APPENDIX A
BIOFILTRO BIDA® SYSTEM INFORMATION

BioFiltro BIDA® System
US Patent 7540960

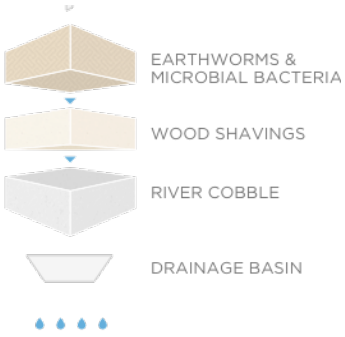
1. ABSTRACT

The BIDA® System, a biological system for treating liquids by forming bacteria flora using earthworm humus, is disclosed. The system includes a containment tank wherein medias of drainage basins, river cobble, and wood shavings provide physical filtration as well as a living environment for microbial flora and worms, which provide biological digestion to remove contaminants from liquid waste.

2. DETAILED DESCRIPTION

The disclosed bacteria flora inoculation process (INOCULUM) can be used for many possible applications, such as for cleaning sanitary wastewater, industrial process water, or other water that presents organic contamination. With regard to industrial water, this technology may be applied to food industry-related waste streams, such as those produced by slaughterhouses, dairies, vineyards and food processors.

2.1 System Design



The BIDA® System, or the filtration system disclosed herein, is traditionally comprised within an open top concrete pool, approximately five (5) feet in height, wherein the concrete pour base (floor) has a 1% grade to enable water to flow out of the system once treated. From the bottom up, drainage basins (plastic pallets), river rock, geotextiles, and wood shavings are layered. PVC pipes placed along the walls provide passive ventilation to the air chamber created by the drainage basins. The hydraulic loading rate, and thereby dimension, of the system is determined primarily by 1) gallons per day that shall be treated and 2) pounds per day of biological oxygen demand (BOD_5) that shall be applied. Once constructed, an automated irrigation system, regulated by pump switches, timers, and sensors, applies wastewater across the system surface.

2.3 Biological Components

Slaughterhouse liquid waste is primarily made up of organic material such as blood, green waters, excrement, and fats. To organically break down these types of waste, it is necessary to form a biological film and system specialized in digesting this particular waste stream. BioFiltro, when installing a BIDA® System, inoculates the system with an industry specific mix of bacteria, worm castings (excrement) and worms, the latter of which is primarily comprised of eisenia fetida, or California red worm. During plant construction, BioFiltro will construct temporary onsite habitats so that the microbiology and worms have ample time to acclimate to onsite wastewater before system start up.

The worms, capable of eating their weight each day, digest larger suspended solids and, as a result, produce castings, which are crucial in providing an ideal environment to cultivate rich microbial activity. Worms also provide passive aeration throughout the system as their constant burrowing motion creates air channels throughout the media enabling aerobic bacteria to flourish through the system. BIDA® Systems are capable of attaining red worm population densities of fourteen (14) pounds per cubic yard or approximately fifteen (15) thousand worms, and billions of bacteria to provide a robust digestive power. This symbiotic relationship enables biofilm to form throughout the system. Biofilm refers to a complex structure, or film, of colonies of bacteria and microbial flora such as yeast and fungi, that form a digestive layer on the shavings, rocks, and drainage basins. As water passes through the system, the biofilm capture, retains, and digests contaminants. Filtered water flows out within approximately 4 hours of initial system application.

2.3 Removal Efficiency

The diverse and abundant microbial population may obtain contaminant removal rates of 80 – 99% of biological oxygen demand (BOD_5), 80 – 99% of Total Suspended Solids (TSS), 80 – 99% of Oil and Grease, 30 – 70% of Phosphorus (P), and 60 – 95% of Total Nitrogen (TKN). Biofilm is also formed on the river cobble and drainage basins to provide further digestive power to organic material that was not retained in the superior layers of the system.

2.4 Wastewater Conveyance and Treatment Scheme

For the bacterial inoculation process as described, it is preferable to separate the large solids upstream of the BIDA® System. If too many solids accumulate in the wood shavings, a film may form and cause puddling, odors, or anaerobic conditions instead of the aerobic environment that the system needs to flourish.

Therefore, typical process conveyance of wastewater in a BIDA® System may consist of the following:

Primary solid separator may refer to equipment such as parabolic screens, rotatory screens, and/or dissolved air flotation (DAF) systems. The equipment to be used is dependent upon influent water quality characteristics, specifically levels of TSS and oils and grease. Influent wastewater to the BIDA System should not have TSS levels exceeding 800 mg/L nor oil and grease levels greater than 200 mg/L.

Tertiary disinfection may refer to systems and equipment such as chlorine decanters, ultraviolet germicidal irradiation (UV), or reverse osmosis. The equipment to be used is dependent upon 1) effluent quality from the BIDA® System 2) discharge requirements and/or, if applicable, 3) water quality requirements for reuse. The effluent from the BIDA® System has very low absorption (is transparent) which permits the elimination of pathogenic microorganisms when using any tertiary disinfection.

BioFiltro employs chlorination disinfection for 45 sanitary waste systems operating in Chile and UV disinfection for the 6 sanitary waste facilities operating in New Zealand.

3. INDUSTRY EXPERIENCE

The BIDA® System is operating in approximately 130 facilities worldwide, processing water from a diverse client base and of wastewater quality characteristics; namely food processors, wineries, aquaculture centers, slaughterhouses, livestock, and sanitary waste. The largest BIDA® System filters approximately two (2) million gallons per day, or 2MGD, for a fruit processor in central Chile and effluent from the facility is reutilized for crop irrigation.

Systems are operating on Antarctica (Chilean Air Force Base) and in the Atacama Desert (mining town) and have demonstrated any significant hindrance to operating in extreme climates.

In the United States, BioFiltro has been operating since 2013; executed 7 pilot studies; installed 5 full-scale commercial facilities; and is in the midst of permitting 2 more full-scale facilities.

For slaughterhouses, the BIDA® System is currently operating in 8 plants in Chile. The oldest slaughterhouse facility was constructed in 2002 and filters approximately 100,000 gallons per day (GPD). The largest cattle facility filters 200,000 GPD and was constructed in 2007 while the largest poultry facility filters 300,000 GPD and was constructed in 2006.

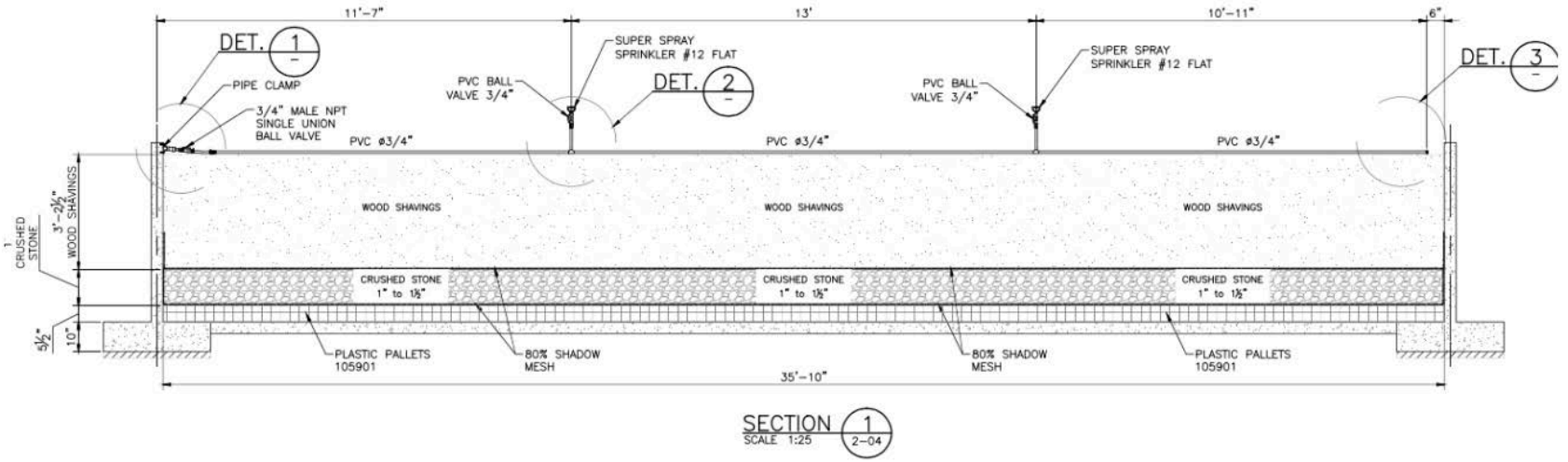
Examples of water quality samples are provide below. Industrial discharge requirements for the City of Brawley are included in the columns to the right so as to enable the reader to compare effluent from the BIDA® System with California requirements.

				California Average	*California Instant*	*Chile Irrigation Limit*
Bavaria	**6/12/15**	**12/23/14**	**4/22/14**			
BOD	113	50	29	*76*	*250*	*300*
TSS	76	77	58	*180*	*250*	*150*
TN	35	25	30		*73*	*75*
Ammonia as Nitrogen	20	13	17	*30*	*50*	
O&G	11	<5	12		*40*	*50*
pH	7.51	7.06	7		*6 to 9*	

All Chile Tests Are Instant

															California Average	*California Instant*	*Chile River Limit*
Faenagro	**2/19/16**	**3/12/15**	**4/17/14**	**11/13/14**	**1/5/12**	**2/6/12**	**3/6/12**	**4/3/12**	**5/24/12**	**7/10/12**	**8/7/12**	**9/28/12**	**10/9/12**	**11/20/12**			
BOD (mg/L)	53	11	30	29	15	14	6	28	12	11	28	8	5	49	*76*	*250*	35
TSS (mg/L)	8	9	8	8	21	19	14	13	18	11	13	<5	<5	15	*180*	*250*	80
TN (mg/L)	24	37	34	14	11	12	8	8	27	16	43	10	8	28		*73*	50
Ammonia as Nitrogen															*30*	*50*	
O&G (mg/L)	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	7		*40*	20
pH	5.11		6.9	7.45	7.26							7.33		6.99		*6 to 9*	*6 to 8.5*

All Tests Are Instant



SECTION 1 / 2-04
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APPENDIX B
LAND-APPLICATION WATER BALANCE ANALYSIS
(Provost & Pritchard 2016)

EST. 1968
PROVOST& PRITCHARD
CONSULTING GROUP
An Employee Owned Company

130 N. Garden Street
Visalia, CA 93291-6362
Tel: (559) 636-1166
Fax: (559) 636-1177
www.ppeng.com

August 12, 2016

TECHNICAL MEMORANDUM

Matias Sjogren
BioFiltro, USA
WET Center
2911 E. Barstow Ave., M/S OF 144
Fresno, CA, 93740

Re: One World Beef – Brawley, California
Biofiltro Project – Land Application Water Balance Calculations

Dear Matias:

This technical memo was prepared for the Biofiltro One World Beef project in Brawley, California. It is understood that the Biofiltro project is intended to replace an existing digester wastewater pretreatment system.

A. WASTEWATER APPLICATION ANALYSIS

The Regional Water Quality Control Board (**Regional Board**) oversees the land application of food processing wastewater. The guidelines of the Regional Board state that the wastewater must be beneficially used. The reuse of process wastewater is of great benefit on both a short term and long term basis.

1. Wastewater Application Area

Wastewater will be used to supplement surface and/or groundwater supplies and will also provide some nutrients to the crops. Distributing wastewater evenly and efficiently over a field is critical to the success of a wastewater reuse system. A wastewater reclamation area water balance was performed to determine the amount of wastewater that can agronomically applied to the 140 acres.

2. Wastewater Parameters

Wastewater parameters and constituent concentrations after treatment by the Biofiltro system were provided by One World Beef and Biofiltro as projected estimates and are listed in the following table.

Note: Fixed Dissolved Solids (**FDS**) and Electrical Conductivity (**EC**) was estimated from correlations of other beef packer wastewater results in relation to a TDS level of 2,100 mg/l.

Wastewater Parameters & Constituents

Parameter & Constituent	Projected Discharge	Units	Notes
Land Application Area	140	Acres	Provided by OWB or Biofiltro
Land Application Area - Predominant Soil Map Unit	Imperial Silty Clay (114)	--	USDA-NRCS Imperial Soil Survey
Soil Available Water Holding Capacity	4.15	Inches in rootzone	8.3 inches per 60 inches of soil
Crop	Bermuda Grass	--	Provided by OWB or Biofiltro
Bermuda Grass - Rootzone Depth	2.5	feet	USDA NRCS
Bermuda Grass- Evapo-transpiration	84.23	Inches/year	USBR ET Lower Colorado River
Bermuda Grass – Nitrogen Utilization	225	lbs/ac/year	Western Fertilizer Handbook
Design Wastewater Production (Workday)	200,000	gpd	Provided by OWB or Biofiltro
Pond Storage Capacity (Ponds 2 & 3)	9,100,000	gallons	Provided by OWB or Biofiltro
Biochemical Oxygen Demand (BOD_5)	100	mg/l	Provided by OWB or Biofiltro
Total Suspended Solids (TSS)	100	mg/l	Provided by OWB or Biofiltro
Total Nitrogen	50	mg/l	Provided by OWB or Biofiltro
Total Dissolved Solids (TDS)	2,100	mg/l	Provided by OWB or Biofiltro
Fixed Dissolved Solids (FDS)	1,226	mg/l	Estimated from correlations with other similar beef packers
Electrical Conductivity (EC)	2,838	umhos/cm	Estimated from correlations with other similar beef packers
Leaching Fraction	5.3	Inches	Calculated based on crop salt tolerance & EC of Wastewater
Salt Loading Guideline (without drainage)	2,000	lbs/acre/year	Single Crop Water Board Guideline
BOD_5 Loading	100	Lbs/acre/day	EPA "Pollution Abatement in the Fruit and Vegetable Industry Volume 3" page 66 Table IV-3 BOD Loading Rates

3. Constituent Loading

A detailed wastewater reclamation area water balance calculation (see attached) was performed to determine impacts of various water volumes and quality levels of wastewater on the dedicated reclamation area.

Biochemical Oxygen Demand (**BOD_5**) and nutrient loading rates were calculated using the projected average monthly wastewater concentrations and the methods and formula described in the EPA Process Design Manual "Land Treatment of Municipal Wastewater" pages 4-1 to 4-35 and 5-1 to 5-21. BOD_5 loading must be less than or equal to 100 lbs/ac/day, as

recommended in accordance with EPA publication "Pollution Abatement in the Fruit and Vegetable Industry Volume 3" page 66 Table IV-3 BOD Loading Rates.

According to the Western Fertilizer Handbook, Seventh Edition published by the California Fertilizer Association, Table 4-1 page 63, the Bermuda nitrogen utilization rates is noted.

FDS is a measure of the fixed dissolved solids or inorganic salts in the wastewater. Because these salts don't provide significant nutrient benefits to plants, they are a limiting factor. Based on the application area, the 5,430 lbs/acre/yr loading rate is well above the 2,000 lbs/acre/yr typically allowed annually for a single cropped field. However because a salt tolerant crop is being irrigated, a leaching requirement is applied, and a subsurface drainage system is utilized to remove salts from the rootzone, a higher salt loading rate is acceptable.

Water Balance Calculations
140 Acres of Bermuda Grass

Condition	Results	Units	Notes
Land Application Area	140	acres	Farmed acres
Crop	Bermuda Grass	--	--
Total Wastewater Production (Work Day)	248,070	gpd	Based on leaching requirement limit and 312 working days/year
Total Wastewater Production (Calendar Day)	212,049	gpd	Based on leaching requirement limit and spread over 365 days/year
Total Wastewater Land Applied	228.1	ac-ft/yr	26% of applied. Includes surface rainwater onto ponds less pond evaporation
Effective Rainfall	0.9	ac-ft/yr	Small contribution towards total crop needs
Fresh Irrigation Water Land Applied	661.6	ac-ft/yr	74% of applied
Leaching Requirement	5.30	in/yr	In conjunction with subsurface drainage system
BOD_5 Loading – Ave.	1.4	lbs/ac/day	Very Good – Well within the 100 lb/ac/day allowed
TSS Loading – Ave.	1.4	lbs/ac/day	Very Good – No loading limit. But same calculation as BOD_5 and thus the same result
Nitrogen Loading – Overall Average	221	lbs/ac/yr	Within crop need of 225 lbs/ac/yr
FDS Salt Loading – Overall Average	5,430	lbs/ac/yr	FDS loading is above 2,000 lb/ac/year but as mentioned, is sustainable

B. CONCLUSION

Based upon wastewater flow and concentration information, it is determined that the reuse of wastewater on the reclamation area should be in compliance with current agronomic and regulatory requirements.

Please note that all values and calculations are based on preliminary projections, and results from actual operations will need to be determined later.

Respectfully,

Donald Ikemiya, RCE 56,630

ONE WORLD BEEF

Wastewater Reclamation - Land Application
Water & Constituent Loading Budget
Bermuda Grass - Normal Year Rainfall
Biofiltro Pretreatment - 140 ac - 100 BOD_5 - 50 TN - 1,226 IDS

DATA:

Month	Number of Days per Month	Working Days per Month	Normal Year Rainfall (in/month)	Normal Year Evaporation (in/month)	ET Bermuda (in/month)	ET (in/month)	BOD Ave. Applied (mg/l)	Total Nitrogen Applied (mg/l)	FDS Salt Applied (mg/l)	Irrigation Nitrogen (mg/l)	Irrigation Salt (mg/l)
January	31	26	0.57	2.81	0.00		100	50	1,226		
February	28	24	0.52	3.75	0.08		100	50	1,226	0.0	0
March	31	26	0.31	5.86	5.10		100	50	1,226	0.0	0
April	30	26	0.09	8.03	6.42		100	50	1,226	0.0	0
May	31	27	0.02	10.37	8.75		100	50	1,226	0.0	0
June	30	26	0.03	11.46	8.96		100	50	1,226	0.0	0
July	31	27	0.23	11.72	8.69		100	50	1,226	0.0	0
August	31	27	0.46	10.01	8.28		100	50	1,226	0.0	0
September	30	26	0.37	8.39	6.51		100	50	1,226	0.0	0
October	31	26	0.22	6.22	0.49		100	50	1,226	0.0	0
November	30	25	0.27	3.54	0.00		100	50	1,226	0.0	0
December	31	26	0.53	2.07	0.00		100	50	1,226	0.0	0
Total	**365**	**312**	**3.62**	**84.23**	**53.28**	**0**	**100**	**50.0**	**1,226.0**	**0.0**	**0.0**

Work Day Effluent Production = **248,070** gpd
Calendar Day Effluent Production = **212,049** gpd

Pond 2 Wet Area = 1.41 acres
Pond 3 Wet Area = 2.58 acres
27.9 ac-ft
Pond 2 & 3 Storage = **9,100,000** gal
Pond Percolation Rate = **0.00** in/day

Approx. Bermuda Area = **140.0** acres
Bermuda Rootzone AWHC = **4.15** inch

STORAGE POND CALCULATIONS:

Month	Effluent Produced (gal/month)	Effluent Exported (gal/month)	Effluent to Ponds (gal/month)	Surface Rainfall (gal/month)	Surface Evaporation (gal/month)	Pond Percolation (gal/month)	Monthly Available (gal/month)	Cumulative Available (gal/month)
January	6,449,831	0	6,449,831	21,824	107,588	0	6,364,067	25,051,600
February	5,953,690	0	5,953,690	19,910	143,578	0	5,830,022	30,881,622
March	6,449,831	0	6,449,831	11,869	224,365	0	6,237,335	37,118,957
April	6,449,831	0	6,449,831	3,446	307,449	0	6,145,828	43,264,785
May	6,697,901	0	6,697,901	766	397,042	0	6,301,625	49,566,410
June	6,449,831	0	6,449,831	1,149	438,775	0	6,012,205	55,578,615
July	6,697,901	0	6,697,901	8,806	448,730	0	6,257,977	61,836,592
August	6,697,901	0	6,697,901	17,612	383,258	0	6,332,255	68,168,847
September	6,449,831	0	6,449,831	14,166	321,233	0	6,142,764	**74,311,611**
October	6,449,831	0	6,449,831	8,423	238,149	0	6,220,105	6,220,105 *
November	6,201,760	0	6,201,760	10,338	135,538	0	6,076,560	12,296,665
December	6,449,831	0	6,449,831	20,292	79,255	0	6,390,868	18,687,533
Total	**77,397,970**	**0**	**77,397,970**	**138,601**	**3,224,960**	**0**	**74,311,611**	

** Start at 0 Stored October 1st*

RECLAMATION AREA:

Bermuda **140.0** acres — Irrigation Application Efficiency = **75%**

Month	Cumulative Available (gal/month)	Effluent Applied (gal/month)	Effluent Applied (in)	Effective Rainfall (in)	Fresh Irrigation (in)	Gross Crop Need (in)	Soil Moisture Start (in)	Soil Moisture End (in)	Percolation & Leaching > 4.15 in	Running Pond Volume (gallons)	BOD Loading Total Weight (lbs/month)	BOD Loading Applied (lbs/ac/day)	Nitrogen Loading Wastewater Applied (lbs/month)	Nitrogen Loading Irrigation Applied (lbs/month)	Nitrogen Loading Total Applied (lbs/ac/month)	Salt Loading Total Weight (lbs/month)	Salt Loading Irrigation Applied (lbs/month)	Salt Loading Total Applied (lbs/ac/month)
January	25,051,600	6,364,067	1.67	0.00	0.00	0.00	4.15	5.82	1.67	0	5,310	**1.5**	2,655	0.00	**19**	65,106	0.00	**465**
February	30,881,622	5,830,022	1.53	0.00	0.00	0.11	4.15	5.57	1.42	0	4,865	**1.4**	2,432	0.00	**17**	59,643	0.00	**426**
March	37,118,957	6,237,335	1.64	0.00	5.16	6.80	4.15	4.15	0.00	0	5,205	**1.4**	2,602	0.00	**19**	63,809	0.00	**456**
April	43,264,785	6,145,828	1.62	0.00	6.94	8.56	4.15	4.15	0.00	0	5,128	**1.4**	2,564	0.00	**18**	62,873	0.00	**449**
May	49,566,410	6,301,625	1.66	0.00	10.01	11.67	4.15	4.15	0.00	0	5,258	**1.4**	2,629	0.00	**19**	64,467	0.00	**460**
June	55,578,615	6,012,205	1.58	0.00	10.37	11.95	4.15	4.15	0.00	0	5,017	**1.4**	2,508	0.00	**18**	61,506	0.00	**439**
July	61,836,592	6,257,977	1.65	0.00	9.94	11.59	4.15	4.15	0.00	0	5,222	**1.4**	2,611	0.00	**19**	64,021	0.00	**457**
August	68,168,847	6,332,255	1.67	0.00	9.37	11.04	4.15	4.15	0.00	0	5,284	**1.4**	2,642	0.00	**19**	64,781	0.00	**463**
September	74,311,611	6,142,764	1.62	0.00	4.92	8.68	4.15	2.01	0.00	**0**	5,126	**1.4**	2,563	0.00	**18**	62,842	0.00	**449**
October	6,220,105	6,220,105	1.64	0.08	0.00	0.65	2.01	**3.08**	0.00	0	5,190	**1.4**	2,595	0.00	**19**	63,633	0.00	**455**
November	12,296,665	6,076,560	1.60	0.00	0.00	0.00	3.08	4.68	0.53	0	5,071	**1.4**	2,535	0.00	**18**	62,165	0.00	**444**
December	18,687,533	6,390,868	1.68	0.00	0.00	0.00	4.15	5.83	1.68	0	5,333	**1.5**	2,666	0.00	**19**	65,380	0.00	**467**
		74,311,611	**19.56**	**0.08**	**56.71**	**71.05**			**5.30**		**62,009**	**1.4**	**31,002**	**0.0 Total**	**221**	**760,226**	**0.0 Total**	**5,430**
		228.1 ac-ft		**0.9**	**661.6**	**828.9** ac-ft			**61.8** ac-ft		**Allowed:**	**100 lb/ac/day**		**Allowed:**	**225 lbs/ac/yr**		**Allowed:**	**2,000 lbs/ac/yr**
Percent of Total =		**26%**		**0%**	**74%**	Leaching Fraction of 5.3"											Leaching helps	

Annual Water Balance Summary	(Gallons)	
Maximum Pond Storage Needed =	6,000,000	
Pond Storage Available =	9,100,000	
Excess Storage =	**3,100,000**	OK
Total Effluent Production =	**77,397,970**	
Total Effluent Exported =	0	
Total Pond Surface Rainfall =	138,601	
Total Pond Evaporation =	-3,224,960	
Total Pond Percolation =	0	
Effluent Applied to Corn/Wheat =	0	
Effluent Applied to Alfalfa =	-74,311,611	
Check Balance =	**77,397,970**	OK

	Bermuda
Crop Water Needs	OK
Deep Percolation/Leaching	OK
Total BOD Loading	OK
Total Nitrogen Loading	OK
Total Salt Loading	OK

APPENDIX C
CARB OFFROAD EMISSIONS ESTIMATION PROGRAM

						Emission Factors[2]						Total Project Emissions[3]											
Description	**CalEEMod Category**	**Total # Devices**	**HP from CalEEMod (User's Guide App. D)**	**Load Factor from CalEEMod (User's Guide App. D)**	**Hours of Operation per Device (Total for Project)**	**CO (g/bhp-hr)**	**NOx (g/bhp hr)**	**PM10 (g/bhp-hr)**	**SOx (g/bhp-hr)**	**ROG (g/bhp-hr)**	**CO2 (g/bhp hr)**	**CO (tons)**	**NOx (tons)**	**PM10 (tons)**	**SOx (tons)**	**ROG (tons)**	**CO2 (tons)**	**CO (lb/day)**	**NOx (lb/day)**	**PM10 (lb/day)**	**SOx (lb/day)**	**ROG (lb/day)**	**CO2 (lb/day)**
Low-Bed Transport[1]	EMFAC T7 HHDT	1			30	N/A[1]	N/A[1]	N/A[1]	N/A[1]	N/A[1]	N/A[1]	0.00023	0.00034	0.00005	0.00243	0.00004	0.56	0.00	0.01	0.00	0.04	0.00	9.35
Asphalt Paver	Pavers	1	126	0.42	80	3.08023	4.87397	0.2422	0.0049	0.4332	506.5401	0.01437	0.02275	0.00113	0.00002	0.00202	2.36	0.24	0.38	0.02	0.00	0.03	39.40
Vibratory Drum Compactor (Roller)	Rollers	1	81	0.38	160	3.75537	5.80563	0.4275	0.0049	0.6282	508.1987	0.02039	0.03152	0.00232	0.00003	0.00341	2.76	0.34	0.53	0.04	0.00	0.06	45.98
Man Lift/Extension-Fork	Forklifts	4	89	0.20	240	4.02311	6.22192	0.5203	0.0049	0.7229	505.5833	0.07578	0.11720	0.00980	0.00009	0.01362	9.52	1.26	1.95	0.16	0.00	0.23	158.72
Concrete pump	Pumps	1	84	0.74	480	3.523	4.478	0.325	0.006	0.610	568.299	0.11587	0.14728	0.01069	0.00020	0.02006	18.69	1.93	2.45	0.18	0.00	0.33	311.51
Excavators	Excavators	2	163	0.38	240	3.15771	4.08095	0.2008	0.0049	0.3575	506.495	0.10349	0.13374	0.00658	0.00016	0.01172	16.60	1.72	2.23	0.11	0.00	0.20	276.65
Drilling Machine	Bore/drill rigs	1	206	0.50	80	1.13299	2.9021	0.0852	0.0048	0.1925	502.128	0.01029	0.02636	0.00077	0.00004	0.00175	4.56	0.17	0.44	0.01	0.00	0.03	76.01
P.U. Trucks[1]	EMFAC LDT	2			192	N/A[1]	N/A[1]	N/A[1]	N/A[1]	N/A[1]	N/A[1]	0.00018	0.00072	0.00020	0.00633	0.00002	1.46	0.00	0.01	0.00	0.11	0.00	24.35
Graders	Graders	1	175	0.41	80	3.91624	8.24966	0.4635	0.005	0.8097	516.1305	0.02478	0.05220	0.00293	0.00003	0.00512	3.27	0.41	0.87	0.05	0.00	0.09	54.43
Cranes	Cranes	1	226	0.29	30	2.5822	7.38068	0.3349	0.0049	0.6229	507.1552	0.00560	0.01600	0.00073	0.00001	0.00135	1.10	0.09	0.27	0.01	0.00	0.02	18.32
Front End Loaders	Tractor/Loader/Backhoe	4	98	0.37	480	3.81146	5.14235	0.3959	0.0049	0.538	511.3456	0.29249	0.39463	0.03038	0.00038	0.04129	39.24	4.87	6.58	0.51	0.01	0.69	654.02
Mechanic Truck[1]	EMFAC MDT	1			192	N/A[1]	N/A[1]	N/A[1]	N/A[1]	N/A[1]	N/A[1]	0.00008	0.00030	0.00010	0.00316	0.00001	0.73	0.00	0.01	0.00	0.05	0.00	12.15
											Subtotal	0.66	0.94	0.07	0.01	0.10	100.85	11.06	15.72	1.09	0.21	1.67	1680.89

[1] Assume on-road vehicles travel on site at 10 mph. Emission factors for these vehicles are referenced in the table below.

[2] Factors obtained from the OFFROAD model, with factors based on the statewide inventory of construction equipment.

[3] Pounds per day assumes a basis of 24 weeks, 5 days a week, or 120 days

Haul Trucks	**Round Trip Distance Traveled - Paved Road**	**Distance on Unpaved Road**	**No. of Round Trips**			**CO (lb/VMT)**	**NOx (lb/VMT)**	**PM10 (lb/VMT)**	**SOx (lb/VMT)**	**ROG (lb/VMT)**	**CO2 (lb/VMT)**	**CO (tons)**	**NOx (tons)**	**PM10 (tons)**	**SOx (tons)**	**ROG (tons)**	**CO2 (tons)**	**CO (lb/day)**	**NOx (lb/day)**	**PM10 (lb/day)**	**SOx (lb/day)**	**ROG (lb/day)**	**CO2 (lb/day)**
Import																							
Class II/V Cement	30		31			0.001506	0.002293	0.000317	0.016191	0.000297	3.741426	0.00070	0.00107	0.00015	0.00753	0.00014	1.74	0.01	0.02	0.00	0.13	0.00	29.00
Hot Mix Asphalt	30		20			0.001506	0.002293	0.000317	0.016191	0.000297	3.741426	0.00045	0.00069	0.00010	0.00486	0.00009	1.12	0.01	0.01	0.00	0.08	0.00	18.71
Mobilization/Demobilization																							
Equipment Delivery	630		5			0.001506	0.002293	0.000317	0.016191	0.000297	3.741426	0.00237	0.00361	0.00050	0.02550	0.00047	5.89	0.04	0.06	0.01	0.43	0.01	98.21
EMFAC Data																							
LDT						0.000093	0.000374	0.000105	0.003295	0.000012	0.76098												
MDT						0.000080	0.000313	0.000105	0.003287	0.000010	0.75913												
T7						0.001506	0.002293	0.000317	0.016191	0.000297	3.74143												
											Subtotal	0.00	0.01	0.00	0.04	0.00	8.75	0.06	0.09	0.01	0.63	0.01	145.92
											TOTAL	**0.67**	**0.95**	**0.07**	**0.05**	**0.10**	**109.61**	**11.12**	**15.81**	**1.11**	**0.85**	**1.69**	**1826.80**
											Imperial County APCD CEQA Thresholds	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**550**	**55**	**150**	**150**	**55**	**N/A**

APPENDIX D
QUERY RESULTS FOR SPECIAL-STATUS SPECIES

Table D-1. Summary of Special Status Species Potential Occurance in the Project Area

Scientific Name	Common Name	Federal Status	State Status	CNPS Rare Plant Rank	General Habitat Characteristics	Potential to Occur on Site	Rationale
Plants							
Abronia villosa var. *Aurita*	chaparral sand verbena	-	-	1B.1	Sandy soils in chaparral, coastal scrub and desert dunes. Elev: 246-5,249 ft (75-1,600 m). Blooms: Jan-Sep (CNPS 2016).	N	Suitable habitat not present on or surrounding the Site.
Euphorbia abramsiana	Abrams' spurge	-	-	2B.2	Sandy soils in Mojavean and Sonoran desert scrub. Elev: -16-3,002 ft (-5-915 m). Blooms: Aug-Nov (CNPS 2016).	N	Suitable habitat not present on the Site. The highly disturbed nature of desert scrub land, located along McNeal ditch, precludes presence of this species.
Nama stenocarpa	mud nama	-	-	2B.2	Marshes and swamps on lake margins and riverbanks. Elev: 16-1,640 ft (5-500 m). Blooms: Jan-Jul (CNPS 20166).	N	Suitable habitat not present on or surrounding the Site.
Pholisma sonorae	sand food	-	-	1B.2	Desert dunes and sandy Sonoran desert scrub. Elev: 0-656 ft (0-200 m). Blooms: Mar-Jun (CNPS 2016).	N	Suitable habitat not present on or surrounding the Site.
Fish							
Cyprinodon macularis	desert pupfish	FE	SE		Habitats include clear, shallow waters with soft substrates associated with cienagas, springs, streams, margins of lakes and rivers, shoreline pools, and irrigation drains and ditches below 5,200 feet (1,585 m.). In California, occurs only in two streams tributary to, and in shoreline pools and irrigation drains of, the Salton Sea (USFWS 2010).	N	Outside species range. Canal/ditches adjacent to Site do not provide suitable habitat.
Xyrauchen texanus	razorback sucker	FE	SE, FP		Currently found in the Green River, upper Colorado and San Juan River basins; as well as the lower Colorado River between Lake Mead and Mohave, and in small tributaries of the Gila River (USFWS 2012).	N	Outside species range. Canal/ditches adjacent to Site do not provide suitable habitat.
Amphibians							
Incilius alvarius	Sonoran desert toad	-	SSC		Extirpated from California. Has not been observed since 1955. Formerly inhabited the lower Colorado River and lirrigated lowlands in Imperial County (Nafis 2016).	N	No longer present in California. Outside known species range.
Lithobates pipiens	northern leopard frog	-	SSC		Inhabits grassland, wet meadows, potholes, forests, woodland, brushlands, springs, canals, bogs, marshes, reservoirs. Generally prefers permanent water with abundant aquatic vegetation. From sea level to 11,000 ft. (3,350 m.) (Nafis 2016).	N	Outside known species range (Nafis 2016).
Lithobates yavapaiensis	lowland leopard frog	-	SSC		Extirpated from California. Formerly found in streams, river side channels, springs, ponds, stock ponds in desert scrub, grassland, woodland, and Pinyon Juniper (Nafis 2016).	N	No longer present in California. Outside known species range.
Reptiles							
Phrynosoma mcallii	flat-tailed horned lizard	FCE	SSC		Sandy desert hardpan or gravel flats with scattered sparse vegetation of low species diversity. Most common in areas with high density of harvester ants and fine windblown sand. From below sea level to around 820 ft (Nafis 2016).	N	The developed and heavily disturbed nature of Site likely precludes presence of this species. In addition, minimal ground disturbance is proposed for the Project, so impacts to species unlikely.
Uma notata	Colorado Desert fringe-toed lizard	-	SSC		Sparsely-vegetated arid areas with fine wind-blown sand, including dunes, flats with sandy hummocks formed around the bases of vegetation, washes, and the banks of rivers. Needs fine, loose sand for burrowing. From below sea level to 1,600 ft. (490 m.) (Nafis 2016).	N	The developed and heavily disturbed nature of Site likely precludes presence of this species. In addition, minimal ground disturbance is proposed for the Project, so impacts to species unlikely.
Birds							
Asio flammeus	short-eared owl	-	SSC		Found in open, treeless areas with elevated sites for perches, and dense vegetation for roosting and nesting. Associated with perennial grasslands, prairies, dunes, meadows, irrigated lands, and saline and fresh emergent wetlands (CDFW 2016).	N	Suitable habitat not present on or surrounding the Site.
Athene cunicularia	burrowing owl	-	SSC		Open areas with mammal burrows. Habitats include dry open rolling hills, grasslands, fallow fields, sparsely vegetated desert scrub with gullies, washes, arroyos, and edges of human disturbed lands. Inhabit golf courses, airports, cemeteries, vacant lots, and road embankments, with friable soils (Bates 2006).	Y	Suitable habitat potentially present on the portion of the Site not developed. The proposed Project will not alter or impact habitat or species on adjacent land.
Charadrius alexandrinus nivosus	western snowy plover	FT	SSC		Inland populations nest along barren to sparsely vegetated flats and along shores of alkaline and saline lakes, reservoirs, ponds, braided river channels, agricultural wastewater ponds, and salt evaporation ponds (Shuford and Gardali 2008).	N	No suitable habitat on Site. Although the McNeal Ditch and a few cement-lined agricultural drainages occur adjacent to the Site, the highly disturbed nature of land adjacent to these areas preclude adequate nesting habitat.

Scientific Name	Common Name	Federal Status	State Status	CNPS Rare Plant Rank	General Habitat Characteristics	Potential to Occur on Site	Rationale
Charadrius montanus	mountain plover	-	SSC		Frequents open plains with low, herbaceous or scattered shrub vegetation below 3,200 ft (1,000 m.). Does not breed in California, only winters (CDFW 2016). Frequently uses fallow, grazed, or burned sites (Shuford and Gardali 2008).	N	May use fields for overwintering, but would not be impacted by project activities.
Chlidonius niger	black tern	-	SSC		Uses fresh emergent wetlands, lakes, ponds, moist grasslands, and agricultural fields for breeding. Can use coastal wetlands and offshore habitats during migration (CDFW 2016).	N	May nest in agricultural fields. Project activities would not alter or impact habitat or species.
Circus cyaneus	northern harrier	-	SSC		Nest on the ground in patches of dense, tall vegetation in undisturbed areas. Breed and forage in variety of open habitats such as marshes, wet meadows, weedy borders of lakes, rivers and steams, grasslands, pastures, croplands, sagebrush flats and desert sinks (Shuford and Gardali 2008).	N	Suitable habitat not present on or surrounding the Site.
Colaptes chrysoides	gilded flicker	-	SE		Suitable habitat consists of desert riparian woodlands and giant cactus forests with snags for nest cavities (CDFW 2016).	N	Suitable habitat not present on or surrounding the Site.
Contopus cooperi	olive-sided flycatcher	-	SSC		Preferred habitat is forest and woodland, with adjacent meadows, lakes or open terrain for foraging (CDFW 2016).	N	Suitable habitat not present on or surrounding the Site.
Empidonax traillii extimus	Southwestern willow flycatcher	FE	SE		Breeds in relatively dense riparian tree and shrub communities associated with rivers, swamps, and other wetlands, including lakes (e.g., reservoirs). Most of these habitats are classified as forested wetlands or scrub-shrub wetlands. Habitat requirements for wintering are not well known, but include brushy savanna edges, second growth, shrubby clearings and pastures, and woodlands near water (USFWS 2002).	N	Suitable habitat not present on or surrounding the Site.
Falco peregrinus	peregrine falcon	FD	SD, FP		Breeds near wetlands lakes, rivers, or other waters on cliffs, banks, dunes or mounds, mostly in woodland, forest and coastal habitats. Nest is a scrape on a depression or ledge in an open site. May use man-made structures, snags, or trees for nesting (CDFW 2016).	N	Suitable habitat not present on or surrounding the Site.
Gelochelidon nilotica	gull-billed tern	-	SSC		Prefers sandy beaches for nesting, and forages over shallow waters, mudflats, grasslands, and croplands. Known to breed at the Salton Sea and near San Diego (CDFW 2016).	N	Suitable habitat not present on or surrounding the Site.
Haliaeetus leucocephalus	bald eagle	FD	FP		Nests in large, old-growth, or dominant live tree with open branchwork, especially ponderosa pine. Requires large bodies of water or rivers with abundant fish, and adjacent snags (CDFW 2016).	N	Suitable habitat not present on or surrounding the Site.
Ixobrychus exilis	least bittern	-	SSC		Common summer resident at Salton Sea and Colorado River in dense emergent wetlands near freshwater and in desert riparian (saltcedar scrub). Likely nests only in emergent wetlands. Rare in deserts and coastal lowlands (CDFW 2016).	N	Suitable habitat not present on or surrounding the Site.
Lanius ludovicianus	loggerhead shrike	-	SSC		Breed in shrublands or open woodlands with a fair amount of grass cover and areas of bare ground (Shuford and Gardali 2008).	N	Suitable habitat not present on or surrounding the Site.
Laterallus jamaicensis coturniculus	California black rail	-	ST, FP		Yearlong resident of saline, brackish, and fresh emergent wetlands (CDFW 2016).	N	Suitable habitat not present on or surrounding the Site.
Melanerpes uropygialis	Gila woodpecker	-	SE		Found along the Colorado River, and locally near Brawley, Imperial Co. Occurs mostly in desert riparian and desert wash habitats, but also found in orchard-vineyard and urban habitats, particularly in shade trees and date palm groves (CDFW 2016).	N	Suitable habitat not present on or surrounding the Site.
Oreothlypis luciae	Lucy's warbler	-	SSC		Breeds along the Colorado River, fairly common locally in a few other desert areas, and rare near Salton Sea. It occurs in desert wash and desert riparian habitats, especially those dominated by mesquite; also ranges into saltcedar and other thickets (CDFW 2016).	N	Suitable habitat not present on or surrounding the Site.
Pelecanus erythrorhynchos	American white pelican	-	SSC		In California, nests only in large lakes in Klamath Basin. Roosts along water edges, beaches, sandbars, or old driftwood (CDFW 2016).	N	Suitable habitat not present on or surrounding the Site.

Scientific Name	Common Name	Federal Status	State Status	CNPS Rare Plant Rank	General Habitat Characteristics	Potential to Occur on Site	Rationale
Pelecanus occidentalis californicus	California brown pelican	FD	SD, FP		Warm coastal marine and estuarine environments. Rare inland, but sometimes found at the Salton Sea. Breeds almost exclusively on undisturbed islands adjacent to good marine fishing areas (CDFW 2016).	N	Suitable habitat not present on or surrounding the Site.
Piranga rubra	summer tanager	-	SSC		Breed primarily in mature riparian woodland with extensive cottonwood canopy, some records of orchard nesting. Need tall, shady trees (Shuford and Gardali 2008).	N	Suitable habitat not present on or surrounding the Site.
Pyrocephalus rubinus	vermilion flycatcher	-	SSC		A yearlong resident along the Colorado River, especially in vicinity of Blythe, Riverside Co. Nesters inhabit cottonwood, willow, mesquite, and other vegetation in desert riparian habitat adjacent to irrigated fields, irrigation ditches, pastures and other open, mesic areas in isolated patches throughout central southern California (CDFW 2016).	N	Suitable habitat not present on or surrounding the Site.
Rallus longirostris yumanensis	Yuma clapper rail	FE	ST, FP		Freshwater marshes dominated by cattail or bulrush. Occurs along the lower Colorado River and it's tributaries, as well as along the banks of the Salton Sea (USFWS 2009).	N	Suitable habitat not present on or surrounding the Site.
Rynchops niger	black skimmer	-	-		Requires calm, shallow water for foraging, and sand bars, beaches, or dikes for roosting and nesting (CDFW 2016).	N	Suitable habitat not present on or surrounding the Site.
Setophaga petechia sonorana	Sonoran yellow warbler	-	SSC		Breeds only along the lower Colorado River in California in willow and cottonwood riparian areas (Shuford and Gardali 2008).	N	Outside known species range, and suitable habitat not present on or surrounding the Site.
Toxostoma crissale	Crissal thrasher	-	SSC		Occupies dense thickets of shrubs or low trees in desert riparian and desert wash habitats (CDFW 2016).	N	Suitable habitat not present on or surrounding the Site.
Toxostoma lecontei	Le Conte's thrasher	-	SSC		Occurs primarily in open desert wash, desert scrub, alkali scrub, and desert succulent shrub habitats, also in Joshua tree habitat with scattered shrubs. Commonly nests in dense, spiny shrubs or cacti (CDFW 2016).	N	Suitable habitat not present on or surrounding the Site.
Xanthocephalus xanthocephalus	yellow-headed blackbird	-	SSC		Nest in marshes with tall, emergent vegetation (e.g., tules and cattails) adjacent to deepwater (Shuford and Gardali 2008).	N	Suitable habitat not present on or surrounding the Site.
Mammals							
Lasiurus xanthinus	western yellow bat	-	SSC		Associated with palm trees in valley foothill riparian, desert riparian, desert wash and palm oasis habitats below 2,000 ft (600 m) (CDFW 2016).	N	Suitable habitat not present on or surrounding the Site.
Macrotus californicus	California leaf-nosed bat	-	SSC		Roosts in rocky, rugged terrain with mines and caves and occasionally in buildings and bridges. Forages over nearby flats and washes (CDFW 2016).	N	Suitable habitat not present on or surrounding the Site.
Nyctinomops macrotis	big free-tailed bat	-	SSC		Rock crevices in canyon settings in arid, high relief landscapes (Bolster 1998).	N	Suitable habitat not present on or surrounding the Site.
Perognathus longimembris bangsi	Palm Springs pocket mouse	-	SSC		Known from various vegetation communities, including creosote scrub, desert scrub, and grasslands, generally occurring on loosely packed or sandy soils with sparse to moderately dense vegetative cover. No longer occurs in areas of urban and agricultural development (Bolster 1998).	N	Suitable habitat not present on or surrounding the Site. The highly disturbed nature of desert scrub adjacent to McNeal ditch precludes adequate nesting habitat.
Sigmodon hispidus eremicus	Yuma hispid cotton rat	-	SSC		Found mostly near the Colorado River or along sloughs and marshes adjacent to the river in brushy or weedy areas; also in irrigated fields, and along ditches and canals in the Imperial Valley (Bolster 1998).	N	The nearest recorded occurrence over 10 miles away from the Site (CNDDB, CDFW 2016). Although the McNeal Ditch and a few cement-lined agricultural drainages occur adjacent to the Site, the highly disturbed nature of land adjacent to these areas likely preclude adequate habitat. Finally, minimal ground disturbance is proposed for the Project. Therefore, impacts to species unlikely.
Taxidea taxus	American badger	-	SSC		Open shrub, forest and herbaceous habitats with friable soils. Associated with treeless regions, prairies, park lands and cold desert areas. Range includes most of California, except the North Coast (CDFW 2016).	N	Heavily disturbed nature of Site and lack of vegetation likely precludes presence of this species. In addition, minimal ground disturbance is proposed for the Project; impacts to species unlikely.

Key:

Status
(FE) Federal Endangered
(FT) Federal Threatened
(FC) Federal Candidate
(FD) Federally Delisted
(SE) State Endangered
(ST) State Threatened
(SSC) State Species of Special Concern
(FP) Fully Protected

CNPS Rare Plant Rank
(1A) Presumed Extinct in California
(1B) Rare, Threatened, or Endangered in California and Elsewhere
(2) Rare, Threatened, or Endangered in California, But More Common Elsewhere
(3) More Species Information Needed
(4) Limited Distribution
Threat Ranks
(0.1) Seriously threatened in California
(0.2) Fairly threatened in California
(0.3) Not very threatened in California