Appendix N

Agricultural Topsoil Memorandum

ALTHOUSE AND MEADE, INC.
BIOLOGICAL AND ENVIRONMENTAL SERVICES

1602 Spring Street, Paso Robles, CA 93446
(805) 237-9626 • Fax (805) 237-9181 • www.althouseandmeade.com

Memo

To: Rachel Kovesdi (Kovesdi Consulting)

From: LynneDee Althouse, M.S. and Thomas J. Rice, Ph.D.

Copy: Dove Daniel (CCB); Craig Campbell, P.E. (Wallace Group)

Date: April 14, 2017

Re: San Luis Ranch Response to Central Coast Grown DEIR Comments

---

This memo responds to a February 2017 inquiry from Central Coast Grown (CCG) who farms City property south of agricultural fields to be retained by San Luis Ranch. Contributors include: LynneDee Althouse, M.S., studied soil microbial ecology and hydrology during her post-graduate years at U.C. Santa Barbara and assists agriculturalists and land managers to protect their soil resources; Thomas J. Rice, Ph.D., soil scientist who is a retired Chair of the Soil Science Department (now recognized as the Natural Resources Management and Environmental Sciences Department) at California Polytechnic State University. Dr. Rice continues to provide expertise as a soil scientist to agriculturalists in California and Wisconsin. Craig Campbell, P.E., PLS, LEED AP, is also the hydrologist who evaluated grading plans for San Luis Ranch Specific Plan prepared by Cannon Associates and provided information in the section on the next page titled Agricultural Field Drainage.

1. *Historic Farming Practices*

Agricultural operations such as grain crop farming and small dairy operations on the San Luis Ranch project site date back to approximately 1900 (City of San Luis Obispo 2016, Rincon Consultants 2004). The Dalidio family purchased the site in 1921 and converted to row crop farming of onion, artichoke, garbanzo beans, and flowers for seed (City of San Luis Obispo 2016). The Dalidio family continued row crop farming on the property throughout the 1900s and in the early 1980s their agricultural business became known as Zapata Farms (City of San Luis Obispo 2016). The active contract farmer on the subject property is Rick Lewis since 2011 (Ochylski 2017). Mr. Lewis routinely deep rips the farmland up to several times a year to a depth of over 4 feet. The Dalidio family sold the property in 2014, but the site remains in use for row crop production (personal communication with Ochylski).

2. *Current and Proposed Farming Practices*

Approximately 109 out of 131 acres are presently used for production of irrigated row crops. The San Luis Ranch Specific Plan designates 52.71 acres of land to remain as agricultural lands (Vesting Tentative Tract Map, Cannon Associates Nov 8, 2016). It is Central Coast Builders' goal to improve the farmland heavily treated with concentrated herbicides and pesticides listed in

Attachment A (County of San Luis Obispo 2015) and transition to organic farmland. Low-input farming methods with organic amendments will be implemented to better protect produce consumers, neighbors (residential, commercial and highway users) and farm workers compared to current chemical inputs during the transition to organic farming practices (see Section 5, below). San Luis Ranch will utilize best management practices for cover cropping, crop rotation, etc., moving toward USDA organic certification with the objective to maintain and improve the quality of prime agricultural soils. This plan is consistent with the San Luis Ranch Specific Plan regarding on-site organic farming and no pesticide use (Section 4.2 Draft EIR 2016).

After limited grading (approximately 6 inches of earth movement near the south end of the field, and 2 feet of earth removed near the north end of the field), agricultural lands will transition to organic operations, utilizing best management practices for cover cropping, crop rotation, etc., moving toward USDA certification with the objective to maintain and improve the quality of prime agricultural soils.

3. Agricultural Field Drainage

Limited grading is proposed to reduce flood risk on and adjacent to San Luis Ranch (Attachment B). The agricultural (ag) field drainage will operate substantially as it does now. At the downstream end of the property, a strip of land approximately 150 feet wide will remain at the current elevation. Drainage sheeting over this strip will cross the property line in the same manner and location as it does now. The upper end of the ag field will be lowered approximately 2 feet and the site will be graded with a smooth sheet flow profile similar to the existing profile. The field slope will be lowered from approximately 0.48% slope to 0.35% slope, which is functionally very similar from a drainage standpoint.

Total flow delivered to the property line at the downstream property line of the ag field will be reduced or remain the same under different storm events. In smaller storms, the watershed draining to the downstream edge is reduced, with runoff from the development area of San Luis Ranch being metered by the detention basin and delivered to Prefumo Creek without passing over the ag field boundary. In the largest storms, flood flow over the ag field is dominated by flood flows crossing over Highway 101 at Prado Road and flowing onto the property. The quantity of this flood flow will be unchanged, and will exit the ag field in the same manner as it does now.

During periods of high rainfall, farming will still be difficult, just as experienced during the recent 2016-17 rain year. Limited grading is proposed to minimize and avoid ponding or pooling, and to allow water to drain from the property just as it does today. Ag soil will remain prime farmland, and may continue to be farmed.

4. Soil Microbes

Soil microbes at multiple depths will continue to be present and distributed by active farming and aerosol actions, even after minor changes to current elevations. Tillage and crop row construction will move microbes throughout the field. Addition of organic amendments will increase microbial biomass compared to conventional farming systems (Ocio et al. 1991; Wyland et al. 1995, 1996; Gunapala and Scow 1998). Clay soil below the current near-surface layer on San Luis Ranch is expected to rapidly respond to organic farming methods. Depending on residual pesticides in the soil profile and best farming practices implemented, microbial activity is expected to reach or exceed pre-grading population sizes and species diversity within three years.

Soil microbial communities are strongly influenced by agricultural practices that change the soil environment, and microbial community composition can respond rapidly (within weeks) to disturbance and addition of organic carbon (Lundquist et al. 1999; Santos et al. 2011; Wang et al. 2011). Lundquist et al. (1999) showed that microbial biomass carbon increases in farming system soils receiving large organic inputs compared to conventional farming systems, and microbial communities in organic farmland are distinctive from those in conventional soils after three years (the biodiversity is not the same in the two systems). They also found that surface microorganisms appear to be adapted to wet/dry cycles of moisture during the growing season compared to microbes at lower depth. Santos et al. (2011) showed that soil organic carbon was highest in organic farming systems in all depths. The lowest values for both soil microbial biomass carbon and nitrogen were observed in the conventionally-farmed plot, but increased gradually from conventional to organic farming, leading to consistent and distinct differences from the conventional control by the end of the second year. Wang et al. (2011) found that management decisions including reducing tillage and increasing organic carbon inputs can promote soil carbon accumulation to improve soil fertility.

Although microbial density may be less in the deeper horizons than at the soil surface, approximately 35 percent of the total quantity of microbial biomass found in the top 2 m (6.6 ft) of soil is found below a depth of 25 cm (Fierer et al. 2003). Noah Fierer and his colleagues examined historically farmed soils in Santa Ynez Valley, Santa Barbara County, and found that in their deep (2+ meter soils), high total active biomass occurred below the surface. Gram-positive bacteria and actinomycetes tended to increase in proportional abundance with increasing soil depth, while the abundances of Gram-negative bacteria, fungi, and protozoa were highest at the soil surface and substantially lower in the subsurface. The proportional abundances of actinomycetes were the lowest in the top 5 cm of the profiles and generally increased at greater soil depths. The vertical distribution of these specific microbial groups was largely attributed to a decline in carbon availability with soil depth.

Eilers et al. (2012) characterized changes in microbial community composition with depth. They compared 54 sample sites from desert to forest to grassland and found that microbial activity parallels carbon quantity and quality. Microbes living throughout the soil profile, not just the near-surface, are likely to have important effects on carbon sequestration, nutrient cycling, and weathering processes.

San Luis Ranch agricultural soil proposed to be protected is very deep, except for nitrogen and organic matter, lab analysis shows consistent soil texture and fertility characteristics from the surface to the lower 3-foot level. With best organic farming practices, and addition of organic carbon and nitrogen amendments, we expect the deep clay soil to continue to be classified as prime farmland within the City of San Luis Obispo.

5. *Transition from Conventional to Organic Farmland*

The transition from conventional to certified organic farming practices requires several steps:

1. The farm or business adopts organic practices, selects a USDA-accredited certifying agent, and submits an application and fees to the certifying agent.
2. The certifying agent reviews the application to verify that practices comply with USDA organic regulations.
3. An inspector conducts an on-site inspection of the applicant's operation.

4. The certifying agent reviews the application and the inspector's report to determine if the applicant complies with the USDA organic regulations.
5. The certifying agent issues organic certificate.

Any land used to produce raw organic commodities must not have had prohibited substances applied to it for the past three years. Until the full 36-month transition period is met, the farm may not: Sell, label, or represent the product as "organic"; or, use the USDA organic or certifying agent's seal (USDA 2017).

The USDA National Organic Program (2015) recommends the following practices:

Crops more easily resist disease, survive drought, and tolerate insects when grown in good soil. Organic crop producers build soil quality by adding compost, animal manures, or green manures. As soil organisms break down these inputs, they convert nutrients into forms plants can absorb and create humus that sustains soil quality. Organic producers must not apply sewage sludge or biosolids to soil. Additionally, organic crop producers use cover crops to protect the soil from wind and water erosion. Soil-conserving practices include the use of cover crops, mulches, conservation tillage, contour plowing, and strip cropping.

Organic crop producers use organic seeds and planting stocks to protect the integrity of their crops. Organic growers may use conventionally grown seeds when an equivalent organic variety is not commercially available, but only if the seeds have not been genetically modified or treated with prohibited substances, such as fungicides.

Organic crop producers practice crop rotation (rotating the crops they grow in a field or planting bed over time) to interrupt insect life cycles, suppress soil borne plant diseases, prevent soil erosion, build organic matter, fix nitrogen, and increase farm biodiversity. To effectively reduce insect and disease levels, farmers typically follow one crop with another from a different crop family, then wait a number of years before replanting the initial crop. While crop rotation is also practiced by many conventional farmers, organic producers are required to implement the practice by the USDA organic regulations.

Pest management on organic farms relies on the 'PAMS' strategy: prevention, avoidance, monitoring and suppression. Prevention and avoidance are the first line of defense against pests, weeds, and diseases. If pest or weed suppression becomes necessary, producers often use mechanical and physical practices, such as releasing predatory insects to reduce pest populations or laying down a thick layer of mulch to smother weeds. As a last resort, producers may work with their organic certifier to use an approved pesticide, such as naturally occurring microorganisms, insecticides naturally derived from plants, or one of a few approved synthetic substances.

Organic crop producers are responsible for preventing contact between organic and conventionally-grown crops, as well as contact with prohibited pesticides or fertilizers. Split operations (farms that raise both organic and conventional crops) must make sure that organic crops don't contact prohibited substances through accidental sprays of conventional agrochemicals, spray drift, or residues on equipment from non-organic fields. Fields from which organic crops are harvested must have defined boundaries and buffer zones, such as hedgerows or crops, separating them from conventional crops and roadways. Prohibited materials cannot be applied to land used for organic cultivation for 36 months prior to harvest of organic crops.

6. Plan for Transition from Conventional to Organic Farming

The transition from conventional to organic farming practices needs to be guided by a management plan specific to the San Luis Ranch agricultural field. San Luis Ranch intends to commence organic farming practices immediately and implement organic farming practices that remediate/remove residual pesticides in the soil.

We recommend that a plan be prepared for Farm Transition from Conventional to Organic Production. The plan would include methods to evaluate baseline soil conditions and track changes within the upper 4 feet of protected farmland. Baseline analysis would include sampling at 1-ft and 3-ft depth for residual toxic residues from previous pesticide applications, and sampling every 1-ft increment for 4 feet to evaluate microbial diversity (bacteria and fungi), soil organic matter, and important soil fertility analytes such as (pH, nitrate nitrogen, phosphorus, potassium, magnesium, calcium, sodium, sulfur, zinc, manganese, iron, copper, boron, chloride, cation exchange capacity, electrical conductivity, and soil texture). Evaluation of baseline conditions will be conducted by a soil scientist that has expertise in soil chemistry and microbial processes. The soil scientist will receive input from an organic farmer with experience in California's deep, heavy clay farmland regarding approaches to manage heavy soils, pesticide residues (if present). The plan will provide recommendations for soil management practices to improve ecosystem services, reduce residual pesticides, maintain or improve water quality in run-off from tailwater or surface water during storm events, maintain or improve crop production in a manner that facilitates ultimate achievement of organic certification for the farm within a 10 year timeframe.

The plan may involve 5 years of research related to farm practices appropriate for San Luis Ranch that includes: (1) soil aeration and introduction of compost to accelerate bio-remediation (natural decomposition) of pesticide residuals; (2) use of tail-water filtration methods to capture pollutants in runoff; (3) study plots to track changes over time with various farming practices; (4) involvement of university researchers working on best practices related to organic farming in deep clay soil.

The plan will provide a transitional framework with measureable goals and long-term recommendations for best practices to be implemented during the research period. After the first two years of research, best practices will be refined to include with measureable outcomes based on research findings. The plan should include annual reports and regular updates to the public and the farming community. with mechanisms to adapt farming practices to changing climate conditions (wet years and dry periods) and incorporate current research into best practices. At the end of the 5-year research and monitoring period, recommendations for long-term organic farming practices will be prepared in cooperation with researchers, contract farmer(s), and the landowners association and submitted to the City for community input.

References

Cannon Associates. 2017. San Luis Ranch Preliminary Overall Grading Plan. February 17, 2017.

Cannon Associates. 2016. San Luis Ranch Vesting Tentative Tract Map. Nov 8, 2016

City of San Luis Obispo. 2016. San Luis Ranch Specific Plan Draft Environmental Impact Report SCH#2015101083; Project# SPEC/ANNX/ER 1502-2015. Prepared with assistance of Rincon Consultants, San Luis Obispo. December, 2016. Section 2 Project Description 25 pp.; Section 4.2 Agricultural Resources 26 pp.

County of San Luis Obispo. 2015. Query results of pesticide use report database for APN 067-121-022 from January 1, 2012 to April 27, 2015. Department of Agriculture/Measurement Standards. May 1, 2015.

Eilers, Kathryn G., Spencer Debenport, Suzanne Anderson, and Noah Fierer. 2012. Digging deeper to find unique microbial communities: the strong effect of depth on the structure of bacterial and archaeal communities in soil. Soil Biology and Biochemistry, 50, pp.58-65.

Fierer, Noah, Joshua P. Schimel, and Patricia A. Holden. 2003. Variations in microbial community composition through two soil depth profiles. Soil Biology and Biochemistry, 35(1), pp.167-176.

Gunapala, Nirmala and Kathryn M. Scow, 1998. Dynamics of soil microbial biomass and activity in conventional and organic farming systems. Soil Biology & Biochemistry, 30, pp.805-816.

Lundquist, E.J., Kathryn M. Scow, L.E. Jackson, Sandra .L. Uesugi, and Carol R. Johnson. 1999. Rapid response of soil microbial communities from conventional, low input, and organic farming systems to a wet/dry cycle. Soil Biology and Biochemistry, 31(12), pp.1661-1675.

Ocio, J.A., P.C. Brookes, and D.S. Jenkinson. 1991. Field incorporation of straw and its effects on soil microbial biomass and soil inorganic N. Soil Biology & Biochemistry, 23(2), pp.171-176.

Rincon Consultants. 2004. Dalidio/San Luis Marketplace Annexation and Development Project. Final Environmental Impact Report. State Clearinghouse No. 2003021089. April, 2004 Section 4.9 Cultural Resources. 11 pp.

Santos, Valdinar, Ademir Araujo, Luiz Leite, Luis Nunes, Wanderley Melo. 2012. Soil microbial biomass and organic matter fractions during transition from conventional to organic farming systems. Geoderma, 170, pp.227-231.

U.S. Department of Agriculture (USDA). 2017. Guidance & Instructions for Accredited Certifying Agents and Certified Operations. Available at: https://www.ams.usda.gov/rules-regulations/organic/handbook. Accessed 4/7/2017.

U..S. Department of Agriculture (USDA). 2017. Available at: https://www.ams.usda.gov/sites/default/files/media/Organic%20Practices%20Factsheet.pdf. Accessed 4/7/2017.

Wang, Yi, Tu Cong, Lei Cheng, Li Chunyue, Laura Gentry, Greg Hoyt, and Xingchang Zhang. 2011. Long-term impact of farming practices on soil organic carbon and nitrogen pools and microbial biomass and activity. Soil and Tillage Research, 117, pp.8-16.

Wyland, L.J., L.E Jackson, W.E. Chaney, K. Klonsky, S.T. Koike, and B. Kimple. 1996. Winter cover crops in a vegetable cropping system: Impacts on nitrate leaching, soil water, crop yield, pests and management costs. Agriculture, Ecosystems & Environment, 59(1-2), pp.1-17.

Wyland, L.J., L.E. Jackson, and K.F. Schulbach. 1995. Soil-plant nitrogen dynamics following incorporation of a mature rye cover crop in a lettuce production system. Journal of Agricultural Science, 124(01), pp.17-25.

PERSONAL COMMUNICATION

Lazcano, Cristina. 2017. Meeting with LynneDee Althouse to discuss transition from conventional to organic farming on San Luis Ranch.

Ochylski, Marshall. 2017. Email to LynneDee Althouse regarding Rick Lewis, contract farmer. April 14.

ATTACHMENTS

A. 2015 QUERY RESULTS OF PESTICIDE USE REPORT DATABASE FOR APN 067-121-022

B. 2017 SAN LUIS RANCH PRELIMINARY OVERALL GRADING PLAN

ATTACHMENT A. 2015 QUERY RESULTS OF PESTICIDE USE REPORT DATABASE FOR APN 067-121-022

COUNTY OF SAN LUIS OBISPO
Department of Agriculture/Weights and Measures
2156 SIERRA WAY, SUITE A • SAN LUIS OBISPO, CALIFORNIA 93401-4556
MARTIN SETTEVENDEMIE (805) 781-5910
AGRICULTURAL COMMISSIONER/SEALER FAX: (805) 781-1035
www.slocounty.ca.gov/agcomm AgCommSLO@co.slo.ca.us

May 1, 2015

MI San Luis Ranch, LLC
c/o Dove Daniel
Coastal Community Builders, PO B
Pismo Beach, CA 93449

Dear Ms. Daniel,

Per your request, we have performed a query of our pesticide use report database for the following site: APN 067-121-022, and the following time frame: From January 1, 2012, to April 27, 2015.

The query showed pesticide use reports were submitted and are attached for your information. This query was made for both production agricultural (crop) use reports and monthly summary (non crop) use reports.

These submitted pesticide use reports do apply to the land in question.

Please contact me at 805-781-5908 if you have any questions.

Sincerely,

James Moore
Agriculture/Weights and Measures Technician II

Pesticide Number and Name(s)
100-1098-ZC
QUADRIS (CA)
100-1112-AA-55467
PROVINCE
PROVINCE INSECTICIDE
100-1254-AA
REVUS
REVUS (CA & NY)
100-1254-ZA
REVUS
100-1276-ZA
ENDIGO ZC
100-1295-AA
WARRIOR II WITH ZEON
WARRIOR II WITH ZEON TECHNOLOGY
100-1320-AA
VOLIAM XPRESS
100-912-ZA
FULFILL
100-938-AA
ACTARA
ACTARA (CA & NY)
100-938-ZA
ACTARA
100-953-AA
SWITCH 62.5WG
10163-21-ZA
GOWAN MALATHION 8
10163-21-ZB
GOWAN MALATHION 8 FL
10182-96-ZA
WARRIOR INSECTICIDE
1021-1770-AA
EVERGREEN CROP PROTE
1021-1772-AA
PYGANIC CROP PROTECT
10951-50063-AA
PHT BUFFER
1471-65-ZA
TREFLAN E.C. WEED AND GRASS PREVENTER
241-427-AA
FORUM(R) FUNGICIDE
264-1025-AA
BELT SC INSECTICIDE
264-1026-AA
SYNAPSE WG INSECTICI

Pesticide Number and Name(s)
264-1050-AA
MOVENTO
MOVENTO (CA & NY)
264-1104-AA
LEVERAGE 360 (CA & H
LEVERAGE 360 (CA & N
LEVERAGE 360 INSECTI
264-333-ZC
SEVIN BRAND XLR PLUS
264-482-ZA
ROVRAL BRAND 4 (CA)
ROVRAL BRAND 4 FLOWA
264-678-AA
PREVICUR FLEX FUNGIC
264-827-ZA
ADMIRE PRO SYSTEMIC
264-840-AA
BAYTHROID XL
BAYTHROID XL (CA & N
279-3108-AA
BRIGADE WSB
279-3114-AA
CAPTURE 2EC-CAL
279-3126-ZB
MUSTANG
MUSTANG INSECTICIDE
279-3328-AA
MUSTANG MAX EW
34704-474-ZA
MALATHION 8 AQUAMUL
352-515-AA
DUPONT ASANA XL INSE
352-592-AA
DUPONT CURZATE 60DF
352-597-AA
DUPONT AVAUNT INSECT
352-662-ZA
DUPONT KOCIDE 3000 F
352-729-AA
DUPONT CORAGEN (CA &
DUPONT CORAGEN (CA)
DUPONT CORAGEN (CA,
DUPONT CORAGEN INSEC
352-834-AA
DUPONT FONTELIS FUNG
400-518-ZB

Pesticide Number and Name(s)
PROCURE 480SC
PROCURE 480SC (015/0
42750-110-AA
MACHO 2.0 FL
50534-188-AA-100
BRAVO WEATHER STIK
BRAVO WEATHER STIK (
50534-1-AA
DACTHAL W-75
51036-214-AA
MALATHION 8EC
5481-479-AA
DIBROM 8 EMULSIVE
5481-487-AA
DACTHAL FLOWABLE
DACTHAL FLOWABLE HERBICIDE
5481-9041-AA
MOCAP EC
55146-1-ZC
CHAMP WG
CHAMP WG (CA)
55146-75-ZA
MICRO SULF
59639-135-AA
VENOM(R) INSECTICIDE
59639-150-AA
BELAY(R) INSECTICIDE
62719-397-ZC
KERB 50-W
62719-410-ZC
RALLY 40 WSP
62719-442-AA
INTREPID 2F
62719-447-ZA
GOALTENDER
62719-515-AA
M-PEDE
62719-545-AA
RADIANT SC
62719-578-AA
KERB SC
65343-50009-AA
GRIP (CA)
66222-46-AA
TRIFLUREX HFP
66330-297-AA

Pesticide Number and Name(s)
IPRODIONE 4L AG
68156-4-ZA
TREFLAN 4D
7001-50005-AA
PHT AD-WET 90 CA
7001-50013-AA
PHT AD-BUFF
PHT AD-BUFF (CA)
7001-50028-AA
PHT ENTRY
70506-234-AA
MANZATE PRO-STICK
70506-8-AA
ACEPHATE 97UP
ACEPHATE 97UP (CA)
70506-8-AA-55467
ACEPHATE 97
70506-9-AA
PERM-UP 3.2 EC
71711-32-AA
VETICA
72662-50005-AA
OROBOOST
7969-187-AA
CABRIO EG FUNGICIDE
CABRIO(R) EG FUNGICI
7969-197-AA
ENDURA(R) FUNGICIDE
8033-36-AA-70506
ASSAIL 30SG
83100-7-AA-83979
MONTANA 2F INSECTICI

ATTACHMENT B. 2017 SAN LUIS RANCH PRELIMINARY OVERALL GRADING PLAN

REV. NO	DATE	REVISED	DESTROY ALL PRINTS BEARING EARLIER DATE	REV. BY	CKD. BY	APRD BY

Cannon

1050 Southwood Drive
San Luis Obispo, CA 93401
P 805.544.7407 F 805.544.3863

SAN LUIS RANCH
CLOMR GRADING PLAN

OVERALL GRADING PLAN

SAN LUIS OBISPO, CA

DRAWN BY	DATE	CA JOB NO.
JSW	02/17/2017	140310
CHECKED BY	SCALE	SHEET
STS	1" = 150'	1 OF 6