

**TSD ENGINEERING, INC.**  
expect more.

## Preliminary Drainage & Stormwater Quality Report

**To:** Placer County Planning Dept.  
**From:** Casey Feickert, PE; TSD Engineering, Inc.  
**CC:**  
**Date:** March 13, 2018  
**Re:** Flying Change Farms (5145 James Drive, Loomis, CA 95650)

---

This memo presents a brief project description for the **Flying Change Farms** project and discusses preliminary drainage, preliminary stormwater quality measures, and best management practices (BMP's) recommended for implementation for this project.

### PROJECT DESCRIPTION

The project consists of the construction of the following items:

- 1) An indoor and outdoor arena (30,000 SF & 34,500 SF respectively), an outdoor dressage court (15,750 SF), a 40-stall barn, hay storage, manure storage, trash enclosure, 64'x44' Mare Motel, two (2) 75'-dia. round pens, and three (3) 6,500 SF fence paddocks.
- 2) A 20-foot wide driveway entrance spanning  $\pm 400$  linear feet that connects to the main loop surrounding the 40-stall barn.
- 3) Bio-retention swales at northern portion of the property

The new infrastructure for the facility will be clustered in the northwest corner of the 40-acre lot, minimizing impact on neighboring parcels that have been developed or have been approved for development. New construction will not involve the removal of any trees. The site currently has more than 75% grass covering and trees and less than 1% (~6,880 SF) impervious surfaces. Once the proposed improvements have been completed, approximately 46,130 SF of new impervious surfaces are introduced with the construction of the 40-stall barn and indoor arena which comprises roughly 3.2% of the total site area ( $\pm 1.28$  out of 40 acres total). The soil in



this site is classified as Type B hydrologic soil group with an infiltration rate of 2.4 in/hr according to the Placer County Stormwater Management Manual.

## **PRELIMINARY DRAINAGE**

Based on existing topography, the site currently sheds from south to north with run-off sheet-flowing onto natural open space and low-lying areas with ample grass cover (Please see attached Developed Shed Map). The developed site generally has two main shed areas, D1 and D2 as shown on the Developed Shed Map. Shed D1 covers an area of 198,528 SF and drains out to the west of the site while D2 covers roughly 280,290 SF and drains northeast of the property. The project will introduce roughly 76,298 SF of new impervious material. Due to minimal disturbance to the site, the developed drainage patterns will closely resemble the existing drainage patterns. Approximately 2,370 SF of bio-retention area have been proposed to provide water quality treatment and hydro-modification. The site will shed storm water and discharge into Secret Ravine then ultimately into the American River. Roof drains will be detached and drain to dispersal trenches. No underground drainage system is proposed for this site.

## **PRELIMINARY WATER QUALITY CONTROL MEASURES**

Stormwater quality design measures will include stream setback and buffer, development will occur approximately 125-feet from the nearest creek and permeable pavement will be used in the parking area. Pollution source control measures to be implemented on-site include the following (with CASQA Fact Sheet references):

- 1) To prevent accidental spills or leaks, materials will be stored indoors away from storm drains or sensitive areas. (CASQA-11)
- 2) For parking/storage areas and maintenance, trash receptacles will be provided, "No Litter" signs posted and surface sweeping shall be conducted regularly. (CASQA-43)
- 3) Indoor and structural pest control: Federal, State and local laws and regulations for the use, storage and disposal of pesticides shall be followed. (CASQA-41)
- 4) Landscape/outdoor pesticide use: Federal, State and local laws and regulations for the use, storage and disposal of pesticides shall be followed. (CASQA-41)
- 5) Outdoor storage of equipment or materials: Limit exposure to rainfall whenever possible (CASQ SC-30, SC-31. SC-32)
- 6) Building and grounds maintenance: Encourage proper lawn management and landscaping. (SC-41)

The proposed source control measures are sufficient to capture and treat the proposed impervious areas created once the development is complete.

## **BEST MANAGEMENT PRACTICES (BMP's)**

### **A. SEDIMENT CONTROL**

1. Implement the use of silt fence, bio-filter bags, and/or fiber rolls along the perimeter of the project and below the toe or down slope of exposed and erodible slopes. (See SE-1, SE-5, and SE-14 of the CASQA Stormwater BMP Handbook).
2. This project will implement the use of porous paving for the ±8,465-SF parking lot (see attached Porous Pavement detail A).

### **B. PAVING & GRINDING OPERATIONS** (See CASQA Stormwater BMP Handbook NS-3)

1. For paving involving asphaltic cement concrete, do not allow sand or gravel placed over new asphalt to wash into storm drains, streets, or creeks. Vacuum or sweep loose sand and gravel and properly dispose of this waste by referring to WM-5, Solid Waste Management.
2. Leaks and spills from paving equipment can contain toxic levels of heavy metals and oil and grease. Place drip pans or absorbent materials under paving equipment when not in use. Clean up spills with absorbent materials and dispose of in accordance with the applicable regulations. See NS-10, Vehicle and Equipment Maintenance, WM-4, Spill Prevention and Control, and WM-10, Liquid Waste Management.
3. Substances used to coat asphalt transport trucks and asphalt spreading equipment should not contain soap and should be non-foaming and non-toxic.
4. Paving equipment parked onsite should be parked over plastic to prevent soil contamination.
5. Clean asphalt coated equipment offsite whenever possible. When cleaning dry, hardened asphalt from equipment, manage hardened asphalt debris as described in WM-5, Solid Waste Management. Any cleaning onsite should follow NS-8, Vehicle and Equipment Cleaning.

### **C. WASTE MANAGEMENT**

The following steps will help keep a clean site and reduce storm water pollution (See CASQA Stormwater BMP Handbook WM-5, WM-9):

1. Select designated waste collection areas onsite. Inspect dumpsters for leaks and repair any dumpster that is not watertight. Locate containers in a covered area or in a secondary containment. Provide an adequate number of containers with lids or covers that can be placed over the container to keep rain out or to prevent loss of wastes when it is windy.
2. Collect site trash daily, especially during rainy and windy conditions. Remove this solid waste promptly since erosion and sediment control devices tend to collect litter. Make sure that toxic liquid wastes (used oils, solvents, and paints) and chemicals (acids, pesticides, additives, curing compounds) are not disposed of in dumpsters designated for construction debris. Do not hose out dumpsters on the construction site. Leave dumpster cleaning to the trash hauling contractor. Arrange for regular waste collection before containers overflow.
3. Clean up immediately if a container does spill. Make sure that construction waste is collected, removed, and disposed of only at authorized disposal areas.
4. Proper sanitary and septic waste management prevent the discharge of pollutants to stormwater from sanitary and septic waste by providing convenient, well-maintained facilities, and arranging for regular service and disposal.

For the complete list of BMP's please refer to the CASQA Stormwater Handbook.

Sincerely,

A handwritten signature in blue ink, appearing to read 'JSTZ'.

Casey Feickert, P.E., CE#58930  
TSD Engineering, Inc.  
Vice President

# **Post-Construction Storm Water Quality Plan**

**For:**

**Flying Change Farms  
City of Loomis**

**Prepared for:**

**Grace Kamphefner**

**Aerometals**

**3920 Sandstone Drive**

**El Dorado Hills, CA 95762**

**(916) 939-6888**

**Prepared by:**

**TSD Engineering, Inc.**

**785 Orchard Drive, Suite 110**

**Folsom, CA 95630**

**(916) 608-0707**

**6-Mar-18**

**Approval Date: \_\_\_\_\_**



## Section 1 General Project Information

The undersigned owner of the subject property, is responsible for the implementation of the provisions of this plan, including ongoing operations and maintenance (O&M), consistent with the requirements of the West Placer Storm Water Quality Design Manual and the State of California Phase II Small MS4 General Permit (Order No: 2013-0001-DWQ). If the undersigned transfers its interest in the property, its successors-in-interest shall bear the aforementioned responsibility to implement the SWQP.

For all Regulated Projects (As identified in Form 1-2 below), the undersigned owner hereby grants access to all representatives of the Jurisdictional Agency for the sole purpose of performing O&M inspections of the installed treatment system(s) and hydromodification control(s) if any.

A copy of the final signed and fully approved SWQP shall be available on the subject site for the duration of construction and then stored with the project approval documentation and improvement plans in perpetuity.

Form 1-1 Project Identification and Owner's Certification		
Project Site Address:	5145 JAMES DRIVE, LOOMIS, CA 95650	
Owner Name:	Grace Kamphefner	
Title		0
Company	Aerometals	
Address	3920 Sandstone Drive	
City, State, Zip Code	El Dorado Hills, CA 95762	
Email	kamphefner@earthlink.net	
Telephone #	(916) 939-6888	
Signature	Date	
Engineer:*	Casey Feickert'	<b>PE Stamp*</b> (Required for all Regulated Projects)
Title	Vice President	
Company	TSD Engineering, Inc.	
Address	785 Orchard Drive, Suite 110	
City, State, Zip Code	Folsom, CA 95630	
Email	cfeickert@tsdeng.com	
Telephone #	(916) 608-0707	
Signature		
Brief Description of Project: (Attach additional sheets as necessary)	The project consists of the development of approximately 5.2 acres of currently undeveloped land with in the Freedom Point - Parcel 49 - NCRSP development. The project will ultimately consist of 5 new buildings and associated drive aisles, parking, hardscape, landscaping and utilities. The site drains to a regional basin and therefore hydromodification is not required and was not analyzed.	

\* Not required for Small Projects as determined in Form 1-2 below. Project owners are responsible for ensuring that all storm water facilities are designed by an appropriately licensed and qualified professional.

## Form 1-2 Project Category

Development Category (Select all that apply)

<sup>1</sup> <b>Small Project</b> – All projects, except LUPs, that create and/or replace between 2,500-5,000 ft <sup>2</sup> of impervious surface or detached single family homes that create and/or replace 2,500 ft <sup>2</sup> or more of impervious surface and are not part of a larger plan of development.	
<sup>2</sup> Enter total new and/or replaced impervious surface (ft <sup>2</sup> )	
<sup>3</sup> <b>Regulated Project</b> – All projects that create and/or replace 5,000 ft <sup>2</sup> or more of impervious surface.	X
<sup>4</sup> <b>Regulated Redevelopment Project</b> with equal to, or greater than 50 percent increase in impervious area	
<sup>5</sup> <b>Regulated Redevelopment Project</b> with less than 50 percent increase in impervious area	
<sup>6</sup> Enter total pre-project impervious surface (ft <sup>2</sup> )	
<sup>7</sup> Enter total new and/or replaced impervious surface (ft <sup>2</sup> )	
<sup>8</sup> <b>Regulated Road or linear underground/overhead project (LUP)</b> creating 5,000 ft <sup>2</sup> or more of newly constructed contiguous impervious surface.	
<sup>9</sup> Enter total new and/or replaced impervious surface (ft <sup>2</sup> )	
<sup>10</sup> <b>Regulated Hydromodification Management Project</b> – Regulated projects that create and/or replace 1 acre or more of impervious surface. A project that does not increase impervious surface area over the pre-project condition is not a hydromodification management project.	
<sup>11</sup> Enter total new and/or replaced impervious surface (ft <sup>2</sup> )	76,298

## Section 3 Regulated Projects

**Section 3 forms are to be completed for all Regulated Projects.**

### Form 3-1 Site Location and Hydrologic Features

Site coordinates:  <i>Take GPS measurement at approximate center of site</i>	<sup>1</sup> Latitude	<sup>2</sup> Longitude	<sup>3</sup> Elevation (ft. above sea level)	<sup>4</sup> 85th Percentile, 24 Hour Design Storm Depth (in):
	38.79537	-121.20000	345	0.9

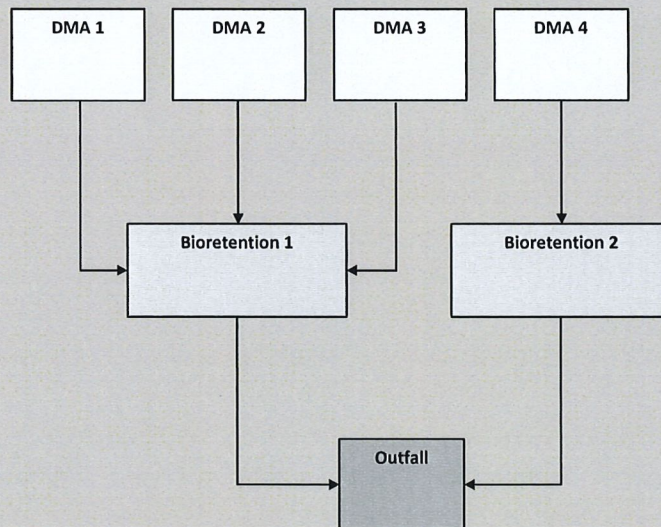
<sup>5</sup> Receiving waters <i>Name of stream, lake or other downstream waterbody to which the site runoff eventually drains</i>	Secret Ravine
---	---------------

<sup>6</sup> 303(d) listed pollutants of concern <i>Refer to State Water Resources Control Board website <a href="http://www.waterboards.ca.gov/water_issues/programs/water_quality_assessment/#impaired">www.waterboards.ca.gov/water_issues/programs/water_quality_assessment/#impaired</a></i>	Pyrethroids and Sediment Toxicity
--	-----------------------------------

<sup>7</sup> Is Project going to be phased? <i>If yes, ensure that the SWQP evaluates each phase with distinct DMAs, requiring LID BMPs to address runoff at time of completion</i>	No
--	----

<sup>8</sup>Use this form to show a conceptual schematic depicting DMAs and conveyance features connecting DMAs to the site outlet(s). An example is provided below that can be modified for the proposed project or a drawing clearly showing DMAs and flow routing may be attached.

Example only  
Modify for project specific SWQP  
Use separate sheet if necessary





Form 3-2 Site Assessment and Layout Documentation		
	Has this Item been considered in the Site Layout and depicted in the Site Plan?	
	Yes	Not Applicable (Include brief explanation)
Define the development envelope and protected areas, identifying areas that are most suitable for development areas to be left undisturbed.	X	
Concentrate development on portions of the site with less permeable soils and preserve areas that can promote infiltration.	X	
Limit overall impervious coverage of the site with paving and roofs.	X	
Set back development from creeks, wetlands, and riparian habitats.	X	
Preserve significant trees.	X	
Conform site layout along natural landforms.	X	
Avoid excessive grading and disturbance of vegetation and soils.	X	
Replicate the site's natural drainage patterns.	X	
Detain and retain runoff throughout the site.	X	
<b>Attach a Site Plan that incorporates the applicable considerations above. Ensure that the following items are included in the Site Plan:</b>		
Site Boundary Soil types and areal extents, test pit and infiltration test locations Topographic data with 1 ft. contours Existing natural hydrologic features (depressions, watercourses, wetlands, riparian corridors) Environmentally sensitive areas and areas to be preserved. Proposed locations and footprints of improvements creating new, or replaced, impervious surfaces Potential pollutant sources and locations Entire site divided into separate DMAs with unique identifiers Existing and proposed site drainage network with flow directions and site run-on and discharge location: Proposed design features and surface treatments used to minimize imperviousness and reduce runoff Proposed locations and footprints of treatment and hydromodification management facilities Design features for managing authorized non-stormwater discharges Areas of soil and/or groundwater contamination Existing utilities and easements Maintenance areas		

Form 3-3 Source Control Measures			
Potential Pollutant Generating Activity or Source	Check One		Describe the source control measures to be implemented for each potential pollutant generating activity or source present on the project as listed in Appendix C and in the CASQA Fact Sheets. Include any special features, materials, or methods of construction that will be used.
	Present	Not Applicable	
Accidental spills or leaks	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Materials will be stored indoors away from storm drains or sensitive areas. (CASQA-11)
Interior floor drains	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Parking/storage areas and maintenance	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Trash receptacles will be provided, no litter signs posted and surface sweeping shall be conducted regularly. (CASQA-43)
Indoor and structural pest control	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Fed., State and local laws and regulations for the use, storage and disposal of pesticides shall be followed. (CASQA-41)
Pools, spas, ponds, decorative fountains, and other water features	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Landscape/outdoor pesticide use	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Fed., State and local laws and regulations for the use, storage and disposal of pesticides shall be followed. (CASQA-41)
Restaurants, grocery stores, and other food service operations	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Refuse areas	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Industrial Processes	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Outdoor storage of equipment or materials	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Vehicle and equipment cleaning	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Vehicle and equipment repair and maintenance	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Fuel dispensing areas	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Loading docks	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Fire sprinkler test water	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Drain or wash water from boiler drain lines, condensate drain lines, rooftop equipment, drainage sumps, and other sources	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Unauthorized non-storm water discharges	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Building and grounds maintenance	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Encourage proper lawn management and landscaping. (SC-41)

The source control measures identified in this table shall be designed consistent with recommendations from the CASQA Stormwater BMP Handbook for New Development and Redevelopment<sup>1</sup>, or from another equivalent manual.

<sup>[1]</sup> California Stormwater BMP Handbook New Development and Redevelopment. California Stormwater Quality Association (CASQA). January 2003.

Form 3-4 Runoff Reduction Calculator for Site Design Measures on Regulated Projects											
		1 DMA ID No.		1		2		3		4	
Site Design Measure	Runoff Reduction Parameters		Runoff Reduction (ft <sup>3</sup> )		Runoff Reduction (ft <sup>3</sup> )		Runoff Reduction (ft <sup>3</sup> )		Runoff Reduction (ft <sup>3</sup> )		
	2 Adjacent/On-Site Stream Setbacks and Buffers	$A_{imp}$ (ft <sup>2</sup> )	impervious drainage area	0	0	0	0	0	0	0	0
$V_{85}$ (in)		runoff volume from 85th percentile, 24-hour storm	0.8	0	0.8	0	0.8	0	0.8	0	
3 Soil Quality Improvement and Maintenance	$A_{pond}$ (ft <sup>2</sup> )	ponding area									
	$D_{pond}$ (ft)	ponding depth									
	$A_a$ (ft <sup>2</sup> )	soil amendment area		0		0		0			
	$D_a$ (ft)	depth of amended soil									
	$n$	porosity of amended soil									
	$n_e$	number of new evergreen trees	0	0							
4 Tree Planting and Preservation	$n_d$	number of new deciduous trees	0	0							
	$A_c$ (ft <sup>2</sup> )	canopy area of existing trees to remain on the property	78015	5266	21426	1446	0	0	0	0	
	$V_{85}$ (in)	runoff volume from 85th percentile, 24-hour storm	0.8	0	0.8	0	0.8	0	0.8	0	
	$A_{imp}$ (ft <sup>2</sup> )	impervious drainage area	0	0	0	0	0	0	0	0	
5 Rooftop and Impervious Area Disconnection	$V_{85}$ (in)	runoff volume from 85th percentile, 24-hour storm	0.8	0	0.8	0	0.8	0	0.8	0	
	$A_{res}$ (ft <sup>2</sup> )	area of gravel storage layer	0	0	0	0	0	0	0	0	
6 Porous Pavement	$D_{res}$ (ft)	depth of gravel storage layer		0		0		0		0	
	$n_{agg}$	porosity of aggregate									
	$C$	efficiency factor									
	$A_{imp}$ (ft <sup>2</sup> )	impervious drainage area	0	0	0	0	0	0	0	0	
7 Vegetated Swales	$V_{85}$ (in)	runoff volume from 85th percentile, 24-hour storm	0.8	0	0.8	0	0.8	0	0.8	0	
	$N$	number of rain barrels and/or cisterns	0	0	0	0	0	0	0	0	
8 Rain Barrels and Cisterns	$V_a$ (ft <sup>3</sup> )	volume of each rain barrel and/or cistern	0	0	0	0	0	0	0	0	
	9 Do all Site Design Measures meet the design requirements outlined in the Fact Sheets?		Yes		No						
10 Total Volume Reduction (ft <sup>3</sup> )		5266		1446		0		0		0	
11 Effective Treated Impervious Area (ft <sup>2</sup> )		70214		19283		0		0		0	





Form 3-6 Volume-Based Infiltrating Bioretention Measures				
<sup>1</sup> DMA ID No. <i>If combining multiple DMAs from Form 3-5, enter a new unique DMA ID No.</i>	1	2	3	4
<sup>2</sup> WQV (ft <sup>3</sup> ) Item 5 in Form 3-5 <i>If combining multiple DMAs from Form 3-5, enter the sum of their respective WQVs.</i>	2775	3383		
<sup>3</sup> Surface Loading Rate Maximum 5.0 in/hr	5	5		
<sup>4</sup> BMP Surface Area (ft <sup>2</sup> ) <i>Top of BMP</i>	600	1770		
<sup>5</sup> Infiltration rate of underlying soils (in/hr)	0.24	0.24		
<sup>6</sup> Maximum ponding depth (ft) <i>BMP specific, see BMP design details</i>	0.5	0.5		
<sup>7</sup> Ponding Depth (ft) <i><math>d_{BMP} = \text{Minimum of } (1/12 * \text{Item 5} * 48 \text{ hrs}) \text{ or Item 6}</math></i>	0.5	0.5	-	-
<sup>8</sup> Infiltrating surface area, $SA_{BMP}$ (ft <sup>2</sup> ) <i>Bottom of BMP</i>	600	1770		
<sup>9</sup> Planting media depth, $d_{media}$ (ft)	2.5	2.5		
<sup>10</sup> Planting media porosity	0.30	0.30		
<sup>11</sup> Gravel depth, $d_{media}$ (ft) <i>Only included in certain BMP types</i>	0.0	0.0		
<sup>12</sup> Gravel porosity	0.00	0.00		
<sup>13</sup> Retention Volume (ft <sup>3</sup> ) <i><math>V_{retention} = \text{Item 8} * [\text{Item 7} + (\text{Item 9} * \text{Item 10}) + (\text{Item 11} * \text{Item 12}) + (1.5 * (\text{Item 5} / 12))]</math></i>	750.0	2,212.5	-	-
<sup>14</sup> Untreated Volume (ft <sup>3</sup> ) <i><math>V_{untreated} = \text{Item 2} - \text{Item 13}</math> If greater than zero, adjust BMP sizing variables and re-compute retention volume</i>	2025	1170	0	0
<sup>15</sup> Treated Flow Rate (ft <sup>3</sup> /s) <i><math>Q_{treated} = 1/43,200 * (\text{Item 3} * \text{Item 4})</math></i>	0.0694	0.2049	0.0000	0.0000
<sup>16</sup> Total Treated Flow Rate for Project (ft <sup>3</sup> /s) <i><math>Q_{total} = \text{Sum of Item 15 for all DMAs}</math></i>	0.366			
<sup>17</sup> Is WQV for each DMA treated on-site?	Yes	X	No	

**Form 5-1 BMP Inspection and Maintenance**

<b>BMP</b>	<b>Inspection Point and Frequency</b>	<b>Maintenance Activity Required</b>
Bio-Retention Swale	Embankments and Channel / Annual or as needed	Repair erosion problems, remove debris
	Channel / Monthly	Landscape Maintenance
	Inlets and Outlets / Twice per year or as needed	Remove debris

## Form 6-1 Post-Construction Stormwater BMPs

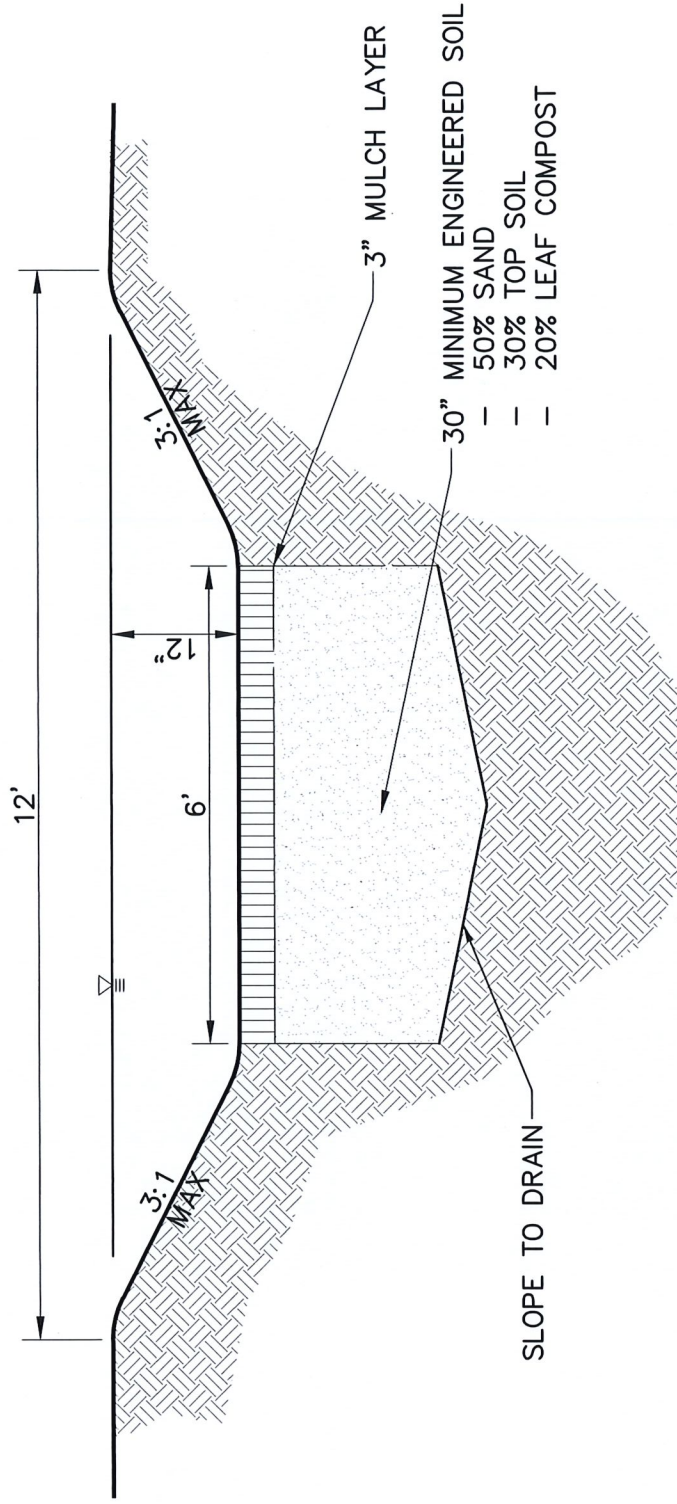
*Following is a summary of all BMPs included in the Project design. This checklist must be included on the cover sheet of the Improvement Plans for all Regulated Projects.*

BMP		Plan Sheet Number(s)
Structural Source Controls (list BMPs)		
Site Design Measures	Stream Setbacks and Buffers	N/A
	Soil Quality Improvement and Maintenance	N/A
	Tree Planting and Preservation	N/A
	Rooftop and Impervious Area Disconnection	N/A
	Porous Pavement	N/A
	Vegetated Swales	N/A
	Rain Barrels and Cisterns	N/A
Stormwater Treatment and Baseline Hydromodification Measures	Bioretention with Infiltration	Sheet 4/5
	Flow-Through Planters, Tree Box Filters and Media Filters	
Hydromodification Management Measures	Supplemental Detention	



# STORMWATER QUALITY PLAN FLYING CHANGE FARMS

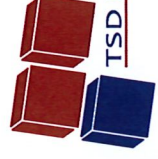
5145 JAMES DRIVE  
LOOMIS, CA 95650



## NOTES:

1. AN ENERGY DISSIPATER AND FLOW SPREADER SHOULD BE INSTALLED AT THE ENTRANCE TO THE SWALE TO REDUCE VELOCITY AND EVENLY DISTRIBUTE FLOWS ACROSS SWALE.
2. MAXIMUM ALLOWABLE SIDE-SLOPE 3:1.
3. IF THE SWALE BOTTOM SLOPE EXCEEDS 4% OR IF SOILS ARE VERY PERMEABLE, INSTALL CHECK DAMS EVERY 50 FEET TO SLOW THE VELOCITY TO PROHIBIT SCOURING AND PROMOTE INFILTRATION.
4. FLOWS IN EXCESS OF WATER QUALITY VOLUME SHOULD BE DIVERTED AROUND SWALE. IF NECESSARY FOR SWALE TO CONVEY FLOOD WATERS, PROVISIONS SHALL BE MADE TO ENSURE CONVEYANCE IN ACCORDANCE WITH CITY OF ROSEVILLE STANDARDS. PROVIDE ±1 FOOT FREEBOARD IF NECESSARY FOR FLOOD CONTROL.

BIORETENTION SWALE DETAIL  
(NOT TO SCALE)  
FLYING CHANGE FARMS  
MARCH 6, 2018



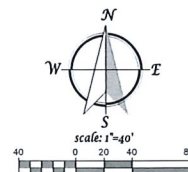
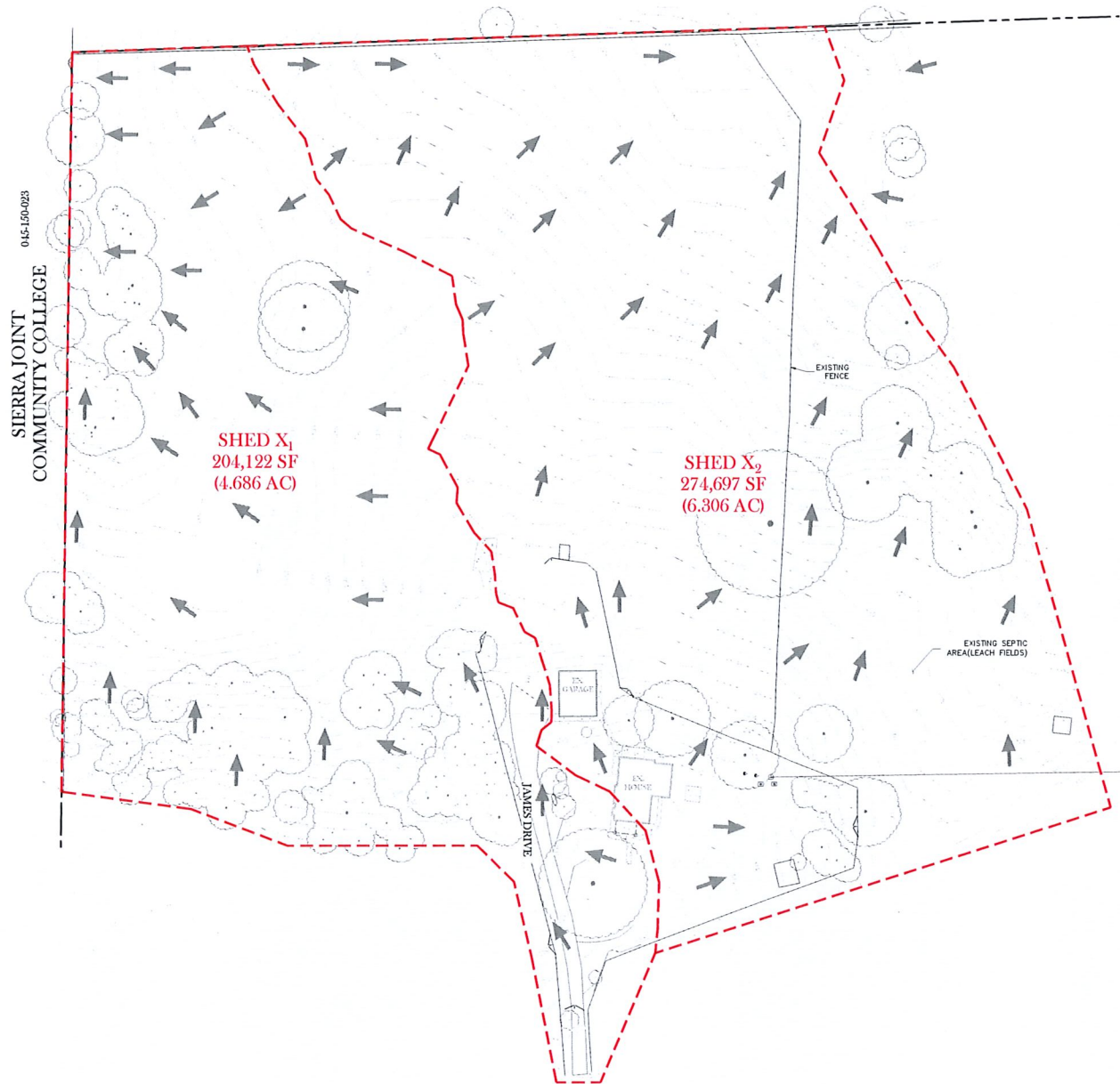
**TSD ENGINEERING, INC.**  
expect more.

785 Orchard Drive, Suite #110  
Folsom, CA 95630  
Phone: (916) 608-0707  
Fax: (916) 608-0701



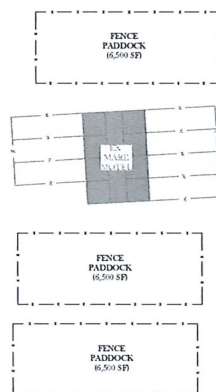
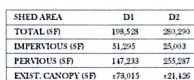
EXISTING SHED MAP  
**FLYING CHANGE  
FARMS**

5145 JAMES DRIVE  
CITY OF LOOMIS, CA 95650  
APN 045-150-003

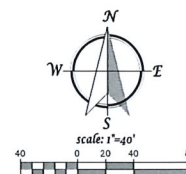


EXISTING SHED MAP  
MARCH 6, 2017

**TSD ENGINEERING, INC.**  
expect more.  
785 Orchard Drive, Suite #110  
Folsom, CA 95630  
Phone: (916) 608-0707  
Fax: (916) 608-0701

SIERRA JOINT  
COMMUNITY COLLEGE

MERGE WITH  
 EXIST. ROAD.  
 MATCH EXIST.  
 ROAD DIMENSIONS



DEVELOPED SHED MAP  
MARCH 13, 2018

# DEVELOPED SHED MAP FLYING CHANGE FARMS

5145 JAMES DRIVE  
CITY OF LOOMIS, CA 95650  
APN 045-150-003

