent of map unit: 10 percent Hydric soil rating: No

#### Delhi

Percent of map unit: 5 percent Hydric soil rating: No

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Soil Survey for Soils Within 1-mile of Project Boundary



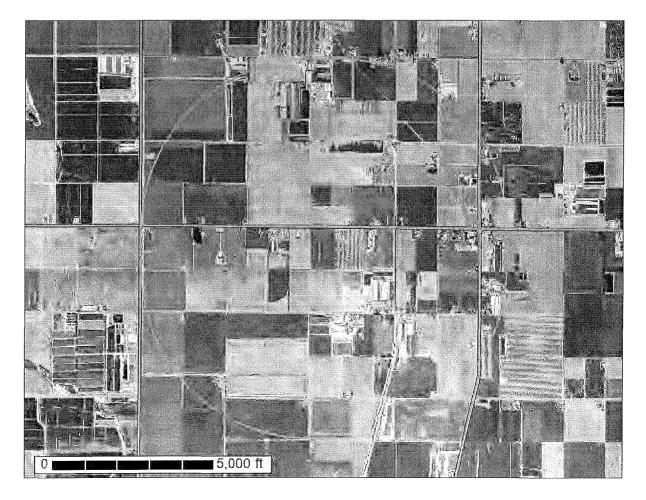
USDA United States Department of Agriculture

> Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

## **Custom Soil Resource Report for Eastern Stanislaus** Area, California

1-mi Buffer Surrounding West **Main Compost Facility** 



## Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/? cid=nrcs142p2 053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey Information.

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# Contents

Preface	. 2
How Soil Surveys Are Made	
Soil Map	. 8
Soil Map	9
Legend	10
Map Unit Legend	11
Map Unit Descriptions	11
Eastern Stanislaus Area, California	14
DrA—Dinuba sandy loam, 0 to 1 percent slopes	14
DwA-Dinuba sandy loam, slightly saline-alkali, 0 to 1 percent slopes	15
DxA—Dinuba sandy loam, moderately saline-alkali, 0 to 1 percent	
slopes	16
DzA-Dinuba sandy loam, very poorly drained variant, slightly saline-	
alkali, 0 to 1 percent slopes	17
FtA—Fresno sandy loam, slightly saline-alkali, 0 to 1 percent slopes	18
FuA—Fresno sandy loam, moderately saline-alkali, 0 to 1 percent	
slopes	20
HfA—Hilmar loamy sand, 0 to 1 percent	21
HkbA—Hilmar loamy sand, slightly saline-alkali, 0 to 1 percent slopes	22
WbA—Waukena fine sandy loam, moderately saline-alkali, 0 to 1	
percent slopes	23
WdA—Waukena sandy loam, slightly saline-alkali, 0 to 1 percent slopes	25
References	27

4

## **How Soil Surveys Are Made**

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

# Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

8

### Custom Soil Resource Report Soil Map



	MAP LEGEND			MAP INFORMATION	
Area of Interest (AOI)		🗃 Spoil Area		The soil surveys that comprise your AOI were mapped at	
	Area of Interest (AOI)	۵	Stony Spot	1:24,000.	
Soils		à	Very Stony Spot	Please rely on the bar scale on each map sheet for map	
	Soil Map Unit Polygons	Ŷ	Wet Spot	measurements.	
A CONTRACT	Soil Map Unit Lines	*	Other	Source of Map: Natural Resources Conservation Service	
<b>*</b>	Soil Map Unit Points	نىيە تەرىپ	Special Line Features	Web Soil Survey URL:	
Special	Point Features	Water Fea		Coordinate System: Web Mercator (EPSG:3857)	
ဖ	Blowout	water rea	Streams and Canals	Maps from the Web Soil Survey are based on the Web Mercat	
8	Borrow Pit	Transport	tation	projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the	
ж	Clay Spot	1-1-1	Rails	Albers equal-area conic projection that preserves area, such as the Albers equal-area conic projection, should be used if more	
$\diamond$	Closed Depression	and a	Interstate Highways	accurate calculations of distance or area are required.	
X	Gravel Pit	girilegti	US Routes	This product is generated from the USDA-NRCS certified data	
	Gravelly Spot	5732 1	Major Roads	of the version date(s) listed below.	
Q	Landfill	and r	Local Roads	Soil Survey Area: Eastern Stanislaus Area, California	
Â	Lava Flow	Backgrou		Survey Area Data: Version 14, May 29, 2020	
44	Marsh or swamp	Dackgrot	Aerial Photography	<b>2</b> ··· ··· ··· ·· ·· ·· ·· ·· ·· ·· ·· ··	
~ *				Soil map units are labeled (as space allows) for map sca 1:50,000 or larger.	
Ô	Miscellaneous Water			-	
	Perennial Water			Date(s) aerial images were photographed: Jun 19, 2015Oc 29, 2017	
0	Rock Outcrop			20,2011	
₩,				The orthophoto or other base map on which the soil lines were	
÷	Saline Spot			compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor	
***	Sandy Spot			shifting of map unit boundaries may be evident.	
	Severely Eroded Spot				
¢	Sinkhole				
ò	Slide or Slip				
ø	Sodic Spot				

## Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
DrA	Dinuba sandy loam, 0 to 1 percent slopes	27.7	1.1%
DwA	Dinuba sandy loam, slightly saline-alkali, 0 to 1 percent slopes	1,690.9	66.7%
DxA	Dinuba sandy loam, moderately saline-alkali, 0 to 1 percent slopes	16.2	0.6%
DzA	Dinuba sandy loam, very poorly drained variant, slightly saline- alkali, 0 to 1 percent slopes	14.9	0.6%
FtA	Fresno sandy loam, slightly saline-alkali, 0 to 1 percent slopes	79.3	3.1%
FuA	Fresno sandy loam, moderately saline-alkali, 0 to 1 percent slopes	110.2	4.4%
HfA	Hilmar loamy sand, 0 to 1 percent	174.8	6.9%
HkbA	Hilmar loamy sand, slightly saline-alkali, 0 to 1 percent slopes	216.2	8.5%
WbA	Waukena fine sandy loam, moderately saline-alkali, 0 to 1 percent slopes	86.4	3.4%
WdA	Waukena sandy loam, slightly saline-alkali, 0 to 1 percent slopes	117.6	4.6%
Totals for Area of Interest		2,534.2	100.0%

## **Map Unit Descriptions**

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without

including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An association is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

### Eastern Stanislaus Area, California

#### DrA—Dinuba sandy loam, 0 to 1 percent slopes

#### **Map Unit Setting**

National map unit symbol: hjbl Elevation: 100 to 500 feet Mean annual precipitation: 12 inches Mean annual air temperature: 63 degrees F Frost-free period: 250 days Farmland classification: Prime farmland if irrigated

#### **Map Unit Composition**

Dinuba and similar soils: 85 percent Minor components: 15 percent Estimates are based on observations, descriptions, and transects of the mapunit.

#### **Description of Dinuba**

#### Setting

Landform: Alluvial fans Landform position (two-dimensional): Toeslope Landform position (three-dimensional): Talf Down-slope shape: Linear Across-slope shape: Linear Parent material: Alluvium derived from granite

#### Typical profile

H1 - 0 to 10 inches: sandy loam
H2 - 10 to 30 inches: sandy loam
H3 - 30 to 60 inches: very fine sand, silt loam

#### **Properties and qualities**

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water capacity: Moderate (about 7.2 inches)

#### Interpretive groups

Land capability classification (irrigated): 2w Land capability classification (nonirrigated): 4s Hydrologic Soil Group: C Hydric soil rating: No

#### **Minor Components**

#### Hilmar

Percent of map unit: 5 percent Hydric soil rating: No

#### Hanford

Percent of map unit: 5 percent Hydric soil rating: No

#### Fresno

Percent of map unit: 5 percent Hydric soil rating: No

#### DwA—Dinuba sandy loam, slightly saline-alkali, 0 to 1 percent slopes

#### **Map Unit Setting**

National map unit symbol: hjbq Elevation: 100 to 500 feet Mean annual precipitation: 12 inches Mean annual air temperature: 63 degrees F Frost-free period: 250 days Farmland classification: Prime farmland if irrigated

#### **Map Unit Composition**

*Dinuba and similar soils:* 85 percent *Minor components:* 15 percent *Estimates are based on observations, descriptions, and transects of the mapunit.* 

#### **Description of Dinuba**

#### Setting

Landform: Alluvial fans Landform position (two-dimensional): Toeslope Landform position (three-dimensional): Talf Down-slope shape: Linear Across-slope shape: Linear Parent material: Alluvium derived from granite

#### **Typical profile**

H1 - 0 to 10 inches: sandy loam
H2 - 10 to 30 inches: sandy loam
H3 - 30 to 60 inches: very fine sand, silt loam

#### **Properties and qualities**

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Slightly saline to moderately saline (4.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum: 5.0

Available water capacity: Low (about 5.4 inches)

#### Interpretive groups

Land capability classification (irrigated): 2w Land capability classification (nonirrigated): 4s Hydrologic Soil Group: C Hydric soil rating: No

#### **Minor Components**

#### Hanford

Percent of map unit: 5 percent Hydric soil rating: No

#### Hilmar

Percent of map unit: 5 percent Hydric soil rating: No

#### Fresno

Percent of map unit: 5 percent Hydric soil rating: No

# DxA—Dinuba sandy loam, moderately saline-alkali, 0 to 1 percent slopes

#### **Map Unit Setting**

National map unit symbol: hjbr Elevation: 100 to 500 feet Mean annual precipitation: 12 inches Mean annual air temperature: 63 degrees F Frost-free period: 250 days Farmland classification: Not prime farmland

#### Map Unit Composition

*Dinuba and similar soils:* 85 percent *Minor components:* 15 percent *Estimates are based on observations, descriptions, and transects of the mapunit.* 

#### **Description of Dinuba**

#### Setting

Landform: Alluvial fans Landform position (two-dimensional): Toeslope Landform position (three-dimensional): Talf Down-slope shape: Linear Across-slope shape: Linear Parent material: Alluvium derived from granite

#### **Typical profile**

H1 - 0 to 10 inches: sandy loam

H2 - 10 to 30 inches: sandy loam

H3 - 30 to 60 inches: very fine sand, silt loam

#### **Properties and qualities**

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Moderately saline to strongly saline (8.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum: 5.0
Available water capacity: Low (about 5.4 inches)

#### Interpretive groups

Land capability classification (irrigated): 4s Land capability classification (nonirrigated): 4s Hydrologic Soil Group: C Hydric soil rating: No

#### **Minor Components**

#### Hilmar

Percent of map unit: 5 percent Hydric soil rating: No

#### Hanford

*Percent of map unit:* 5 percent *Hydric soil rating:* No

#### Fresno

Percent of map unit: 5 percent Hydric soil rating: No

### DzA—Dinuba sandy loam, very poorly drained variant, slightly salinealkali, 0 to 1 percent slopes

#### Map Unit Setting

National map unit symbol: hjbt Elevation: 100 to 500 feet Mean annual precipitation: 12 inches Mean annual air temperature: 63 degrees F Frost-free period: 250 days Farmland classification: Not prime farmland

#### Map Unit Composition

Dinuba variant and similar soils: 85 percent Minor components: 15 percent Estimates are based on observations, descriptions, and transects of the mapunit.

#### **Description of Dinuba Variant**

#### Setting

Landform: Depressions Down-slope shape: Linear Across-slope shape: Linear Parent material: Alluvium derived from granite

#### **Typical profile**

H1 - 0 to 10 inches: sandy loam H2 - 10 to 30 inches: sandy loam H3 - 30 to 60 inches: very fine sand, silt loam

#### **Properties and qualities**

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Slightly saline to moderately saline (4.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum: 5.0
Available water capacity: Low (about 5.4 inches)

#### Interpretive groups

Land capability classification (irrigated): 3w Land capability classification (nonirrigated): 4w Hydrologic Soil Group: C Hydric soil rating: Yes

#### **Minor Components**

#### Hilmar

Percent of map unit: 5 percent Hydric soil rating: No

#### Hanford

Percent of map unit: 5 percent Hydric soil rating: No

#### Fresno

Percent of map unit: 5 percent Hydric soil rating: No

#### FtA—Fresno sandy loam, slightly saline-alkali, 0 to 1 percent slopes

#### Map Unit Setting

National map unit symbol: hjc3

#### **Custom Soil Resource Report**

*Elevation:* 0 to 250 feet *Mean annual precipitation:* 8 inches *Mean annual air temperature:* 63 degrees F *Frost-free period:* 250 days *Farmland classification:* Not prime farmland

#### Map Unit Composition

*Fresno and similar soils:* 85 percent *Minor components:* 15 percent *Estimates are based on observations, descriptions, and transects of the mapunit.* 

#### **Description of Fresno**

#### Setting

Landform: Fan remnants Landform position (two-dimensional): Toeslope Landform position (three-dimensional): Tread Down-slope shape: Linear Across-slope shape: Linear Parent material: Alluvium derived from granite

#### **Typical profile**

H1 - 0 to 5 inches: fine sandy loam H2 - 5 to 18 inches: sandy clay loam H3 - 18 to 38 inches: silt loam

- H4 38 to 40 inches: cemented
- H5 40 to 60 inches: sandy loam, loam

#### **Properties and qualities**

Slope: 0 to 1 percent
Depth to restrictive feature: 24 to 40 inches to duripan
Drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Slightly saline to strongly saline (4.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum: 20.0
Available water capacity: Low (about 3.7 inches)

#### Interpretive groups

Land capability classification (irrigated): 3s Land capability classification (nonirrigated): 6s Hydrologic Soil Group: D Hydric soil rating: No

#### **Minor Components**

#### Unnamed

Percent of map unit: 10 percent Landform: Depressions Hydric soil rating: Yes Traver

Percent of map unit: 5 percent Hydric soil rating: No

### FuA—Fresno sandy loam, moderately saline-alkali, 0 to 1 percent slopes

#### Map Unit Setting

National map unit symbol: hjc4 Elevation: 0 to 250 feet Mean annual precipitation: 8 inches Mean annual air temperature: 63 degrees F Frost-free period: 250 days Farmland classification: Not prime farmland

#### **Map Unit Composition**

*Fresno and similar soils:* 85 percent *Minor components:* 15 percent *Estimates are based on observations, descriptions, and transects of the mapunit.* 

#### **Description of Fresno**

#### Setting

Landform: Fan remnants Landform position (two-dimensional): Toeslope Landform position (three-dimensional): Tread Down-slope shape: Linear Across-slope shape: Linear Parent material: Alluvium derived from granite

#### **Typical profile**

H1 - 0 to 5 inches: fine sandy loam
H2 - 5 to 18 inches: sandy clay loam
H3 - 18 to 38 inches: silt loam
H4 - 38 to 40 inches: cemented
H5 - 40 to 60 inches: sandy loam, loam

#### **Properties and qualities**

Slope: 0 to 1 percent
Depth to restrictive feature: 24 to 40 inches to duripan
Drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 ln/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Slightly saline to strongly saline (4.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum: 20.0
Available water capacity: Low (about 3.7 inches)

#### Interpretive groups

Land capability classification (irrigated): 4s Land capability classification (nonirrigated): 6s Hydrologic Soil Group: D Hydric soil rating: No

#### **Minor Components**

#### Unnamed

Percent of map unit: 10 percent Landform: Depressions Hydric soil rating: Yes

#### Traver

Percent of map unit: 5 percent Hydric soil rating: No

#### HfA—Hilmar loamy sand, 0 to 1 percent

#### Map Unit Setting

National map unit symbol: hjd3 Elevation: 300 to 900 feet Mean annual precipitation: 11 inches Mean annual air temperature: 63 degrees F Frost-free period: 230 to 300 days Farmland classification: Farmland of statewide importance

#### **Map Unit Composition**

*Hilmar and similar soils:* 85 percent *Minor components:* 15 percent *Estimates are based on observations, descriptions, and transects of the mapunit.* 

#### **Description of Hilmar**

#### Setting

Landform: Fan skirts Landform position (two-dimensional): Toeslope Landform position (three-dimensional): Talf Down-slope shape: Linear Across-slope shape: Linear Parent material: Wind modified sandy alluvium derived from granite over silty alluvium derived from granite

#### **Typical profile**

H1 - 0 to 7 inches: loamy sand
H2 - 7 to 21 inches: sand
H3 - 21 to 29 inches: sandy loam
H4 - 29 to 60 inches: very fine sandy loam, silt loam

#### Properties and qualities

Slope: 0 to 1 percent

#### Custom Soil Resource Report

Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Very slightly saline to moderately saline (2.0 to 8.0 mmhos/cm)
Available water capacity: Moderate (about 7.2 inches)

#### Interpretive groups

Land capability classification (irrigated): 3w Land capability classification (nonirrigated): 4s Hydrologic Soil Group: C Hydric soil rating: No

#### **Minor Components**

#### Dinuba

Percent of map unit: 10 percent Hydric soil rating: No

#### Delhi

Percent of map unit: 5 percent Hydric soil rating: No

#### HkbA—Hilmar loamy sand, slightly saline-alkali, 0 to 1 percent slopes

#### **Map Unit Setting**

National map unit symbol: hjd7 Elevation: 300 to 900 feet Mean annual precipitation: 11 inches Mean annual air temperature: 63 degrees F Frost-free period: 230 to 300 days Farmland classification: Not prime farmland

#### Map Unit Composition

*Hilmar and similar soils:* 85 percent *Minor components:* 15 percent *Estimates are based on observations, descriptions, and transects of the mapunit.* 

#### **Description of Hilmar**

#### Setting

Landform: Fan skirts Landform position (two-dimensional): Toeslope Landform position (three-dimensional): Talf Down-slope shape: Linear Across-slope shape: Linear

#### Custom Soil Resource Report

Parent material: Wind modified sandy alluvium derived from granite over silty alluvium derived from granite

#### **Typical profile**

H1 - 0 to 7 inches: loamy sand

H2 - 7 to 21 inches: sand

H3 - 21 to 29 inches: sandy loam

H4 - 29 to 60 inches: very fine sandy loam, silt loam

#### **Properties and qualities**

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Slightly saline to moderately saline (4.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum: 5.0
Available water capacity: Moderate (about 7.2 inches)

#### Interpretive groups

Land capability classification (irrigated): 3w Land capability classification (nonirrigated): 4s Hydrologic Soil Group: C Hydric soil rating: No

#### **Minor Components**

#### Dinuba

*Percent of map unit:* 10 percent *Hydric soil rating:* No

#### Delhi

Percent of map unit: 5 percent Hydric soil rating: No

# WbA—Waukena fine sandy loam, moderately saline-alkali, 0 to 1 percent slopes

#### **Map Unit Setting**

National map unit symbol: hjhr Elevation: 1,500 to 3,800 feet Mean annual precipitation: 50 inches Mean annual air temperature: 55 degrees F Frost-free period: 225 to 275 days Farmland classification: Not prime farmland

#### Map Unit Composition

Waukena and similar soils: 85 percent Minor components: 15 percent Estimates are based on observations, descriptions, and transects of the mapunit.

#### **Description of Waukena**

#### Setting

Landform: Basin-floor remnants Landform position (two-dimensional): Toeslope Landform position (three-dimensional): Talf Down-slope shape: Linear Across-slope shape: Linear Parent material: Alluvium derived from granite

#### Typical profile

H1 - 0 to 6 inches: fine sandy loam H2 - 6 to 60 inches: sandy loam

#### Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Moderately saline to strongly saline (8.0 to 18.0 mmhos/cm)
Sodium adsorption ratio, maximum: 20.0
Available water capacity: Low (about 5.4 inches)

#### Interpretive groups

Land capability classification (irrigated): 4s Land capability classification (nonirrigated): 6s Hydrologic Soil Group: C Hydric soil rating: No

#### **Minor Components**

#### Unnamed

*Percent of map unit:* 5 percent *Landform:* Depressions *Hydric soil rating:* Yes

#### Rossi

*Percent of map unit:* 5 percent *Hydric soil rating:* No

#### Fresno

*Percent of map unit:* 5 percent *Hydric soil rating:* No

#### WdA—Waukena sandy loam, slightly saline-alkali, 0 to 1 percent slopes

#### Map Unit Setting

National map unit symbol: hjht Elevation: 1,500 to 3,800 feet Mean annual precipitation: 50 inches Mean annual air temperature: 55 degrees F Frost-free period: 225 to 275 days Farmland classification: Farmland of statewide importance

#### **Map Unit Composition**

Waukena and similar soils: 85 percent Minor components: 15 percent Estimates are based on observations, descriptions, and transects of the mapunit.

#### **Description of Waukena**

#### Setting

Landform: Basin-floor remnants Landform position (two-dimensional): Toeslope Landform position (three-dimensional): Talf Down-slope shape: Linear Across-slope shape: Linear Parent material: Alluvium derived from granite

#### **Typical profile**

H1 - 0 to 6 inches: sandy loam H2 - 6 to 60 inches: sandy loam

#### **Properties and qualities**

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Slightly saline to moderately saline (4.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum: 20.0
Available water capacity: Moderate (about 6.6 inches)

#### Interpretive groups

Land capability classification (irrigated): 3s Land capability classification (nonirrigated): 6s Hydrologic Soil Group: C Hydric soil rating: No

#### Minor Components

#### Rossi

Percent of map unit: 5 percent Hydric soil rating: No

### Unnamed

Percent of map unit: 5 percent Landform: Depressions Hydric soil rating: Yes

#### Fresno

*Percent of map unit:* 5 percent *Hydric soil rating:* No

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### **INTRODUCTION**

This application package constitutes a Report of Waste Discharge (ROWD) pursuant to California Water Code Section 13260. Section 13260 states that persons discharging or proposing to discharge waste that could affect the quality of the waters of the State, other than into a community sewer system, shall file a ROWD containing information which may be required by the appropriate Regional Water Quality Control Board (RWQCB).

This package is to be used to start the application process for all waste discharge requirements (WDRs) and National Pollutant Discharge Elimination System (NPDES) permits\* issued by a RWQCB except:

- a) Those landfill facilities that must use a joint Solid Waste Facility Permit Application Form, California Integrated Waste Management Board Form E-1-77; and
- b) General WDRs or general NPDES permits that use a Notice of Intent to comply or specify the use of an alternative application form designed for that permit.

#### This application package contains:

- 1. Application/General Information Form for WDRs and NPDES Permits [Form 200 (10/97)].
- 2. Application/General Information Instructions.

#### **Instructions**

Instructions are provided to assist you with completion of the application. If you are unable to find the answers to your questions or need assistance with the completion of the application package, please contact your RWQCB representative. The RWQCBs strongly recommend that you make initial telephone or personal contact with RWQCB regulatory staff to discuss a proposed new discharge before submitting your application. The RWQCB representative will be able to answer procedural and annual fee related questions that you may have. (See map and telephone numbers inside of application cover.)

All dischargers regulated under WDRs and NPDES permits must pay an annual fee, except dairies, which pay a filing fee only. The RWQCB will notify you of your annual fee based on an evaluation of your proposed discharge. Please do NOT submit a check for your first annual fee or filing fee until requested to do so by a RWQCB representative. Dischargers applying for reissuance (renewal) of an existing NPDES permit or update of an existing WDR will be billed through the annual fee billing system and are therefore requested NOT to submit a check with their application. Checks should be made payable to the State Water Resources Control Board.

#### Additional Information Requirements

A RWQCB representative will notify you within 30 days of receipt of the application form and any supplemental documents whether your application is complete. If your application is incomplete, the RWQCB representative will send you a detailed list of discharge specific information necessary to complete the application process. The completion date of your application is normally the date when all required information, including the correct fee, is received by the RWQCB.

\* NPDES PERMITS: If you are applying for a permit to discharge to surface water, you will need an NPDES permit which is issued under both State and Federal law and may be required to complete one or more of the following Federal NPDES permit application forms: Short Form A, Standard Form A, Forms 1, 2B, 2C, 2D, 2E, and 2F. These forms may be obtained at a RWQCB office or can be ordered from the National Center for Environmental Publications and Information at (513) 891-6561.

CALIFORNIA ENVIRONMENTAL



AL State of California Regional Water Quality Control Board APPLICATION/REPORT OF WASTE DISCHARGE GENERAL INFORMATION FORM FOR WASTE DISCHARGE REQUIREMENTS OR NPDES PERMIT



Page 2

### **INSTRUCTIONS**

### FOR COMPLETING THE APPLICATION/REPORT OF WASTE DISCHARGE GENERAL INFORMATION FORM FOR: WASTE DISCHARGE REQUIREMENTS/NPDES PERMIT

If you have any questions on the completion of any part of the application, please contact your RWQCB representative. A map of RWQCB locations, addresses, and telephone numbers is located on the reverse side of the application cover.

#### I. FACILITY INFORMATION

You must provide the factual information listed below for ALL owners, operators, and locations and, where appropriate, for ALL general partners and lease holders.

#### A. FACILITY:

Legal name, physical address including the county, person to contact, and phone number at the facility. (NO P.O. Box numbers! If no address exists, use street and nearest cross street.)

#### B. FACILITY OWNER:

Legal owner, address, person to contact, and phone number. Also include the owner's Federal Tax Identification Number.

#### **OWNER TYPE:**

Check the appropriate Owner Type. The legal owner will be named in the WDRs/NPDES permit.

#### C. FACILITY OPERATOR (The agency or business, not the person):

If applicable, the name, address, person to contact, and telephone number for the facility operator. Check the appropriate Operator Type. If identical to B. above, enter "same as owner".

#### D. OWNER OF THE LAND:

Legal owner of the land(s) where the facility is located, address, person to contact, and phone number. Check the appropriate Owner Type. If identical to B. above, enter "same as owner".

#### E. ADDRESS WHERE LEGAL NOTICE MAY BE SERVED:

Address where legal notice may be served, person to contact, and phone number. If identical to B. above, enter "same as owner".

#### F. BILLING ADDRESS

Address where annual fee invoices should be sent, person to contact, and phone number. If identical to B. above, enter "same as owner".

Page 3

CALIFORNIA ENVIRONMENTAL



L State of California Regional Water Quality Control Board APPLICATION/REPORT OF WASTE DISCHARGE GENERAL INFORMATION FORM FOR WASTE DISCHARGE REQUIREMENTS OR NPDES PERMIT



#### II. TYPE OF DISCHARGE

Check the appropriate box to describe whether the waste will be discharged to: A. Land, or B. Surface Water.

Check the appropriate box(es) which best describe the activities at your facility.

Hazardous Waste - If you check the Hazardous Waste box, STOP and contact a representative of the RWQCB for further instructions.

Landfills - A separate form, APPLICATION FOR SOLID WASTE FACILITY PERMIT/WASTE DISCHARGE REQUIREMENTS, California Integrated Waste Management Board Form E-1-77, may be required. Contact a RWQCB representative to help determine the appropriate form for your discharge.

#### III. LOCATION OF THE FACILITY

- 1. Enter the Assessor's Parcel Number(s) (APN), which is located on the property tax bill. The number can also be obtained from the County Assessor's Office. Indicate the APN for both the facility and the discharge point.
- 2. Enter the Latitude of the entrance to the proposed/existing facility and of the discharge point. Latitude and longitude information can be obtained from a U.S. Geological Survey quadrangle topographic map. Other maps may also contain this information.
- 3. Enter the Longitude of the entrance to the proposed/existing facility and of the discharge point.

#### IV. REASON FOR FILING

#### NEW DISCHARGE OR FACILITY:

A discharge or facility that is proposed but does not now exist, or that does not yet have WDRs or an NPDES permit.

#### CHANGE IN DESIGN OR OPERATION:

A material change in design or operation from existing discharge requirements. Final determination of whether the reported change is material will be made by the RWQCB.

#### CHANGE IN QUANTITY/TYPE OF DISCHARGE:

A material change in characteristics of the waste from existing discharge requirements. Final determination of whether the reported change would have a significant effect will be made by the RWQCB.

#### CHANGE IN OWNERSHIP/OPERATOR:

Change of legal owner of the facility. Complete Parts I, III, and IV only and contact the RWQCB to determine if additional information is required.

#### WASTE DISCHARGE REQUIREMENTS UPDATE OR NPDES PERMIT REISSUANCE:

WDRs must be updated periodically to reflect changing technology standards and conditions. A new application is required to reissue an NPDES permit which has expired.

#### **OTHER:**

If there is a reason other than the ones listed, please describe the reason on the space provided. (If more space is needed, attach a separate sheet.)

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY



#### L State of California Regional Water Quality Control Board APPLICATION/REPORT OF WASTE DISCHARGE GENERAL INFORMATION FORM FOR WASTE DISCHARGE REQUIREMENTS OR NPDES PERMIT



Page 4

#### V. CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)

It should be emphasized that communication with the appropriate RWQCB staff is vital before starting the CEQA documentation, and is recommended before completing this application. There are Basin Plan issues which may complicate the CEQA effort, and RWQCB staff may be able to help in providing the needed information to complete the CEQA documentation.

Name the Lead Agency responsible for completion of CEQA requirements for the project, i.e., completion and certification of CEQA documentation.

Check YES or NO. Has a public agency determined that the proposed project is exempt from CEQA? If the answer is YES, state the basis for the exemption and the name of the agency supplying the exemption on the space provided. (Remember that, if extra space is needed, use an extra sheet of paper, but be sure to indicate the attached sheet under Section VII. Other.)

Check YES or NO. Has the "Notice of Determination" been filed under CEQA? If YES, give the date the notice was filed and enclose a copy of the Notice of Determination and the Initial Study, Environmental Impact Report, or Negative Declaration. If NO, check the box of the expected type of CEQA document for this project, and include the expected date of completion using the timelines given under CEQA. The date of completion should be taken as the date that the Notice of Determination will be submitted. (If not known, write "Unknown")

#### VI. OTHER REQUIRED INFORMATION

To be approved, your application MUST include a COMPLETE characterization of the discharge. If the characterization is found to be incomplete, RWQCB staff will contact you and request that additional specific information be submitted.

This application MUST be accompanied by a site map. A USGS 7.5' Quadrangle map or a street map, if more appropriate, is sufficient for most applications.

#### VII. OTHER

If any of the answers on your application form need further explanation, attach a separate sheet. Please list any attachments with the titles and dates on the space provided.

#### VIII. CERTIFICATION

Certification by the owner of the facility or the operator of the facility, if the operator is different from the owner, is required. The appropriate person must sign the application form.

Acceptable signatures are:

- 1. for a corporation, a principal executive officer of at least the level of senior vice-president;
- 2. for a partnership or individual (sole proprietorship), a general partner or the proprietor;
- 3. for a governmental or public agency, either a principal executive officer or ranking elected/appointed official.

### **DISCHARGE SPECIFIC INFORMATION**

In most cases, a request to supply additional discharge specific information will be sent to you by a representative of the RWQCB. If the RWQCB determines that additional discharge specific information is not needed to process your application, you will be so notified.

Page 5

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### AL State of California Regional Water Quality Control Board APPLICATION/REPORT OF WASTE DISCHARGE GENERAL INFORMATION FORM FOR WASTE DISCHARGE REQUIREMENTS OR NPDES PERMIT



### A. Facility:

FACILITY INFORMATION

I.

Machado and Sons Construction, Inc We	st Main Compost F	acility	
Address: 1236 West Main Ave			
<sup>city:</sup> Crows Landing	<sup>County:</sup> Stanislaus	state: CA	Zip Code: 95313
Contact Person: Sean Kilgrow		Telephone Numb (916) 206-4	
B. Facility Owner:			
Name: Machado and Sons Construction, Inc.			Owner Type (Check One)       1.     Individual       2.     V       Corporation
Address: 1000 South Kilroy Rd.			3. Governmental 4. Partnership Agency
city: Turlock	State: CA	Zip Code: 95380	5. Other:
Contact Person:		Telephone Numbe	er: Federal Tax ID:

### C. Facility Operator (The agency or business, not the person):

Name: Machado and Sons Construction, In	с.		Operator Type (Check One) 1. Individual 2. 🖌 Corporation
Address: 1000 South Kilroy Rd.			3. Governmental 4. Partnership Agency
<sup>city:</sup> Turlock	State: CA	Zip Code: 95380	5. Other:
Contact Person: Sean Kilgrow		Telephone Nu (916) 206-	

(916) 206-4342

77-0398995

### D. Owner of the Land:

Sean Kilgrow

Name : Dave and Cindy Starkey			Owner Type (Check One) 1. Individual 2. Corporation
Address: 1643 W. Tuolumne Rd			3. Governmental 4. Partnership Agency
city: Ceres	State: CA	Zip Code: 95307	5. Other:
Contact Person: Dave Starkey		Telephone Nu	mber:

### E. Address Where Legal Notice May Be Served:

Address: 1000 South Kilroy Rd.			
<sup>city:</sup> Turlock	State: CA	Zip Code: 95380	
Contact Person: Sean Kilgrow		Telephone Number: (916) 206-4342	· · · · · · · · · · · · · · · · · · ·

#### F. Billing Address:

Address: 1000 South Kilroy Rd.		
city: Turlock	state: CA	zip Code: 95380
Contact Person: Sean Kilgrow		Telephone Number: (916) 206-4342

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY	State of California Regional Water Quality Control Board APPLICATION/REPORT OF WASTE DISCHARGE GENERAL INFORMATION FORM FOR /ASTE DISCHARGE REQUIREMENTS OR NPDES PERMIT
A. WASTE DISCH	II. TYPE OF DISCHARGE ) Described in this Application (A <u>or</u> B): ARGE TO LAND B. WASTE DISCHARGE TO SURFACE WATER
Check all that apply:          Domestic/Municipal W         Treatment and Disposa         Cooling Water         Mining         Waste Pile         Wastewater Reclamatic         ✓         Other, please describe:	Land Treatment Unit       Biosolids/Residual         Dredge Material Disposal       Hazardous Waste (see instructions)         Surface Impoundment       Landfill (see instructions)

### **III. LOCATION OF THE FACILITY**

Describe the physical location of the facility.

1. Assessor's Parcel Number(s) Facility: 058-003-006 Discharge Point: 2. Latitude Facility: 37.492004 Discharge Point: 3. Longitude Facility: -121.011339 Discharge Point: Page 6

### **IV. REASON FOR FILING**

✓ New Discharge or Facility

Changes in Ownership/Operator (see instructions)

Waste Discharge Requirements Update or NPDES Permit Reissuance

Change in Design or Operation

Change in Quantity/Type of Discharge Other:\_

## V. CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)

Name of Lead Agency: Stanislaus County	
Has a public agency determined that the proposed project is exempt from CEQA?	Yes 🔽 No
If Yes, state the basis for the exemption and the name of the agency supplying the exe Basis for Exemption/Agency:	emption on the line below.
Has a "Notice of Determination" been filed under CEQA? If Yes, enclose a copy of the CEQA document, Environmental Impact Report, or Neg expected type of CEQA document and expected date of completion.	∠ No gative Declaration. If no, identify the
Expected CEQA Documents:	
EIR Negative Declaration Expected CEQA Comp	letion Date: <u>NA</u>

Page 7



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### VI. OTHER REQUIRED INFORMATION

Please provide a COMPLETE characterization of your discharge. A complete characterization includes, but is not limited to, design and actual flows, a list of constituents and the discharge concentration of each constituent, a list of other appropriate waste discharge characteristics, a description and schematic drawing of all treatment processes, a description of any Best Management Practices (BMPs) used, and a description of disposal methods.

Also include a site map showing the location of the facility and, if you are submitting this application for an NPDES permit, identify the surface water to which you propose to discharge. Please try to limit your maps to a scale of 1:24,000 (7.5' USGS Quadrangle) or a street map, if more appropriate.

### VII. OTHER

Attach additional sheets to explain any responses which need clarification. List attachments with titles and dates below:

You will be notified by a representative of the RWQCB within 30 days of receipt of your application. The notice will state if your application is complete or if there is additional information you must submit to complete your Application/Report of Waste Discharge, pursuant to Division 7, Section 13260 of the California Water Code.

### VIII. CERTIFICATION

"I certify under penalty of law that this document, including all attachments and supplemental information, were prepared under my direction and supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment."

Print Name	Allen Waggoner		Title:	Senior Professional Geologist
Signature:	-	 	Date:	2/3/21

#### FOR OFFICE USE ONLY

Date Form 200 Received:	Letter to Discharger:	Fee Amount Received:	Check #:

### California Environmental Protection Agency Bill of Rights for Environmental Permit Applicants

California Environmental Protection Agency (Cal/EPA) recognizes that many complex issues must be addressed when pursuing reforms of environmental permits and that significant challenges remain. We have initiated reforms and intend to continue the effort to make environmental permitting more efficient, less costly, and to ensure that those seeking permits receive timely responses from the boards and departments of the Cal/EPA. To further this goal, Cal/EPA endorses the following precepts that form the basis of a permit applicant's "Bill of Rights."

- 1. Permit applicants have the right to assistance in understanding regulatory and permit requirements. All Cal/EPA programs maintain an Ombudsman to work directly with applicants. Permit Assistance Centers located throughout California have permit specialists from all the State, regional, and local agencies to identify permit requirements and assist in permit processing.
- 2. Permit applicants have the right to know the projected fees for review of applications, how any costs will be determined and billed, and procedures for resolving any disputes over fee billings.
- 3. Permit applicants have the right of access to complete and clearly written guidance documents that explain the regulatory requirements. Agencies must publish a list of all information required in a permit application and of criteria used to determine whether the submitted information is adequate.
- 4. Permit applicants have the right of timely completeness determinations for their applications. In general, agencies notify the applicant within 30 days of any deficiencies or determine that the application is complete. California Environmental Quality Act (CEQA) and public hearing requests may require additional information.
- 5. Permit applicants have the right to know exactly how their applications are deficient and what further information is needed to make their applications complete. Pursuant to California Government code Section 65944, after an application is accepted as complete, an agency may not request any new or additional information that was not specified in the original application.
- 6. Permit applicants have the right of a timely decision on their permit application. The agencies are required to establish time limits for permit reviews.
- 7. Permit applicants have the right to appeal permit review time limits by statute or administratively that have been violated without good cause. For state environmental agencies, appeals are made directly to the Cal/EPA Secretary or to a specific board. For local environmental agencies, appeals are generally made to the local governing board or, under certain circumstances, to Cal/EPA. Through this appeal, applicants may obtain a set date for a decision on their permit and, in some cases, a refund of all application fees (ask boards and departments for details).
- 8. Permit applicants have the right to work with a single lead agency where multiple environmental approvals are needed. For multiple permits, all agency actions can be consolidated under a lead agency. For site remediation, all applicable laws can be administered through a single agency.
- 9. Permit applicants have the right to know who will be reviewing their application and the time required to complete the full review process.

April 2, 2021

Teresa McDonald Senior Planner Stanislaus County Planning

Since 19 Starkey Farms has been producing healthy foods in Stanislaus county. Community involvement has been part of Starkey Farms since day one. We give our full support to the W. Main compost facility. In addition to providing recycling compliance, the compost this facility will produce improves the soil quality at our farms.

The State of California has passed and is now implementing SB 1383. This legislation is the most significant waste reduction mandate to be adopted in California in the last 30 years. SB 1383 requires the state to reduce organic waste disposal by 75% by 2025. In other words, the state must reduce organic waste disposal by more than 20 million tons annually by 2025. We are glad to support this project which is a key component to local organic recycling

Starkey does plan to utilize as much W. Main compost as our farms can effectively implement into our soil management program. We anticipate that the W. Main facility will produce sufficient compost for those requirements.

Best Regards,

**David Starkey** 

Starkev Farms 🔿