APPENDIX A WETLAND DETERMINATION DATA FORMS

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Janus Solar | City/County: Colusa County | Sampling Date: 1/18/2021

Applicant/Owner: RWE Solar Development, LLC | State: CA | Sampling Point: 1-1a up

Investigator(s): Daniel Berg, Monique O'Conner | Section, Township, Range: 1-3, 25, 26, 29, 30, 35; 14N, 15N; 3W, 4W

Landform (hillslope, terrace, etc.): Plain | Local relief (concave, convex, none): None | Slope (%): 0

Subregion (LRR): C - Mediterranean California | Lat: Refer to Map | Long: Refer to Map | Datum: N/A

Soil Map Unit Name: Capay clay loam | NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes (●) No ( ) (If no, explain in Remarks.)

Are Vegetation [X] Soil [X] or Hydrology [ ] significantly disturbed? Are "Normal Circumstances" present? Yes (●) No ( )

Are Vegetation [ ] Soil [ ] or Hydrology [ ] naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	( )	(●)
Hydric Soil Present?	( )	(●)
Wetland Hydrology Present?	( )	(●)

Is the Sampled Area within a Wetland? **Yes** ( ) **No** (●)

Remarks: Project site is actively grazed by cattle throughout.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	%		
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:	%		
Herb Stratum			
1. *Aegilops triuncialis*	80	Yes	Not Listed
2. *Centaurea solstitialis*	1	No	Not Listed
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:	81 %		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum 19 % | % Cover of Biotic Crust 0 %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0 % (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	0
FACW species		x 2 =	0
FAC species		x 3 =	0
FACU species		x 4 =	0
UPL species	81	x 5 =	405
Column Totals:	81 (A)		405 (B)

Prevalence Index = B/A = 5.00

Hydrophytic Vegetation Indicators:

- ( ) Dominance Test is >50%
- ( ) Prevalence Index is ≤3.0[1]
- [ ] Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** ( ) **No** (●)

Remarks:

SOIL

Sampling Point: 1-1a up

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture[3]	Remarks
0-10	7.5YR 3/3	100					Silty clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.
[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[4]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ○ No ◉

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ○ No ◉ Depth (inches):

Water Table Present? Yes ○ No ◉ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ○ No ◉ Depth (inches):

Wetland Hydrology Present? Yes ○ No ◉

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Janus Solar | City/County: Colusa County | Sampling Date: 1/18/2021

Applicant/Owner: RWE Solar Development, LLC | State: CA | Sampling Point: 1-1a wet

Investigator(s): Daniel Berg, Monique O'Conner | Section, Township, Range: 1-3, 25, 26, 29, 30, 35; 14N, 15N; 3W, 4W

Landform (hillslope, terrace, etc.): Drainage channel | Local relief (concave, convex, none): None | Slope (%): 1

Subregion (LRR): C - Mediterranean California | Lat: Refer to Map | Long: Refer to Map | Datum: N/A

Soil Map Unit Name: Capay clay loam | NWI classification: R4SBC

Are climatic / hydrologic conditions on the site typical for this time of year? Yes (●) No ( ) (If no, explain in Remarks.)

Are Vegetation [X] Soil [X] or Hydrology [ ] significantly disturbed? Are "Normal Circumstances" present? Yes (●) No ( )

Are Vegetation [ ] Soil [ ] or Hydrology [ ] naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	( )	(●)
Hydric Soil Present?	( )	(●)
Wetland Hydrology Present?	(●)	( )

Is the Sampled Area within a Wetland? Yes ( ) No (●)

Remarks: Project site is actively grazed by cattle throughout.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Salix laevigata*	10	Yes	FACW
2. *Prunus dulcis*	10	Yes	Not Listed
3.			
4.			
Total Cover:	20 %		
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:	%		
Herb Stratum			
1. *Centaurea solstitialis*	1	Yes	Not Listed
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:	1 %		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum 99 % | % Cover of Biotic Crust 0 %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33.3 % (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	0
FACW species	10	x 2 =	20
FAC species		x 3 =	0
FACU species		x 4 =	0
UPL species	11	x 5 =	55
Column Totals:	21 (A)		75 (B)

Prevalence Index = B/A = 3.57

Hydrophytic Vegetation Indicators:

- [ ] Dominance Test is >50%
- [ ] Prevalence Index is ≤3.0[1]
- [ ] Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ( ) No (●)

Remarks:

SOIL

Sampling Point: 1-1a wet

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture[3]	Remarks
0-10	7.5YR 3/4	100%					Silty clay loam	<1% thin white lines at 5-10"

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.
[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[4]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):
Type:
Depth (inches):

Hydric Soil Present? Yes ○ **No** ●

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☒ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☒ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ○	No ●	Depth (inches):
Water Table Present?	Yes ○	No ●	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes ○	No ●	Depth (inches):

Wetland Hydrology Present? Yes ● **No** ○

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Janus Solar | City/County: Colusa County | Sampling Date: 1/18/2021

Applicant/Owner: RWE Solar Development, LLC | State: CA | Sampling Point: 1-1b up

Investigator(s): Daniel Berg, Monique O'Conner | Section, Township, Range: 1-3, 25, 26, 29, 30, 35; 14N, 15N; 3W, 4W

Landform (hillslope, terrace, etc.): Plain | Local relief (concave, convex, none): None | Slope (%): 0

Subregion (LRR): C - Mediterranean California | Lat: Refer to Map | Long: Refer to Map | Datum: N/A

Soil Map Unit Name: Capay clay loam | NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ◉ No ○ (If no, explain in Remarks.)

Are Vegetation ☒ Soil ☒ or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ◉ No ○

Are Vegetation ☐ Soil ☐ or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ○	No ◉
Hydric Soil Present?	Yes ○	No ◉
Wetland Hydrology Present?	Yes ○	No ◉

Is the Sampled Area within a Wetland? Yes ○ No ◉

Remarks: Project site is actively grazed by cattle throughout.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Salix laevigata*	3	Yes	FACW
2. *Prunus dulcis*	3	Yes	Not Listed
3.			
4.			
Total Cover:	6 %		
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:	%		
Herb Stratum			
1. *Aegilops triuncialis*	50	Yes	Not Listed
2. *Cynodon dactylon*	10	No	FACU
3. *Centaurea solstitialis*	1	No	Not Listed
4. *Erodium sp.*	1	No	FACU
5.			
6.			
7.			
8.			
Total Cover:	62 %		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum 38 % | % Cover of Biotic Crust 0 %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	1	(A)
Total Number of Dominant Species Across All Strata:	3	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	33.3 %	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	0
FACW species	3	x 2 =	6
FAC species		x 3 =	0
FACU species	11	x 4 =	44
UPL species	54	x 5 =	270
Column Totals:	68 (A)		320 (B)

Prevalence Index = B/A = 4.71

Hydrophytic Vegetation Indicators:

- ○ Dominance Test is >50%
- ○ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ○ No ◉

Remarks:

SOIL

Sampling Point: 1-1b up

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture[3]	Remarks
0-16	7.5YR 3/3	100					Silty clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.
[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[4]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? **Yes** ○ **No** ●

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ○	No ●	Depth (inches):
Water Table Present?	Yes ○	No ●	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes ○	No ●	Depth (inches):

Wetland Hydrology Present? **Yes** ○ **No** ●

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Janus Solar City/County: Colusa County Sampling Date: 1/18/2021

Applicant/Owner: RWE Solar Development, LLC State: CA Sampling Point: 1-2a up

Investigator(s): Daniel Berg, Monique O'Conner Section, Township, Range: 1-3, 25, 26, 29, 30, 35; 14N, 15N; 3W, 4W

Landform (hillslope, terrace, etc.): Plain Local relief (concave, convex, none): None Slope (%): 0

Subregion (LRR): C - Mediterranean California Lat: Refer to Map Long: Refer to Map Datum: N/A

Soil Map Unit Name: Capay clay loam NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ● No ○ (If no, explain in Remarks.)

Are Vegetation ☒ Soil ☒ or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ● No ○

Are Vegetation ☐ Soil ☐ or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	○	●
Hydric Soil Present?	○	●
Wetland Hydrology Present?	○	●

Is the Sampled Area within a Wetland? Yes ○ No ●

Remarks: Project site is actively grazed by cattle throughout.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	%		
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:	%		
Herb Stratum			
1. *Aegilops triuncialis*	30	Yes	Not Listed
2. *Centaurea solstitialis*	30	Yes	Not Listed
3. *Hemizonia congesta*	5	No	Not Listed
4.			
5.			
6.			
7.			
8.			
Total Cover:	65 %		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum 35 % % Cover of Biotic Crust 0 %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	0	(A)
Total Number of Dominant Species Across All Strata:	2	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	0.0 %	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 = 0
FACW species		x 2 = 0
FAC species		x 3 = 0
FACU species		x 4 = 0
UPL species	65	x 5 = 325
Column Totals:	65 (A)	325 (B)

Prevalence Index = B/A = 5.00

Hydrophytic Vegetation Indicators:

- ○ Dominance Test is >50%
- ○ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ○ No ●

Remarks:

SOIL

Sampling Point: 1-2a up

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture[3]	Remarks
0-16	7.5YR 3/4	100					Silty clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.
[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[4]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ○ No ●

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ○ No ● Depth (inches):

Water Table Present? Yes ○ No ● Depth (inches):

Saturation Present? (includes capillary fringe) Yes ○ No ● Depth (inches):

Wetland Hydrology Present? Yes ○ No ●

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Janus Solar | City/County: Colusa County | Sampling Date: 1/18/2021

Applicant/Owner: RWE Solar Development, LLC | State: CA | Sampling Point: 1-2a wet

Investigator(s): Daniel Berg, Monique O'Conner | Section, Township, Range: 1-3, 25, 26, 29, 30, 35; 14N, 15N; 3W, 4W

Landform (hillslope, terrace, etc.): Drainage channel | Local relief (concave, convex, none): None | Slope (%): 1

Subregion (LRR): C - Mediterranean California | Lat: Refer to Map | Long: Refer to Map | Datum: N/A

Soil Map Unit Name: Capay clay loam | NWI classification: PSSC

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ◉ No ○ (If no, explain in Remarks.)

Are Vegetation ☒ Soil ☒ or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ◉ No ○

Are Vegetation ☐ Soil ☐ or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	◉	○
Hydric Soil Present?	◉	○
Wetland Hydrology Present?	◉	○

Is the Sampled Area within a Wetland? **Yes** ◉ **No** ○

Remarks: Project site is actively grazed by cattle throughout.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	%		
Sapling/Shrub Stratum			
1. *Salix sp.*	2	Yes	FACW
2.			
3.			
4.			
5.			
Total Cover:	2 %		
Herb Stratum			
1. *Typha sp.*	15	Yes	OBL
2. *Ambrosia psilostachya*	5	Yes	FACU
3. *Juncus sp.*	5	Yes	FACW
4.			
5.			
6.			
7.			
8.			
Total Cover:	25 %		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum 75 % % Cover of Biotic Crust 0 %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 75.0 % (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	15	x 1 =	15
FACW species	7	x 2 =	14
FAC species		x 3 =	0
FACU species	5	x 4 =	20
UPL species		x 5 =	0
Column Totals:	27 (A)		49 (B)

Prevalence Index = B/A = 1.81

Hydrophytic Vegetation Indicators:

- ☒ Dominance Test is >50%
- ☒ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** ◉ **No** ○

Remarks:

SOIL

Sampling Point: 1-2a wet

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture[3]	Remarks
0-4	Gley 1 3/10Y	100					Silty clay loam	Mucky texture.
4-16	10YR 5/8	100					Silty clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.
[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- [ ] Histosol (A1)
- [ ] Histic Epipedon (A2)
- [ ] Black Histic (A3)
- [x] Hydrogen Sulfide (A4)
- [ ] Stratified Layers (A5) (**LRR C**)
- [ ] 1 cm Muck (A9) (**LRR D**)
- [ ] Depleted Below Dark Surface (A11)
- [ ] Thick Dark Surface (A12)
- [ ] Sandy Mucky Mineral (S1)
- [ ] Sandy Gleyed Matrix (S4)
- [ ] Sandy Redox (S5)
- [ ] Stripped Matrix (S6)
- [ ] Loamy Mucky Mineral (F1)
- [x] Loamy Gleyed Matrix (F2)
- [ ] Depleted Matrix (F3)
- [ ] Redox Dark Surface (F6)
- [ ] Depleted Dark Surface (F7)
- [ ] Redox Depressions (F8)
- [ ] Vernal Pools (F9)

Indicators for Problematic Hydric Soils[4]:

- [ ] 1 cm Muck (A9) (**LRR C**)
- [ ] 2 cm Muck (A10) (**LRR B**)
- [ ] Reduced Vertic (F18)
- [ ] Red Parent Material (TF2)
- [ ] Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes (●) **No** ( )

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- [x] Surface Water (A1)
- [ ] High Water Table (A2)
- [ ] Saturation (A3)
- [ ] Water Marks (B1) (**Nonriverine**)
- [ ] Sediment Deposits (B2) (**Nonriverine**)
- [ ] Drift Deposits (B3) (**Nonriverine**)
- [ ] Surface Soil Cracks (B6)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [x] Water-Stained Leaves (B9)
- [ ] Salt Crust (B11)
- [ ] Biotic Crust (B12)
- [ ] Aquatic Invertebrates (B13)
- [x] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres along Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Plowed Soils (C6)
- [ ] Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- [x] Water Marks (B1) (**Riverine**)
- [ ] Sediment Deposits (B2) (**Riverine**)
- [ ] Drift Deposits (B3) (**Riverine**)
- [ ] Drainage Patterns (B10)
- [ ] Dry-Season Water Table (C2)
- [ ] Thin Muck Surface (C7)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [ ] Shallow Aquitard (D3)
- [ ] FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes (●) No ( ) Depth (inches): 16 inches

Water Table Present? Yes ( ) No (●) Depth (inches):

Saturation Present? (includes capillary fringe) Yes ( ) No (●) Depth (inches):

Wetland Hydrology Present? Yes (●) **No** ( )

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Algae layer present atop water.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Janus Solar | City/County: Colusa County | Sampling Date: 1/18/2021

Applicant/Owner: RWE Solar Development, LLC | State: CA | Sampling Point: 1-2b up

Investigator(s): Daniel Berg, Monique O'Conner | Section, Township, Range: 1-3, 25, 26, 29, 30, 35; 14N, 15N; 3W, 4W

Landform (hillslope, terrace, etc.): Plain | Local relief (concave, convex, none): None | Slope (%): 0

Subregion (LRR): C - Mediterranean California | Lat: Refer to Map | Long: Refer to Map | Datum: N/A

Soil Map Unit Name: Capay clay loam | NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ◉ No ○ (If no, explain in Remarks.)

Are Vegetation ☒ Soil ☒ or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ◉ No ○

Are Vegetation ☐ Soil ☐ or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	○	◉
Hydric Soil Present?	○	◉
Wetland Hydrology Present?	○	◉

Is the Sampled Area within a Wetland? **Yes** ○ **No** ◉

Remarks: Project site is actively grazed by cattle throughout.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	%		
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:	%		
Herb Stratum			
1. *Aegilops triuncialis*	30	Yes	Not Listed
2. *Centaurea solstitialis*	30	Yes	Not Listed
3. *Juncus sp.*	3	No	FACW
4. *Hemizonia congesta*	1	No	Not Listed
5. *Cynodon dactylon*	1	No	FACU
6.			
7.			
8.			
Total Cover:	65 %		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum 35 % | % Cover of Biotic Crust 0 %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	0	(A)
Total Number of Dominant Species Across All Strata:	2	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	0.0 %	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	0
FACW species	3	x 2 =	6
FAC species		x 3 =	0
FACU species	1	x 4 =	4
UPL species	61	x 5 =	305
Column Totals:	65 (A)		315 (B)

Prevalence Index = B/A = 4.85

Hydrophytic Vegetation Indicators:

- Dominance Test is >50%
- Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** ○ **No** ◉

Remarks:

SOIL

Sampling Point: 1-2b up

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture[3]	Remarks
0-8	7.5YR 3/3	100					Silty clay loam	Soil is extremely compacted

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.
[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- [ ] Histosol (A1)
- [ ] Histic Epipedon (A2)
- [ ] Black Histic (A3)
- [ ] Hydrogen Sulfide (A4)
- [ ] Stratified Layers (A5) (**LRR C**)
- [ ] 1 cm Muck (A9) (**LRR D**)
- [ ] Depleted Below Dark Surface (A11)
- [ ] Thick Dark Surface (A12)
- [ ] Sandy Mucky Mineral (S1)
- [ ] Sandy Gleyed Matrix (S4)
- [ ] Sandy Redox (S5)
- [ ] Stripped Matrix (S6)
- [ ] Loamy Mucky Mineral (F1)
- [ ] Loamy Gleyed Matrix (F2)
- [ ] Depleted Matrix (F3)
- [ ] Redox Dark Surface (F6)
- [ ] Depleted Dark Surface (F7)
- [ ] Redox Depressions (F8)
- [ ] Vernal Pools (F9)

Indicators for Problematic Hydric Soils[4]:

- [ ] 1 cm Muck (A9) (**LRR C**)
- [ ] 2 cm Muck (A10) (**LRR B**)
- [ ] Reduced Vertic (F18)
- [ ] Red Parent Material (TF2)
- [ ] Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: Compacted soil

Depth (inches): 8

Hydric Soil Present? Yes ○ No ◉

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- [ ] Surface Water (A1)
- [ ] High Water Table (A2)
- [ ] Saturation (A3)
- [ ] Water Marks (B1) (**Nonriverine**)
- [ ] Sediment Deposits (B2) (**Nonriverine**)
- [ ] Drift Deposits (B3) (**Nonriverine**)
- [ ] Surface Soil Cracks (B6)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [ ] Water-Stained Leaves (B9)
- [ ] Salt Crust (B11)
- [ ] Biotic Crust (B12)
- [ ] Aquatic Invertebrates (B13)
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres along Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Plowed Soils (C6)
- [ ] Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- [ ] Water Marks (B1) (**Riverine**)
- [ ] Sediment Deposits (B2) (**Riverine**)
- [ ] Drift Deposits (B3) (**Riverine**)
- [ ] Drainage Patterns (B10)
- [ ] Dry-Season Water Table (C2)
- [ ] Thin Muck Surface (C7)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [ ] Shallow Aquitard (D3)
- [ ] FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ○ No ◉ Depth (inches):

Water Table Present? Yes ○ No ◉ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ○ No ◉ Depth (inches):

Wetland Hydrology Present? Yes ○ No ◉

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Janus Solar | City/County: Colusa County | Sampling Date: 1/18/2021

Applicant/Owner: RWE Solar Development, LLC | State: CA | Sampling Point: 1-3 wet

Investigator(s): Daniel Berg, Monique O'Conner | Section, Township, Range: 1-3, 25, 26, 29, 30, 35; 14N, 15N; 3W, 4W

Landform (hillslope, terrace, etc.): Drainage channel | Local relief (concave, convex, none): None | Slope (%): 1

Subregion (LRR): C - Mediterranean California | Lat: Refer to Map | Long: Refer to Map | Datum: N/A

Soil Map Unit Name: Capay clay loam | NWI classification: R4SBC

Are climatic / hydrologic conditions on the site typical for this time of year? Yes (●) No ( ) (If no, explain in Remarks.)

Are Vegetation [X] Soil [X] or Hydrology [ ] significantly disturbed? Are "Normal Circumstances" present? Yes (●) No ( )

Are Vegetation [ ] Soil [ ] or Hydrology [ ] naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	( )	(●)
Hydric Soil Present?	( )	(●)
Wetland Hydrology Present?	(●)	( )

Is the Sampled Area within a Wetland? Yes ( ) No (●)

Remarks: Project site is actively grazed by cattle throughout.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	%		
Sapling/Shrub Stratum			
1. *Salix sp.*	1	Yes	FACW
2.			
3.			
4.			
5.			
Total Cover:	1 %		
Herb Stratum			
1. *Centaurea solstitialis*	1	Yes	Not Listed
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:	1 %		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum 99 % | % Cover of Biotic Crust 0 %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	1	(A)
Total Number of Dominant Species Across All Strata:	2	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	50.0 %	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	0
FACW species	1	x 2 =	2
FAC species		x 3 =	0
FACU species		x 4 =	0
UPL species	1	x 5 =	5
Column Totals:	2	(A)	7 (B)

Prevalence Index = B/A = 3.50

Hydrophytic Vegetation Indicators:

- Dominance Test is >50%
- Prevalence Index is ≤3.0[1]
- [ ] Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ( ) No (●)

Remarks:

SOIL

Sampling Point: 1-3 wet

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture[3]	Remarks
0-5	7.5YR 4/3	100					Silty clay loam	
5-12	10YR 5/6	95	10YR 7/3	5	D	M	Silty clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.
[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[4]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ○ No ◉

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☒ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☒ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ○ No ◉ Depth (inches):

Water Table Present? Yes ○ No ◉ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ○ No ◉ Depth (inches):

Wetland Hydrology Present? Yes ◉ No ○

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Janus Solar | City/County: Colusa County | Sampling Date: 1/18/2021

Applicant/Owner: RWE Solar Development, LLC | State: CA | Sampling Point: 1-4 wet

Investigator(s): Daniel Berg, Monique O'Conner | Section, Township, Range: 1-3, 25, 26, 29, 30, 35; 14N, 15N; 3W, 4W

Landform (hillslope, terrace, etc.): Drainage channel | Local relief (concave, convex, none): None | Slope (%): 1

Subregion (LRR): C - Mediterranean California | Lat: Refer to Map | Long: Refer to Map | Datum: N/A

Soil Map Unit Name: Capay clay loam | NWI classification: R4SBC

Are climatic / hydrologic conditions on the site typical for this time of year? Yes (●) No ( ) (If no, explain in Remarks.)

Are Vegetation ☒ Soil ☒ or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes (●) No ( )

Are Vegetation ☐ Soil ☐ or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	(●)	( )
Hydric Soil Present?	(●)	( )
Wetland Hydrology Present?	(●)	( )

Is the Sampled Area within a Wetland? **Yes** (●) **No** ( )

Remarks: Project site is actively grazed by cattle throughout.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	%		
Sapling/Shrub Stratum			
1. *Salix sp.*	3	Yes	FACW
2.			
3.			
4.			
5.			
Total Cover:	3 %		
Herb Stratum			
1. *Typha sp.*	3	Yes	OBL
2. *Vicia villosa*	1	Yes	Not Listed
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:	4 %		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum 96 % | % Cover of Biotic Crust %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66.7 % (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	3	x 1 =	3
FACW species	3	x 2 =	6
FAC species		x 3 =	0
FACU species		x 4 =	0
UPL species	1	x 5 =	5
Column Totals:	7 (A)		14 (B)

Prevalence Index = B/A = 2.00

Hydrophytic Vegetation Indicators:

- ☒ Dominance Test is >50%
- ☒ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** (●) **No** ( )

Remarks:

SOIL

Sampling Point: 1-4 wet

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture[3]	Remarks
0-6	Gley 1 3/10Y	100					Clay loam	Muck (30-40%), small rocks
6-12	2.5Y 4/4	100					Loamy sand	Small rocks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.
[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☒ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☒ Loamy Mucky Mineral (F1)
- ☒ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[4]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ◉ **No** ○

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☒ Surface Water (A1)
- ☐ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☒ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☒ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

	Yes	No	Depth (inches)
Surface Water Present?	◉	○	1
Water Table Present?	○	◉	
Saturation Present? (includes capillary fringe)	◉	○	12

Wetland Hydrology Present? Yes ◉ **No** ○

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Janus Solar | City/County: Colusa County | Sampling Date: 1/19/2021

Applicant/Owner: RWE Solar Development, LLC | State: CA | Sampling Point: 1-5 wet

Investigator(s): Daniel Berg, Monique O'Conner | Section, Township, Range: 1-3, 25, 26, 29, 30, 35; 14N, 15N; 3W, 4W

Landform (hillslope, terrace, etc.): Drainage channel | Local relief (concave, convex, none): None | Slope (%): 1

Subregion (LRR): C - Mediterranean California | Lat: Refer to Map | Long: Refer to Map | Datum: N/A

Soil Map Unit Name: Capay clay loam | NWI classification: PSSC

Are climatic / hydrologic conditions on the site typical for this time of year? Yes (•) No ( ) (If no, explain in Remarks.)

Are Vegetation [X] Soil [X] or Hydrology [ ] significantly disturbed? Are "Normal Circumstances" present? Yes (•) No ( )

Are Vegetation [ ] Soil [ ] or Hydrology [ ] naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ( )	No (•)
Hydric Soil Present?	Yes ( )	No (•)
Wetland Hydrology Present?	Yes (•)	No ( )

Is the Sampled Area within a Wetland? Yes ( ) No (•)

Remarks: Project site is actively grazed by cattle throughout.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	%		
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:	%		
Herb Stratum			
1. *Ambrosia psilostachya*	3	Yes	FACU
2. *Centaurea solstitialis*	2	Yes	Not Listed
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:	5 %		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum 95 % | % Cover of Biotic Crust %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0 % (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	0
FACW species		x 2 =	0
FAC species		x 3 =	0
FACU species	3	x 4 =	12
UPL species	2	x 5 =	10
Column Totals:	5	(A)	22 (B)

Prevalence Index = B/A = 4.40

Hydrophytic Vegetation Indicators:

- [ ] Dominance Test is >50%
- [ ] Prevalence Index is ≤3.0[1]
- [ ] Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ( ) No (•)

Remarks:

SOIL

Sampling Point: 1-5 wet

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture[3]	Remarks
0-1	10YR 3/2	97	2.5YR 4/8	3	C	M	Loam	
1-16	7.5YR 4/6	97	2.5YR 4/8	3	C	M	Loamy sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.
[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[4]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ○ No ◉

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☒ Water Marks (B1) (**Riverine**)
- ☒ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ○ No ◉ Depth (inches):

Water Table Present? Yes ○ No ◉ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ○ No ◉ Depth (inches):

Wetland Hydrology Present? Yes ◉ No ○

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Janus Solar | City/County: Colusa County | Sampling Date: 1/19/2021
Applicant/Owner: RWE Solar Development, LLC | State: CA | Sampling Point: 1-6 wet
Investigator(s): Daniel Berg, Monique O'Conner | Section, Township, Range: 1-3, 25, 26, 29, 30, 35; 14N, 15N; 3W, 4W
Landform (hillslope, terrace, etc.): Drainage channel | Local relief (concave, convex, none): None | Slope (%): 1
Subregion (LRR): C - Mediterranean California | Lat: Refer to Map | Long: Refer to Map | Datum: N/A
Soil Map Unit Name: Capay clay loam | NWI classification: PSSC

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ◉ No ○ (If no, explain in Remarks.)

Are Vegetation ☒ Soil ☒ or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ◉ No ○

Are Vegetation ☐ Soil ☐ or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ◉	No ○
Hydric Soil Present?	Yes ◉	No ○
Wetland Hydrology Present?	Yes ◉	No ○

Is the Sampled Area within a Wetland? Yes ◉ No ○

Remarks: Project site is actively grazed by cattle throughout.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	%		
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:	%		
Herb Stratum			
1. *Typha sp.*	5	Yes	OBL
2. *Centaurea solstitialis*	1	No	Not Listed
3. *Xanthium strumarium*	1	No	FAC
4. *Ambrosia psilostachya*	1	No	FACU
5.			
6.			
7.			
8.			
Total Cover:	8 %		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum 92 % | % Cover of Biotic Crust %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	1	(A)
Total Number of Dominant Species Across All Strata:	1	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100.0 %	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	5	x 1 =	5
FACW species		x 2 =	0
FAC species	1	x 3 =	3
FACU species	1	x 4 =	4
UPL species	1	x 5 =	5
Column Totals:	8 (A)		17 (B)

Prevalence Index = B/A = 2.13

Hydrophytic Vegetation Indicators:

- ☒ Dominance Test is >50%
- ☒ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ◉ No ○

Remarks:

SOIL

Sampling Point: 1-6 wet

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture[3]	Remarks
0-12	7.5YR 3/2	80	2.5YR 4/6	20	C	M	Silty clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.
[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- [ ] Histosol (A1)
- [ ] Histic Epipedon (A2)
- [ ] Black Histic (A3)
- [ ] Hydrogen Sulfide (A4)
- [ ] Stratified Layers (A5) (**LRR C**)
- [ ] 1 cm Muck (A9) (**LRR D**)
- [ ] Depleted Below Dark Surface (A11)
- [ ] Thick Dark Surface (A12)
- [ ] Sandy Mucky Mineral (S1)
- [ ] Sandy Gleyed Matrix (S4)
- [ ] Sandy Redox (S5)
- [ ] Stripped Matrix (S6)
- [ ] Loamy Mucky Mineral (F1)
- [ ] Loamy Gleyed Matrix (F2)
- [ ] Depleted Matrix (F3)
- [x] Redox Dark Surface (F6)
- [ ] Depleted Dark Surface (F7)
- [ ] Redox Depressions (F8)
- [ ] Vernal Pools (F9)

Indicators for Problematic Hydric Soils[4]:

- [ ] 1 cm Muck (A9) (**LRR C**)
- [ ] 2 cm Muck (A10) (**LRR B**)
- [ ] Reduced Vertic (F18)
- [ ] Red Parent Material (TF2)
- [ ] Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes (●) **No** ( )

Remarks: White crust on channel banks.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- [x] Surface Water (A1)
- [ ] High Water Table (A2)
- [x] Saturation (A3)
- [ ] Water Marks (B1) (**Nonriverine**)
- [ ] Sediment Deposits (B2) (**Nonriverine**)
- [ ] Drift Deposits (B3) (**Nonriverine**)
- [ ] Surface Soil Cracks (B6)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [x] Water-Stained Leaves (B9)
- [ ] Salt Crust (B11)
- [ ] Biotic Crust (B12)
- [ ] Aquatic Invertebrates (B13)
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres along Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Plowed Soils (C6)
- [ ] Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- [x] Water Marks (B1) (**Riverine**)
- [ ] Sediment Deposits (B2) (**Riverine**)
- [ ] Drift Deposits (B3) (**Riverine**)
- [ ] Drainage Patterns (B10)
- [ ] Dry-Season Water Table (C2)
- [ ] Thin Muck Surface (C7)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [ ] Shallow Aquitard (D3)
- [ ] FAC-Neutral Test (D5)

Field Observations:

	Yes	No	Depth (inches)
Surface Water Present?	(●)	( )	4
Water Table Present?	( )	(●)	
Saturation Present? (includes capillary fringe)	(●)	( )	12

Wetland Hydrology Present? Yes (●) **No** ( )

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Janus Solar | City/County: Colusa County | Sampling Date: 1/20/2021

Applicant/Owner: RWE Solar Development, LLC | State: CA | Sampling Point: 1-7 wet

Investigator(s): Daniel Berg, Monique O'Conner | Section, Township, Range: 1-3, 25, 26, 29, 30, 35; 14N, 15N; 3W, 4W

Landform (hillslope, terrace, etc.): Drainage channel | Local relief (concave, convex, none): None | Slope (%): 2

Subregion (LRR): C - Mediterranean California | Lat: Refer to Map | Long: Refer to Map | Datum: N/A

Soil Map Unit Name: Capay clay loam | NWI classification: PSSC

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ◉ No ○ (If no, explain in Remarks.)

Are Vegetation ☒ Soil ☒ or Hydrology ☒ significantly disturbed? Are "Normal Circumstances" present? Yes ◉ No ○

Are Vegetation ☐ Soil ☐ or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ◉	No ○
Hydric Soil Present?	Yes ◉	No ○
Wetland Hydrology Present?	Yes ◉	No ○

Is the Sampled Area within a Wetland? **Yes** ◉ **No** ○

Remarks: Project site is actively grazed by cattle throughout.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	%		
Sapling/Shrub Stratum			
1. *Salix sp.*	3	Yes	FACW
2. *Populus fremontii*	1	Yes	FAC
3.			
4.			
5.			
Total Cover:	4 %		
Herb Stratum			
1. *Centaurea solstitialis*	2	Yes	Not Listed
2. *Juncus sp.*	2	Yes	FACW
3. *Aegilops triuncialis*	1	No	Not Listed
4. *Typha sp.*	1	No	OBL
5.			
6.			
7.			
8.			
Total Cover:	6 %		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum 94 % | % Cover of Biotic Crust %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 75.0 % (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	1	x 1 =	1
FACW species	5	x 2 =	10
FAC species	1	x 3 =	3
FACU species		x 4 =	0
UPL species	3	x 5 =	15
Column Totals:	10 (A)		29 (B)

Prevalence Index = B/A = 2.90

Hydrophytic Vegetation Indicators:

- ☒ Dominance Test is >50%
- ☒ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☒ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** ◉ **No** ○

Remarks: Feature is significantly grazed/disturbed or wetland vegetation would likely be more prominent.

SOIL

Sampling Point: 1-7 wet

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Color (moist)	Redox %	Type[1]	Loc[2]	Texture[3]	Remarks
0-1	Gley 1 2.5/10Y	100					Silty clay loam	Muck
1-10	10YR 4/4	85	2.5YR 3/6	15	C	M	Loam	Rocks present

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.
[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- [ ] Histosol (A1)
- [ ] Histic Epipedon (A2)
- [ ] Black Histic (A3)
- [ ] Hydrogen Sulfide (A4)
- [ ] Stratified Layers (A5) (**LRR C**)
- [ ] 1 cm Muck (A9) (**LRR D**)
- [ ] Depleted Below Dark Surface (A11)
- [ ] Thick Dark Surface (A12)
- [ ] Sandy Mucky Mineral (S1)
- [ ] Sandy Gleyed Matrix (S4)
- [ ] Sandy Redox (S5)
- [ ] Stripped Matrix (S6)
- [ ] Loamy Mucky Mineral (F1)
- [x] Loamy Gleyed Matrix (F2)
- [ ] Depleted Matrix (F3)
- [ ] Redox Dark Surface (F6)
- [ ] Depleted Dark Surface (F7)
- [ ] Redox Depressions (F8)
- [ ] Vernal Pools (F9)

Indicators for Problematic Hydric Soils[4]:

- [ ] 1 cm Muck (A9) (**LRR C**)
- [ ] 2 cm Muck (A10) (**LRR B**)
- [ ] Reduced Vertic (F18)
- [ ] Red Parent Material (TF2)
- [ ] Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):
Type: Rock
Depth (inches): 10

Hydric Soil Present? Yes (●) No ( )

Remarks: Directly below a culvert, rip rap/fill is present in low quantity.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- [x] Surface Water (A1)
- [ ] High Water Table (A2)
- [x] Saturation (A3)
- [ ] Water Marks (B1) (**Nonriverine**)
- [ ] Sediment Deposits (B2) (**Nonriverine**)
- [ ] Drift Deposits (B3) (**Nonriverine**)
- [ ] Surface Soil Cracks (B6)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [ ] Water-Stained Leaves (B9)
- [ ] Salt Crust (B11)
- [ ] Biotic Crust (B12)
- [ ] Aquatic Invertebrates (B13)
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres along Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Plowed Soils (C6)
- [ ] Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- [x] Water Marks (B1) (**Riverine**)
- [ ] Sediment Deposits (B2) (**Riverine**)
- [ ] Drift Deposits (B3) (**Riverine**)
- [ ] Drainage Patterns (B10)
- [ ] Dry-Season Water Table (C2)
- [ ] Thin Muck Surface (C7)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [ ] Shallow Aquitard (D3)
- [ ] FAC-Neutral Test (D5)

Field Observations:

	Yes	No	Depth (inches)
Surface Water Present?	(●)	( )	6
Water Table Present?	( )	(●)	
Saturation Present? (includes capillary fringe)	(●)	( )	10

Wetland Hydrology Present? Yes (●) No ( )

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Janus Solar | City/County: Colusa County | Sampling Date: 1/20/2021

Applicant/Owner: RWE Solar Development, LLC | State: CA | Sampling Point: 1-8 wet

Investigator(s): Daniel Berg, Monique O'Conner | Section, Township, Range: 1-3, 25, 26, 29, 30, 35; 14N, 15N; 3W, 4W

Landform (hillslope, terrace, etc.): Drainage channel | Local relief (concave, convex, none): None | Slope (%): 2

Subregion (LRR): C - Mediterranean California | Lat: Refer to Map | Long: Refer to Map | Datum: N/A

Soil Map Unit Name: Capay clay loam | NWI classification: PSSC

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ◉ No ○ (If no, explain in Remarks.)

Are Vegetation ☒ Soil ☒ or Hydrology ☒ significantly disturbed? Are "Normal Circumstances" present? Yes ◉ No ○

Are Vegetation ☐ Soil ☐ or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ◉	No ○
Hydric Soil Present?	Yes ◉	No ○
Wetland Hydrology Present?	Yes ◉	No ○

Is the Sampled Area within a Wetland? **Yes** ◉ **No** ○

Remarks: Project site is actively grazed by cattle throughout.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	%		
Sapling/Shrub Stratum			
1. *Salix sp.*	5	Yes	FACW
2. *Populus fremontii*	2	Yes	FAC
3.			
4.			
5.			
Total Cover:	7 %		
Herb Stratum			
1. *Centaurea solstitialis*	2	Yes	Not Listed
2. *Juncus sp.*	1	Yes	FACW
3. *Aegilops triuncialis*	1	Yes	Not Listed
4.			
5.			
6.			
7.			
8.			
Total Cover:	4 %		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum 96 % | % Cover of Biotic Crust %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 60.0 % (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	0
FACW species	6	x 2 =	12
FAC species	2	x 3 =	6
FACU species		x 4 =	0
UPL species	3	x 5 =	15
Column Totals:	11 (A)		33 (B)

Prevalence Index = B/A = 3.00

Hydrophytic Vegetation Indicators:

- ☒ Dominance Test is >50%
- ☒ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☒ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** ◉ **No** ○

Remarks: Feature is significantly grazed/disturbed or wetland vegetation would likely be more prominent.

SOIL

Sampling Point: 1-8 wet

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture[3]	Remarks
0-0.5	10YR 3/3	100					Loam	Mucky
0.5-16	10YR 3/6	90	2.5YR 3/6	10	C	M	Loamy sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.
[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☒ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[4]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☒ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ◉ No ○

Remarks: Directly below a culvert, rip rap/fill is present in low quantity. Muck would likely be more developed without cattle grazing/trampling and based on directly adjacent wetland areas on either side of sample point. A depression feature is evident surrounding the sample point within the channel.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☒ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ○	No ◉	Depth (inches):
Water Table Present?	Yes ◉	No ○	Depth (inches): 14
Saturation Present? (includes capillary fringe)	Yes ◉	No ○	Depth (inches): 14

Wetland Hydrology Present? Yes ◉ No ○

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Janus Solar | City/County: Colusa County | Sampling Date: 1/20/2021

Applicant/Owner: RWE Solar Development, LLC | State: CA | Sampling Point: 1-9 wet

Investigator(s): Daniel Berg, Monique O'Conner | Section, Township, Range: 1-3, 25, 26, 29, 30, 35; 14N, 15N; 3W, 4W

Landform (hillslope, terrace, etc.): Drainage channel | Local relief (concave, convex, none): None | Slope (%): 2

Subregion (LRR): C - Mediterranean California | Lat: Refer to Map | Long: Refer to Map | Datum: N/A

Soil Map Unit Name: Capay clay loam | NWI classification: PSSC

Are climatic / hydrologic conditions on the site typical for this time of year? Yes (●) No ( ) (If no, explain in Remarks.)

Are Vegetation [X] Soil [X] or Hydrology [X] significantly disturbed? Are "Normal Circumstances" present? Yes (●) No ( )

Are Vegetation [ ] Soil [ ] or Hydrology [ ] naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	(●)	( )
Hydric Soil Present?	(●)	( )
Wetland Hydrology Present?	(●)	( )

Is the Sampled Area within a Wetland? **Yes** (●) **No** ( )

Remarks: Project site is actively grazed by cattle throughout.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	%		
Sapling/Shrub Stratum			
1. *Salix sp.*	3	Yes	FACW
2. *Populus fremontii*	1	Yes	FAC
3.			
4.			
5.			
Total Cover:	4 %		
Herb Stratum			
1. *Centaurea solstitialis*	2	Yes	Not Listed
2. *Juncus sp.*	2	Yes	FACW
3. *Aegilops triuncialis*	1	No	Not Listed
4. *Typha sp.*	1	No	OBL
5.			
6.			
7.			
8.			
Total Cover:	6 %		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum 94 % | % Cover of Biotic Crust %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 75.0 % (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	1	x 1 =	1
FACW species	5	x 2 =	10
FAC species	1	x 3 =	3
FACU species		x 4 =	0
UPL species	3	x 5 =	15
Column Totals:	10 (A)		29 (B)

Prevalence Index = B/A = 2.90

Hydrophytic Vegetation Indicators:

- [X] Dominance Test is >50%
- [X] Prevalence Index is ≤3.0[1]
- [ ] Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [X] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** (●) **No** ( )

Remarks: Feature is significantly grazed/disturbed or wetland vegetation would likely be more prominent.

SOIL

Sampling Point: 1-9 wet

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture[3]	Remarks
0-1	Gley 1 2.5/10Y	100					Silty clay loam	Muck
1-6	10YR 4/4	85	2.5YR 3/6	15	C	M	Loam	Rocks present

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.
[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☒ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[4]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: Rock

Depth (inches): 6

Hydric Soil Present? Yes ◉ No ○

Remarks: Directly below a culvert, rip rap/fill is present in low quantity.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☒ Surface Water (A1)
- ☐ High Water Table (A2)
- ☒ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☒ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ◉	No ○	Depth (inches): 6
Water Table Present?	Yes ○	No ◉	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes ◉	No ○	Depth (inches): 6

Wetland Hydrology Present? Yes ◉ No ○

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Janus Solar | City/County: Colusa County | Sampling Date: 1/20/2021

Applicant/Owner: RWE Solar Development, LLC | State: CA | Sampling Point: 1-10 wet

Investigator(s): Daniel Berg, Monique O'Conner | Section, Township, Range: 1-3, 25, 26, 29, 30, 35; 14N, 15N; 3W, 4W

Landform (hillslope, terrace, etc.): Drainage channel | Local relief (concave, convex, none): None | Slope (%): 1

Subregion (LRR): C - Mediterranean California | Lat: Refer to Map | Long: Refer to Map | Datum: N/A

Soil Map Unit Name: Capay clay loam | NWI classification: R4SBA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes (●) No ( ) (If no, explain in Remarks.)

Are Vegetation [X] Soil [X] or Hydrology [X] significantly disturbed? Are "Normal Circumstances" present? Yes (●) No ( )

Are Vegetation [ ] Soil [ ] or Hydrology [ ] naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	( )	(●)
Hydric Soil Present?	( )	(●)
Wetland Hydrology Present?	(●)	( )

Is the Sampled Area within a Wetland? Yes ( ) No (●)

Remarks: Project site is actively grazed by cattle throughout.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	%		
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:	%		
Herb Stratum			
1. *Vicia villosa*	1	Yes	Not Listed
2. *Centaurea solstitialis*	1	Yes	Not Listed
3. *Medicago polymorpha*	1	Yes	FACU
4. *Avena sp.*	1	Yes	UPL
5. *Aegilops triuncialis*	1	Yes	Not Listed
6.			
7.			
8.			
Total Cover:	5 %		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum 95 % | % Cover of Biotic Crust %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0 % (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	0
FACW species		x 2 =	0
FAC species		x 3 =	0
FACU species	1	x 4 =	4
UPL species	4	x 5 =	20
Column Totals:	5	(A)	24 (B)

Prevalence Index = B/A = 4.80

Hydrophytic Vegetation Indicators:

- Dominance Test is >50%
- Prevalence Index is ≤3.0[1]
- [ ] Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ( ) No (●)

Remarks:

SOIL

Sampling Point: 1-10 wet

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture[3]	Remarks
0-2	7.5YR 4/6	98	2.5YR 3/6	1	C	M	Sand	
			10YR 8/1	1	D	M		
2-16	7.5YR 4/6	100					Sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.
[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[4]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? **Yes** ○ **No** ◉

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☒ Water Marks (B1) (**Riverine**)
- ☒ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ○ No ◉ Depth (inches):

Water Table Present? Yes ○ No ◉ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ○ No ◉ Depth (inches):

Wetland Hydrology Present? **Yes** ◉ **No** ○

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Janus Solar | City/County: Colusa County | Sampling Date: 1/19/2021

Applicant/Owner: RWE Solar Development, LLC | State: CA | Sampling Point: 2-1 wet

Investigator(s): Daniel Berg, Monique O'Conner | Section, Township, Range: 1-3, 25, 26, 29, 30, 35; 14N, 15N; 3W, 4W

Landform (hillslope, terrace, etc.): Plain | Local relief (concave, convex, none): None | Slope (%): 1

Subregion (LRR): C - Mediterranean California | Lat: Refer to Map | Long: Refer to Map | Datum: N/A

Soil Map Unit Name: Capay clay loam | NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes (●) No ( ) (If no, explain in Remarks.)

Are Vegetation [X] Soil [X] or Hydrology [X] significantly disturbed? Are "Normal Circumstances" present? Yes (●) No ( )

Are Vegetation [ ] Soil [ ] or Hydrology [ ] naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	( )	(●)
Hydric Soil Present?	( )	(●)
Wetland Hydrology Present?	(●)	( )

Is the Sampled Area within a Wetland? **Yes** ( ) **No** (●)

Remarks: Project site is actively grazed by cattle throughout.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	%		
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:	%		
Herb Stratum			
1. *Aegilops triuncialis*	30	Yes	Not Listed
2. *Centaurea solstitialis*	30	Yes	Not Listed
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:	60 %		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum 40 % | % Cover of Biotic Crust %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0 % (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 = 0
FACW species		x 2 = 0
FAC species		x 3 = 0
FACU species		x 4 = 0
UPL species	60	x 5 = 300
Column Totals:	60 (A)	300 (B)

Prevalence Index = B/A = 5.00

Hydrophytic Vegetation Indicators:

- [ ] Dominance Test is >50%
- [ ] Prevalence Index is ≤3.0[1]
- [ ] Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** ( ) **No** (●)

Remarks:

SOIL

Sampling Point: 2-1 wet

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture[3]	Remarks
0-10	10.5YR 3/2	100					Silty clay loam	
10-16	10.5YR 3/2	97	5YR 4/6	3	C	M	Silty clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.
[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[4]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ○ No ◉

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☒ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☒ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ○	No ◉	Depth (inches):
Water Table Present?	Yes ○	No ◉	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes ○	No ◉	Depth (inches):

Wetland Hydrology Present? **Yes** ◉ **No** ○

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: No defined bed, banks, and channel but OHWM is evident.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Janus Solar | City/County: Colusa County | Sampling Date: 1/19/2021

Applicant/Owner: RWE Solar Development, LLC | State: CA | Sampling Point: 3-1 up

Investigator(s): Daniel Berg, Monique O'Conner | Section, Township, Range: 1-3, 25, 26, 29, 30, 35; 14N, 15N; 3W, 4W

Landform (hillslope, terrace, etc.): Plain | Local relief (concave, convex, none): None | Slope (%): 0

Subregion (LRR): C - Mediterranean California | Lat: Refer to Map | Long: Refer to Map | Datum: N/A

Soil Map Unit Name: Capay/Corning clay loam | NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☑ No ☐ (If no, explain in Remarks.)

Are Vegetation ☒ Soil ☒ or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☑ No ☐

Are Vegetation ☐ Soil ☐ or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	☐	☑
Hydric Soil Present?	☐	☑
Wetland Hydrology Present?	☐	☑

Is the Sampled Area within a Wetland? **Yes** ☐ **No** ☑

Remarks: Project site is actively grazed by cattle throughout.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	%		
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:	%		
Herb Stratum			
1. *Erodium sp.*	15	Yes	FACU
2. *Centaurea solstitialis*	10	Yes	Not Listed
3. *Non-native grass*	5	No	Not Listed
4.			
5.			
6.			
7.			
8.			
Total Cover:	30 %		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum 70 % | % Cover of Biotic Crust 0 %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0 % (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	0
FACW species		x 2 =	0
FAC species		x 3 =	0
FACU species	15	x 4 =	60
UPL species	15	x 5 =	75
Column Totals:	30	(A)	135 (B)

Prevalence Index = B/A = 4.50

Hydrophytic Vegetation Indicators:

- ☐ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** ☐ **No** ☑

Remarks:

SOIL

Sampling Point: 3-1 up

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture[3]	Remarks
0-6	7.5YR 3/2	100					Silty clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.
[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[4]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: Compacted soil

Depth (inches): 6

Hydric Soil Present? Yes ○ No ●

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ○ No ● Depth (inches):

Water Table Present? Yes ○ No ● Depth (inches):

Saturation Present? (includes capillary fringe) Yes ○ No ● Depth (inches):

Wetland Hydrology Present? Yes ○ No ●

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Janus Solar | City/County: Colusa County | Sampling Date: 1/19/2021

Applicant/Owner: RWE Solar Development, LLC | State: CA | Sampling Point: 3-1 wet

Investigator(s): Daniel Berg, Monique O'Conner | Section, Township, Range: 1-3, 25, 26, 29, 30, 35; 14N, 15N; 3W, 4W

Landform (hillslope, terrace, etc.): Drainage channel | Local relief (concave, convex, none): None | Slope (%): 1

Subregion (LRR): C - Mediterranean California | Lat: Refer to Map | Long: Refer to Map | Datum: N/A

Soil Map Unit Name: Capay/Corning clay loam | NWI classification: R4SBC

Are climatic / hydrologic conditions on the site typical for this time of year? Yes (●) No ( ) (If no, explain in Remarks.)

Are Vegetation [X] Soil [X] or Hydrology [X] significantly disturbed? Are "Normal Circumstances" present? Yes (●) No ( )

Are Vegetation [ ] Soil [ ] or Hydrology [ ] naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	( )	(●)
Hydric Soil Present?	( )	(●)
Wetland Hydrology Present?	(●)	( )

Is the Sampled Area within a Wetland? Yes ( ) No (●)

Remarks: Project site is actively grazed by cattle throughout and trampling has occurred throughout this feature. Defined bed, banks, and channel are not present in some areas.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	%		
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:	%		
Herb Stratum			
1. *Centaurea solstitialis*	15	Yes	Not Listed
2. *Hemizonia congesta*	3	No	Not Listed
3. *Erodium sp.*	1	No	FACU
4.			
5.			
6.			
7.			
8.			
Total Cover:	19 %		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum 81 % | % Cover of Biotic Crust %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0 % (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	0
FACW species		x 2 =	0
FAC species		x 3 =	0
FACU species	1	x 4 =	4
UPL species	18	x 5 =	90
Column Totals:	19	(A)	94 (B)

Prevalence Index = B/A = 4.95

Hydrophytic Vegetation Indicators:

- [ ] Dominance Test is >50%
- [ ] Prevalence Index is ≤3.0[1]
- [ ] Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ( ) No (●)

Remarks:

SOIL

Sampling Point: 3-1 wet

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture[3]	Remarks
0-8	7.5YR 3/1	100					Silty clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.
[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[4]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: Compacted soil

Depth (inches): 8

Hydric Soil Present? Yes ○ No ◉

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☒ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ○ No ◉ Depth (inches):

Water Table Present? Yes ○ No ◉ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ○ No ◉ Depth (inches):

Wetland Hydrology Present? Yes ◉ No ○

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Defined bed, banks, and channel are not present in the vicinity of this sample point. Top 3 inches of soil are moist.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Janus Solar | City/County: Colusa County | Sampling Date: 1/20/2021

Applicant/Owner: RWE Solar Development, LLC | State: CA | Sampling Point: 3-2 wet

Investigator(s): Daniel Berg, Monique O'Conner | Section, Township, Range: 1-3, 25, 26, 29, 30, 35; 14N, 15N; 3W, 4W

Landform (hillslope, terrace, etc.): Drainage channel | Local relief (concave, convex, none): None | Slope (%): 1

Subregion (LRR): C - Mediterranean California | Lat: Refer to Map | Long: Refer to Map | Datum: N/A

Soil Map Unit Name: Capay clay loam/Ayar clay | NWI classification: R4SBA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes (●) No ( ) (If no, explain in Remarks.)

Are Vegetation [X] Soil [X] or Hydrology [ ] significantly disturbed? Are "Normal Circumstances" present? Yes (●) No ( )

Are Vegetation [ ] Soil [ ] or Hydrology [ ] naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	( )	(●)
Hydric Soil Present?	( )	(●)
Wetland Hydrology Present?	(●)	( )

Is the Sampled Area within a Wetland? Yes ( ) No (●)

Remarks: Project site is actively grazed by cattle throughout and trampling has occurred throughout this feature. Defined bed, banks, and channel are not present in some areas.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	%		
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:	%		
Herb Stratum			
1. *Xanthium strumarium*	3	Yes	FAC
2. *Centaurea solstitialis*	1	Yes	Not Listed
3. *Aegilops triuncialis*	1	Yes	Not Listed
4. *Erodium sp.*	1	Yes	FACU
5. *Medicago polymorpha*	1	Yes	FACU
6. *Lupinus sp.*	1	Yes	Not Listed
7.			
8.			
Total Cover:	8 %		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum 92 % | % Cover of Biotic Crust %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 16.7 % (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	0
FACW species		x 2 =	0
FAC species	3	x 3 =	9
FACU species	2	x 4 =	8
UPL species	3	x 5 =	15
Column Totals:	8 (A)		32 (B)

Prevalence Index = B/A = 4.00

Hydrophytic Vegetation Indicators:

- [ ] Dominance Test is >50%
- [ ] Prevalence Index is ≤3.0[1]
- [ ] Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ( ) No (●)

Remarks:

SOIL

Sampling Point: 3-2 wet

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture[3]	Remarks
0-4	10YR 3/4	98	7.5YR 5/8	1	C	M	Sand	
			7.5YR 8/1	1	D	M		
4-16	10YR 3/4	100					Sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.
[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[4]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: Compacted soil

Depth (inches): 8

Hydric Soil Present? Yes ○ No ◉

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☒ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☒ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☒ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ○ No ◉ Depth (inches):

Water Table Present? Yes ○ No ◉ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ○ No ◉ Depth (inches):

Wetland Hydrology Present? Yes ◉ No ○

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Defined bed, banks, and channel are present in the vicinity of this sample point.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Janus Solar | City/County: Colusa County | Sampling Date: 1/20/2021

Applicant/Owner: RWE Solar Development, LLC | State: CA | Sampling Point: 3-3 wet

Investigator(s): Daniel Berg, Monique O'Conner | Section, Township, Range: 1-3, 25, 26, 29, 30, 35; 14N, 15N; 3W, 4W

Landform (hillslope, terrace, etc.): Drainage channel | Local relief (concave, convex, none): None | Slope (%): 1

Subregion (LRR): C - Mediterranean California | Lat: Refer to Map | Long: Refer to Map | Datum: N/A

Soil Map Unit Name: Capay clay loam/Ayar clay | NWI classification: PSS/EM1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes (●) No ( ) (If no, explain in Remarks.)

Are Vegetation [X] Soil [X] or Hydrology [ ] significantly disturbed? Are "Normal Circumstances" present? Yes (●) No ( )

Are Vegetation [ ] Soil [ ] or Hydrology [ ] naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		(●)
Hydric Soil Present?		(●)
Wetland Hydrology Present?	(●)	

Is the Sampled Area within a Wetland? Yes ( ) No (●)

Remarks: Project site is actively grazed by cattle throughout and trampling has occurred throughout this feature. Defined bed, banks, and channel are not present in some areas.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Populus fremontii*	30	Yes	FAC
2.			
3.			
4.			
Total Cover:	30 %		
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:	%		
Herb Stratum			
1. *Juncus sp.*	1	Yes	FACW
2. *Centaurea solstitialis*	1	Yes	Not Listed
3. *Medicago polymorpha*	1	Yes	FACU
4. *Non-native grass*	1	Yes	Not Listed
5.			
6.			
7.			
8.			
Total Cover:	4 %		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum 96 % | % Cover of Biotic Crust %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	2	(A)
Total Number of Dominant Species Across All Strata:	5	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	40.0 %	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	0
FACW species	1	x 2 =	2
FAC species	30	x 3 =	90
FACU species	1	x 4 =	4
UPL species	2	x 5 =	10
Column Totals:	34 (A)		106 (B)

Prevalence Index = B/A = 3.12

Hydrophytic Vegetation Indicators:

- [ ] Dominance Test is >50%
- [ ] Prevalence Index is ≤3.0[1]
- [ ] Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ( ) No (●)

Remarks: Vegetation is grazed in this area so new sprouts of riparian trees likely don't survive.

SOIL

Sampling Point: 3-3 wet

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture[3]	Remarks
0-4	10YR 3/4	94	7.5YR 5/8	5	C	M	Loamy sand	
			7.5YR 8/1	1	D	M		
4-16	10YR 3/4	100					Loamy sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.
[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[4]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: Rock

Depth (inches): 10

Hydric Soil Present? Yes ○ **No** ◉

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☒ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☒ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☒ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ○	No ◉	Depth (inches):
Water Table Present?	Yes ○	No ◉	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes ○	No ◉	Depth (inches):

Wetland Hydrology Present? Yes ◉ **No** ○

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Janus Solar | City/County: Colusa County | Sampling Date: 5/22/2024

Applicant/Owner: RWE Solar Development, LLC | State: CA | Sampling Point: 3-4 wet

Investigator(s): Daniel Berg, Jack Gordon, Lauren Jennings | Section, Township, Range: 1-3, 25, 26, 29, 30, 35; 14N, 15N; 3W, 4W

Landform (hillslope, terrace, etc.): Ephemeral drainage | Local relief (concave, convex, none): Concave | Slope (%): 1

Subregion (LRR): C - Mediterranean California | Lat: Refer to Map | Long: Refer to Map | Datum: N/A

Soil Map Unit Name: Ayar clay | NWI classification: R4SBC

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ◉ No ○ (If no, explain in Remarks.)

Are Vegetation ☒ Soil ☒ or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ◉ No ○

Are Vegetation ☐ Soil ☐ or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	○	◉
Hydric Soil Present?	○	◉
Wetland Hydrology Present?	◉	○

Is the Sampled Area within a Wetland? **Yes** ○ **No** ◉

Remarks:

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	%		
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:	%		
Herb Stratum			
1. *Juncus effusus*	5	Yes	FACW
2. *Medicago polymorpha*	2	Yes	FACU
3. *Aegilops triuncialis*	1	No	Not Listed
4. *Phylla nodiflora*	1	No	Not Listed
5. *Hordeum murinum*	1	No	FACU
6.			
7.			
8.			
Total Cover:	10 %		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum 90 % | % Cover of Biotic Crust 0 %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	1	(A)
Total Number of Dominant Species Across All Strata:	2	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	50.0 %	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	0
FACW species	5	x 2 =	10
FAC species		x 3 =	0
FACU species	3	x 4 =	12
UPL species	2	x 5 =	10
Column Totals:	10 (A)		32 (B)

Prevalence Index = B/A = 3.20

Hydrophytic Vegetation Indicators:

- Dominance Test is >50%
- Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** ○ **No** ◉

Remarks:

SOIL

Sampling Point: 3-4 wet

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture[3]	Remarks
0-4	2.5Y 3/3	100		0			loam	
4-14	10YR 2/1	99	5YR 4/6	1	C	M	silty clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.
[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[4]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ○ No ●

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☒ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☒ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ● No ○ Depth (inches): 1 inch

Water Table Present? Yes ● No ○ Depth (inches): 14 inches

Saturation Present? (includes capillary fringe) Yes ○ No ● Depth (inches):

Wetland Hydrology Present? **Yes** ● **No** ○

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Janus Solar | City/County: Colusa County | Sampling Date: 1/20/2021

Applicant/Owner: RWE Solar Development, LLC | State: CA | Sampling Point: 4-1 up

Investigator(s): Daniel Berg, Monique O'Conner | Section, Township, Range: 1-3, 25, 26, 29, 30, 35; 14N, 15N; 3W, 4W

Landform (hillslope, terrace, etc.): Disturbed drainage | Local relief (concave, convex, none): None | Slope (%): 0

Subregion (LRR): C - Mediterranean California | Lat: Refer to Map | Long: Refer to Map | Datum: N/A

Soil Map Unit Name: Clear Lake/Ayar clay | NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes (●) No ( ) (If no, explain in Remarks.)

Are Vegetation [X] Soil [ ] or Hydrology [ ] significantly disturbed? Are "Normal Circumstances" present? Yes (●) No ( )

Are Vegetation [ ] Soil [ ] or Hydrology [ ] naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	( )	(●)
Hydric Soil Present?	( )	(●)
Wetland Hydrology Present?	( )	(●)

Is the Sampled Area within a Wetland? **Yes** ( ) **No** (●)

Remarks: Project site is actively grazed by cattle throughout.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	%		
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:	%		
Herb Stratum			
1. *Aegilops triuncialis*	65	Yes	Not Listed
2. *Avena sp.*	30	Yes	FACU
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:	95 %		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum 5 % | % Cover of Biotic Crust 0 %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	0	(A)
Total Number of Dominant Species Across All Strata:	2	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	0.0 %	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	0
FACW species		x 2 =	0
FAC species		x 3 =	0
FACU species	30	x 4 =	120
UPL species	65	x 5 =	325
Column Totals:	95	(A)	445 (B)

Prevalence Index = B/A = 4.68

Hydrophytic Vegetation Indicators:

- ( ) Dominance Test is >50%
- ( ) Prevalence Index is ≤3.0[1]
- [ ] Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** ( ) **No** (●)

Remarks:

SOIL

Sampling Point: 4-1 up

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture[3]	Remarks
0-16	10YR 3/4	100					Silty clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.
[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- [ ] Histosol (A1)
- [ ] Histic Epipedon (A2)
- [ ] Black Histic (A3)
- [ ] Hydrogen Sulfide (A4)
- [ ] Stratified Layers (A5) (**LRR C**)
- [ ] 1 cm Muck (A9) (**LRR D**)
- [ ] Depleted Below Dark Surface (A11)
- [ ] Thick Dark Surface (A12)
- [ ] Sandy Mucky Mineral (S1)
- [ ] Sandy Gleyed Matrix (S4)
- [ ] Sandy Redox (S5)
- [ ] Stripped Matrix (S6)
- [ ] Loamy Mucky Mineral (F1)
- [ ] Loamy Gleyed Matrix (F2)
- [ ] Depleted Matrix (F3)
- [ ] Redox Dark Surface (F6)
- [ ] Depleted Dark Surface (F7)
- [ ] Redox Depressions (F8)
- [ ] Vernal Pools (F9)

Indicators for Problematic Hydric Soils[4]:

- [ ] 1 cm Muck (A9) (**LRR C**)
- [ ] 2 cm Muck (A10) (**LRR B**)
- [ ] Reduced Vertic (F18)
- [ ] Red Parent Material (TF2)
- [ ] Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ○ No ●

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- [ ] Surface Water (A1)
- [ ] High Water Table (A2)
- [ ] Saturation (A3)
- [ ] Water Marks (B1) (**Nonriverine**)
- [ ] Sediment Deposits (B2) (**Nonriverine**)
- [ ] Drift Deposits (B3) (**Nonriverine**)
- [ ] Surface Soil Cracks (B6)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [ ] Water-Stained Leaves (B9)
- [ ] Salt Crust (B11)
- [ ] Biotic Crust (B12)
- [ ] Aquatic Invertebrates (B13)
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres along Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Plowed Soils (C6)
- [ ] Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- [ ] Water Marks (B1) (**Riverine**)
- [ ] Sediment Deposits (B2) (**Riverine**)
- [ ] Drift Deposits (B3) (**Riverine**)
- [ ] Drainage Patterns (B10)
- [ ] Dry-Season Water Table (C2)
- [ ] Thin Muck Surface (C7)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [ ] Shallow Aquitard (D3)
- [ ] FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ○ No ● Depth (inches):

Water Table Present? Yes ○ No ● Depth (inches):

Saturation Present? (includes capillary fringe) Yes ○ No ● Depth (inches):

Wetland Hydrology Present? Yes ○ No ●

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Janus Solar | City/County: Colusa County | Sampling Date: 1/20/2021

Applicant/Owner: RWE Solar Development, LLC | State: CA | Sampling Point: 4-1 wet

Investigator(s): Daniel Berg, Monique O'Conner | Section, Township, Range: 1-3, 25, 26, 29, 30, 35; 14N, 15N; 3W, 4W

Landform (hillslope, terrace, etc.): Disturbed drainage | Local relief (concave, convex, none): None | Slope (%): 1

Subregion (LRR): C - Mediterranean California | Lat: Refer to Map | Long: Refer to Map | Datum: N/A

Soil Map Unit Name: Clear Lake/Ayar clay | NWI classification: PFOA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes (●) No ( ) (If no, explain in Remarks.)

Are Vegetation [X] Soil [X] or Hydrology [X] significantly disturbed? Are "Normal Circumstances" present? Yes (●) No ( )

Are Vegetation [ ] Soil [ ] or Hydrology [ ] naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	(●)	( )
Hydric Soil Present?	( )	(●)
Wetland Hydrology Present?	( )	(●)

Is the Sampled Area within a Wetland? Yes ( ) No (●)

Remarks: Project site is actively grazed by cattle throughout and trampling has occurred throughout this feature.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Populus fremontii*	10	Yes	FAC
2. *Salix laevigata*	10	Yes	FACW
3. *Salix goodingii*	10	Yes	FACW
4.			
Total Cover:	30 %		
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:	%		
Herb Stratum			
1. *Aegilops triuncialis*	50	Yes	Not Listed
2. *Rumex sp.*	5	No	FACW
3. *Centaurea solstitialis*	3	No	Not Listed
4. *Erodium sp.*	1	No	FACU
5.			
6.			
7.			
8.			
Total Cover:	59 %		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum 41 % | % Cover of Biotic Crust %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	3	(A)
Total Number of Dominant Species Across All Strata:	4	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	75.0 %	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	0
FACW species	25	x 2 =	50
FAC species	10	x 3 =	30
FACU species	1	x 4 =	4
UPL species	53	x 5 =	265
Column Totals:	89 (A)		349 (B)

Prevalence Index = B/A = 3.92

Hydrophytic Vegetation Indicators:

- [X] Dominance Test is >50%
- [ ] Prevalence Index is ≤3.0[1]
- [ ] Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes (●) No ( )

Remarks: Vegetation is grazed in this area so new sprouts of riparian trees likely don't survive.

SOIL

Sampling Point: 4-1 wet

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture[3]	Remarks
0-12	10YR 3/3	94	2.5YR 4/8	5	C	M	Silty clay loam	
			7.5YR 8/1	1	D	M		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.
[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[4]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? **Yes** ○ **No** ◉

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ○ No ◉ Depth (inches):

Water Table Present? Yes ○ No ◉ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ○ No ◉ Depth (inches):

Wetland Hydrology Present? Yes ○ **No** ◉

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Janus Solar | City/County: Colusa County | Sampling Date: 1/21/2021

Applicant/Owner: RWE Solar Development, LLC | State: CA | Sampling Point: 5-1 trans

Investigator(s): Daniel Berg, Monique O'Conner | Section, Township, Range: 1-3, 25, 26, 29, 30, 35; 14N, 15N; 3W, 4W

Landform (hillslope, terrace, etc.): Pond slope | Local relief (concave, convex, none): Concave | Slope (%): 5

Subregion (LRR): C - Mediterranean California | Lat: Refer to Map | Long: Refer to Map | Datum: N/A

Soil Map Unit Name: Ayar clay | NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes (●) No ( ) (If no, explain in Remarks.)

Are Vegetation [X] Soil [X] or Hydrology [X] significantly disturbed? Are "Normal Circumstances" present? Yes (●) No ( )

Are Vegetation [ ] Soil [ ] or Hydrology [ ] naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes (●)	No ( )
Hydric Soil Present?	Yes (●)	No ( )
Wetland Hydrology Present?	Yes (●)	No ( )

Is the Sampled Area within a Wetland? Yes (●) No ( )

Remarks: Project site is actively grazed by cattle throughout.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	%		
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:	%		
Herb Stratum			
1. *Festuca perennis*	15	Yes	FAC
2. *Phalaris sp.*	15	Yes	FACW
3. *Medicago polymorpha*	7	No	FACU
4. *Erodium sp.*	3	No	FACU
5. *Aegilops triuncialis*	2	No	Not Listed
6. *Convolvulus arvensis*	1	No	Not Listed
7. *Centaurea solstitialis*	1	No	Not Listed
8. *Polygonum aviculare*	1	No	FAC
Total Cover:	45 %		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum 55 % | % Cover of Biotic Crust 0 %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	2	(A)
Total Number of Dominant Species Across All Strata:	2	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100.0 %	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	0
FACW species	15	x 2 =	30
FAC species	16	x 3 =	48
FACU species	10	x 4 =	40
UPL species	4	x 5 =	20
Column Totals:	45 (A)		138 (B)

Prevalence Index = B/A = 3.07

Hydrophytic Vegetation Indicators:

- [X] Dominance Test is >50%
- [ ] Prevalence Index is ≤3.0[1]
- [ ] Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes (●) No ( )

Remarks:

SOIL

Sampling Point: 5-1 trans

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture[3]	Remarks
0-6	10YR 5/6	95	5YR 5/8	5	C	M	Silty clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.
[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☒ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[4]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: Compacted soil

Depth (inches): 6

Hydric Soil Present? Yes ◉ No ○

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☒ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☒ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☒ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ○ No ◉ Depth (inches):

Water Table Present? Yes ○ No ◉ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ○ No ◉ Depth (inches):

Wetland Hydrology Present? Yes ◉ **No** ○

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Janus Solar | City/County: Colusa County | Sampling Date: 1/21/2021

Applicant/Owner: RWE Solar Development, LLC | State: CA | Sampling Point: 5-1 up

Investigator(s): Daniel Berg, Monique O'Conner | Section, Township, Range: 1-3, 25, 26, 29, 30, 35; 14N, 15N; 3W, 4W

Landform (hillslope, terrace, etc.): Hillslope | Local relief (concave, convex, none): Concave | Slope (%): 10

Subregion (LRR): C - Mediterranean California | Lat: Refer to Map | Long: Refer to Map | Datum: N/A

Soil Map Unit Name: Ayar clay | NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes (●) No ( ) (If no, explain in Remarks.)

Are Vegetation [X] Soil [ ] or Hydrology [ ] significantly disturbed? Are "Normal Circumstances" present? Yes (●) No ( )

Are Vegetation [ ] Soil [ ] or Hydrology [ ] naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	( )	(●)
Hydric Soil Present?	( )	(●)
Wetland Hydrology Present?	( )	(●)

Is the Sampled Area within a Wetland? Yes ( ) No (●)

Remarks: Project site is actively grazed by cattle throughout.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	%		
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:	%		
Herb Stratum			
1. *Aegilops triuncialis*	58	Yes	Not Listed
2. *Avena sp.*	38	Yes	FACU
3. *Vicia villosa*	3	No	Not Listed
4. *Lupinus sp.*	1	No	Not Listed
5.			
6.			
7.			
8.			
Total Cover:	100%		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum 0 % | % Cover of Biotic Crust 0 %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0 % (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	0
FACW species		x 2 =	0
FAC species		x 3 =	0
FACU species	38	x 4 =	152
UPL species	62	x 5 =	310
Column Totals:	100 (A)		462 (B)

Prevalence Index = B/A = 4.62

Hydrophytic Vegetation Indicators:

- [ ] Dominance Test is >50%
- [ ] Prevalence Index is ≤3.0[1]
- [ ] Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ( ) No (●)

Remarks:

SOIL

Sampling Point: 5-1 up

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture[3]	Remarks
0-12	10YR 4/4	100					Silty clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.
[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[4]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ○ No ◉

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ○ No ◉ Depth (inches):

Water Table Present? Yes ○ No ◉ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ○ No ◉ Depth (inches):

Wetland Hydrology Present? Yes ○ No ◉

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Janus Solar | City/County: Colusa County | Sampling Date: 1/21/2021

Applicant/Owner: RWE Solar Development, LLC | State: CA | Sampling Point: 5-1 wet

Investigator(s): Daniel Berg, Monique O'Conner | Section, Township, Range: 1-3, 25, 26, 29, 30, 35; 14N, 15N; 3W, 4W

Landform (hillslope, terrace, etc.): Pond | Local relief (concave, convex, none): Concave | Slope (%): 0

Subregion (LRR): C - Mediterranean California | Lat: Refer to Map | Long: Refer to Map | Datum: N/A

Soil Map Unit Name: Ayar clay | NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes (●) No ( ) (If no, explain in Remarks.)

Are Vegetation ☒ Soil ☒ or Hydrology ☒ significantly disturbed? Are "Normal Circumstances" present? Yes (●) No ( )

Are Vegetation ☐ Soil ☐ or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	(●)	( )
Hydric Soil Present?	(●)	( )
Wetland Hydrology Present?	(●)	( )

Is the Sampled Area within a Wetland? **Yes** (●) **No** ( )

Remarks: Project site is actively grazed by cattle throughout.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	%		
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:	%		
Herb Stratum			
1. *Medicago polymorpha*	3	Yes	FACU
2. *Festuca perennis*	2	Yes	FAC
3. *Phalaris sp.*	2	Yes	FACW
4. *Erodium sp.*	1	No	FACU
5. *Convolvulus arvensis*	1	No	Not Listed
6. *Proboscidea sp.*	1	No	FACU
7.			
8.			
Total Cover:	10 %		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum 90 % | % Cover of Biotic Crust 0 %

Remarks:

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66.7 % (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 = 0
FACW species	2	x 2 = 4
FAC species	2	x 3 = 6
FACU species	5	x 4 = 20
UPL species	1	x 5 = 5
Column Totals:	10 (A)	35 (B)

Prevalence Index = B/A = 3.50

Hydrophytic Vegetation Indicators:

☒ Dominance Test is >50%

☐ Prevalence Index is ≤3.0[1]

☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** (●) **No** ( )

SOIL

Sampling Point: 5-1 wet

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture[3]	Remarks
0-6	10YR 5/6	92	5YR 5/8	7	C	M	Silty clay	
			2.5YR 3/6	1	C	M		
6-16	10YR 5/6	83	5YR 5/8	9	C	M	Silty clay	
			2.5YR 3/6	7	C	M		
			7.5YR 8/3	1	D	M		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.
[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☒ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[4]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? **Yes** ◉ **No** ○

Remarks: Soil is in large chunks that do not easily break.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☒ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☒ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ○	No ◉	Depth (inches):
Water Table Present?	Yes ○	No ◉	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes ○	No ◉	Depth (inches):

Wetland Hydrology Present? **Yes** ◉ **No** ○

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Soil is slightly damp at depth of 6-16 inches.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Janus Solar | City/County: Colusa County | Sampling Date: 1/21/2021

Applicant/Owner: RWE Solar Development, LLC | State: CA | Sampling Point: 6-1 wet

Investigator(s): Daniel Berg, Monique O'Conner | Section, Township, Range: 1-3, 25, 26, 29, 30, 35; 14N, 15N; 3W, 4W

Landform (hillslope, terrace, etc.): Depression | Local relief (concave, convex, none): Concave | Slope (%): 0

Subregion (LRR): C - Mediterranean California | Lat: Refer to Map | Long: Refer to Map | Datum: N/A

Soil Map Unit Name: Ayar clay | NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes (●) No ○ (If no, explain in Remarks.)

Are Vegetation ☒ Soil ☒ or Hydrology ☒ significantly disturbed? Are "Normal Circumstances" present? Yes (●) No ○

Are Vegetation ☐ Soil ☐ or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes (●)	No ○
Hydric Soil Present?	Yes ○	No (●)
Wetland Hydrology Present?	Yes (●)	No ○

Is the Sampled Area within a Wetland? **Yes** ○ **No** (●)

Remarks: Project site is actively grazed by cattle throughout.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	%		
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:	%		
Herb Stratum			
1. *Festuca perennis*	10	Yes	FAC
2. *Phalaris sp.*	10	Yes	FACW
3. *Medicago polymorpha*	7	Yes	FACU
4. *Erodium sp.*	3	No	FACU
5. *Aegilops triuncialis*	3	No	Not Listed
6. *Polygonum aviculare*	1	No	FAC
7.			
8.			
Total Cover:	34 %		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum 66 % | % Cover of Biotic Crust 0 %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	2	(A)
Total Number of Dominant Species Across All Strata:	3	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	66.7 %	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	0
FACW species	10	x 2 =	20
FAC species	11	x 3 =	33
FACU species	10	x 4 =	40
UPL species	3	x 5 =	15
Column Totals:	34 (A)		108 (B)

Prevalence Index = B/A = 3.18

Hydrophytic Vegetation Indicators:

- ☒ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** (●) **No** ○

Remarks:

SOIL

Sampling Point: 6-1 wet

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture[3]	Remarks
0-12	10YR 5/6	99	5YR 5/8	1	C	M	Silty clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.
[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- [ ] Histosol (A1)
- [ ] Histic Epipedon (A2)
- [ ] Black Histic (A3)
- [ ] Hydrogen Sulfide (A4)
- [ ] Stratified Layers (A5) (**LRR C**)
- [ ] 1 cm Muck (A9) (**LRR D**)
- [ ] Depleted Below Dark Surface (A11)
- [ ] Thick Dark Surface (A12)
- [ ] Sandy Mucky Mineral (S1)
- [ ] Sandy Gleyed Matrix (S4)
- [ ] Sandy Redox (S5)
- [ ] Stripped Matrix (S6)
- [ ] Loamy Mucky Mineral (F1)
- [ ] Loamy Gleyed Matrix (F2)
- [ ] Depleted Matrix (F3)
- [ ] Redox Dark Surface (F6)
- [ ] Depleted Dark Surface (F7)
- [ ] Redox Depressions (F8)
- [ ] Vernal Pools (F9)

Indicators for Problematic Hydric Soils[4]:

- [ ] 1 cm Muck (A9) (**LRR C**)
- [ ] 2 cm Muck (A10) (**LRR B**)
- [ ] Reduced Vertic (F18)
- [ ] Red Parent Material (TF2)
- [ ] Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? Yes ◯ No ◉

Remarks: Low percent redox, does not meet F8.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- [ ] Surface Water (A1)
- [ ] High Water Table (A2)
- [ ] Saturation (A3)
- [x] Water Marks (B1) (**Nonriverine**)
- [ ] Sediment Deposits (B2) (**Nonriverine**)
- [ ] Drift Deposits (B3) (**Nonriverine**)
- [x] Surface Soil Cracks (B6)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [ ] Water-Stained Leaves (B9)
- [ ] Salt Crust (B11)
- [ ] Biotic Crust (B12)
- [ ] Aquatic Invertebrates (B13)
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres along Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Plowed Soils (C6)
- [ ] Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- [ ] Water Marks (B1) (**Riverine**)
- [ ] Sediment Deposits (B2) (**Riverine**)
- [ ] Drift Deposits (B3) (**Riverine**)
- [ ] Drainage Patterns (B10)
- [ ] Dry-Season Water Table (C2)
- [ ] Thin Muck Surface (C7)
- [ ] Crayfish Burrows (C8)
- [x] Saturation Visible on Aerial Imagery (C9)
- [ ] Shallow Aquitard (D3)
- [ ] FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ◯ No ◉ Depth (inches):

Water Table Present? Yes ◯ No ◉ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ◯ No ◉ Depth (inches):

Wetland Hydrology Present? Yes ◉ No ◯

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Janus Solar | City/County: Colusa County | Sampling Date: 1/21/2021

Applicant/Owner: RWE Solar Development, LLC | State: CA | Sampling Point: 7-1 trans

Investigator(s): Daniel Berg, Monique O'Conner | Section, Township, Range: 1-3, 25, 26, 29, 30, 35; 14N, 15N; 3W, 4W

Landform (hillslope, terrace, etc.): Pond slope | Local relief (concave, convex, none): Concave | Slope (%): 1

Subregion (LRR): C - Mediterranean California | Lat: Refer to Map | Long: Refer to Map | Datum: N/A

Soil Map Unit Name: Ayar clay | NWI classification: R4SBC

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ◉ No ○ (If no, explain in Remarks.)

Are Vegetation ☒ Soil ☒ or Hydrology ☒ significantly disturbed? Are "Normal Circumstances" present? Yes ◉ No ○

Are Vegetation ☐ Soil ☐ or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ◉	No ○
Hydric Soil Present?	Yes ◉	No ○
Wetland Hydrology Present?	Yes ◉	No ○

Is the Sampled Area within a Wetland? **Yes** ◉ **No** ○

Remarks: Project site is actively grazed by cattle throughout.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Populus fremontii*	3	Yes	FAC
2.			
3.			
4.			
Total Cover:	3 %		
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:	%		
Herb Stratum			
1. *Festuca perennis*	90	Yes	FAC
2. *Phalaris sp.*	5	No	FACW
3. *Polygonum aviculare*	3	No	FAC
4. *Convolvulus arvensis*	3	No	Not Listed
5. *Avena sp.*	2	No	UPL
6. *Aegilops triuncialis*	2	No	Not Listed
7. *Rumex sp.*	1	No	FACW
8. *Centaurea solstitialis*	1	No	Not Listed
Total Cover:	107 %		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum 0 % | % Cover of Biotic Crust 0 %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	2	(A)
Total Number of Dominant Species Across All Strata:	2	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100.0 %	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	0
FACW species	6	x 2 =	12
FAC species	96	x 3 =	288
FACU species		x 4 =	0
UPL species	8	x 5 =	40
Column Totals:	110 (A)		340 (B)

Prevalence Index = B/A = 3.09

Hydrophytic Vegetation Indicators:

- ☒ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** ◉ **No** ○

Remarks:

SOIL

Sampling Point: 7-1 trans

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture[3]	Remarks
0-16	10YR 3/4	95	2.5YR 3/6	1	C	M	Silty clay loam	
			5YR 4/6	4	C	M		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.
[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☒ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils:[4]

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? **Yes** ◉ **No** ○

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☒ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☒ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ○ No ◉ Depth (inches):

Water Table Present? Yes ○ No ◉ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ○ No ◉ Depth (inches):

Wetland Hydrology Present? **Yes** ◉ **No** ○

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Janus Solar City/County: Colusa County Sampling Date: 1/21/2021

Applicant/Owner: RWE Solar Development, LLC State: CA Sampling Point: 7-1 up

Investigator(s): Daniel Berg, Monique O'Conner Section, Township, Range: 1-3, 25, 26, 29, 30, 35; 14N, 15N; 3W, 4W

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 10

Subregion (LRR): C - Mediterranean California Lat: Refer to Map Long: Refer to Map Datum: N/A

Soil Map Unit Name: Ayar clay NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes (●) No ( ) (If no, explain in Remarks.)

Are Vegetation [X] Soil [ ] or Hydrology [ ] significantly disturbed? Are "Normal Circumstances" present? Yes (●) No ( )

Are Vegetation [ ] Soil [ ] or Hydrology [ ] naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	( )	(●)
Hydric Soil Present?	( )	(●)
Wetland Hydrology Present?	( )	(●)

Is the Sampled Area within a Wetland? **Yes** ( ) **No** (●)

Remarks: Project site is actively grazed by cattle throughout.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	%		
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:	%		
Herb Stratum			
1. *Erodium sp.*	40	Yes	FACU
2. *Aegilops triuncialis*	30	Yes	Not Listed
3. *Avena sp.*	30	Yes	FACU
4. *Achyrachaena mollis*	5	No	FAC
5. *Croton setiger*	3	No	Not Listed
6. *Medicago polymorpha*	3	No	FACU
7. *Plantago erecta*	2	No	Not Listed
8.			
Total Cover:	113 %		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum 0 % % Cover of Biotic Crust 0 %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0 % (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	0
FACW species		x 2 =	0
FAC species	5	x 3 =	15
FACU species	73	x 4 =	292
UPL species	35	x 5 =	175
Column Totals:	113 (A)		482 (B)

Prevalence Index = B/A = 4.27

Hydrophytic Vegetation Indicators:

- [ ] Dominance Test is >50%
- [ ] Prevalence Index is ≤3.0[1]
- [ ] Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** ( ) **No** (●)

Remarks:

SOIL

Sampling Point: 7-1 up

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture[3]	Remarks
0-16	10YR 4/4	100					Clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.
[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[4]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? **Yes** ○ **No** ◉

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ○	No ◉	Depth (inches):
Water Table Present?	Yes ○	No ◉	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes ○	No ◉	Depth (inches):

Wetland Hydrology Present? **Yes** ○ **No** ◉

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Janus Solar | City/County: Colusa County | Sampling Date: 1/21/2021

Applicant/Owner: RWE Solar Development, LLC | State: CA | Sampling Point: 7-1 wet

Investigator(s): Daniel Berg, Monique O'Conner | Section, Township, Range: 1-3, 25, 26, 29, 30, 35; 14N, 15N; 3W, 4W

Landform (hillslope, terrace, etc.): Pond | Local relief (concave, convex, none): Concave | Slope (%): 0

Subregion (LRR): C - Mediterranean California | Lat: Refer to Map | Long: Refer to Map | Datum: N/A

Soil Map Unit Name: Ayar clay | NWI classification: R4SBC

Are climatic / hydrologic conditions on the site typical for this time of year? Yes (●) No ( ) (If no, explain in Remarks.)

Are Vegetation [X] Soil [X] or Hydrology [X] significantly disturbed? Are "Normal Circumstances" present? Yes (●) No ( )

Are Vegetation [ ] Soil [ ] or Hydrology [ ] naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	(●)	( )
Hydric Soil Present?	(●)	( )
Wetland Hydrology Present?	(●)	( )
Is the Sampled Area within a Wetland?	(●)	( )

Remarks: Project site is actively grazed by cattle throughout.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	%		
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:	%		
Herb Stratum			
1. *Polygonum aviculare*	3	Yes	FAC
2. *Phalaris sp.*	3	Yes	FACW
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:	6 %		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum 94 % | % Cover of Biotic Crust 0 %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	2	(A)
Total Number of Dominant Species Across All Strata:	2	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100.0 %	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	0
FACW species	3	x 2 =	6
FAC species	3	x 3 =	9
FACU species		x 4 =	0
UPL species		x 5 =	0
Column Totals:	6 (A)		15 (B)

Prevalence Index = B/A = 2.50

Hydrophytic Vegetation Indicators:

- [X] Dominance Test is >50%
- [X] Prevalence Index is ≤3.0[1]
- [ ] Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes (●) No ( )

Remarks:

SOIL

Sampling Point: 7-1 wet

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture[3]	Remarks
0-16	10YR 4/3	80	2.5YR 3/6	10	C	M	Silty clay	
			5YR 4/6	10	C	M		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.
[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☒ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[4]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? **Yes** ◉ **No** ○

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☒ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☒ Surface Soil Cracks (B6)
- ☒ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ○ No ◉ Depth (inches):

Water Table Present? Yes ○ No ◉ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ○ No ◉ Depth (inches):

Wetland Hydrology Present? **Yes** ◉ **No** ○

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Janus Solar | City/County: Colusa County | Sampling Date: 1/21/2021

Applicant/Owner: RWE Solar Development, LLC | State: CA | Sampling Point: 8-1 wet

Investigator(s): Daniel Berg, Monique O'Conner | Section, Township, Range: 1-3, 25, 26, 29, 30, 35; 14N, 15N; 3W, 4W

Landform (hillslope, terrace, etc.): Disturbed drainage | Local relief (concave, convex, none): Concave | Slope (%): 1

Subregion (LRR): C - Mediterranean California | Lat: Refer to Map | Long: Refer to Map | Datum: N/A

Soil Map Unit Name: Ayar clay | NWI classification: R4SBC

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ◉ No ◯ (If no, explain in Remarks.)

Are Vegetation ☒ Soil ☒ or Hydrology ☒ significantly disturbed? Are "Normal Circumstances" present? Yes ◉ No ◯

Are Vegetation ☐ Soil ☐ or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ◉	No ◯
Hydric Soil Present?	Yes ◯	No ◉
Wetland Hydrology Present?	Yes ◯	No ◉

Is the Sampled Area within a Wetland? **Yes** ◯ **No** ◉

Remarks: Project site is actively grazed by cattle throughout.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Salix laevigata*	25	Yes	FACW
2.			
3.			
4.			
Total Cover:	25 %		
Sapling/Shrub Stratum			
1. *Salix laevigata*	5	Yes	FACW
2.			
3.			
4.			
5.			
Total Cover:	5 %		
Herb Stratum			
1. *Aegilops triuncialis*	15	Yes	Not Listed
2. *Avena sp.*	15	Yes	UPL
3. *Festuca perennis*	15	Yes	FAC
4. *Phalaris sp.*	5	No	FACW
5. *Erodium sp.*	3	No	FACU
6.			
7.			
8.			
Total Cover:	53 %		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum 47 % | % Cover of Biotic Crust 0 %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 60.0 % (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	0
FACW species	35	x 2 =	70
FAC species	15	x 3 =	45
FACU species	3	x 4 =	12
UPL species	30	x 5 =	150
Column Totals:	83 (A)		277 (B)

Prevalence Index = B/A = 3.34

Hydrophytic Vegetation Indicators:

- ☒ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** ◉ **No** ◯

Remarks:

SOIL

Sampling Point: 8-1 wet

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture[3]	Remarks
0-8	10YR 3/4	98	5YR 4/6	2	C	M	Silty clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.
[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[4]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: Compacted soil

Depth (inches): 8

Hydric Soil Present? Yes ○ No ◉

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ○ No ◉ Depth (inches):

Water Table Present? Yes ○ No ◉ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ○ No ◉ Depth (inches):

Wetland Hydrology Present? Yes ○ No ◉

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Janus Solar | City/County: Colusa County | Sampling Date: 1/21/2021

Applicant/Owner: RWE Solar Development, LLC | State: CA | Sampling Point: 9-1 wet

Investigator(s): Daniel Berg, Monique O'Conner | Section, Township, Range: 1-3, 25, 26, 29, 30, 35; 14N, 15N; 3W, 4W

Landform (hillslope, terrace, etc.): Plain | Local relief (concave, convex, none): Concave | Slope (%): 1

Subregion (LRR): C - Mediterranean California | Lat: Refer to Map | Long: Refer to Map | Datum: N/A

Soil Map Unit Name: Ayar clay | NWI classification: R4SBC

Are climatic / hydrologic conditions on the site typical for this time of year? Yes (●) No ( ) (If no, explain in Remarks.)

Are Vegetation [X] Soil [X] or Hydrology [X] significantly disturbed? Are "Normal Circumstances" present? Yes (●) No ( )

Are Vegetation [ ] Soil [ ] or Hydrology [ ] naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	( )	(●)
Hydric Soil Present?	( )	(●)
Wetland Hydrology Present?	(●)	( )

Is the Sampled Area within a Wetland? Yes ( ) No (●)

Remarks: Project site is actively grazed by cattle throughout.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Salix laevigata*			
2.			
3.			
4.			
Total Cover:	%		
Sapling/Shrub Stratum			
1. *Salix laevigata*			
2.			
3.			
4.			
5.			
Total Cover:	%		
Herb Stratum			
1. *Centaurea solstitialis*	10	Yes	Not Listed
2. *Aegilops triuncialis*	10	Yes	Not Listed
3. *Medicago polymorpha*	5	No	FACU
4. *Rumex sp.*	3	No	FACW
5. *Hemizonia congesta*	1	No	Not Listed
6.			
7.			
8.			
Total Cover:	29 %		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum 71 % | % Cover of Biotic Crust 0 %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0 % (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	0
FACW species	3	x 2 =	6
FAC species		x 3 =	0
FACU species	5	x 4 =	20
UPL species	21	x 5 =	105
Column Totals:	29 (A)		131 (B)

Prevalence Index = B/A = 4.52

Hydrophytic Vegetation Indicators:

- [ ] Dominance Test is >50%
- [ ] Prevalence Index is ≤3.0[1]
- [ ] Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ( ) No (●)

Remarks:

SOIL

Sampling Point: 9-1 wet

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture[3]	Remarks
0-6	10YR 3/4	99	5YR 4/6	1	C	M	Clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.
[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- [ ] Histosol (A1)
- [ ] Histic Epipedon (A2)
- [ ] Black Histic (A3)
- [ ] Hydrogen Sulfide (A4)
- [ ] Stratified Layers (A5) (**LRR C**)
- [ ] 1 cm Muck (A9) (**LRR D**)
- [ ] Depleted Below Dark Surface (A11)
- [ ] Thick Dark Surface (A12)
- [ ] Sandy Mucky Mineral (S1)
- [ ] Sandy Gleyed Matrix (S4)
- [ ] Sandy Redox (S5)
- [ ] Stripped Matrix (S6)
- [ ] Loamy Mucky Mineral (F1)
- [ ] Loamy Gleyed Matrix (F2)
- [ ] Depleted Matrix (F3)
- [ ] Redox Dark Surface (F6)
- [ ] Depleted Dark Surface (F7)
- [ ] Redox Depressions (F8)
- [ ] Vernal Pools (F9)

Indicators for Problematic Hydric Soils[4]:

- [ ] 1 cm Muck (A9) (**LRR C**)
- [ ] 2 cm Muck (A10) (**LRR B**)
- [ ] Reduced Vertic (F18)
- [ ] Red Parent Material (TF2)
- [ ] Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: Rock

Depth (inches): 6

Hydric Soil Present? Yes ○ No ●

Remarks: Soil is very rocky and slightly moist.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- [ ] Surface Water (A1)
- [ ] High Water Table (A2)
- [ ] Saturation (A3)
- [ ] Water Marks (B1) (**Nonriverine**)
- [ ] Sediment Deposits (B2) (**Nonriverine**)
- [ ] Drift Deposits (B3) (**Nonriverine**)
- [ ] Surface Soil Cracks (B6)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [ ] Water-Stained Leaves (B9)
- [ ] Salt Crust (B11)
- [ ] Biotic Crust (B12)
- [ ] Aquatic Invertebrates (B13)
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres along Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Plowed Soils (C6)
- [ ] Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- [ ] Water Marks (B1) (**Riverine**)
- [x] Sediment Deposits (B2) (**Riverine**)
- [ ] Drift Deposits (B3) (**Riverine**)
- [x] Drainage Patterns (B10)
- [ ] Dry-Season Water Table (C2)
- [ ] Thin Muck Surface (C7)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [ ] Shallow Aquitard (D3)
- [ ] FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ○	No ●	Depth (inches):
Water Table Present?	Yes ○	No ●	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes ○	No ●	Depth (inches):

Wetland Hydrology Present? Yes ● No ○

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Bed, banks, and channel are not present.

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Janus Solar | City/County: Colusa County | Sampling Date: 5/22/2024

Applicant/Owner: RWE Solar Development, LLC | State: CA | Sampling Point: 12-1 up

Investigator(s): Daniel Berg, Jack Gordon, Lauren Jennings | Section, Township, Range: 1-3, 25, 26, 29, 30, 35; 14N, 15N; 3W, 4W

Landform (hillslope, terrace, etc.): Upland | Local relief (concave, convex, none): None | Slope (%): 0

Subregion (LRR): C - Mediterranean California | Lat: Refer to Map | Long: Refer to Map | Datum: N/A

Soil Map Unit Name: Clear Lake clay | NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes (●) No ( ) (If no, explain in Remarks.)

Are Vegetation [X] Soil [X] or Hydrology [ ] significantly disturbed? Are "Normal Circumstances" present? Yes (●) No ( )

Are Vegetation [ ] Soil [ ] or Hydrology [ ] naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ( )	No (●)
Hydric Soil Present?	Yes ( )	No (●)
Wetland Hydrology Present?	Yes ( )	No (●)

Is the Sampled Area within a Wetland? Yes ( ) No (●)

Remarks:

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	%		
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:	%		
Herb Stratum			
1. *Hordeum murinum*	75	Yes	FACU
2. *Lolium perenne*	10	No	FAC
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:	85 %		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum 15 % | % Cover of Biotic Crust 0 %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	0	(A)
Total Number of Dominant Species Across All Strata:	1	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	0.0 %	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	0
FACW species		x 2 =	0
FAC species	10	x 3 =	30
FACU species	75	x 4 =	300
UPL species		x 5 =	0
Column Totals:	85 (A)		330 (B)

Prevalence Index = B/A = 3.88

Hydrophytic Vegetation Indicators:

- [ ] Dominance Test is >50%
- [ ] Prevalence Index is ≤3.0[1]
- [ ] Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ( ) No (●)

Remarks:

SOIL

Sampling Point: 12-1 up

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture[3]	Remarks
0-10	2.5Y 3/2	100		0			silty clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.
[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[4]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: Hardpan

Depth (inches): 10 inches

Hydric Soil Present? Yes ○ No ◉

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ○ No ◉ Depth (inches):

Water Table Present? Yes ○ No ◉ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ○ No ◉ Depth (inches):

Wetland Hydrology Present? Yes ○ No ◉

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Janus Solar City/County: Colusa County Sampling Date: 5/22/2024

Applicant/Owner: RWE Solar Development, LLC State: CA Sampling Point: 12-1 wet

Investigator(s): Daniel Berg, Jack Gordon, Lauren Jennings Section, Township, Range: 1-3, 25, 26, 29, 30, 35; 14N, 15N; 3W, 4W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): 3

Subregion (LRR): C - Mediterranean California Lat: Refer to Map Long: Refer to Map Datum: N/A

Soil Map Unit Name: Clear Lake clay NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes (●) No ( ) (If no, explain in Remarks.)

Are Vegetation [X] Soil [X] or Hydrology [ ] significantly disturbed? Are "Normal Circumstances" present? Yes (●) No ( )

Are Vegetation [ ] Soil [ ] or Hydrology [ ] naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	( )	(●)
Hydric Soil Present?	( )	(●)
Wetland Hydrology Present?	(●)	( )

Is the Sampled Area within a Wetland? Yes ( ) No (●)

Remarks: Depression used by cattle for watering. A large berm is present at one side of the depression.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	%		
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:	%		
Herb Stratum			
1. *Hordeum murinum*	1	Yes	FACU
2. *Malvella leprosa*	1	Yes	FACU
3. *Convolvulus arvensis*	1	Yes	Not Listed
4.			
5.			
6.			
7.			
8.			
Total Cover:	3 %		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum 97 % % Cover of Biotic Crust 0 %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0 % (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	0
FACW species		x 2 =	0
FAC species		x 3 =	0
FACU species	2	x 4 =	8
UPL species	1	x 5 =	5
Column Totals:	3	(A)	13 (B)

Prevalence Index = B/A = 4.33

Hydrophytic Vegetation Indicators:

- Dominance Test is >50%
- Prevalence Index is ≤3.0[1]
- [ ] Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- [ ] Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ( ) No (●)

Remarks:

SOIL

Sampling Point: 12-1 wet

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture[3]	Remarks
0-14	2.5Y 3/1	99	5YR 4/6	<1	C	M	silty clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.
[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[4]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? **Yes** ○ **No** ◉

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☒ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☒ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☒ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ◉	No ○	Depth (inches): 36 inches
Water Table Present?	Yes ○	No ◉	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes ○	No ◉	Depth (inches):

Wetland Hydrology Present? **Yes** ◉ **No** ○

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: Janus Solar | City/County: Colusa County | Sampling Date: 5/22/2024

Applicant/Owner: RWE Solar Development, LLC | State: CA | Sampling Point: 13-1 wet

Investigator(s): Daniel Berg, Jack Gordon, Lauren Jennings | Section, Township, Range: 1-3, 25, 26, 29, 30, 35; 14N, 15N; 3W, 4W

Landform (hillslope, terrace, etc.): Depression | Local relief (concave, convex, none): Concave | Slope (%): 1

Subregion (LRR): C - Mediterranean California | Lat: Refer to Map | Long: Refer to Map | Datum: N/A

Soil Map Unit Name: Clear Lake clay | NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ◉ No ○ (If no, explain in Remarks.)

Are Vegetation ☒ Soil ☒ or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ◉ No ○

Are Vegetation ☐ Soil ☐ or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	○	◉
Hydric Soil Present?	○	◉
Wetland Hydrology Present?	◉	○

Is the Sampled Area within a Wetland? Yes ○ No ◉

Remarks: Upland pit for this depression is sample point 14-1 UP.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Salix laevigata*	5	Yes	FACW
2.			
3.			
4.			
Total Cover:	5 %		
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:	%		
Herb Stratum			
1. *Hordeum murinum*	1	Yes	FACU
2. *Malvella leprosa*	1	Yes	FACU
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:	2 %		
Woody Vine Stratum			
1.			
2.			
Total Cover:	%		

% Bare Ground in Herb Stratum 98 % | % Cover of Biotic Crust 0 %

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33.3 % (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	0
FACW species	5	x 2 =	10
FAC species		x 3 =	0
FACU species	2	x 4 =	8
UPL species		x 5 =	0
Column Totals:	7 (A)		18 (B)

Prevalence Index = B/A = 2.57

Hydrophytic Vegetation Indicators:

- ☐ Dominance Test is >50%
- ☒ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ○ No ◉

Remarks:

SOIL

Sampling Point: 13-1 wet

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture[3]	Remarks
0-14	2.5Y 3/1	99	5YR 4/6	1	C	M	silty clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.
[3]Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[4]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[4]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present? **Yes** ○ **No** ◉

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ☒ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☒ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Plowed Soils (C6)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Thin Muck Surface (C7)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ◉ No ○ Depth (inches): 1 inch

Water Table Present? Yes ○ No ◉ Depth (inches):

Saturation Present? (includes capillary fringe) Yes ○ No ◉ Depth (inches):

Wetland Hydrology Present? **Yes** ◉ **No** ○

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

APPENDIX B PHOTOGRAPHS

Photograph 1	
Date: 2021	
Location: Feature 1	
Notes: Overview photo of water inside Feature 1.	

Photograph 2	
Date: 2021	
Location: Feature 1	
Notes: Overview photo of water inside Feature 1.	

Photograph 3	
Date: 2021	
Location: Feature 1	
Notes: Sample point 1-1a up.	

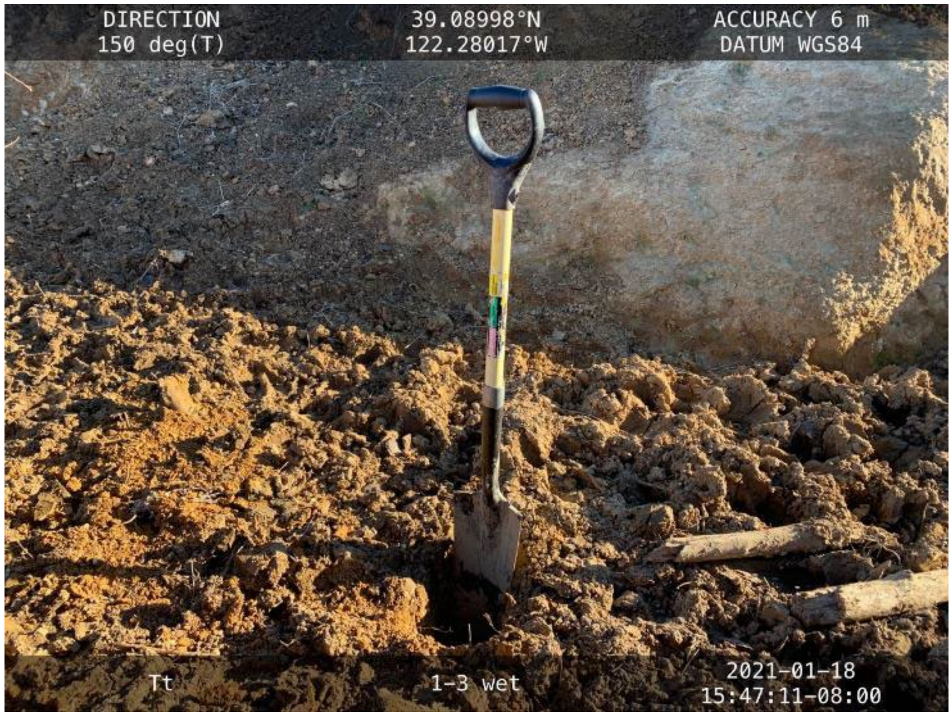
Photograph 4	
Date: 2021	
Location: Feature 1	
Notes: Sample point 1-1a wet	

Photograph 5	
Date: 2021	
Location: Feature 1	
Notes: Sample point 1-1b up.	

Photograph 6	
Date: 2021	
Location: Feature 1	
Notes: Sample point 1-2a up.	

Photograph 7	
Date: 2021	
Location: Feature 1	
Notes: Sample point 1-2a wet.	

Photograph 8	
Date: 2021	
Location: Feature 1	
Notes: Sample point 1-2b up.	

Photograph 9	
Date: 2021	
Location: Feature 1	
Notes: Sample point 1-3 wet.	

Photograph 10	
Date: 2021	
Location: Feature 1	
Notes: Sample point 1-4 wet.	

<table>
<tr><td>Photograph 11</td><td rowspan="4">
</td></tr>
<tr><td>Date: 2021</td></tr>
<tr><td>Location:
Feature 1</td></tr>
<tr><td>Notes: Sample point 1-5 wet.</td></tr>
</table>

<table>
<tr><td>Photograph 12</td><td rowspan="4">
</td></tr>
<tr><td>Date: 2021</td></tr>
<tr><td>Location:
Feature 1</td></tr>
<tr><td>Notes: Sample point 1-6 wet.</td></tr>
</table>

<table>
<tr><td>Photograph 13</td><td rowspan="4">
</td></tr>
<tr><td>Date: 2021</td></tr>
<tr><td>Location:
Feature 1</td></tr>
<tr><td>Notes: Sample point 1-7 wet.</td></tr>
</table>

<table>
<tr><td>Photograph 14</td><td rowspan="4">
</td></tr>
<tr><td>Date: 2021</td></tr>
<tr><td>Location:
Feature 1</td></tr>
<tr><td>Notes: Sample point 1-8 wet.</td></tr>
</table>

Photograph 15	
Date: 2021	
Location: Feature 1	
Notes: Sample point 1-9 wet.	

Photograph 16	
Date: 2021	
Location: Feature 1	
Notes: Sample point 1-10 wet.	

Photograph 17	
Date: 2021	
Location: Feature 2	
Notes: Sample point 2-1 wet.	

Photograph 18	
Date: 2021	
Location: Feature 3	
Notes: Sample point 3-1 up.	

Photograph 19	
Date: 2021	
Location: Feature 3	
Notes: Sample point 3-1 wet.	

Photograph 20	
Date: 2021	
Location: Feature 3	
Notes: Sample point 3-2 wet.	

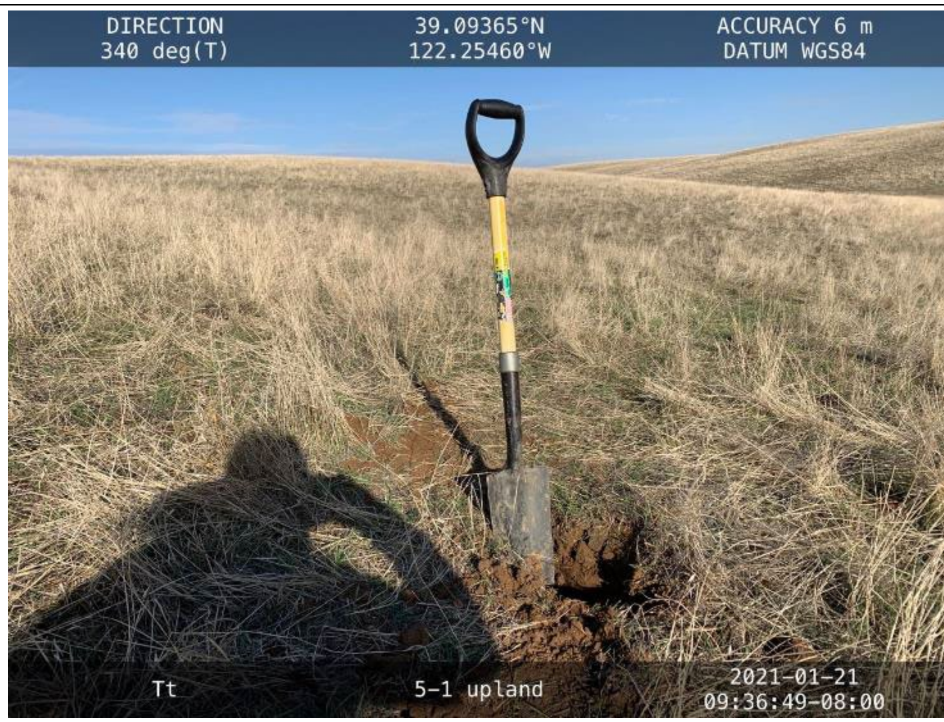
Photograph 21	
Date: 2021	
Location: Feature 3	
Notes: Sample point 3-3 wet.	

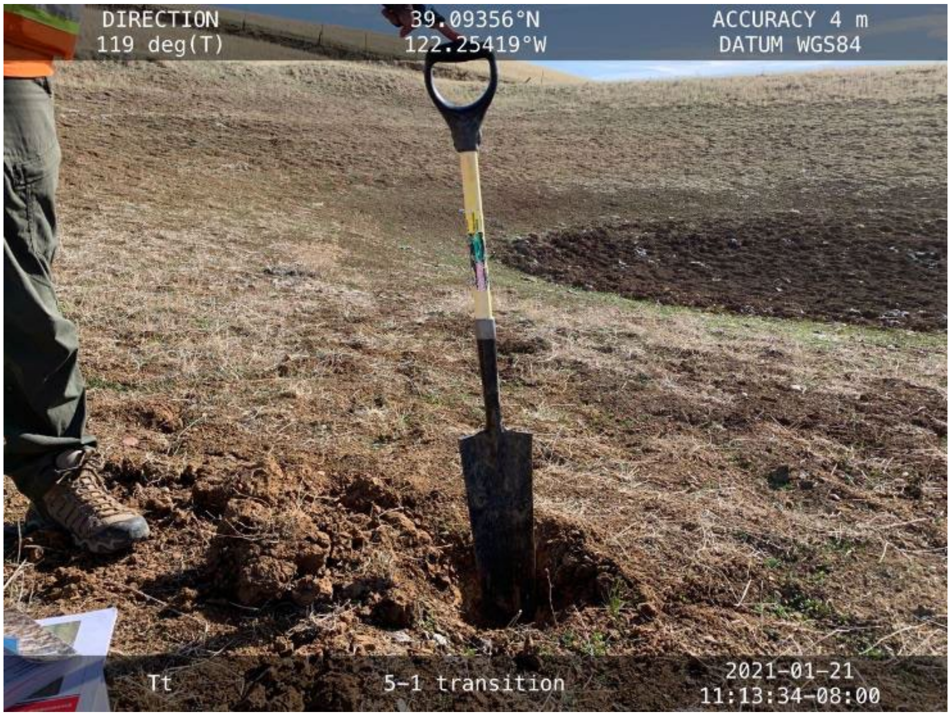
Photograph 22	
Date: 2021	
Location: Feature 4	
Notes: Sample point 4-1 up.	

<table>
<tr><td>Photograph 23</td><td rowspan="4">
</td></tr>
<tr><td>Date: 2021</td></tr>
<tr><td>Location:
Feature 4</td></tr>
<tr><td>Notes: Sample point 4-1 wet.</td></tr>
</table>

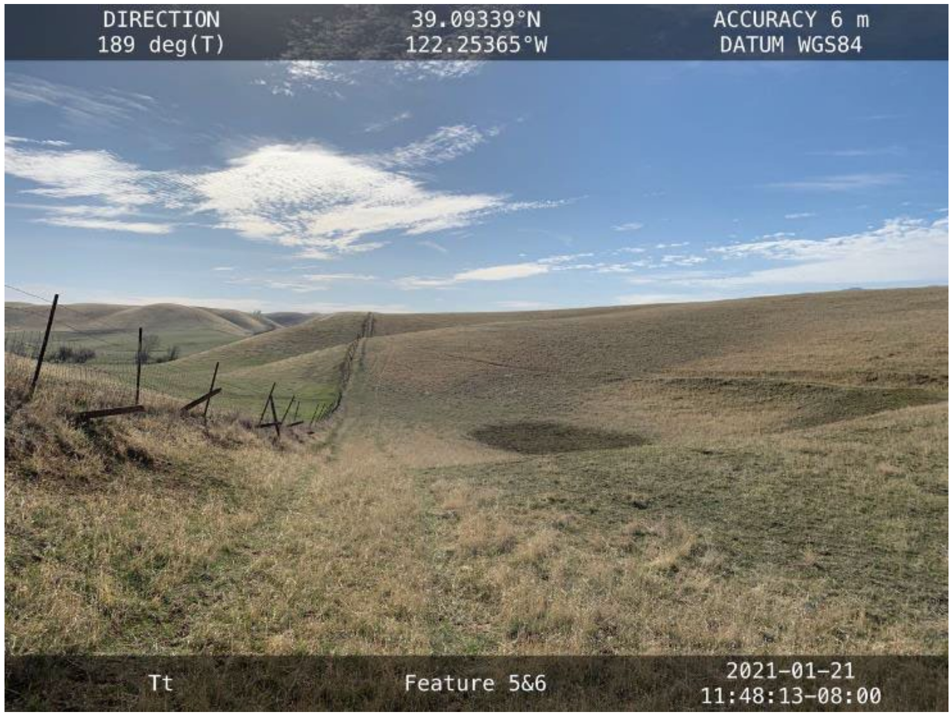
<table>
<tr><td>Photograph 24</td><td rowspan="4">
</td></tr>
<tr><td>Date: 2021</td></tr>
<tr><td>Location:
Feature 5</td></tr>
<tr><td>Notes: Overview photo of Feature 5.</td></tr>
</table>

<table>
<tr><td>Photograph 25</td><td rowspan="4">
</td></tr>
<tr><td>Date: 2021</td></tr>
<tr><td>Location:
Feature 5</td></tr>
<tr><td>Notes: Overview photo of Feature 5.</td></tr>
</table>

<table>
<tr><td>Photograph 26</td><td rowspan="4">
</td></tr>
<tr><td>Date: 2021</td></tr>
<tr><td>Location:
Feature 5</td></tr>
<tr><td>Notes: Sample point 5-1 up.</td></tr>
</table>

<table>
<tr><td>Photograph 27</td><td rowspan="4">
</td></tr>
<tr><td>Date: 2021</td></tr>
<tr><td>Location:
Feature 5</td></tr>
<tr><td>Notes: Sample point 5-1 trans.</td></tr>
</table>

<table>
<tr><td>Photograph 28</td><td rowspan="4">
</td></tr>
<tr><td>Date: 2021</td></tr>
<tr><td>Location:
Feature 5</td></tr>
<tr><td>Notes: Sample point 5-1 wet.</td></tr>
</table>

Photograph 29	
Date: 2021	
Location: Feature 6	
Notes: Overview photo of Feature 6.	

Photograph 30	
Date: 2021	
Location: Feature 6	
Notes: Sample point 6-1 wet.	

Photograph 31	
Date: 2021	
Location: Feature 7	
Notes: Overview photo of Feature 7.	

Photograph 32	
Date: 2021	
Location: Feature 7	
Notes: Overview photo of Feature 7.	

Photograph 33	
Date: 2021	
Location: Feature 7	
Notes: Overview photo of Feature 7.	

Photograph 34	
Date: 2021	
Location: Feature 7	
Notes: Sample point 7-1 up.	

Photograph 35	
Date: 2021	
Location: Feature 7	
Notes: Sample point 7-1 trans.	

Photograph 36	
Date: 2021	
Location: Feature 7	
Notes: Sample point 7-1 wet.	

Photograph 37	
Date: 2021	
Location: Feature 8	
Notes: Overview photo of Feature 8.	

Photograph 38	
Date: 2021	
Location: Feature 8	
Notes: Sample point 8-1 wet.	

Photograph 39	
Date: 2021	
Location: Feature 9	
Notes: Sample point 9-1 wet.	

Photograph 40	
Date: 2024	
Location: Feature 3	
Notes: Sample point 3-4 wet.	

Photograph 41	
Date: 2024	
Location: Feature 10	
Notes: Overview photo of Feature 10.	

Photograph 42	
Date: 2024	
Location: Feature 11	
Notes: Overview photo of Feature 11.	

Photograph 43	
Date: 2024	
Location: Feature 12	
Notes: Overview photo of Feature 12.	

Photograph 44	
Date: 2024	
Location: Feature 12	
Notes: Sample point 12-1 wet.	

Photograph 45	
Date: 2024	
Location: Feature 12	
Notes: Sample point 12-1 up.	

Photograph 46	
Date: 2024	
Location: Feature 13	
Notes: Overview photo of Feature 13.	

Photograph 47	
Date: 2024	
Location: Feature 13	
Notes: Sample point 13-1 wet.	

Photograph 48	
Date: 2024	
Location: Feature 14	
Notes: Overview photo of Feature 14.	

Photograph 49	
Date: 2024	
Location: Feature 15	
Notes: Overview photo of Feature 15.	

APPENDIX F
PALEONTOLOGICAL RESOURCES TECHNICAL MEMORANDUM

TETRA TECH

Technical Memorandum

Date: July 8, 2021

To: Scott Schwartz, RWE Solar Development, LLC

From: Derrick Coleman, PhD, Senior Geomorphologist

Subject: Janus Solar Project Paleontological Resources
Colusa County, California

This technical memorandum evaluates the potential for paleontological resources (i.e., fossils) to occur at the proposed Janus Solar Energy project (Project) site in Colusa County, California. Paleontological resources are an important source of information on previous environments and conditions for most of the geologic record, and this technical memorandum also provides recommendations for management options based on such resources' sensitivity to Project-related disturbance.

1.0 Introduction

This technical memorandum describes the known geologic formations mapped within the Project site footprint and surrounding area, including both surface and subsurface formations. It describes the likelihood for these formations to contain paleontological resources, and where applicable, includes the type of fossils associated with each. Various activities related to construction have the potential to affect paleontological resources. These activities include grading, excavation, drilling, trenching, or tunneling (generally, any kind of surface-disturbing activity). A framework is presented for evaluating paleontological resource sensitivity, which is applied to the appropriate formations with potential to be encountered.

1.1 Project Location and Setting

The Project is proposed for an area of agricultural land in unincorporated Colusa County, California. The nearest city is Williams, located approximately 6.5 miles northeast of the Project site, and the community of Arbuckle is located more than 11 miles to the southeast of the Project site (see Figure 1). The Tehama-Colusa Canal, which provides irrigation water to the west side of the Sacramento Valley, is within 1 to 2 miles of the Project boundary to the north and east. The Project generation tie (gen-tie) line crosses the canal north of the Project site.

The Project is located within Township 14 North, Range 4 West, Sections 1, 2, and 3, and Township 15 North, Range 3 West, Sections 29 and 30. The coordinates of the Project centroid is north latitude 39.093° and west longitude 122.251°.

1.2 Project Description

Janus Solar PV, LLC is proposing to construct a photovoltaic solar power-generating facility of sufficient size and configuration to produce 80 megawatts of electricity and provide up to 80 megawatts of battery energy storage. The Project would include a photovoltaic solar energy generating facility and Project-related operational support facilities. This operational infrastructure would include on-site underground electrical collection lines, substation, battery energy storage system, operations and maintenance facility, internal service roads, security fencing, gates, and lighting, along with a site-external 60-kilovolt transmission line to the Pacific Gas & Electric Cortina substation. During construction, a laydown yard and other temporary use areas would be developed.

2.0 Regulatory Context

The following sections provide summaries of federal, state, and local regulations pertaining to the protection of paleontological resources.

2.1 Federal Regulations

Federal protection of paleontological resources applies if a project overlaps or crosses federally owned or managed lands, or if a federal license, permit, approval or funding is required. The current Project boundary, including grid connection, would cross U.S. Bureau of Reclamation lands where the gen-tie line crosses the Tehama-Colusa Canal; however, no ground-disturbing activities would occur on federal land, such that there would be no impacts to paleontological resources on federal lands.

2.2 State Regulations

California state regulations provide guidance with respect to paleontological resources under the California Environmental Quality Act. Appendix G, Section V.c of the CEQA Guidelines requires that a project proponent determine whether the proposed project would directly or indirectly destroy a unique paleontological resource or site or a unique geological feature. Should an impact be established as significant, CEQA Guidelines require reasonable or feasible measures be applied to limit or minimize significant adverse impacts (State CEQA Guidelines § 15126.4). In addition, CEQA Guidelines (§15370) describe mitigation options to avoid, minimize, rectify, reduce, or compensate for impacts to paleontological resources.

2.3 Regional/Local Regulations

Under the Conservation Element of the 2013 General Plan for Colusa County (Objective CON-3A, Conserve Important Cultural Resources and the County's Heritage; and Policy CON 3-2, Inadvertent Discovery), paleontological resources are protected during "all development, infrastructure, and other ground-disturbing projects," per the following requirement:

> *If construction or grading activities result in the discovery of significant historic or prehistoric archaeological artifacts or unique paleontological resources, all work within 100 feet of the discovery shall cease, the County Department of Planning and Building shall be notified, the resources shall be examined by a qualified archaeologist, paleontologist, or historian for appropriate protection and preservation measures; and work may only resume when appropriate protections are in place and have been approved by the County Department of Planning and Building.*

3.0 Project Environment

The Project site is situated along the western side of the Sacramento Valley, as it rises from the alluvial bottomlands of the great valley, in the southwestern quadrant of Colusa County. The Project site is within the lower one-third of the valley, at about the latitude where the Sacramento River swings from a mostly north-south orientation to a south-southeasterly orientation, flowing toward the city of Sacramento. While the topography in the vicinity of the site is relatively flat, it is influenced by the slow increase in elevation further to the west.

3.1 Physiographic Setting

The central valley of California is classified as the Great Valley geomorphic province. This province is a long (approximately 450 miles) and comparatively narrow lowland (with a width averaging about 50 miles) that has a central drainage outlet through Suisun Bay and into San Francisco Bay. The northern half of the province (the Sacramento Valley) and the southern half (the San Joaquin Valley) meet at the Sacramento-San Joaquin Delta, which is tidally influenced and therefore essentially at sea level. The Project area is on ground that sits at elevations from 280 feet to 360 feet above mean sea level, though most is between 300 feet and 320 feet above mean sea level.

The Great Valley geomorphic province is a mostly intact (i.e., with limited deformation) asymmetric structural trough that has been filled with a thick layer of sediment that ranges in age back to the Jurassic period. The Sacramento Valley portion of this geomorphic province is bounded on the west by the Coast Ranges, on the east by the Sierra Nevada Mountains, and to the north by the Klamath Mountains. The southern end is the Sacramento-San Joaquin Delta. The thickest sequence of Mesozoic age sediment (roughly between 66 and 250 million years ago) occurs in the southern end of the Sacramento Valley, and on the western side, within about 25 miles of the Project site (Hackel 1966).

3.2 Local Geology

Because the Great Valley is a depositional trough, most of the local geologic formations in the Project area are sedimentary rocks, formed from alluvial deposits into either marine or non-marine environments. These sediments are deposited on a basement of Franciscan Formation rocks to the west (including igneous, sedimentary, and metamorphic rocks) and Sierran Formation rocks on the east side (mostly igneous, granitic rock). The contact between the two basement formations is concealed underneath the Great Valley deposits. Even though it is not visible, it is presumed to be a subduction zone or fault-related contact. Much of the Great Valley had active tectonism throughout the Cenozoic, creating unconformities among sedimentary units. Deposition in much of the center of the Great Valley appears to provide an unbroken record through the Cenozoic. Along the margins of the Great Valley, deposition appears to have been frequently disrupted by tectonic activity and erosion (Norris and Webb 1990).

Geologic mapping of the Sacramento Valley has been documented by a number of researchers, including Irwin (1960), Jennings and Strand (1960), Helley and Harwood (1985), and Jennings, et al. (2010). The current interpretation of the local geology of the Project area has not changed drastically over the past several decades, and it indicates that the Project site is located in an area of alluvial rocks with an age of Pliocene to Pleistocene (see Figure 3 and Table 1). East of the Project site on the floor of the Sacramento Valley, the underlying materials are primarily the youngest alluvial sediments, Quaternary age, unconsolidated to semi-consolidated, and mostly non-marine (Q). The Project site sits on older materials (QPc), Pliocene to Pleistocene in age, slightly more consolidated than the younger materials, and deposited into both non-marine and marine environments. These sedimentary materials have been exposed due to uplift of the Coast Ranges to the west, and subsequent erosion of the overlying younger materials. West of the Project includes exposures of yet older sedimentary materials (Ku, Kl, KJf, and J), with ages from Cretaceous to Jurassic, and exhibiting greater consolidation of materials. Topographically, these older sedimentary formations are found at higher elevations than the Project site, which also resulted from the Coast Range orogeny. One of the primary causes of the Coast Range uplift is plate tectonic activity along the Pacific Coast, and a significant marker of this activity is the intrusion of ultramafic plutonic rock, with associated metamorphic rock, which are ultimately exposed at the surface due to erosion. Such geologic materials are found to the west of the Project, and are labeled as Mesozoic in age.

4.0 Paleontological Resources

Since paleontological resources are limited and nonrenewable and provide scientific and educational value, they are protected under both state and county laws and regulations. The evaluation of paleontological resources by this technical memorandum follows guidelines of significance criteria specified by the U.S. Bureau of Land Management (BLM) in their Paleontological Fossil Yield Classification (PFYC) system (BLM 2016).

Surface and subsurface geologic units in the Project vicinity were identified through a review of published maps and literature. In the absence of specific scientific studies of the paleontology of the area, geologic units provide an indication of paleontological sensitivity and the potential for impacting non-renewable paleontological resources by Project development. The reviewed geologic literature and maps included Irwin (1960), Jennings and Strand (1960), Helley and Harwood (1985), and Jennings, et al. (2010), as noted earlier.

4.1 Database Search

A records search was performed by the University of California Museum of Paleontology (UCMP) for records of fossil localities occurring within local geologic units in Colusa County (Holroyd 2021). The record collection search objective was to identify known fossil localities in or near the Project site, or regionally within the identified geologic formation present at the Project site. The searches performed covered all fossil types (vertebrate, invertebrate, plant, microfossils, and trace fossils).

Limiting the search to records of localities found in Colusa County, the UCMP database contains 186 records of invertebrate fossils, 19 microfossils, 6 vertebrate fossils, and 1 plant fossil (UCMP 2021). None of these records were of fossil localities directly within the Project site. However, two fossil localities were within 5 miles of the Project: one is an invertebrate fossil (UCMP locality IP3326), and the other a vertebrate fossil (UCMP locality V5249). The invertebrate locality is about 3 miles to the northwest of the Project area, and also has a U.S. Geological Survey locality identifier (Mesozoic M4098). This fossil was found in Cretaceous rock (Ku) along Freshwater Creek Road. The latter locality is approximately 4 miles southeast of the Project site along Cortina Creek. This is a vertebrate fossil identified in the Pliocene-Pleistocene age Tehama Formation (QPc), the same materials underlying the Project site. The fossil collected at this location (UCMP specimen 42890) were identified as limb bone fragments of a peccary (Holroyd 2021).

4.2 Resource Assessment

Based on known land histories and a review of aerial imagery from 1985 through 2018, the Project site has been used for cultivation at various times throughout this period. However, this has been limited to the western parcel, and the southwestern half of the central parcel. The northeastern half of the central parcel, and the eastern parcel do not appear to have had significant ground disturbance over this period. Use for much of this area was likely limited to livestock grazing. The aerial images show that the land maintains some limited natural vegetation. The U.S. Geological Survey 7.5 Minute “Salt Canyon” quadrangle shows the western half of the Project site is within a relatively flat portion of Spring Valley, while the eastern half is within a portion of the valley with subdued, but hilly relief that slopes gently toward the southeast. No reconnaissance field surveys were conducted of the local geology, geomorphology, or paleontology.

4.3 Paleontological Resource Sensitivity

The classification of paleontological resources applied here follows the PFYC system developed by the BLM (2016) for use on public lands. The BLM system classifies geologic units into one of five broad categories (some with sub-classes) that have an increasing likelihood for containing paleontological resources from PFYC-1 to PFYC-5 (see Table 2). Rating the sensitivity of these geological formations was based on the record search, literature review, and professional judgement. Results of the analysis have been used to develop recommendations for this Project. All of the Project site and most of the gen-tie line occur on Plio-Pleistocene (QPc) alluvial rock formations.

Plio-Pleistocene Alluvium (QPc). These sediments are likely derived from the Coast Range to the west. This unit is known to contain widely scattered and scientifically significant paleontological resources. An example of this resource is the UCMP vertebrate fossil locality (V5249) described above, and located about 4 miles to the southwest. Because of the variability of fossil resource significance, abundance, and predictability in this unit, they are considered to have a moderate paleontological sensitivity (PFYC-3a).

Quaternary Alluvium (Q) and Older Alluvium (Qoa). A portion of the gen-tie line would be located on Quaternary alluvium (Q) or Older alluvium (Qoa). These units present a smaller probability of encountering fossils, and the gen-tie line requires very little surface disturbance during construction. The Pleistocene- to Holocene-aged sediments of Quaternary alluvium (Q) are too young to contain scientifically significant paleontological resources and are therefore considered to have low paleontological sensitivity (PFYC-2). The Older alluvium (Qoa) sediments can contain scattered paleontological resources, but have a low probability of containing fossils, and are therefore considered to have a low to moderate paleontological sensitivity in this area (PFYC-2 to PFYC-3a).

5.0 Evaluation Of Paleontological Resources

The surface geologic unit mapped within the Project site is Plio-Pleistocene alluvium (QPc). This unit is assessed as PFYC-3a (having moderate paleontological sensitivity), and therefore, has a moderate probability of containing fossils. The local geologic unit that stratigraphically underlies the QPc surface unit is Cretaceous sedimentary rock (Ku), which also is considered to have moderate (though little known) paleontological sensitivity (PFYC-3b). This unit has contained fossils at other locations, including the previously discussed UCMP locality IP3326 that is only 3 miles from the Project.

Only the upper of these two units (QPc) is likely to be impacted by Project activities because excavations and other surface-penetrating actions are not expected to be deep enough to reach the older unit. The depth of the QPc surface unit is not known, but may be better defined through geotechnical investigation. However, since both the QPc and Ku units have similar sensitivity classifications, the potential for encountering fossils with ground-disturbing activities is assumed to be moderate. As a result, Project development activities must anticipate the possibility of impacting scientifically significant paleontological resources.

6.0 Resource Protection

Paleontological resources are finite and nonrenewable. Fossils are important because they can provide significant information to advance our understanding of past environments, climates, species occurrence and diversity, and species response to climate change. These resources are vulnerable to impacts from ground-disturbing activities associated with development projects. Possible impacts to fossils and fossil sites due to development or other site-disturbing activities could result in a direct loss of scientific data or research potential. On-site construction activities associated with site development could impact previously undisturbed and paleontologically rich geologic deposits that may be present; in such case, potentially significant paleontological resources could be destroyed.

However, potential impacts can be evaluated by (a) assessing the likelihood that important paleontological resources will be found within the development site, and (b) considering whether protective measures are available and necessary. We have established that the Plio-Pleistocene-aged sediments found at the surface within the Project boundaries have potential for containing paleontological resources, and thus, there is potential for Project construction activity to encounter paleontological resources. Therefore, the following management and mitigation measures are recommended.

6.1 Management and Mitigation Measure Recommendations

Due to the potential for encountering paleontological resources on the Project site, the proposed mitigation measures would elevate worker awareness of paleontological resources to increase the likelihood a fossil would be recognized if unearthed.

Construction crews must be informed of the potential to encounter paleontological materials (fossils). Mitigation measures to be implemented during Project development and construction include the following:

A. ***Paleontological Worker Education and Awareness Program:*** Before starting construction activities, on-site personnel should be trained in basic recognition of fossils and appropriate procedures to notify management in order to engage a qualified paleontologist in the event that fossils are discovered during construction activities. If potential paleontological resources are unearthed while conducting construction activities for the Project, all construction work occurring within 100 feet of the find shall immediately stop.

B. ***Unanticipated Find Contingency:*** A qualified specialist, meeting the Secretary of the Interior's Professional Qualification Standards for the Society of Vertebrate Paleontology (SVP 2010), must be brought on-site to evaluate the significance of any unanticipated discovery of paleontological resources (an Unanticipated Find) and determine if additional study is warranted. If the significance of the find under CEQA or California Public Resources Code, Section 21082, does not warrant such study, the qualified paleontologist may decide to just record the find and allow work to continue. If the discovery proves significant under CEQA, additional work will be prescribed, such as preparation of a paleontological treatment plan, testing, or data recovery.

7.0 References

BLM (U.S. Bureau of Land Management). 2016. Potential Fossil Yield Classification System for Paleontological Resources on Public Lands. BLM Instruction Memorandum No. 2016-124, July 8, 2016.

Hackel, O. 1966. Summary of the Geology of the Great Valley. In Bailey. E.H., Editor, Geology of Northern California, California Division of Mines and Geology Bulletin 190.

Helley, E. J. and Harwood, D. S. 1985. Geologic map of late Cenozoic deposits of the Sacramento Valley and northern Sierran foothills, California: U.S. Geological Survey Miscellaneous Field Studies Map MF-1790, 5 plates, scale 1:62,500, 1 pamphlet, 24 p. URL: http://pubs.usgs.gov/mf/1985/ 1790/.

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Irwin, W.P. 1960. Geologic Reconnaissance of the northern Coast Ranges and Klamath Mountains, California, with a summary of the mineral resources: California Division of Mines Bulletin 179, Plate 1, Geologic map of northwestern California, scale 1:500,000.

Jennings, C. W. and Strand, R. G. 1960. Geologic Map of California, Olaf P. Jenkins Edition, Ukiah Sheet. 1:250,000. California Geological Survey. https://www.conservation.ca.gov/cgs/maps-data/rgm.

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Norris, R. M., and Webb, R.W. 1990. Geology of California. 2d ed. New York: John Wiley & Sons.

SVP (Society of Vertebrate Paleontology). 2010. Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources. Society of Vertebrate Paleontology, 1– 11.

UCMP (University of California Museum of Paleontology). 2021. UCMP Online Database. URL: http://ucmpdb.berkeley.edu/loc.html. Accessed June 16, 2021.

8.0 ATTACHMENTS

Figure 1. Project Location

Figure 2. Project Site

Figure 3. Geology Map

Table 1. Geologic Time and Rock Formations in the Project Area

Table 2. Paleontological Resource Sensitivity and Management

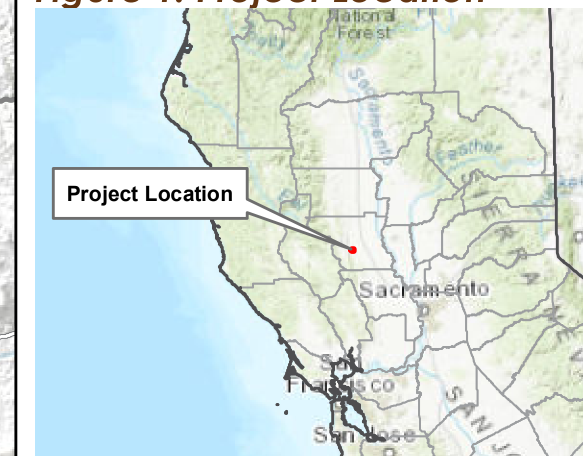
Attachments

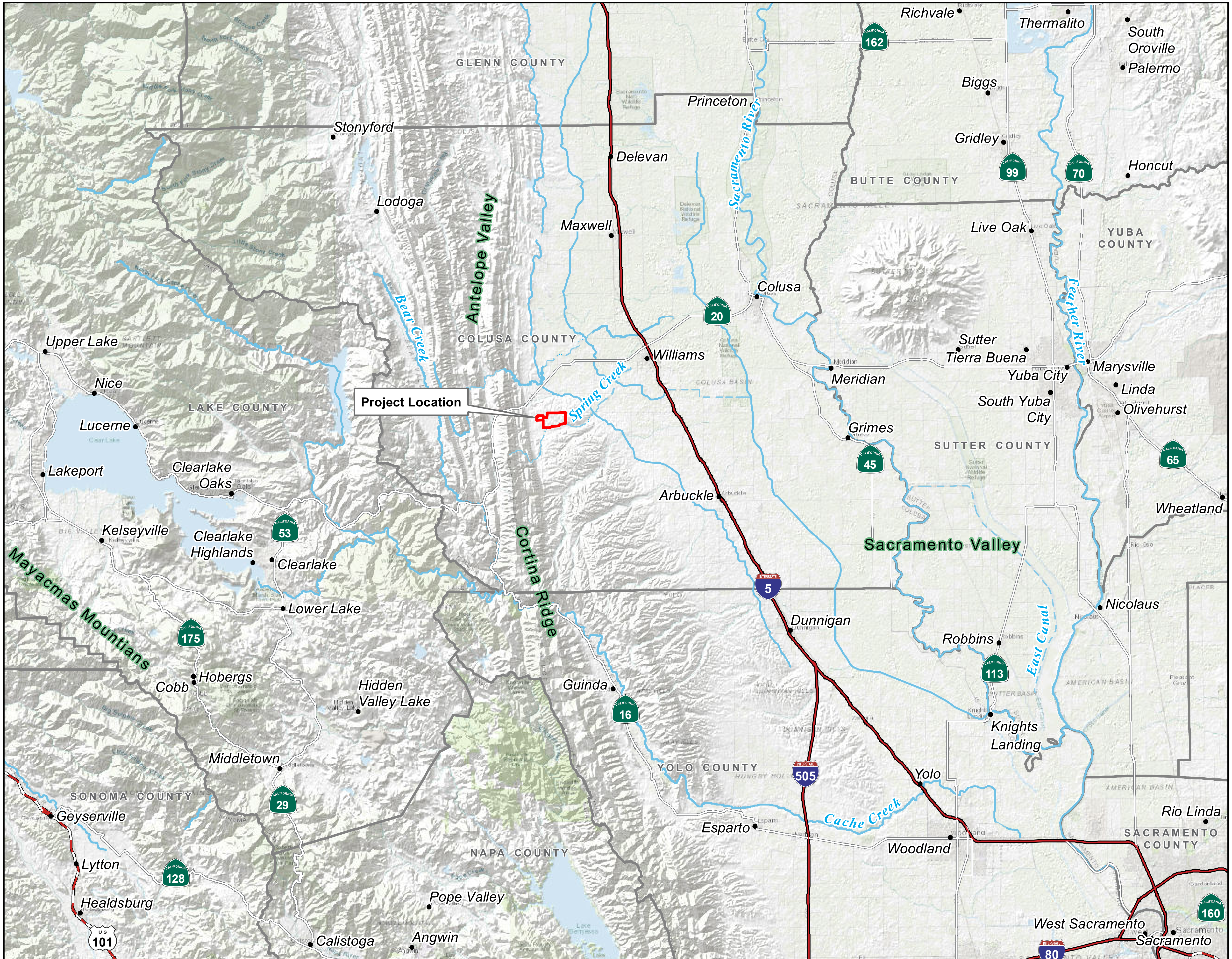
Janus Solar Project

Colusa County, CA

Paleontology Technical Memorandum

Figure 1: Project Location





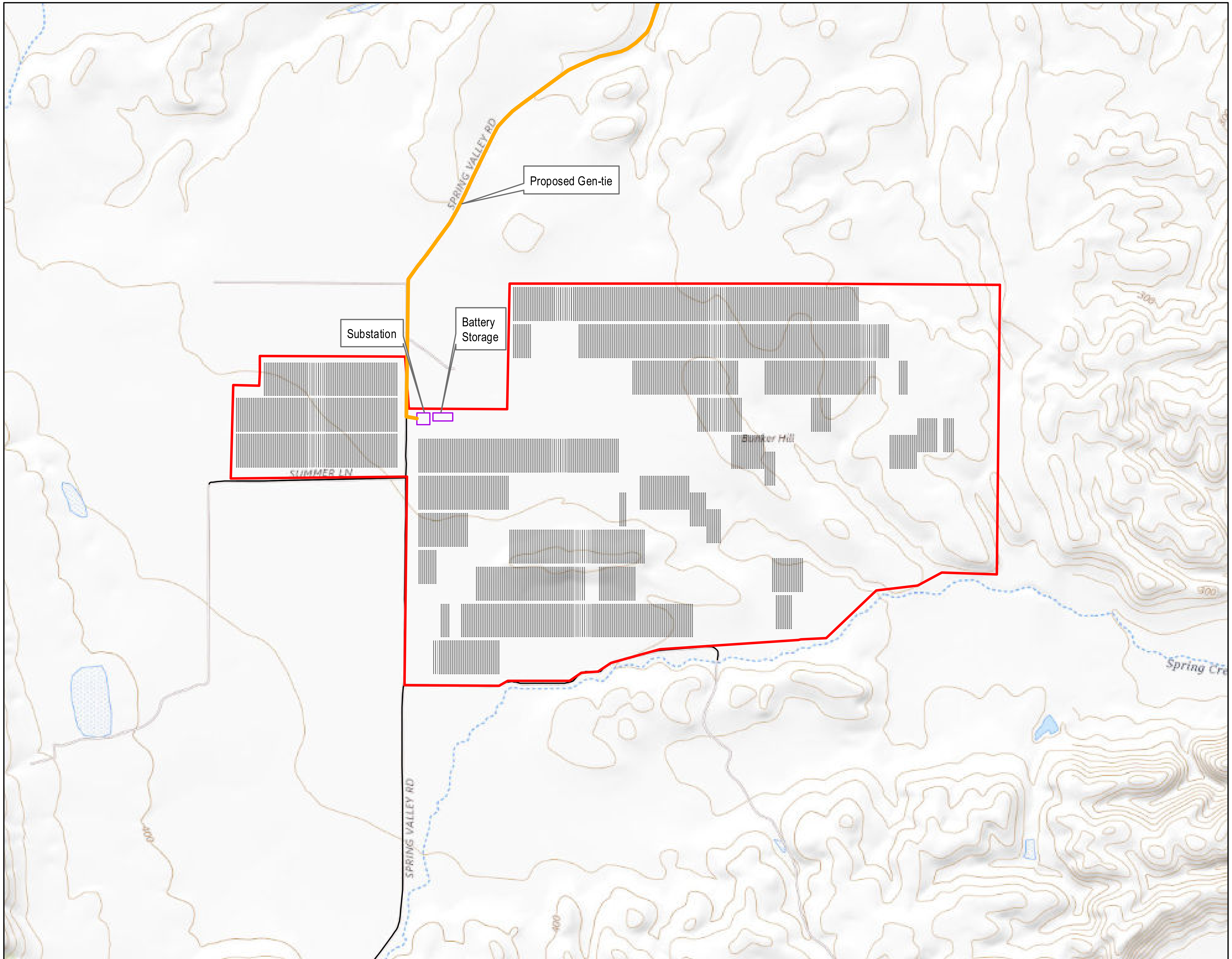
	Project Site
	County Boundary
Transportation	
	Interstate
	State Highway
Hydrology	
	Major River or Creek

0 5 10 Miles

Scale is 1:400,000 when printed at 11"x17"

NOT FOR CONSTRUCTION

Document Path: P:\17055_JanusSolar_RWE_CA\GIS\Layouts\Paleo_Report\Project_Location.mxd



Janus Solar Project

Colusa County, CA

Paleontology Technical Memorandum

Figure 2: Project Site

Project Area

Solar Array

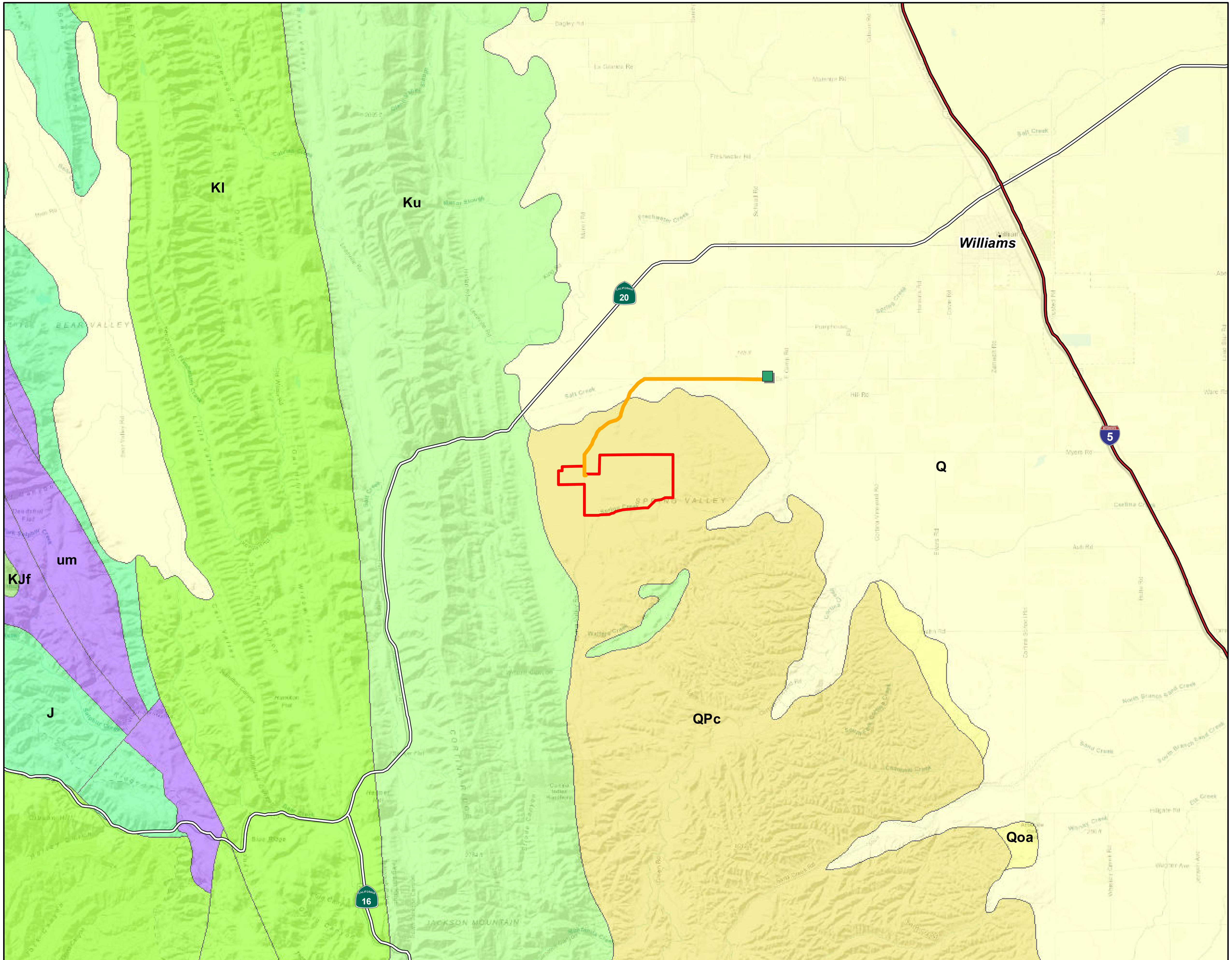
Substation and Battery Storage

Proposed Gen-tie

0 0.25 0.5 Miles

Scale is 1:15,000 when printed at 11"x17"

NOT FOR CONSTRUCTION



Janus Solar Project

Colusa County, CA

Paleontology Technical Memorandum
Figure 3: Geology Map

Project Area

Geologic Map Units

- Q – Quaternary alluvium
- Qoa – Older alluvium
- QPc – Plio-Pleistocene alluvium
- Ku – Cretaceous sedimentary rock
- Kl – Lower Cretaceous sedimentary rock
- KJf – Franciscan Complex
- J – Jurassic Marine Sedimentary Rock
- Um – Mesozoic plutonic rock

Geologic Map Source: Jennings, et al. 2010

0 1 2 4 Miles

Scale is 1:100,000 when printed at 11"x17"

NOT FOR CONSTRUCTION

TABLE 1. Geologic Units Represented in the Project Area

Eon	Era	Period	Epoch	Time Range (mya)			Present in Project Area Alluvial	Plutonic
Phanerozoic	Cenzoic	Quaternary	Holocene	0.00	to	0.01	Q	
			Pleistocene	0.01	to	2.58	Qoa	
		Neogene	Pliocene	2.58	to	5.33	QPc	
			Miocene	5.33	to	23.03		
		Paleogene	Oligocene	23.03	to	33.90		
			Eocene	33.90	to	56.00		
			Paleocene	56.00	to	66.00		
	Mesozoic	Cretaceous	Upper	66.00	to	100.50	Ku	um
			Lower	100.50	to	145.00	Kl, KJf	um
		Jurassic	Upper	145.00	to	163.50	KJf, J	um
			Middle	163.50	to	174.10	J	um
			Lower	174.10	to	201.30	J	um
		Triassic	Upper	201.30	to	237.00		
			Middle	237.00	to	247.20		
			Lower	247.20	to	251.90		
	Paleozoic	Permian		251.90	to	298.90		
		Cabiniferous		298.90	to	358.90		
		Devonian		358.90	to	419.20		
		Silurian		419.20	to	443.80		
		Ordovician		443.80	to	458.40		
		Cambrian		458.40	to	541.00		
Proterozoic	Neoproterozoic			541.00	to	1000.00		
	Mesoproterozoic			1000.00	to	1600.00		
	Paleoproterozoic			1600.00	to	2500.00		
Archean	Neoarchean			2500.00	to	2800.00		
	Mesoarchean			2800.00	to	3200.00		
	Paleoarchean			3200.00	to	3600.00		
	Eoarchean			3600.00	to	4000.00		
Hadean				4000.00	to	4600.00		

Q	**Quaternary alluvium (Pleistocene-Holocene).** Marine and non-marine (i.e. continental) sedimentary rocks - Alluvium, lake, playa, and terrace deposits; unconsolidated and semi-consolidated. Mostly non-marine.
Qoa	**Older alluvium (Pleistocene).** Marine and non-marine (i.e. continental) sedimentary rocks - Older alluvium, lake, playa, and terrace deposits.
QPc	**Plio-Pleistocene alluvium.** Non-marine (i.e. continental) sedimentary rocks (Pleistocene-Holocene) - Pliocene and/or Pleistocent sandstone, shale, and gravel deposits; mostly loosely consolidated.
Ku	**Sedimentary rock (Upper Cretaceous)**. Marine sedimentary and metasedimentary rocks - sandstone, shale, and conglomerate.
Kl	**Sedimentary rock (Lower Cretaceous).** Marine sedimentary and metasedimentary rocks - sandstone, shale, and conglomerate.
KJf	**Franciscan complex (Cretaceous-Jurassic).** Marine sedimentary and metasedimentary rocks - sandstone with smaller amounts of shale, chert, limestone, and conglomerate. Includes Franciscan melange, except where separated.
J	**unspecified (Jurassic).** Marine sedimentary and metasedimentary rocks - Shale, sandstone, minor conglomerate, chert, slate, limestone; minor pyroclastic rocks.
um	**Plutonic rock (Mesozoic).** Plutonic rocks - Ultramafic rocks, mostly serpentine. Minor peridotite, gabbro, and diabase.

TABLE 2. Paleontological Resource Sensitivity and Management

Sensitivity Class	Description	Management Considerations
Class 1 – Very Low (PFYC-1)	Includes geologic units that are not likely to contain recognizable fossil remains. • Units that are igneous or metamorphic, excluding reworked volcanic ash units. • Units that are Precambrian in age or older. The probability for impacting any fossils is negligible.	1) Concern for paleontological resources is usually negligible or not applicable. 2) Assessment or mitigation is usually unnecessary except in very rare or isolated circumstances. 3) Assessment or mitigation of paleontological resources is usually unnecessary. 4) The occurrence of significant fossils is non-existent or extremely rare.
Class 2 – Low (PFYC-2)	Includes sedimentary geologic units that are not likely to contain vertebrate fossils or scientifically significant nonvertebrate fossils. • Vertebrate or significant invertebrate or plant fossils not present or very rare. • Units that are generally younger than 10,000 years before present. • Recent aeolian deposits. • Sediments that exhibit significant physical and chemical changes (i.e., diagenetic alteration). The probability for impacting vertebrate fossils or scientifically significant invertebrate or plant fossils is low.	1) Concern for paleontological resources is generally low. 2) Assessment or mitigation is usually unnecessary except in rare or isolated circumstances. 3) Assessment or mitigation of paleontological resources is not likely to be necessary. 4) Localities containing important resources may exist but would be rare and would not influence the classification. 5) These important localities would be managed on a case-by-case basis.
Class 3 Moderate	Includes fossiliferous sedimentary geologic units where fossil content varies in significance, abundance, and predictability; or sedimentary units of unknown fossil potential.	1) Concern for paleontological resources is moderate; or cannot be determined from existing data. 2) Surface-disturbing activities may require field assessment to determine appropriate course of action. 3) This classification includes geologic units of unknown potential, as well as units of moderate or infrequent occurrence of significant fossils. 4) Management considerations cover a broad range of options as well, and could include pre-disturbance surveys, monitoring, or avoidance. 5) Surface-disturbing activities will require sufficient assessment to determine whether significant paleontological resources occur in the area of a proposed action, and whether the action could affect the paleontological resources. 6) These units may contain areas that would be appropriate to designate as hobby collection areas due to the higher occurrence of common fossils and a lower concern about affecting significant paleontological resources.
a – Moderate ***(PFYC-3a)***	Includes units that are known to contain vertebrate fossils or scientifically significant nonvertebrate fossils, but these occurrences are widely scattered. Common invertebrate or plant fossils may be found in the area, and opportunities may exist for hobby collecting. The potential for a project to be sited on or impact a significant fossil locality is low but is somewhat higher for common fossils. • Often marine in origin with sporadic known occurrences of vertebrate fossils. • Vertebrate fossils and scientifically significant invertebrate or plant fossils known to occur intermittently; predictability known to be low.	
b – Unknown ***(PFYC-3b)***	Includes units that exhibit geologic features or indicate conditions suggesting significant fossils could be present, but little information about the paleontological resources of the unit or the area has been recorded. This may indicate the unit or area is poorly studied, and field surveys may uncover significant finds. The units in this Class may eventually be placed in another Class when sufficient survey and research is performed. The unknown potential of the units in this Class should be carefully considered when developing any mitigation or management actions. • Poorly studied and/or poorly documented. Potential yield cannot be assigned without ground reconnaissance.	

TABLE 2. Paleontological Resource Sensitivity and Management

Sensitivity Class	Description	Management Considerations
Class 4 - High	Includes geologic units containing a high occurrence of significant fossils. Vertebrate fossils or scientifically significant invertebrate or plant fossils are known to occur and have been documented but may vary in occurrence and predictability. Surface disturbing activities may adversely affect paleontological resources in many cases.	1) Management concern for paleontological resources is moderate to high, depending on the proposed action. 2) A field survey by a qualified paleontologist is often needed to assess local conditions. 3) Management prescriptions for resource preservation and conservation through controlled access or special management designation should be considered. 4) Class 4 and Class 5 units may be combined as Class 5 for broad applications, such as planning efforts or preliminary assessments, when geologic mapping at an appropriate scale is not available. 5) Resource assessment, mitigation, and other management considerations are similar at this level of analysis and impacts and alternatives can be addressed at a level appropriate to the application. 6) Mitigation considerations must include assessment of the disturbance, such as removal or penetration of protective surface alluvium or soils, potential for future accelerated erosion, or increased ease of access resulting in greater looting potential. 7) If impacts to significant fossils can be anticipated, on-the-ground surveys prior to authorizing the surface disturbing action will usually be necessary. 8) On-site monitoring or spot-checking may be necessary during construction activities.
a – Exposed ***(PFYC-4a)***	Includes units that are exposed with little or no soil or vegetative cover. Outcrop areas are extensive with exposed bedrock areas often larger than two acres. Paleontological resources may be susceptible to adverse impacts from surface disturbing actions. Illegal collecting activities may impact some areas.	
b – Covered ***(PFYC-4b)***	Includes areas underlain by geologic units with high potential but have lowered risks of human-caused adverse impacts and/or lowered risk of natural degradation due to moderating circumstances. The bedrock unit has high potential, but a protective layer of soil, thin alluvial material, or other conditions may lessen or prevent potential impacts to the bedrock resulting from the activity. • Extensive soil or vegetative cover; bedrock exposures are limited or not expected to be impacted. • Areas of exposed outcrop are smaller than two contiguous acres. • Outcrops form cliffs of sufficient height and slope so that impacts are minimized by topographic conditions. • Other characteristics are present that lower the vulnerability of both known and unidentified paleontological resources. The probability for impacting significant paleontological resources is moderate to high and is dependent on the proposed action.	
Class 5 – Very High	Highly fossiliferous geologic units that consistently and predictably produce vertebrate fossils or scientifically significant invertebrate or plant fossils, and that are at risk of human-caused adverse impacts or natural degradation. The probability for impacting significant fossils is high.	1) Management concern for paleontological resources is high to very high. 2) A field survey by a qualified paleontologist is usually necessary prior to surface disturbing activities or land tenure adjustments. Mitigation will often be necessary before and/or during these actions. 3) Official designation of areas of avoidance, special interest, and concern may be appropriate. 4) Vertebrate fossils or scientifically significant invertebrate fossils are known or can reasonably be expected to occur in the impacted area. 5) On-the-ground surveys prior to authorizing any surface disturbing activities will usually be necessary. 6) On-site monitoring may be necessary during construction activities.
a – Exposed ***(PFYC-5a)***	Unit is exposed with little or no soil or vegetative cover. Outcrop areas are extensive with exposed bedrock areas often larger than two contiguous acres. Paleontological resources are highly susceptible to adverse impacts from surface disturbing actions. Unit is frequently the focus of illegal collecting activities.	
b – Covered ***(PFYC-5b)***	Areas underlain by geologic units with very high potential but lower risks of human-caused adverse impacts and/or lowered risk of natural degradation due to moderating circumstances. Bedrock unit has very high potential, but protective layer of soil, thin alluvial material, or other conditions may lessen or prevent potential impacts to the bedrock resulting from the activity. • Extensive soil or vegetative cover; bedrock exposures limited or not likely impacted. • Areas of exposed outcrop are smaller than two contiguous acres. • Exposure impacts are minimized by topographic conditions. • Other characteristics lower vulnerability of known/unidentified paleontological resources.	

To: Greg Plucker, Community Development Director, Colusa County

From: Jennifer Merrick, Senior Technical Advisor, Tetra Tech, Inc.

Cc: Anna Shamey, Project Manager, Tetra Tech, Inc.

Date: August 15, 2024

Subject: Addendum to the Paleontological Resources Technical Memorandum for the Janus Solar Project, Colusa County, California

1.0 INTRODUCTION

In July 2021, Tetra Tech prepared a technical memorandum for paleontological resources for the Janus Solar Project (Project). In 2021, the Project was sited on three parcels with Assessor Parcel Numbers (APN) 018-050-005-000, 018-050-006-000, and 018-050-013-000, which are 630.5, 255.7, and 137.7 acres in size, respectively, for a total area of approximately 1,024 acres. The Project also included a 4-mile-long generation interconnect (gen-tie) line to connect to the electrical grid at the existing Cortina Substation. In 2024, the Project was re-designed, removing parcel 018050-013-000 and reducing the Project site size to approximately 886 acres, with the 4-mile-long gen-tie line.

2.0 PALEONTOLOGICAL RESOURCES

The paleontological resources evaluation provided by the 2021 technical memorandum followed the guidelines of significance criteria specified by the U.S. Bureau of Land Management (BLM) in their Potential Fossil Yield Classification (PFYC) system for assessing paleontological resources. Additionally, a review of published geological maps and literature identified surface and subsurface geologic units within the Project vicinity. Geologic units provide an indication of paleontological sensitivity and the potential for impacting non-renewable paleontological resources by Project development.

The University of California Museum of Paleontology (UCMP) conducted a search for records of fossil localities found within local geologic units in Colusa County. No records of fossil localities occurred directly within the Project site; however, an invertebrate fossil locality was located about 3 miles northwest of the Project area, and a vertebrate fossil was located 4 miles southeast of the Project site along Cortina Creek. As the Project no longer includes the western parcel (APN 018-050-013-000), the invertebrate fossil locality is now approximately 3.5 miles northwest of the Project site. The vertebrate fossil remains 4 miles southeast of the reconfigured Project site.

Known land histories and a review of aerial imagery from 1985 through 2018 revealed that the western parcel (APN 018-050-013-000) and the southwestern half of the central parcel (APN 018-050-005-000) of the initial Project site were used for cultivation at various times throughout the time period. However, as the re-designed Project site no longer includes the western parcel, the history of cultivation is now limited to the southwestern

Tetra Tech, Inc.
17885 Von Karman Avenue, Suite 500, Irvine, CA 92614
Tel +1.949.809.5000 **Cell** +1. 949.809.5010 | tetratech.com

half of the central parcel. The northeastern half of the central parcel and the eastern parcel (APN 018-050-006-000) did not appear to have had significant ground disturbance over the time period.

The entirety of the Project site and most of the gen-tie line occur on the PFYC system geological unit classification of Plio-Pleistocene (QPc) alluvial rock formations. This unit is known to contain widely scattered and scientifically significant paleontological resources. Due to the variability of fossil resource significance, abundance, and predictability in this unit, it is considered to have a moderate paleontological sensitivity (PFYC-3a). A portion of the gen-tie line would be located on Quaternary alluvium (Q) or older alluvium (Qoa). The Q geologic unit is considered too young to contain scientifically significant paleontological resources and is thus considered to have a low paleontological sensitivity (PFYC-2). Older alluvium (Qoa) sediments contain scattered paleontological resources, but have a low probability of containing fossils, and are therefore considered to have a low to moderate paleontological sensitivity in this area (PFYC-2 to PFYC-3a). These units present a smaller probability of encountering fossils, considering the construction of the gen-tie line would cause very little surface disturbance. Despite the reduction of ground disturbance due to the decreased acreage of the Project site, the possibility remains that development activities could encounter QPc alluvial rock formations and scientifically significant paleontological resources.

3.0 CONCLUSION

The re-designed Project site of 886 acres would decrease the amount of ground disturbance originally determined in the 2021 technical memorandum, thus lessening the potential for encountering paleontological resources. However, it is recommended that mitigation measures be implemented to elevate worker awareness of paleontological resources to increase the likelihood a fossil would be recognized if unearthed. The mitigation measures recommended for the Project development and construction include:

A. ***Paleontological Worker Education and Awareness Program***: Before starting construction activities, on-site personnel should be trained in basic recognition of fossils and appropriate procedures to notify management to engage a qualified paleontologist in the event that fossils are discovered during construction activities. If potential paleontological resources are unearthed while conducting construction activities for the Project, all construction work occurring within 100 feet of the find shall immediately stop.

B. ***Unanticipated Find Contingency:*** A qualified specialist, meeting the Secretary of the Interior’s Professional Qualification Standards for the Society of Vertebrate Paleontology (SVP 2010), must be brought on-site to evaluate the significance of any unanticipated discovery of paleontological resources (an Unanticipated Find) and determine if additional study is warranted. If the significance of the find under CEQA or California Public Resources Cod, Section 21082, does not warrant such study, the qualified paleontologist may decide to just record the find and allow work to continue. If the discovery proves significant under CEQA, additional work will be prescribed, such as preparation of a paleontological treatment plan, testing, or data recovery.

APPENDIX G
PHASE I ENVIRONMENTAL SITE ASSESSMENT AND HAZARD MITIGATION ANALYSIS

Draft Phase I Environmental Site Assessment Report

RWE Solar Development, LLC
Janus Solar and Battery Storage Project, Colusa County, CA

Prepared for

RWE Solar Development, LLC
20 California Street, Suite 500
San Francisco, CA 94111

Prepared by

TETRA TECH
17885 Von Karman Ave, Suite 500
Irvine, CA 92614

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EXECUTIVE SUMMARY

This Phase I Environmental Site Assessment (ESA) was conducted by Tetra Tech, Inc. (Tetra Tech) for RWE Solar Development, LLC (Client / User). This Phase I ESA was performed in general accordance with the Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process for Forestland or Rural Property, ASTM International (ASTM) Designation: E2247-16, for a rural property located in Williams, Colusa County, California (Subject Property). This Phase I ESA was conducted as part of the due diligence for the planned development of a solar energy generation and battery energy storage facility. The Subject Property has been owned and operated by Paul and Rex Favero since 1984 and is currently used as a cattle ranch. The Subject Property had reportedly operated as a cattle ranch prior to the Favero ownership. The Subject Property information is described in **Table ES-1**.

Table ES-1. Property Information

Item	Description
Subject Property Name	Favero Ranch
Street Address	1958 Spring Valley Road, Williams, CA 95987
City	Williams
County	Colusa
State	California
Parcel Number(s)	018-050-005-000, 018-050-006-000
Acres	886
Owner	Paul and Rex Favero
Current Use	Cattle Ranch, Rangeland, Agriculture

The purpose of this assessment is to determine whether hazardous substances or petroleum products have been released in, on, or at the Subject Property under conditions that would represent a recognized environmental condition (REC).

The subsections below summarize findings of the environmental conditions in connection with the Subject Property based on information collected during the ESA. The findings may include RECs, controlled recognized environmental conditions (CREC), historical recognized environmental conditions (HREC), *de minimis* conditions, and significant data gaps. The conditions and findings discovered in this ESA are dependent on the regulatory status review, historical file review, user provided information, and the site reconnaissance conducted for the Subject Property. Definitions of environmental conditions are provided in **Section 1.1**.

RECs

No RECs were identified during the completion of this Phase I ESA.

CRECs

No CRECs were identified during the completion of this Phase I ESA.

HRECs

No HRECs were identified during the completion of this Phase I ESA.

De Minimis Conditions

The following *de minimis* condition was identified:

- Staining was observed on the soil ground surface beneath the aboveground storage tanks containing petroleum fuel products, located within the Favero Ranch Corral of the Subject Property. Staining was observed directly beneath gasoline and diesel fueling areas. Since the staining appeared to be surficial, did not appear to present a threat to human health or the environment, and would not likely require enforcement action if brought to the attention of appropriate governmental agencies, it is considered a *de minimis* condition.

Significant Data Gaps

No significant data gaps were identified during the completion of this Phase I ESA.

1.0 INTRODUCTION

On May 31, 2024, Tetra Tech was authorized by Alex Salas on behalf of RWE Solar Development, LLC (RWE/User/Client), to conduct a Phase I Environmental Site Assessment (ESA) of the Favero Ranch herein referred to as the "Subject Property." This evaluation was conducted in accordance with Tetra Tech's Proposal dated April 19, 2024. This Phase I ESA was conducted as part of the due diligence for the planned development of a solar energy generation and battery energy storage facility.

The Subject Property is known as Favero Ranch and is located at 1958 Spring Valley Road, Williams, California (see **Figure 1**, Site Vicinity Map). According to the tax parcel information provided on the Colusa County Property Records website, the property consists of 886 acres and includes two parcels of land. The two parcels are designated by the Colusa County Board of Assessment as Parcel Identification Numbers 018-050-005-000 (630.5 acres) and 018-050-006-000 (255.7 acres) (see **Figure 2**, Site Reconnaissance Map). A legal description was not provided by RWE. Photographic documentation of the site reconnaissance is presented in **Appendix A**.

The Subject Property is improved with multiple structures for rural residential use. The residential buildings appeared to be constructed with wood exterior walls above raised foundations with either metal or composite shingle roofing. Only the exterior of structures on the Subject Property were observed. The Subject Property is accessed from Spring Valley Road along the western property boundary. The parking areas primarily consisted of unpaved roads; patches of asphalt paved over soil were observed. The public utility company, Pacific Gas and Electric, provides electrical utilities to the Subject Property. Local municipalities provide non-hazardous waste disposal services.

The Subject Property currently operates as Favero Ranch, a cattle ranch primarily composed of rangeland.

1.1 Purpose

The purpose of this ESA is to identify whether recognized environmental conditions (RECs), historical recognized environmental conditions (HRECs), controlled recognized environmental conditions (CRECs), or *de minimis* conditions are present on the Subject Property. RECs are (1) the presence of hazardous substances or petroleum products in, on, or at the Subject Property due to a release to the environment; (2) the likely presence of hazardous substances or petroleum products in, on, or at the Subject Property due to a release or likely release to the environment; or (3) the presence of hazardous substances or petroleum products in, on, or at the Subject Property under conditions that pose a material threat of a future release to the environment. HRECs are a previous release of hazardous substances or petroleum products affecting the Subject Property that have been addressed to the satisfaction of the applicable regulatory authority or authorities and meeting unrestricted use criteria established by the applicable regulatory authority or authorities without subjecting the Subject Property to any controls. An HREC is not a REC. CRECs are recognized environmental conditions affecting the Subject Property that have been addressed to the satisfaction of the applicable regulatory authority or authorities with hazardous substances or petroleum products allowed to remain in place subject to implementation of required controls. A *de minimis* condition is a condition related to a release that generally does not present a threat to human health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies. A condition determined to be a condition is not a REC nor a CREC.

This ESA is intended to satisfy one of the requirements for the innocent landowner defense to Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) liability: that is, the practices that constitute "all appropriate inquiry into the previous ownership and uses of the Subject Property consistent with good customary practice," as defined in 42 U.S. Code Section 9601 (35)(B).

1.2 Detailed Scope of Services

The scope of work (SOW), based on ASTM E2247-16, *Environmental Site Assessments: Phase I Environmental Site Assessment Process for Forestland or Rural Property*, is to identify whether RECs are present on the Subject Property. Phase I ESAs typically are conducted in a four-phase process, including: records review; site reconnaissance; interviews with current owners, occupants of the Subject Property, and local government agencies; and preparation of a report.

Report limitations are provided in **Section 1.4**. Deviations from ASTM E2247-16 are described in **Section 1.6.**

In addition to the site reconnaissance, readily available resources including, but not limited to, soil surveys, Subject Property maps, aerial photographs, U.S. Geological Survey (USGS) topographic maps, and regulatory records were reviewed. A listing of referenced documents utilized during this assessment is provided in **Section 9**.

ASTM E2247-16 establishes a 180-day viability period for Phase I ESA reports. The 180-day period commences upon the earliest date of five specific components of the report. The component dates and report viability date are summarized in **Table 1-1**.

Table 1-1. Component Dates

Phase I Environmental Site Assessment Task	Date
Date of Initial Interview(s) of Past and Present Owners and Occupants	July 9, 2024
Date of Initial Regulatory Record Reviews	July 3, 2024
Date of Visual Inspection(s) of Subject Property and Adjoining Properties	June 27, 2024
Earliest Date of Interviews, Record Reviews, and Inspections	June 27, 2024
Report Viability (expiration) Date	December 24, 2024

1.3 Significant Assumptions

In conducting the Phase I ESA, Tetra Tech assumes that all information obtained from others for the Subject Property is correct and complete. Additionally, Tetra Tech assumes that the client and/or the current owner(s) and/or occupants within the Subject Property have provided Tetra Tech with all reasonably ascertainable prior environmental information concerning the Subject Property. Tetra Tech assumes that the User will read this report in its entirety.

1.4 Limitations

This Phase I ESA Report was prepared according to the scope of work approved by RWE under the terms and conditions defined in the contract between RWE and Tetra Tech. This report is intended for the sole and exclusive use of RWE. No other party is granted Reliance on this report without the express written consent of RWE and the execution of a Reliance Letter agreement between that party and Tetra Tech. To avoid any ambiguity, proper execution of a Reliance Letter in a form acceptable to Tetra Tech is a condition precedent to third-party reliance on the Report.

This Phase I ESA was performed in general accordance with ASTM Standard E2247-16 and current, generally accepted practices and standards of care, consistent with the level of care and skill exercised under similar circumstances by other professional consultants or firms performing the same, or similar, services. Tetra Tech notes that no environmental standard can eliminate the role of professional judgment and that other parties may reach different conclusions. Therefore, this section identifies limitations associated with this Phase I ESA.

An ASTM Standard E2247-16 Phase I ESA is not a comprehensive site assessment and should not be construed as such. This report presents opinions that are based on the findings of visually observable on- and off-site conditions at the time of the site visit, a review of specific records and historical sources, and comments made by interviewees. The lack of evidence of RECs does not guarantee the absence of such conditions; rather, it indicates that none were identified as a result of the Phase I ESA scope of services implemented and the conditions at the time the work was completed. This Phase I ESA is subject to the limitations cited in ASTM Standard E2247-16, including the limited period of viability of 180 days (as identified in **Table 1-1** in **Section 1.2**).

Unless specifically cited in this report, any conclusions associated with subsurface soil, soil vapor, and/or groundwater impacts, are limited to those that can be formed based on a review of the listed records, interviews with the listed individuals, visual observations at the time of inspection of the Subject Property, if applicable, and non-intrusive investigation.

This report and its findings are based on information from standard sources that are reasonably ascertainable (publicly available, readily obtainable within a reasonable time and cost, and practically reviewable). Tetra Tech has attempted to ascertain, but does not guarantee, the authenticity or reliability of information it has received from outside sources. Sources used in this report are cited in the text and in the listed as references in **Section 9**.

This Phase I ESA's limited scope of services precludes Tetra Tech from providing a warranty or guarantee regarding the presence or absence of hazardous substances or petroleum products that could potentially affect the property. None of the work performed constitutes, nor should be represented as, a legal opinion of any kind or nature, but is a representation of professional findings of fact based on the information examined. Implementation or use of the findings or conclusions of this report does not preclude the potential for present or future environmental liability.

1.5 Exceptions

At the client's request, the building occupants were not interviewed.

1.6 Limiting Conditions/Deviations

There were no limiting conditions, deletions, or deviations from ASTM E2247-16.

1.7 Special Terms and Conditions

This ESA was conducted by Tetra Tech on behalf of RWE and was authorized by Alex Salas of RWE.

1.8 User Reliance

The Client is the only party that has been involved in defining the scope of services needed to satisfactorily manage its risks. The Client is the only intended beneficiary of this report. Reliance on this report by parties other than the client may result in reliance on assumptions whose extent and nature could distort the meaning and impact of the findings given in this report. As such, no party, except the Client, should rely upon estimates for the potential of hazardous materials to exist at the Subject Property. With the consent of the client, Tetra Tech is available to work with other parties in developing probability estimates, assuming mutually agreed contract terms, given other parties unique risk management concerns. The guidelines used to define hazardous substances and petroleum products were obtained from the ASTM Standard of Practice E2247-16. For the purposes of this report, the surrounding vicinity of the Subject Property is defined as properties located within approximately 500 feet of the Subject Property.

2.0 USER PROVIDED INFORMATION

The following sections summarize information provided by RWE, also identified as the User of this ESA. Tetra Tech provided an environmental User Questionnaire to Alex Salas with RWE Solar Development, LLC. The completed questionnaire is provided in **Appendix B**.

2.1 Title Records

No title records for the Subject Property were provided by RWE.

2.2 Environmental Liens and Activity and Use Limitations

Environmental liens and activity and use limitations (AULs) information was evaluated as part of this ESA. The Subject Property was not listed on the National Priority List (NPL) Liens, Liens, CERCLA Liens Information, or Deed Restriction Listings databases searched by Environmental Risk Information Services of Toronto, Ontario, Canada (ERIS). The ERIS Database Report is included in **Appendix C**.

2.3 Specialized Knowledge

According to the Subject Property representative and User Questionnaire, RWE has no specialized knowledge regarding or experience that is material to RECs associated with the Subject Property.

2.4 Actual Knowledge

According to the Subject Property representative and User Questionnaire, RWE has no actual knowledge of any environmental lien or AULs encumbering the Subject Property or in connection with the Subject Property,

2.5 Valuation Reduction for Environmental Issues

RWE has no knowledge of valuation reduction for environmental issues associated with the Subject Property.

2.6 Commonly Known or Reasonably Ascertainable Information

RWE did not provide any other commonly known or reasonably ascertainable information regarding potential RECs.

2.7 Degree of Obviousness

RWE is not aware of any obvious indications of the presence or likely presence of releases or threatened releases at the Subject Property.

2.8 Other

According to RWE, this Phase I ESA was requested as part of a real estate transaction.

3.0 SITE RECONNAISSANCE

The purpose of the site reconnaissance is to collect information and make observations to help identify RECs, CRECs, HRECs, and *de minimis* conditions in connection with the Subject Property.

3.1 Observation

The Subject Property comprises two parcels occupying a total of approximately 886 acres of land and is identified with the addresses of 1958 Spring Valley Road, Williams CA 95987. The Subject Property is situated within an area predominately composed of undeveloped grasslands with a historical use of cattle rangeland.

The Subject Property site visit was conducted on June 27, 2024, by Jack Gordon, with Tetra Tech. At the time of the site reconnaissance, the weather was sunny, 67 degrees Fahrenheit, and visibility was good.

Multiple residential structures and outbuildings on the Subject Property areas were observed from the exterior.

3.2 Methodology

The Subject Property is accessed from Spring Valley Road on the western Subject Property boundary.

The Subject Property site reconnaissance consisted of a walk-through of target areas within the Subject Property, a grid-pattern pedestrian reconnaissance of the perimeter area of the Subject Property, and a curbside review of adjacent properties to determine the presence of possible fuel tanks, drums, or other objects of potential environmental concern. The periphery of structures on the Subject Property were visibly observed. The interior of structures at the Subject Property were not observed.

The majority of the site reconnaissance involved observing the conditions of the facility located in the northwestern corner of the Subject Property, herein referred to as the Favero Ranch Corral Area. (**Figure 2**). The majority of the Subject Property was accessed by passing through the Favero Ranch Corral Area through unpaved roads.

3.3 Observations

The Subject Property comprises two parcels (Assessor Parcel Numbers [APN] 018-050-005-000 and 018-050-006-000) occupying a total of approximately 886 acres of land and is identified with the addresses of 1958 Spring Valley Road, Williams CA 95987. The Subject Property is situated within an area of predominately undeveloped grasslands with a historical use as a cattle ranch and rangeland.

The Favero Ranch Corral Area within the Subject Property contains multiple structures, including residential rural homesteads, several open-air garages or outbuildings, a warehouse structure, and corral areas used for cattle, with a known historical and current use of cattle ranching (**Figure 3,** Favero Ranch Corral Area). Heavy equipment and vehicles utilized for cattle ranching purposes were observed within the open-air garages and maintenance building.

Table 3-1 summarizes the Subject Property exterior observations. Affirmative responses are discussed in detail following the table.

Table 3-1. Subject Property Exterior Observations

Feature	Observed
Storage Tanks	**Yes**
Drums, Barrels, Totes and/or Containers > 5 gallons	**Yes**
Unidentified Substance Containers	No
Chip Hoppers	No
Hazardous or Petroleum Waste Streams	No
Underground Storage Tanks	No
Fuel Dispensers	No
Sumps or Cisterns	No
On- Subject Property septic or sewage treatment	No
Oil/Water Separators	No
Floor Drains, Trench Drains, etc.	No
Pipeline Markers	No
Stressed Vegetation	No
Stained Soil or Pavement	No
Pad or Pole Mounted Transformers and/or Capacitors	No
PCB-Containing Equipment	No
Wells (Drinking, irrigation, water supply, injection, abandoned, monitoring, dry, or other wells)	No
Trash compactor	No
Soil Piles of Unknown Origin	No
Back-up power generator(s)	No
Cooling Towers	No
Exterior Dumpsters with Staining	No
Leachate or Other Waste Seeps	No
Trash, Debris, or Other Waste Materials	No
Uncontrolled Dumping or Disposal Areas	No
Surface Water Discoloration, Sheen, or Free Product	No
Strong, Pungent or Noxious Odors	No
Stormwater Retention or Detention Ponds	No
On-site Propane Storage	**Yes**
Heating/Fuel Oil Tanks On-site	**Yes**
Corroded material	**Yes**
Oil Stored Aboveground	**Yes**

Trash, Debris, or Other Waste Materials: An area on the western portion of the Favero Ranch Corral Area was used for storing scrap materials and equipment, this area is referred to as the Scrap Yard. The Scrap Yard contained scrapped equipment, including vehicles, fencing equipment, various farming equipment, and empty aboveground storage tanks (ASTs). No significant staining was observed on soil or vegetation within these areas.

Corroded materials: Rusted scrap equipment and vehicles were observed within the scrap yards of the Favero Ranch Corral Area.

Drums: Empty drums were observed within the Favero Ranch Corral Area. The drums appeared to have contained cattle feed products.

Storage tanks, including ASTs containing petroleum products, and waste oil storage, are discussed in the following **Section 3.4**.

3.4 Storage Tanks

Tetra Tech observed areas within the Favero Ranch Corral Area of the Subject Property that were utilized for the storage of water and petroleum products. Aboveground Storage Tanks (ASTs) on the Favero Ranch Corral Area included waste oil, water, liquid cattle feed, and gasoline/diesel storage tanks (**Figure 3**).

Table 3-2 summarizes the storage tanks located at the Subject Property, observed during the site reconnaissance.

Table 3-2. Storage Tank Summary

Tank #	Description	Material	Contents	Approx. Capacity (Gallons)	Location	Photo No.
1	AST #1	Metal	Water	1,000	Middle of parcel 018-050-005-000	Photo 8
2	AST #2	Metal	Water	1,000	Middle of parcel 018-050-005-000	Photo 8
3	AST #3	Metal	Gasoline/Diesel	100	Favero Ranch Corral Area	Photo 18
4	AST #4	Metal	Diesel	100	Favero Ranch Corral Area	Photo 18
5	AST #5	Metal	Diesel	100	Favero Ranch Corral Area	Photo 18
6	AST #6	Metal	Gasoline	100	Favero Ranch Corral Area	Photo 18
7	AST #7	Polyethylene	Water	1,000	Favero Ranch Corral Area	Photo 17
8	AST #8	Polyethylene	Water	1,000	Favero Ranch Corral Area	Photo 17
9	AST #9	Polyethylene	Water	1,000	Favero Ranch Corral Area	Photo 17
10	AST #10	Polyethylene	Liquid Cattle Feed	10,000	Favero Ranch Corral Area	Photo 20, 21

The four ASTs containing petroleum products were located within the Favero Ranch Corral Area, outside one of the outbuildings. The four gasoline / diesel ASTs are positioned side by side. These tanks are heightened by metal stands and equipped with fuel pumping systems. De minimis staining on soil was observed beneath the petroleum ASTs.

3.5 Limiting Conditions

No limiting conditions were experienced during the site reconnaissance.

3.6 Current Uses of The Subject Property

The Subject Property is currently used as a cattle ranch and rangeland.

3.7 Past Use of Subject Property

Based on the site reconnaissance of the Subject Property, the land has historically been used for cattle ranch operations both before and after its acquisition by the current landowner.

3.8 Current Use of Adjoining Properties and Surrounding Area

Adjoining properties were visually examined from public access rights-of-way to make a cursory assessment of the current land use and its potential for RECs which may have an impact on the Subject Property. The Subject Property appeared to be surrounded by undeveloped land, agricultural land, and rural homesteads. The surrounding properties are primarily undeveloped.

A rural homestead is located to the south of the Subject Property with an address of 1830 Spring Valley Road, Williams CA 95987. Another rural homestead is located to the west of the Subject Property and Favero Ranch Corral Area with an address of 1961 Spring Valley Road, Williams CA 95987. These properties appeared to have a history of agricultural and animal husbandry use.

3.9 Geologic, Hydrogeologic, Hydrologic, and Topographic Conditions

The topography of the Subject Property is relatively flat surrounding the Favero Ranch Corral, most likely due to soil grading of the area in the past. The remaining portions of the Subject Property are composed of rolling hills that slope gradually south towards Spring Creek. Stormwater runoff appears to flow towards depression points across the site as well as towards ephemeral drainage routes that bisect the Subject Property from east to west and connect with Spring Creek.

3.10 Structures and Other Improvements

The Subject Property building contains three residential structures ranging from 800 to 3,000 square feet. The residential structures are constructed on raised foundations with wood exterior walls and either a wood or metal roof. Outbuildings are also located within the Favero Ranch Corral Area of the Subject Property. The outbuildings area ranges from 2,000 to 5,000 square feet. Three outbuildings are located within the corral area for cattle ranching purposes. A maintenance building is on a concrete pad and is utilized for storing equipment. An open-air garage, open towards the north, contains paved concrete flooring and is utilized for storing large utility vehicles, including excavators, forklifts, and tractors. A warehouse structure is located to the east of the open-air garage and also contains paved flooring. The parking areas consist of concrete and unpaved areas.

3.11 Potable Water Supply

Sources of potable water supply were not observed during the site reconnaissance. According to the landowner, Michael Rex Favero, potable water is self-supplied. It is unknown if potable water is supplied by means of groundwater or water delivery suppliers.

3.12 Sewage Disposal System

No sewage disposal system was observed on the Subject Property.

3.13 Wells

According to the landowner, there is a groundwater well on the Subject Property.

3.14 Septic System or Cesspools

No septic systems or cesspools were observed at the Subject Property, but it is likely that a septic system services the rural homesteads.

4.0 RECORDS REVIEW

The purpose of the records review is to obtain and review records that will help identify RECs in connection with the Subject Property. A record database report was generated by ERIS and used to evaluate identified listings found on environmental databases for the Subject Property and surrounding areas; it is discussed in **Section 4.3** and provided in **Appendix C**. Documents discovered from regulatory agencies are discussed in **Section 4.4,** and relevant documents are provided in **Appendix D**.

4.1 Physical Setting

The following sections provide information about the geologic, hydrogeologic, hydrologic, or topographic characteristics of the area.

4.1.1 Topography

According to the 2021 USGS Topographic map, the Subject Property is about 309 feet above mean sea level and is relatively flat with gradual slopes in all directions. ERIS topographic maps are included in **Appendix E**.

4.1.2 Soil and Geologic Setting

According to the ERIS Physical Setting Report (ERIS 2024a) and the U.S. Department of Agriculture, Natural Resources Conservation Service's Web Soil Survey (USDA NRCS 2024), the Subject Property and surrounding areas are underlain by soils of the Capay clay loam, the Ayar clay, and the Corning clay loam types. The Capay clay loam is described as a clay loam with slow infiltration rates. Soils in this group have high runoff potential when thoroughly wet. Water movement through the soil is restricted or very restricted. Ayar clay is also present within the Subject Property. The Ayar series consists of deep or very deep, well-drained soils that formed in material weathered from decomposed alkaline shales and sandstone. Ayar clay is often found within hill formations. The Corning clay loam is also present within the Subject Property, which is also described as on terraces a clay loam with very slow infiltration rates and are well drained. The shrink-swell potential is moderate. The series of soil identified do not meet hydric criteria.

The geologic unit within the Subject Property is identified as Quaternary (Plio-Pleistocene) loosely consolidated deposits primarily containing sand and gravel. At depth may be sandstone and conglomerate (or gravel) units. Sandstone is found approximately 100 feet below ground surface. The ages of these units are approximately the Miocene to Pleistocene eras. The ERIS Physical Setting Report is included in **Appendix C**.

4.1.3 Hydrogeology

Based on surface topography, as interpreted from the USGS topographic quadrangle map, the groundwater in the immediate area of the Subject Property is assumed to flow towards the Spring Creek to the south of the Subject Property. The actual groundwater flow direction may be locally influenced by factors such as surface topography, underground structures, seasonal fluctuations, soil and bedrock geology, water wells, and other factors. According to the ERIS Physical Setting Report (**Appendix E**), there are two groundwater production wells within the Subject Property. Groundwater is found approximately from 50 to 100 feet below ground surface.

4.2 Historical Records Review

Historical data on the Subject Property were gathered to determine past uses and evaluate visible environmental issues that may constitute RECs. If included with the Subject Property research data, the uses of the adjoining and surrounding area were also evaluated for environmental issues that may constitute RECs. The following sections describe the aerial photographs, Sanborn® maps, topographic maps, city directories, and ownership information reviewed for the Subject Property.

4.2.1 Aerial Photographs

Historical aerial photographs of the Subject Property were provided by ERIS and were reviewed for information on the past uses of the Subject Property and surrounding area. An aerial photograph dated 2023 was obtained from ESRI World Imagery. A summary of the aerial photographs reviewed is provided in **Table 4-1** below and the aerial photographs are included in **Appendix E**.

Table 4-1. Review of Aerial Photographs

Years	Description
1937	**Subject Property:** The Subject Property has no major structures or improvements. Vegetation in the north and northwest areas are visible. **Surrounding Area:** The land appears to be undeveloped with possible agricultural use.
1954	**Subject Property:** It appears that a residential building was established in the Subject Property. Areas appear to have been graded and/or improved for agricultural use. **Surrounding Area:** A rural homestead appears to be present to the south of the Subject Property. The areas are primarily undeveloped and used for agricultural uses.
1957	**Subject Property:** Unpaved roads are visible within the Subject Property. **Surrounding Area:** An additional rural homestead is visible to the south of the Subject Property.
1957, 1968, 1977	No significant changes to the Subject Property or surrounding area were observed.
1985	**Subject Property:** Additional structures are visible within the Subject Property's Favero Ranch Corral Area. **Surrounding Area:** No significant changes to the surrounding area were observed.
1993, 2003, 2004 – 2006, 2009, 2010, 2012, 2014, 2016, 2018, 2020, 2023	No significant changes to the Subject Property or surrounding area were observed.

4.2.2 Fire Insurance Map Report

No fire insurance maps were identified in this Phase I ESA.

4.2.3 City Directories

A City Directory Image Report was provided by ERIS and was reviewed for information regarding the past uses of the Subject Property and surrounding area. Properties and facilities likely to have current or former releases of hazardous substances and/or petroleum products with the potential to migrate to the Subject Property are targeted in this city directory review. The city directory provided by ERIS only identified residential properties. The majority of the residential properties identified are rural homesteads that may have historical agricultural or animal husbandry use. The city directory report is included in **Appendix E**.

4.2.4 Historical Topographic Maps

Historic topographic maps of the Subject Property were provided by ERIS and were reviewed for information regarding the past uses of the Subject Property and surrounding area. A summary of topographic maps reviewed is provided in **Table 4-2** and the topographic maps are included in **Appendix E.**

Table 4-2. Review of Topographic Maps

Years	Description
1920	The map depicts nearby waterways, including the Spring Creek.
1944	Contour lines are shown along with the ephemeral creek that flows through the Subject Property from east to west.
1961, 1989, 1994, 2015, 2018, 2021	No significant changes to the Subject Property or surrounding area were observed.

4.2.5 Chain-of-Title

Chain-of-title records were not provided for review. Procurement of chain-of-title records was not included in the SOW for this Phase I ESA.

4.2.6 Previous Environmental Reports

Tetra Tech completed a Phase I ESA for the Subject Property in February 2020 that was attached to a draft Environmental Impact Report that was submitted for public review. The Subject Property had slightly different boundaries during this 2020 Phase I ESA; the previous Phase I ESA included the parcel with an address 1961 Spring Valley Road, Williams, CA, also owned by Paul and Rex Favero. No other previous environmental investigation reports were provided, and none were found during the conducting of this assessment. The findings of the previous Phase I ESA are summarized in the following passages.

Tetra Tech previously prepared a Phase I ESA report on February 4, 2020, covering the Subject Property, but including additional land that is not part of the current environmental site assessment. This report was prepared for 967-acres, including the 886-acres of the Subject Property. This report revealed no RECs, CRECs, or HRECs.

This report identified the presence of *de minimis* conditions involving staining observed by the waste oil storage area on concrete pad outside of the maintenance building. During this most recent Phase I ESA, the waste oil drums were no longer present and significant staining was not observed in this area.

The information included in the prior report was not verified for accuracy and an evaluation of the report was beyond the scope of this assessment. The prior report is included in **Appendix F**.

4.2.7 Past Uses of Subject Property

According to the landowner, Rex Favero, prior to their acquisition of the property, the Subject Property operated as a cattle ranch. Based on site observations, the property appears to have been used for animal husbandry, pastureland, and rangeland.

4.2.8 Past Uses of Adjoining Properties and Surrounding Area

According to the review of the historical information used to determine the historical use of the Subject Property, the historical use of the adjoining properties and surrounding area included agricultural land and residential use.

4.3 Regulatory Records Review

Federal, state, and local records were reviewed to assess whether the Subject Property or facilities within the ASTM E2247-16 approximate minimum search distance have experienced significant unauthorized releases of hazardous substances or other events with potentially adverse environmental effects. Tetra Tech contracted with ERIS to perform a database search of the Subject Property in accordance with ASTM E2247-16. The database report is provided in **Appendix C** and the number of facilities listed are summarized in **Table 4-3**.

Table 4-3. Databases Searched and Number of Facilities Identified

Database Acronym	Database Definition	Number of Facilities
Federal Records from Standard Sources		
NPL	National Priority List	0
PROPOSED NPL	Proposed National Priority List Sites	0
DELETED NPL	National Priority List Deletions	0
SEMS	Superfund Enterprise Management System	0
ODI	Open Dump Inventory	0
SEMS-ARCHIVE	Superfund Enterprise Management System Archive	0
CERCLIS	Comprehensive Environmental Response, Compensation and Liability Information System	0
IODI	Open Dump Inventory on Indian Lands	0
CERCLIS NFRAP	CERCLIS - No Further Remedial Action Planned	0
CERCLIS LIENS	CERCLIS Liens	0
RCRA CORRACTS	RCRA - Corrective Action Report	0
RCRA-TSDF	RCRA - Treatment, Storage, and Disposal	0
RCRA-LQG	RCRA - Large Quantity Generators	0
RCRA-SQC	RCRA - Small Quantity Generators	0
RCRA-VSQG	RCRA – Very Small Quantity Generators	0
RCRA NON-GEN	RCRA – Non-Generators	0
RCRA CONTROLS	RCRA – Sites with Controls	0
FED ENG	Federal Engineering Controls-ECs	0
FED INST	Federal Institutional Controls- ICs:	0
LUCIS	Land Use Control Information System	0

Database Acronym	Database Definition	Number of Facilities
NPL IC	Institutional Control Boundaries at NPL sites	0
ERNS 1982 TO 1986	Emergency Response Notification System	0
ERNS 1987 TO 1989	Emergency Response Notification System	0
ERNS	Emergency Response Notification System	0
FED BROWNFIELDS	The Assessment, Cleanup and Redevelopment Exchange System (ACRES) Brownfield Database	0
FEMA UST	FEMA Underground Storage Tank Listing	0
FRP	Facility Response Plan	0
DELISTED FRP	Delisted Facility Response Plans	0
HIST GAS STATIONS	Historical Gas Station	0
REFN	Petroleum Refineries	0
BULK TERMINAL	Petroleum Product and Crude Oil Rail Terminals	0
SEMS LIENS	Superfund Enterprise Management System Liens	0
SUPERFUND ROD	Superfund Decision Documents	0
DOE FUSRAP	Formerly Utilized Sites Remedial Action Program	0
State, Tribal, and Local Records from Standard Sources		
RESPONSE	State Response Sites	0
ENVIROSTOR	EnviroStor Database	0
DELISTED ENVS	Delisted State Response Sites	0
SWF/LF	Solid Waste Information System	0
SWRCB SWF	Solid Waste Disposal Sites with Waste Constituents Above Hazardous Waste Levels	0
WMUD	Waste Management Unit Database	0
HWP	EnviroStor Hazardous Waste Facilities	0
SWAT	Sites Listed in the Solid Waste Assessment Test (SWAT) Program Report	0
C&D DEBRIS RECY	Construction and Demolition Debris Recyclers	0
RECYCLING	Recycling Centers	0
PROCESSORS	Listing of Certified Processors	0
CONTAINER RECY	Listing of Certified Dropoff, Collection, and Community Service Programs	0
LDS	Land Disposal Sites	0
LUST	Leaking Underground Fuel Tank Reports	0
DELISTED LST	Delisted Leaking Storage Tanks	0
UST	Permitted Underground Storage Tank (UST) in GeoTracker	0
UST CLOSURE	Proposed Closure of Underground Storage Tank Cases	0
HHSS	Historical Hazardous Substance Storage Information Database	0
UST SWEEPS	Statewide Environmental Evaluation and Planning System	0
AST	Aboveground Storage Tanks	0
AST SWRCB	SWRCB Historical Aboveground Storage Tanks	0
TANK OIL GAS	Oil and Gas Facility Tanks	0
DELISTED TNK	Delisted Storage Tanks	0
CERS TANK	California Environmental Reporting System (CERS) Tanks	0
DELISTED CTNK	Delisted California Environmental Reporting System (CERS) Tanks	0

Database Acronym	Database Definition	Number of Facilities
HIST TANK	Historical Hazardous Substance Storage Container Information - Facility Summary	0
LUR	Site Mitigation and Brownfields Reuse Program Facility Sites with Land Use Restrictions	0
CALSITES	CALSITES Database	0
HLUR	Hazardous Waste Management Program Facility Sites with Deed / Land Use Restrictions	0
DEED	Deed Restrictions and Land Use Restrictions	0
VCP	Voluntary Cleanup Program	0
CLEANUP SITES	GeoTracker Cleanup Program Sites	0
DELISTED CLEANUP	Delisted Cleanup Program Sites	0
DELISTED COUNTY	Delisted County Records	0
INDIAN LUST	Leaking Underground Storage Tanks on Tribal/Indian Lands	0
NDIAN UST	Underground Storage Tanks on Tribal/Indian Lands	0
DELISTED INDIAN LST	Delisted Tribal Leaking Storage Tanks	0
DELISTED INDIAN UST	Delisted Tribal Underground Storage Tanks	0
UST KERN	Kern County – UST List	0
AST KERN	Kern County – AST List	0
CUPA KERN	Kern County - CUPA Facilities List	0
CUPA BAKERSFIELD	Bakersfield – CUPA Facilities List	0
Additional Environmental Federal, State, Tribal, and Local Records		
FINDS/FRS	Facility Registry Service/Facility Index	0
TRIS	Toxics Release Inventory (TRI) Program	0
PFAS NPL	PFOA/PFOS Contaminated Sites	0
PFAS FED SITES	Federal Agency Locations with Known or Suspected PFAS Detections	0
PFAS SSEHRI	SSEHRI PFAS Contamination Sites	0
ERNS PFAS	National Response Center PFAS Spills	0
PFAS NPDES	PFAS NPDES Discharge Monitoring	0
PFAS TRI	Perfluorinated Alkyl Substances (PFAS) from Toxic Release Inventory	0
PFAS WATER	Perfluorinated Alkyl Substances (PFAS) Water Quality	0
PFAS TSCA	PFAS TSCA Manufacture and Import Facilities	0
PFAS E-MANIFEST	PFAS Waste Transfers from RCRA e-Manifest	0
PFAS IND	PFAS Industry Sectors	0
HMIRS	Hazardous Materials Information Reporting System	0
NCDL	National Clandestine Drug Labs	0
TSCA	Toxic Substances Control Act	0
HIST TSCA	Hist TSCA	0
FTTS ADMIN	FTTS Administrative Case Listing	0
FTTS INSP	FTTS Inspection Case Listing	0
PRP	Potentially Responsible Parties List	0
SCRD DRYCLEANER	State Coalition for Remediation of Drycleaners Listing	0
ICIS	Integrated Compliance Information System	0
FED DRYCLEANERS	Drycleaner Facilities	0

Database Acronym	Database Definition	Number of Facilities
DELISTED FED DRY	Delisted Drycleaner Facilities	0
FUDS	Formerly Used Defense Sites	0
FUDS MRS	FUDS Munitions Response Sites	0
FORMER NIKE	Former Military Nike Missile Sites	0
PIPELINE INCIDENT	PHMSA Pipeline Safety Flagged Incidents	0
MLTS	Material Licensing Tracking System	0
HIST MLTS	Historic Material Licensing Tracking System (MLTS) sites	0
MINES	Mines Master Index File	0
SMCRA	Surface Mining Control and Reclamation Act Sites	0
MRDS	Mineral Resource Data System	0
LM SITES	DOE Legacy Management Sites	0
ALT FUELS	Alternative Fueling Stations	0
CONSENT DECREES	Superfunds Consent Decrees	0
AFS	Air Facility System	0
SSTS	Registered Pesticide Establishments	0
PCBT	Polychlorinated Biphenyl (PCB) Transformers	0
PCB	Polychlorinated Biphenyl (PCB) Notifiers	0
PFAS SAMPLING	PFAS Sampling Locations	0
DRYCLEANERS	Dry Cleaning Facilities	0
DELISTED DRYCLEANERS	Delisted Drycleaners	0
DRYC GRANT	Non-Toxic Dry Cleaning Incentive Program	0
PFAS GT CLEANUPS	PFAS GeoTracker Cleanup Sites	0
PFAS GW	PFOA/PFOS Groundwater	0
PFAS INVEST	PFAS Investigations	0
HWSS CLEANUP	Hazardous Waste and Substances Site List - Site Cleanup	0
TOXIC PITS	Toxic Pit Cleanup Act Sites	0
DTSC HWF	List of Hazardous Waste Facilities Subject to Corrective Action	0
INSP COMP ENF	EnviroStor Inspection, Compliance, and Enforcement	0
SCH	School Property Evaluation Program Sites	0
CHMIRS	California Hazardous Material Incident Report System	0
HIST CHMIRS	Historical California Hazardous Material Incident Report System	0
HAZNET	Handlers from Hazardous Waste Manifest Data	0
HAZ GEN	Generators from Hazardous Waste Manifest Data	0
HAZ TSD	TSDF from Hazardous Waste Manifest Data	0
HIST MANIFEST	Historical Hazardous Waste Manifest Data	0
HW TRANSPORT	DTSC Registered Hazardous Waste Transporters	0
WASTE TIRE	Registered Waste Tire Haulers	0
MEDICAL WASTE	California Medical Waste Management Program Facility List	0
HIST CORTESE	Historical Cortese List	0
CDO/CAO	Cease and Desist Orders and Cleanup and Abatement Orders	0
CERS HAZ	California Environmental Reporting System (CERS) Hazardous Waste Sites	0
DELISTED HAZ	**Delisted Environmental Reporting System (CERS) Hazardous Waste Sites**	**2**

Database Acronym	Database Definition	Number of Facilities
GEOTRACKER	Sites in GeoTracker	0
MINE	Mines Listing	0
LIEN	Recorded Environmental Cleanup Liens	0
WASTE DISCHG	Waste Discharge Requirements	0
EMISSIONS	Toxic Pollutant Emissions Facilities	0
CDL	Clandestine Drug Lab Sites	0

The databases searched have been developed and are updated by federal, state, and local agencies. While these databases are reliable and comprehensive, there have been cases where the data presented are out of date and no longer reflective of actual facility conditions. The Government Records Searched/Data Currency Tracking section of the ERIS Database Report provided in **Appendix C** identifies when each database was updated.

4.3.1 Subject Property Database Listings

No listings were found in any of the databases searched regarding the Subject Property.

4.3.2 Adjoining and Relevant Non-Subject Property Database Listings

The ERIS Database Report identified two listings for the same location outside of the Subject Property. Two listings were discovered in the Delisted Environmental Reporting System Hazardous Waste Site database. This database, provided by the California Environmental Protection Agency, lists facilities that have been removed from regulatory programs such as Hazardous Chemical Management, Hazardous Waste Onsite Treatment, Household Hazardous Waste Collection, Hazardous Waste Generator, and Resource Conservation and Recovery Act (RCRA) Generator Programs. The ERIS Database Report has placed the property with the identified listings approximately 0.27 miles northwest of the Subject Property. The coordinates provided for the facility lead to the Parcel, 016-190-016-000, located directly north of the Subject Property.

Based on the absence of open cases regarding hazardous substance contamination on this property, and the nature of the database, listing sites that are no longer considered hazardous waste generators, the identified listings are not considered RECs.

4.4 Additional Environmental Record Sources

Tetra Tech also reviewed the following record sources:

- City of Williams
- Colusa County Environmental Health Department
- County of Colusa Agricultural Department
- Department of Toxic Substance Control (DTSC)
- DTSC – EnviroStor
- United States Environmental Protection Agency (USEPA)

- Office of Environmental Health Hazard Assessment (OEHHA)
- California Department of Forestry and Fire Protection (CAL FIRE)
- California State Water Board – GeoTracker

Regulatory correspondence and documents recovered from regulatory agencies are provided in **Appendix D**.

4.4.1 City of Williams

On July 8, 2024, Tetra Tech sent an email to the City of Williams Clerk in an effort to obtain relevant environmental documents and permits that include site inspection records/notice of violations, spills, groundwater or soil sampling reports/analytical results, underground/aboveground storage tanks, hazardous materials, wastewater discharge permits, solid waste disposal permits, building permits, reports of chemical odors/fumes, and well installation information. At the time of publishing this Phase I ESA, the City of Williams has not responded to the record request.

4.4.2 Colusa County Health and Human Services – Environmental Health Department

The Colusa County Environmental Health Department is the local Certified Unified Program Agency (CUPA) tasked to enforce California Environmental Protection Agency regulation. On July 8, 2024, Tetra Tech sent an email to the Colusa County Environmental Health Department in an effort to obtain relevant environmental documents and permits that include site inspection records/notice of violations, spills, groundwater or soil sampling reports/analytical results, underground/aboveground storage tanks, hazardous materials, wastewater discharge permits, solid waste disposal permits, building permits, reports of chemical odors/fumes, and well installation information. At the time of publishing this Phase I ESA, the City of Williams has not responded to the record request.

4.4.3 Colusa County Agricultural Department

On July 8, 2024, Tetra Tech sent an email to the Colusa County Agricultural Department in an effort to obtain relevant environmental documents and permits that include site inspection records/notice of violations, spills, groundwater or soil sampling reports/analytical results, underground/aboveground storage tanks, reports of chemical odors/fumes, and pesticide use information. An associate of the Colusa County agriculture responded through a phone call and reported that there are several documents for the Subject Property regarding pesticide use. It was described that the Subject Property does not have violation notices from the agricultural department but permits and procedures documenting the use of typical pesticides and herbicides. At the time of publishing this Phase I ESA, Tetra Tech has not received these documents from the Colusa County Agricultural Department.

4.4.4 Department of Toxic Substances Control

On July 8, 2024, Tetra Tech sent an email to the DTSC in an effort to obtain relevant environmental documents and permits that include site inspection records/notice of violations, spills, groundwater or soil sampling reports/analytical results, underground/aboveground storage tanks, hazardous materials, wastewater discharge permits, solid waste disposal permits, building permits, reports of chemical odors/fumes, and well installation information. The DTSC sent a response to Tetra Tech on July 9, 2024, indicating that its databases were unable to locate any records near the provided addresses or APNs.

4.4.5 Department of Toxic Substances Control – EnviroStor

The DTSC provides the website resource, EnviroStor, as a means of identifying open and closed cleanup sites, hazardous waste generating facilities, underground storage tanks, and historical analytical data points. The Subject Property and surrounding areas were searched within the EnviroStor website to identify site inspection records/notice of violations, spills, groundwater or soil sampling reports/analytical results, underground/aboveground storage tanks, hazardous materials, wastewater discharge permits, solid waste disposal permits, and well installation information. No listings were identified within the Subject Property or surrounding area within a mile.

4.4.6 United States Environmental Protection Agency

On July 10, 2024, Tetra Tech submitted a records request to the USEPA in an effort to obtain relevant environmental documents and permits that include site inspection records/notice of violations, spills, groundwater or soil sampling reports/analytical results, underground/aboveground storage tanks, hazardous materials, wastewater discharge permits, solid waste disposal permits, building permits, reports of chemical odors/fumes, and well installation information. At the time of publishing this Phase I ESA, the USEPA has not responded to the record request.

4.4.7 Office of Environmental Health Hazard Assessment

On July 8, 2024, Tetra Tech submitted a records request to the OEHHA in an effort to obtain relevant environmental documents and permits that include site inspection records/notice of violations, spills, groundwater or soil sampling reports/analytical results, underground/aboveground storage tanks, hazardous materials, wastewater discharge permits, solid waste disposal permits, building permits, reports of chemical odors/fumes, and well installation information. At the time of publishing this Phase I ESA, the OEHHA has not responded to the record request.

4.4.8 California Department of Forestry and Fire Protection

On July 02, 2024, Tetra Tech submitted a records request to CAL FIRE in an effort to obtain relevant environmental documents and permits that include site inspection records/notice of violations, spills, groundwater or soil sampling reports/analytical results, underground/aboveground storage tanks, hazardous materials, wastewater discharge permits, solid waste disposal permits, building permits, reports of chemical odors/fumes, and well installation information. At the time of publishing this Phase I ESA, the CAL FIRE has not responded to the record request.

4.4.9 California State Waterboard GeoTracker

The California State Water Board provides the website resource, GeoTracker, as a means of identifying open and closed cleanup sites, hazardous waste generating facilities, underground storage tanks, and historical analytical data points. The Subject Property and surrounding areas were searched within the GeoTracker resource to identify site inspection records/notice of violations, spills, groundwater or soil sampling reports/analytical results, underground/aboveground storage tanks, hazardous materials, wastewater discharge permits, solid waste disposal permits, and well installation information. No listings were identified within the Subject Property or surrounding area within a mile.

5.0 INTERVIEWS

The objective of the interviews is to obtain information concerning RECs in connection with the Subject Property. This information was obtained in writing through a landowner questionnaire provided to one of the landowners, Michael Rex Favero, as indicated below.

5.1 Interview With Landowner

In order to meet the All Appropriate Inquiry rule, the representative of the Subject Property, landowner, Mr. Michael Rex Favero, was asked to provide responses to questions presented in the Landowner Questionnaire. Relevant responses are summarized in the following passage.

The Subject Property is owned by Paul and Rex Favero and was acquired in 1984 for its use as a cattle ranch. It was reported that the property's previous use was also as a cattle ranch.

Mr. Favero reported that there have never been any underground storage tanks on the Subject Property. ASTs on the Subject Property are currently and historically have been used for storing water and fuel.

Mr. Favero reported that a groundwater well is located on the Subject Property and services the Subject Property. Propane is provided for the Subject Property by a local gas supplier, Ferrellgas. Electricity is provided to the Subject Property by Pacific Gas and Electric. Nonhazardous waste disposal services are provided for a 2-yard dumpster by the local provider.

Mr. Favero reported that he has no knowledge of any environmental lien, AULs, or deed restrictions encumbering the Subject Property or in connection with the Subject Property. Mr. Favero reported that he has no knowledge of the site having or ever having stormwater discharge permits, air quality permits, or hazardous waste generator registration.

5.2 Interviews With State and Local Government Officials

Tetra Tech contacted the City of Williams, the Colusa County Agricultural Department, the DTSC, the USEPA, the OEHHA, and CAL FIRE with questions regarding environmental concerns pertaining to the Subject Property. The responses, if any, from the respective officials are discussed in **Section 4.4**.

6.0 FINDINGS AND OPINIONS

The following summarizes the presence or likely presence of hazardous substances or petroleum products in connection with the Subject Property based on information collected during the ESA. For the items listed, Tetra Tech provides an opinion of the impact on the Subject Property based on an evaluation of the results of record reviews, interviews, and site reconnaissance. Tetra Tech also provides rationale regarding whether an environmental condition is a REC, CREC, HREC, or *de minimis* condition.

ASTM defines a REC as:

> *The presence or likely presence of any hazardous substances or petroleum products on a property: (1) due to any release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of a future release to the environment.*

- No RECs were identified during the completion of this Phase I ESA.

ASTM defines a CREC as:

> *A past release of any hazardous substances or petroleum products that has occurred in connection with the property and has been addressed to the satisfaction of the applicable regulatory authority (e.g., as evidenced by the issuance of a no further action letter or equivalent, or meeting risk-based criteria established by regulatory authority), with hazardous substances allowed to remain in place subject to the implementation of required controls.*

- No CRECs were identified during the completion of this Phase I ESA.

ASTM defines an HREC as:

> *A past release of any hazardous substances or petroleum products that has occurred in connection with the property and has been addressed to the satisfaction of the applicable regulatory authority or meeting unrestricted use criteria established by a regulatory authority, without subjecting the property to any required controls (e.g., property use restrictions, activity and use limitations [AULs], institutional controls or engineering controls).*

- No HRECs were identified during the completion of this Phase I ESA.

ASTM defines a *de minimis* condition as:

> *A condition related to a release that generally does not present a threat to human health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies. A condition determined to be a de minimis condition is not a recognized environmental condition nor a controlled recognized environmental condition.*

- *De minimis* soil staining was identified during the site reconnaissance of the Subject Property within the Favero Ranch Corral Area. Staining was observed on the soil ground surface beneath the ASTs containing petroleum fuel products (gasoline / diesel) located within the

Favero Ranch Corral Area of the Subject Property. Staining was observed directly beneath gasoline and diesel fueling areas. Since the staining appeared to be surficial, did not appear to present a threat to human health or the environment, and would not likely require enforcement action if brought to the attention of appropriate governmental agencies, it is considered a *de minimis* condition.

In agricultural areas such as the Subject Property, pesticides / herbicides were likely historically used on the Subject Property (as indicated by maps on the OEHHA website). Depending on the type and method of application, concentrations may be present in shallow soil and potentially at concentrations exceeding some California Environmental Protection Agency health risk standards (e.g., for residential and/or school use). The presence of pesticides / herbicides can pose a business-related risk in the development of the project. In accordance with ASTM E2247-16, the proper and customary application of pesticides on an agricultural property can and does provide an exemption from CERCLA liability with appropriate documentation. Given there are no indications of inappropriate applications, the use of pesticides and herbicides on the Subject Property is not considered a REC but may present some business risk.

7.0 CONCLUSIONS

Tetra Tech has performed a Phase I ESA in conformance with the scope and limitations of ASTM E2247-16 for the Janus Solar and Battery Storage Project, on the Subject Property located in Colusa County, California, which included the two parcels of rural land. Any exceptions to, or deviations from, this practice are described in **Section 1** of this report.

This assessment has revealed no RECs, CRECs, or HRECs. *De minimis* soil staining in relation to the gasoline and diesel ASTs, observed during the site reconnaissance, was identified on the Subject Property.

8.0 ENVIRONMENTAL PROFESSIONAL STATEMENT

This report was prepared by Daniel O'Connell with Tetra Tech under the supervision of Jay Neuhaus, PG. Resumes are provided in **Appendix G**.

The findings, recommendations, specifications, and professional opinions presented in this report were prepared in accordance with generally accepted professional practice, and within the scope of the project. There is no other warranty, either express or implied.

We declare that, to the best of our professional knowledge and belief, we meet the definition of Environmental Professional as defined in 40 Code of Federal Regulations (CFR) 312.10. We have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the Subject Property. We have developed and performed all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312.

We appreciate the opportunity to work with you on this project. If you have any questions concerning the findings and conclusions contained in this report, please contact Jay Neuhaus at (949) 809-5043, or via email at Jay.Neuhaus@tetratech.com.

Jay Neuhaus, PG
Sr. Project Geologist
July 19, 2024

Daniel O'Connell
Staff Engineer
July 19, 2024

9.0 REFERENCES

ERIS (Environmental Risk Information Services). 2024a. Physical Settings Report, Order No. 24070100592. July 3.

ERIS. 2024b. Historical Aerials, Order No. 24070100592. July 3.

ERIS. 2024c. Topographic Maps, Order No. 24070100592. July 3.

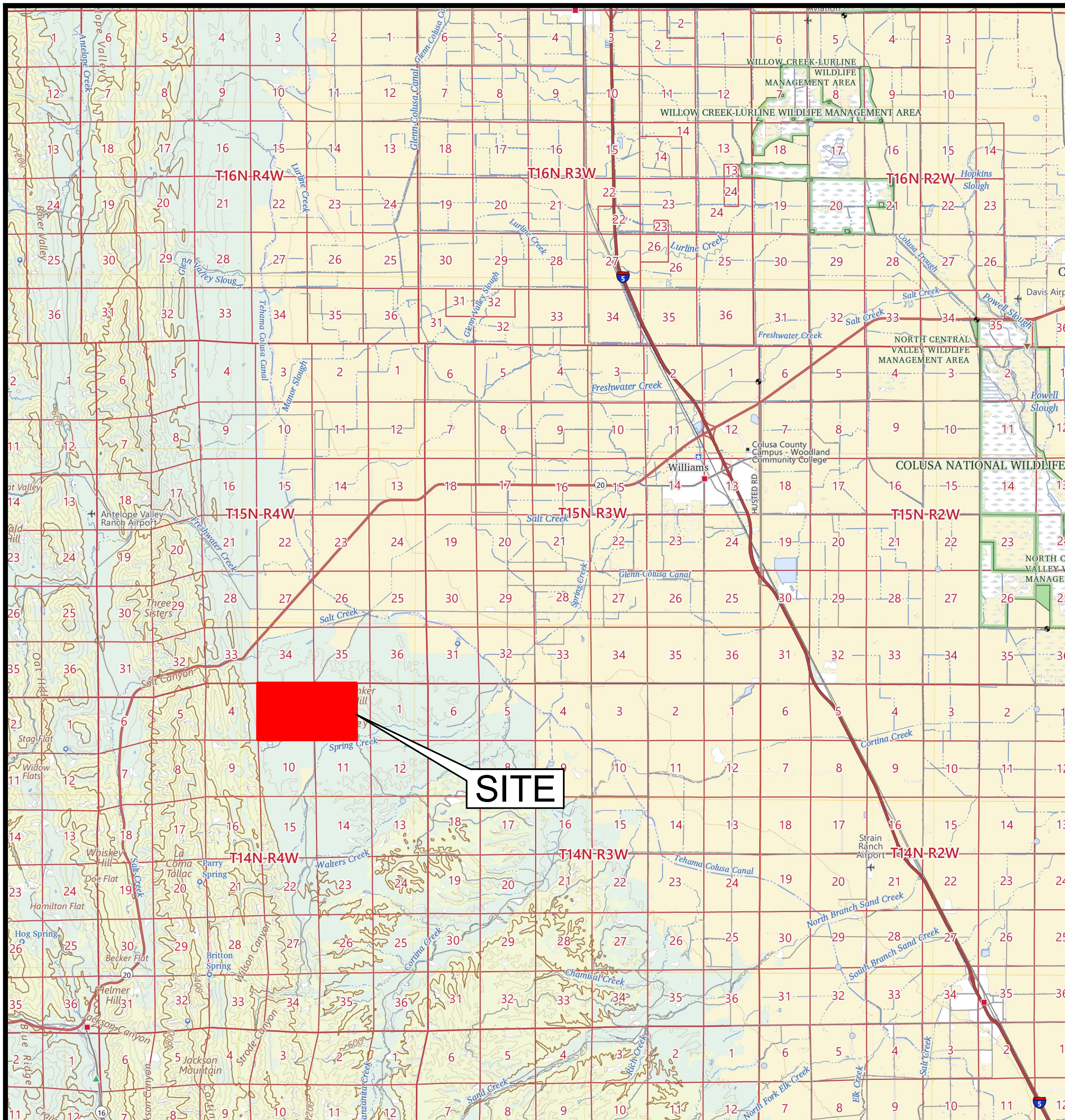
ERIS. 2024d. The ERIS Database Report. Order No. 24070100592. July 3.

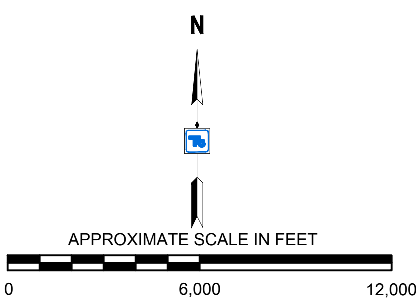
ERIS. 2024e. The ERIS City Directory Search. Order No. 24070100592. July 9.

USDA NRCS (U.S. Department of Agriculture Natural Resources Conservation Service). 2024. Web Soil Survey. Available online at: https://websoilsurvey.nrcs.usda.gov/app/ (accessed on July 10, 2024).

USGS (United States Geological Survey). 2024. Topographic Quadrangle Map, 7.5-Minute Series, Williams, California.

FIGURES





SOURCE: USGS TOPO MAP 2024

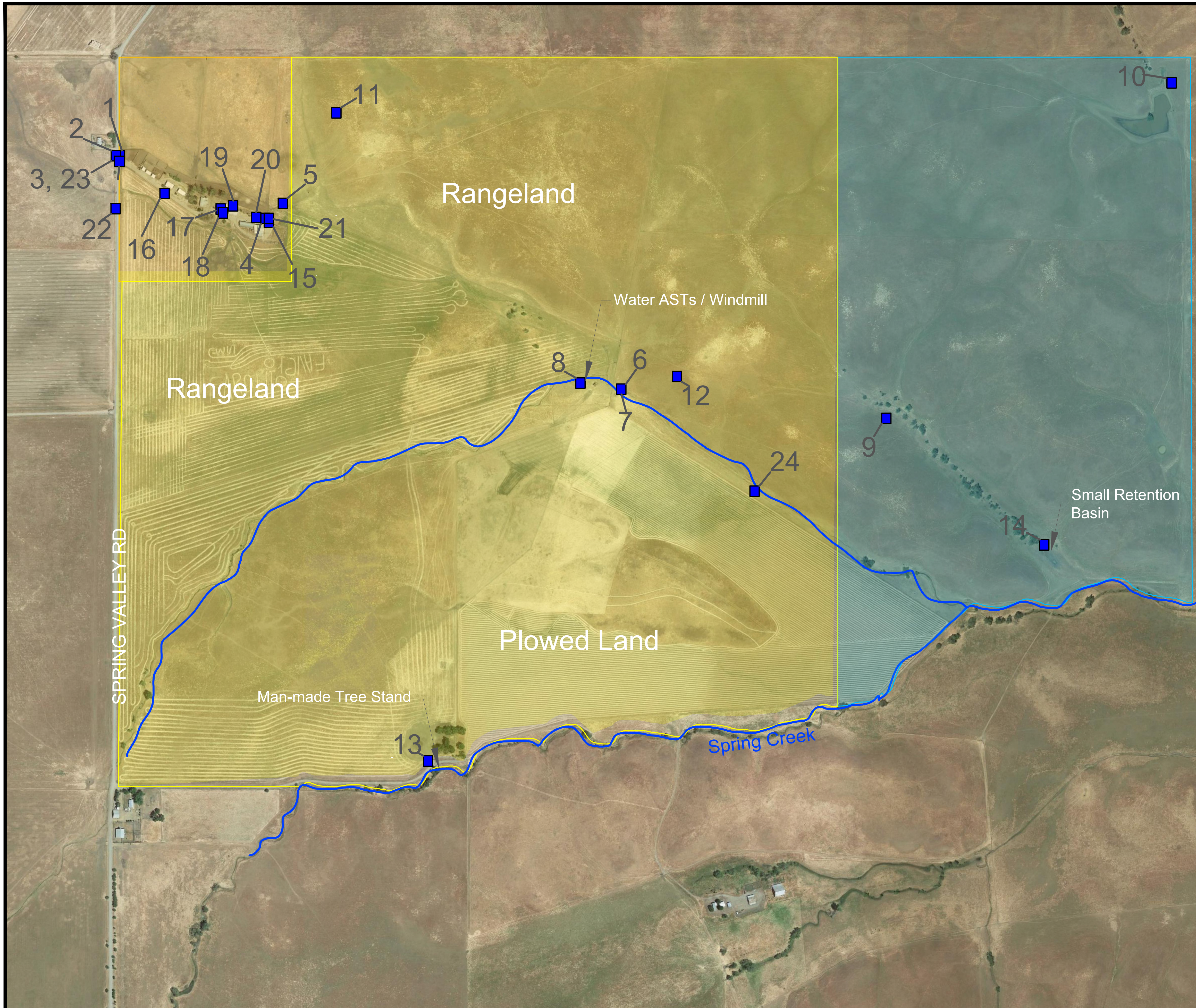
SITE LOCATION MAP

1958 SPRING VALLEY RD — WILLIAMS, CA

TETRA TECH

PROJECT NUMBER	APPROVED BY	DRAWN BY	DATE	FIGURE
194-7055	JN	DO	JUL 2024	1

P:\7055-RWE Renewables - Janus Solar Project\CAD\Phase I\FIGURES - RWE RENEWABLES PHASE I.dwg Jul 18, 2024 - 12:48pm DANIEL.OCONNELL1



LEGEND

- FAVERO CORRAL AREA
- PARCEL 018-050-005-000
- PARCEL 018-050-006-000
- PHOTO POINT

N

APPROXIMATE SCALE IN FEET

0 750 1,500

NOTES:

1. ALL LOCATIONS ARE APPROXIMATE.
2. "WILLIAMS, WA." MAP. GOOGLE EARTH PRO. GOOGLE, DECEMBER 2019.

NO WARRANTY IS MADE BY TETRA TECH AS TO ACCURACY, RELIABILITY, OR COMPLETENESS OF THESE DATA. THIS INFORMATION MAY NOT MEET NATIONAL MAP ACCURACY STANDARDS. THIS PRODUCT WAS DEVELOPED ELECTRONICALLY AND MAY BE UPDATED WITHOUT NOTIFICATION. REPRODUCTION MAY RESULT IN A LOSS OF SCALE AND OR INFORMATION.

SITE RECONNAISSANCE MAP

1958 SPRING VALLEY RD WILLIAMS, CA

TETRA TECH

PROJECT NUMBER	APPROVED BY	DRAWN BY	DATE	FIGURE
194-7055	JN	DO	JUL 2024	2

LEGEND

AST ABOVEGROUND STORAGE TANK

N

APPROXIMATE SCALE IN FEET

0 100 200

NOTES:

1. ALL LOCATIONS ARE APPROXIMATE.
2. "WILLIAMS, WA." MAP. GOOGLE EARTH PRO. GOOGLE, DECEMBER 2019.

NO WARRANTY IS MADE BY TETRA TECH AS TO ACCURACY, RELIABILITY, OR COMPLETENESS OF THESE DATA. THIS INFORMATION MAY NOT MEET NATIONAL MAP ACCURACY STANDARDS. THIS PRODUCT WAS DEVELOPED ELECTRONICALLY AND MAY BE UPDATED WITHOUT NOTIFICATION. REPRODUCTION MAY RESULT IN A LOSS OF SCALE AND OR INFORMATION.

FAVERO RANCH CORRAL AREA

1958 SPRING VALLEY RD WILLIAMS, CA

TETRA TECH

PROJECT NUMBER	APPROVED BY	DRAWN BY	DATE	FIGURE
194-7055	JN	DO	JUL 2024	3

APPENDIX A: PHOTOGRAPHIC DOCUMENTATION

Photographic Documentation
Janus Solar and Battery Storage Project
Colusa County, CA

Photo: 1 **Description:** View of the entrance to Favero Ranch Corral Area and the Subject Property. **Orientation:** Facing east. (39.099395, -122.281633)	

Photo: 2 **Description:** View of Spring Valley Road. **Orientation:** Facing north (39.099336, -122.281644)	

Photo: 3 **Description:** View of Spring Valley Road. **Orientation:** Facing south. (39.099336, -122.281644)	
Photo: 4 **Description:** View of gate to the rest of the Subject Property from the Favero Ranch Corral Area. **Orientation:** Facing northeast. (39.098037, -122.277768)	

Photo: 5 **Description:** View of the Subject Property from the Favero Ranch Corral Area entrance gate. **Orientation:** Facing east. (39.098359, -122.27724)	

Photo: 6 **Description:** View of dry ephemeral drainage running through the middle of the Subject Property. **Orientation:** Facing southeast. (39.094634, -122.268347)	

Photo: 7

Description:

View of culvert located in the middle of the Site for dry ephemeral drainage.

Orientation:

Facing northwest.
(39.094634, -122.268347)

Photo: 8

Description:

View of two aboveground storage tanks located in the middle of the Subject Property.

Orientation:

Facing east.
(39.094799, -122.269353)

Photo: 9

Description:

View of row of trees located in the middle of the Subject Property.

Orientation:

Facing southeast. (39.094035, -122.261355)

Photo: 10

Description:

View of cattle pond located in northeast corner of the Subject Property.

Orientation:

Facing southwest. (39.100816, -122.2539)

Photo: 11

Description:

View of Subject Property and the Favero Ranch Corral Area in the background.

Orientation:

Facing southwest.
(39.10019, -122.275883)

Photo: 12

Description:

View of western portion of the Subject Property and the Favero Ranch Corral Area in the background.

Orientation:

Facing west.
(39.095076, -122.267183)

Photo: 13

Description:

View of manmade tree stand in the southern portion of the Subject Property.

Orientation:

Facing northeast.
(39.087053, -122.273439)

Photo: 14

Description:

View of cattle pond located in southern portion of the Subject Property.

Orientation:

Facing southeast.
(39.091359, -122.257143)

Photo: 15 **Description:** View of collected debris near the Favero Ranch Corral Area. **Orientation:** Facing southeast. (39.098008, -122.277686)	
Photo: 16 **Description:** View of residence on the near the Favero Ranch Corral Area entrance. **Orientation:** Facing north. (39.098654, -122.280381)	

Photo: 17

Description:

View of aboveground storage containing water located on the Favero Ranch Corral Area.

Orientation:

Facing northwest.
(39.098262, -122.278967)

Photo: 18

Description:

View gasoline and diesel aboveground storage tanks located on the Favero Ranch Corral Area.

Orientation:

Facing south.
(39.098204, -122.278801)

Photo: 19

Description:

View of open-air garage for equipment storage in the Favero Ranch Corral Area.

Orientation:

Facing southeast.
(39.09819, -122.27843)

Photo: 20

Description:

View of poly tanks containing liquid feed next to the open-air garage in the Favero Ranch Corral Area.

Orientation:

Facing southwest.
(39.098181, -122.277958)

Photo: 21 **Description:** View of Favero Ranch Corral Area. **Orientation:** Facing west. (39.098088, -122.277628)	

Photo: 22 **Description:** View of adjacent property. **Orientation:** Facing west. (39.098054, -122.281652)	

Photo: 23

Description:

View of adjacent property with homestead.

Orientation:

Facing northwest.
(39.099323, -122.281588)

Photo: 24

Description:

View of recently plowed field in the southern portion of the Subject Property.

Orientation:

Facing southwest.
(39.092323, -122.264595)

APPENDIX B: INTERVIEW DOCUMENTATION

TETRA TECH

Phase I Environmental Site Assessment
User Questionnaire
Janus Solar and Battery Storage Project in Colusa County, CA

The purpose of this questionnaire is to assist us in compiling the information required by ASTM Standard E2247-16, *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process for Farmland or Rural Property*—the standard for conducting Phase I Environmental Site Assessments. Please answer questions to the best of your ability. If an answer cannot be provided, write “Unknown.”

Question	Response/Comments
1. Is the User aware of any environmental cleanup liens against the Property that are filed or recorded under federal, tribal, state or local law?	No
2. Is the User aware of any AULs, such as engineering controls, land use restrictions or institutional controls that are in place on the Property and/or have been filed or recorded in a registry under federal, state or local law?	No
3. Does the User have any specialized knowledge or experience related to the Property or nearby properties?	No
4. Is the User involved in the same line of business as the current or former occupants of the Property or on adjoining properties so that they would have knowledge of the chemicals and processes used by current or former occupants?	No
5. Is the User aware of any commonly known or reasonably ascertainable information about the Property that would help the environmental professional to identify conditions indicative of releases or threatened releases?	Yes
6. Is the User aware of specific chemicals that are or may have been present on the Property, spills or chemical releases on the property, or any cleanups that may have taken place on the Property?	No

Question	Response/Comments
7. Is it the User's opinion that the purchase (or lease) price being paid for Property reasonably reflects the fair market value of the Property?	Yes
8. Is the User aware of any obvious indicators that point to the presence or likely presence of contamination on the Property?	No

Please use space below to provide additional explanation of any your responses above:

The property has been used as a cattle ranch for many years. It has also been used to farm alfalfa, wheat, oats, and rye. Artificial water channels and drainages have been created to care for the cattle.

The questionnaire was completed by:

Name of User (or Representative) Alex Salas

Company, Address, and Phone Number RWE Solar Development, LLC

Signature Alex Salas

Date July 9, 2024

Email Address Alex.salas@rwe.com

ENVIRONMENTAL DUE DILIGENCE
OWNER/OCCUPANT QUESTIONNAIRE

The time you take to complete this questionnaire will help Tetra Tech minimize the impact on your time and staff resources when we arrive onsite. Please feel free to use additional sheets if necessary. Thank you!

SOURCE OF KNOWLEDGE CONCERNING SITE	
1. Name of individual completing questionnaire	Michael Rex Favero
2. Title	Owner
3. Telephone	916 487-9100
4. Fax	916 488-6757
5. What is the nature of your knowledge of the Site (i.e. on-site management, staff, absentee owner, etc.)?	Owner for decades
6. When does your first-hand knowledge of the Site begin (year)?	1984

BASIC SITE INFORMATION		Check if appropriate	✓
1. Site number or unique identifier, such as facility name	Excepting certain portions of 018-050-013 and 018-050-0005 APN: 018-050-013, 018-050-005, 018-050-006		
2. Site address, including zip code	1958 and 1961 Spring Valley Road Williams, CA 95987		
3. Inside incorporated area of...		Not applicable	X
4. County	Colusa		
5. Legal description (please attach if available)		Don't know...	X
6. Approximate size of property	900 acres	Don't know...	
7. Tax parcel number	See Above	Don't know...	

CURRENT SITE CONDITIONS	
1. Who owns the Site?	Paul and Rex Favero
2. Does anyone other than the owner occupy the Site?	yes
3. What is the nature of the current use?	Cattle ranch
4. When was the Site first occupied and/or developed?	unknown
5. Was the Site ever occupied for the same use by a previous occupant? If so, when?	Yes – immediatley prior to us. (1984)

SITE FEATURES/INDICATORS OF RECOGNIZED ENVIRONMENTAL CONDITIONS				
To the best of your knowledge, does the subject Site have, or has it ever had…	**Please check (✓) as appropriate**			
	Never had	**Currently has**	**Formerly had**	**Don't know**
1. Underground storage tanks?	X			
2. Indications of a release from an underground storage tank?	X			
3. Above-ground storage tanks?		Fuel and Water		
4. Fuel storage and dispensing equipment?		X		
5. Ponds, pits or lagoons?		Water		
6. A septic system?	X			
7. Water wells?		X		
8. Disposal wells?	X			
9. Retention basins?		Water		
10. Paint Booth?	X			
11. Wash Rack or Area?	X			
12. Storm drains?	X			
13. Dry wells?				X
14. On-site waste treatment or disposal?		X		

SITE FEATURES/INDICATORS OF RECOGNIZED ENVIRONMENTAL CONDITIONS				
To the best of your knowledge, does the subject Site have, or has it ever	**Please check (✓) as appropriate**			
	Never had	**Currently has**	**Formerly had**	**Don't know**
15. Electrical transformers or other equipment potentially containing polychlorinated biphenyls (PCBs)?	X			
16. Stationary, in-the-ground hydraulic lifts?	X			
17. Fill material brought onto the Site? By whom?	X			
18. Pipelines carrying petroleum or hazardous materials?	X			
19. Stained soil?	X			
20. Unusual odors?	X			
21. Pipes, fill ports, or access ways of unknown origin protruding from the ground?	X			
22. Sheen or other discoloration of surface water?	X			
23. Distressed vegetation (other than due to lack of water)?	X			
24. Does the Site accept construction debris for pit backfill?	X			
25. Mixing, filling, or on-site application of pesticides other than for structural treatment or sanitation?	X			
26. Environmental assessments or investigations?	X			
27. Lead-based paint?	X			
28. Surveys for lead-based paint?	X			
29. Lead abatement activities?	X			
30. Asbestos-containing materials?	X			
31. Asbestos surveys?	X			
32. Asbestos abatement activities?	X			

SITE FEATURES/INDICATORS OF RECOGNIZED ENVIRONMENTAL CONDITIONS				
To the best of your knowledge, does the subject Site have, or has it ever	**Please check (✓) as appropriate**			
	Never had	**Currently has**	**Formerly had**	**Don't know**
33. Environmental liens against the Site?	X			
34. Notices of environmental violations from any regulatory agency?	X			
35. Any investigation by a governmental agency of potential responsibility for environmental contamination, including responsibility for off-Site concerns?	X			
36. Any lawsuits, disputes or administrative proceedings regarding environmental concerns associated with the Site, or activities conducted at the Site?	X			

PREVIOUS SITE USES			
To the best of your knowledge, please identify previous uses, occupants, and dates of occupancy for the subject Site		**Check if appropriate**	✓
• Previous occupant	Kron	Don't know	
• Nature of use	Cattle ranch	Don't know	
• Dates of occupancy		Don't know	X
• Previous occupant		Don't know	X
• Nature of use		Don't know	X
• Dates of occupancy		Don't know	X
• Previous occupant		Don't know	X
• Nature of use		Don't know	X
• Dates of occupancy		Don't know	X

To the best of your knowledge, has the subject Site or an adjoining property ever been used as a...	Subject Site			Adjoining Properties (including those across the street)		
	Yes	No	Don't Know	Yes	No	Don't Know
1. Fueling station (other than during current use)?		X			X	

PREVIOUS SITE USES						
2. Manufacturing facility		X				
3. Vehicle repair facility?		X				
4. Commercial printing facility?		X				
5. Dry cleaner?		X				
6. Photo-processing laboratory?		X				
7. Junkyard?		X				
8. Commercial painting facility?		X				
9. Recycler?		X				
10. Waste treatment, storage or disposal facility?		X				
11. Waste transfer station?		X				
12. Landfill?		X				
13. Pest control facility?		X				
14. Asphalt batch plants?		X				
15. Concrete batch plants?		X				
16. Gravel pit or other mining operations?		X				
17. Other industrial facility?		X				

WASTE DISPOSAL	**How is waste disposed of and by whom (if applicable)?**	**Check (✓) if N/A**
1. Used oil		X
2. Oil filters		X
3. Wash rack oil/grease		X
4. Mud/grit from wash racks		X
5. Paint waste		X
6. Solvent wash tank waste		X
7. Off-spec fuel		X
8. Waste antifreeze		X
9. Non-hazardous solid waste (dumpsters)	2 YARD DUMPSTER BY LOCAL WASTE PROVIDER	

10. Tires		X
11. Batteries		X
12. Return concrete or off-spec products		X
13. Slimes or fines from wash plant		X
14. Other wastes (please specify)		X
15. Other wastes (please specify)		X

UTILITIES	
Who provide the following services to the Site?	
1. drinking water	SELF
2. gas	FERRELL GAS (PROPANE)
3. electricity	PGE
4. heating oil, if applicable	N/A
5. sanitary sewage disposal	N/A
6. garbage disposal	LOCAL PROVIDER
7. industrial wastewater disposal	N/A

PERMITS

To the best of your knowledge, does the Site have, or has it ever had, any of the following?	**Yes**	**No**	**Don't know**	**Descriptions and/or comments**
1. Storm Water Discharge Permit? Issuing agency and issue date? Fees/taxes paid? Any actions required? When?		X		Permit No. Expiration Date:
2. Air quality permit? Issuing agency and issue date? Fees/taxes paid? Any actions required? When?		X		Permit No. Expiration Date:
3. Is the Site registered as a hazardous waste generator? Other registration numbers? Fees/taxes paid? Any actions required? When?		X		RCRA EPA ID No. RCRA State ID No.

4. Wastewater discharge permit? Issuing agency and issue date? Fees/taxes paid? Any actions required? When?		X		Permit No. Expiration Date:
5. Reclamation or mining permit?		X		
				Permit No. Expiration Date:
				Permit No. Expiration Date:
				Permit No. Expiration Date:
6. Special use permit?		X		
				Permit No. Expiration Date:
				Permit No. Expiration Date:
				Permit No. Expiration Date:
7. Any other types of permits? Please list.		X		
				Permit No. Expiration Date:
				Permit No. Expiration Date:
				Permit No. Expiration Date:

OTHER HELPFUL DOCUMENTS	Check (✓) if Yes (attach copy of each document)	Check (✓) if No
Do you have any other knowledge or experience with the *property* that may be pertinent to the *environmental professional* (for example, copies of any available prior *environmental site assessment reports*, documents, correspondence, etc., concerning the *property* and its environmental conditions. These include, but are not necessarily limited to:		
1. Environmental site assessment report(s)		X
2. Environmental compliance audit report(s)		X
3. Environmental permit(s) and/or registrations		X
4. Registrations for underground storage tanks and/or above-ground storage tanks		X
5. Registrations for underground injection systems		X
6. Material safety data sheets		X
7. Community right-to-know reports		X
8. Safety plans; preparedness and prevention/contingency plans; spill prevention, control, and countermeasures plans; etc.		X
9. Reports regarding hydrogeologic conditions on the property or surrounding area		X
10. Notices or other correspondence from any government agency relating to past or current violations of environmental laws with respect to the property or relating to environmental liens encumbering the property		X
11. Hazardous waste generator notices or reports		X
12. Geotechnical studies and tests		X
13. Risk assessments		X
14. Deed restrictions and/or other activity and use limitations (AULs)		X

15. Other (please specify)		X

Completed by:

Signature	Michael Rex Favero
Printed Name	Michael Rex Favero
Organization	Favero Ranch
Date	7-9-24

APPENDIX C: REGULATORY DATABASE REPORT

DATABASE REPORT

Project Property:	*Janus Solar* *Colusa County* *Williams CA*
Project No:	*194-1129-0040*
Report Type:	*Database Report*
Order No:	*24070100592*
Requested by:	*Tetra Tech, Inc.*
Date Completed:	*July 3, 2024*

Environmental Risk Information Services
A division of Glacier Media Inc.
1.866.517.5204 | info@erisinfo.com | erisinfo.com

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Executive Summary

Property Information:

Project Property:		*Janus Solar* *Colusa County Williams CA*
Project No:		*194-1129-0040*
Coordinates:		
	Latitude:	*39.09464762*
	Longitude:	*-122.2683889*
	UTM Northing:	*4,327,534.54*
	UTM Easting:	*563,267.36*
	UTM Zone:	*UTM Zone 10S*
Elevation:		*309 FT*

Order Information:

Order No:	*24070100592*
Date Requested:	*July 1, 2024*
Requested by:	*Tetra Tech, Inc.*
Report Type:	*Database Report*

Historicals/Products:

Aerial Photographs	*Historical Aerials (with Project Boundaries)*
City Directory Search	*CD - 2 Street Search*
ERIS Xplorer	*ERIS Xplorer*
Excel Add-On	*Excel Add-On*
Fire Insurance Maps	*US Fire Insurance Maps*
Physical Setting Report (PSR)	*Physical Setting Report (PSR)*
Topographic Map	*Topographic Maps*
Vapor Screening Tool	*Vapor Screening Tool*

Executive Summary: Report Summary

Database	Searched	Search Radius	Project Property	Within 0.12mi	0.125mi to 0.25mi	0.25mi to 0.50mi	0.50mi to 1.00mi	Total
Standard Environmental Records								
Federal								
NPL	Y	1	0	0	0	0	0	0
PROPOSED NPL	Y	1	0	0	0	0	0	0
DELETED NPL	Y	0.5	0	0	0	0	-	0
SEMS	Y	0.5	0	0	0	0	-	0
ODI	Y	0.5	0	0	0	0	-	0
SEMS ARCHIVE	Y	0.5	0	0	0	0	-	0
CERCLIS	Y	0.5	0	0	0	0	-	0
IODI	Y	0.5	0	0	0	0	-	0
CERCLIS NFRAP	Y	0.5	0	0	0	0	-	0
CERCLIS LIENS	Y	PO	0	-	-	-	-	0
RCRA CORRACTS	Y	1	0	0	0	0	0	0
RCRA TSD	Y	0.5	0	0	0	0	-	0
RCRA LQG	Y	0.25	0	0	0	-	-	0
RCRA SQG	Y	0.25	0	0	0	-	-	0
RCRA VSQG	Y	0.25	0	0	0	-	-	0
RCRA NON GEN	Y	0.25	0	0	0	-	-	0
RCRA CONTROLS	Y	0.5	0	0	0	0	-	0
FED ENG	Y	0.5	0	0	0	0	-	0
FED INST	Y	0.5	0	0	0	0	-	0
LUCIS	Y	0.5	0	0	0	0	-	0
NPL IC	Y	0.5	0	0	0	0	-	0
ERNS 1982 TO 1986	Y	PO	0	-	-	-	-	0
ERNS 1987 TO 1989	Y	PO	0	-	-	-	-	0
ERNS	Y	PO	0	-	-	-	-	0
FED BROWNFIELDS	Y	0.5	0	0	0	0	-	0
FEMA UST	Y	0.25	0	0	0	-	-	0
FRP	Y	0.25	0	0	0	-	-	0

Database	Searched	Search Radius	Project Property	Within 0.12mi	0.125mi to 0.25mi	0.25mi to 0.50mi	0.50mi to 1.00mi	Total
DELISTED FRP	Y	0.25	0	0	0	-	-	0
HIST GAS STATIONS	Y	0.25	0	0	0	-	-	0
REFN	Y	0.25	0	0	0	-	-	0
BULK TERMINAL	Y	0.25	0	0	0	-	-	0
SEMS LIEN	Y	PO	0	-	-	-	-	0
SUPERFUND ROD	Y	1	0	0	0	0	0	0
DOE FUSRAP	Y	1	0	0	0	0	0	0
State								
RESPONSE	Y	1	0	0	0	0	0	0
ENVIROSTOR	Y	1	0	0	0	0	0	0
DELISTED ENVS	Y	1	0	0	0	0	0	0
SWF/LF	Y	0.5	0	0	0	0	-	0
SWRCB SWF	Y	0.5	0	0	0	0	-	0
WMUD	Y	0.5	0	0	0	0	-	0
HWP	Y	1	0	0	0	0	0	0
SWAT	Y	0.5	0	0	0	0	-	0
C&D DEBRIS RECY	Y	0.5	0	0	0	0	-	0
RECYCLING	Y	0.5	0	0	0	0	-	0
PROCESSORS	Y	0.5	0	0	0	0	-	0
CONTAINER RECY	Y	0.5	0	0	0	0	-	0
LDS	Y	0.5	0	0	0	0	-	0
LUST	Y	0.5	0	0	0	0	-	0
DELISTED LST	Y	0.5	0	0	0	0	-	0
UST	Y	0.25	0	0	0	-	-	0
UST CLOSURE	Y	0.5	0	0	0	0	-	0
HHSS	Y	0.25	0	0	0	-	-	0
UST SWEEPS	Y	0.25	0	0	0	-	-	0
AST	Y	0.25	0	0	0	-	-	0
AST SWRCB	Y	0.25	0	0	0	-	-	0
TANK OIL GAS	Y	0.25	0	0	0	-	-	0
DELISTED TNK	Y	0.25	0	0	0	-	-	0
CERS TANK	Y	0.25	0	0	0	-	-	0
DELISTED CTNK	Y	0.25	0	0	0	-	-	0
HIST TANK	Y	0.25	0	0	0	-	-	0

Database	Searched	Search Radius	Project Property	Within 0.12mi	0.125mi to 0.25mi	0.25mi to 0.50mi	0.50mi to 1.00mi	Total
LUR	Y	0.5	0	0	0	0	-	0
CALSITES	Y	0.5	0	0	0	0	-	0
HLUR	Y	0.5	0	0	0	0	-	0
DEED	Y	0.5	0	0	0	0	-	0
VCP	Y	0.5	0	0	0	0	-	0
CLEANUP SITES	Y	0.5	0	0	0	0	-	0
DELISTED CLEANUP	Y	0.5	0	0	0	0	-	0
DELISTED COUNTY	Y	0.25	0	0	0	-	-	0
Tribal								
INDIAN LUST	Y	0.5	0	0	0	0	-	0
INDIAN UST	Y	0.25	0	0	0	-	-	0
DELISTED INDIAN LST	Y	0.5	0	0	0	0	-	0
DELISTED INDIAN UST	Y	0.25	0	0	0	-	-	0
County								
CUPA COLUSA	Y	0.25	0	0	0	-	-	0

Additional Environmental Records

Federal

Database	Searched	Search Radius	Project Property	Within 0.12mi	0.125mi to 0.25mi	0.25mi to 0.50mi	0.50mi to 1.00mi	Total
PFAS GHG	Y	0.5	0	0	0	0	-	0
OSC RESPONSE	Y	0.125	0	0	-	-	-	0
FINDS/FRS	Y	PO	0	-	-	-	-	0
TRIS	Y	PO	0	-	-	-	-	0
PFAS NPL	Y	0.5	0	0	0	0	-	0
PFAS FED SITES	Y	0.5	0	0	0	0	-	0
PFAS SSEHRI	Y	0.5	0	0	0	0	-	0
ERNS PFAS	Y	0.5	0	0	0	0	-	0
PFAS NPDES	Y	0.5	0	0	0	0	-	0
PFAS TRI	Y	0.5	0	0	0	0	-	0
PFAS WATER	Y	0.5	0	0	0	0	-	0
PFAS TSCA	Y	0.5	0	0	0	0	-	0
PFAS E-MANIFEST	Y	0.5	0	0	0	0	-	0
PFAS IND	Y	0.5	0	0	0	0	-	0
HMIRS	Y	0.125	0	0	-	-	-	0
NCDL	Y	0.125	0	0	-	-	-	0
TSCA	Y	0.125	0	0	-	-	-	0

Database	Searched	Search Radius	Project Property	Within 0.12mi	0.125mi to 0.25mi	0.25mi to 0.50mi	0.50mi to 1.00mi	Total
HIST TSCA	Y	0.125	0	0	-	-	-	0
FTTS ADMIN	Y	PO	0	-	-	-	-	0
FTTS INSP	Y	PO	0	-	-	-	-	0
PRP	Y	PO	0	-	-	-	-	0
SCRD DRYCLEANER	Y	0.5	0	0	0	0	-	0
ICIS	Y	PO	0	-	-	-	-	0
FED DRYCLEANERS	Y	0.25	0	0	0	-	-	0
DELISTED FED DRY	Y	0.25	0	0	0	-	-	0
FUDS	Y	1	0	0	0	0	0	0
FUDS MRS	Y	1	0	0	0	0	0	0
FORMER NIKE	Y	1	0	0	0	0	0	0
PIPELINE INCIDENT	Y	PO	0	-	-	-	-	0
MLTS	Y	PO	0	-	-	-	-	0
HIST MLTS	Y	PO	0	-	-	-	-	0
MINES	Y	0.25	0	0	0	-	-	0
SMCRA	Y	1	0	0	0	0	0	0
MRDS	Y	1	0	0	0	0	0	0
LM SITES	Y	1	0	0	0	0	0	0
ALT FUELS	Y	0.25	0	0	0	-	-	0
CONSENT DECREES	Y	0.25	0	0	0	-	-	0
AFS	Y	PO	0	-	-	-	-	0
SSTS	Y	0.25	0	0	0	-	-	0
PCBT	Y	0.5	0	0	0	0	-	0
PCB	Y	0.5	0	0	0	0	-	0
State								
PFAS SAMPLING	Y	0.5	0	0	0	0	-	0
DRYCLEANERS	Y	0.25	0	0	0	-	-	0
DELISTED DRYCLEANERS	Y	0.25	0	0	0	-	-	0
DRYC GRANT	Y	0.25	0	0	0	-	-	0
PFAS GT CLEANUPS	Y	0.5	0	0	0	0	-	0
PFAS GW	Y	0.5	0	0	0	0	-	0
PFAS INVEST	Y	0.5	0	0	0	0	-	0
HWSS CLEANUP	Y	0.5	0	0	0	0	-	0
TOXIC PITS	Y	1	0	0	0	0	0	0
DTSC HWF	Y	0.5	0	0	0	0	-	0

Database	Searched	Search Radius	Project Property	Within 0.12mi	0.125mi to 0.25mi	0.25mi to 0.50mi	0.50mi to 1.00mi	Total
INSP COMP ENF	Y	1	0	0	0	0	0	0
SCH	Y	1	0	0	0	0	0	0
CHMIRS	Y	PO	0	-	-	-	-	0
HIST CHMIRS	Y	PO	0	-	-	-	-	0
HAZNET	Y	PO	0	-	-	-	-	0
HAZ GEN	Y	PO	0	-	-	-	-	0
HAZ TSD	Y	0.5	0	0	0	0	-	0
HIST MANIFEST	Y	PO	0	-	-	-	-	0
HW TRANSPORT	Y	0.125	0	0	-	-	-	0
WASTE TIRE	Y	PO	0	-	-	-	-	0
MEDICAL WASTE	Y	0.25	0	0	0	-	-	0
HIST CORTESE	Y	0.5	0	0	0	0	-	0
CDO/CAO	Y	0.5	0	0	0	0	-	0
CERS HAZ	Y	0.125	0	0	-	-	-	0
DELISTED HAZ	Y	0.5	0	0	0	**2**	-	**2**
GEOTRACKER	Y	0.125	0	0	-	-	-	0
MINE	Y	1	0	0	0	0	0	0
LIEN	Y	PO	0	-	-	-	-	0
WASTE DISCHG	Y	0.25	0	0	0	-	-	0
EMISSIONS	Y	0.25	0	0	0	-	-	0
CDL	Y	0.125	0	0	-	-	-	0
Tribal	***No Tribal additional environmental record sources available for this State.***							
County								
	Total:		0	0	0	**2**	0	**2**

**** PO – Property Only***
**** 'Property and adjoining properties' database search radii are set at 0.25 miles.***

Executive Summary: Site Report Summary - Project Property

Map Key	DB	Company/Site Name	Address	Direction	Distance (mi/ft)	Elev Diff (ft)	Page Number

No records found in the selected databases for the project property.

Executive Summary: Site Report Summary - Surrounding Properties

Map Key	*DB*	*Company/Site Name*	*Address*	*Direction*	*Distance (mi/ft)*	*Elev Diff (ft)*	*Page Number*
1	DELISTED HAZ	Somerset #1	SECTION 4 TOWNSHIP 14N RANGE 2W WILLIAMS CA 95987	NW	0.27 / 1,415.68	-9	17
1	DELISTED HAZ	Magnum #1	HWY 20 / SECTION 6 TOWNSHIP 15N RANGE 2W WILLIAMS CA 95987	NW	0.27 / 1,415.68	-9	17

Executive Summary: Summary by Data Source

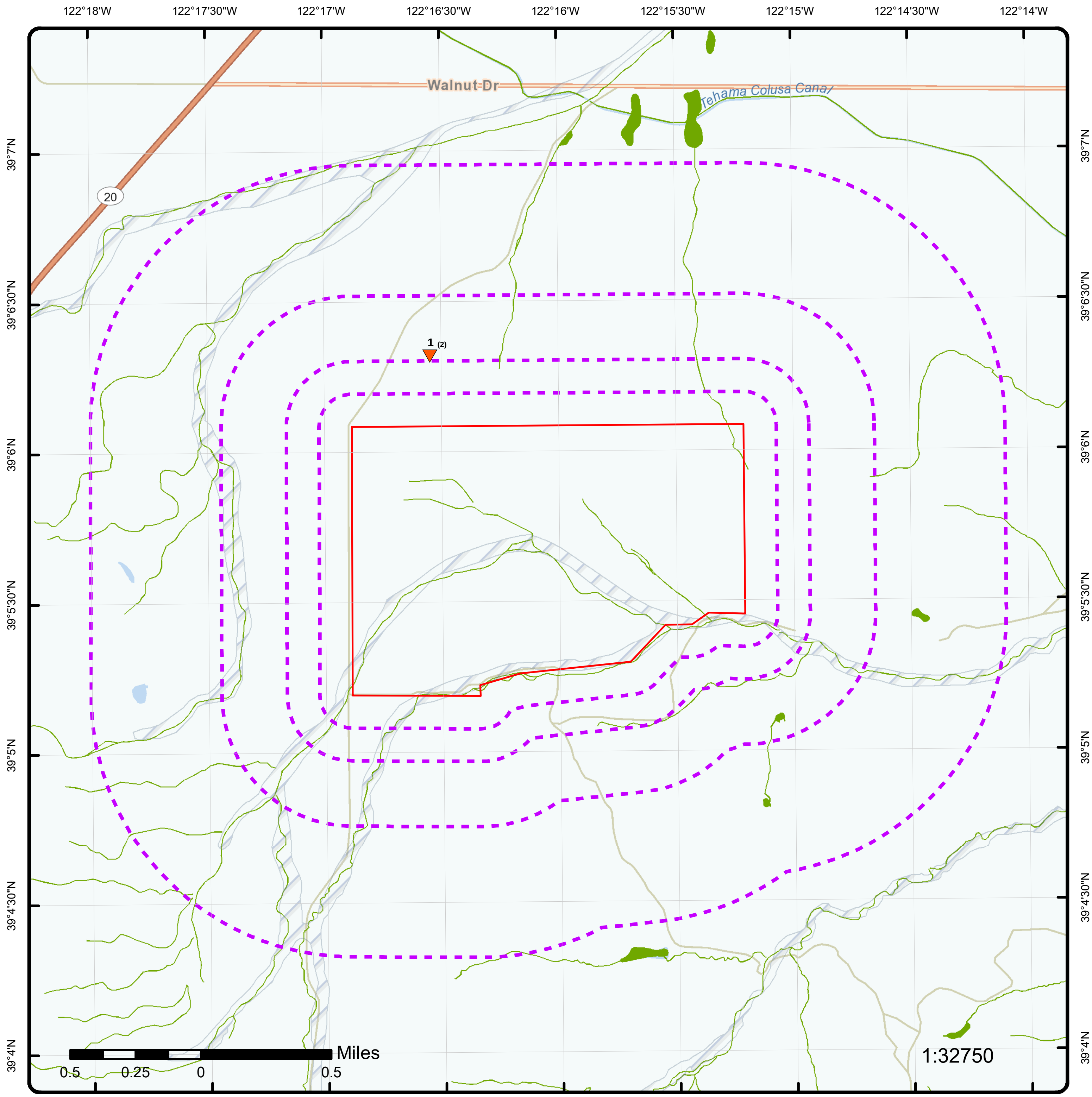
Non Standard

State

DELISTED HAZ - Delisted Environmental Reporting System (CERS) Hazardous Waste Sites

A search of the DELISTED HAZ database, dated Nov 29, 2018 has found that there are 2 DELISTED HAZ site(s) within approximately 0.50miles of the project property.

Lower Elevation	Address	Direction	Distance (mi/ft)	Map Key
Magnum #1	HWY 20 / SECTION 6 TOWNSHIP 15N RANGE 2W WILLIAMS CA 95987	NW	0.27 / 1,415.68	1
Somerset #1	SECTION 4 TOWNSHIP 14N RANGE 2W WILLIAMS CA 95987	NW	0.27 / 1,415.68	1



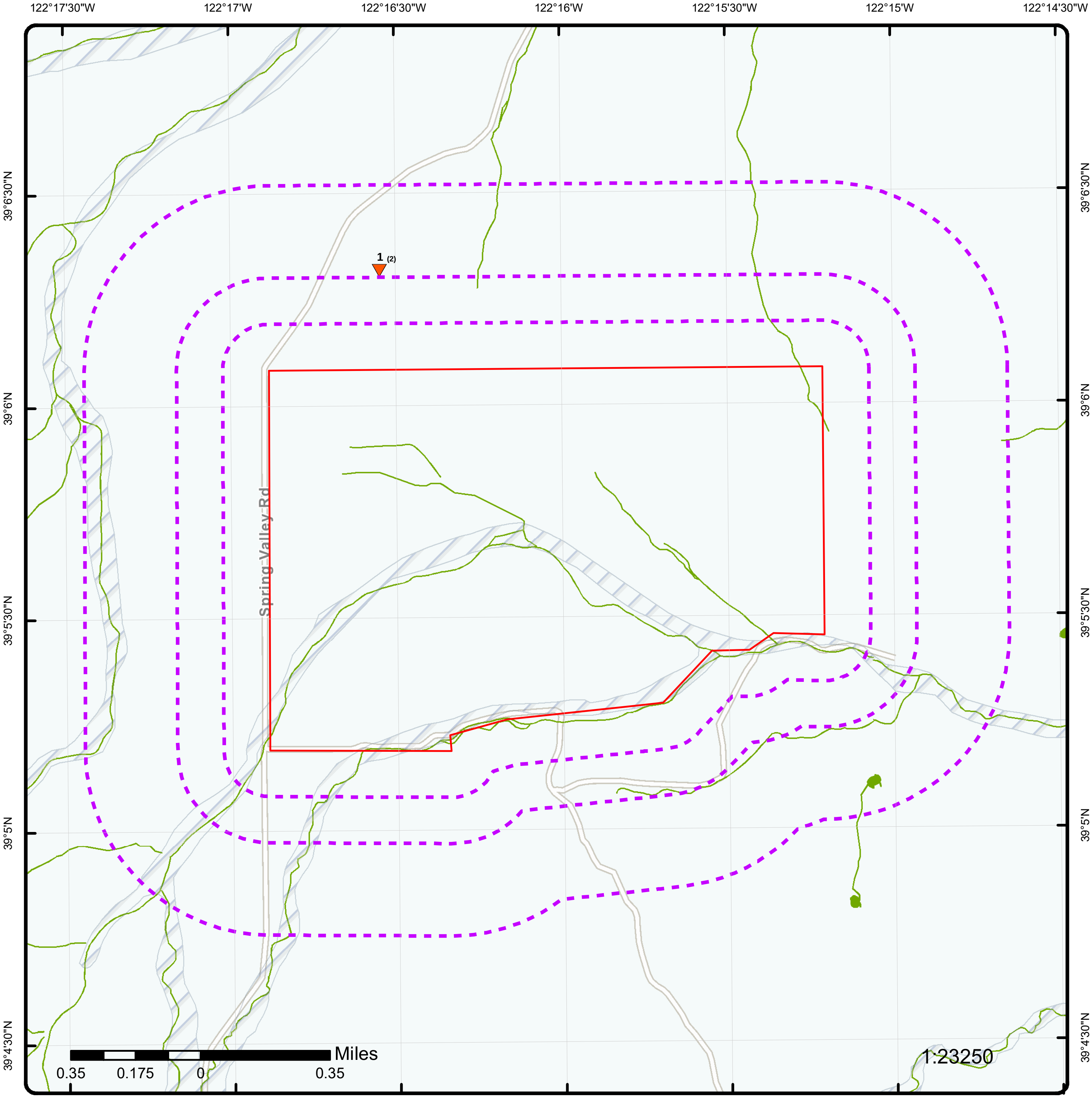
Map: 1.0 Mile Radius

Order Number: 24070100592

Address: Colusa County, Williams, CA

- Project Property
- Buffer Outline
- Sites with Higher Elevation
- Sites with Same Elevation
- Sites with Lower Elevation
- Sites with Unknown Elevation
- Areas with Higher Elevation
- Areas with Same Elevation
- Areas with Lower Elevation
- Areas with Unknown Elevation
- Freeways; Highways
- Traffic Circle; Ramp
- Major & Minor Arterial
- Traffic Circle; Ramp
- Local Road
- Rail
- State
- Country
- National Wetland
- Indian Reserve Land
- 100 Year Flood Zone
- 500 Year Flood Zone
- FWS Special Designation Areas
- National Priorities List (Active, Delisted, Proposed, Institutional Control)

Source: © 2021 ESRI StreetMap Premium



Map: 0.5 Mile Radius

Order Number: 24070100592

Address: Colusa County, Williams, CA

Project Property

Buffer Outline

Sites with Higher Elevation

Sites with Same Elevation

Sites with Lower Elevation

Sites with Unknown Elevation

Areas with Higher Elevation

Areas with Same Elevation

Areas with Lower Elevation

Areas with Unknown Elevation

Freeways; Highways

Traffic Circle; Ramp

Major & Minor Arterial

Traffic Circle; Ramp

Local Road

Rail

State

Country

National Wetland

Indian Reserve Land

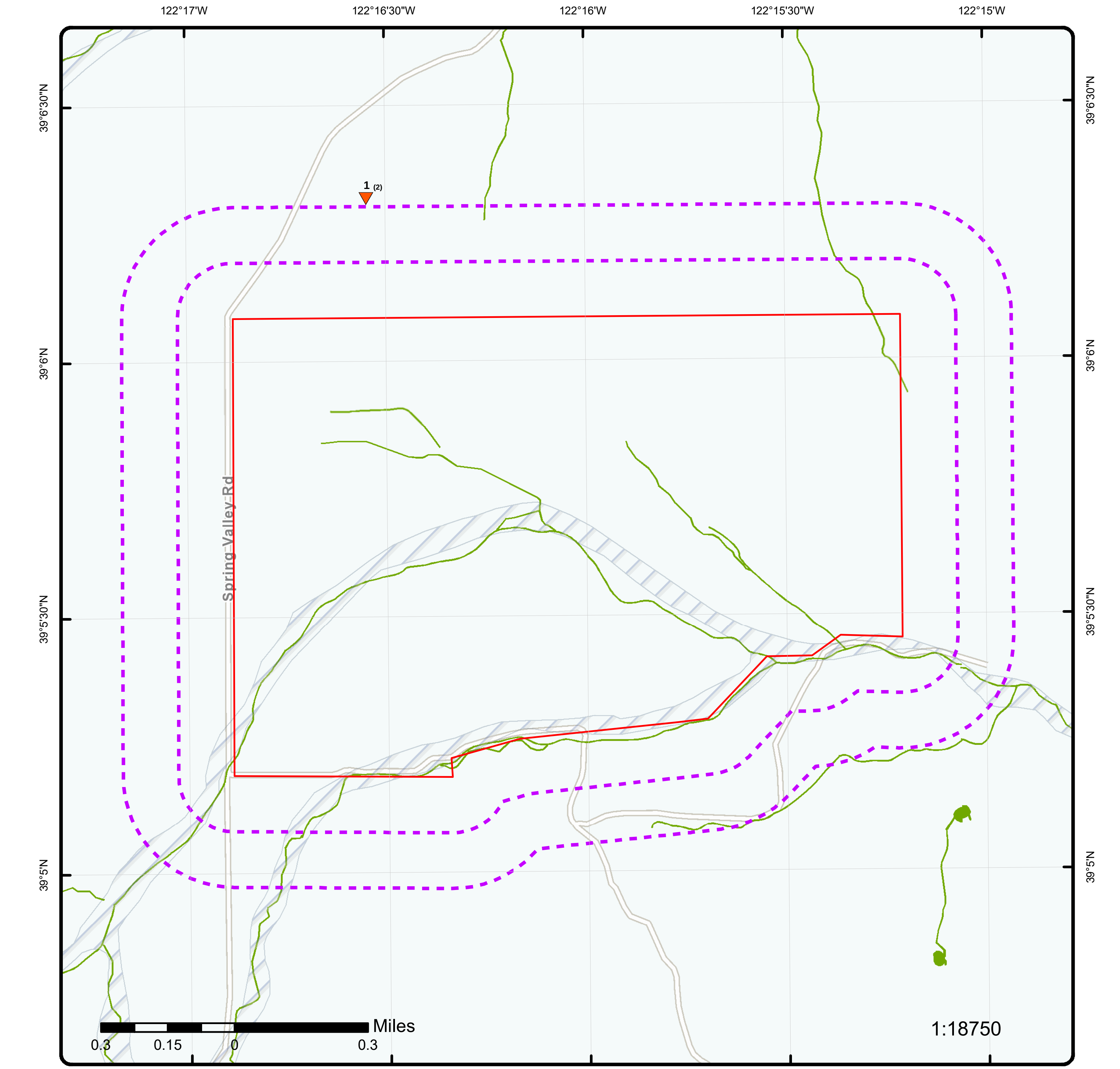
100 Year Flood Zone

500 Year Flood Zone

FWS Special Designation Areas

National Priorities List (Active, Delisted, Proposed, Institutional Control)

Source: © 2021 ESRI StreetMap Premium



Map: 0.25 Mile Radius

Order Number: 24070100592

Address: Colusa County, Williams, CA

Project Property

Buffer Outline

Sites with Higher Elevation

Sites with Same Elevation

Sites with Lower Elevation

Sites with Unknown Elevation

Areas with Higher Elevation

Areas with Same Elevation

Areas with Lower Elevation

Areas with Unknown Elevation

Freeways; Highways

Traffic Circle; Ramp

Major & Minor Arterial

Traffic Circle; Ramp

Local Road

Rail

State

Country

National Wetland

Indian Reserve Land

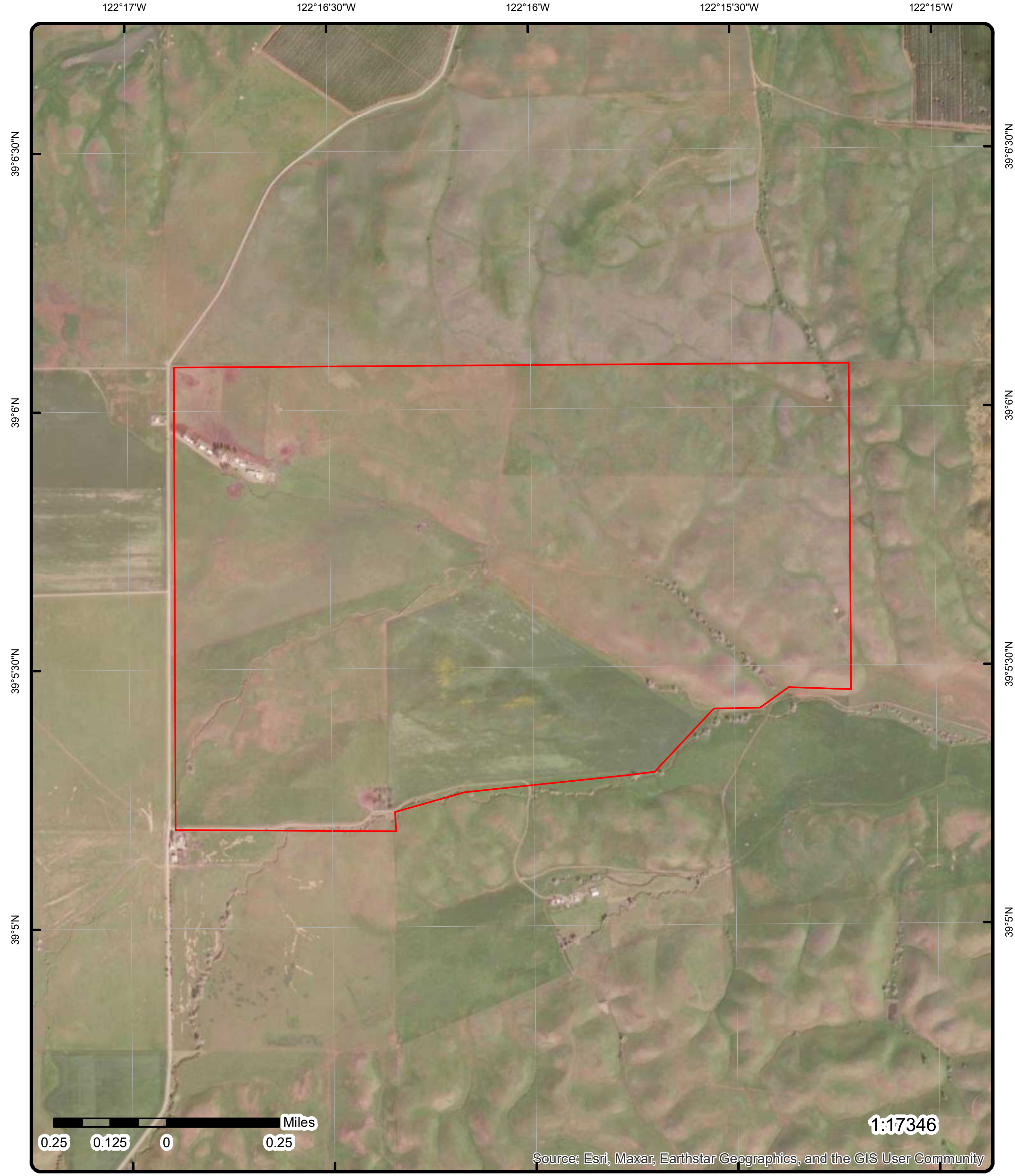
100 Year Flood Zone

500 Year Flood Zone

FWS Special Designation Areas

National Priorities List (Active, Delisted, Proposed, Institutional Control)

Source: © 2021 ESRI StreetMap Premium

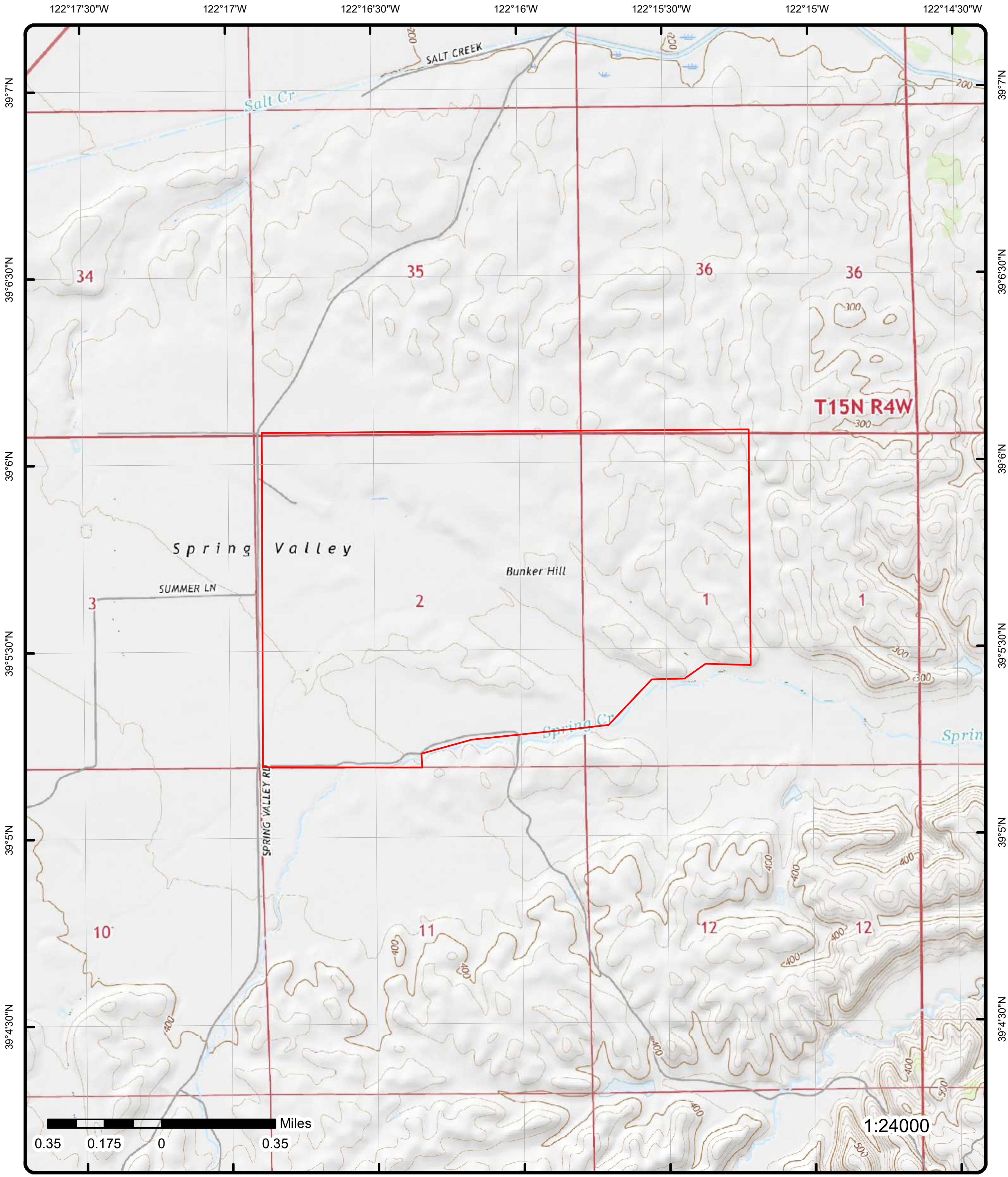


Aerial Year: 2022

Order Number: 24070100592

Address: Colusa County, Williams, CA

Source: ESRI World Imagery



Topographic Map

Year: 2021

Order Number: 24070100592

Address: Colusa County, CA

Quadrangle(s): Manor Slough CA, Williams CA, Cortina Creek CA, Salt Canyon CA

Source: USGS Topographic Map

Detail Report

Map Key	Number of Records	Direction	Distance (mi/ft)	Elev/Diff (ft)	Site	DB
1	1 of2	NW	0.27 / 1,415.68	300.20 / -9	Somerset #1 SECTION 4 TOWNSHIP 14N RANGE 2W WILLIAMS CA 95987	DELISTED HAZ

Siteid:	154623
Latitude:	39.105300
Longitude:	-122.275810
Original Source:	CHAZ
Record Date:	30-MAY-2017

Map Key	Number of Records	Direction	Distance (mi/ft)	Elev/Diff (ft)	Site	DB
1	2 of2	NW	0.27 / 1,415.68	300.20 / -9	Magnum #1 HWY 20 / SECTION 6 TOWNSHIP 15N RANGE 2W WILLIAMS CA 95987	DELISTED HAZ

Siteid:	132384
Latitude:	39.105300
Longitude:	-122.275810
Original Source:	CHAZ
Record Date:	30-MAY-2017

Unplottable Summary

Total: 0 Unplottable sites

DB	Company Name/Site Name	Address	City	Zip	ERIS ID

No unplottable records were found that may be relevant for the search criteria.

Unplottable Report

No unplottable records were found that may be relevant for the search criteria.

Appendix: Database Descriptions

Environmental Risk Information Services (ERIS) can search the following databases. The extent of historical information varies with each database and current information is determined by what is publicly available to ERIS at the time of update. ERIS updates databases as set out in ASTM Standard E1527-13 and E1527-21, Section 8.1.8 Sources of Standard Source Information:

"Government information from nongovernmental sources may be considered current if the source updates the information at least every 90 days, or, for information that is updated less frequently than quarterly by the government agency, within 90 days of the date the government agency makes the information available to the public."

Standard Environmental Record Sources

Federal

National Priority List: NPL

Sites on the United States Environmental Protection Agency (EPA)'s National Priorities List of the most serious uncontrolled or abandoned hazardous waste sites identified for possible long-term remedial action under the Superfund program. The NPL, which EPA is required to update at least once a year, is based primarily on the score a site receives from EPA's Hazard Ranking System. A site must be on the NPL to receive money from the Superfund Trust Fund for remedial action. Sites are represented by boundaries where available in the EPA Superfund Site Boundaries maintained by the Shared Enterprise Geodata and Services (SEGS). Site boundaries represent the footprint of a whole site, the sum of all of the Operable Units and the current understanding of the full extent of contamination; for Federal Facility sites, the total site polygon may be the Facility boundary. Where there is no polygon boundary data available for a given site, the site is represented as a point.

Government Publication Date: Apr 22, 2024

National Priority List - Proposed: PROPOSED NPL

Sites proposed by the United States Environmental Protection Agency (EPA), the state agency, or concerned citizens for addition to the National Priorities List (NPL) due to contamination by hazardous waste and identified by the EPA as a candidate for cleanup because it poses a risk to human health and/or the environment. Sites are represented by boundaries where available in the EPA Superfund Site Boundaries maintained by the Shared Enterprise Geodata and Services (SEGS). Site boundaries represent the footprint of a whole site, the sum of all of the Operable Units and the current understanding of the full extent of contamination; for Federal Facility sites, the total site polygon may be the Facility boundary. Where there is no polygon boundary data available for a given site, the site is represented as a point.

Government Publication Date: Apr 22, 2024

Deleted NPL: DELETED NPL

Sites deleted from the United States Environmental Protection Agency (EPA)'s National Priorities List. The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate. Sites are represented by boundaries where available in the EPA Superfund Site Boundaries maintained by the Shared Enterprise Geodata and Services (SEGS). Site boundaries represent the footprint of a whole site, the sum of all of the Operable Units and the current understanding of the full extent of contamination; for Federal Facility sites, the total site polygon may be the Facility boundary. Where there is no polygon boundary data available for a given site, the site is represented as a point.

Government Publication Date: Apr 22, 2024

SEMS List 8R Active Site Inventory: SEMS

The U.S. Environmental Protection Agency's (EPA) Superfund Program has deployed the Superfund Enterprise Management System (SEMS), which integrates multiple legacy systems into a comprehensive tracking and reporting tool. This inventory contains active sites evaluated by the Superfund program that are either proposed to be or are on the National Priorities List (NPL) as well as sites that are in the screening and assessment phase for possible inclusion on the NPL. The Active Site Inventory Report displays site and location information at active SEMS sites. An active site is one at which site assessment, removal, remedial, enforcement, cost recovery, or oversight activities are being planned or conducted. This data includes SEMS sites from the List 8R Active file as well as applicable sites from the EPA's Facility Registry Service map tool.

Government Publication Date: Mar 27, 2024

Inventory of Open Dumps, June 1985: ODI

The Resource Conservation and Recovery Act (RCRA) provides for publication of an inventory of open dumps. The Act defines "open dumps" as facilities which do not comply with EPA's "Criteria for Classification of Solid Waste Disposal Facilities and Practices" (40 CFR 257).

Government Publication Date: Jun 1985

SEMS List 8R Archive Sites: SEMS ARCHIVE

The U.S. Environmental Protection Agency's (EPA) Superfund Enterprise Management System (SEMS) Archived Site Inventory displays site and location information at sites archived from SEMS. An archived site is one at which EPA has determined that assessment has been completed and no further remedial action is planned under the Superfund program at this time. This data includes sites from the List 8R Archived site file.

Government Publication Date: Mar 27, 2024

Comprehensive Environmental Response, Compensation and Liability Information System - CERCLIS: CERCLIS

Superfund is a program administered by the United States Environmental Protection Agency (EPA) to locate, investigate, and clean up the worst hazardous waste sites throughout the United States. CERCLIS is a database of potential and confirmed hazardous waste sites at which the EPA Superfund program has some involvement. It contains sites that are either proposed to be or are on the National Priorities List (NPL) as well as sites that are in the screening and assessment phase for possible inclusion on the NPL. The EPA administers the Superfund program in cooperation with individual states and tribal governments; this database is made available by the EPA.

Government Publication Date: Oct 25, 2013

EPA Report on the Status of Open Dumps on Indian Lands: IODI

Public Law 103-399, The Indian Lands Open Dump Cleanup Act of 1994, enacted October 22, 1994, identified congressional concerns that solid waste open dump sites located on American Indian or Alaska Native (AI/AN) lands threaten the health and safety of residents of those lands and contiguous areas. The purpose of the Act is to identify the location of open dumps on Indian lands, assess the relative health and environment hazards posed by those sites, and provide financial and technical assistance to Indian tribal governments to close such dumps in compliance with Federal standards and regulations or standards promulgated by Indian Tribal governments or Alaska Native entities.

Government Publication Date: Dec 31, 1998

CERCLIS - No Further Remedial Action Planned: CERCLIS NFRAP

An archived site is one at which EPA has determined that assessment has been completed and no further remedial action is planned under the Superfund program at this time. The Archive designation means that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list this site on the National Priorities List (NPL). This decision does not necessarily mean that there is no hazard associated with a given site; it only means that, based upon available information, the location is not judged to be a potential NPL site.

Government Publication Date: Oct 25, 2013

CERCLIS Liens: CERCLIS LIENS

A Federal Superfund lien exists at any property where EPA has incurred Superfund costs to address contamination ("Superfund site") and has provided notice of liability to the property owner. A Federal CERCLA ("Superfund") lien can exist by operation of law at any site or property at which EPA has spent Superfund monies. This database is made available by the United States Environmental Protection Agency (EPA). This database was provided by the United States Environmental Protection Agency (EPA). Refer to SEMS LIEN as the current data source for Superfund Liens.

Government Publication Date: Jan 30, 2014

RCRA CORRACTS-Corrective Action: RCRA CORRACTS

RCRA Info is the U.S. Environmental Protection Agency's (EPA) comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. At these sites, the Corrective Action Program ensures that cleanups occur. EPA and state regulators work with facilities and communities to design remedies based on the contamination, geology, and anticipated use unique to each site.

Government Publication Date: Apr 8, 2024

RCRA non-CORRACTS TSD Facilities: RCRA TSD

RCRA Info is the U.S. Environmental Protection Agency's (EPA) comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. This database includes Non-Corrective Action sites that have indicated engagement in the treatment, storage, or disposal of hazardous waste which requires a RCRA hazardous waste permit.

Government Publication Date: Apr 8, 2024

RCRA Generator List: RCRA LQG

RCRA Info is the U.S. Environmental Protection Agency's (EPA) comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. RCRA Info replaces the data recording and reporting abilities of the Resource Conservation and Recovery Information System (RCRIS) and the Biennial Reporting System (BRS). A hazardous waste generator is any person or site whose processes and actions create hazardous waste (see 40 CFR 260.10). Large Quantity Generators (LQGs) generate 1,000 kilograms per month or more of hazardous waste or more than one kilogram per month of acutely hazardous waste.

Government Publication Date: Apr 8, 2024

RCRA Small Quantity Generators List: RCRA SQG

RCRA Info is the U.S. Environmental Protection Agency's (EPA) comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. RCRA Info replaces the data recording and reporting abilities of the Resource Conservation and Recovery Information System (RCRIS) and the Biennial Reporting System (BRS). A hazardous waste generator is any person or site whose processes and actions create hazardous waste (see 40 CFR 260.10). Small Quantity Generators (SQGs) generate more than 100 kilograms, but less than 1,000 kilograms, of hazardous waste per month.

Government Publication Date: Apr 8, 2024

RCRA Very Small Quantity Generators List: RCRA VSQG

RCRA Info is the U.S. Environmental Protection Agency's (EPA) comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. A hazardous waste generator is any person or site whose processes and actions create hazardous waste (see 40 CFR 260.10). Very Small Quantity Generators (VSQG) generate 100 kilograms or less per month of hazardous waste, or one kilogram or less per month of acutely hazardous waste. Additionally, VSQG may not accumulate more than 1,000 kilograms of hazardous waste at any time.

Government Publication Date: Apr 8, 2024

RCRA Non-Generators: RCRA NON GEN

RCRA Info is the U.S. Environmental Protection Agency's (EPA) comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. RCRA Info replaces the data recording and reporting abilities of the Resource Conservation and Recovery Information System (RCRIS) and the Biennial Reporting System (BRS). A hazardous waste generator is any person or site whose processes and actions create hazardous waste (see 40 CFR 260.10). Non-Generators do not presently generate hazardous waste.

Government Publication Date: Apr 8, 2024

RCRA Sites with Controls: RCRA CONTROLS

List of Resource Conservation and Recovery Act (RCRA) facilities with institutional controls in place. RCRA gives the U.S. Environmental Protection Agency (EPA) the authority to control hazardous waste from the "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of non-hazardous solid wastes. The 1986 amendments to RCRA enabled EPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances.

Government Publication Date: Apr 8, 2024

Federal Engineering Controls-ECs: FED ENG

List of Engineering controls (ECs) made availabe by the United States Environmental Protection Agency (EPA). ECs encompass a variety of engineered and constructed physical barriers (e.g., soil capping, sub-surface venting systems, mitigation barriers, fences) to contain and/or prevent exposure to contamination on a property. The EC listing includes remedy component data from Superfund decision documents for applicable sites on the final or deleted on the National Priorities List (NPL); and sites with a Superfund Alternative Approach (SAA) Agreement in place. The only sites included that are not on the NPL; proposed for NPL; or removed from proposed NPL, are those with an SAA Agreement in place.

Government Publication Date: Apr 22, 2024

Federal Institutional Controls- ICs: FED INST

List of Institutional controls (ICs) made available by the United States Environmental Protection Agency (EPA). ICs are non-engineered instruments, such as administrative and legal controls, that help minimize the potential for human exposure to contamination and/or protect the integrity of the remedy. Although it is EPA's expectation that treatment or engineering controls will be used to address principal threat wastes and that groundwater will be returned to its beneficial use whenever practicable, ICs play an important role in site remedies because they reduce exposure to contamination by limiting land or resource use and guide human behavior at a site. The IC listing includes remedy component data from Superfund decision documents for applicable sites on the final or deleted on the National Priorities List (NPL); and sites with a Superfund Alternative Approach (SAA) Agreement in place. The only sites included that are not on the NPL; proposed for NPL; or removed from proposed NPL, are those with an SAA Agreement in place.

Government Publication Date: Apr 22, 2024

Land Use Control Information System: LUCIS

The LUCIS database is maintained by the U.S. Department of the Navy and contains information for former Base Realignment and Closure (BRAC) properties across the United States.

Government Publication Date: Sep 1, 2006

Institutional Control Boundaries at NPL sites: NPL IC

Boundaries of Institutional Control areas at sites on the United States Environmental Protection Agency (EPA)'s National Priorities List, or Proposed or Deleted, made available by the EPA's Shared Enterprise Geodata and Services (SEGS). United States Environmental Protection Agency (EPA)'s National Priorities List of the most serious uncontrolled or abandoned hazardous waste sites identified for possible long-term remedial action under the Superfund program. Institutional controls are non-engineered instruments such as administrative and legal controls that help minimize the potential for human exposure to contamination and/or protect the integrity of the remedy.

Government Publication Date: Apr 22, 2024

Emergency Response Notification System: ERNS 1982 TO 1986

Database of oil and hazardous substances spill reports controlled by the National Response Center. The primary function of the National Response Center is to serve as the sole national point of contact for reporting oil, chemical, radiological, biological, and etiological discharges into the environment anywhere in the United States and its territories.

Government Publication Date: 1982-1986

Emergency Response Notification System: ERNS 1987 TO 1989

Database of oil and hazardous substances spill reports controlled by the National Response Center. The primary function of the National Response Center is to serve as the sole national point of contact for reporting oil, chemical, radiological, biological, and etiological discharges into the environment anywhere in the United States and its territories.

Government Publication Date: 1987-1989

Emergency Response Notification System: ERNS

Database of oil and hazardous substances spill reports made available by the United States Coast Guard National Response Center (NRC). The NRC fields initial reports for pollution and railroad incidents and forwards that information to appropriate federal/state agencies for response. These data contain initial incident data that has not been validated or investigated by a federal/state response agency.

Government Publication Date: Apr 28, 2024

The Assessment, Cleanup and Redevelopment Exchange System (ACRES) Brownfield Database: FED BROWNFIELDS

Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties protects the environment, reduces blight, and takes development pressures off greenspaces and working lands. This data is provided by the United States Environmental Protection Agency (EPA) and includes Brownfield sites from the Cleanups in My Community (CIMC) web application.

Government Publication Date: Feb 7, 2024

FEMA Underground Storage Tank Listing: FEMA UST

The Federal Emergency Management Agency (FEMA) of the Department of Homeland Security maintains a list of FEMA owned underground storage tanks.

Government Publication Date: Dec 31, 2017

Facility Response Plan: FRP

This listing contains facilities that have submitted Facility Response Plans (FRPs) to the U.S. Environmental Protection Agency (EPA). Facilities that could reasonably be expected to cause "substantial harm" to the environment by discharging oil into or on navigable waters are required to prepare and submit FRPs. Harm is determined based on total oil storage capacity, secondary containment and age of tanks, oil transfer activities, history of discharges, proximity to a public drinking water intake or sensitive environments. This listing includes FRP facilities from an applicable EPA FOIA file and Homeland Infrastructure Foundation-Level Data (HIFLD) data file.

Government Publication Date: Jan 9, 2024

Delisted Facility Response Plans: DELISTED FRP

Facilities that once appeared in - and have since been removed from - the list of facilities that have submitted Facility Response Plans (FRP) to EPA. Facilities that could reasonably be expected to cause "substantial harm" to the environment by discharging oil into or on navigable waters are required to prepare and submit Facility Response Plans (FRPs). Harm is determined based on total oil storage capacity, secondary containment and age of tanks, oil transfer activities, history of discharges, proximity to a public drinking water intake or sensitive environments.

Government Publication Date: Jan 9, 2024

Historical Gas Stations: HIST GAS STATIONS

This historic directory of service stations is provided by the Cities Service Company. The directory includes Cities Service filling stations that were located throughout the United States in 1930.

Government Publication Date: Jul 1, 1930

Petroleum Refineries: REFN

List of petroleum refineries from the U.S. Energy Information Administration (EIA) Refinery Capacity Report. Includes operating and idle petroleum refineries (including new refineries under construction) and refineries shut down during the previous year located in the 50 States, the District of Columbia, Puerto Rico, the Virgin Islands, Guam, and other U.S. possessions. Survey locations adjusted using public data.

Government Publication Date: Feb 28, 2024

Petroleum Product and Crude Oil Rail Terminals: BULK TERMINAL

A list of petroleum product and crude oil rail terminals from the U.S. Energy Information Administration (EIA), as well as petroleum terminals sourced from the Federal Communications Commission Data hosted by the Homeland Infrastructure Foundation-Level Database. Data includes operable bulk petroleum product terminals with a total bulk shell storage capacity of 50,000 barrels or more, and/or the ability to receive volumes from tanker, barge, or pipeline; also rail terminals handling the loading and unloading of crude oil with activity between 2017 and 2018. EIA petroleum product terminal data comes from the EIA-815 Bulk Terminal and Blender Report, which includes working, shell in operation, and shell idle for several major product groupings.

Government Publication Date: Jun 6, 2024

LIEN on Property: SEMS LIEN

The U.S. Environmental Protection Agency's (EPA) Superfund Enterprise Management System (SEMS) provides Lien details on applicable properties, such as the Superfund lien on property activity, the lien property information, and the parties associated with the lien.

Government Publication Date: Mar 27, 2024

Superfund Decision Documents: SUPERFUND ROD

This database contains a list of decision documents for Superfund sites. Decision documents serve to provide the reasoning for the choice of (or) changes to a Superfund Site cleanup plan. The decision documents include completed Records of Decision (ROD), ROD Amendments, Explanations of Significant Differences (ESD) for active and archived sites stored in the Superfund Enterprise Management System (SEMS), along with other associated memos and files. This information is maintained and made available by the U.S. Environmental Protection Agency.

Government Publication Date: Mar 27, 2024

Formerly Utilized Sites Remedial Action Program: DOE FUSRAP

The U.S. Department of Energy (DOE) established the Formerly Utilized Sites Remedial Action Program (FUSRAP) in 1974 to remediate sites where radioactive contamination remained from the Manhattan Project and early U.S. Atomic Energy Commission (AEC) operations. The DOE Office of Legacy Management (LM) established long-term surveillance and maintenance (LTS&M) requirements for remediated FUSRAP sites. DOE evaluates the final site conditions of a remediated site on the basis of risk for different future uses. DOE then confirms that LTS&M requirements will maintain protectiveness.

Government Publication Date: Mar 4, 2017

State

State Response Sites: RESPONSE

A list of identified confirmed release sites where the Department of Toxic Substances Control (DTSC) is involved in remediation, either in a lead or oversight capacity. These confirmed release sites are generally high-priority and high potential risk. This database is state equivalent NPL.

Government Publication Date: Feb 15, 2024

EnviroStor Database: ENVIROSTOR

The EnviroStor Data Management System is made available by the Department of Toxic Substances Control (DTSC). Includes Corrective Action sites, Tiered Permit sites, Historical Sites and Evaluation/Investigation sites. This database is state equivalent CERCLIS.

Government Publication Date: Feb 15, 2024

Delisted State Response Sites: DELISTED ENVS

Sites removed from the list of State Response Sites made available by the EnviroStor Data Management System, Department of Toxic Substances Control (DTSC).

Government Publication Date: Feb 15, 2024

Solid Waste Information System (SWIS): SWF/LF

The Solid Waste Information System (SWIS) database made available by the Department of Resources Recycling and Recovery (CalRecycle) contains information on solid waste facilities, operations, and disposal sites throughout the State of California. The types of facilities found in this database include landfills, transfer stations, material recovery facilities, composting sites, transformation facilities, waste tire sites, and closed disposal sites.

Government Publication Date: May 10, 2024

Solid Waste Disposal Sites with Waste Constituents Above Hazardous Waste Levels: SWRCB SWF

This is a list of solid waste disposal sites identified by California State Water Resources Control Board with waste constituents above hazardous waste levels outside the waste management unit.

Government Publication Date: Sep 20, 2006

Waste Management Unit Database: WMUD

The Waste Management Unit Database System tracks and inventories waste management units. CCR Title 27 contains criteria stating that Waste Management Units are classified according to their ability to contain wastes. Containment shall be determined by geology, hydrology, topography, climatology, and other factors relating to the ability of the Unit to protect water quality. Water Code Section 13273.1 requires that operators submit a water quality solid waste assessment test (SWAT) report to address leak status. The WMUDS was last updated by the State Water Resources control board in 2000.

Government Publication Date: Jan 1, 2000

EnviroStor Hazardous Waste Facilities: HWP

A list of hazardous waste facilities including permitted, post-closure and historical facilities found in the Department of Toxic Substances Control (DTSC) EnviroStor database.

Government Publication Date: Feb 15, 2024

Sites Listed in the Solid Waste Assessment Test (SWAT) Program Report: SWAT

In a 1993 Memorandum of Understanding, the State Water Resources Control Board (SWRCB) agreed to submit a comprehensive report on the Solid Waste Assessment Test (SWAT) Program to the California Integrated Waste Management Board (CIWMB). This report summarizes the work completed to date on the SWAT Program, and addresses both the impacts that leakage from solid waste disposal sites (SWDS) may have upon waters of the State and the actions taken to address such leakage.

Government Publication Date: Dec 31, 1995

Construction and Demolition Debris Recyclers: C&D DEBRIS RECY

This listing of Construction and Demolition Debris Recyclers is maintained by the California Intergrated Waste Management Board-common C&D materials include lumber, drywall, metals, masonry (brick, concrete, etc.), carpet, plastic, pipe, rocks, dirt, paper, cardboard, or green waste related to land development.

Government Publication Date: Jun 20, 2018

Recycling Centers: RECYCLING

This list of Certified Recycling Centers that are operating under the state of California's Beverage Container Recycling Program is maintained by the California Department of Resources Recycling and Recovery.

Government Publication Date: Apr 8, 2024

Listing of Certified Processors: PROCESSORS

This list of Certified Processors that are operating under the state of California's Beverage Container Recycling Program is maintained by the California Department of Resources Recycling and Recovery.

Government Publication Date: Apr 29, 2024

Listing of Certified Dropoff, Collection, and Community Service Programs: CONTAINER RECY

This list of Certified Dropoff, Collection, and Community Service Programs (non-buyback) operating under the state of California's Beverage Container Recycling Program is maintained by the California Department of Resources Recycling and Recovery.

Government Publication Date: Apr 17, 2024

Land Disposal Sites: LDS

Land Disposal Sites in GeoTracker, the State Water Resources Control Board (SWRCB)'s data management system. The Land Disposal program regulates of waste discharge to land for treatment, storage and disposal in waste management units. Waste management units include waste piles, surface impoundments, and landfills.

Government Publication Date: Mar 15, 2024

Leaking Underground Fuel Tank Reports: LUST

List of Leaking Underground Storage Tanks within the Cleanup Sites data in GeoTracker database. GeoTracker is the State Water Resources Control Board's (SWRCB) data management system for managing sites that impact groundwater, especially those that require groundwater cleanup (Underground Storage Tanks, Department of Defense and Site Cleanup Program) as well as permitted facilities such as operating Underground Storage Tanks. The Leak Prevention Program that overlooks LUST sites is the SWRCB in California's Environmental Protection Agency.

Government Publication Date: Mar 15, 2024

Delisted Leaking Storage Tanks: DELISTED LST

List of Leaking Underground Storage Tanks (LUST) cleanup sites removed from GeoTracker, the State Water Resources Control Board (SWRCB)'s database system, as well as sites removed from the SWRCB's list of UST Case closures.

Government Publication Date: Apr 4, 2024

Permitted Underground Storage Tank (UST) in GeoTracker: UST

List of Permitted Underground Storage Tank (UST) sites made available by the State Water Resources Control Board (SWRCB) in California's Environmental Protection Agency (EPA).

Government Publication Date: Jun 11, 2024

Proposed Closure of Underground Storage Tank Cases: UST CLOSURE

This listing includes Proposed Closure of Underground Storage Tank (UST) Cases which are being considered for closure by either the State Water Resources Control Board at a Future Board Meeting or the Executive Director that have been posted for a 60-day public comment period, and Closure of UST Cases with Closure Denials and Approved Orders. The lists are provided by the California Water Boards.

Government Publication Date: Apr 4, 2024

Historical Hazardous Substance Storage Information Database: HHSS

The Historical Hazardous Substance Storage database contains information collected in the 1980s from facilities that stored hazardous substances. The information was originally collected on paper forms, was later transferred to microfiche, and recently indexed as a searchable database. When using this database, please be aware that it is based upon self-reported information submitted by facilities which has not been independently verified. It is unlikely that every facility responded to the survey and the database should not be expected to be a complete inventory of all facilities that were operating at that time. This database is maintained by the California State Water Resources Control Board's (SWRCB) Geotracker.

Government Publication Date: Aug 27, 2015

Statewide Environmental Evaluation and Planning System: UST SWEEPS

The Statewide Environmental Evaluation and Planning System (SWEEPS) is a historical listing of active and inactive underground storage tanks made available by the California State Water Resources Control Board (SWRCB).

Government Publication Date: Oct 1, 1994

Aboveground Storage Tanks: AST

A statewide list from 2009 of aboveground storage tanks (ASTs) made available by the Cal FIRE Office of the State Fire Marshal (OSFM). This list is no longer maintained or updated by the Cal FIRE OSFM.

Government Publication Date: Aug 31, 2009

SWRCB Historical Aboveground Storage Tanks: AST SWRCB

A list of aboveground storage tanks made available by the California State Water Resources Control Board (SWRCB). Effective January 1, 2008, the Certified Unified Program Agencies (CUPAs) are vested with the responsibility and authority to implement the Aboveground Petroleum Storage Act (APSA).

Government Publication Date: Dec 1, 2007

Oil and Gas Facility Tanks: TANK OIL GAS

Locations of oil and gas tanks that fall under the jurisdiction of the Geologic Energy Management Division of the California Department of Conservation (CalGEM) (CCR 1760). CalGEM was formerly the Division of Oil, Gas, and Geothermal Resources (DOGGR).

Government Publication Date: May 9, 2024

Delisted Storage Tanks: DELISTED TNK

This database contains a list of storage tank sites that were removed by the State Water Resources Control Board (SWRCB) in California's Environmental Protection Agency (EPA) and the Cal FIRE Office of State Fire Marshal (OSFM).

Government Publication Date: Jun 11, 2024

California Environmental Reporting System (CERS) Tanks: CERS TANK

List of sites in the California Environmental Protection Agency (CalEPA) Regulated Site Portal which fall under the Aboveground Petroleum Storage and Underground Storage Tank regulatory programs. The CalEPA oversees the statewide implementation of the Unified Program which applies regulatory standards to protect Californians from hazardous waste and materials.

Government Publication Date: Apr 25, 2024

Delisted California Environmental Reporting System (CERS) Tanks: DELISTED CTNK

This database contains a list of Aboveground Petroleum Storage and Underground Storage Tank sites that were removed from in the California Environmental Protection Agency (CalEPA) Regulated Site Portal.

Government Publication Date: Apr 25, 2024

Historical Hazardous Substance Storage Container Information - Facility Summary: HIST TANK

The State Water Resources Control Board maintained the Hazardous Substance Storage Containers listing and inventory in th 1980s. This facility summary lists historic tank sites where the following container types were present: farm motor vehicle fuel tanks; waste tanks; sumps; pits, ponds, lagoons, and others; and all other product tanks. This set, published in May 1988, lists facility and owner information, as well as the number of containers. This data is historic and will not be updated.

Government Publication Date: May 27, 1988

Site Mitigation and Brownfields Reuse Program Facility Sites with Land Use Restrictions: LUR

The Department of Toxic Substances Control (DTSC) Site Mitigation and Brownfields Reuse Program (SMBRP) list includes sites cleaned up under the program's oversight and generally does not include current or former hazardous waste facilities that required a hazardous waste facility permit. The list represents land use restrictions that are active. Some sites have multiple land use restrictions.

Government Publication Date: Feb 15, 2024

CALSITES Database: CALSITES

This historical database was maintained by the Department of Toxic Substance Control (DTSC) for more than a decade. CALSITES contains information on Brownfield properties with confirmed or potential hazardous contamination. In 2006, DTSC introduced EnviroStor as the latest Brownfields site database.

Government Publication Date: May 1, 2004

Hazardous Waste Management Program Facility Sites with Deed / Land Use Restrictions: HLUR

The Department of Toxic Substances Control (DTSC) Hazardous Waste Management Program (HWMP) has developed a list of current or former hazardous waste facilities that have a recorded land use restriction at the local county recorder's office. The land use restrictions on this list were required by the DTSC HWMP as a result of the presence of hazardous substances that remain on site after the facility (or part of the facility) has been closed or cleaned up. The types of land use restriction include deed notice, deed restriction, or a land use restriction that binds current and future owners.

Government Publication Date: Feb 18, 2021

Deed Restrictions and Land Use Restrictions: DEED

List of Deed Restrictions, Land Use Restrictions and Covenants in GeoTracker made available by the State Water Resources Control Board (SWRCB) in California's Environmental Protection Agency. A deed restriction (land use covenant) may be required to facilitate the remediation of past environmental contamination and to protect human health and the environment by reducing the risk of exposure to residual hazardous materials.

Government Publication Date: Mar 15, 2024

Voluntary Cleanup Program: VCP

List of sites in the Voluntary Cleanup Program made available by the Department of Toxic Substances and Control (DTSC). The Voluntary Cleanup Program was designed to respond to lower priority sites. Under the Voluntary Cleanup Program, DTSC enters site-specific agreements with project proponents for DTSC oversight of site assessment, investigation, and/or removal or remediation activities, and the project proponents agree to pay DTSC's reasonable costs for those services.

Government Publication Date: Feb 15, 2024

GeoTracker Cleanup Program Sites: CLEANUP SITES

A list of Cleanup Program sites in the state of California made available by The State Water Resources Control Board (SWRCB) of the California Environmental Protection Agency (EPA). SWRCB tracks leaking underground storage tank cleanups as well as other water board cleanups.

Government Publication Date: Mar 15, 2024

Delisted Cleanup Program Sites: DELISTED CLEANUP

A list of Cleanup Program sites which were once included - and have since been removed from - the list of Cleanup Program Sites in GeoTracker. GeoTracker is the State Water Resource Control Boards' data management system for sites that impact, or have the potential to impact, water quality in California, with emphasis on groundwater.
Government Publication Date: Mar 15, 2024

Delisted County Records: DELISTED COUNTY
Records removed from county or CUPA databases. Records may be removed from the county lists made available by the respective county departments because they are inactive, or because they have been deemed to be below reportable thresholds.
Government Publication Date: Jun 26, 2024

Tribal

Leaking Underground Storage Tanks on Tribal/Indian Lands: INDIAN LUST
This list of leaking underground storage tanks (LUSTs) on Tribal/Indian Lands in Region 9, which includes California, is made available by the United States Environmental Protection Agency (EPA).
Government Publication Date: May 7, 2024

Underground Storage Tanks on Tribal/Indian Lands: INDIAN UST
This list of underground storage tanks (USTs) on Tribal/Indian Lands in Region 9, which includes California, is made available by the United States Environmental Protection Agency (EPA).
Government Publication Date: May 7, 2024

Delisted Tribal Leaking Storage Tanks: DELISTED INDIAN LST
Leaking Underground Storage Tank (LUST) facilities which once appeared on - and have since been removed from - the Regional Tribal/Indian LUST lists made available by the United States Environmental Protection Agency (EPA).
Government Publication Date: May 7, 2024

Delisted Tribal Underground Storage Tanks: DELISTED INDIAN UST
Underground Storage Tank (UST) facilities which once appeared on - and have since been removed from - the Regional Tribal/Indian UST lists made available by the United States Environmental Protection Agency (EPA).
Government Publication Date: May 7, 2024

County

Colusa County - CUPA List: CUPA COLUSA
A list of facilities associated with Business Plan and Hazardous Generator programs in the County of Colusa. This list is made available by Colusa County Environmental Health which was certified by the California Environmental Protection Agency as Certified Unified Program Agency for Colusa County.
Government Publication Date: Jan 2, 2024

Additional Environmental Record Sources

Federal

PFAS Greenhouse Gas Emissions Data: PFAS GHG
The U.S. Environmental Protection Agency's Greenhouse Gas Reporting Program (GHGRP) collects Greenhouse Gas (GHG) data from large emitting facilities (25,000 metric tons of carbon dioxide equivalent (CO2e) per year), and suppliers of fossil fuels and industrial gases that results in GHG emissions when used. Includes GHG emissions data for facilities that emit or have emitted since 2010 chemicals identified in EPA's CompTox Chemicals Dashboard list of PFAS without explicit structures and list of PFAS structures by DSSTox. PFAS emissions data has been identified for facilities engaged in the following industrial processes: Aluminum Production (GHGRP Subpart F), HCFC-22 Production and HFC-23 Destruction (Subpart O), Electronics Manufacturing (Subpart I), Fluorinated Gas Production (Subpart L), Magnesium Production (Subpart T), Electrical Transmission and Distribution Equipment Use (Subpart DD), and Manufacture of Electric Transmission and Distribution Equipment (Subpart SS). Over time, other industrial processes with required GHGRP reporting may include PFAS emissions data and the list of reportable gases may change over time.
Government Publication Date: May 9, 2024

On-Scene Coordinator Response Sites: OSC RESPONSE

This list of On-Scene Coordinator (OSC) Response Sites is provided by the U.S. Environmental Protection Agency (EPA). OSCs are the federal officials responsible for monitoring or directing responses to all oil spills and hazardous substance releases reported to the federal government. OSCs coordinate all federal efforts with, and provide support and information to local, state, and regional response communities. An OSC is an agent of either EPA or the U.S. Coast Guard (USCG), depending on where the incident occurs. EPA's OSCs have primary responsibility for spills and releases to inland areas and waters. USCG OSCs have responsibility for coastal waters and the Great Lakes. In general, an OSC has the following key responsibilities during and after a response: Assessment, Monitoring, Response Assistance, and Evaluation.

Government Publication Date: Apr 4, 2024

Facility Registry Service/Facility Index: FINDS/FRS

The Facility Registry Service (FRS) is a centrally managed database that identifies facilities, sites, or places subject to environmental regulations or of environmental interest. FRS creates high-quality, accurate, and authoritative facility identification records through rigorous verification and management procedures that incorporate information from program national systems, state master facility records, and data collected from EPA's Central Data Exchange registrations and data management personnel. This list is made available by the U.S. Environmental Protection Agency (EPA).

Government Publication Date: Feb 9, 2024

Toxics Release Inventory (TRI) Program: TRIS

The U.S. Environmental Protection Agency's Toxics Release Inventory (TRI) is a database containing data on disposal or other releases of toxic chemicals from U.S. facilities and information about how facilities manage those chemicals through recycling, energy recovery, and treatment. There are currently 770 individually listed chemicals and 33 chemical categories covered by the TRI Program. Facilities that manufacture, process or otherwise use these chemicals in amounts above established levels must submit annual reporting forms for each chemical. Note that the TRI chemical list does not include all toxic chemicals used in the U.S. One of TRI's primary purposes is to inform communities about toxic chemical releases to the environment. This database includes TRI Reporting Data for calendar years 1987 through 2021 and Preliminary Data for 2022.

Government Publication Date: Sep 20, 2023

PFOA/PFOS Contaminated Sites: PFAS NPL

This list of Superfund Sites with Per- and Polyfluoroalkyl Substances (PFAS) detections is made available by the U.S. Environmental Protection Agency (EPA) in their PFAS Analytic Tools data, previously the list was obtained by EPA FOIA requests. EPA's Office of Land and Emergency Management and EPA Regional Offices maintain what is known about site investigations, contamination, and remedial actions under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) where PFAS is present in the environment. Limitations: Detections of PFAS at National Priorities List (NPL) sites do not mean that people are at risk from PFAS, are exposed to PFAS, or that the site is the source of the PFAS. The information in the Superfund NPL and Superfund Alternative Agreement (SAA) PFAS detection site list is years old and may not be accurate today. Site information such as site name, site ID, and location has been confirmed for accuracy; however, PFAS-related information such as media sampled, drinking water being above the health advisory, or mitigation efforts has not been verified. For Federal Facilities data, the other Federal agencies (OFA) are the lead agency for their data and provided them to EPA.

Government Publication Date: Jun 20, 2024

Federal Agency Locations with Known or Suspected PFAS Detections: PFAS FED SITES

List of Federal agency locations with known or suspected detections of Per- and Polyfluoroalkyl Substances (PFAS), made available by the U.S. Environmental Protection Agency (EPA) in their PFAS Analytic Tools data. EPA outlines that these data are gathered from several federal entities, such as the Federal Superfund program, Department of Defense (DOD), National Aeronautics and Space Administration, Department of Transportation, and Department of Energy. The dates this data was extracted for the PFAS Analytic Tools range from 2022 to 2024. Sites on this list do not necessarily reflect the source/s of PFAS contamination and detections do not indicate level of risk or human exposure at the site. Agricultural notifications in this data are limited to DOD sites only. At this time, the EPA is aware that this list is not comprehensive of all Federal agencies.

Government Publication Date: Apr 1, 2024

SSEHRI PFAS Contamination Sites: PFAS SSEHRI

This PFAS Contamination Site Tracker database is compiled by the Social Science Environmental Health Research Institute (SSEHRI) at Northeastern University. According to the SSEHRI, the database records qualitative and quantitative data from each known site of PFAS contamination, including timeline of discovery, sources, levels, health impacts, community response, and government response. The goal of this database is to compile information and support public understanding of the rapidly unfolding issue of PFAS contamination. All data presented was extracted from government websites, news articles, or publicly available documents, and this is cited in the tracker. Locations for the Known PFAS Contamination Sites are sourced from the PFAS Sites and Community Resources Map, credited to the Northeastern University's PFAS Project Lab, Silent Spring Institute, and the PFAS-REACH team. Disclaimer: The source conveys the data undergoes regular updates as new information becomes available, some sites may be missing and/or contain information that is incorrect or outdated, as well as their information represents all contamination sites SSEHRI is aware of, not all possible contamination sites. This data is not intended to be used for legal purposes. Access the following source link for the most current information: https://pfasproject.com/pfas-sites-and-community-resources/

Government Publication Date: May 19, 2023

National Response Center PFAS Spills: ERNS PFAS

This Per- and Poly-Fluoroalkyl Substances (PFAS) Spills dataset is made available via the U.S. Environmental Protection Agency's (EPA) PFAS Analytic Tools. The National Response Center (NRC), operated by the U.S. Coast Guard, is the designated federal point of contact for reporting all oil, chemical, and other discharges into the environment, for the United States and its territories. This dataset contains NRC spill information from 1990 to the present that is restricted to records associated with PFAS and PFAS-containing materials. Incidents are filtered to include only records with a "Material Involved" or "Incident Description" related to Aqueous Film Forming Foam (AFFF). The keywords used to filter the data included "AFFF," "Fire Fighting Foam," "Aqueous Film Forming Foam," "Fire Suppressant Foam, "PFAS," "PERFL," "PFOA," "PFOS," and "Genx." Limitations: The data from the NRC website contains initial incident data that has not been validated or investigated by a federal/state response agency. Keyword searches may misidentify some incident reports that do not contain PFAS. This dataset should also not be considered to be exhaustive of all PFAS spills/release incidents.

Government Publication Date: Apr 17, 2024

PFAS NPDES Discharge Monitoring: PFAS NPDES

This list of National Pollutant Discharge Elimination System (NPDES) permitted facilities with required monitoring for Per- and Polyfluoroalkyl (PFAS) Substances is made available via the U.S. Environmental Protection Agency (EPA)'s PFAS Analytic Tools. Any point-source wastewater discharger to waters of the United States must have a NPDES permit, which defines a set of parameters for pollutants and monitoring to ensure that the discharge does not degrade water quality or impair human health. This list includes NPDES permitted facilities associated with permits that monitor for Per- and Polyfluoroalkyl Substances (PFAS), limited to the years 2007 - present. EPA further advises the following regarding these data: currently, fewer than half of states have required PFAS monitoring for at least one of their permittees, and fewer states have established PFAS effluent limits for permittees. For states that may have required monitoring, some reporting and data transfer issues may exist on a state-by-state basis.

Government Publication Date: May 6, 2024

Perfluorinated Alkyl Substances (PFAS) from Toxic Release Inventory: PFAS TRI

List of Toxics Release Inventory (TRI) facilities at which the reported chemical is a per- or polyfluoroalkyl (PFAS) substance included in the U.S. Environmental Protection Agency's (EPA) consolidated PFAS Master List of PFAS Substances. Encompasses Toxics Release Inventory records included in the EPA PFAS Analytic Tools. The EPA's TRI database currently tracks information on disposal or releases of 770 individually listed toxic chemicals and 33 chemical categories from thousands of U.S. facilities and details about how facilities manage those chemicals through recycling, energy recovery, and treatment. This listing includes TRI Reporting Data for calendar years 1987 through 2021 and Preliminary Data for 2022.

Government Publication Date: Sep 20, 2023

Perfluorinated Alkyl Substances (PFAS) Water Quality: PFAS WATER

The Water Quality Portal (WQP) is a cooperative service sponsored by the United States Geological Survey (USGS), the Environmental Protection Agency (EPA), and the National Water Quality Monitoring Council (NWQMC). This listing includes records from the Water Quality Portal where the characteristic (environmental measurement) is in the Environmental Protection Agency (EPA)'s consolidated Master List of PFAS Substances.

Government Publication Date: Jul 20, 2020

PFAS TSCA Manufacture and Import Facilities: PFAS TSCA

The U.S. Environmental Protection Agency (EPA) issued the Chemical Data Reporting (CDR) Rule under the Toxic Substances Control Act (TSCA) and requires chemical manufacturers and facilities that manufacture or import chemical substances to report data to EPA. This list is specific only to TSCA Manufacture and Import Facilities with reported per- and poly-fluoroalkyl (PFAS) substances. Data file is sourced from EPA's PFAS Analytic Tools TSCA dataset which includes CDR/Inventory Update Reporting data from 1998 up to 2020. Disclaimer: This data file includes production and importation data for chemicals identified in EPA's CompTox Chemicals Dashboard list of PFAS without explicit structures and list of PFAS structures in DSSTox. Note that some regulations have specific chemical structure requirements that define PFAS differently than the lists in EPA's CompTox Chemicals Dashboard. Reporting information on manufactured or imported chemical substance amounts should not be compared between facilities, as some companies claim Chemical Data Reporting Rule data fields for PFAS information as Confidential Business Information.

Government Publication Date: Jan 5, 2023

PFAS Waste Transfers from RCRA e-Manifest : PFAS E-MANIFEST

This Per- and Poly-Fluoroalkyl Substances (PFAS) Waste Transfers dataset is made available via the U.S. Environmental Protection Agency's (EPA) PFAS Analytic Tools. Every shipment of hazardous waste in the U.S. must be accompanied by a shipment manifest, which is a critical component of the cradle-to-grave tracking of wastes mandated by the Resource Conservation and Recovery Act (RCRA). According to the EPA, currently no Federal Waste Code exists for any PFAS compounds. To work around the lack of PFAS waste codes in the RCRA database, EPA developed the PFAS Transfers dataset by mining e-Manifest records containing at least one of these common PFAS keywords: • PFAS • PFOA • PFOS • PERFL • AFFF • GENX • GEN-X (plus the Vermont state-specific waste codes). Limitations: Amount or concentration of PFAS being transferred cannot be determined from the manifest information. Keyword searches may misidentify some manifest records that do not contain PFAS. This dataset should also not be considered to be exhaustive of all PFAS waste transfers.

Government Publication Date: Apr 29, 2024

PFAS Industry Sectors: PFAS IND

This Per- and Poly-Fluoroalkyl Substances (PFAS) Industry Sectors dataset is made available via the U.S. Environmental Protection Agency's (EPA) PFAS Analytic Tools. The EPA developed the dataset from various sources that show which industries may be handling PFAS including: EPA's Enforcement and Compliance History Online (ECHO) records restricted to potential PFAS-handling industry sectors; ECHO records for Fire Training Sites identified where fire-fighting foam may have been used in training exercises; and 14 CFR Part 139 Airports compiled from historic and current records from the FAA Airport Data and Information Portal. Since July 2006, all certificated Part 139 Airports are required to have fire-fighting foam onsite that meet certain military specifications, which to date have been fluorinated (Aqueous Film Forming Foam). Limitations: Inclusion in this dataset does not indicate that PFAS are being manufactured, processed, used, or released by the facility. Listed facilities potentially handle PFAS based on their industrial profile, but are unconfirmed by the EPA. Keyword searches in ECHO for Fire Training sites may misidentify some facilities and should not be considered to be an exhaustive list of fire training facilities in the U.S.

Government Publication Date: Apr 15, 2024

Hazardous Materials Information Reporting System: HMIRS

The Hazardous Materials Incident Reporting System (HMIRS) database contains unintentional hazardous materials release information reported to the U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration.

Government Publication Date: Nov 26, 2023

National Clandestine Drug Labs: NCDL

The U.S. Department of Justice ("the Department"), Drug Enforcement Administration (DEA), provides this data as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy.

Government Publication Date: Nov 30, 2023

Toxic Substances Control Act: TSCA

The U.S. Environmental Protection Agency (EPA) is amending the Toxic Substances Control Act (TSCA) section 8(a) Inventory Update Reporting (IUR) rule and changing its name to the Chemical Data Reporting (CDR) rule. The CDR enables EPA to collect and publish information on the manufacturing, processing, and use of commercial chemical substances and mixtures (referred to hereafter as chemical substances) on the TSCA Chemical Substance Inventory (TSCA Inventory). This includes current information on chemical substance production volumes, manufacturing sites, and how the chemical substances are used. This information helps the Agency determine whether people or the environment are potentially exposed to reported chemical substances. EPA publishes submitted CDR data that is not Confidential Business Information (CBI). EPA CDR collections occur approximately every four years and reporting requirements change per collection.

Government Publication Date: May 12, 2022

Hist TSCA: HIST TSCA

The Environmental Protection Agency (EPA) is amending the Toxic Substances Control Act (TSCA) section 8(a) Inventory Update Reporting (IUR) rule and changing its name to the Chemical Data Reporting (CDR) rule.

The 2006 IUR data summary report includes information about chemicals manufactured or imported in quantities of 25,000 pounds or more at a single site during calendar year 2005. In addition to the basic manufacturing information collected in previous reporting cycles, the 2006 cycle is the first time EPA collected information to characterize exposure during manufacturing, processing and use of organic chemicals. The 2006 cycle also is the first time manufacturers of inorganic chemicals were required to report basic manufacturing information.

Government Publication Date: Dec 31, 2006

FTTS Administrative Case Listing: FTTS ADMIN

An administrative case listing from the Federal Insecticide, Fungicide, & Rodenticide Act (FIFRA) and Toxic Substances Control Act (TSCA), together known as FTTS. This database was obtained from the Environmental Protection Agency's (EPA) National Compliance Database (NCDB). The FTTS and NCDB was shut down in 2006.

Government Publication Date: Jan 19, 2007

FTTS Inspection Case Listing: FTTS INSP

An inspection case listing from the Federal Insecticide, Fungicide, & Rodenticide Act (FIFRA) and Toxic Substances Control Act (TSCA), together known as FTTS. This database was obtained from the Environmental Protection Agency's (EPA) National Compliance Database (NCDB). The FTTS and NCDB was shut down in 2006.

Government Publication Date: Jan 19, 2007

Potentially Responsible Parties List: PRP

Early in the site cleanup process, the U.S. Environmental Protection Agency (EPA) conducts a search to find the Potentially Responsible Parties (PRPs). The EPA looks for evidence to determine liability by matching wastes found at the site with parties that may have contributed wastes to the site. This listing contains PRPs, Noticed Parties, at sites in the EPA's Superfund Enterprise Management System (SEMS).

Government Publication Date: Apr 22, 2024

State Coalition for Remediation of Drycleaners Listing: SCRD DRYCLEANER

The State Coalition for Remediation of Drycleaners (SCRD) was established in 1998, with support from the U.S. Environmental Protection Agency (EPA) Office of Superfund Remediation and Technology Innovation. Coalition members are states with mandated programs and funding for drycleaner site remediation. Current members are Alabama, Connecticut, Florida, Illinois, Kansas, Minnesota, Missouri, North Carolina, Oregon, South Carolina, Tennessee, Texas, and Wisconsin. Since 2017, the SCRD no longer maintains this data, refer to applicable state source data where available.

Government Publication Date: Nov 08, 2017

Integrated Compliance Information System (ICIS): ICIS

The Integrated Compliance Information System (ICIS) database contains integrated enforcement and compliance information across most of U.S. Environmental Protection Agency's (EPA) programs. The vision for ICIS is to replace EPA's independent databases that contain enforcement data with a single repository for that information. Currently, ICIS contains all Federal Administrative and Judicial enforcement actions and a subset of the Permit Compliance System (PCS), which supports the National Pollutant Discharge Elimination System (NPDES). This information is maintained by the EPA Headquarters and at the Regional offices. A future release of ICIS will completely replace PCS and will integrate that information with Federal actions already in the system. ICIS also has the capability to track other activities that support compliance and enforcement programs, including incident tracking, compliance assistance, and compliance monitoring.

Government Publication Date: Apr 13, 2024

Drycleaner Facilities: FED DRYCLEANERS

A list of drycleaner facilities from Enforcement and Compliance History Online (ECHO) data as made available by the U.S. Environmental Protection Agency (EPA), sourced from the ECHO Exporter file. The EPA tracks facilities that possess NAIC and SIC codes that classify businesses as drycleaner establishments.

Government Publication Date: May 5, 2024

Delisted Drycleaner Facilities: DELISTED FED DRY

List of sites removed from the list of Drycleaner Facilities (sites in the EPA's Integrated Compliance Information System (ICIS) with NAIC or SIC codes identifying the business as a drycleaner establishment).

Government Publication Date: May 5, 2024

Formerly Used Defense Sites: FUDS

Formerly Used Defense Sites (FUDS) are properties that were formerly owned by, leased to, or otherwise possessed by and under the jurisdiction of the Secretary of Defense prior to October 1986, where the Department of Defense (DOD) is responsible for an environmental restoration. The FUDS Annual Report to Congress (ARC) is published by the U.S. Army Corps of Engineers (USACE). This data is compiled from the USACE's Geospatial FUDS data layers and Homeland Infrastructure Foundation-Level Data (HIFLD) FUDS dataset which applies to the Fiscal Year 2021 FUDS Inventory.

Government Publication Date: May 15, 2023

FUDS Munitions Response Sites: FUDS MRS

Boundaries of Munitions Response Sites (MRS), published with the Formerly Used Defense Sites (FUDS) Annual Report to Congress (ARC) by the U.S. Army Corps of Engineers (USACE). An MRS is a discrete location within a Munitions response area (MRA) that is known to require a munitions response. An MRA means any area on a defense site that is known or suspected to contain unexploded ordnance (UXO), discarded military munitions (DMM), or munitions constituents (MC). This data is compiled from the USACE's Geospatial MRS data layers and Homeland Infrastructure Foundation-Level Data (HIFLD) MRS dataset.

Government Publication Date: May 15, 2023

Former Military Nike Missile Sites: FORMER NIKE

This information was taken from report DRXTH-AS-IA-83A016 (Historical Overview of the Nike Missile System, 12/1984) which was performed by Environmental Science and Engineering, Inc. for the U.S. Army Toxic and Hazardous Materials Agency Assessment Division. The Nike system was deployed between 1954 and the mid-1970's. Among the substances used or stored on Nike sites were liquid missile fuel (JP-4); starter fluids (UDKH, aniline, and furfuryl alcohol); oxidizer (IRFNA); hydrocarbons (motor oil, hydraulic fluid, diesel fuel, gasoline, heating oil); solvents (carbon tetrachloride, trichloroethylene, trichloroethane, stoddard solvent); and battery electrolyte. The quantities of material a disposed of and procedures for disposal are not documented in published reports. Virtually all information concerning the potential for contamination at Nike sites is confined to personnel who were assigned to Nike sites. During deactivation most hardware was shipped to depot-level supply points. There were reportedly instances where excess materials were disposed of on or near the site itself at closure. There was reportedly no routine site decontamination.

Government Publication Date: Dec 2, 1984

PHMSA Pipeline Safety Flagged Incidents: PIPELINE INCIDENT

This list of flagged pipeline incidents is made available by the U.S. Department of Transportation (US DOT) Pipeline and Hazardous Materials Safety Administration (PHMSA). PHMSA regulations require incident and accident reports for five different pipeline system types. Accidents reported on hazardous liquid gravity lines (§195.13) and reporting-regulated-only hazardous liquid gathering lines (§195.15) and incidents reported on Type R gas gathering (§192.8(c)) are not included in the flagged incident file data.
Government Publication Date: May 6, 2024

Material Licensing Tracking System (MLTS): MLTS

A list of sites that store radioactive material subject to the Nuclear Regulatory Commission (NRC) licensing requirements. This list is maintained by the NRC. As of September 2016, the NRC no longer releases location information for sites. Site locations were last received in July 2016.
Government Publication Date: May 11, 2021

Historic Material Licensing Tracking System (MLTS) sites: HIST MLTS

A historic list of sites that have inactive licenses and/or removed from the Material Licensing Tracking System (MLTS). In some cases, a site is removed from the MLTS when the state becomes an "Agreement State". An Agreement State is a State that has signed an agreement with the Nuclear Regulatory Commission (NRC) authorizing the State to regulate certain uses of radioactive materials within the State.
Government Publication Date: Jan 31, 2010

Mines Master Index File: MINES

The Master Index File (MIF) is provided by the United States Department of Labor, Mine Safety and Health Administration (MSHA). This file, which was originally created in the 1970's, contained many Mine-IDs that were invalid. MSHA removes invalid IDs from the MIF upon discovery. MSHA applicable data includes the following: all Coal and Metal/Non-Metal mines under MSHA's jurisdiction since 1/1/1970; mine addresses for all mines in the database except for Abandoned mines prior to 1998 from MSHA's legacy system (addresses may or may not correspond with the physical location of the mine itself); violations that have been assessed penalties as a result of MSHA inspections beginning on 1/1/2000; and violations issued as a result of MSHA inspections conducted beginning on 1/1/2000.
Government Publication Date: Feb 5, 2024

Surface Mining Control and Reclamation Act Sites: SMCRA

An inventory of land and water impacted by past mining (primarily coal mining) is maintained by the Office of Surface Mining Reclamation and Enforcement (OSMRE) to provide information needed to implement the Surface Mining Control and Reclamation Act of 1977 (SMCRA). This inventory contains information on the type and extent of Abandoned Mine Land (AML) impacts, as well as information on the cost associated with the reclamation of those problems. The data is based upon field surveys by State, Tribal, and OSMRE program officials. It is dynamic to the extent that it is modified as new problems are identified and existing problems are reclaimed. Disclaimer: Per the OSMRE, States and tribes who enter their data into eAMLIS (AML Inventory System) may truncate their latitude and longitude so the precise location of usually dangerous AMLs is not revealed in an effort to protect the public from searching for these AMLs, most of which are on private property. If more precise location information is needed, please contact the applicable state/tribe of interest.
Government Publication Date: Jun 13, 2023

Mineral Resource Data System: MRDS

The Mineral Resource Data System (MRDS) is a collection of reports describing metallic and nonmetallic mineral resources throughout the world. Included are deposit name, location, commodity, deposit description, geologic characteristics, production, reserves, resources, and references. This database contains the records previously provided in the Mineral Resource Data System (MRDS) of USGS and the Mineral Availability System/Mineral Industry Locator System (MAS/MILS) originated in the U.S. Bureau of Mines, which is now part of USGS. The USGS has ceased systematic updates of the MRDS database with their focus more recently on deposits of critical minerals while providing a well-documented baseline of historical mine locations from USGS topographic maps.
Government Publication Date: Mar 15, 2016

DOE Legacy Management Sites: LM SITES

The U.S. Department of Energy (DOE) Office of Legacy Management (LM) currently manages radioactive and chemical waste, environmental contamination, and hazardous material at over 100 sites across the U.S. The LM manages sites with diverse regulatory drivers (statutes or programs that direct cleanup and management requirements at DOE sites) or as part of internal DOE or congressionally-recognized programs, such as but not limited to: Formerly Utilized Sites Remedial Action Program (FUSRAP), Uranium Mill Tailings Radiation Control Act (UMTRCA Title I, Tile II), Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Resource Conservation and Recovery Act (RCRA), Decontamination and Decommissioning (D&D), Nuclear Waste Policy Act (NWPA). This site listing includes data exported from the DOE Office of LM's Geospatial Environmental Mapping System (GEMS). GEMS Data disclaimer: The DOE Office of LM makes no representation or warranty, expressed or implied, regarding the use, accuracy, availability, or completeness of the data presented herein.
Government Publication Date: Dec 12, 2023

Alternative Fueling Stations: ALT FUELS

This list of alternative fueling stations is sourced from the Alternative Fuels Data Center (AFDC). The U.S. Department of Energy's Office of Energy Efficiency & Renewable Energy launched the AFDC in 1991 as a repository for alternative fuel vehicle performance data, which provides a wealth of information and data on alternative and renewable fuels, advanced vehicles, fuel-saving strategies, and emerging transportation technologies. The data includes Biodiesel (B20 and above), Compressed Natural Gas (CNG), Electric, Ethanol (E85), Hydrogen, Liquefied Natural Gas (LNG), Propane (LPG), and Renewable Diesel (R20 and above) fuel type locations.

Government Publication Date: Apr 30, 2024

Superfunds Consent Decrees: CONSENT DECREES

This list of Superfund consent decrees is provided by the Department of Justice, Environment & Natural Resources Division (ENRD) through a Freedom of Information Act (FOIA) applicable file. This listing includes Cases filed since 2010 limited to the following: Consent Decrees for CERCLA or Superfund Sites filed and/or as proposed within the ENRD's Case Management System (CMS); and applicable ENRD's Environmental Defense Section (EDS) CERCLA Cases with "Consent" in History Note. CMS may not reflect the latest developments in a case, nor can the agency guarantee the accuracy of the data. ENRD Disclaimer: Congress excluded three discrete categories of law enforcement and national security records from the requirements of the FOIA; response is limited to those records that are subject to the requirements of the FOIA; however, this should not be taken as an indication that excluded records do, or do not, exist.

Government Publication Date: Sep 15, 2023

Air Facility System: AFS

This EPA retired Air Facility System (AFS) dataset contains emissions, compliance, and enforcement data on stationary sources of air pollution. Regulated sources cover a wide spectrum; from large industrial facilities to relatively small operations such as dry cleaners. AFS does not contain data on facilities that are solely asbestos demolition and/or renovation contractors, or landfills. ECHO Clean Air Act data from AFS are frozen and reflect data as of October 17, 2014; the EPA retired this system for Clean Air Act stationary sources and transitioned to ICIS-Air.

Government Publication Date: Oct 17, 2014

Registered Pesticide Establishments: SSTS

This national list of active EPA-registered foreign and domestic pesticide and/or device-producing establishments is based on data from the Section Seven Tracking System (SSTS). The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Section 7 requires that each producing establishment must place its EPA establishment number on the label or immediate container of each pesticide, active ingredient or device produced. An EPA establishment number on a pesticide product label identifies the EPA registered location where the product was produced. The list of establishments is made available by the U.S. Environmental Protection Agency (EPA).

Government Publication Date: Feb 29, 2024

Polychlorinated Biphenyl (PCB) Transformers: PCBT

Locations of Transformers Containing Polychlorinated Biphenyls (PCBs) registered with the United States Environmental Protection Agency. PCB transformer owners must register their transformer(s) with EPA. Although not required, PCB transformer owners who have removed and properly disposed of a registered PCB transformer may notify EPA to have their PCB transformer de-registered. Data made available by EPA.

Government Publication Date: Oct 15, 2019

Polychlorinated Biphenyl (PCB) Notifiers: PCB

Facilities included in the national list of facilities that have notified the United States Environmental Protection Agency (EPA) of Polychlorinated Biphenyl (PCB) activities. Any company or person storing, transporting or disposing of PCBs or conducting PCB research and development must notify the EPA and receive an identification number.

Government Publication Date: May 23, 2024

State

PFAS Sampling Locations: PFAS SAMPLING

This data is sourced from the State Water Board's GeoTracker Per- and Polyfluoroalkyl Substances (PFAS) Map tool which contains individual sampling points (i.e., soil boring, groundwater monitoring well, drinking water well for municipal drinking water systems, etc.) or a site location with PFAS analytical data. Includes analytical results that are finalized and submitted electronically by the Responsible Parties via GeoTracker's Electronic Submittal of Information Portal, and after it's accepted by a Regional Water Quality Control Board.

Government Publication Date: Jan 2, 2024

Dry Cleaning Facilities: DRYCLEANERS

A list of drycleaner related facilities that have EPA ID numbers. These are facilities with certain SIC codes: power laundries, family and commercial, linen supply, commercial laundry, dry cleaning and pressing machines - Coin Operated Laundry and Dry Cleaning. This is provided by the Department of Toxic Substance Control.

Government Publication Date: Dec 20, 2021

Delisted Drycleaners: DELISTED DRYCLEANERS

Sites removed from the list of drycleaner related facilities that have EPA ID numbers, made available by the California Department of Toxic Substance Control.

Government Publication Date: Jan 31, 2022

Non-Toxic Dry Cleaning Incentive Program: DRYC GRANT

A list of grant recipients of the Non-Toxic Dry Cleaning Incentive Program made available by the California Air Resources Board (CARB). The program provides grants to eligible dry cleaning businesses to assist them in transitioning away from PERC machines to alternative non-toxic and non-smog forming technologies.

Government Publication Date: Jan 31, 2022

PFAS GeoTracker Cleanup Sites: PFAS GT CLEANUPS

A list of applicable cleanup sites from the State Water Resources Control Board's (SWRCB) GeoTracker data management system where one or more of the potential contaminants of concern are identified in the PFAS Master List of PFAS Substances made available by the Environmental Protection Agency (US EPA).

Government Publication Date: Mar 15, 2024

PFOA/PFOS Groundwater: PFAS GW

A list of water wells from the Groundwater Ambient Monitoring and Assessment Program (GAMA) Groundwater Information System with the groundwater chemical perfluorooctanoic acid (PFOA) (NL = 0.014 UG/L) or perfluorooctanoic sulfonate (PFOS) (NL = 0.013 UG/L). The GAMA Groundwater Information System search is made available by California Water Boards.

Government Publication Date: Jan 7, 2024

PFAS Investigations: PFAS INVEST

This list of potential Per- and Polyfluoroalkyl Substance (PFAS) sites is compiled from the California State Water Resources Control Board's (SWRCB) PFAS Investigations Map tool. The SWRCB issued investigative orders, per California Water Code (CWC) Section 13267 and/or 13383, to these sites. Orders were also issued to the public water systems to sample wells in the vicinity of these locations. Military facilities have been identified by the Department of Defense (DOD) as part of their efforts to investigate PFAS per the Defense Environmental Restoration Program (DERP) under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The data includes locations for Airports, Chrome Plating Facilities, Landfills, Publicly Owned Treatment Works, Refineries and Bulk Terminals, DOD Facilities, and Monitored Drinking Water Wells being investigated for potential PFAS.

Government Publication Date: Jan 23, 2024

Hazardous Waste and Substances Site List - Site Cleanup: HWSS CLEANUP

The Hazardous Waste and Substances Sites (Cortese) List is a planning document used by the State, local agencies and developers to comply with the California Environmental Quality Act requirements in providing information about the location of hazardous materials release sites. This list is published by California Department of Toxic Substance Control.

Government Publication Date: Mar 15, 2023

Toxic Pit Cleanup Act Sites: TOXIC PITS

The Toxic Pits Cleanup Act (TPCA) list identifies sites suspected of containing hazardous substances where cleanup has not yet been completed. This list was maintained by the State Water Resources Control Board (SWRCB), is not longer maintained, and updates are not planned.

Government Publication Date: Jul 1, 1995

List of Hazardous Waste Facilities Subject to Corrective Action: DTSC HWF

This is a list of hazardous waste facilities identified in Health and Safety Code (HSC) § 25187.5. These facilities are those where Department of Toxic Substances Control (DTSC) has taken or contracted for corrective action because a facility owner/operator has failed to comply with a date for taking corrective action in an order issued under HSC § 25187, or because DTSC determined that immediate corrective action was necessary to abate an imminent or substantial endangerment.

Government Publication Date: Jul 18, 2016

EnviroStor Inspection, Compliance, and Enforcement: INSP COMP ENF

A list of permitted facilities with inspections and enforcements tracked by the California Department of Toxic Substance Control's (DTSC) EnviroStor data management system.

Government Publication Date: Nov 23, 2023

School Property Evaluation Program Sites: SCH

A list of sites registered with The Department of Toxic Substances Control (DTSC) School Property Evaluation and Cleanup (SPEC) Division. SPEC is responsible for assessing, investigating and cleaning up proposed school sites. The Division ensures that selected properties are free of contamination or, if the properties were previously contaminated, that they have been cleaned up to a level that protects the students and staff who will occupy the new school.

Government Publication Date: Feb 15, 2024

California Hazardous Material Incident Report System (CHMIRS): CHMIRS

A list of reported hazardous material incidents, spills, and releases from the California Hazardous Material Incident Report System (CHMIRS). This list has been made available by the California Office of Emergency Services (OES).

Government Publication Date: Apr 23, 2024

Historical California Hazardous Material Incident Report System (CHMIRS): HIST CHMIRS

A list of reported hazardous material incidents, spills, and releases from the California Hazardous Material Incident Report System (CHMIRS) prior to 1993. This list has been made available by the California Office of Emergency Services (OES).

Government Publication Date: Jan 1, 1993

Handlers from Hazardous Waste Manifest Data: HAZNET

A list of handlers not otherwise classified as Treatment, Storage, Disposal facilities (TSDF) or generators from the facilities and manifests data made available by the California Department of Toxic Substances Control (DTSC) in their Hazardous Waste Tracking System (HWTS).

Government Publication Date: Oct 24, 2016

Generators from Hazardous Waste Manifest Data: HAZ GEN

List of handlers listed as having generated waste from the facilities and manifests data made available by the California Department of Toxic Substances Control (DTSC) in their Hazardous Waste Tracking System (HWTS).

Government Publication Date: Dec 31, 2017

TSDF from Hazardous Waste Manifest Data: HAZ TSD

List of Treatment, Storage, and Disposal Facilities (TSDFs) from the facilities and manifests data made available by the California Department of Toxic Substances Control (DTSC) in their Hazardous Waste Tracking System (HWTS).

Government Publication Date: Dec 31, 2017

Historical Hazardous Waste Manifest Data: HIST MANIFEST

A list of historic hazardous waste manifests received by the Department of Toxic Substances Control (DTSC) from year the 1980 to 1992. The volume of manifests is typically 900,000 - 1,000,000 annually, representing approximately 450,000 - 500,000 shipments.

Government Publication Date: Dec 31, 1992

DTSC Registered Hazardous Waste Transporters: HW TRANSPORT

The California Department of Toxic Substances Control (DTSC) maintains this list of Registered Hazardous Waste Transporters.

Government Publication Date: Apr 15, 2024

Registered Waste Tire Haulers: WASTE TIRE

This list of registered waste tire haulers is maintained by the California Department of Resources Recycling and Recovery.

Government Publication Date: Mar 25, 2024

California Medical Waste Management Program Facility List: MEDICAL WASTE

This list of Medical Waste Management Program Facilities is maintained by the California Department of Public Health. The Medical Waste Management Program (MWMP) regulates the generation, handling, storage, treatment, and disposal of medical waste by providing oversight for the implementation of the Medical Waste Management Act (MWMA). The MWMP permits and inspects all medical waste off-site treatment facilities, medical waste transporters, and medical waste transfer stations. This list contains transporters, treatment, and transfer facilities.

Government Publication Date: Apr 15, 2024

Historical Cortese List: HIST CORTESE

List of sites which were once included on the Cortese list. The Hazardous Waste and Substances Sites (Cortese) List is a planning document used by the State, local agencies and developers to comply with the California Environmental Quality Act requirements for providing information about the location of hazardous sites.

Government Publication Date: Nov 13, 2008

Cease and Desist Orders and Cleanup and Abatement Orders: CDO/CAO

The California Environment Protection Agency "Cortese List" of active Cease and Desist Orders (CDO) and Cleanup and Abatement Orders (CAO). This list contains many CDOs and CAOs that do NOT concern the discharge of wastes that are hazardous materials. Many of the listed orders concern, as examples, discharges of domestic sewage, food processing wastes, or sediment that do not contain hazardous materials, but the Water Boards' database does not distinguish between these types of orders.

Government Publication Date: Dec 6, 2021

California Environmental Reporting System (CERS) Hazardous Waste Sites: CERS HAZ

List of sites in the California Environmental Protection Agency (CalEPA) Regulated Site Portal which fall under the following regulatory programs: Hazardous Chemical Management, Hazardous Waste Onsite Treatment, Household Hazardous Waste Collection, Hazardous Waste Generator, RCRA LQ HW Generator. The CalEPA oversees the statewide implementation of the Unified Program which applies regulatory standards to protect Californians from hazardous waste and materials.

Government Publication Date: Apr 25, 2024

Delisted Environmental Reporting System (CERS) Hazardous Waste Sites: DELISTED HAZ

This database contains a list of sites that were removed from the California Environmental Protection Agency (CalEPA) in the following regulatory programs: Hazardous Chemical Management, Hazardous Waste Onsite Treatment, Household Hazardous Waste Collection, Hazardous Waste Generator, RCRA LQ HW Generator.

Government Publication Date: Nov 29, 2018

Sites in GeoTracker: GEOTRACKER

GeoTracker is the State Water Resource Control Boards' data management system for sites that impact, or have the potential to impact, water quality in California, with emphasis on groundwater. This is a list of sites in GeoTracker that aren't otherwise categorized as LUST, Land Disposal Sites (LDS), Cleanup Sites, or sites having Waste Discharge Requirements (WDR). This listing includes program types such as Underground Injection Control (UIC), Confined Animal Facilities (CAF), Irrigated Lands Regulatory Program, plans, and non-case information.

Government Publication Date: Mar 15, 2024

Mines Listing: MINE

This list includes mine site locations extracted from the Mines Online database, maintained by the California Department of Conservation. Mines Online (MOL) is an interactive web map designed with GIS features that provide information such as the mine name, mine status, commodity sold, location, and other mine specific data. Please note: Mine location information is provided to assist experts in determining the location of mine operators in accordance with California Civil Code section 1103.4 and reflects information reported by mine operators in annual reports provided under Public Resources Code section 2207. While the Division of Mine Reclamation (DMR) attempts to populate MOL with accurate location information, the DMR cannot guarantee the accuracy of operator reported location information.

Government Publication Date: Jun 16, 2023

Recorded Environmental Cleanup Liens: LIEN

The California Department of Toxic Substance Control (DTSC) maintains this list of liens placed upon real properties. A lien is utilized by the DTSC to obtain reimbursement from responsible parties for costs associated with the remediation of contaminated properties.

Government Publication Date: Dec 18, 2023

Waste Discharge Requirements: WASTE DISCHG

List of sites in California State Water Resources Control Board (SWRCB) Waste Discharge Requirements (WDRs) Program in California, made available by the SWRCB via GeoTracker. The WDR program regulates point discharges that are exempt pursuant to Subsection 20090 of Title 27 and not subject to the Federal Water Pollution Control Act. The scope of the WDRs Program also includes the discharge of wastes classified as inert, pursuant to section 20230 of Title 27.

Government Publication Date: Mar 15, 2024

Toxic Pollutant Emissions Facilities: EMISSIONS

A list of criteria and toxic pollutant emissions data for facilities in California made available by the California Environmental Protection Agency - Air Resources Board (ARB). Risk data may be based on previous inventory submittals. The toxics data are submitted to the ARB by the local air districts as requirement of the Air Toxics "Hot Spots" Program.

Government Publication Date: Dec 31, 2021

Clandestine Drug Lab Sites: CDL

The Department of Toxic Substances Control (DTSC) maintains a listing of drug lab sites. DTSC is responsible for removal and disposal of hazardous substances discovered by law enforcement officials while investigating illegal/clandestine drug laboratories.

Government Publication Date: Jan 19, 2021

Tribal

No Tribal additional environmental record sources available for this State.

County

Definitions

Database Descriptions: This section provides a detailed explanation for each database including: source, information available, time coverage, and acronyms used. They are listed in alphabetic order.

Detail Report: This is the section of the report which provides the most detail for each individual record. Records are summarized by location, starting with the project property followed by records in closest proximity.

Distance: The distance value is the distance between plotted points, not necessarily the distance between the sites' boundaries. All values are an approximation.

Direction: The direction value is the compass direction of the site in respect to the project property and/or center point of the report.

Elevation: The elevation value is taken from the location at which the records for the site address have been plotted. All values are an approximation. Source: Google Elevation API.

Executive Summary: This portion of the report is divided into 3 sections:

'Report Summary'- Displays a chart indicating how many records fall on the project property and, within the report search radii.

'Site Report Summary'-Project Property'- This section lists all the records which fall on the project property. For more details, see the 'Detail Report' section.

'Site Report Summary-Surrounding Properties'- This section summarizes all records on adjacent properties, listing them in order of proximity from the project property. For more details, see the 'Detail Report' section.

Map Key: The map key number is assigned according to closest proximity from the project property. Map Key numbers always start at #1. The project property will always have a map key of '1' if records are available. If there is a number in brackets beside the main number, this will indicate the number of records on that specific property. If there is no number in brackets, there is only one record for that property.

The symbol and colour used indicates 'elevation': the red inverted triangle will dictate 'ERIS Sites with Lower Elevation', the yellow triangle will dictate 'ERIS Sites with Higher Elevation' and the orange square will dictate 'ERIS Sites with Same Elevation.'

Unplottables: These are records that could not be mapped due to various reasons, including limited geographic information. These records may or may not be in your study area, and are included as reference.

APPENDIX D: REGULATORY FILE REVIEW DOCUMENTATION

TETRA TECH

July 8, 2024

City of Williams
City Clerk
Williams, CA 95987

VIA EMAIL: mpineda@citywilliams.org

RE: Public Information Act Request
Cattle Ranch
1958 Spring Valley Road, Williams, CA 95987

***Please see the attached satellite images for detailed information regarding the site property boundaries and parcel numbers associated with the FOIA request.**

Dear Mariana Pineda:

(1) Please email the following records if possible:

Tetra Tech Inc. (Tetra Tech) is conducting a Phase I Environmental Site Assessment (ESA) at the above-mentioned property, 1958 Spring Valley Road, currently occupied by a cattle ranch owned by Paul and Rex Favero. This investigation is being conducted in order to identify evidence of any recognized environmental conditions (RECs) that may have an adverse environmental impact upon the subject properties. Under the Public Information Act, Tetra Tech is requesting records you may have concerning the properties of interest. Such records may include **groundwater or soil sampling reports/analytical results, reports of spills of petroleum or hazardous chemicals (both closed and open), aboveground storage tank (ASTs) and underground storage tank (USTs) closure reports/certificates, inspection reports, wastewater permits, air permits, building permits, and reports of chemical odors or fumes**. I am interested in reviewing any records that the City of Williams may maintain which are associated with the above-mentioned properties and/or any potential environmental conditions that may have an adverse environmental impact upon them. Any assistance from your office in obtaining a copy of these records would be greatly appreciated.

(2) If all the requested records cannot be emailed to me, please inform me by email of the portions that can be emailed and advise me of the cost for reproducing the remainder of the records requested.

(3) If the requested records cannot be emailed to me due to the volume of records identified in response to my request, please advise me of the actual cost of copying all records onto a CD.

(4) If my request is too broad or does not reasonably describe the records, please contact me via email so that I may clarify my request, and when appropriate inform me of the manner in which records are filed, retrieved or generated.

If it is necessary to modify my request, and an email response is not preferred, please contact me at the following telephone number: 949-809-5030.

If for any reason any portion of my request is denied, please inform me of the reasons for the denial in writing and provide the name, address and email address of the person or body to whom an appeal should be directed.

Thank you in advance for spending time on this matter.

Sincerely,

TETRA TECH

Daniel O'Connell
Tetra Tech, Inc.
17885 Von Karman Avenue, Suite 500
Irvine, CA 92614
Email: daniel.oconnell1@tetratech.com

July 9, 2024

Daniel O'Connell
Tetra Tech
DANIEL.OCONNELL1@tetratech.com

Public Records Request Number: 1-070824-05
Location(s): 1958 Spring Valley Road, Williams, California 95987

Dear Requestor:

On July 8, 2024, the Department of Toxic Substances Control (DTSC) received your email of July 8, 2024 requesting records under the Public Records Act. After a thorough review of our files, no site records were found pertaining to the sites/facilities referenced above.

A large number of our records are available on EnviroStor, an online database that provides non-confidential, public access to DTSCs data management system. It tracks our cleanup, permitting, enforcement, and investigation efforts at hazardous waste facilities and sites with known or suspected contamination issues. EnviroStor is available 24/7, 365 days a year. The data reflects the latest updates as they are entered in the system. Access it from your computer or smartphone, the local library – anywhere Internet access is available. Just go to www.envirostor.dtsc.ca.gov. You'll find a step-by-step tour of EnviroStor under the "How to Use EnviroStor" menu on the website.

If you have any questions or would like further information regarding your request, please contact me at (916) 255-3611 or via email at PubReqAct@dtsc.ca.gov.

Sincerely,

Nancy Fang

Nancy Fang
Regional Records Coordinator

Reference No: R014264-071624

Logged in as: DANIEL.OCONNELL1@TETRATECH.COM

Thank you for your interest in public records of CAL FIRE. Your request has been received and is being processed in accordance with the California Public Records Act, Government Code section 7920.000 et seq. Your request was received on July 16, 2024 and given the reference number R014264-071624 for tracking purposes.

Record(s) Requested:
Properties of Interest: 1958 Spring Valley Road, Williams, CA 95987 APNs: 016-190-016-000, 018-050-005-000 , 018-050-006-000 I am is requesting records you may have concerning the properties of interest. Such records may include groundwater or soil sampling reports/analytical results, reports of spills of petroleum or hazardous chemicals (both closed and open), aboveground storage tank (ASTs) and underground storage tank (USTs) closure reports/certificates, inspection reports, wastewater permits, air permits, building permits, and reports of chemical odors or fumes.

Your request will be forwarded to the relevant CAL FIRE department(s) to locate the information you seek and to determine the volume and any costs that may be associated with satisfying your request. You will be contacted about the availability and/or provided with copies of the records in question. PLEASE NOTE: The California Public Records Act does not require a governmental body to create new information, to do legal research, or to answer questions.

You can monitor the progress of your request in "My Request Center" and you'll receive an email when your request has been completed.

14N/1W-2

ORIGINAL
File with DWR

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

Do Not Fill In

No 123116

State Well No.

Other Well No.

CONFIDENTIAL LOG
Water Code Sec. 13752

(1) OWNER:

Name

Address

(2) LOCATION OF WELL:

County Colusa Owner's number, if any

Township, Range, and Section NW¼ Sec 2, T14N, R4W

Distance from cities, roads, railroads, etc. ½mi S. of Spring Valley Rd. & Baker Rd. 9 mi SW Williams

(3) TYPE OF WORK (check):

New Well [X] Deepening [ ] Reconditioning [ ] Destroying [ ]

If destruction, describe material and procedure in Item 11.

(4) PROPOSED USE (check):

Domestic [X] Industrial [ ] Municipal [ ]
Irrigation [ ] Test Well [ ] Other [ ]

(5) EQUIPMENT:

Rotary [X]
Cable [ ]
Other [ ]

(6) CASING INSTALLED:

STEEL: OTHER:
SINGLE [X] DOUBLE [ ]

If gravel packed

From ft.	To ft.	Diam.	Gage or Wall	Diameter of Bore	From ft.	To ft.
0	38	16"OD	3/16	20"	0	38

Size of shoe or well ring: Welded plate bottom Size of gravel: Re-run pea

Describe joint All-welded collar

(7) PERFORATIONS OR SCREEN:

Type of perforation or name of screen Factory punch

From ft.	To ft.	Perf. per row	Rows per ft.	Size in. x in.
20	38	~~2~~ 4	32	1"x3/16"

(8) CONSTRUCTION:

Was a surface sanitary seal provided? Yes [X] No [ ] To what depth 10 ft.

Were any strata sealed against pollution? Yes [X] No [ ] 5' If yes, note depth of strata

From 2 ft. to 5 ft.

From ft. to ft.

Method of sealing cement grout

(9) WATER LEVELS:

Depth at which water was first found, if known 25 ft.

Standing level before perforating, if known 17 ft.

Standing level after perforating and developing 17 ft.

(10) WELL TESTS:

Was pump test made? Yes [ ] No [ ] If yes, by whom? Bailing test only

Yield: 10 gal./min. with ft. drawdown after hrs.

Temperature of water Was a chemical analysis made? Yes [ ] No [X]

Was electric log made of well? Yes [ ] No [X] If yes, attach copy

(11) WELL LOG:

Total depth 38 ft. Depth of completed well 38 ft.

Formation: *Describe by color, character, size of material, and structure*

Formation	From ft.		To ft.
soil & clay	0	-	2
gravel	2	-	~~12~~ 5
clay	5	-	7
sandy clay	7	-	17
sandy clay & fine gravel	17	-	21
clay	21	-	22
sandy clay and gravel	22	-	28
clay	28	-	30
brittle clay & gravel	30	-	32
brittle clay & fine gravel	32	-	34
clay	34	-	37
hard clay & shale	37	-	38

CONFIDENTIAL LOG
Water Code Sec. 13752

Work started 4/17 1974, Completed 4/20 1974

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME AULMAN & AULMAN DRILLING
(Person, firm, or corporation) (Typed or printed)

Address 1309 Westwood Way
Woodland, CA. 95695

[SIGNED] Mark Aulman
(Well Driller)

License No. 249799 Dated 9/14/67, 19

SKETCH LOCATION OF WELL ON REVERSE SIDE

14N/04W-02M
6156A

ORIGINAL
File with DWR

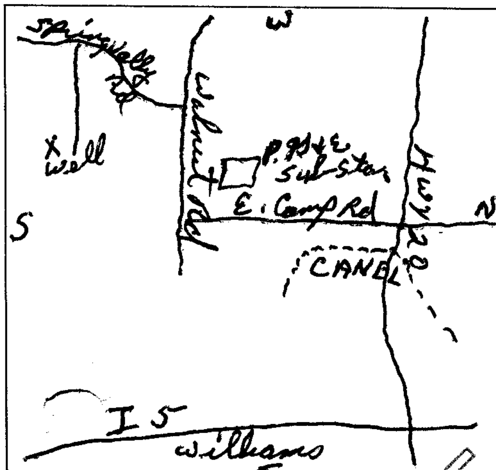
STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
WATER WELL DRILLERS REPORT

Do not fill in
No. 231682

State Well No. ____
Other Well No. ____

Notice of Intent No. ____
Local Permit No. or Date ____

(2) LOCATION OF WELL (See instructions):
County Colusa Owner's Well Number ____
Well address if different from above Spring Valley Rd. Williams
Township 14 N Range 4 W Section 2 Co.
Distance from cities, roads, railroads, fences, etc. 10 Mi West of Williams off East Camp Road + off Walnut Rd on Springvalley Rd.



WELL LOCATION SKETCH

(3) TYPE OF WORK:
New Well ☑ Deepening ☐
Reconstruction ☐
Reconditioning ☐
Horizontal Well ☐
Destruction ☐ (Describe destruction materials and procedures in Item 12)

(4) PROPOSED USE:
Domestic ☑
Irrigation ☐
Industrial ☐
Test Well ☐
Stock ☑
Municipal ☐
Other ☐

(5) EQUIPMENT:
Rotary ☑ Reverse ☐
Cable ☐ Air ☑
Other ☐ Bucket ☐

(6) GRAVEL PACK:
Yes ☐ No ☑ Size ____
Diameter of bore ____
Packed from ____ to ____ ft.

(7) CASING INSTALLED:
Steel ☑ Plastic ☐ Concrete ☐

From ft.	To ft.	Dia. in.	Gage or Wall
0'	21'	8 5/8	10

(8) PERFORATIONS:
Type of perforation or size of screen ____

From ft.	To ft.	Slot size

(9) WELL SEAL:
Was surface sanitary seal provided? Yes ☑ No ☐ If yes, to depth 0' to 20' ft.
Were strata sealed against pollution? Yes ☑ No ☐ Interval ____ ft.
Method of sealing Grout

(10) WATER LEVELS:
Depth of first water, if known 106' ft.
Standing level after well completion 10' ft.

(11) WELL TESTS:
Was well test made? Yes ☑ No ☐ If yes, by whom? Driller
Type of test Pump ☐ Bailer ☐ Air lift ☑
Depth to water at start of test 10' ft. At end of test 10' ft
Discharge 11 gal/min after 1 hr hours Water temperature ____
Chemical analysis made? Yes ☐ No ☑ If yes, by whom? ____
Was electric log made? Yes ☐ No ☑ If yes, attach copy to this report

(12) WELL LOG: Total depth 280 ft. Depth of completed well 280 ft.

from ft.	to ft.	Formation (Describe by color, character, size or material)
0	3	Grey Top Soil
3	75	Yellow clay
75	90	" Shale
90	106	Grey "
106	160	Black " + Sand Stone
160	167	Grey "
167	280	Black " + Sand Stone

MAR 15 1985

Work started 2-21-85 19__ Completed 2-27-85 19__

WELL DRILLER'S STATEMENT:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

SIGNED George Irwin (Well Driller) 00205

NAME Beymer Well Service (Person, firm, or corporation) (Typed or printed)
Address P.O. Box 1212
City Yuba City Ca Zip 95991
License No. 375209 Date of this report 2-27-85

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

APPENDIX E: HISTORICAL REVIEW DOCUMENTATION

HISTORICAL AERIALS

Project Property: Janus Solar
Colusa County
Williams CA

Project No: 194-1129-0040

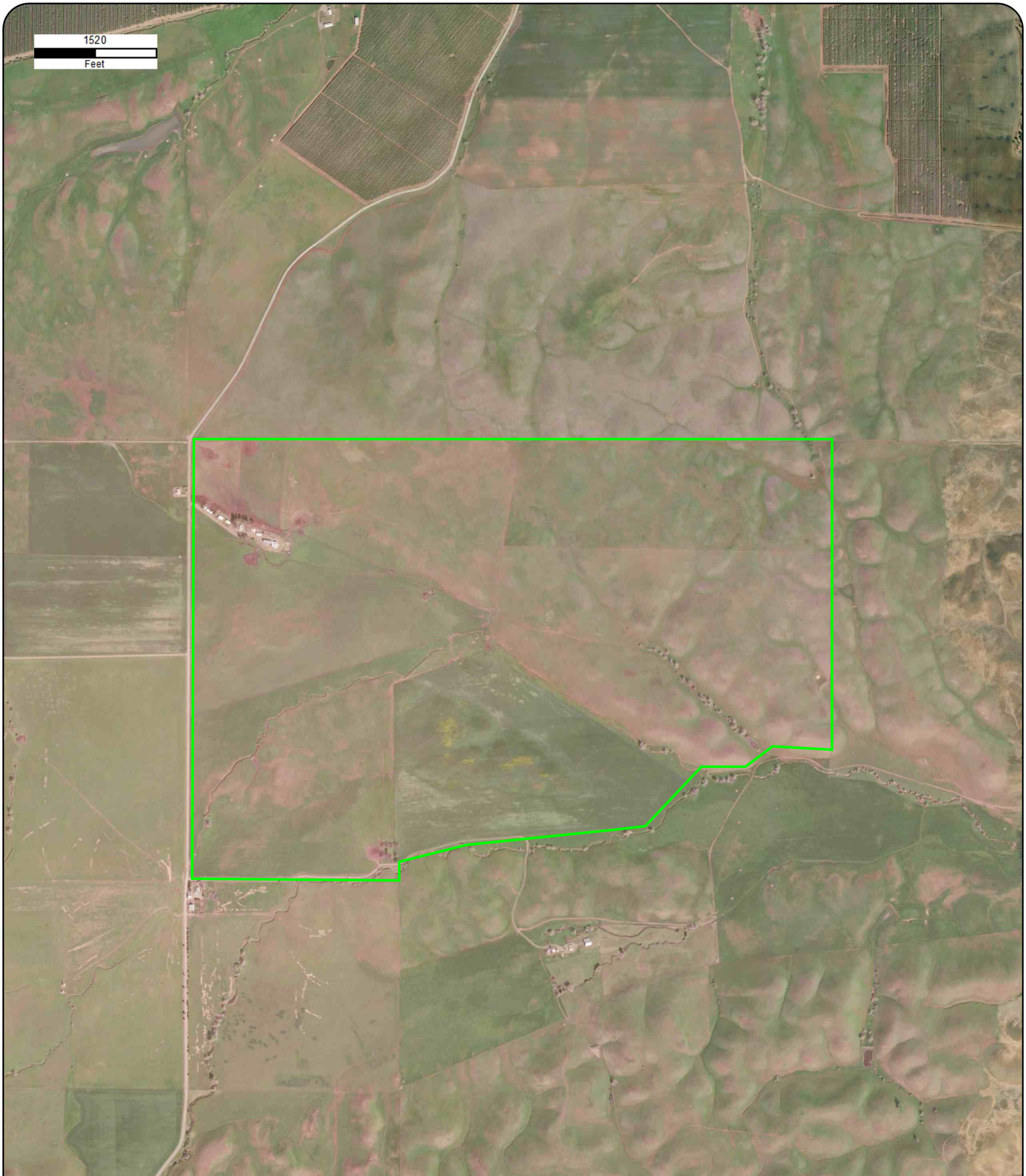
Requested By: Tetra Tech, Inc.

Order No: 24070100592

Date Completed: July 03,2024

Environmental Risk Information Services
A division of Glacier Media Inc.
1.866.517.5204 | info@erisinfo.com | erisinfo.com

Date	Source	Scale	Comments
2023	Maxar Technologies	1" = 1500'	
2020	United States Department of Agriculture	1" = 1500'	
2018	United States Department of Agriculture	1" = 1500'	
2016	United States Department of Agriculture	1" = 1500'	
2014	United States Department of Agriculture	1" = 1500'	
2012	United States Department of Agriculture	1" = 1500'	
2010	United States Department of Agriculture	1" = 1500'	
2009	United States Department of Agriculture	1" = 1500'	
2006	United States Department of Agriculture	1" = 1500'	
2005	United States Department of Agriculture	1" = 1500'	
2004	United States Department of Agriculture	1" = 1500'	
2003	United States Department of Agriculture	1" = 1500'	
1993	United States Geological Survey	1" = 1500'	
1985	United States Geological Survey	1" = 1500'	
1977	United States Geological Survey	1" = 1500'	Best Copy Available
1968	United States Air Force	1" = 1500'	Best Copy Available
1957	United States Geological Survey	1" = 1500'	
1954	Army Mapping Service	1" = 1500'	Best Copy Available
1937	Agricultural Stabilization & Conserv. Service	1" = 1500'	Photo Index - Best Available

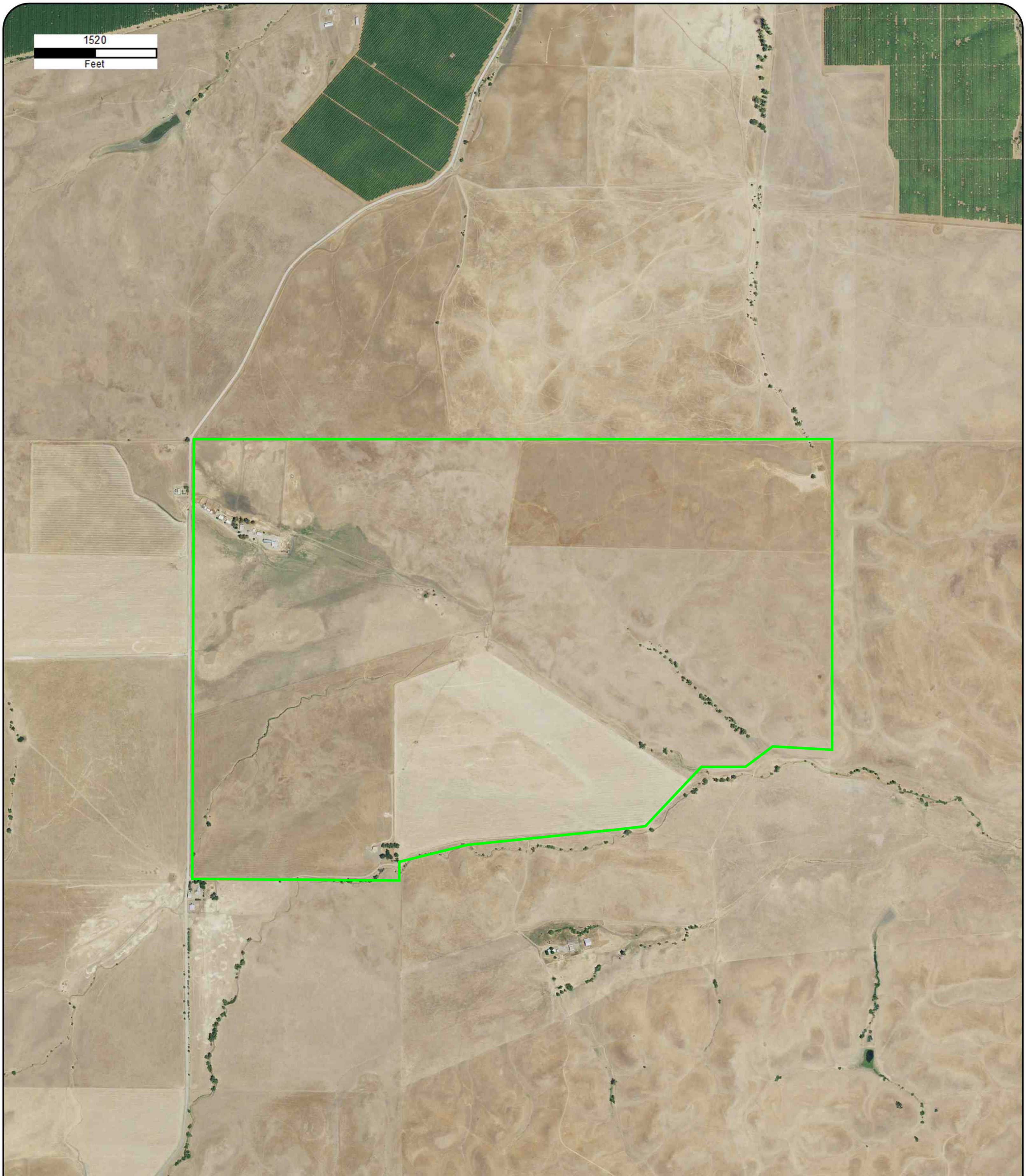


Year: 2023
Source: MAXAR
Scale: 1" = 1500'
Comment:

Address: Colusa County, Williams, CA
Approx Center: -122.2683889,39.09464762

Order No: 24070100592

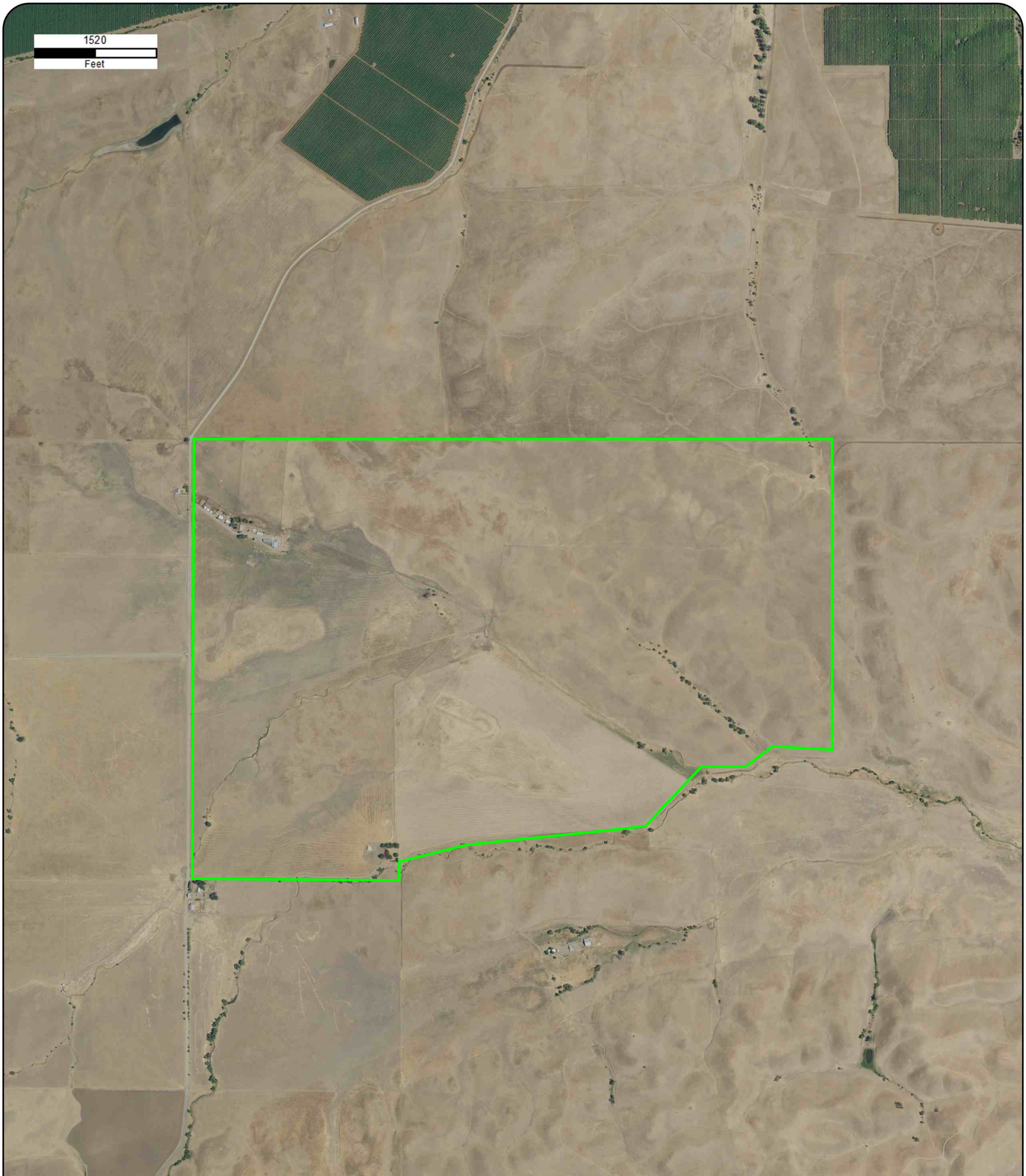
ERIS



Year: 2020
Source: USDA
Scale: 1" = 1500'
Comment:

Address: Colusa County, Williams, CA
Approx Center: -122.2683889,39.09464762

Order No: 24070100592

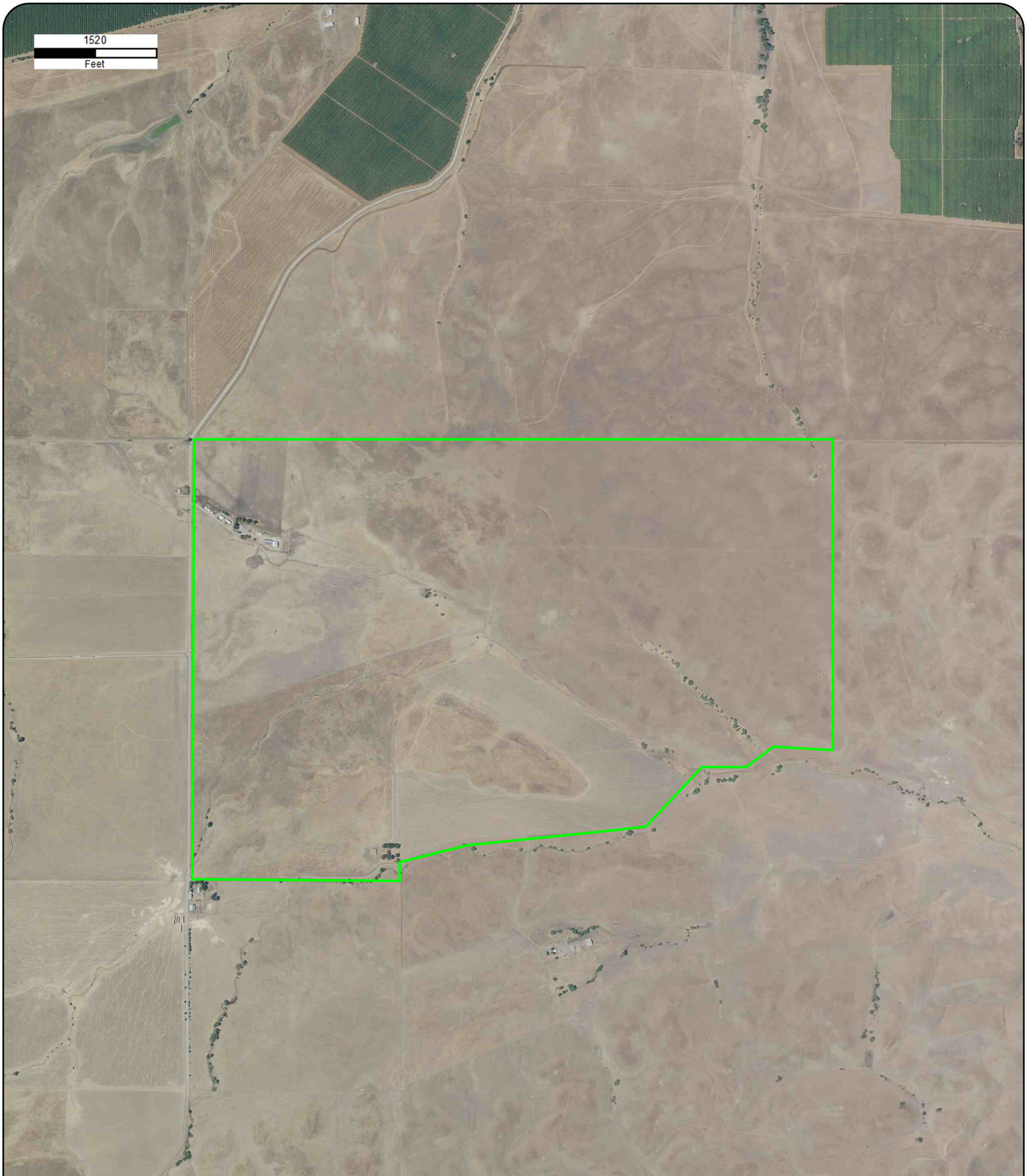


Year: 2018
Source: USDA
Scale: 1" = 1500'
Comment:

Address: Colusa County, Williams, CA
Approx Center: -122.2683889,39.09464762

Order No: 24070100592

ERIS

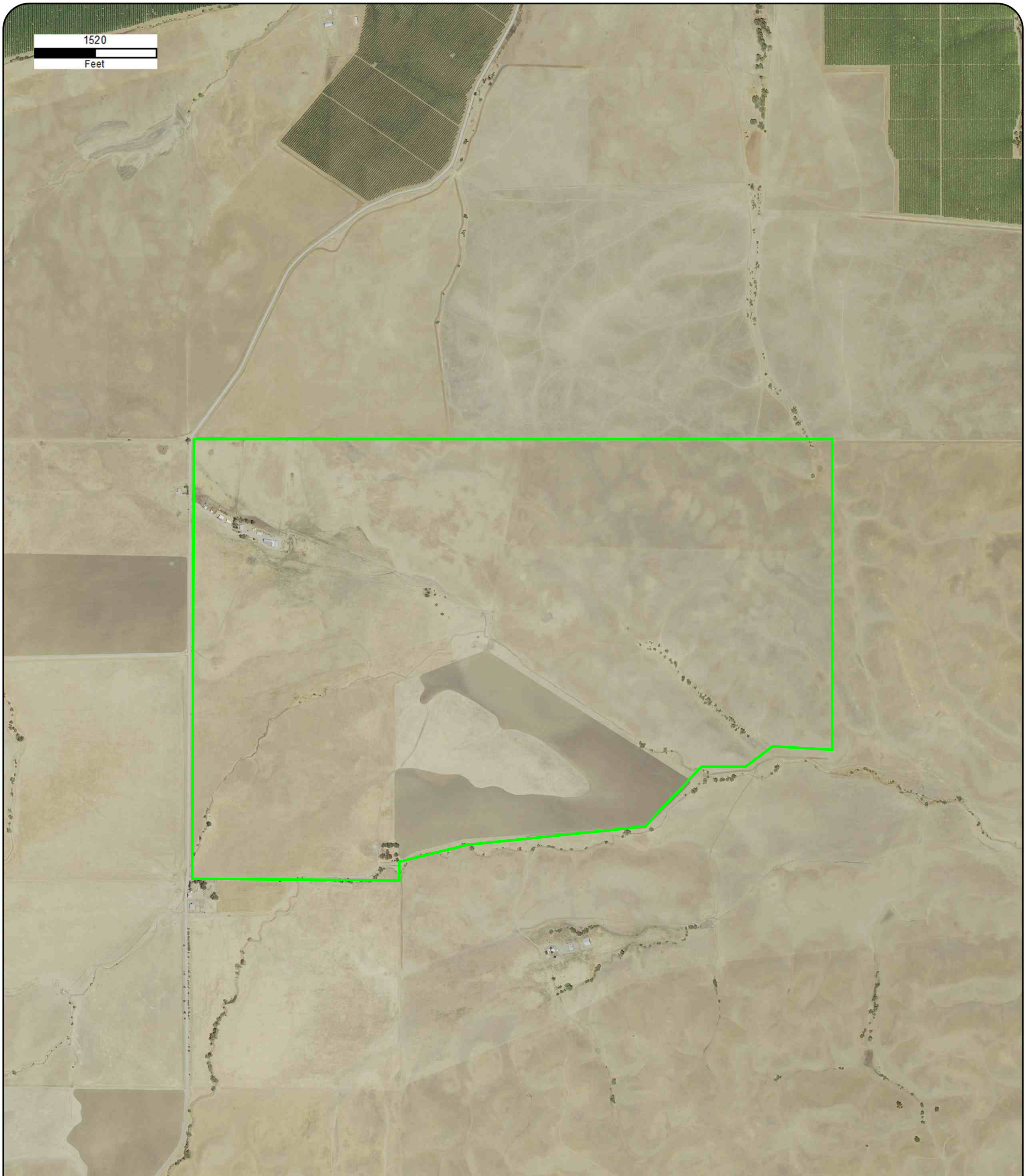


Year: 2016
Source: USDA
Scale: 1" = 1500'
Comment:

Address: Colusa County, Williams, CA
Approx Center: -122.2683889,39.09464762

Order No: 24070100592

ERIS

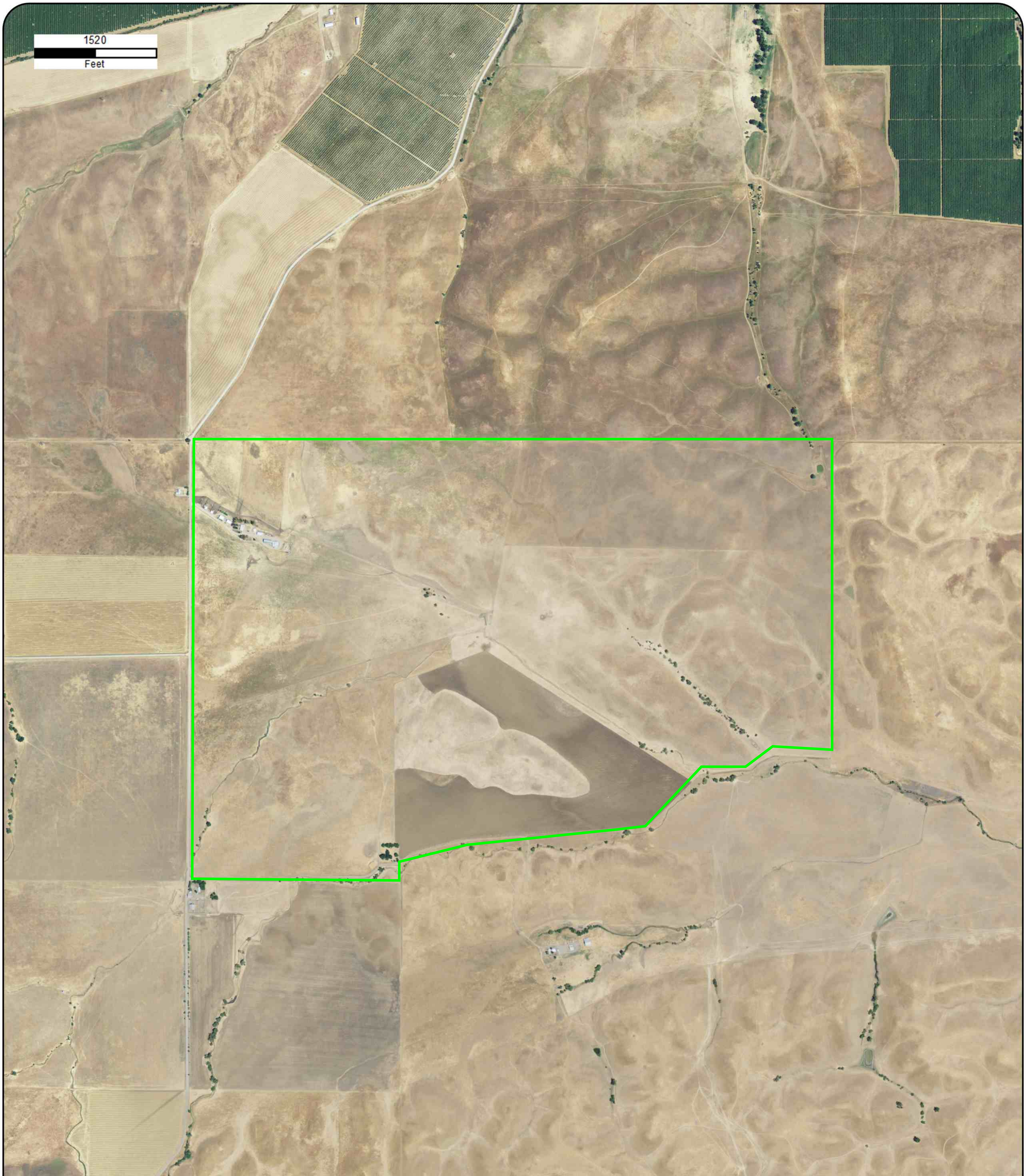


Year: 2014
Source: USDA
Scale: 1" = 1500'
Comment:

Address: Colusa County, Williams, CA
Approx Center: -122.2683889,39.09464762

Order No: 24070100592

ERIS

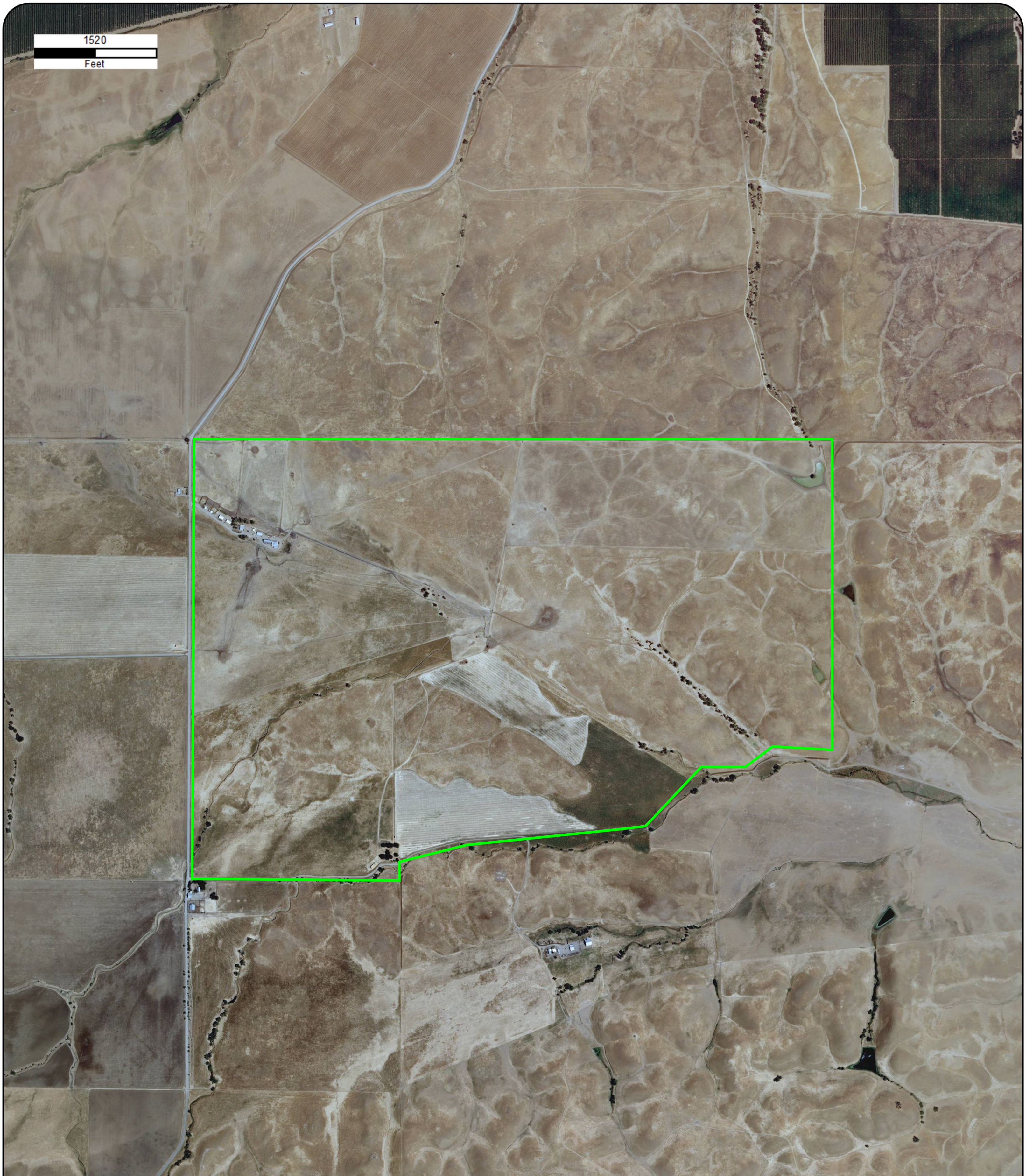


Year: 2012
Source: USDA
Scale: 1" = 1500'
Comment:

Address: Colusa County, Williams, CA
Approx Center: -122.2683889,39.09464762

Order No: 24070100592

ERIS

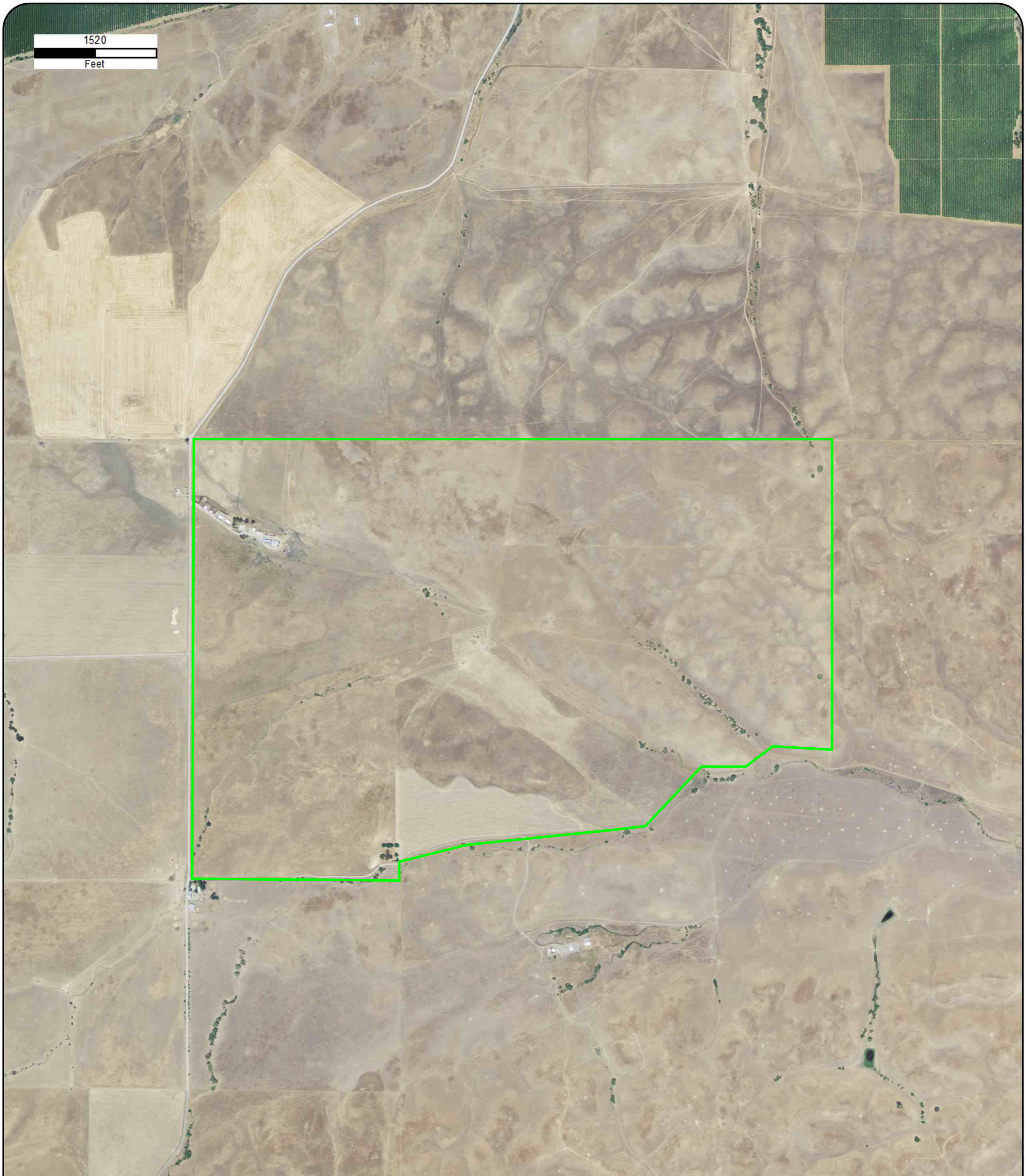


Year: 2010
Source: USDA
Scale: 1" = 1500'
Comment:

Address: Colusa County, Williams, CA
Approx Center: -122.2683889,39.09464762

Order No: 24070100592

ERIS

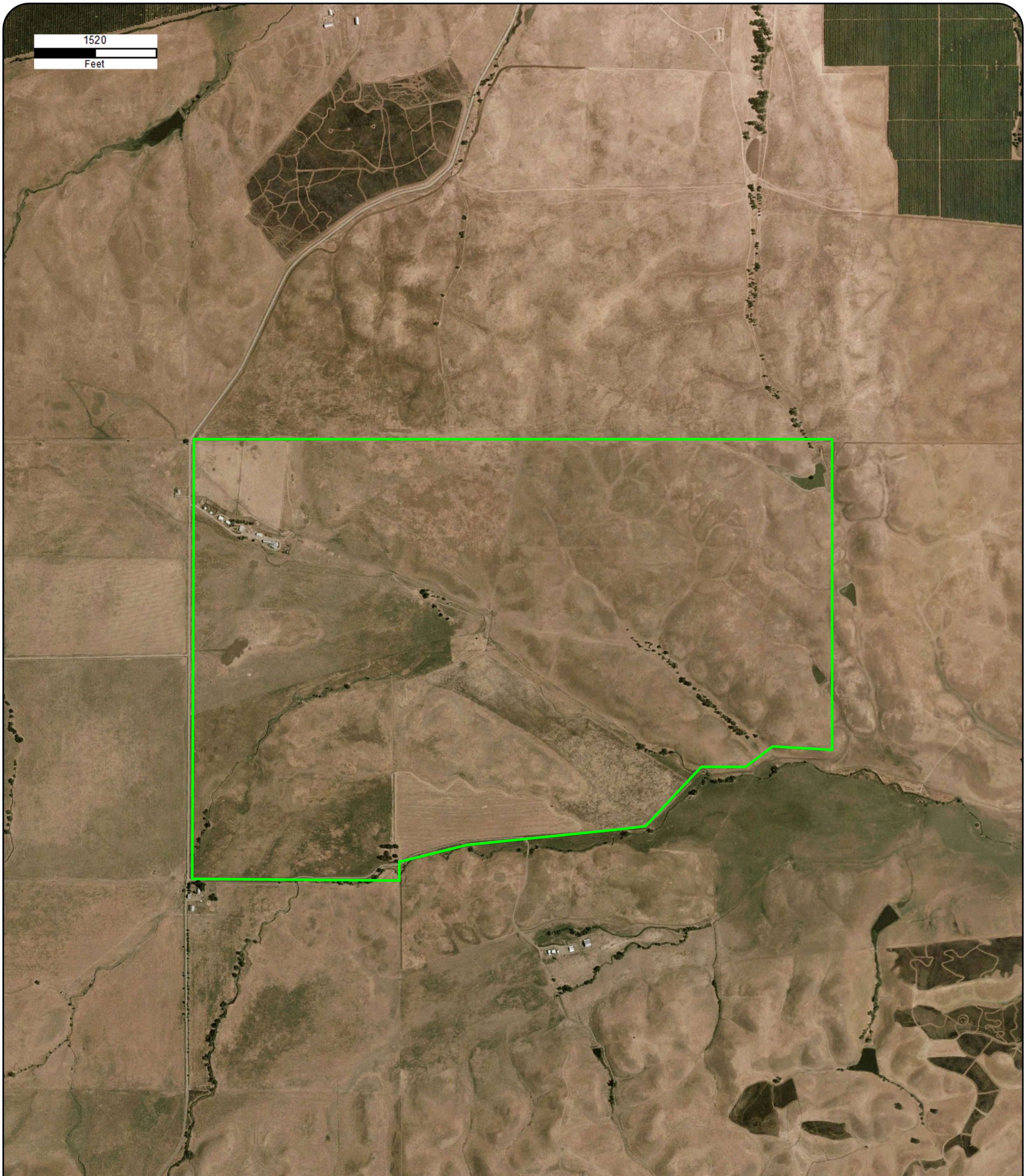


Year: 2009
Source: USDA
Scale: 1" = 1500'
Comment:

Address: Colusa County, Williams, CA
Approx Center: -122.2683889,39.09464762

Order No: 24070100592

ERIS



Year: 2006

Source: USDA

Scale: 1" = 1500'

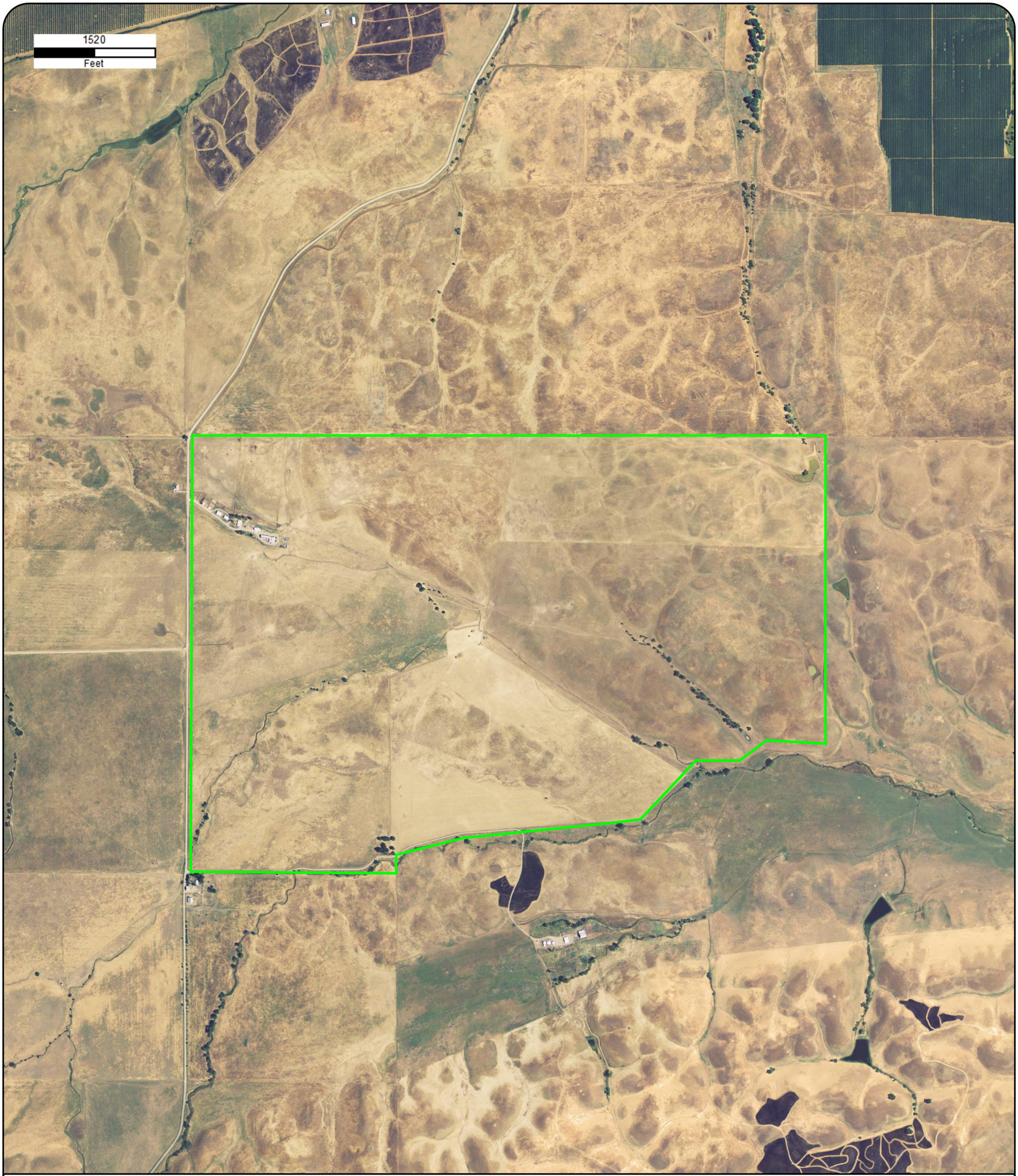
Comment:

Address: Colusa County, Williams, CA

Approx Center: -122.2683889,39.09464762

Order No: 24070100592

ERIS

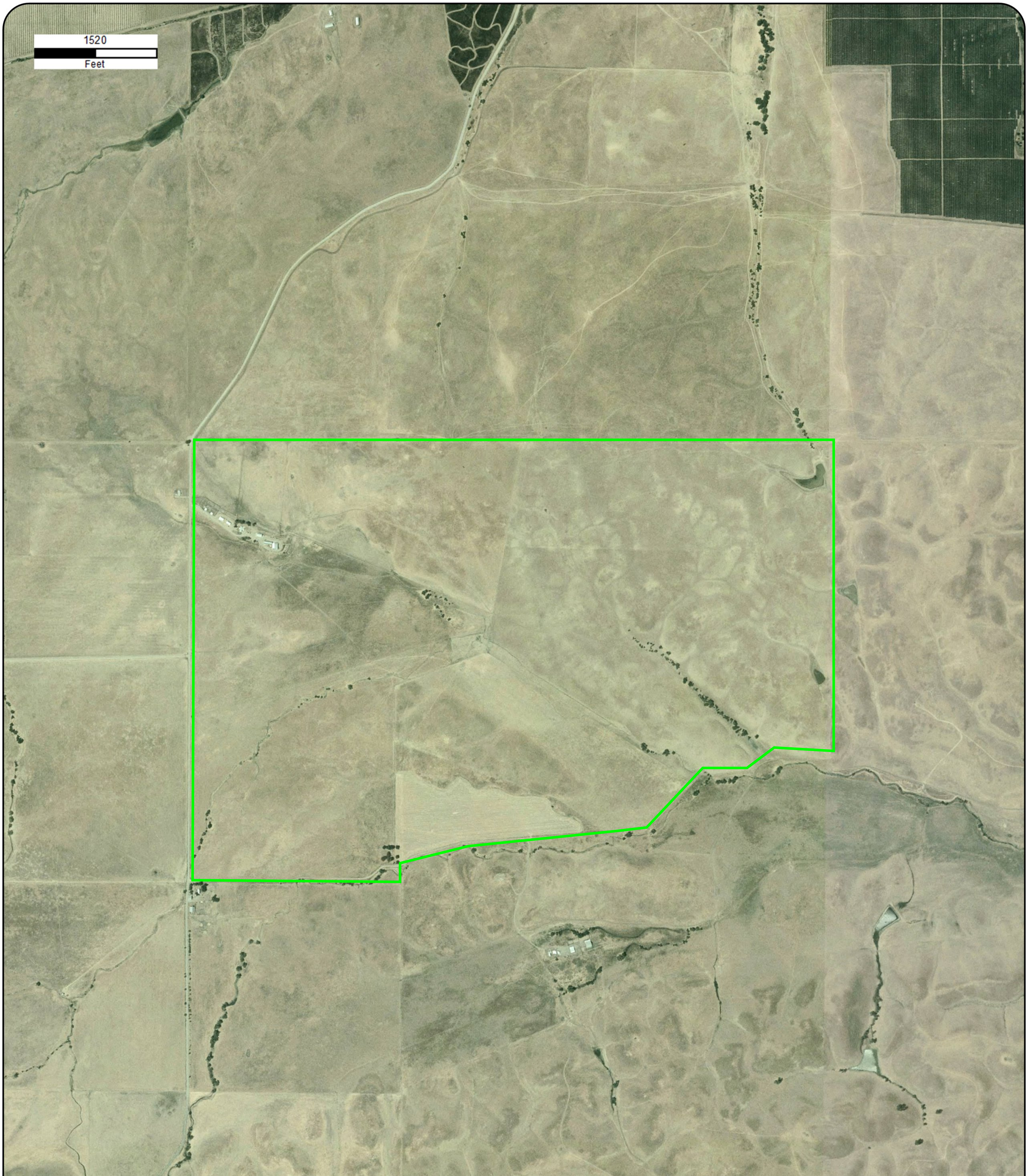


Year: 2005
Source: USDA
Scale: 1" = 1500'
Comment:

Address: Colusa County, Williams, CA
Approx Center: -122.2683889,39.09464762

Order No: 24070100592

ERIS

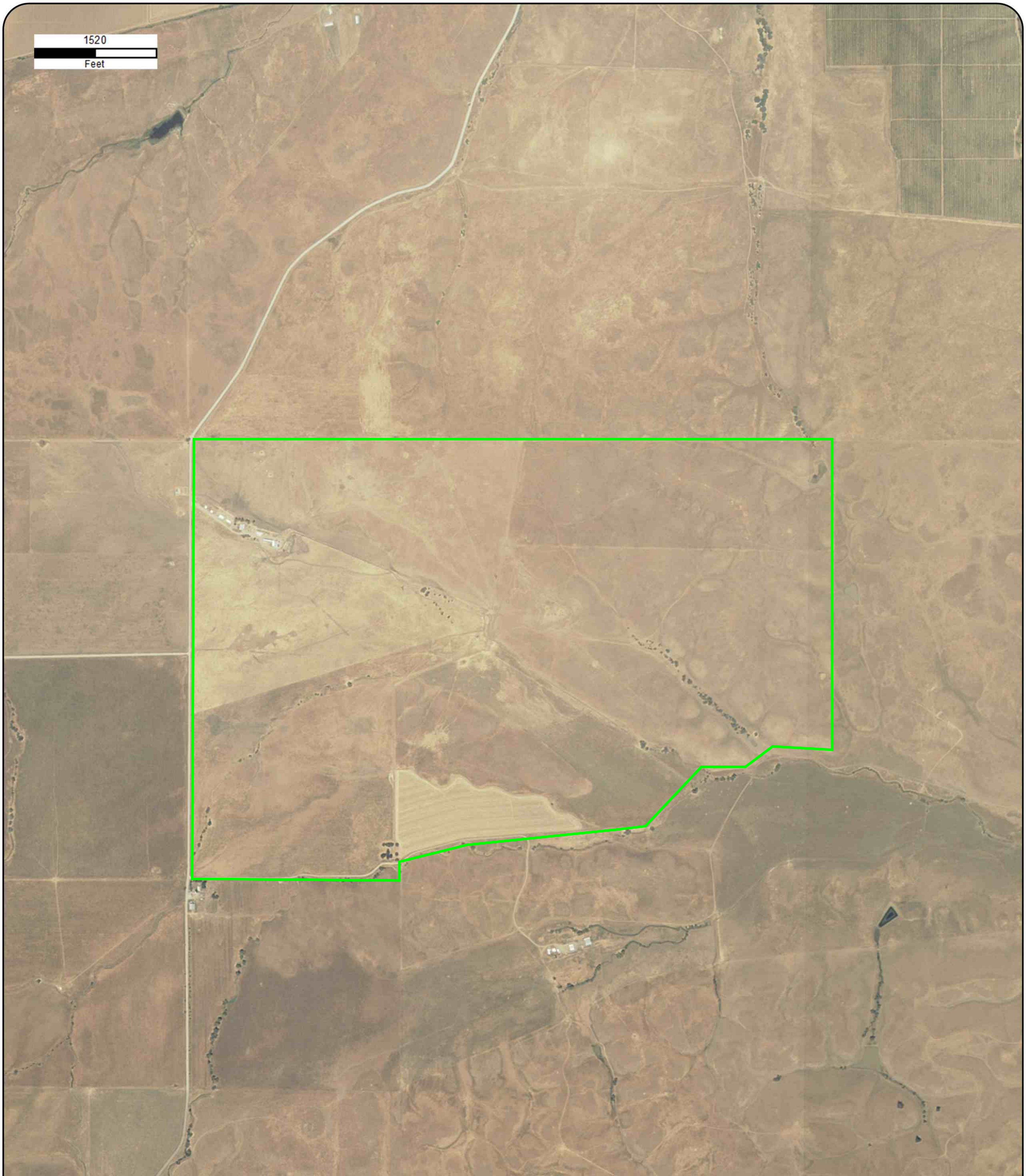


Year: 2004
Source: USDA
Scale: 1" = 1500'
Comment:

Address: Colusa County, Williams, CA
Approx Center: -122.2683889,39.09464762

Order No: 24070100592

ERIS

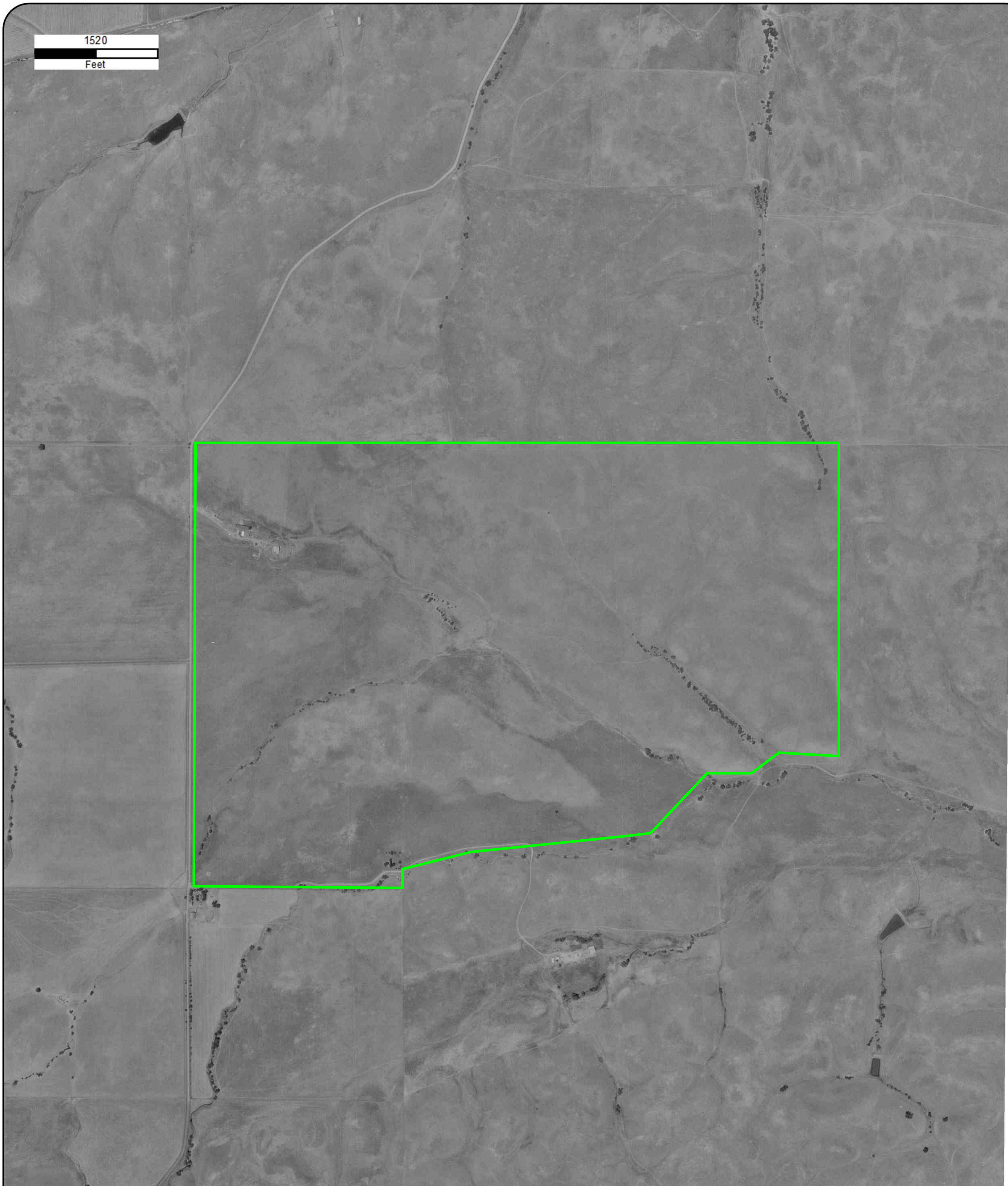


Year: 2003
Source: USDA
Scale: 1" = 1500'
Comment:

Address: Colusa County, Williams, CA
Approx Center: -122.2683889,39.09464762

Order No: 24070100592

ERIS

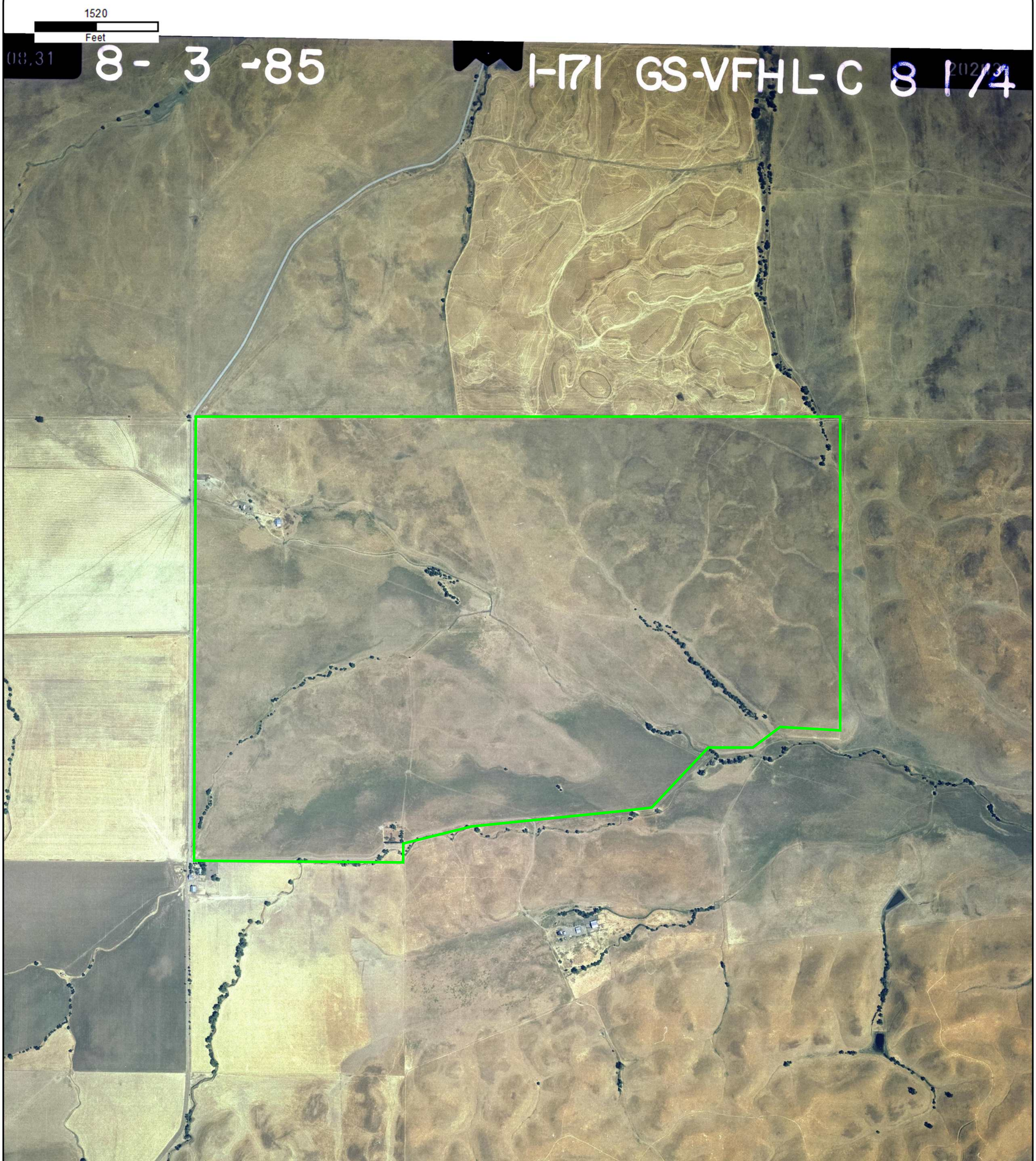


Year: 1993
Source: USGS
Scale: 1" = 1500'
Comment:

Address: Colusa County, Williams, CA
Approx Center: -122.2683889,39.09464762

Order No: 24070100592

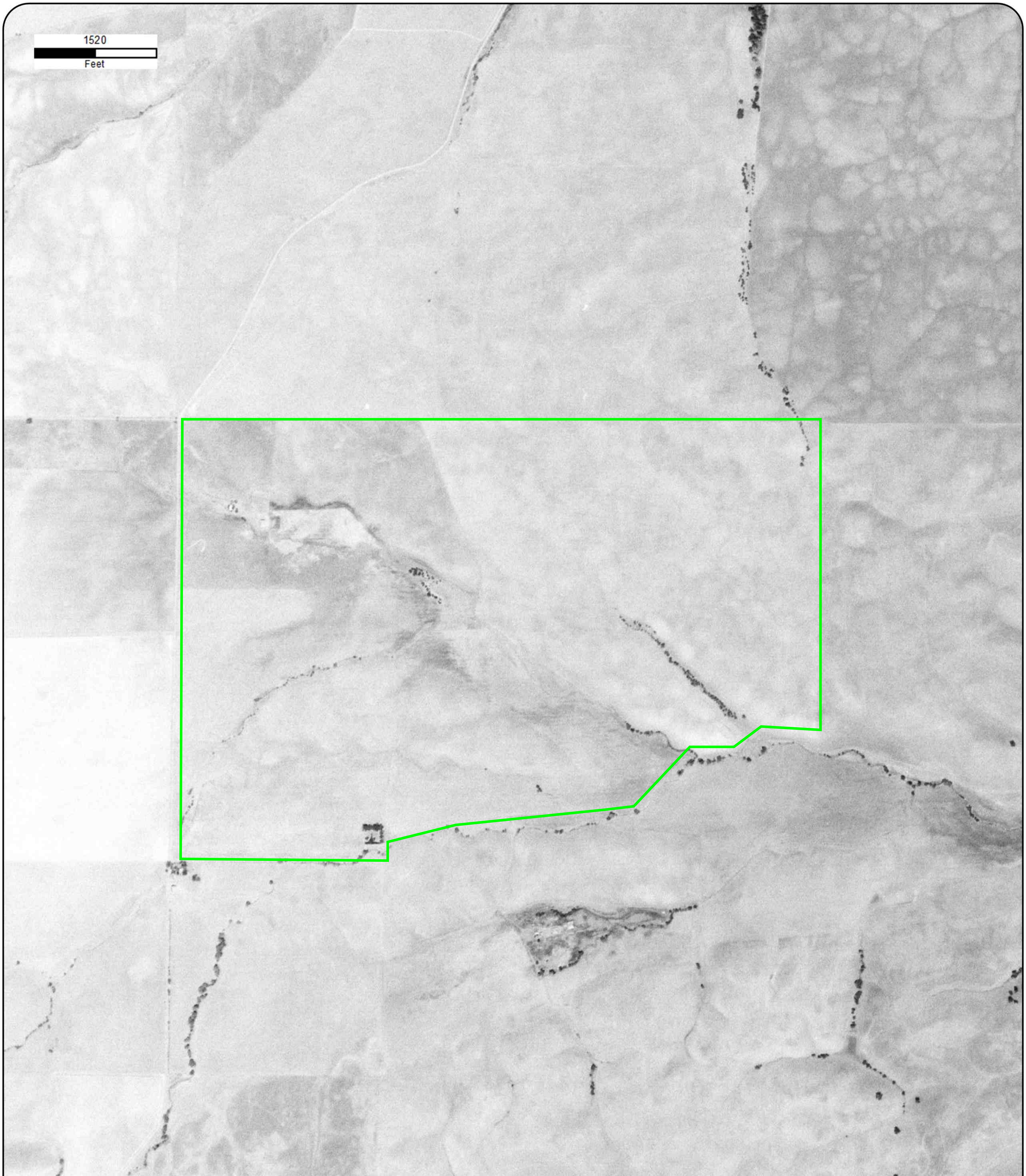
ERIS



Year: 1985
Source: USGS
Scale: 1" = 1500'
Comment:

Address: Colusa County, Williams, CA
Approx Center: -122.2683889,39.09464762

Order No: 24070100592



Year: 1977
Source: USGS
Scale: 1" = 1500'
Comment: Best Copy Available

Address: Colusa County, Williams, CA
Approx Center: -122.2683889,39.09464762

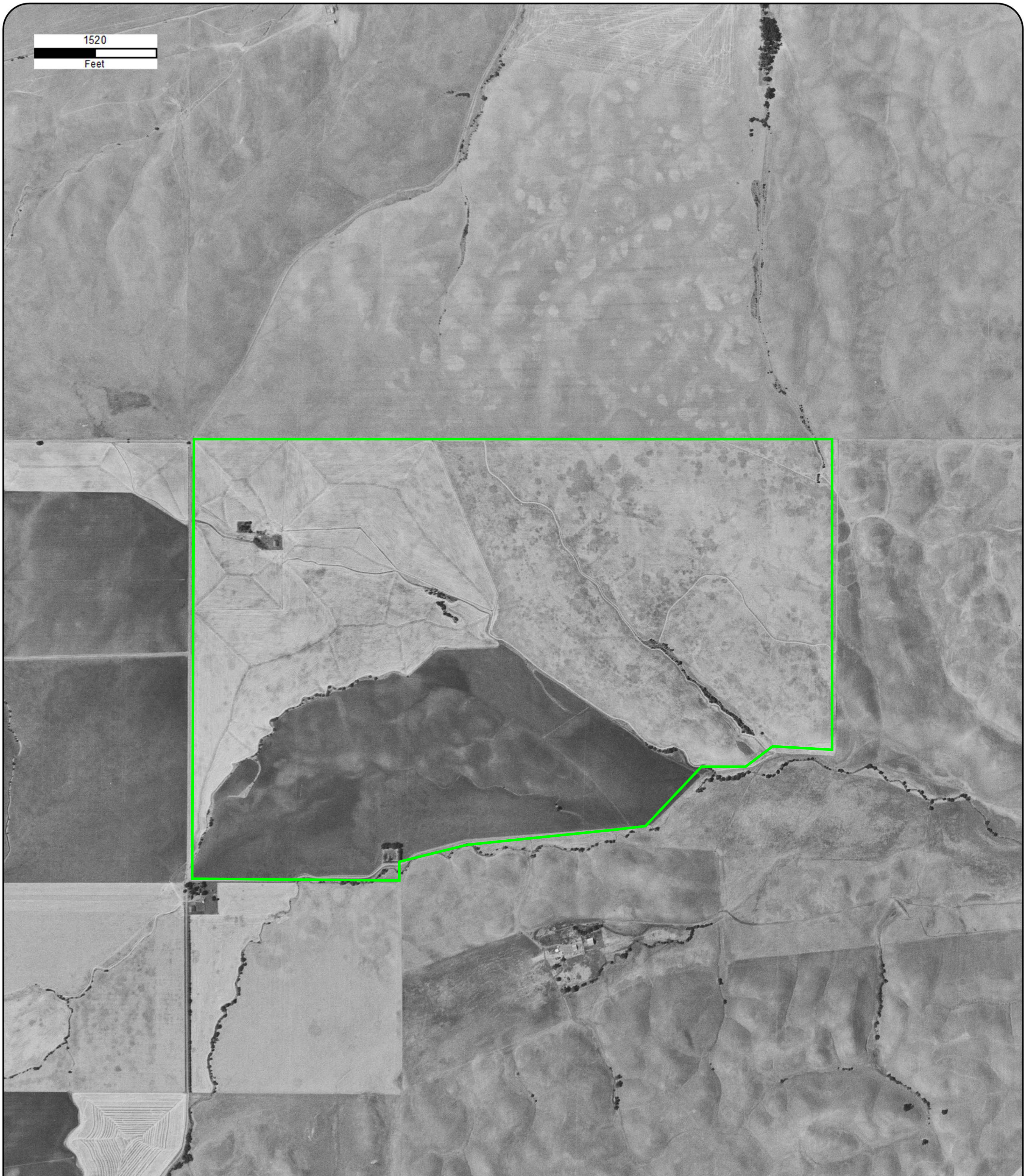
Order No: 24070100592

ERIS

Year: 1968
Source: USAF
Scale: 1" = 1500'
Comment: Best Copy Available

Address: Colusa County, Williams, CA
Approx Center: -122.2683889,39.09464762

Order No: 24070100592



Year: 1957
Source: USGS
Scale: 1" = 1500'
Comment:

Address: Colusa County, Williams, CA
Approx Center: -122.2683889,39.09464762

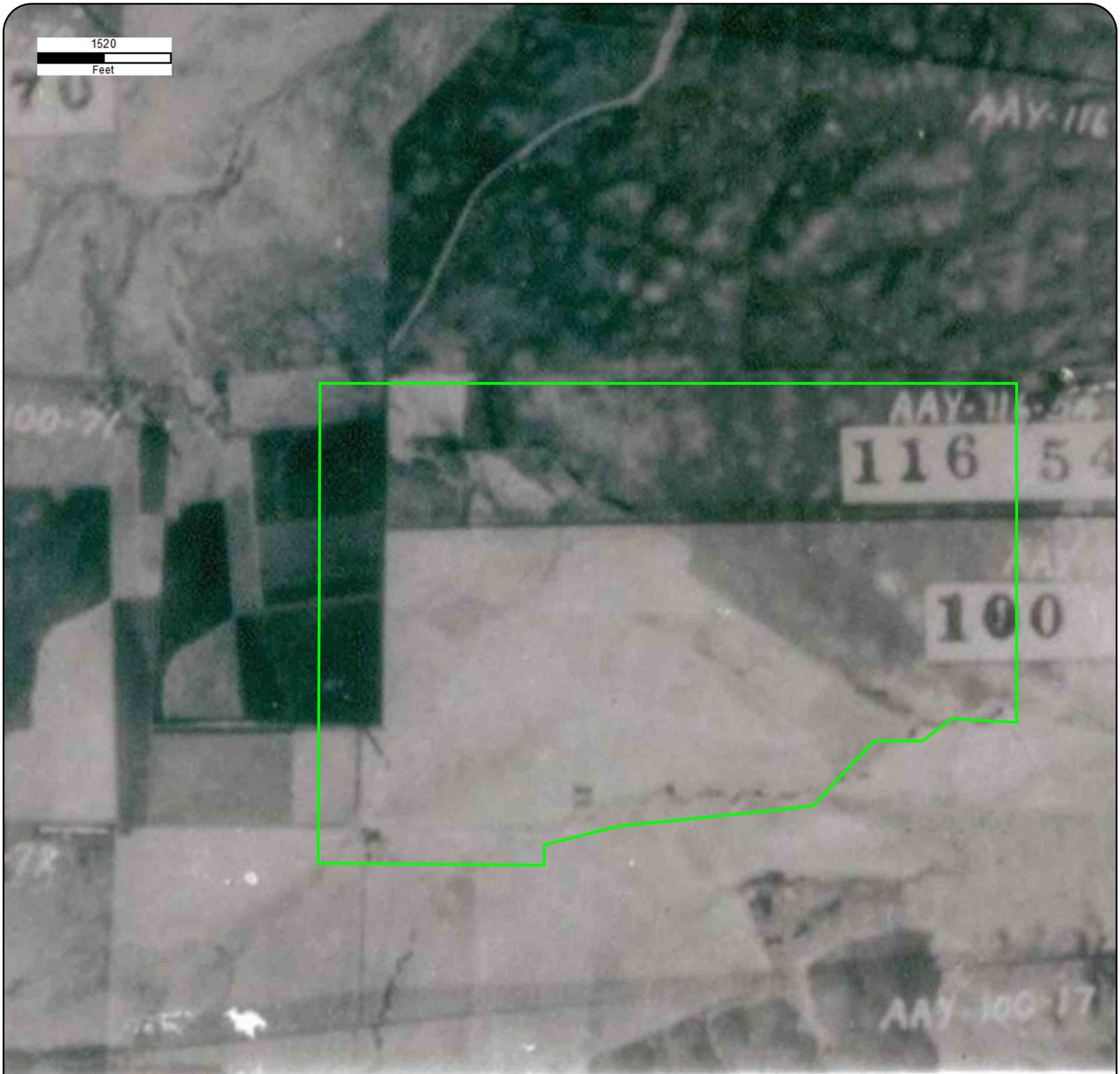
Order No: 24070100592

Year: 1954
Source: AMS
Scale: 1" = 1500'
Comment: Best Copy Available

Address: Colusa County, Williams, CA
Approx Center: -122.2683889,39.09464762

Order No: 24070100592

ERIS



Year: 1937
Source: ASCS
Scale: 1" = 1500'
Comment: Photo Index - Best Available

Address: Colusa County, Williams, CA
Approx Center: -122.2683889,39.09464762

Order No: 24070100592

ERIS

ERIS

CITY
DIRECTORY

Project Property:	*Janus Solar* *Colusa County* *Williams,CA*
Project No:	*194-1129-0040*
Requested By:	*Tetra Tech, Inc.*
Order No:	*24070100592*
Date Completed:	*July 10, 2024*

Environmental Risk Information Services
A division of Glacier Media Inc.
1.866.517.5204 | info@erisinfo.com | erisinfo.com

July 10, 2024
RE: CITY DIRECTORY RESEARCH
Colusa County
Williams,CA

Thank you for contacting ERIS for an City Directory Search for the site described above. Our staff has conducted a reverse listing City Directory search to determine prior occupants of the subject site and adjacent properties. We have provided the nearest addresses(s) when adjacent addresses are not listed. If we have searched a range of addresses, all addresses in that range found in the Directory are included.

Note: Reverse Listing Directories generally are focused on more highly developed areas. Newly developed areas may be covered in the more recent years, but the older directories will tend to cover only the "central" parts of the city. To complete the search, we have either utilized the ACPL, Library of Congress, State Archives, and/or a regional library or history center as well as multiple digitized directories. These do not claim to be a complete collection of all reverse listing city directories produced.

ERIS has made every effort to provide accurate and complete information but shall not be held liable for missing, incomplete or inaccurate information. To complete this search we used the general range(s) below to search for relevant findings. If you believe there are additional addresses or streets that require searching please contact us at 866-517-5204.

Search Criteria:
ALL of Baker Rd
ALL of Spring Valley Rd
Search Notes:

Search Results Summary

Date	Source	Comment
2022	DIGITAL BUSINESS DIRECTORY	
2020	DIGITAL BUSINESS DIRECTORY	
2016	DIGITAL BUSINESS DIRECTORY	
2011	DIGITAL BUSINESS DIRECTORY	
2007	DIGITAL BUSINESS DIRECTORY	
2002	DIGITAL BUSINESS DIRECTORY	
2000-01	HAINES	
1995-96	HAINES	
1990	HAINES	
1986	HAINES	

2022 BAKER RD

SOURCE: DIGITAL BUSINESS DIRECTORY

NO LISTING FOUND

2022 SPRING VALLEY RD

SOURCE: DIGITAL BUSINESS DIRECTORY

1830 **GAYLENE PARKER**...*RESIDENTIAL*
1830 **TOM CORRIEA**...*RESIDENTIAL*

2020 BAKER RD

SOURCE: DIGITAL BUSINESS DIRECTORY

NO LISTING FOUND

2020 SPRING VALLEY RD

SOURCE: DIGITAL BUSINESS DIRECTORY

1830 **GAYLENE PARKER**...*RESIDENTIAL*
1830 **TOM CORRIEA**...*RESIDENTIAL*

2016 BAKER RD
SOURCE: DIGITAL BUSINESS DIRECTORY

NO LISTING FOUND

2016 SPRING VALLEY RD
SOURCE: DIGITAL BUSINESS DIRECTORY

1830 **TOM CORRIEA...***RESIDENTIAL*

2011 BAKER RD

SOURCE: DIGITAL BUSINESS DIRECTORY

NO LISTING FOUND

2011 SPRING VALLEY RD

SOURCE: DIGITAL BUSINESS DIRECTORY

1830 **GAYLENE PARKER...***RESIDENTIAL*

2007 BAKER RD

SOURCE: DIGITAL BUSINESS DIRECTORY

NO LISTING FOUND

2007 SPRING VALLEY RD

SOURCE: DIGITAL BUSINESS DIRECTORY

1663	**BUD HARMAN...***RESIDENTIAL*
1830	**GAYLENE PARKER...***RESIDENTIAL*
1850	**SHAWN GREEN...***RESIDENTIAL*

2002 BAKER RD
SOURCE: DIGITAL BUSINESS DIRECTORY

NO LISTING FOUND

2002 SPRING VALLEY RD
SOURCE: DIGITAL BUSINESS DIRECTORY

0	**KENNETH LORMAN**...*RESIDENTIAL*
30	**CHARLES RANCH MARSH**...*RESIDENTIAL*

2000-01 BAKER RD
SOURCE: HAINES

STREET NOT LISTED

2000-01 SPRING VALLEY RD
SOURCE: HAINES

SPRING VLY RD 95987
WILLIAMS

WEALTH CODE 6.0

1663	HARMAN Bud	530-473-2359	9
1830	PARKER Gaylene	530-473-3263	+0

★ 0 BUS 2 RES 1 NEW

1995-96 BAKER RD
SOURCE: HAINES

STREET NOT LISTED

1995-96 SPRING VALLEY RD
SOURCE: HAINES

SPRING VLY RD 95987
WILLIAMS

WEALTH CODE 1.0

1830	*MARSH CHARLES RANCH	473-2109	3
NO #	LORMAN Kenneth	473-2110	0
NO #	OWENS Jim	473-2441	

* 1 BUS 2 RES 0 NEW

1990 BAKER RD
SOURCE: HAINES

STREET NOT LISTED

1990 SPRING VALLEY RD
SOURCE: HAINES

SPRING VLY RD 95987
WILLIAMS

NO #	ESTILL John	473-2343	9
NO #	HANSEN Vic	473-2441	
NO #	LORMAN Kenneth	473-2110	+0
NO #	★OWENS JIM CATTLE CO	473-2441	

★ 1 BUS 3 RES 1 NEW

1986 BAKER RD

SOURCE: HAINES

STREET NOT LISTED

1986 SPRING VALLEY RD

SOURCE: HAINES

SPRING VLY RD 95987 WILLIAMS

NO #	COLEMAN JAMES C	473-5671
NO #	HANSEN VIC	473-2441
NO #	MILLER GREGORY N	473-2638
NO #	OWENS JIM CATTLE CO	473-2441
*	1 BUS 3 RES	

FIRE INSURANCE MAPS

Project Property:	Janus Solar Colusa County Williams CA
Project No:	194-1129-0040
Requested By:	Tetra Tech, Inc.
Order No:	24070100592
Date Completed:	July 02, 2024

Please note that no information was found for your site or adjacent properties.

Environmental Risk Information Services
A division of Glacier Media Inc.
1.866.517.5204 | info@erisinfo.com | erisinfo.com

Property Information

Order Number:		24070100592p
Date Completed:		July 2, 2024
Project Number:		194-1129-0040
Project Property:		Janus Solar Colusa County Williams CA
Coordinates:		
	Latitude:	39.09464762
	Longitude:	-122.2683889
	UTM Northing:	4327534.54449 Meters
	UTM Easting:	563267.357272 Meters
	UTM Zone:	UTM Zone 10S
	Elevation:	308.85 ft
	Slope Direction:	SSE

Topographic Information....................2
Hydrologic Information....................12
Geologic Information....................25
Soil Information....................31
Wells and Additional Sources....................43
Summary....................48
Detail Report....................49
Radon Information....................54
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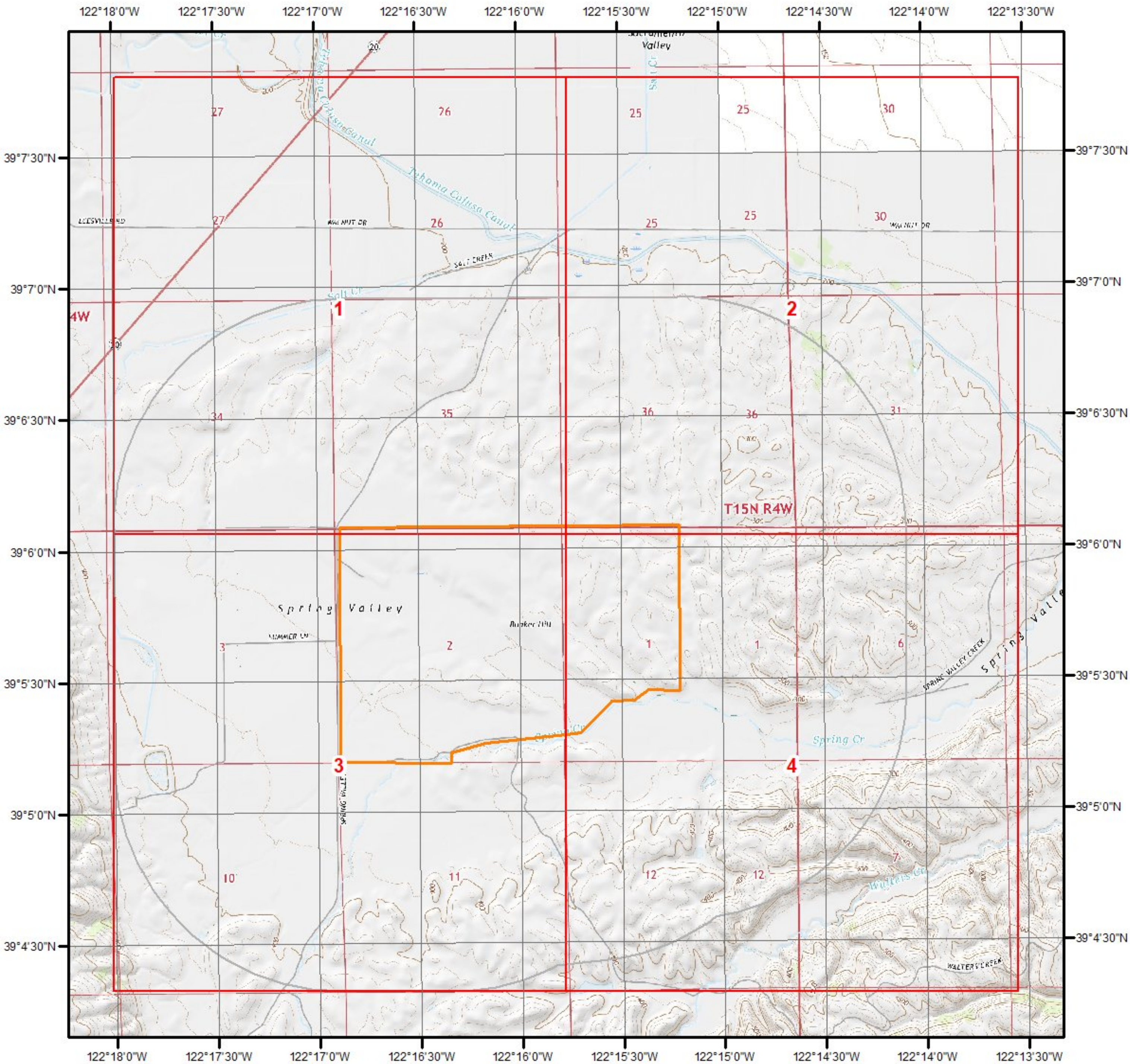
The ERIS ***Physical Setting Report - PSR*** provides comprehensive information about the physical setting around a site and includes a complete overview of topography and surface topology, in addition to hydrologic, geologic and soil characteristics. The location and detailed attributes of oil and gas wells, water wells, public water systems and radon are also included for review.

The compilation of both physical characteristics of a site and additional attribute data is useful in assessing the impact of migration of contaminants and subsequent impact on soils and groundwater.

Disclaimer

This Report does not provide a full environmental evaluation for the site or adjacent properties. Please see the terms and disclaimer at the end of the Report for greater detail.

Topographic Information



Current USGS Topo (2022)

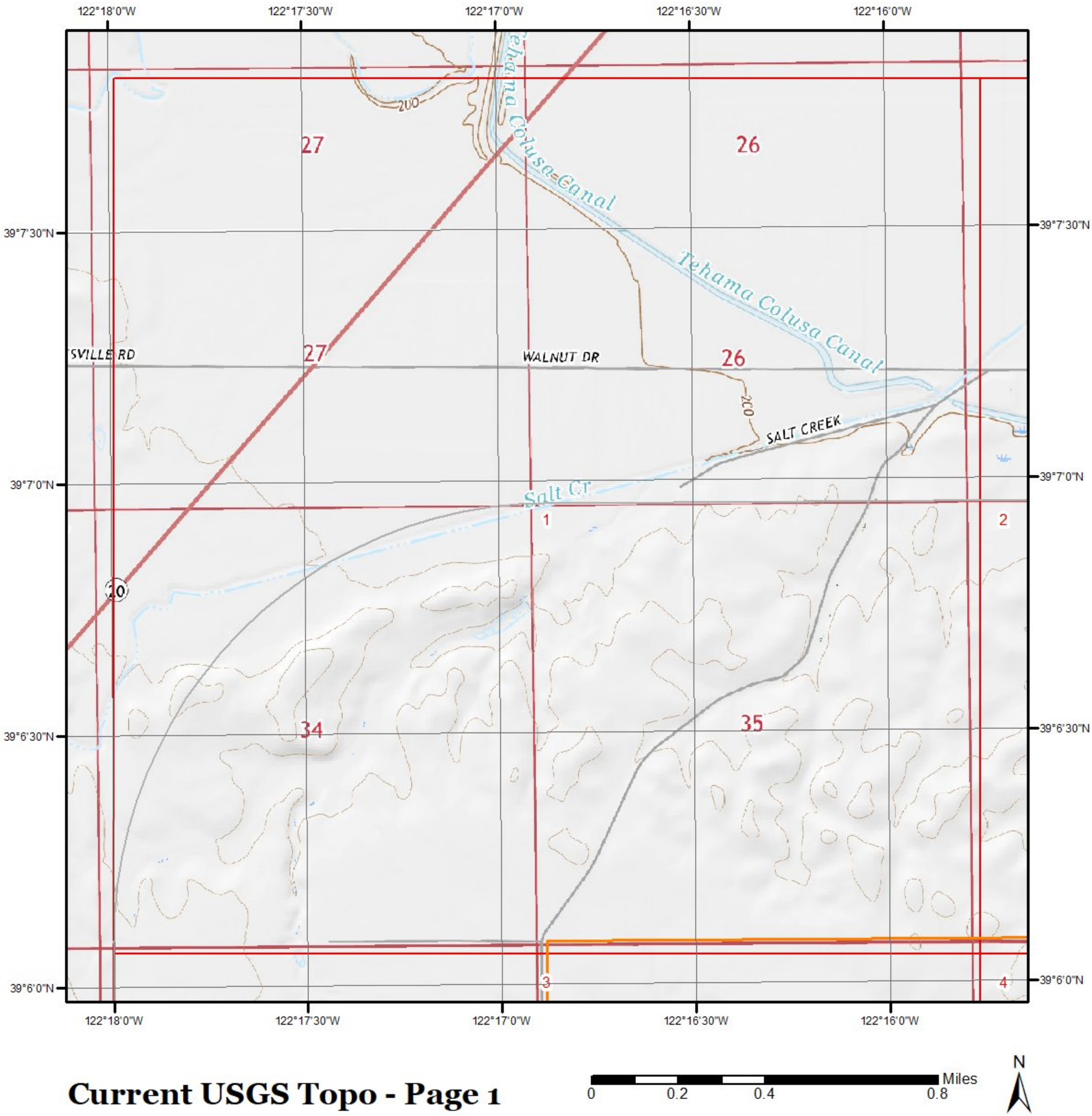
0 0.2 0.4 0.8 1.2 1.6 Miles

N

Quadrangle(s): Cortina Creek,CA; Manor Slough,CA; Salt Canyon,CA; Williams,CA

Source: USGS 7.5 Minute Topographic Map

Topographic Information

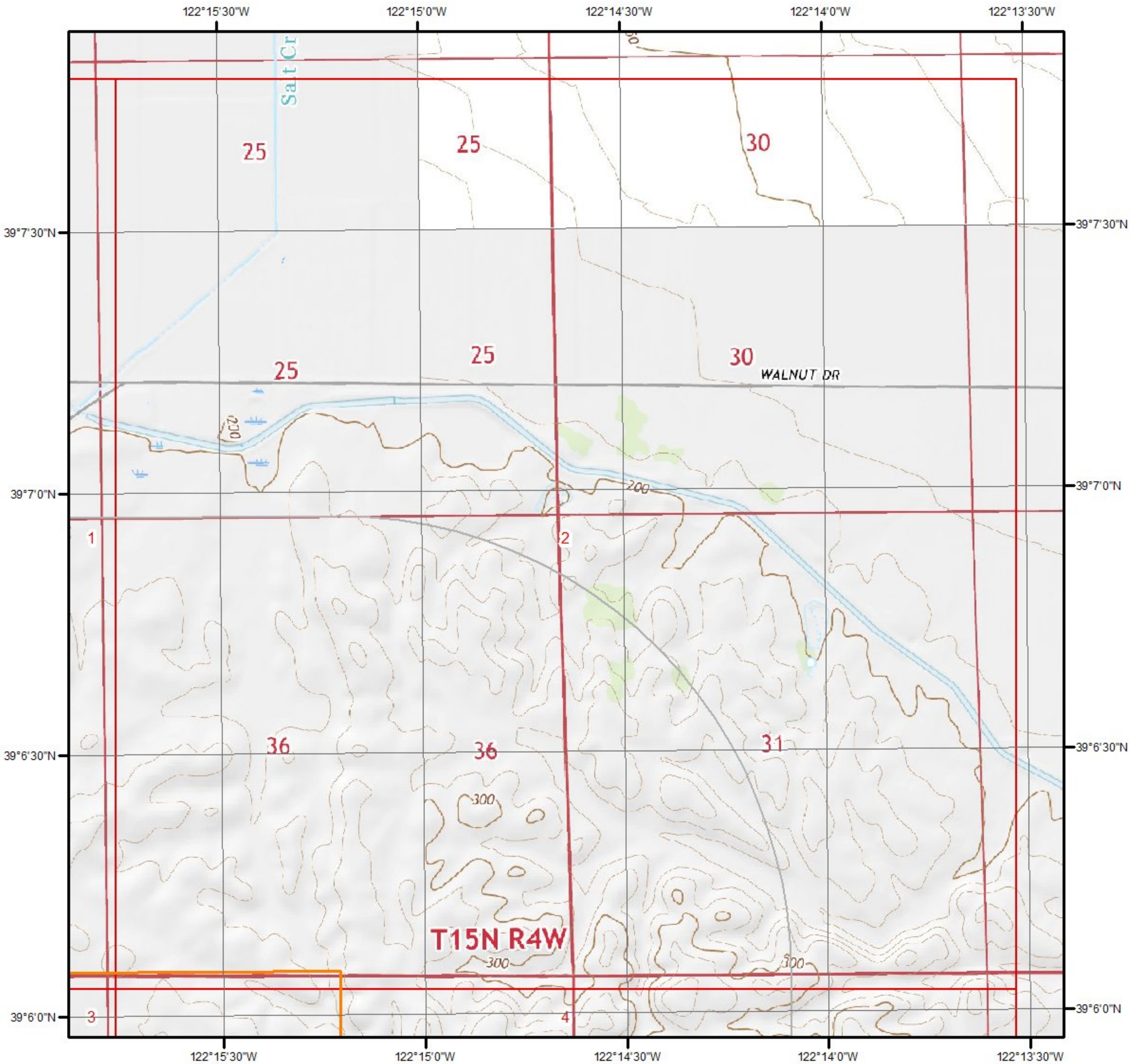


Current USGS Topo - Page 1

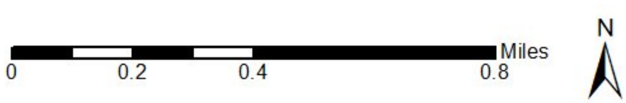
Quadrangle(s): Manor Slough,CA; Salt Canyon,CA

Source: USGS 7.5 Minute Topographic Map

Topographic Information



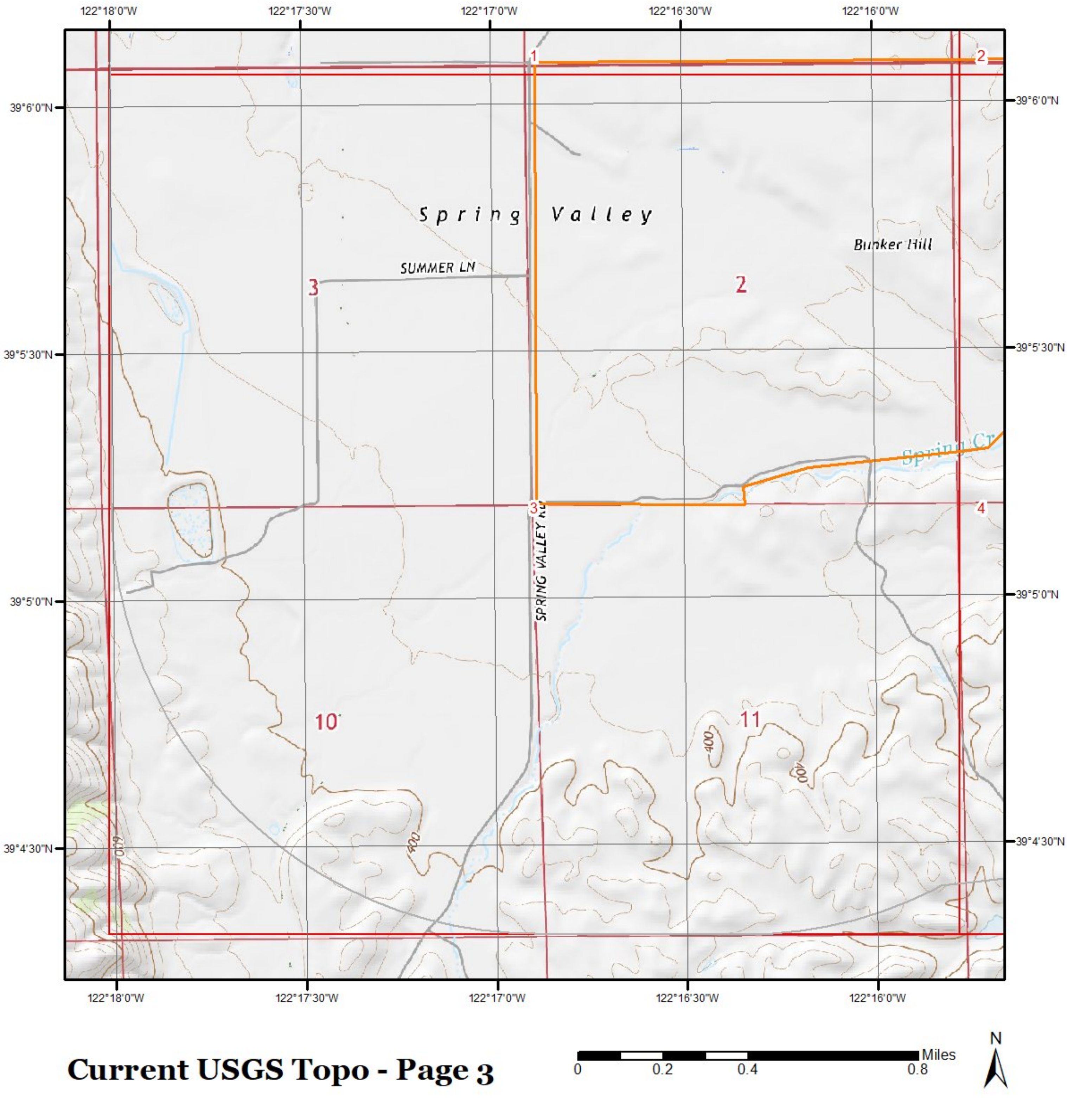
Current USGS Topo - Page 2



Quadrangle(s): Cortina Creek,CA; Manor Slough,CA; Salt Canyon,CA; Williams,CA

Source: USGS 7.5 Minute Topographic Map

Topographic Information

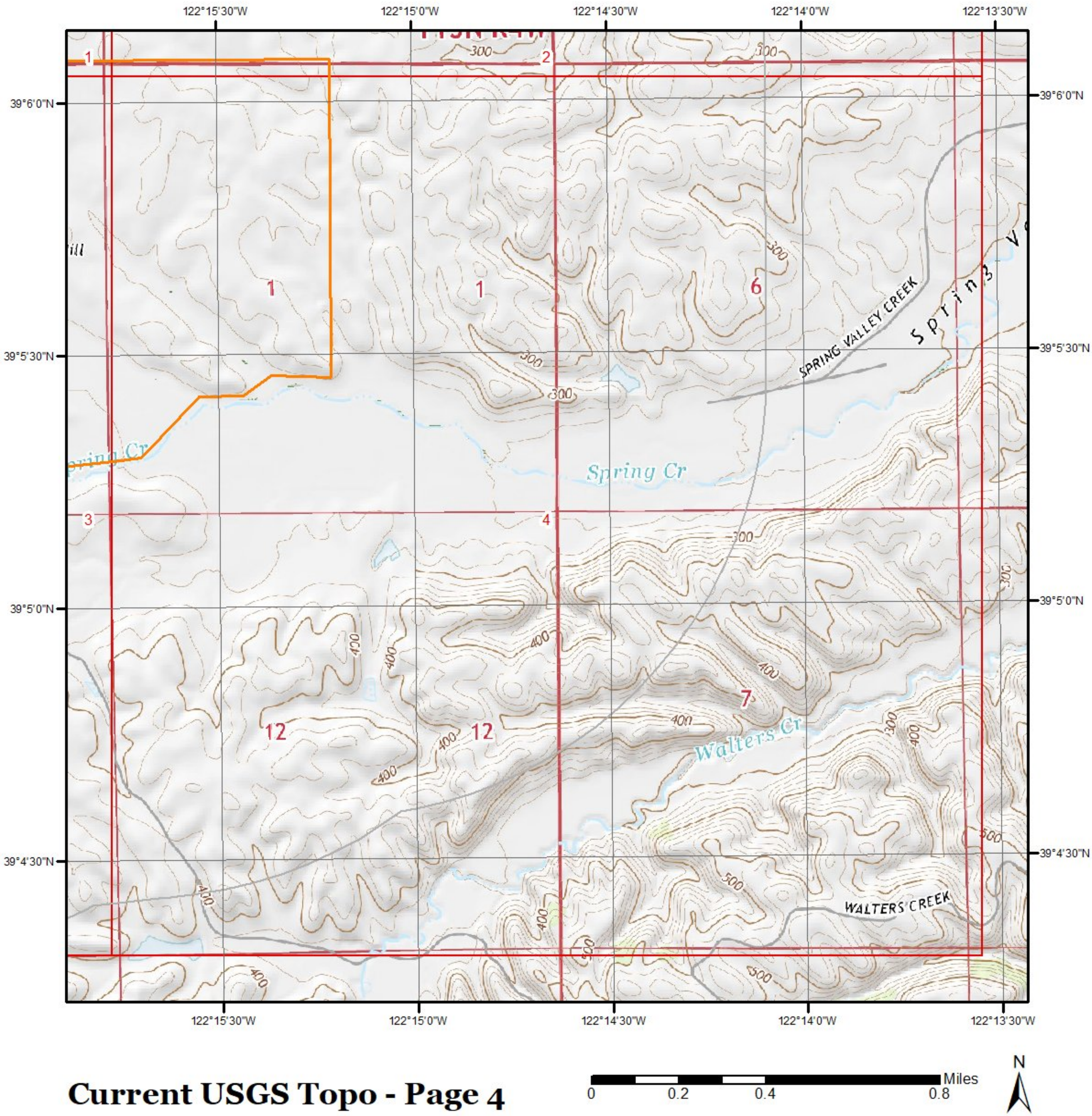


Current USGS Topo - Page 3

Quadrangle(s): Salt Canyon,CA

Source: USGS 7.5 Minute Topographic Map

Topographic Information



Current USGS Topo - Page 4

Quadrangle(s): Cortina Creek,CA; Salt Canyon,CA

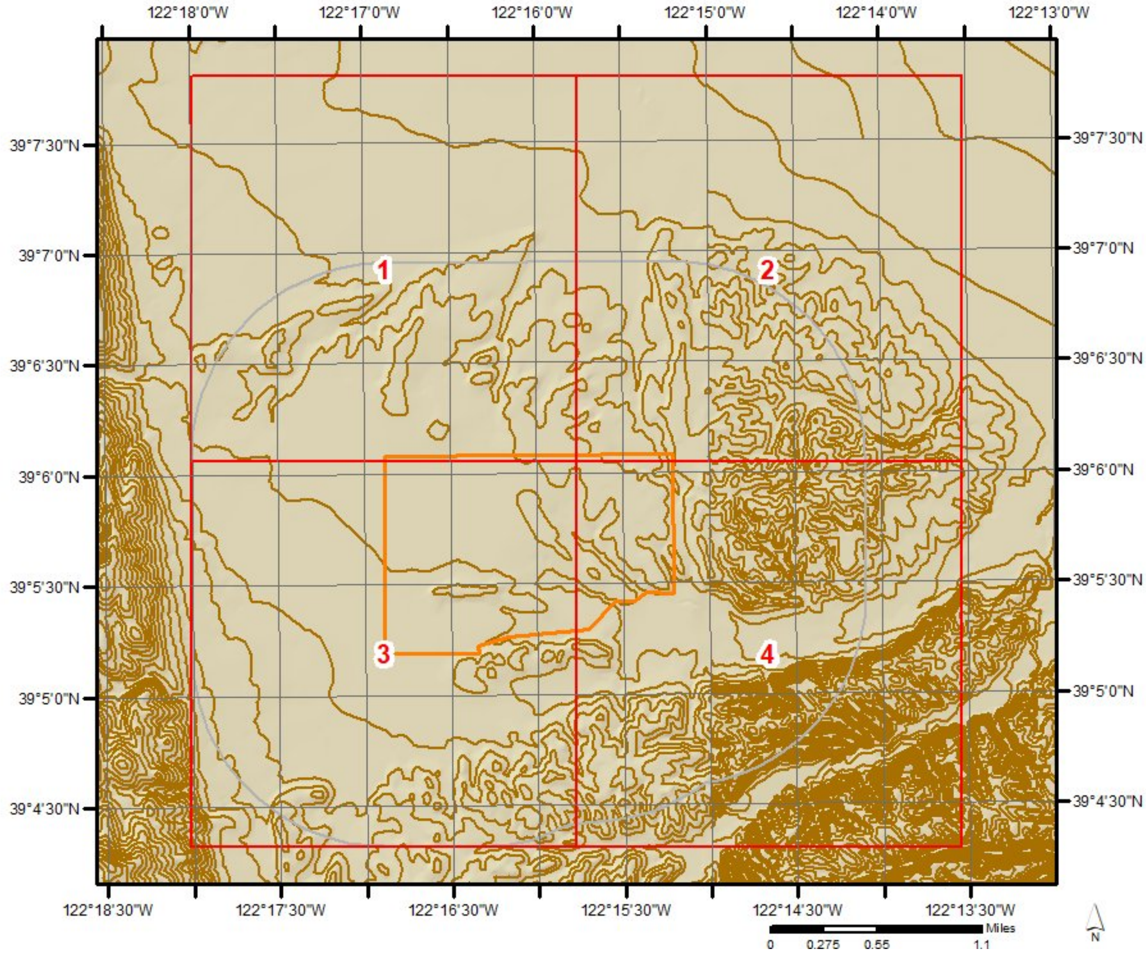
Source: USGS 7.5 Minute Topographic Map

Topographic Information

The previous topographic map(s) are created by seamlessly merging and cutting current USGS topographic data. Below are shaded relief map(s), derived from USGS elevation data to show surrounding topography in further detail.

Topographic information at project property:

Elevation:	308.85 ft
Slope Direction:	SSE



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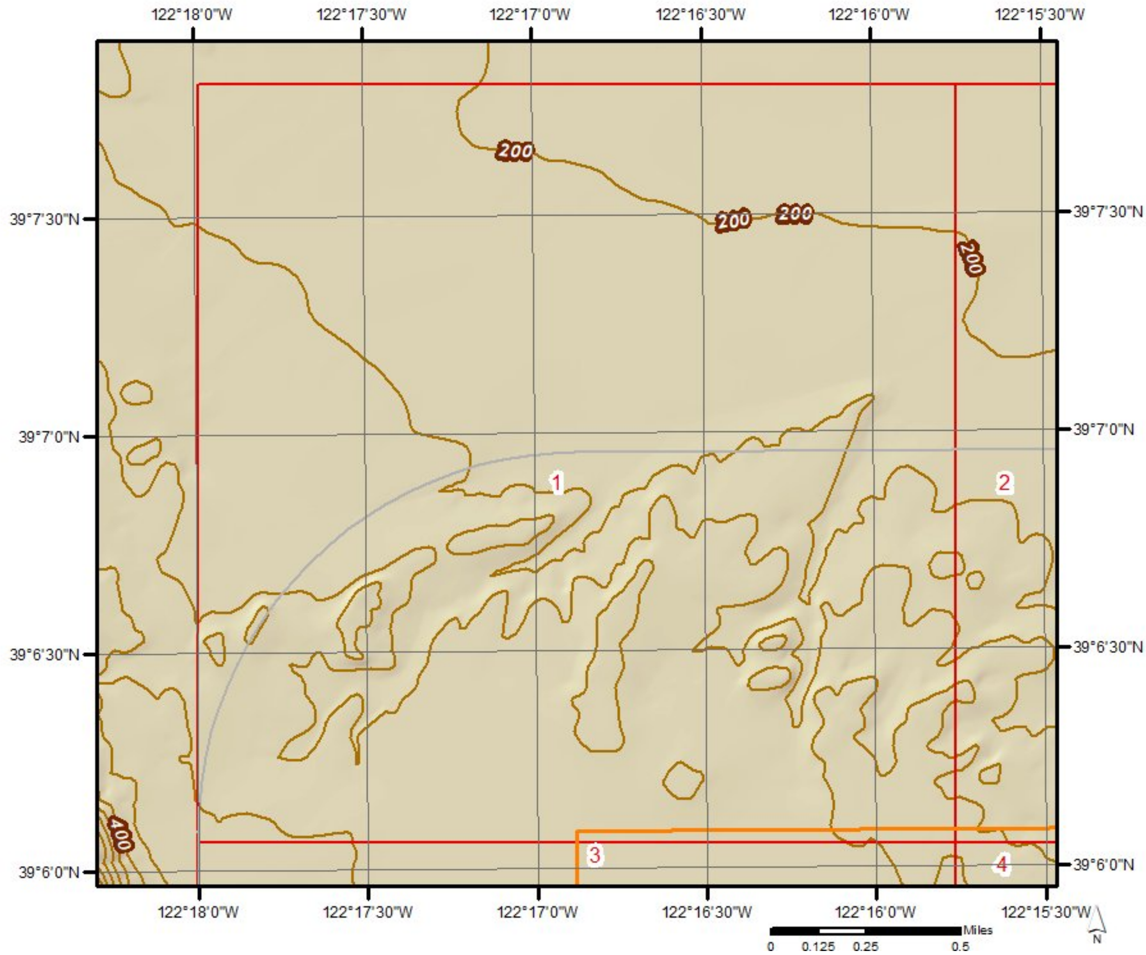

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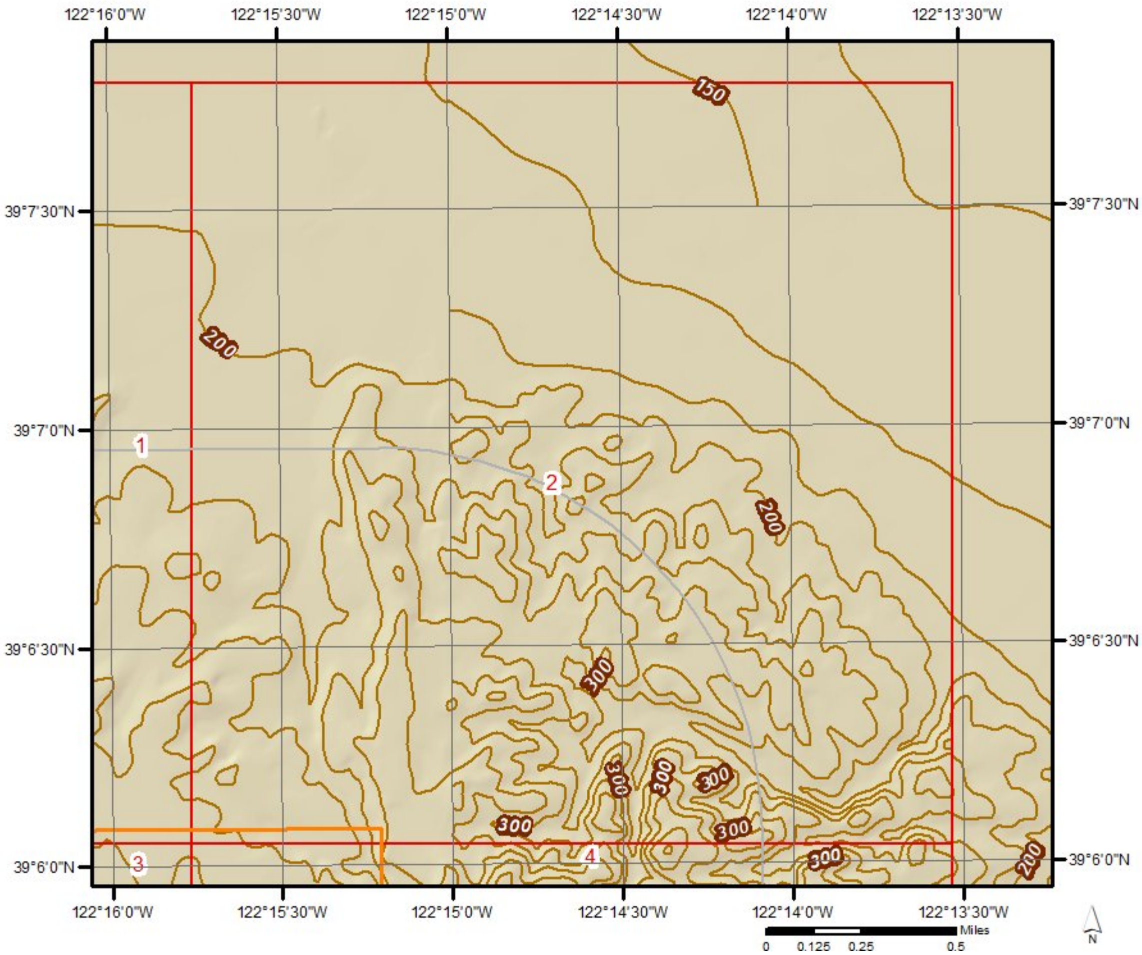

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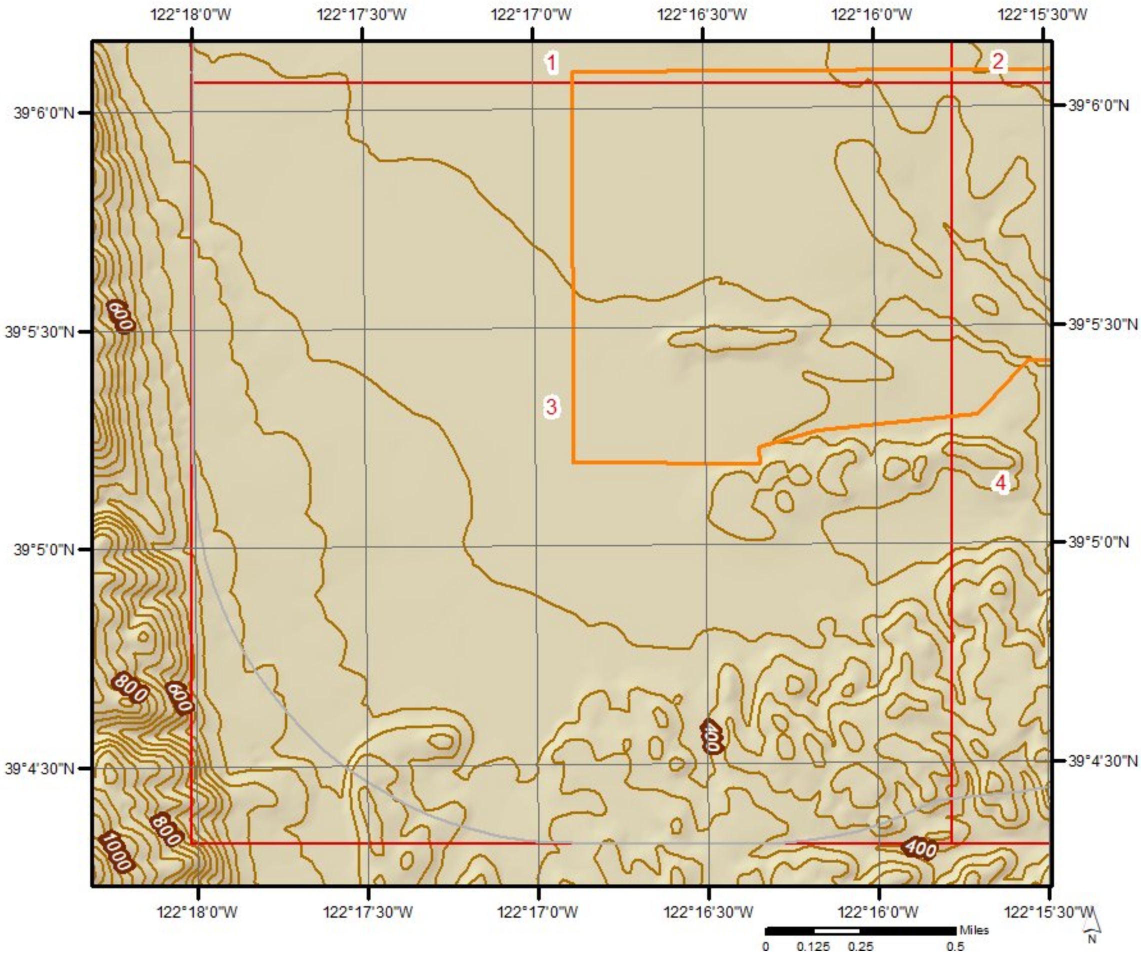
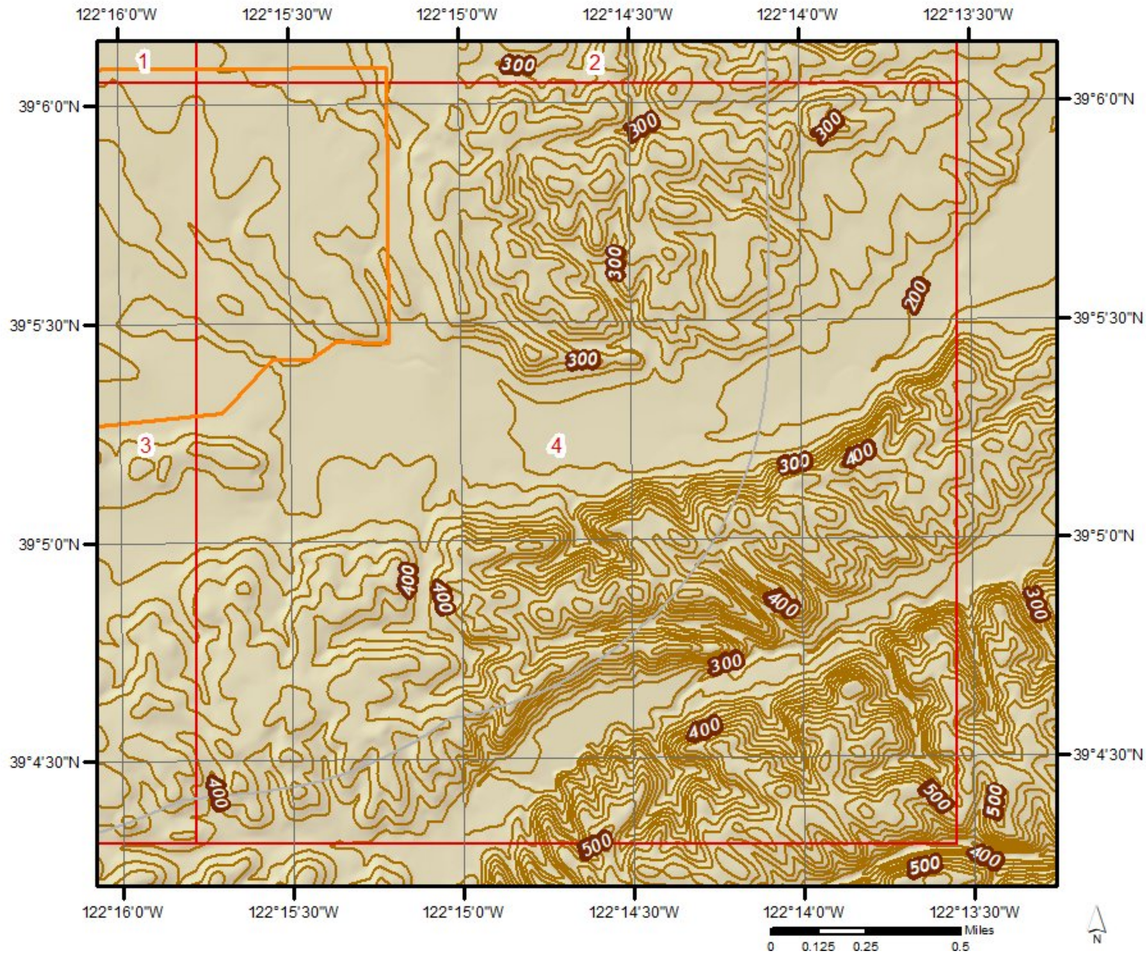
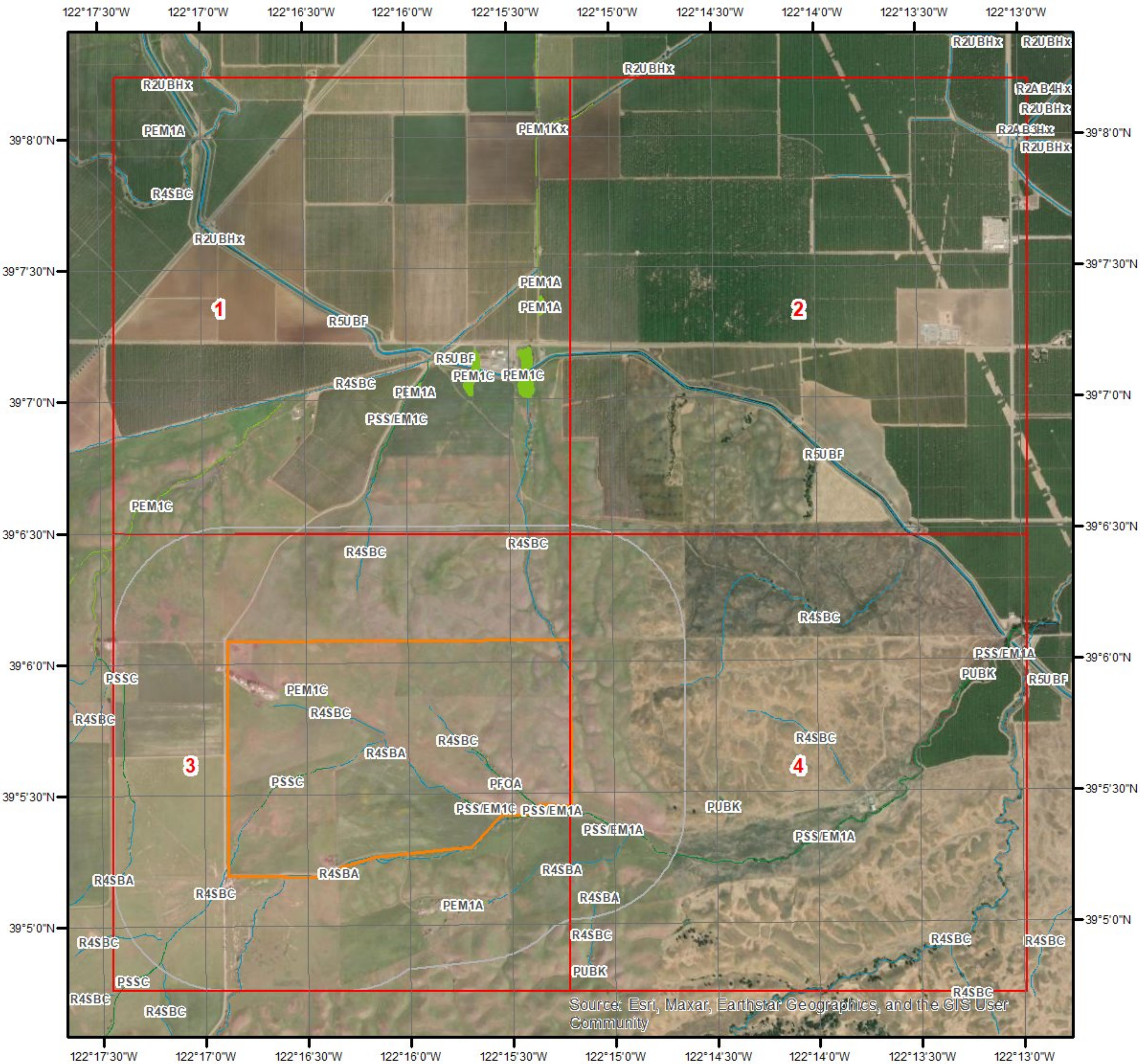


Topographic Information



Hydrologic Information



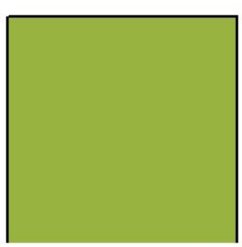
Wetland

0 0.275 0.55 1.1 Miles

N

This map shows wetland existence using data from US Fish & Wildlife.
Data coverage is shown to the right. Gray indicates no data available in the area.

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine



Hydrologic Information

Wetland Type - Page 1

0 0.125 0.25 0.5 Miles

N

This map shows wetland existence using data from US Fish & Wildlife.
Data coverage is shown to the right. Gray indicates no data available in the area.

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

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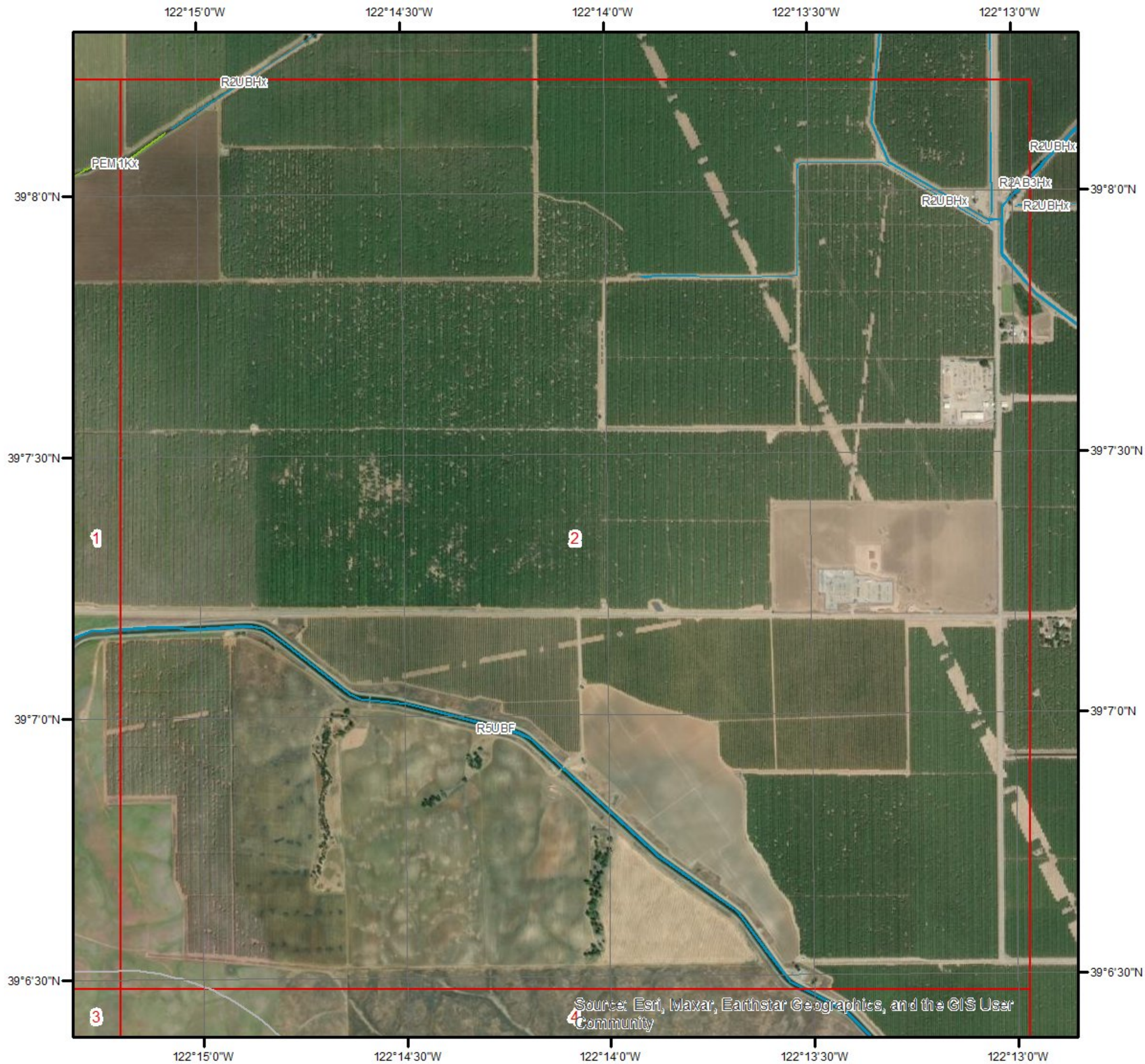
Hydrologic Information

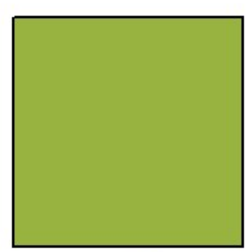


Wetland Type - Page 2

Miles
0 0.125 0.25 0.5

N

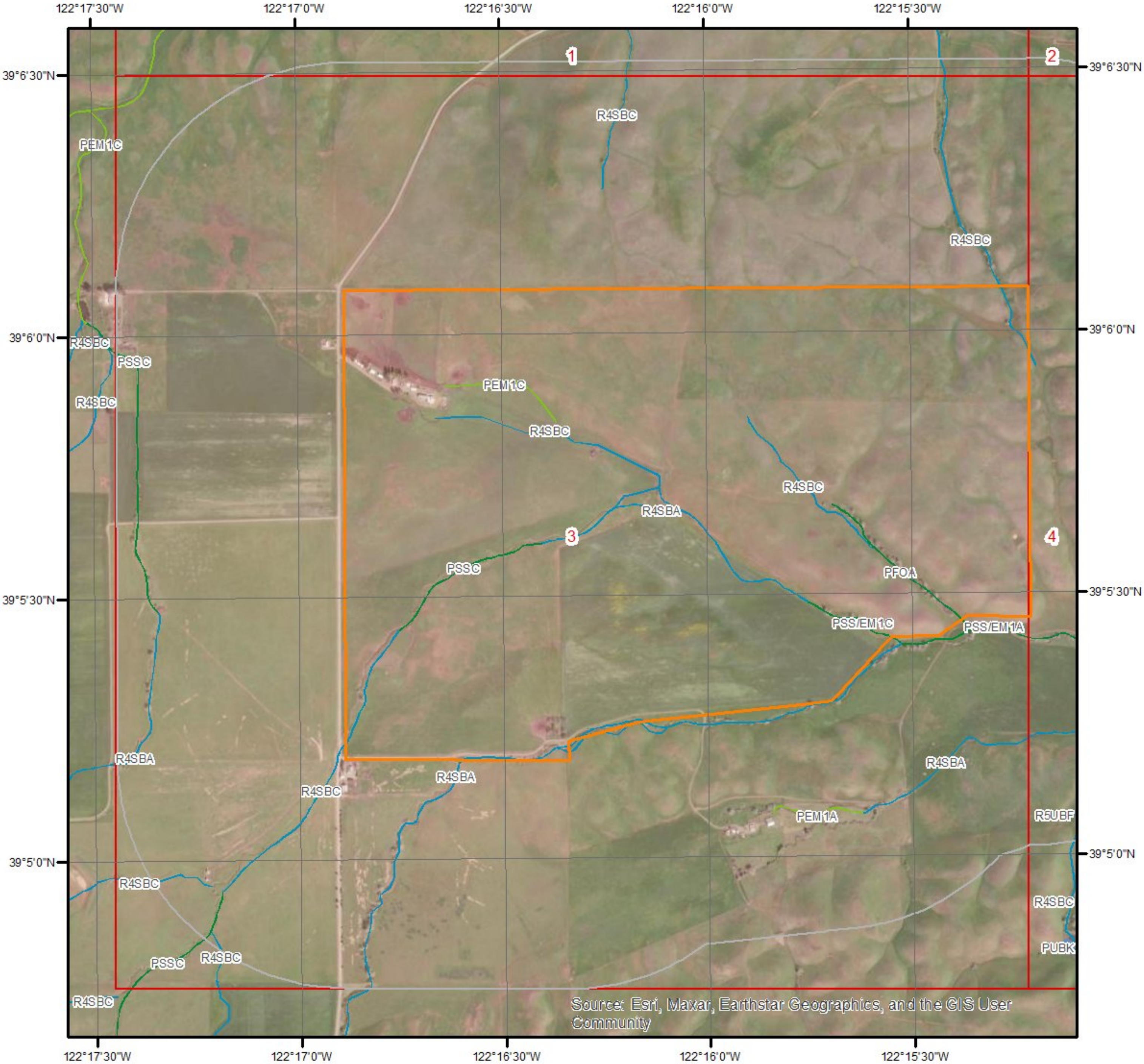
This map shows wetland existence using data from US Fish & Wildlife.
Data coverage is shown to the right. Gray indicates no data available in the area.



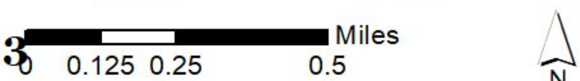
Estuarine and Marine Deepwater	Freshwater Pond
Estuarine and Marine Wetland	Lake
Freshwater Emergent Wetland	Other
Freshwater Forested/Shrub Wetland	Riverine

ERIS

Hydrologic Information



Wetland Type - Page 3



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- Estuarine and Marine Deepwater
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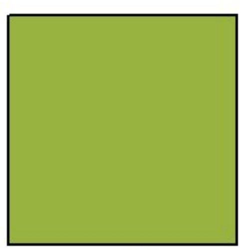
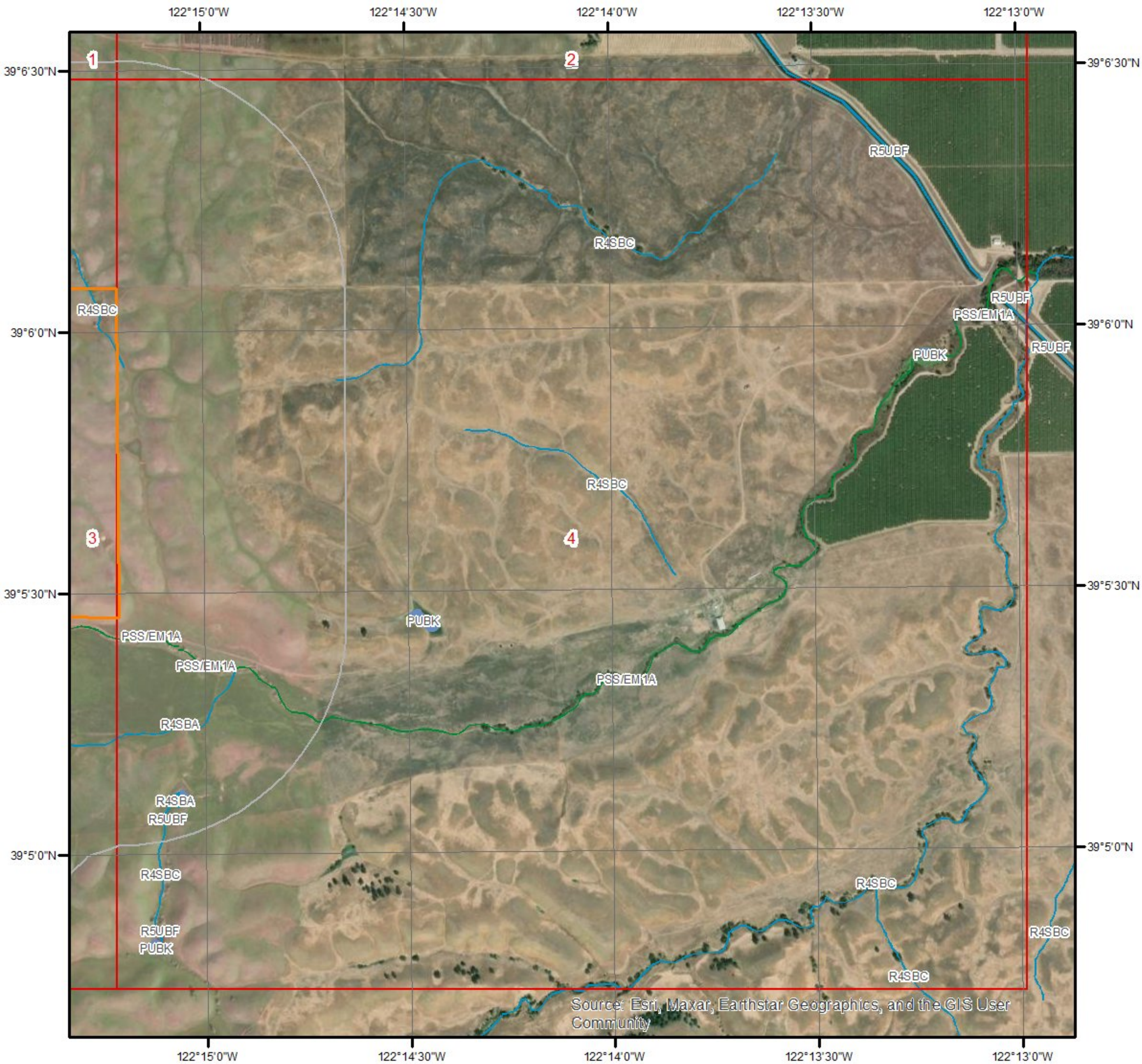
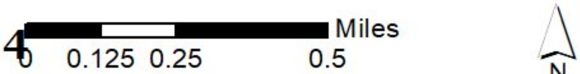


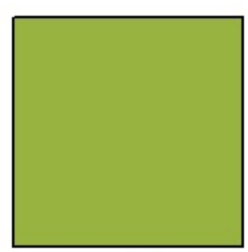
Hydrologic Information



Wetland Type - Page 4

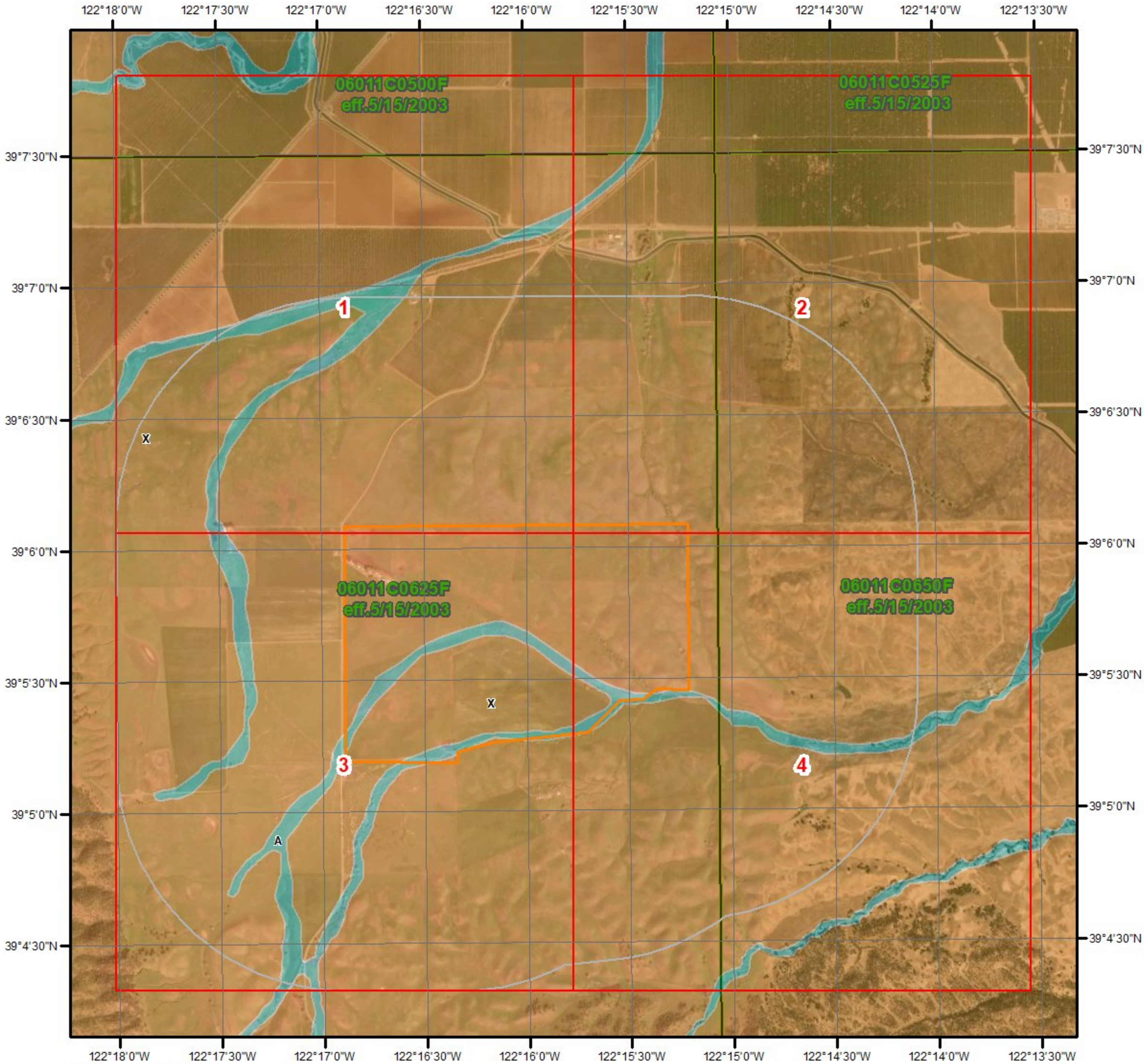


This map shows wetland existence using data from US Fish & Wildlife.
Data coverage is shown to the right. Gray indicates no data available in the area.



- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

Hydrologic Information



Flood Hazard Zones

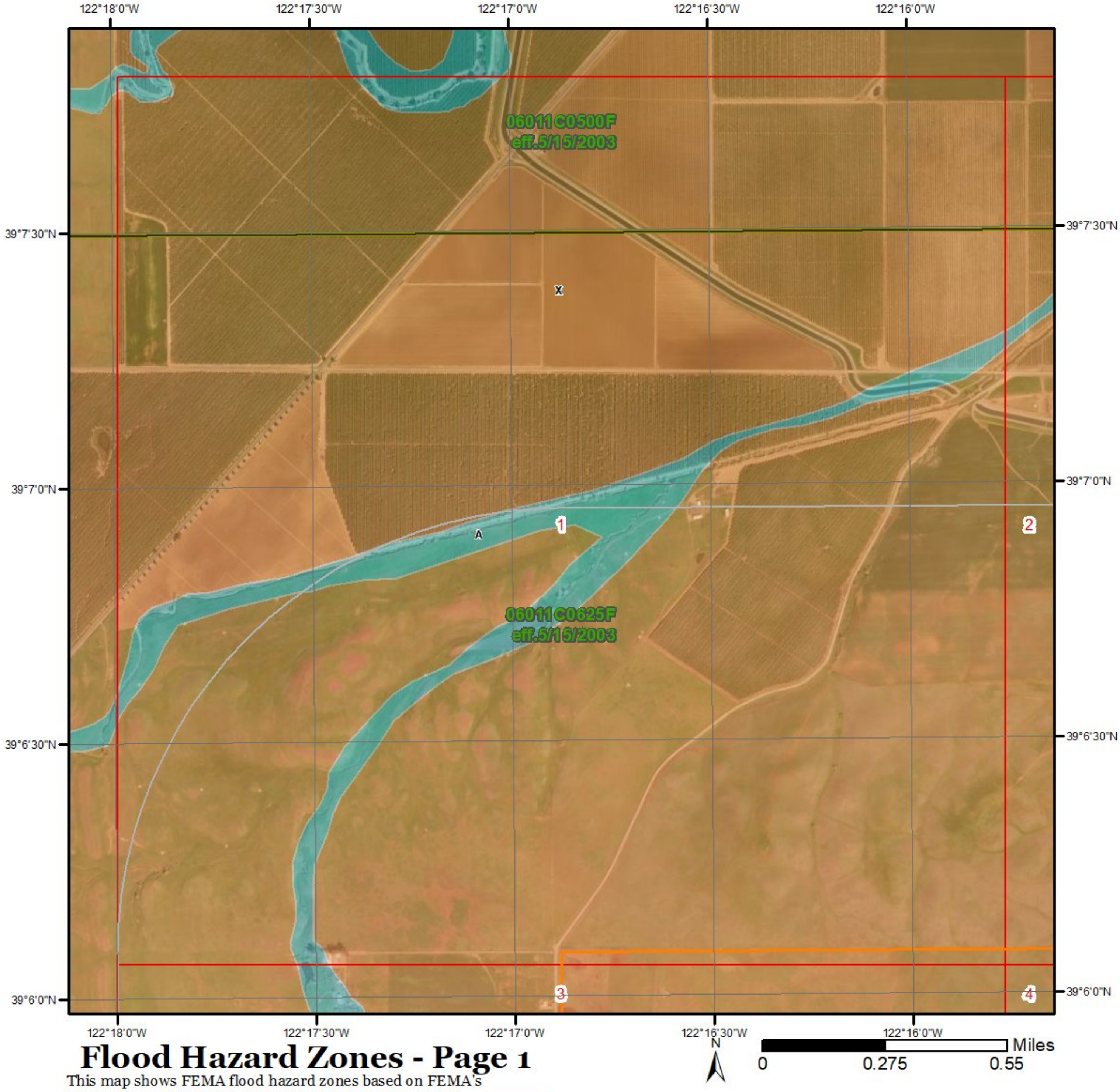
This map shows FEMA flood hazard zones based on FEMA's National Flood Hazard Layer. FIRM Panels are overlayed. An absent FIRM panel represents no data available.

- 1% Annual Chance Flood Hazard
- Regulatory Floodway
- Special Floodway
- Area of Undetermined Flood Hazard
- 0.2% Annual Chance Flood Hazard
- Future Conditions 1% Annual Chance Flood Hazard
- Area with Reduced Risk Due to Levee
- Area with Risk Due to Levee
- Open Water

Quadrangle(s): Cortina Creek,CA; Manor Slough,CA; Salt Canyon,CA; Williams,CA

ERIS

Hydrologic Information



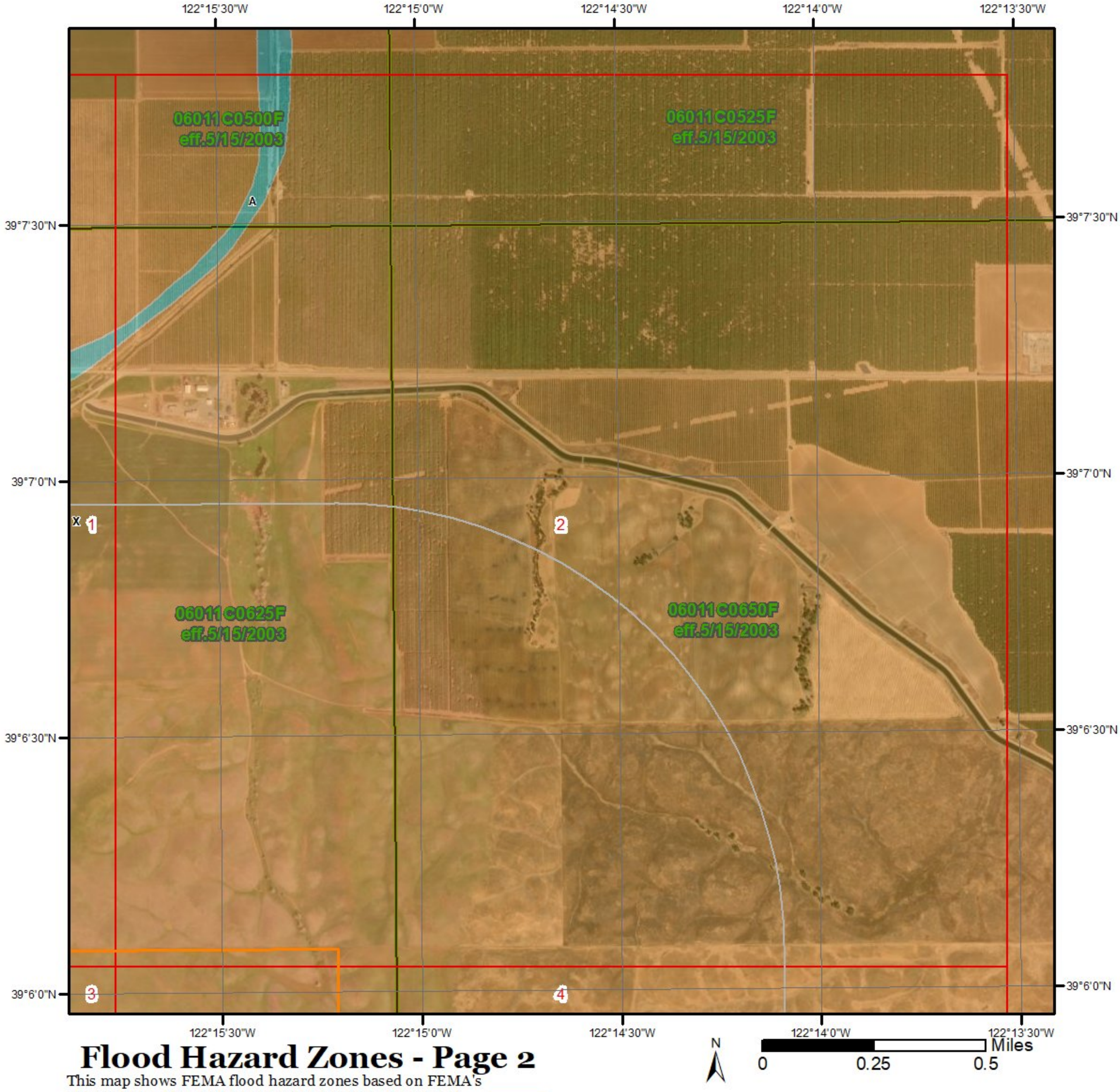
Flood Hazard Zones - Page 1

This map shows FEMA flood hazard zones based on FEMA's National Flood Hazard Layer. FIRM Panels are overlayed. An absent FIRM panel represents no data available.

- 1% Annual Chance Flood Hazard
- Regulatory Floodway
- Special Floodway
- Area of Undetermined Flood Hazard
- 0.2% Annual Chance Flood Hazard
- Future Conditions 1% Annual Chance Flood Hazard
- Area with Reduced Risk Due to Levee
- Area with Risk Due to Levee
- Open Water

Quadrangle(s):

Hydrologic Information



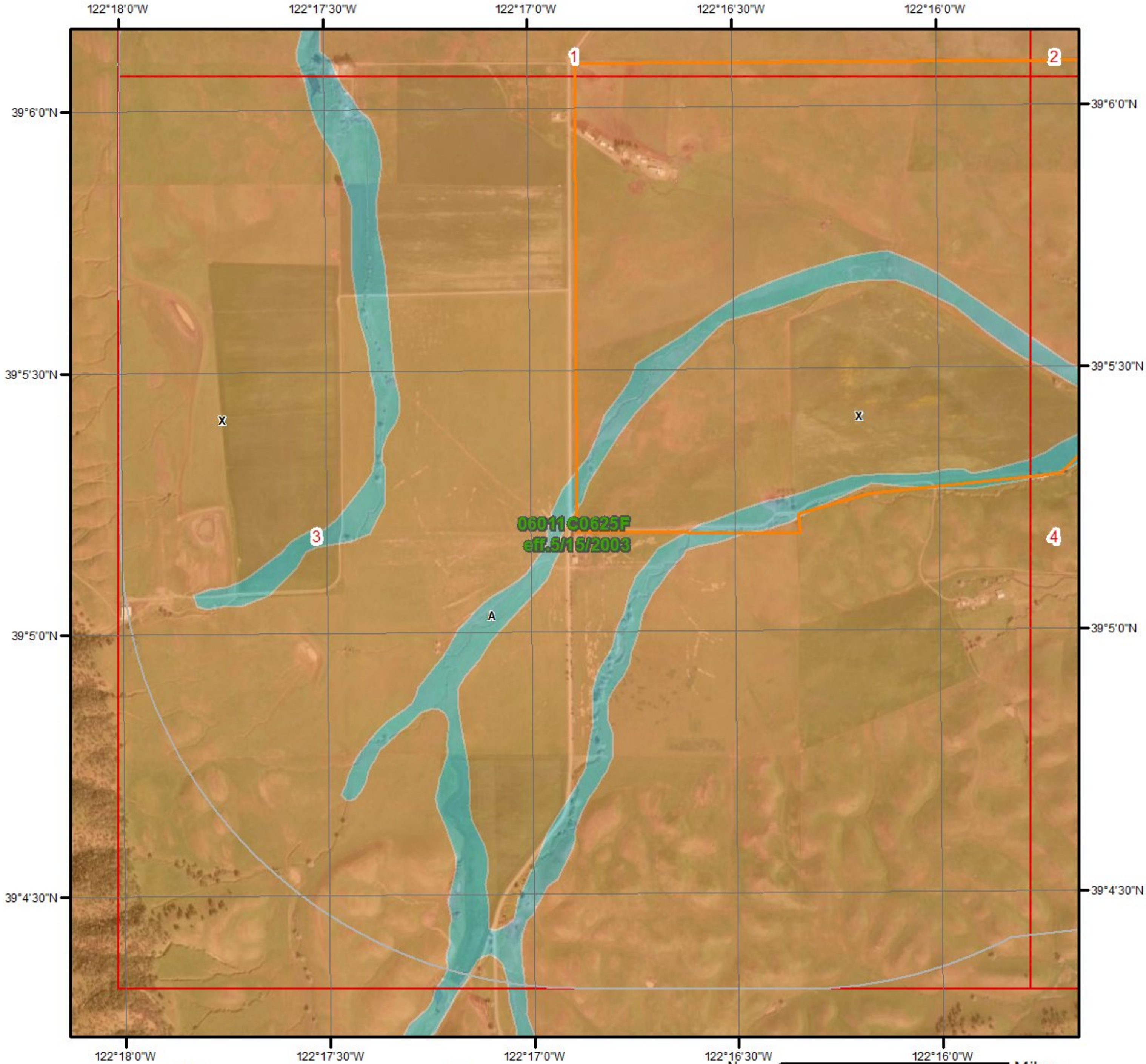
Flood Hazard Zones - Page 2

This map shows FEMA flood hazard zones based on FEMA's National Flood Hazard Layer. FIRM Panels are overlayed. An absent FIRM panel represents no data available.

- 1% Annual Chance Flood Hazard
- Regulatory Floodway
- Special Floodway
- Area of Undetermined Flood Hazard
- 0.2% Annual Chance Flood Hazard
- Future Conditions 1% Annual Chance Flood Hazard
- Area with Reduced Risk Due to Levee
- Area with Risk Due to Levee
- Open Water

Quadrangle(s):

Hydrologic Information



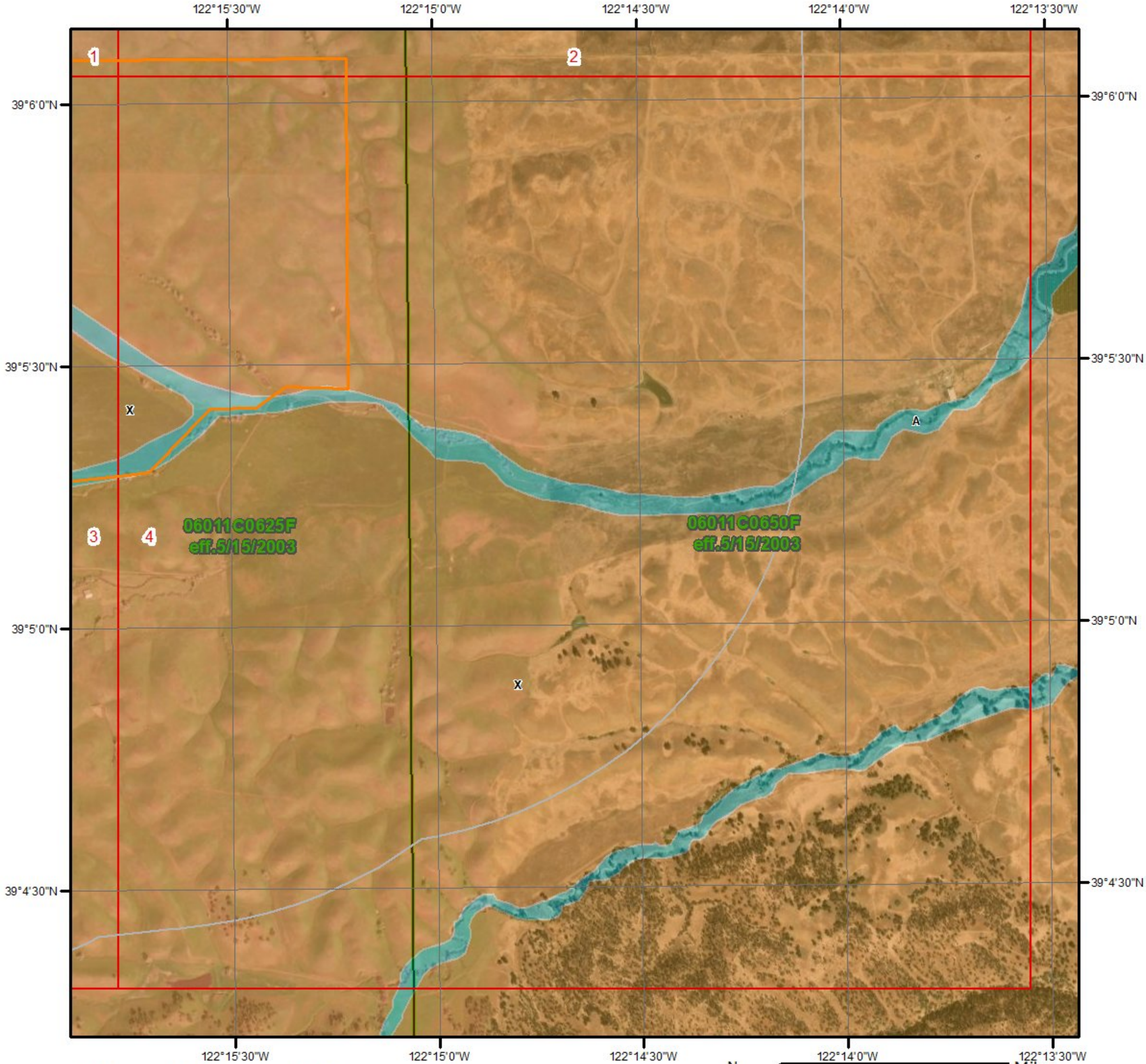
Flood Hazard Zones - Page 3

This map shows FEMA flood hazard zones based on FEMA's National Flood Hazard Layer. FIRM Panels are overlayed. An absent FIRM panel represents no data available.

- 1% Annual Chance Flood Hazard
- Regulatory Floodway
- Special Floodway
- Area of Undetermined Flood Hazard
- 0.2% Annual Chance Flood Hazard
- Future Conditions 1% Annual Chance Flood Hazard
- Area with Reduced Risk Due to Levee
- Area with Risk Due to Levee
- Open Water

Quadrangle(s):

Hydrologic Information



Flood Hazard Zones - Page 4

This map shows FEMA flood hazard zones based on FEMA's National Flood Hazard Layer. FIRM Panels are overlayed. An absent FIRM panel represents no data available.

- 1% Annual Chance Flood Hazard
- Regulatory Floodway
- Special Floodway
- Area of Undetermined Flood Hazard
- 0.2% Annual Chance Flood Hazard
- Future Conditions 1% Annual Chance Flood Hazard
- Area with Reduced Risk Due to Levee
- Area with Risk Due to Levee
- Open Water

Quadrangle(s):

Hydrologic Information

The Wetland Type map shows wetland existence overlaid on an aerial imagery. The Flood Hazard Zones map shows FEMA flood hazard zones overlaid on an aerial imagery. Relevant FIRM panels and detailed zone information is provided below.
For detailed Zone descriptions please click the link: https://floodadvocate.com/fema-zone-definitions

Available FIRM Panels in area:	06011C0650F(effective:2003-05-15) 06011C0625F(effective:2003-05-15)

Flood Zone A-01

Zone:	A
Zone subtype:	

Flood Zone X-12

Zone:	X
Zone subtype:	AREA OF MINIMAL FLOOD HAZARD

FEMA Flood Zone Definitions

Special Flood Hazard Areas – High Risk

Special Flood Hazard Areas represent the area subject to inundation by 1-percent-annual chance flood. Structures located within the SFHA have a 26-percent chance of flooding during the life of a standard 30-year mortgage. Federal floodplain management regulations and mandatory flood insurance purchase requirements apply in these zones.

ZONE	DESCRIPTION
A	Areas subject to inundation by the 1-percent-annual-chance flood event. Because detailed hydraulic analyses have not been performed, no Base Flood Elevations (BFEs) or flood depths are shown.
AE, A1-A30	Areas subject to inundation by the 1-percent-annual-chance flood event determined by detailed methods. BFEs are shown within these zones. (Zone AE is used on new and revised maps in place of Zones A1–A30.)
AH	Areas subject to inundation by 1-percent-annual-chance shallow flooding (usually areas of ponding) where average depths are 1–3 feet. BFEs derived from detailed hydraulic analyses are shown in this zone.
AO	Areas subject to inundation by 1-percent-annual-chance shallow flooding (usually sheet flow on sloping terrain) where average depths are 1–3 feet. Average flood depths derived from detailed hydraulic analyses are shown within this zone.
AR	Areas that result from the decertification of a previously accredited flood protection system that is determined to be in the process of being restored to provide base flood protection.
A99	Areas subject to inundation by the 1-percent-annual-chance flood event, but which will ultimately be protected upon completion of an under-construction Federal flood protection system. These are areas of special flood hazard where enough progress has been made on the construction of a protection system, such as dikes, dams, and levees, to consider it complete for insurance rating purposes. Zone A99 may be used only when the flood protection system has reached specified statutory progress toward completion. No BFEs or flood depths are shown.

Coastal High Hazard Areas – High Risk

Coastal High Hazard Areas (CHHA) represent the area subject to inundation by 1-percent-annual chance flood, extending from offshore to the inland limit of a primary front al dune along an open coast and any other area subject to high velocity wave action from storms or seismic sources. Structures located within the CHHA have a 26-percent chance of flooding during the life of a standard 30-year mortgage. Federal floodplain management regulations and mandatory purchase requirements apply in these zones.

ZONE	DESCRIPTION
V	Areas along coasts subject to inundation by the 1-percent-annual-chance flood event with additional hazards associated with storm-induced waves. Because detailed coastal analyses have not been performed, no BFEs or flood depths are shown.
VE, V1-V30	Areas along coasts subject to inundation by the 1-percent-annual-chance flood event with additional hazards due to storm-induced velocity wave action. BFEs derived from detailed hydraulic coastal analyses are shown within these zones. (Zone VE is used on new and revised maps in place of Zones V1–V30.)

Hydrologic Information

Moderate and Minimal Risk Areas

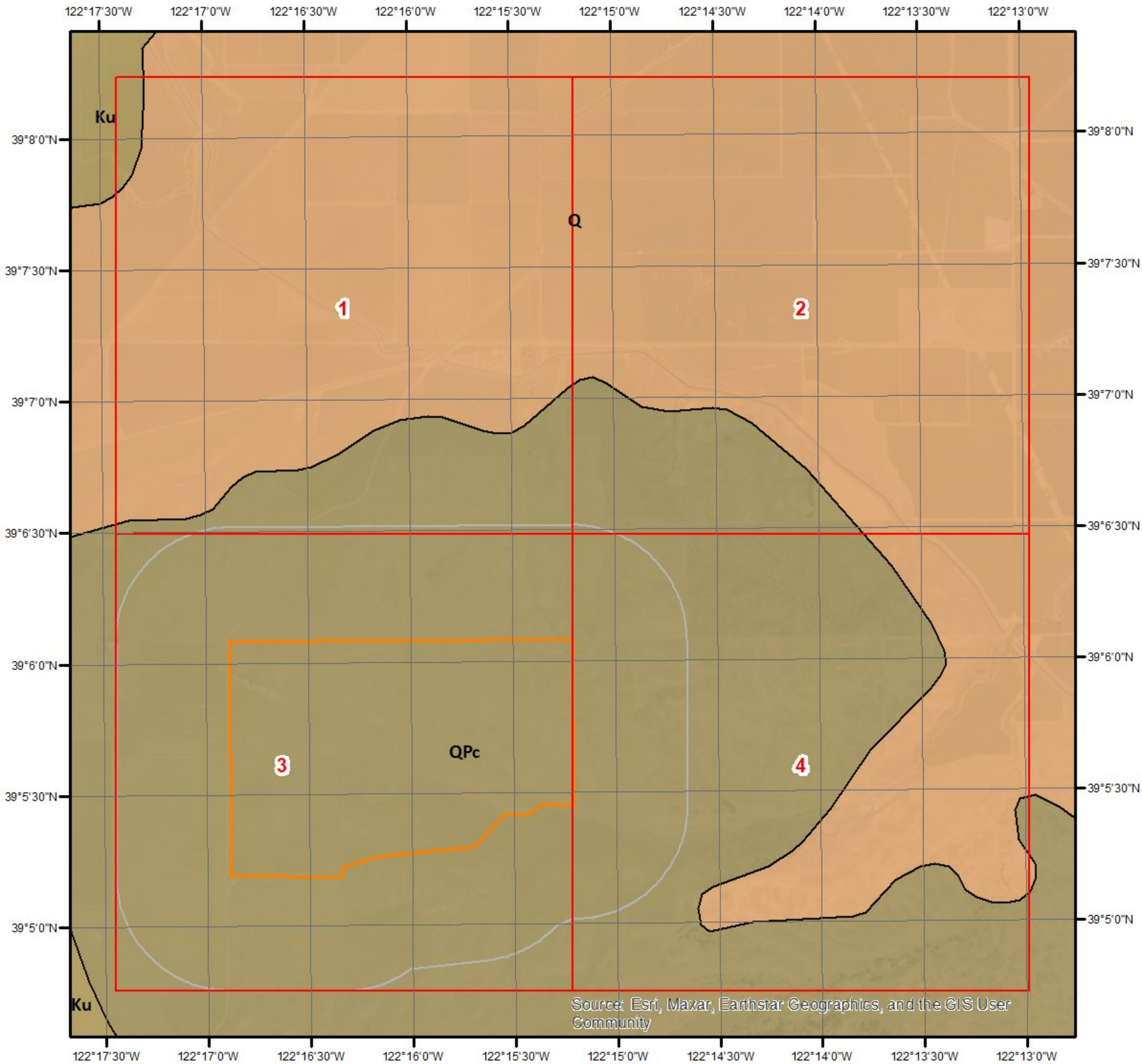
Areas of moderate or minimal hazard are studied based upon the principal source of flood in the area. However, buildings in these zones could be flooded by severe, concentrated rainfall coupled with inadequate local drainage systems. Local stormwater drainage systems are not normally considered in a community's flood insurance study. The failure of a local drainage system can create areas of high flood risk within these zones. Flood insurance is available in participating communities, but is not required by regulation in these zones. Nearly 25-percent of all flood claims filed are for structures located within these zones.

ZONE	DESCRIPTION
B, X (shaded)	Moderate risk areas within the 0.2-percent-annual-chance floodplain, areas of 1-percent-annual-chance flooding where average depths are less than 1 foot, areas of 1-percent-annual-chance flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 1-percent-annual-chance flood by a levee. No BFEs or base flood depths are shown within these zones. (Zone X (shaded) is used on new and revised maps in place of Zone B.)
C, X (unshaded)	Minimal risk areas outside the 1-percent and .2-percent-annual-chance floodplains. No BFEs or base flood depths are shown within these zones. (Zone X (unshaded) is used on new and revised maps in place of Zone C.)

Undetermined Risk Areas

ZONE	DESCRIPTION
D	Unstudied areas where flood hazards are undetermined, but flooding is possible. No mandatory flood insurance purchase requirements apply, but coverage is available in participating communities.

Geologic Information

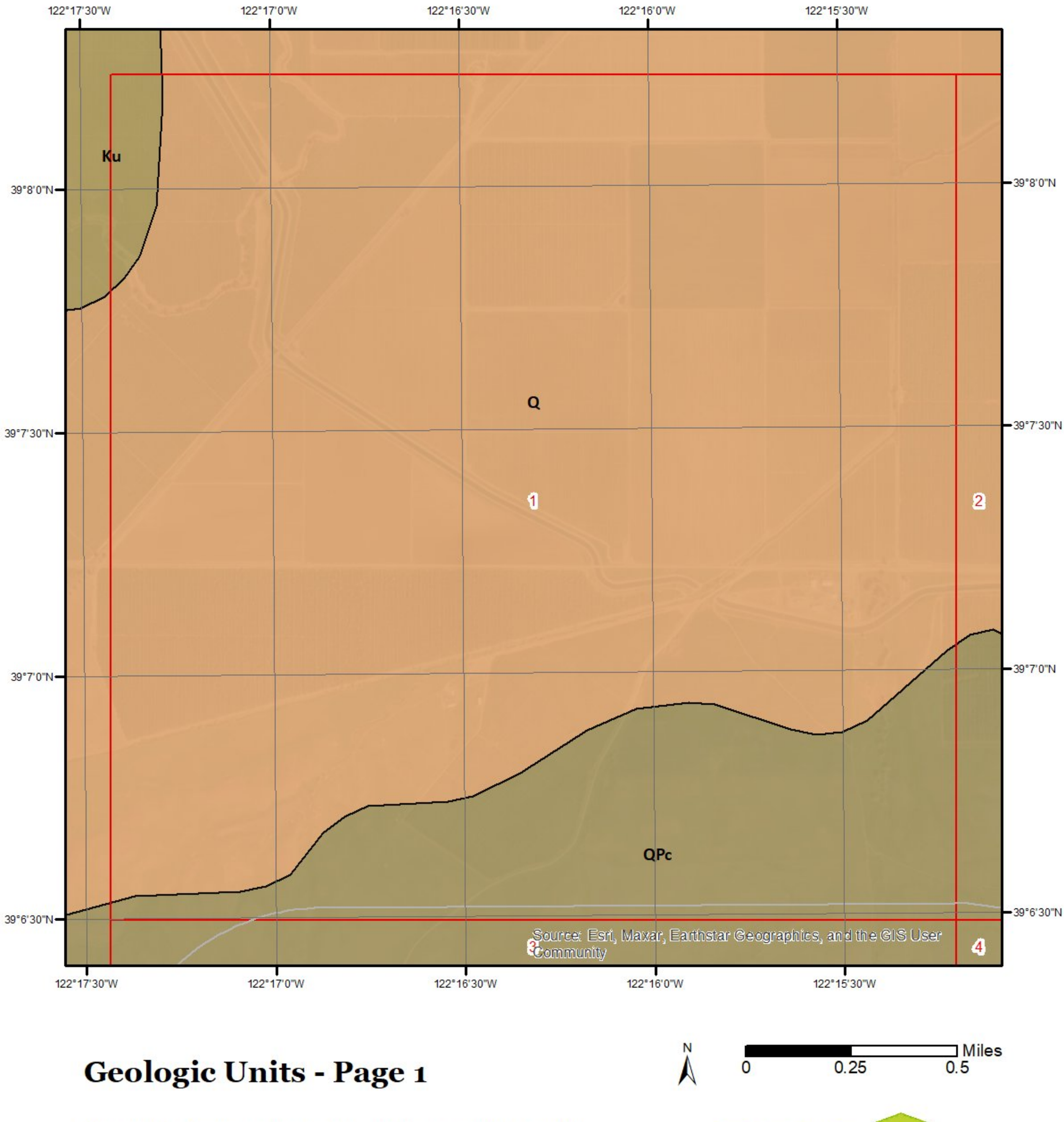


Geologic Units

This maps shows geologic units in the area. Please refer to the report for detailed descriptions.

ERIS

Geologic Information

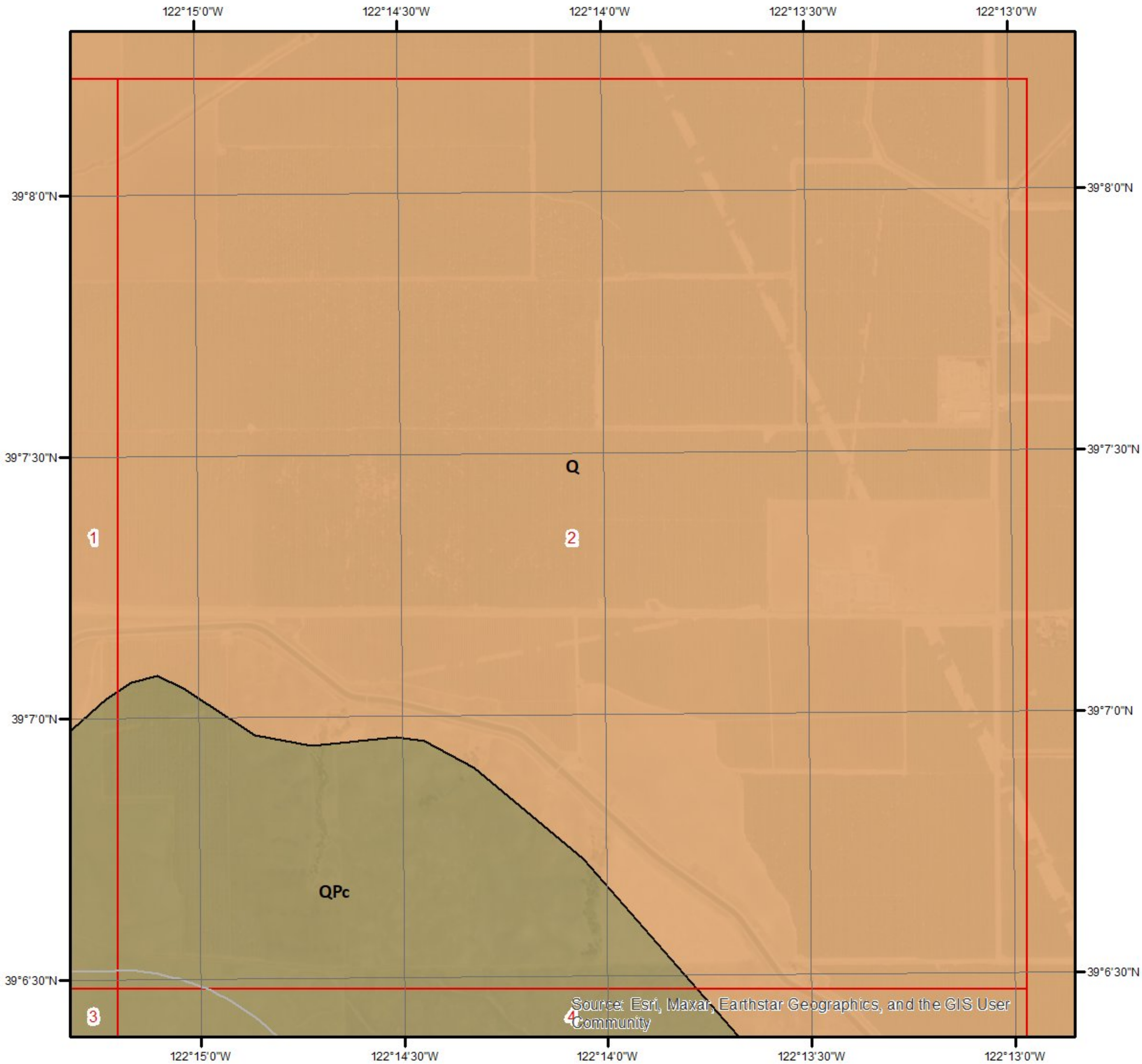


Geologic Units - Page 1

This maps shows geologic units in the area. Please refer to the report for detailed descriptions.

ERIS

Geologic Information



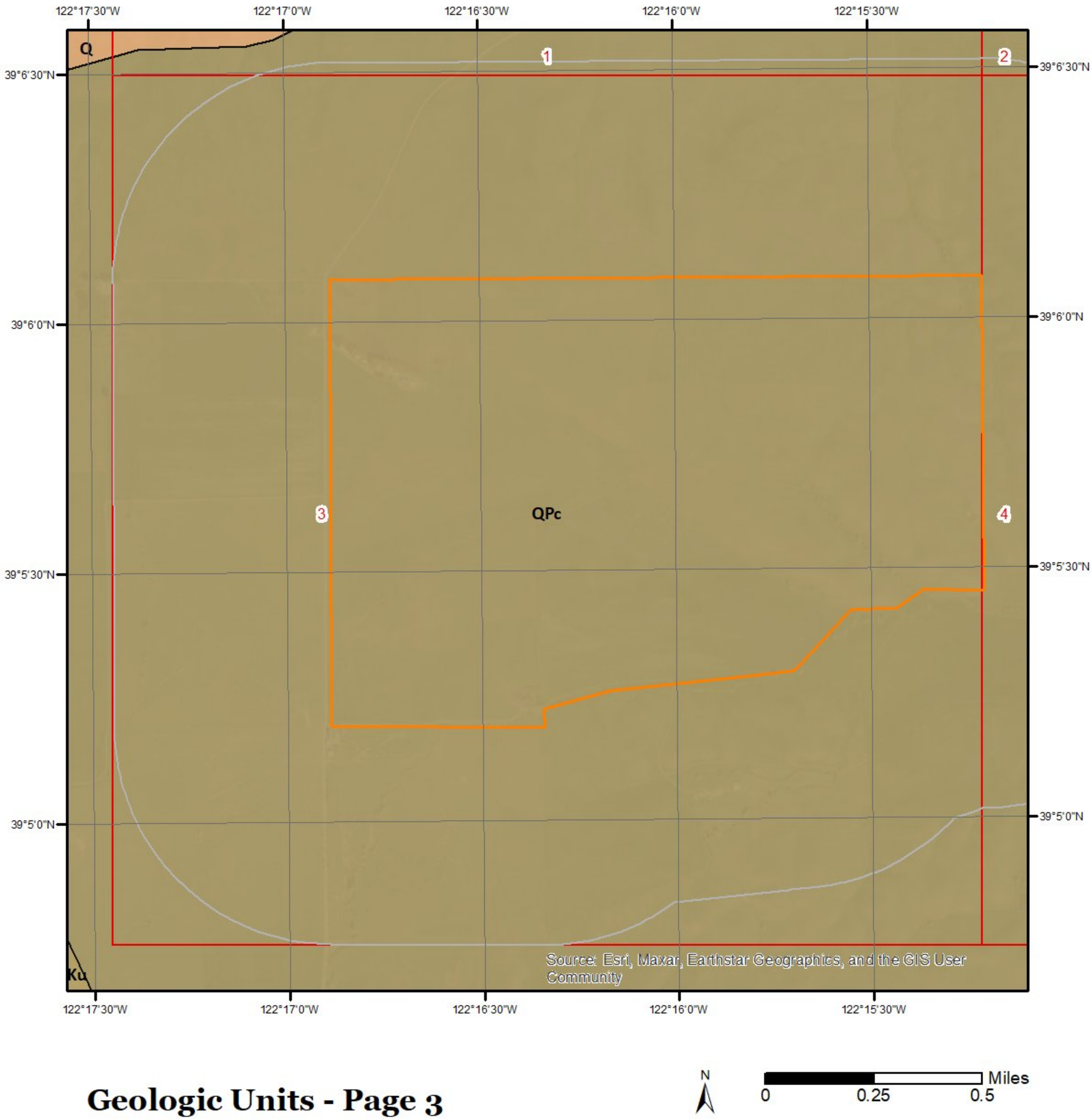
N

Miles
0 0.25 0.5

Geologic Units - Page 2

This maps shows geologic units in the area. Please refer to the report for detailed descriptions.

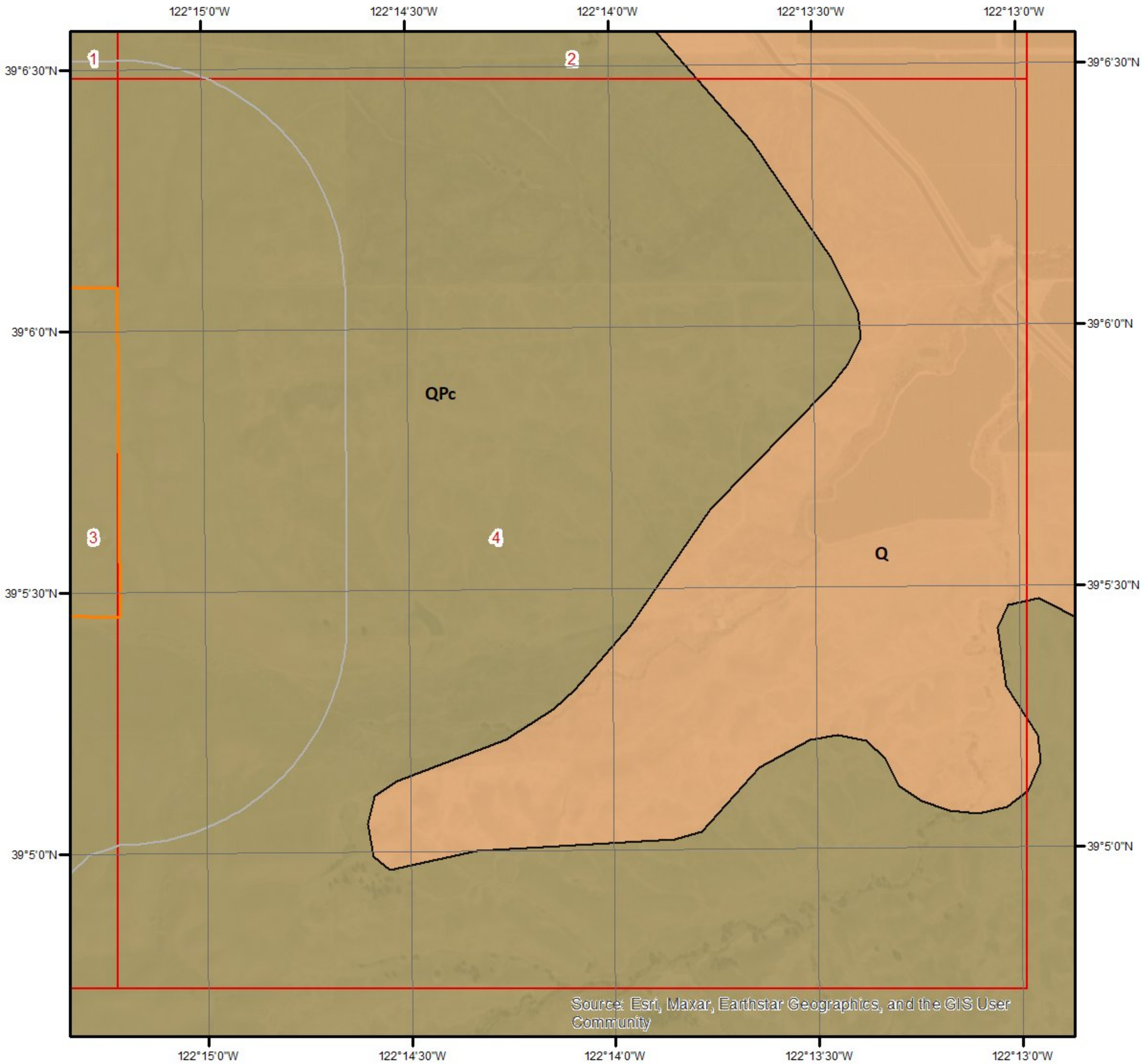
Geologic Information



Geologic Units - Page 3

This maps shows geologic units in the area. Please refer to the report for detailed descriptions.

Geologic Information



Geologic Units - Page 4

This maps shows geologic units in the area. Please refer to the report for detailed descriptions.

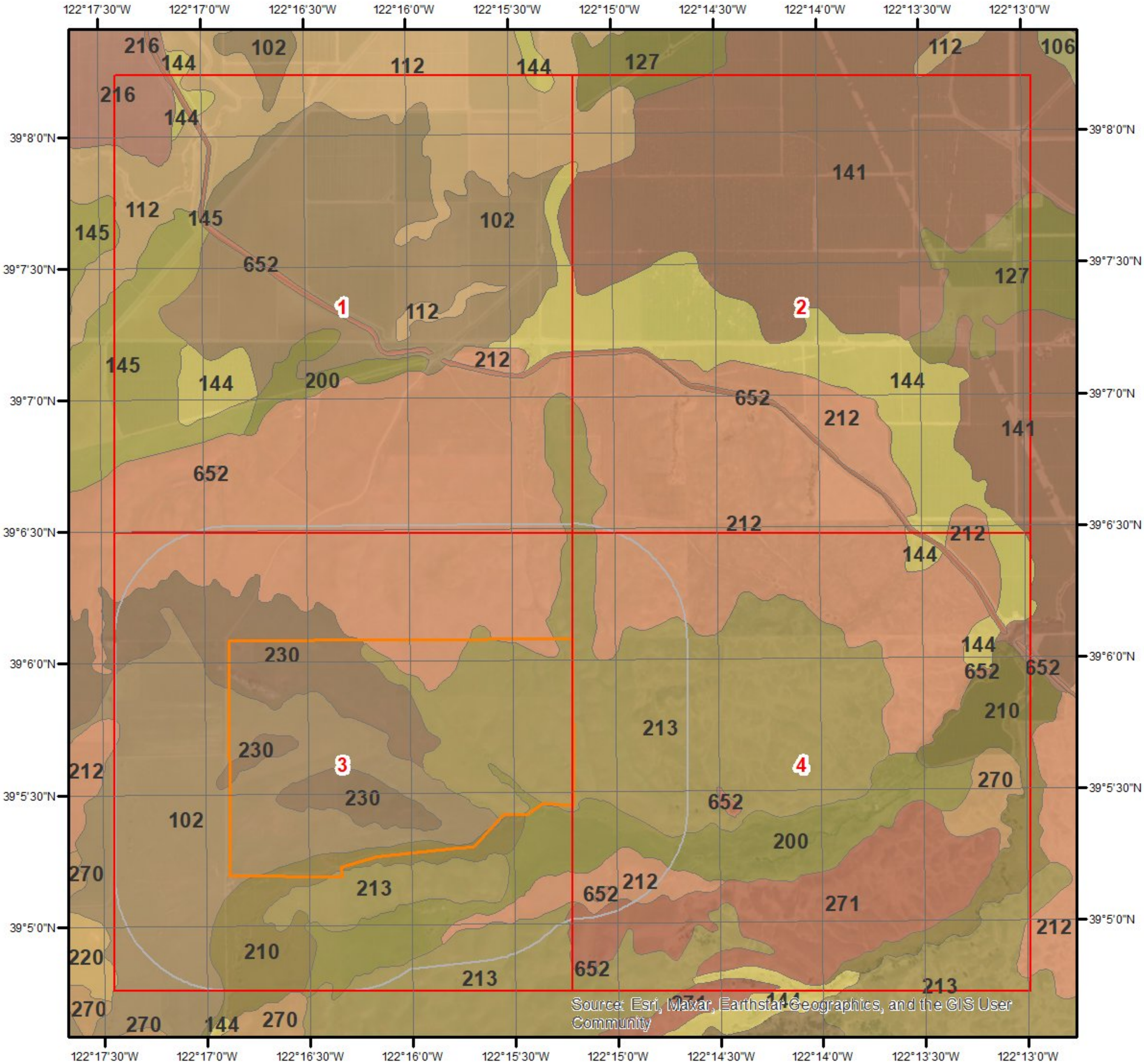
Geologic Information

The previous page shows USGS geology information. Detailed information about each unit is provided below.

Geologic Unit QPc

Unit Name:	Plio-Pleistocene and Pliocene loosely consolidated deposits
Unit Age:	Miocene to Pleistocene
Primary Rock Type:	Sandstone
Secondary Rock Type:	Conglomerate
Unit Description:	Pliocene and/or Pleistocene sandstone, shale, and gravel deposits; in part Miocene.

Soil Information



SSURGO Soils

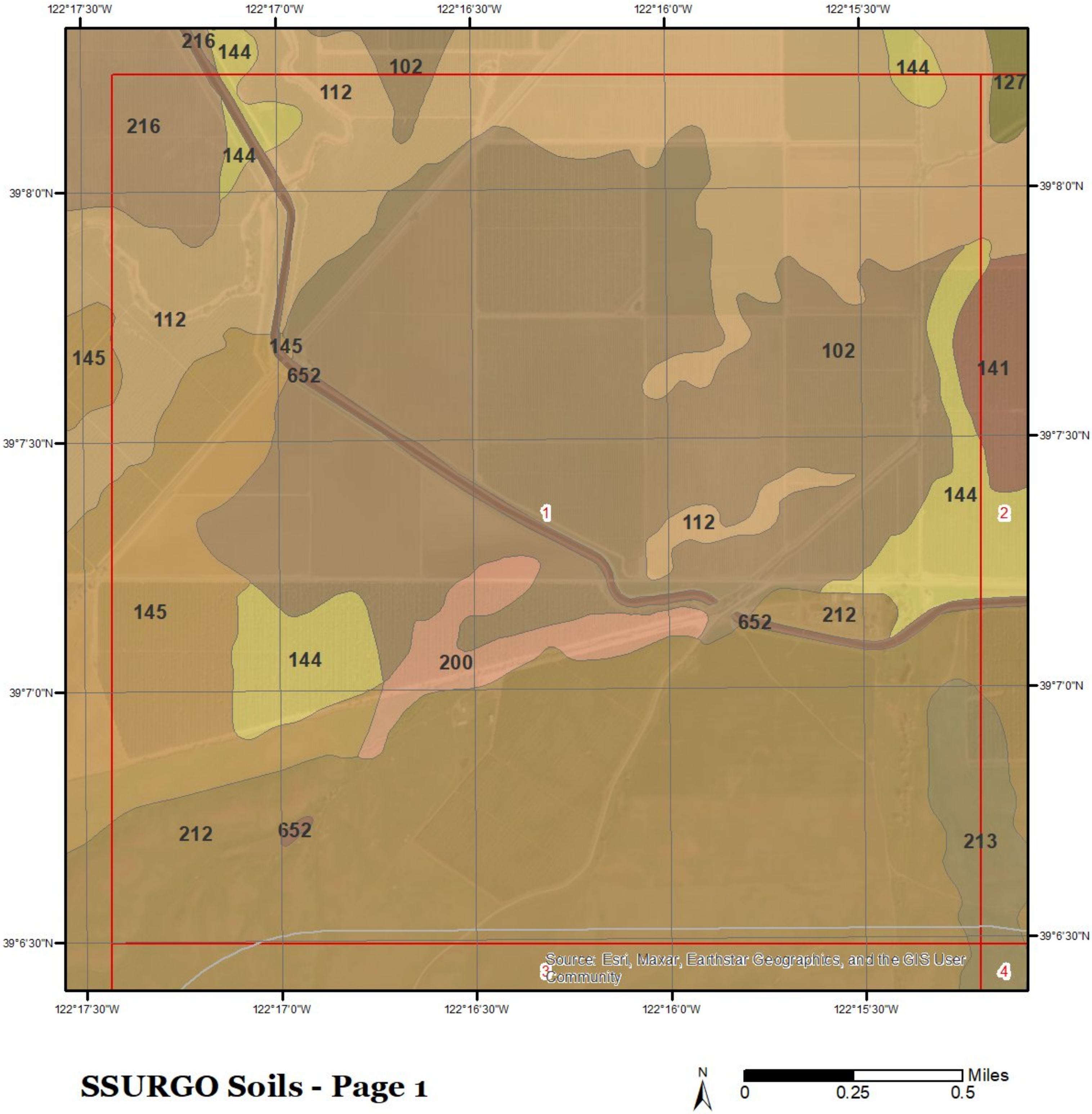
N

0 0.5 1 Miles

This maps shows SSURGO soil units around the target property. Please refer to the report for detailed soil descriptions.

ERIS

Soil Information

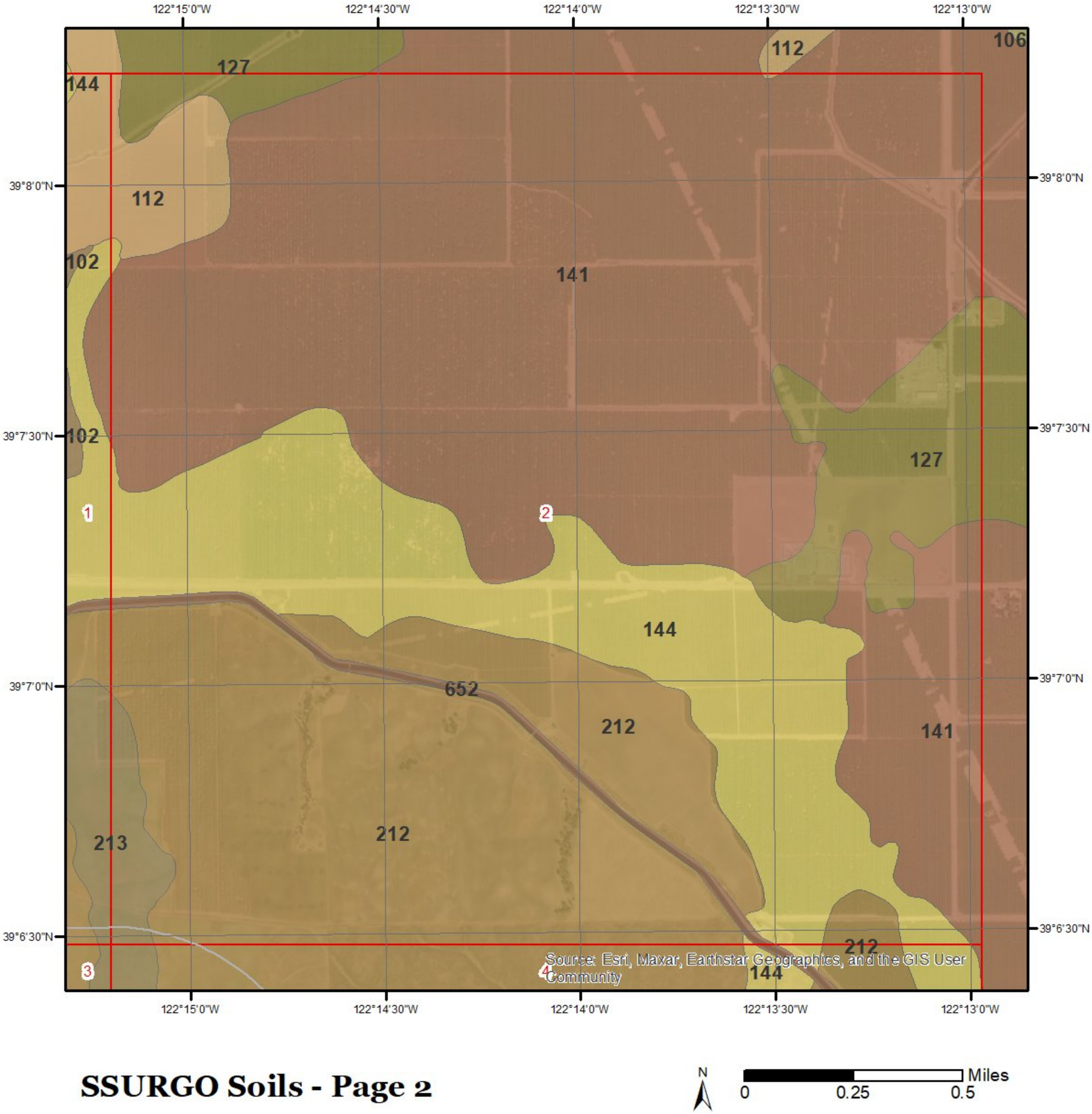


SSURGO Soils - Page 1

This maps shows SSURGO soil units around the target property. Please refer to the report for detailed soil descriptions.

ERIS

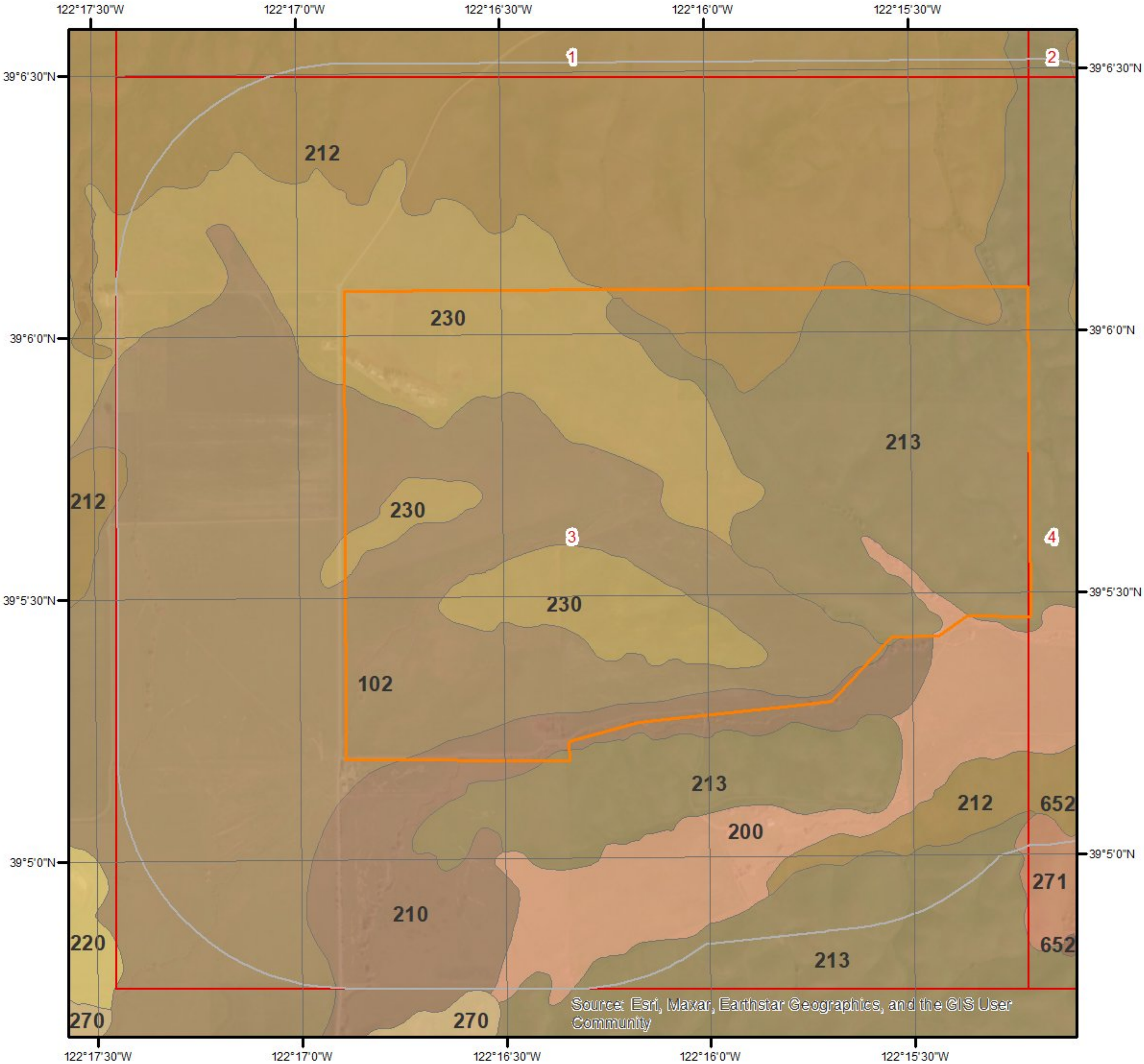
Soil Information



SSURGO Soils - Page 2

This maps shows SSURGO soil units around the target property. Please refer to the report for detailed soil descriptions.

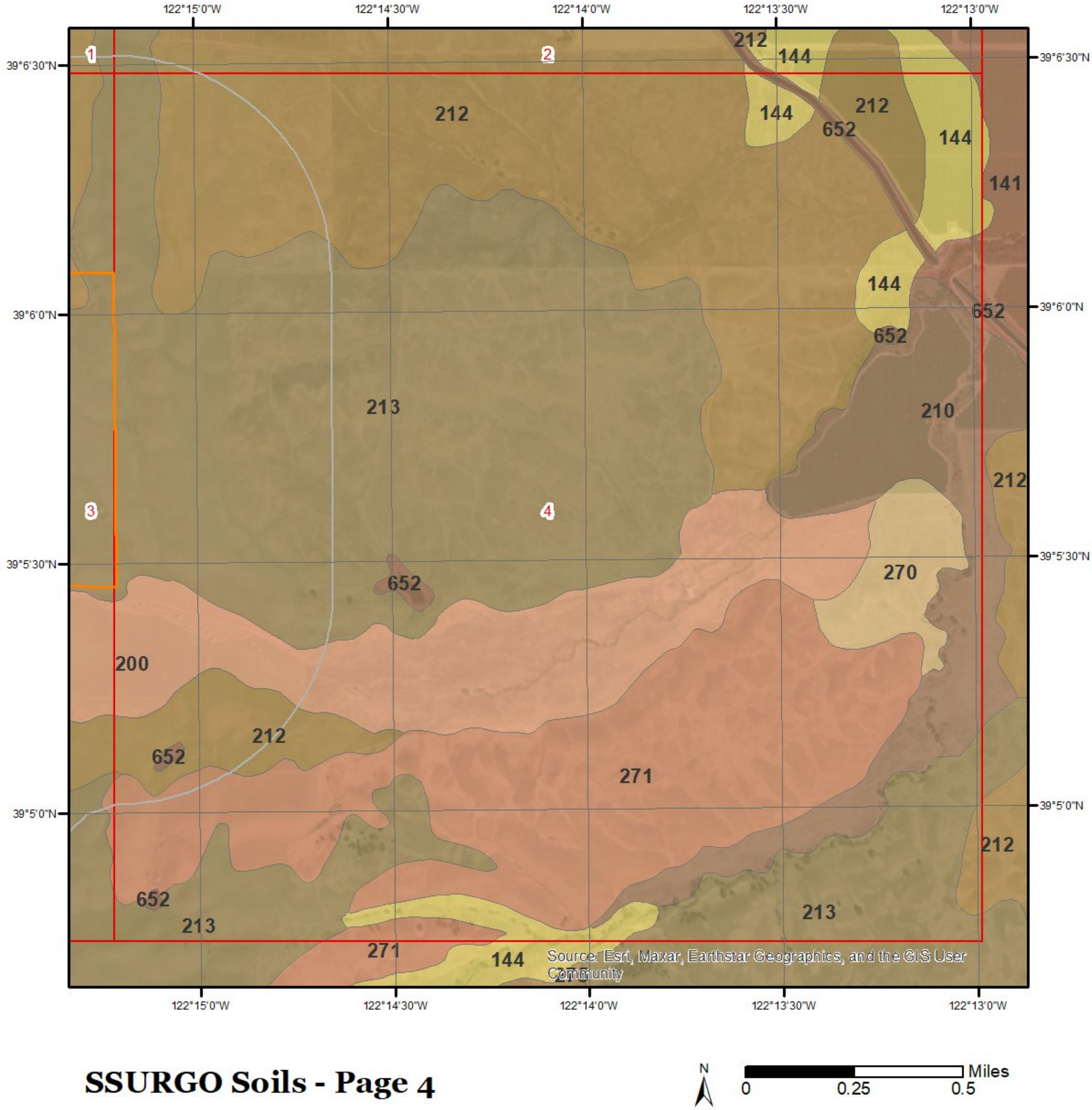
Soil Information



SSURGO Soils - Page 3

This maps shows SSURGO soil units around the target property. Please refer to the report for detailed soil descriptions.

Soil Information



SSURGO Soils - Page 4

This maps shows SSURGO soil units around the target property. Please refer to the report for detailed soil descriptions.

Soil Information

The previous page shows a soil map using SSURGO data from USDA Natural Resources Conservation Service. Detailed information about each unit is provided below.

Map Unit 102 (12.84%)

Map Unit Name:	Capay clay loam, 0 percent slopes, low precip, MLRA 17
Bedrock Depth - Min:	null
Watertable Depth - Annual Min:	122cm
Drainage Class - Dominant:	Moderately well drained
Hydrologic Group - Dominant:	D - Soils in this group have high runoff potential when thoroughly wet. Water movement through the soil is restricted or very restricted.

Major components are printed below

Capay(90%)

horizon Ap(0cm to 38cm)	Clay loam
horizon A(38cm to 84cm)	Clay loam
horizon Bss1(84cm to 99cm)	Clay
horizon Bss2(99cm to 117cm)	Clay
horizon Bkss(117cm to 163cm)	Clay

Component Description:

Minor map unit components are excluded from this report.

Map Unit: 102 - Capay clay loam, 0 percent slopes, low precip, MLRA 17

Component: Capay (90%)
The Capay, clay loam component makes up 90 percent of the map unit. Slopes are 0 to 0 percent. This component is on basin floors on valleys. The parent material consists of clayey alluvium derived from sedimentary rock. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is low. Available water to a depth of 60 inches (or restricted depth) is high. Shrink-swell potential is high. This soil is rarely flooded. It is frequently ponded. A seasonal zone of water saturation is at 48 inches during January, February. Organic matter content in the surface horizon is about 2 percent. Nonirrigated land capability classification is 4s. Irrigated land capability classification is 2s. This soil does not meet hydric criteria. There are no saline horizons within 30 inches of the soil surface. The soil has a maximum sodium adsorption ratio of 1 within 30 inches of the soil surface.

Component: Capay (5%)
Generated brief soil descriptions are created for major soil components. The Capay soil is a minor component.

Component: Unnamed (2%)
Generated brief soil descriptions are created for major soil components. The Unnamed soil is a minor component.

Component: Westfan (1%)
Generated brief soil descriptions are created for major soil components. The Westfan soil is a minor component.

Component: Willows (1%)
Generated brief soil descriptions are created for major soil components. The Willows soil is a minor component.

Component: Capay (1%)
Generated brief soil descriptions are created for major soil components. The Capay soil is a minor component.

Map Unit 200 (5.35%)

Map Unit Name:	Clear Lake clay, drained, 0 to 8 percent slopes, MLRA 15
Bedrock Depth - Min:	null
Watertable Depth - Annual Min:	9cm
Drainage Class - Dominant:	Poorly drained

Soil Information

Hydrologic Group - Dominant:	C/D - These soils have moderately high runoff potential when drained and high runoff potential when undrained.

Major components are printed below

Clear Lake(90%)

horizon Ap1(0cm to 9cm)	Clay
horizon Ap2(9cm to 26cm)	Clay
horizon Bss1(26cm to 50cm)	Clay
horizon Bss2(50cm to 86cm)	Silty clay
horizon Bss3(86cm to 120cm)	Silty clay
horizon Bkss1(120cm to 150cm)	Silty clay
horizon Bkss2(150cm to 200cm)	Silty clay

Component Description:

Minor map unit components are excluded from this report.

Map Unit: 200 - Clear Lake clay, drained, 0 to 8 percent slopes, MLRA 15

Component: Clear Lake (90%)
The Clear Lake, drained component makes up 90 percent of the map unit. Slopes are 0 to 8 percent. This component is on basin floors on foothills. The parent material consists of clayey alluvium derived from metamorphic and sedimentary rock. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is poorly drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is very high. This soil is rarely flooded. It is frequently ponded. A seasonal zone of water saturation is at 4 inches during January, February. Organic matter content in the surface horizon is about 4 percent. This component is in the R015XE086CA Clayey Bottom ecological site. Nonirrigated land capability classification is 4w. Irrigated land capability classification is 3w. This soil meets hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 1 percent. There are no saline horizons within 30 inches of the soil surface. The soil has a maximum sodium adsorption ratio of 5 within 30 inches of the soil surface.

Component: Capay (7%)
Generated brief soil descriptions are created for major soil components. The Capay soil is a minor component.

Component: Altamont (2%)
Generated brief soil descriptions are created for major soil components. The Altamont soil is a minor component.

Component: Riverwash (1%)
Generated brief soil descriptions are created for major soil components. The Riverwash soil is a minor component.

Map Unit 210 (2.64%)

Map Unit Name:	Corval loam, 0 to 3 percent slopes
Bedrock Depth - Min:	null
Watertable Depth - Annual Min:	null
Drainage Class - Dominant:	Well drained
Hydrologic Group - Dominant:	C - Soils in this group have moderately high runoff potential when thoroughly wet. Water transmission through the soil is somewhat restricted.

Major components are printed below

Corval(85%)

horizon A(0cm to 20cm)	Loam
horizon Bw1(20cm to 61cm)	Clay loam
horizon Bw2(61cm to 92cm)	Clay loam
horizon Bw3(92cm to 117cm)	Clay loam
horizon Bw4(117cm to 153cm)	Silty clay loam
horizon Bw5(153cm to 178cm)	Clay loam

Component Description:

Minor map unit components are excluded from this report.

Map Unit: 210 - Corval loam, 0 to 3 percent slopes

Soil Information

Component: Corval (85%)
The Corval, loam component makes up 85 percent of the map unit. Slopes are 0 to 3 percent. This component is on flood plains, alluvial fans, valleys. The parent material consists of alluvium. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is high. Shrink-swell potential is moderate. This soil is rarely flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This component is in the R017XE061CA Loamy Fan Remnant 8-10" P.z. ecological site. Nonirrigated land capability classification is 4s. Irrigated land capability classification is 1 This soil does not meet hydric criteria. There are no saline horizons within 30 inches of the soil surface. The soil has a maximum sodium adsorption ratio of 1 within 30 inches of the soil surface.

Component: Vina (9%)
Generated brief soil descriptions are created for major soil components. The Vina soil is a minor component.

Component: Arand (5%)
Generated brief soil descriptions are created for major soil components. The Arand soil is a minor component.

Component: Unnamed (1%)
Generated brief soil descriptions are created for major soil components. The Unnamed soil is a minor component.

Map Unit 212 (32.25%)

Map Unit Name:	Ayar clay, 5 to 15 percent slopes
Bedrock Depth - Min:	183cm
Watertable Depth - Annual Min:	null
Drainage Class - Dominant:	Well drained
Hydrologic Group - Dominant:	C - Soils in this group have moderately high runoff potential when thoroughly wet. Water transmission through the soil is somewhat restricted.

Major components are printed below

Ayar(85%)

horizon A1(0cm to 23cm)	Clay
horizon A2(23cm to 64cm)	Clay
horizon Bss1(64cm to 92cm)	Clay
horizon Bss2(92cm to 117cm)	Clay
horizon Bw(117cm to 147cm)	Clay
horizon C(147cm to 183cm)	Clay loam
horizon Cr(183cm to 200cm)	Weathered bedrock

Component Description:

Minor map unit components are excluded from this report.

Map Unit: 212 - Ayar clay, 5 to 15 percent slopes

Component: Ayar (85%)
The Ayar, clay component makes up 85 percent of the map unit. Slopes are 5 to 15 percent. This component is on hills, foothills. The parent material consists of residuum weathered from sandstone, calcareous. Depth to a root restrictive layer, bedrock, paralithic, is 60 to 80 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is high. Shrink-swell potential is high. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This component is in the R015XE001CA Clayey Hills 10-14" P.z. ecological site. Nonirrigated land capability classification is 4e. Irrigated land capability classification is 3e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 9 percent. There are no saline horizons within 30 inches of the soil surface.

Component: Altamont (5%)
Generated brief soil descriptions are created for major soil components. The Altamont soil is a minor component.

Component: Capay (4%)
Generated brief soil descriptions are created for major soil components. The Capay soil is a minor component.

Component: Balcom (2%)
Generated brief soil descriptions are created for major soil components. The Balcom soil is a minor component.

Component: Millsholm (2%)
Generated brief soil descriptions are created for major soil components. The Millsholm soil is a minor component.

Component: Unnamed (1%)
Generated brief soil descriptions are created for major soil components. The Unnamed soil is a minor component.

Component: Hillgate (1%)
Generated brief soil descriptions are created for major soil components. The Hillgate soil is a minor component.

Map Unit 213 (35.74%)

Map Unit Name:	Ayar clay, 15 to 30 percent slopes
Bedrock Depth - Min:	183cm
Watertable Depth - Annual Min:	null
Drainage Class - Dominant:	Well drained
Hydrologic Group - Dominant:	C - Soils in this group have moderately high runoff potential when thoroughly wet. Water transmission through the soil is somewhat restricted.

Major components are printed below

Ayar(85%)

horizon A1(0cm to 23cm)	Clay
horizon A2(23cm to 64cm)	Clay
horizon Bss1(64cm to 92cm)	Clay
horizon Bss2(92cm to 117cm)	Clay
horizon Bw(117cm to 147cm)	Clay
horizon C(147cm to 183cm)	Clay loam
horizon Cr(183cm to 200cm)	Weathered bedrock

Component Description:

Minor map unit components are excluded from this report.

Map Unit: 213 - Ayar clay, 15 to 30 percent slopes

Component: Ayar (85%)
The Ayar, clay component makes up 85 percent of the map unit. Slopes are 15 to 30 percent. This component is on hills, foothills. The parent material consists of residuum weathered from sandstone, calcareous. Depth to a root restrictive layer, bedrock, paralithic, is 60 to 80 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is high. Shrink-swell potential is high. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This component is in the R015XE001CA Clayey Hills 10-14" P.z. ecological site. Nonirrigated land capability classification is 4e. Irrigated land capability classification is 4e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 9 percent. There are no saline horizons within 30 inches of the soil surface.

Component: Altamont (4%)
Generated brief soil descriptions are created for major soil components. The Altamont soil is a minor component.

Component: Millsholm (3%)
Generated brief soil descriptions are created for major soil components. The Millsholm soil is a minor component.

Component: Capay (3%)
Generated brief soil descriptions are created for major soil components. The Capay soil is a minor component.

Component: Balcom (3%)
Generated brief soil descriptions are created for major soil components. The Balcom soil is a minor component.

Component: Unnamed (1%)
Generated brief soil descriptions are created for major soil components. The Unnamed soil is a minor component.

Component: Hillgate (1%)
Generated brief soil descriptions are created for major soil components. The Hillgate soil is a minor component.

Soil Information

Map Unit 230 (5.85%)

Map Unit Name:	Corning clay loam, 1 to 5 percent slopes
Bedrock Depth - Min:	null
Watertable Depth - Annual Min:	null
Drainage Class - Dominant:	Well drained
Hydrologic Group - Dominant:	C - Soils in this group have moderately high runoff potential when thoroughly wet. Water transmission through the soil is somewhat restricted.

Major components are printed below

Corning(90%)

horizon A1(0cm to 10cm)	Clay loam
horizon A2(10cm to 23cm)	Clay loam
horizon Bt1(23cm to 51cm)	Clay
horizon Bt2(51cm to 79cm)	Gravelly clay
horizon 2BC1(79cm to 99cm)	Gravelly clay loam
horizon 2BC2(99cm to 132cm)	Very cobbly sandy clay loam
horizon 3BC3(132cm to 153cm)	Very gravelly sandy loam

Component Description:

Minor map unit components are excluded from this report.

Map Unit: 230 - Corning clay loam, 1 to 5 percent slopes

Component: Corning (90%)
The Corning, clay loam component makes up 90 percent of the map unit. Slopes are 1 to 5 percent. This component is on terraces, foothills. The parent material consists of alluvium. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is moderate. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. This component is in the R015XE077CA Shallow Loamy Hills 10-15" P.z. Gravelly ecological site. Nonirrigated land capability classification is 4e. Irrigated land capability classification is 3e. This soil does not meet hydric criteria.

Component: Arbuckle (6%)
Generated brief soil descriptions are created for major soil components. The Arbuckle soil is a minor component.

Component: Ayar (3%)
Generated brief soil descriptions are created for major soil components. The Ayar soil is a minor component.

Component: Unnamed (1%)
Generated brief soil descriptions are created for major soil components. The Unnamed soil is a minor component.

Map Unit 271 (5.31%)

Map Unit Name:	Balcom-Ayar complex, 30 to 50 percent slopes
Bedrock Depth - Min:	84cm
Watertable Depth - Annual Min:	null
Drainage Class - Dominant:	Well drained
Hydrologic Group - Dominant:	C - Soils in this group have moderately high runoff potential when thoroughly wet. Water transmission through the soil is somewhat restricted.

Major components are printed below

Balcom(55%)

horizon A1(0cm to 5cm)	Silt loam
horizon A2(5cm to 28cm)	Silt loam
horizon Bk1(28cm to 46cm)	Silty clay loam
horizon Bk2(46cm to 84cm)	Silt loam
horizon Cr(84cm to 152cm)	Weathered bedrock

Ayar(30%)

horizon A1(0cm to 23cm)	Clay
horizon A2(23cm to 64cm)	Clay
horizon Bss1(64cm to 92cm)	Clay
horizon Bss2(92cm to 117cm)	Clay
horizon Bw(117cm to 147cm)	Clay
horizon C(147cm to 183cm)	Clay loam
horizon Cr(183cm to 200cm)	Weathered bedrock

Component Description:

Minor map unit components are excluded from this report.

Map Unit: 271 - Balcom-Ayar complex, 30 to 50 percent slopes

Component: Balcom (55%)
The Balcom, silt loam component makes up 55 percent of the map unit. Slopes are 30 to 50 percent. This component is on hills, foothills. The parent material consists of residuum weathered from sandstone-shale. Depth to a root restrictive layer, bedrock, paralithic, is 26 to 40 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 1 percent. This component is in the R015XE020CA Fine Loamy 9-13 ecological site. Nonirrigated land capability classification is 6e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 20 percent. There are no saline horizons within 30 inches of the soil surface.

Component: Ayar (30%)
The Ayar, clay component makes up 30 percent of the map unit. Slopes are 30 to 50 percent. This component is on foothills, hills. The parent material consists of residuum weathered from sandstone, calcareous. Depth to a root restrictive layer, bedrock, paralithic, is 60 to 80 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is high. Shrink-swell potential is high. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This component is in the R015XE001CA Clayey Hills 10-14" P.z. ecological site. Nonirrigated land capability classification is 6e. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 9 percent. There are no saline horizons within 30 inches of the soil surface.

Component: Altamont (6%)
Generated brief soil descriptions are created for major soil components. The Altamont soil is a minor component.

Component: Hillgate (4%)
Generated brief soil descriptions are created for major soil components. The Hillgate soil is a minor component.

Component: Capay (3%)
Generated brief soil descriptions are created for major soil components. The Capay soil is a minor component.

Component: Unnamed (1%)
Generated brief soil descriptions are created for major soil components. The Unnamed soil is a minor component.

Component: Millsholm (1%)
Generated brief soil descriptions are created for major soil components. The Millsholm soil is a minor component.

Map Unit 652 (0.02%)

Map Unit Name:	Water

No more attributes available for this map unit

Component Description:

Minor map unit components are excluded from this report.

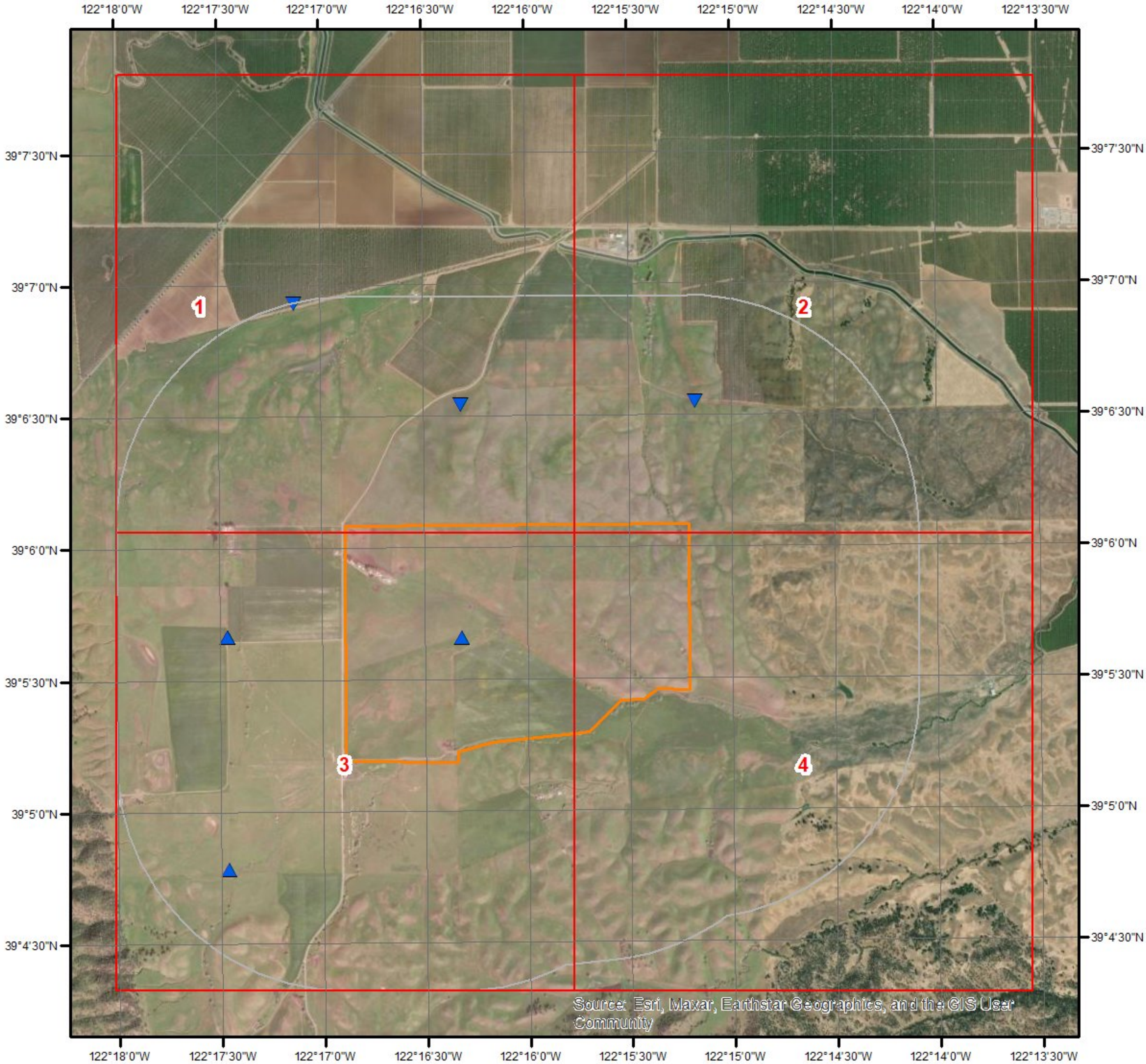
Map Unit: 652 - Water

Component: Water (100%)

Soil Information

Generated brief soil descriptions are created for major soil components. The Water is a miscellaneous area.

Wells and Additional Sources



Wells & Additional Sources

N

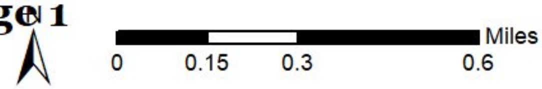
0 0.3 0.6 1.2 Miles

- Sites with Higher Elevation
- Sites with Same Elevation
- Sites with Lower Elevation
- Sites with Unknown Elevation
- OGW Sites with Higher Elevation
- OGW Sites with Same Elevation
- OGW Sites with Lower Elevation
- OGW Sites with Unknown Elevation

ERIS

Wells and Additional Sources

Wells & Additional Sources - Page 1



- Sites with Higher Elevation
- Sites with Same Elevation
- Sites with Lower Elevation
- Sites with Unknown Elevation
- OGW Sites with Higher Elevation
- OGW Sites with Same Elevation
- OGW Sites with Lower Elevation
- OGW Sites with Unknown Elevation

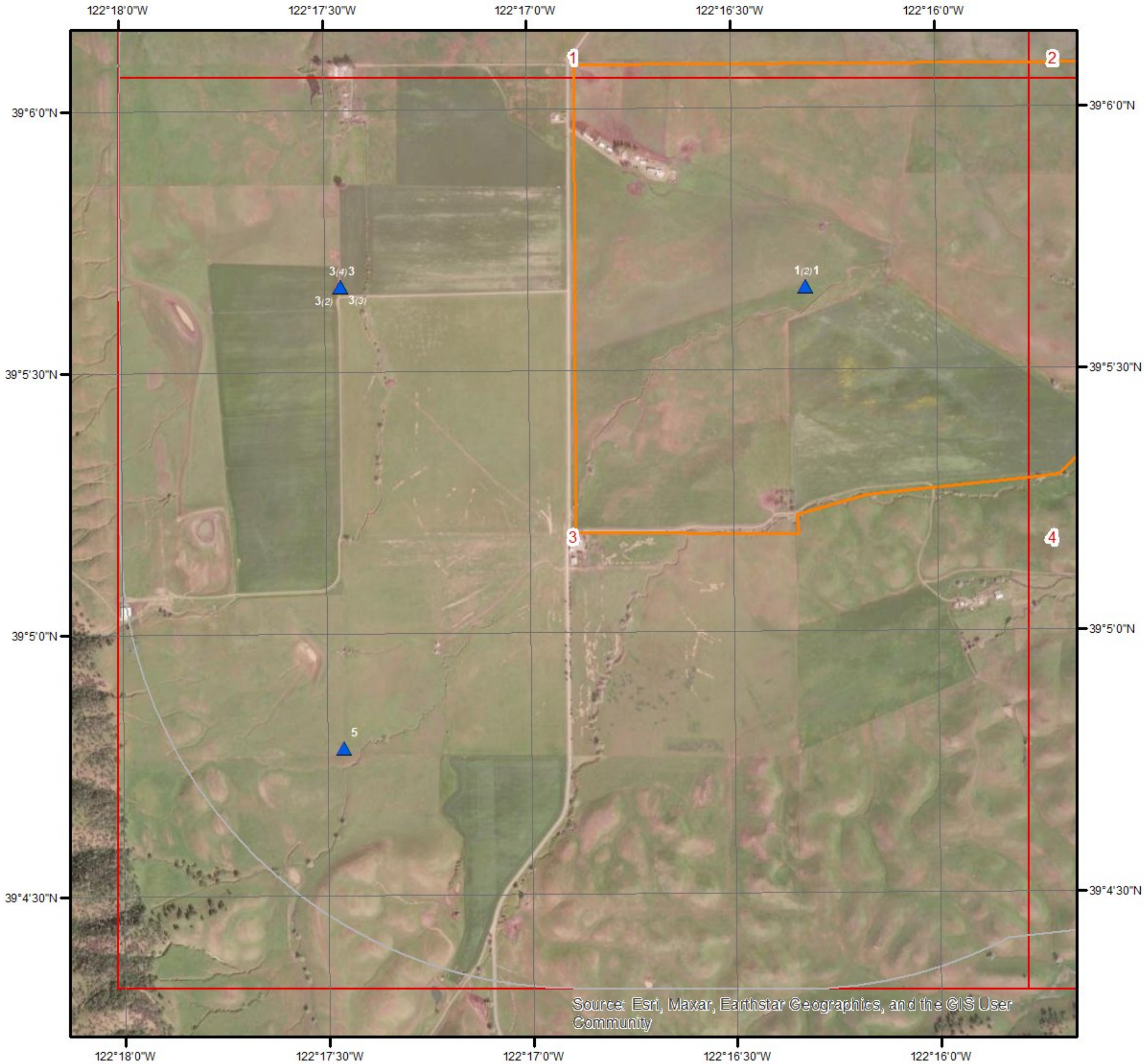
ERIS

Wells and Additional Sources

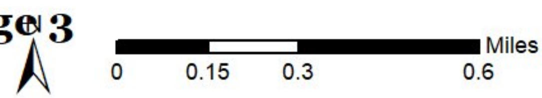
Wells & Additional Sources - Page 2

Sites with Higher Elevation
Sites with Same Elevation
Sites with Lower Elevation
Sites with Unknown Elevation
OGW Sites with Higher Elevation
OGW Sites with Same Elevation
OGW Sites with Lower Elevation
OGW Sites with Unknown Elevation

Wells and Additional Sources

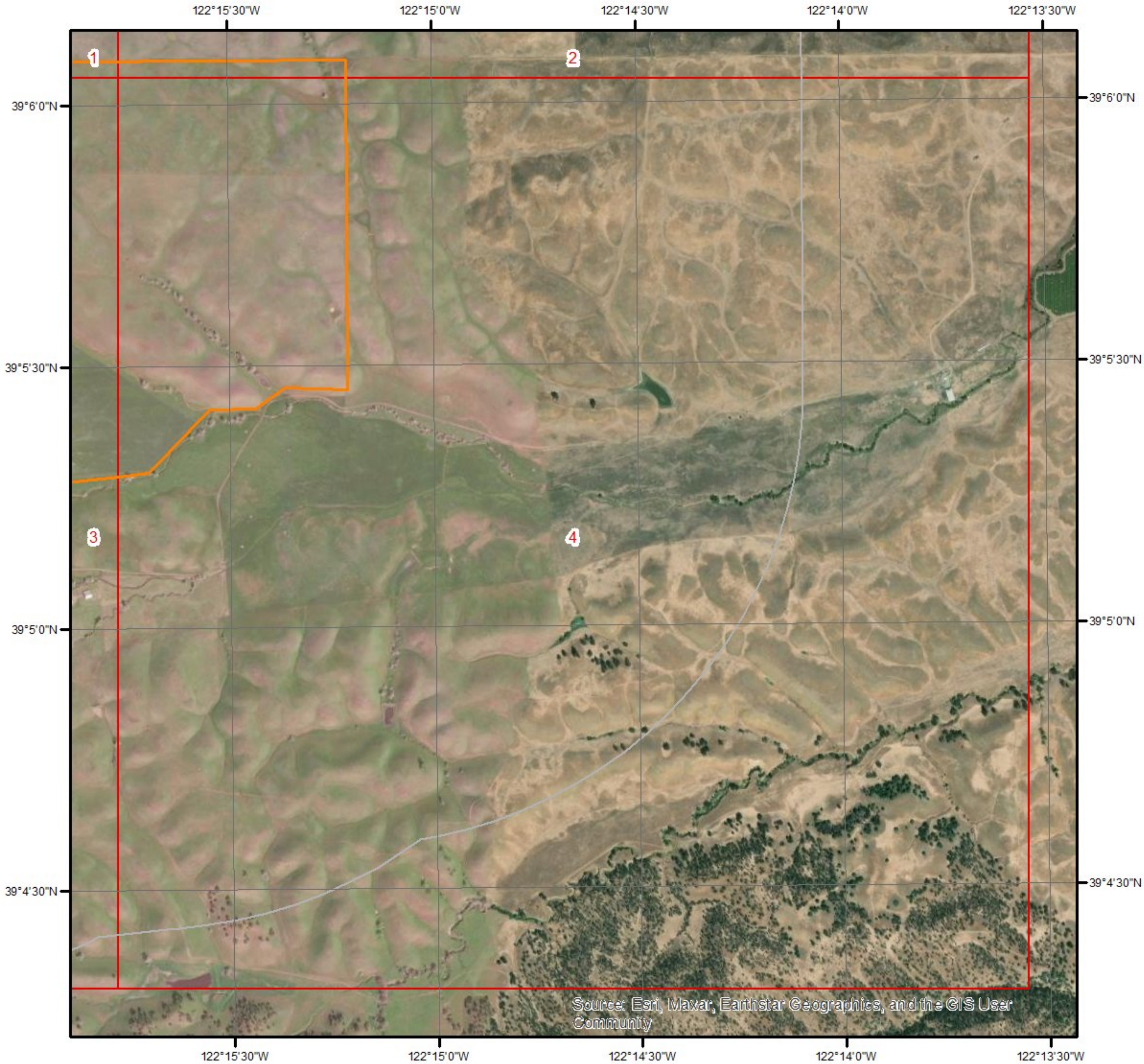


Wells & Additional Sources - Page 3



- Sites with Higher Elevation
- Sites with Same Elevation
- Sites with Lower Elevation
- Sites with Unknown Elevation
- OGW Sites with Higher Elevation
- OGW Sites with Same Elevation
- OGW Sites with Lower Elevation
- OGW Sites with Unknown Elevation

Wells and Additional Sources



Wells & Additional Sources - Page 4

N

0 0.15 0.3 0.6 Miles

- Sites with Higher Elevation
- Sites with Same Elevation
- Sites with Lower Elevation
- Sites with Unknown Elevation
- OGW Sites with Higher Elevation
- OGW Sites with Same Elevation
- OGW Sites with Lower Elevation
- OGW Sites with Unknown Elevation

ERIS

Wells and Additional Sources Summary

Federal Sources

Public Water Systems Violations and Enforcement Data

Map Key	ID	Distance (ft)	Direction
	No records found		

Safe Drinking Water Information System (SDWIS)

Map Key	ID	Distance (ft)	Direction
	No records found		

USGS National Water Information System

Map Key	Site No	Distance (ft)	Direction
6	USGS-390656122170401	5241.55	NNW

State Sources

Oil and Gas Wells

Map Key	ID	Distance (ft)	Direction
	No records found		

Periodic Groundwater Level Measurement Locations

Map Key	ID	Distance (ft)	Direction
	No records found		

Well Completion Reports

Map Key	WCR No	Distance (ft)	Direction
1	WCR1985-008314	0.00	-
1	WCR1974-001988	0.00	-
2	WCR2014-006491	2763.46	NNW
2	WCR2014-006490	2763.46	NNW
3	WCR2003-009687	2709.20	W
3	WCR2003-009713	2709.20	W
3	WCR1966-001042	2709.20	W
3	WCR1974-001989	2709.20	W
4	WCR1978-004759	2807.39	NE
5	WCR1994-008920	3664.68	SW

Wells and Additional Sources Detail Report

USGS National Water Information System

Map Key	Direction	Distance (mi)	Distance (ft)	Elevation (ft)	DB
6	NNW	0.99	5,241.55	228.61	FED USGS

Site No:	USGS-390656122170401
Site Type:	Stream
Formation Type:	
Date Drilled:	
Well Depth:	
Well Depth Unit:	
Well Hole Depth:	
Well Hole Depth Unit:	
Reporting Agency:	USGS California Water Science Center
Station Name:	SALT C A WALNUT AVE 2 CA
Latitude:	39.11544770000000
Longitude:	-122.2855318000000

Well Completion Reports

Map Key	Direction	Distance (mi)	Distance (ft)	Elevation (ft)	DB
1	-	0.00	0.00	312.22	WATER WELLS

WCR No:	WCR1985-008314
Location:	
City:	
County:	Colusa
Decimal Latitude:	39.0943
Decimal Longitude:	-122.272
Location(OSWCR):	
City(OSWCR):	
County(OSWCR):	Colusa
Decimal Lat(OSWCR):	39.09434328
Decim Long(OSWCR):	-122.2722908
Data Source:	California Department of Water Resources - OSWCR(Well Numbers); California Department of Water Resources - Well Completion Reports

Map Key	Direction	Distance (mi)	Distance (ft)	Elevation (ft)	DB
1	-	0.00	0.00	312.22	WATER WELLS

WCR No:	WCR1974-001988
Location:	
City:	
County:	Colusa
Decimal Latitude:	39.0943

Decimal Longitude:	-122.272
Location(OSWCR):	
City(OSWCR):	
County(OSWCR):	Colusa
Decimal Lat(OSWCR):	39.09434328
Decim Long(OSWCR):	-122.2722908
Data Source:	California Department of Water Resources - OSWCR(Well Numbers); California Department of Water Resources - Well Completion Reports

Map Key	Direction	Distance (mi)	Distance (ft)	Elevation (ft)	DB
2	NNW	0.52	2,763.46	280.93	WATER WELLS

WCR No:	WCR2014-006491
Location:	
City:	
County:	Colusa
Decimal Latitude:	39.109
Decimal Longitude:	-122.272
Location(OSWCR):	
City(OSWCR):	
County(OSWCR):	Colusa
Decimal Lat(OSWCR):	39.10900347
Decim Long(OSWCR):	-122.2720384
Data Source:	California Department of Water Resources - OSWCR(Well Numbers); California Department of Water Resources - Well Completion Reports

Map Key	Direction	Distance (mi)	Distance (ft)	Elevation (ft)	DB
2	NNW	0.52	2,763.46	280.93	WATER WELLS

WCR No:	WCR2014-006490
Location:	
City:	
County:	Colusa
Decimal Latitude:	39.109
Decimal Longitude:	-122.272
Location(OSWCR):	
City(OSWCR):	
County(OSWCR):	Colusa
Decimal Lat(OSWCR):	39.10900347
Decim Long(OSWCR):	-122.2720384
Data Source:	California Department of Water Resources - OSWCR(Well Numbers); California Department of Water Resources - Well Completion Reports

Map Key	Direction	Distance (mi)	Distance (ft)	Elevation (ft)	DB
3	W	0.51	2,709.20	335.78	WATER WELLS

WCR No:	WCR2003-009687

Location:	
City:	
County:	Colusa
Decimal Latitude:	39.0944
Decimal Longitude:	-122.291
Location(OSWCR):	
City(OSWCR):	
County(OSWCR):	Colusa
Decimal Lat(OSWCR):	39.09439959
Decim Long(OSWCR):	-122.2908925
Data Source:	California Department of Water Resources - OSWCR(Well Numbers); California Department of Water Resources - Well Completion Reports

Map Key	Direction	Distance (mi)	Distance (ft)	Elevation (ft)	DB
3	W	0.51	2,709.20	335.78	WATER WELLS

WCR No:	WCR2003-009713
Location:	
City:	
County:	Colusa
Decimal Latitude:	39.0944
Decimal Longitude:	-122.291
Location(OSWCR):	
City(OSWCR):	
County(OSWCR):	Colusa
Decimal Lat(OSWCR):	39.09439959
Decim Long(OSWCR):	-122.2908925
Data Source:	California Department of Water Resources - OSWCR(Well Numbers); California Department of Water Resources - Well Completion Reports

Map Key	Direction	Distance (mi)	Distance (ft)	Elevation (ft)	DB
3	W	0.51	2,709.20	335.78	WATER WELLS

WCR No:	WCR1966-001042
Location:	
City:	
County:	Colusa
Decimal Latitude:	39.0944
Decimal Longitude:	-122.291
Location(OSWCR):	
City(OSWCR):	
County(OSWCR):	Colusa
Decimal Lat(OSWCR):	39.09439959
Decim Long(OSWCR):	-122.2908925
Data Source:	California Department of Water Resources - OSWCR(Well Numbers); California Department of Water Resources - Well Completion Reports

Map Key	Direction	Distance (mi)	Distance (ft)	Elevation (ft)	DB

3	W	0.51	2,709.20	335.78	WATER WELLS

WCR No:	WCR1974-001989
Location:	
City:	
County:	Colusa
Decimal Latitude:	39.0944
Decimal Longitude:	-122.291
Location(OSWCR):	
City(OSWCR):	
County(OSWCR):	Colusa
Decimal Lat(OSWCR):	39.09439959
Decim Long(OSWCR):	-122.2908925
Data Source:	California Department of Water Resources - OSWCR(Well Numbers); California Department of Water Resources - Well Completion Reports

Map Key	Direction	Distance (mi)	Distance (ft)	Elevation (ft)	DB
4	NE	0.53	2,807.39	304.24	WATER WELLS

WCR No:	WCR1978-004759
Location:	
City:	
County:	Colusa
Decimal Latitude:	39.1091
Decimal Longitude:	-122.253
Location(OSWCR):	
City(OSWCR):	
County(OSWCR):	Colusa
Decimal Lat(OSWCR):	39.10914247
Decim Long(OSWCR):	-122.2530918
Data Source:	California Department of Water Resources - OSWCR(Well Numbers); California Department of Water Resources - Well Completion Reports

Map Key	Direction	Distance (mi)	Distance (ft)	Elevation (ft)	DB
5	SW	0.69	3,664.68	381.76	WATER WELLS

WCR No:	WCR1994-008920
Location:	
City:	
County:	Colusa
Decimal Latitude:	39.0797
Decimal Longitude:	-122.291
Location(OSWCR):	
City(OSWCR):	
County(OSWCR):	Colusa
Decimal Lat(OSWCR):	39.07972829

Wells and Additional Sources Detail Report

Decim Long(OSWCR):	-122.2910047
Data Source:	California Department of Water Resources - OSWCR(Well Numbers); California Department of Water Resources - Well Completion Reports

Radon Information

This section lists any relevant radon information found for the target property.

Federal EPA Radon Zone for *COLUSA* County: **3**

Zone 1: Counties with predicted average indoor radon screening levels greater than 4 pCi/L
Zone 2: Counties with predicted average indoor radon screening levels from 2 to 4 pCi/L
Zone 3: Counties with predicted average indoor radon screening levels less than 2 pCi/L

Federal Area Radon Information for *COLUSA* County

No Measures/Homes:	2
Geometric Mean:	0.3
Arithmetic Mean:	0.6
Median:	0.6
Standard Deviation:	0.6
Maximum:	1
% >4 pCi/L:	0
% >20 pCi/L:	0
Notes on Data Table:	TABLE 1. Screening indoor radon data from the EPA/State Residential Radon Survey of California conducted during 1989-90. Data represent 2-7 day charcoal canister measurements from the lowest level of each home tested.

Appendix

Federal Sources

FEMA National Flood Hazard Layer — **FEMA FLOOD**

The National Flood Hazard Layer (NFHL) data incorporates Flood Insurance Rate Map (FIRM) databases published by the Federal Emergency Management Agency (FEMA), and any Letters Of Map Revision (LOMRs) that have been issued against those databases since their publication date. The FIRM Database is the digital, geospatial version of the flood hazard information shown on the published paper FIRMs. The FIRM Database depicts flood risk information and supporting data used to develop the risk data. The FIRM Database is derived from Flood Insurance Studies (FISs), previously published FIRMs, flood hazard analyses performed in support of the FISs and FIRMs, and new mapping data, where available.

Indoor Radon Data — **INDOOR RADON**

Indoor radon measurements tracked by the Environmental Protection Agency(EPA) and the State Residential Radon Survey.

Public Water Systems Violations and Enforcement Data — **PWSV**

This list of drinking water violations and enforcement actions is sourced from the U.S Environmental Protection Agency's (EPA) Enforcement and Compliance History Online (ECHO) system that incorporates Public Water Systems data from EPA's Safe Drinking Water Information System (SDWIS) database, as part of the national download of Safe Drinking Water Act (SDWA) data. SDWIS contains information on public water systems from the Public Water System Supervision (PWSS) Program, including monitoring, enforcement, and violation data related to requirements established by the SWDA. Address information provided in SWDIS may correspond either with the physical location of the water system, or with a contact address.

Radon Zone Level — **RADON ZONE**

Areas showing the level of Radon Zones (level 1, 2 or 3) by county. This data is maintained by the Environmental Protection Agency (EPA).

Safe Drinking Water Information System (SDWIS) — **SDWIS**

This national download of Safe Drinking Water Act (SDWA) data is sourced from the U.S Environmental Protection Agency's (EPA) Enforcement and Compliance History Online (ECHO) system that incorporates Public Water Systems data from EPA's Safe Drinking Water Information System (SDWIS) database. SDWIS contains information on public water systems from the Public Water System Supervision (PWSS) Program related to requirements established by the Safe Drinking Water Act (SDWA). Address information provided in SWDIS may correspond either with the physical location of the water system, or with a contact address.

Soil Survey Geographic database — **SSURGO**

The Soil Survey Geographic database (SSURGO) contains information about soil as collected by the National Cooperative Soil Survey at the Natural Resources Conservation Service (NRCS). Soil maps outline areas called map units. The map units are linked to soil properties in a database. Each map unit may contain one to three major components and some minor components.

U.S. Fish & Wildlife Service Wetland Data — **US WETLAND**

The U.S. Fish & Wildlife Service Wetland layer represents the approximate location and type of wetlands and deepwater habitats in the United States.

USGS Current Topo — **US TOPO**

US Topo topographic maps are produced by the National Geospatial Program of the U.S. Geological Survey (USGS). The project was launched in late 2009, and the term "US Topo" refers specifically to quadrangle topographic maps published in 2009 and later.

USGS Geology — **US GEOLOGY**

Seamless maps depicting geological information provided by the United States Geological Survey (USGS).

USGS National Water Information System — **FED USGS**

The U.S. Geological Survey's (USGS) National Water Information System (NWIS) is the nation's principal repository of water resources data. The data includes comprehensive information of well-construction details, time-series data for gage height, streamflow, groundwater level, and precipitation and water use data. This NWIS database information is obtained through the Water Quality Data Portal (WQP). The WQP is a cooperative service sponsored by the USGS, the Environmental Protection Agency (EPA), and the National Water Quality Monitoring Council (NWQMC).

State Sources

Oil and Gas Wells **OGW**

The California Department of Conservation, Geologic Energy Management Division (CalGEM) provides this oil and gas wells dataset. CalGEM makes no warranties, whether expressed or implied, and the data is for informational purposes.

Periodic Groundwater Level Measurement Locations **MONITOR WELLS**

Locations of groundwater level monitoring wells in the Department of Water Resources (DWR)'s Periodic Groundwater Levels dataset. The DWR Periodic Groundwater Levels dataset contains seasonal and long-term groundwater level measurements collected by the Department of Water Resources and cooperating agencies.

Well Completion Reports **WATER WELLS**

List of wells from the Well Completion Reports data made available by the California Department of Water Resources' (DWR) Online System for Well Completion Reports (OSWCR). Please note that the majority of well completion reports have been spatially registered to the center of the 1x1 mile Public Land Survey System section that the well is located in.

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ERIS

TOPOGRAPHIC MAPS

Project Property:	Janus Solar
	Colusa County
	Williams CA None
Project No:	194-1129-0040
Requested By:	Tetra Tech, Inc.
Order No:	24070100592
Date Completed:	July 02, 2024

Environmental Risk Information Services
A division of Glacier Media Inc.
1.866.517.5204 | info@erisinfo.com | erisinfo.com

We have searched USGS collections of current topographic maps and historical topographic maps for the project property. Below is a list of maps found for the project property and adjacent area. Maps are from 7.5 and 15 minute topographic map series, if available.

Year	Map Series
2021	7.5
2018	7.5
2015	7.5
1994	7.5
1989	7.5
1961	15
1944	15
1920	15

Topographic Map Symbology for the maps may be available in the following documents:

Pre-1947

Page 223 of 1918 Topographic Instructions

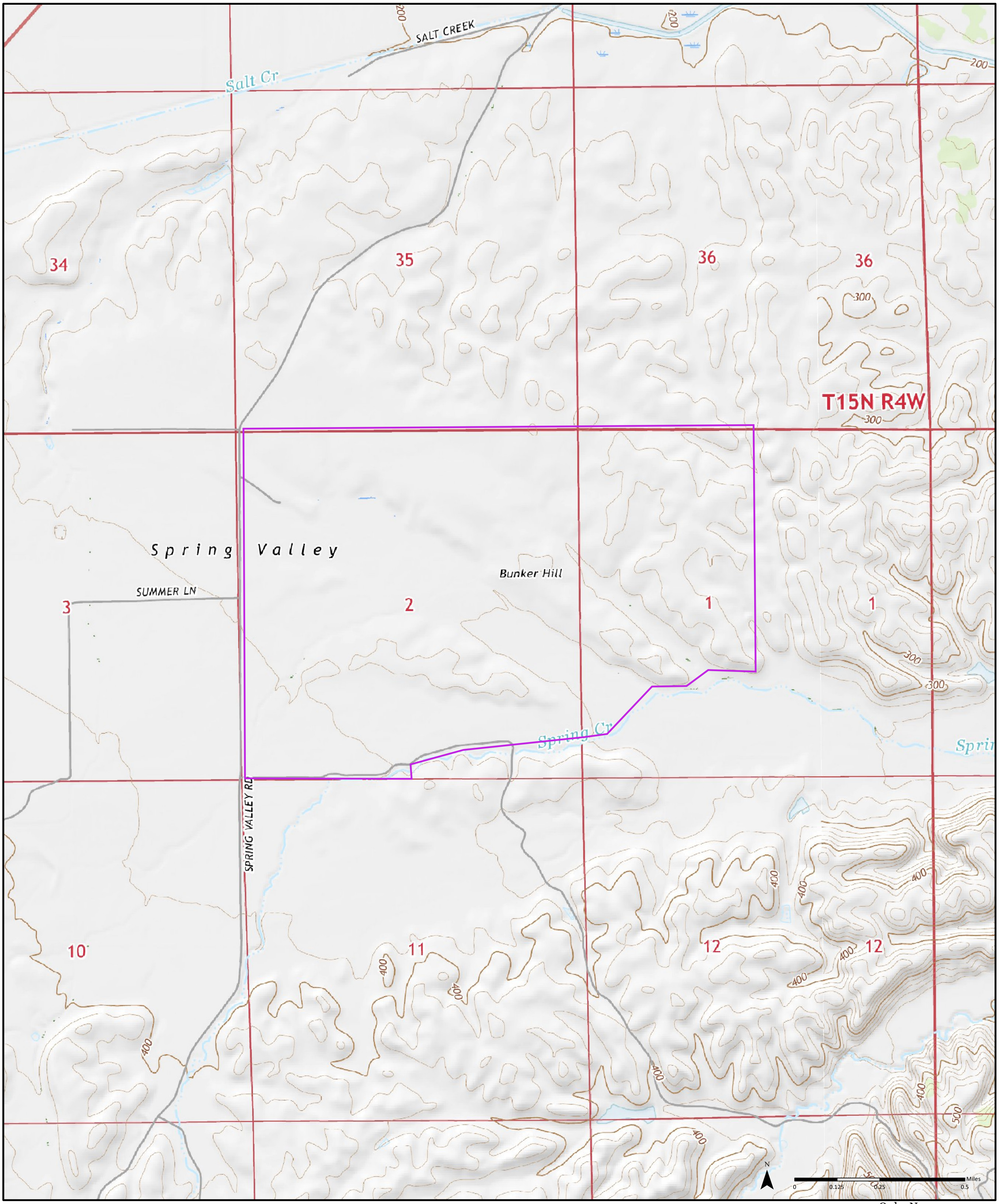
Page 130 of 1928 Topographic Instructions

1947-2009

Topographic Map Symbols

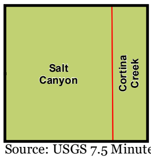
2009-present

US Topo Map Symbols



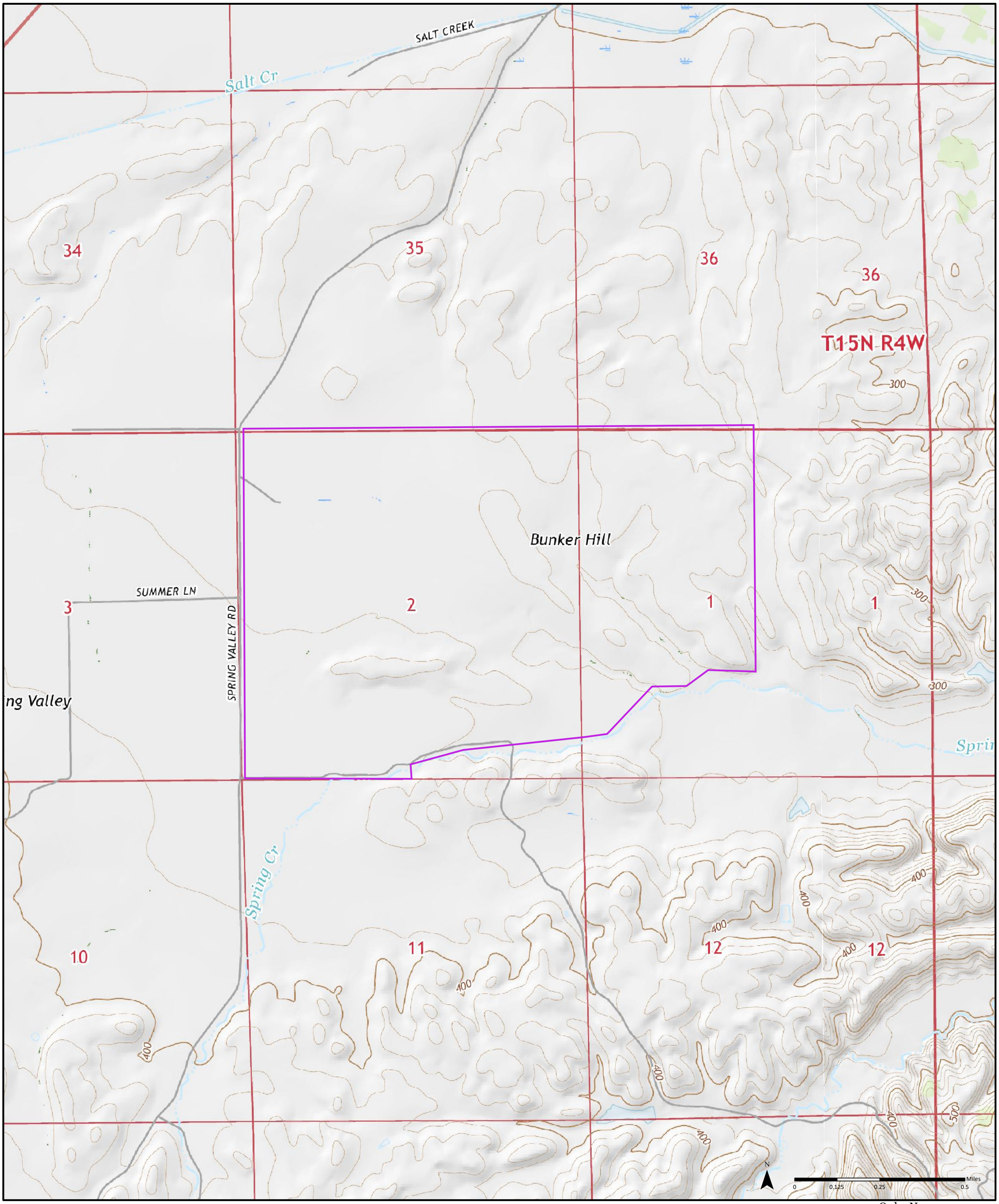
Order No. 24070100592

2021



Available Quadrangle(s): Salt Canyon, CA
Cortina Creek, CA

Source: USGS 7.5 Minute Topographic Map



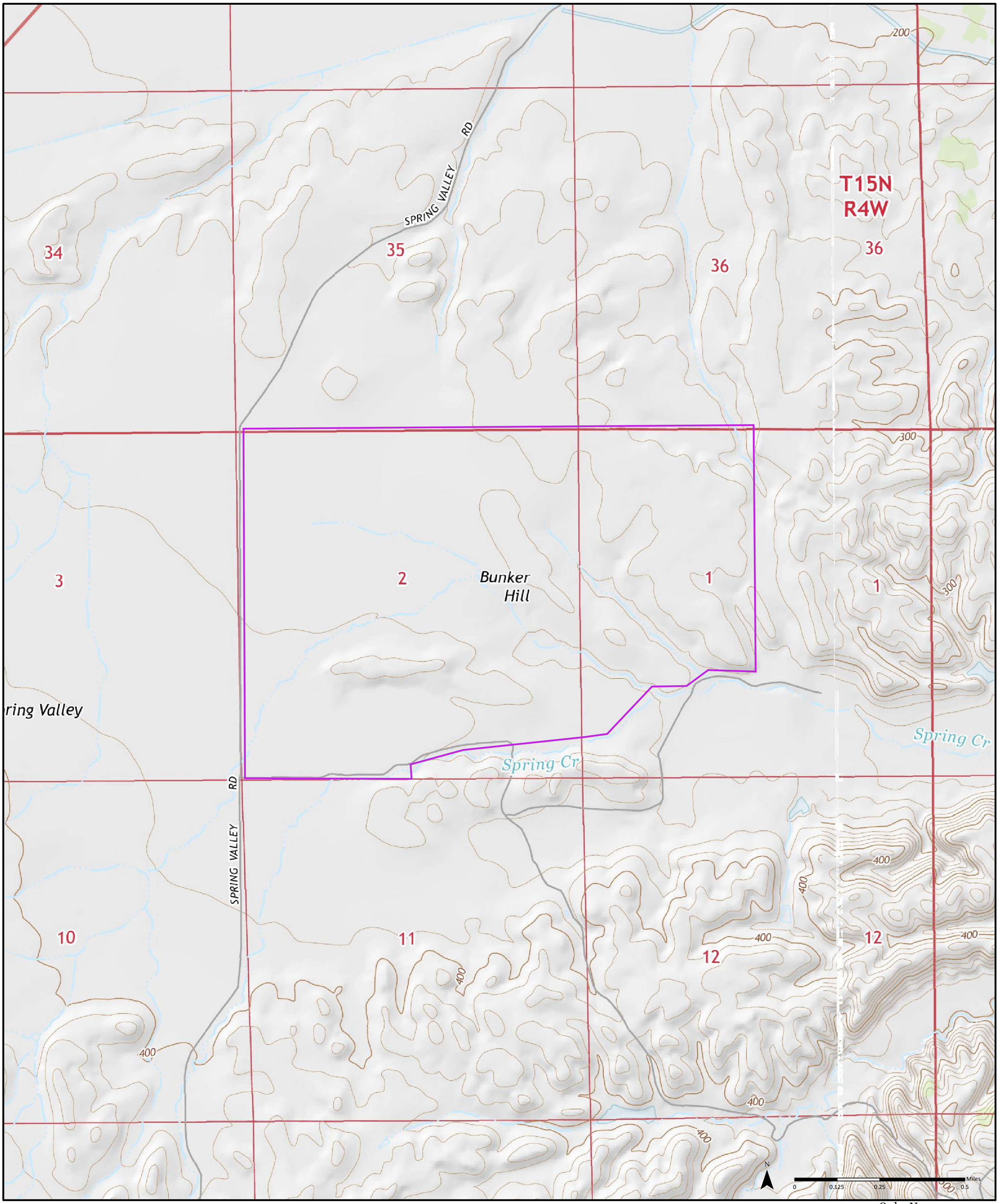
2018

Order No. 24070100592

Salt Canyon
Cortina Creek

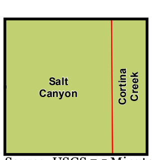
Available Quadrangle(s): Salt Canyon, CA
Cortina Creek, CA

Source: USGS 7.5 Minute Topographic Map



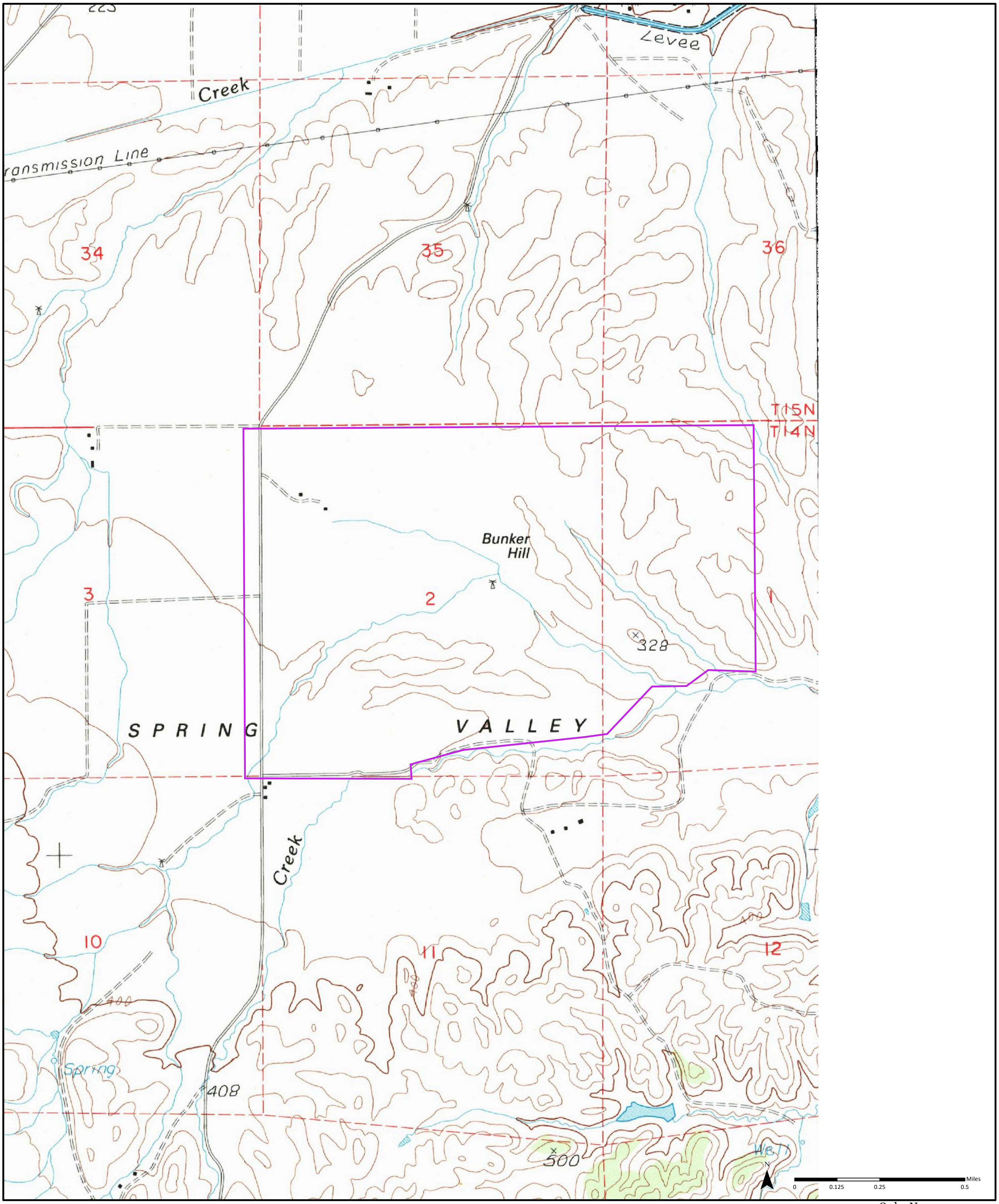
2015

Order No. 24070100592



Available Quadrangle(s): Salt Canyon, CA
Cortina Creek, CA

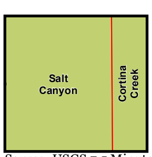
Source: USGS 7.5 Minute Topographic Map



Order No. 24070100592

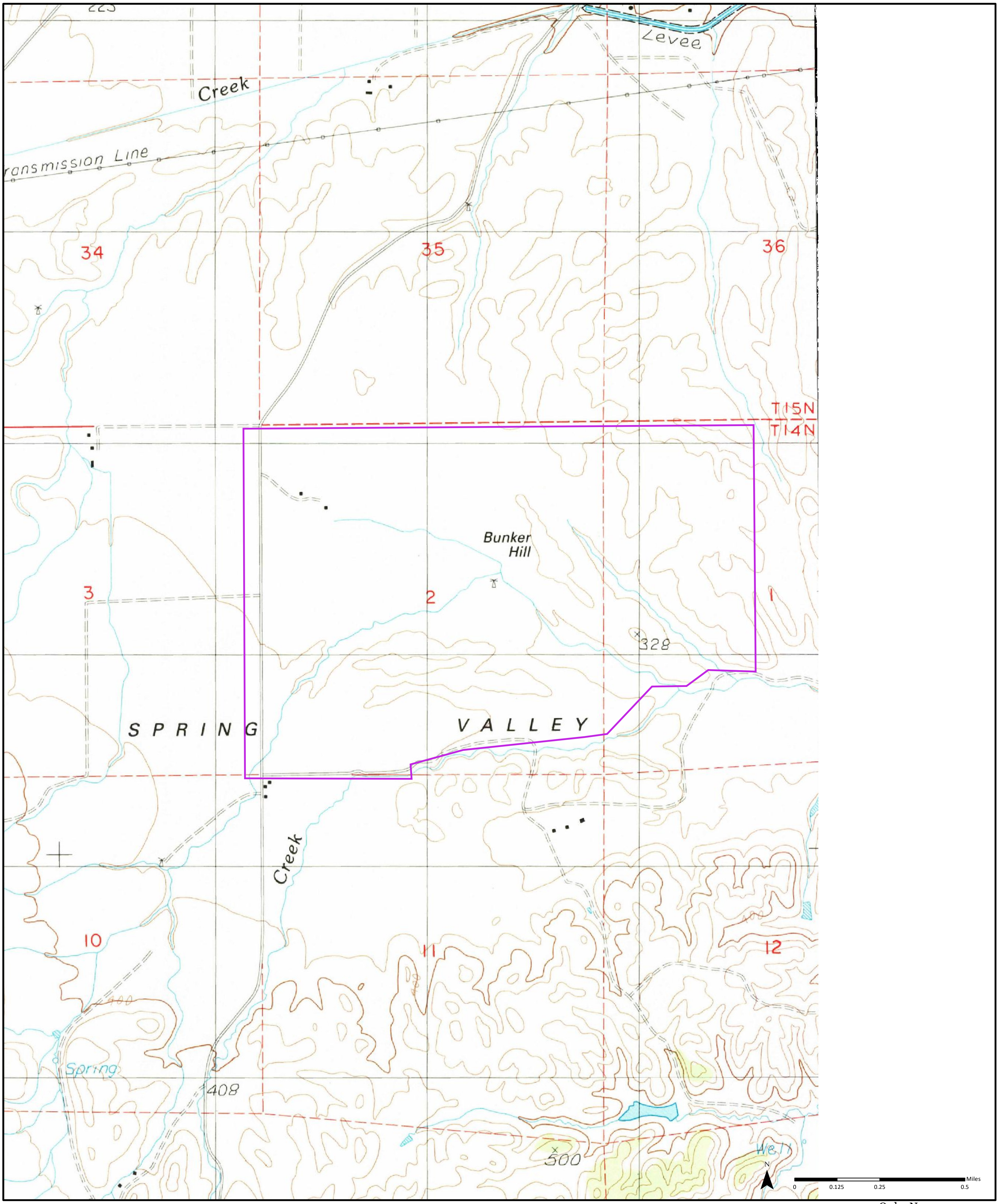
1994

(1-1994)
Aerial Photo Year: 1985
Photo Revision Year: 1994



Available Quadrangle(s): Salt Canyon, CA(1-1994)

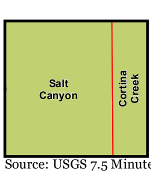
Source: USGS 7.5 Minute Topographic Map



1989

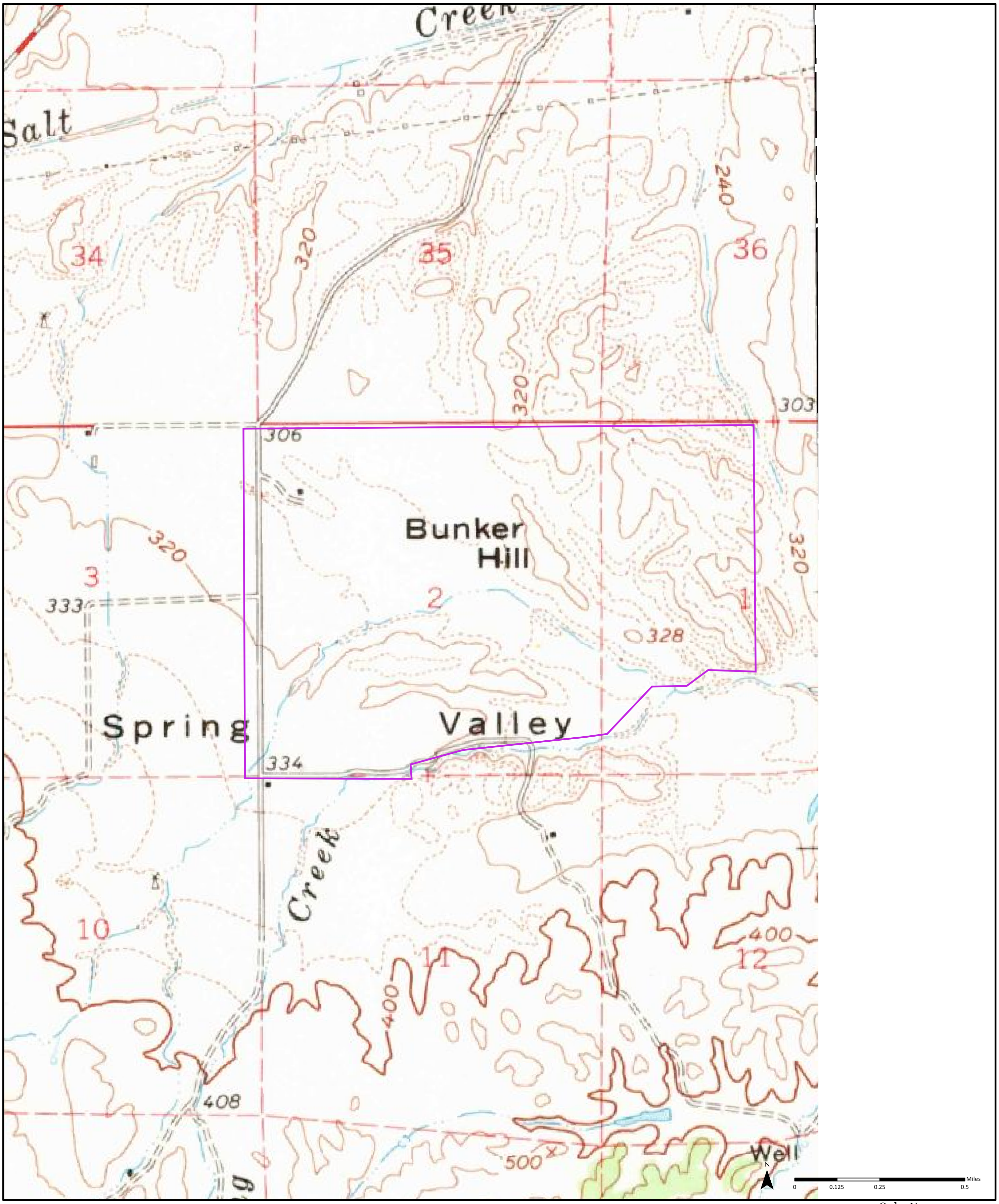
(1-1989)
Aerial Photo Year: 1985

Order No. 24070100592



Available Quadrangle(s): Salt Canyon, CA(1-1989)

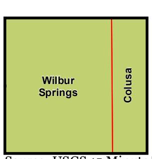
Source: USGS 7.5 Minute Topographic Map



1961

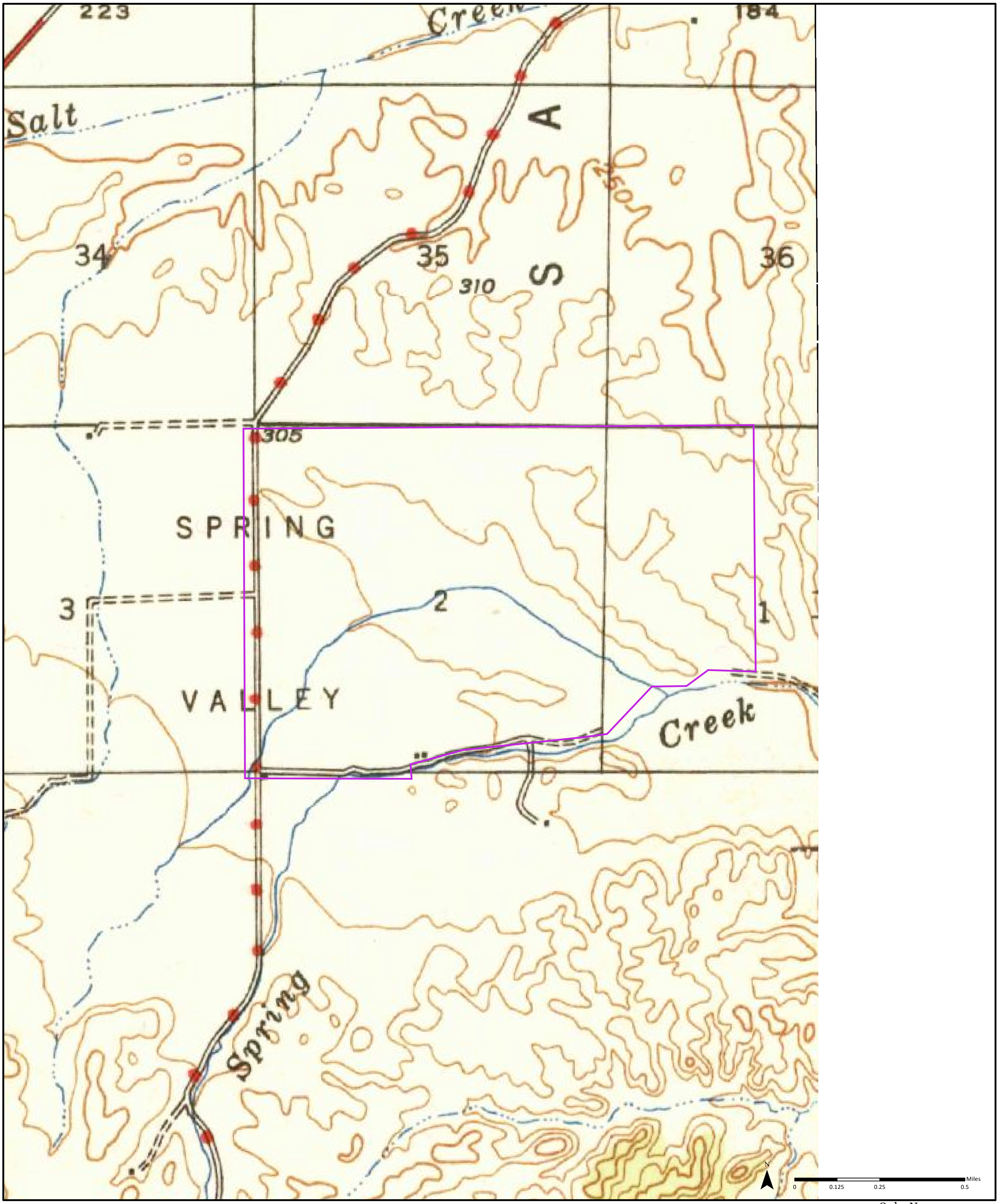
(1-1961)
Aerial Photo Year: 1957

Order No. 24070100592



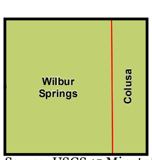
Available Quadrangle(s): Wilbur Springs, CA(1-1961)

Source: USGS 15 Minute Topographic Map



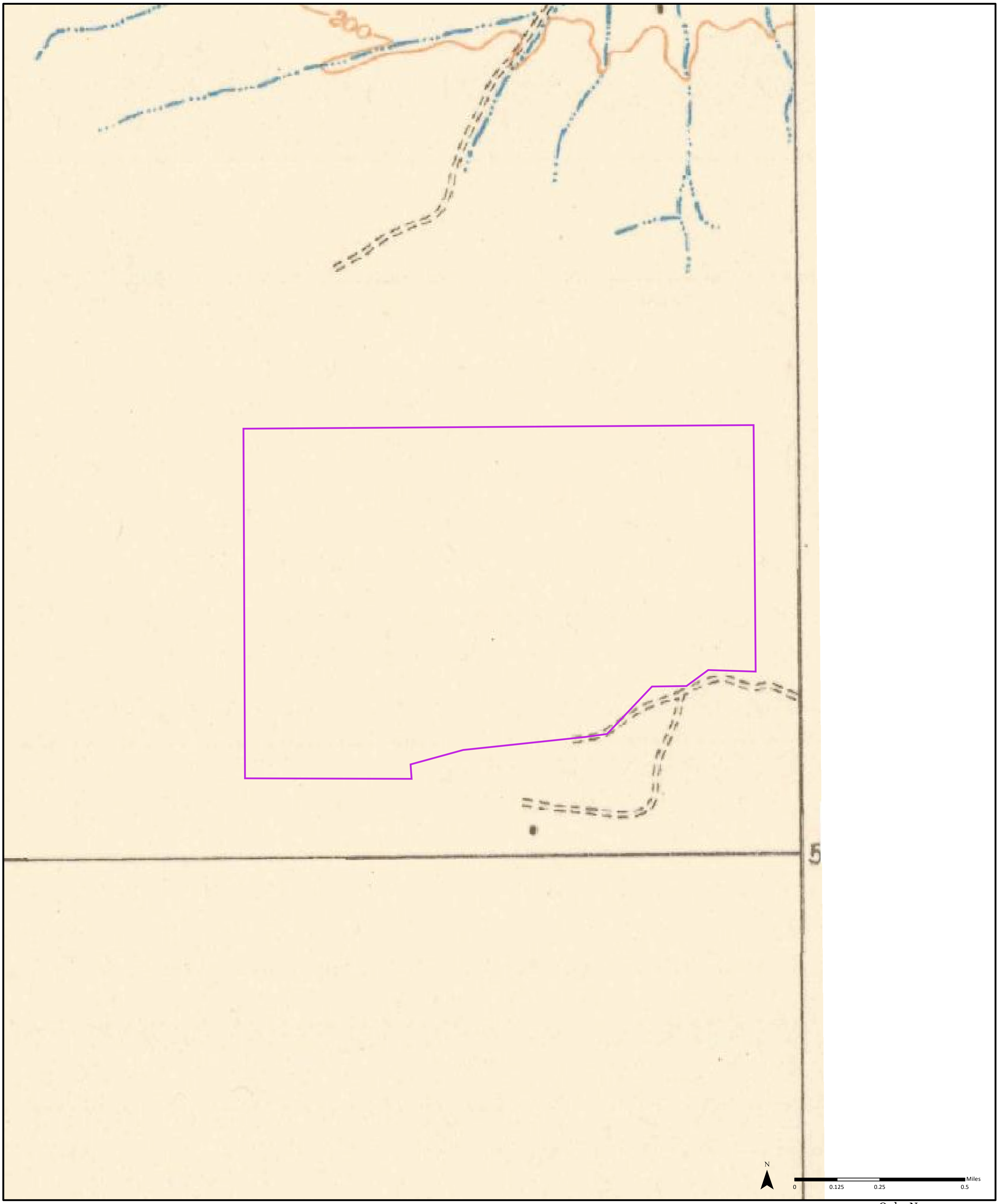
Order No. 24070100592

1944



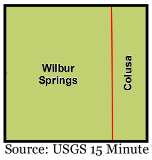
Available Quadrangle(s): Wilbur Springs, CA

Source: USGS 15 Minute Topographic Map



Order No. 24070100592

1920



Available Quadrangle(s): Venado, CA

Source: USGS 15 Minute Topographic Map

APPENDIX F: PRIOR ENVIRONMENTAL REPORTS

DRAFT Phase I Environmental Site Assessment: RWE Solar Development, LLC: Janus Solar
1830 and 1961 Spring Valley Road Williams California 95987

Tt Project No. 194-7055

TETRA TECH

PRESENTED TO

RWE Solar Development, LLC
20 California Street, Suite 500
San Francisco, CA 94111
Attn: Ms. Camila Goetze

PRESENTED BY

Tetra Tech, Inc.
17885 Von Karman Avenue
Irvine, CA 92614-6213
949-809-5043

February 4, 2020

www.tetratech.com

EXECUTIVE SUMMARY

Tetra Tech, Inc. (Tetra Tech) conducted a Phase I Environmental Site Assessment (ESA) on behalf of RWE Solar Development, LLC and any entity in which it has an ownership interest, either directly or indirectly, for the real property listed as Favero Ranch (hereinafter referred to as the “Site”) located at 1830 Spring Valley Road and 1961 Spring Valley Road (Figure 1). The Site is further identified by the Colusa County Assessor’s Office as the Assessor’s Parcel Numbers: 018-050-005-000, 018-050-006-000 and 018-050-013-000.

INTRODUCTION

This Phase I ESA was performed in accordance with American Society for Testing and Materials (ASTM) Standard E1527-13 and Final Rule 40 Code of Federal Regulations (CFR) Part 312 et seq. and the U.S. Environmental Protection Agency’s All Appropriate Inquiries Final Rule, 40 CFR Part 312. Any exceptions to, or deletions from, this practice are described in Section 1.4 of this report. The objective of this Phase I ESA is to identify Recognized Environmental Conditions (RECs) in connection with the Site. ASTM defines a REC as: “the presence or likely presence of any hazardous substances or petroleum products on a property; (1) due to any release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of a future release to the environment.”

SITE DESCRIPTION

The Site is located at 1830 and 1961 Spring Valley Road in Williams, California, approximately 8 miles southwest of the city of Williams. The Site is currently operated as a cattle ranch and is comprised of three parcels totaling approximately 967 acres and is surrounded by rural residential, agricultural fields, and undeveloped land. The Site boundaries as pertaining to this report exclude approximately 56 acres of land west of Spring Valley Road (Figure 2). The Favero Corral Area contains all buildings associated with the above listed addresses and will be considered part of this report however, no construction or activities are expected to take place within this space. No other buildings are listed or found on the Site besides what is found in the Favero Corral Area and the Favero retained areas to the west (Figure 3).

SITE HISTORY

Based on a review of historical documentation, the Site appears as partially developed land as far back as 1937 with at least a couple of man-made structures located in a planted tree patch along the southern border and evidence of tilling and agricultural activities throughout the Site. Documentation of surrounding areas show some land improvements of a road and some buildings to the north and east as far back as 1907. Land improvements to the Site appear to be minimal with mostly dirt roads and cattle fencing. In 1989, the historical topographic map shows a windmill located on the Site. Most of the land improvements appear to be to the surrounding areas and adjacent properties which include residential agricultural structures and the creation of dirt roads. According to the City Directories provided in the November 2019 Environmental Data Resources Inc. reports, the Site was owned by the Charles Marsh Ranch in 1996, by Gaylene Parker from 2001 through 2009, and then by Thomas A. Corriea in 2014. However, according to the questionnaire provided by Rex. Favero on behalf of the current owner, Favero Ranch, the Favero family has owned the Site since 1984 with the previous owner being “Kron.” No Sanborn maps exist to confirm previous ownership for the Site or the surrounding areas. Based on aerial imagery and the questionnaire provided by the current owner, the Site was used for agriculture, mainly the grazing of cattle, throughout its history. Further details regarding the history of the Site, previous site occupants, and surrounding vicinity are provided in Section 3.5.1.

FINDINGS

Tetra Tech conducted a site reconnaissance on November 20, 2019. No significant environmental concerns were noted during the site reconnaissance.

CONCLUSIONS

Tetra Tech performed a Phase I ESA in conformance with the scope and limitations of ASTM E1527-13 (and Final Rule 40 CFR Part 312 *et seq.*) with respect to the Site. Any exceptions to, or deletions from, this practice are described in Section 1.2 of this report. This assessment has revealed one REC in connection with the Site. Tetra Tech's conclusions are set forth, as follows:

This Phase I ESA investigation has revealed no RECs in connection with the Site as defined by ASTM E1527-13

This Phase I ESA investigation has revealed no *Historical RECs* in connection with the Site as defined by ASTM E1527-13.

This Phase I ESA investigation has revealed no *Controlled RECs* with respect to the Site as defined by ASTM E1527-13.

Tetra Tech identified some *de minimis* staining near waste oil storage next to the maintenance building. Due to the size and nature of the staining, this is not considered a REC.

Tetra Tech identified no potential business environmental risks associated with the Site within the Phase I ESA scope.

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1.0 INTRODUCTION

Tetra Tech, Inc. (Tetra Tech) conducted a Phase I Environmental Site Assessment (ESA) on behalf of RWE Solar Development, LLC (RWE) for the asset listed as the Favero Ranch property located at 1830 Spring Valley Road and 1961 Spring Valley Road in Williams, California (hereinafter referred to as the "Site"; Figures 1 and 2). This Phase I ESA was completed in accordance with the requirements of American Society for Testing and Materials (ASTM) E1527-13 and All Appropriate Inquiries Final Rule 40 Code of Federal Regulations (CFR) Part 312.

Tetra Tech conducted interviews with owners, operators, and/or occupants of the facility on the Site, reviewed federal, tribal, state and local government records, and performed a visual inspection of the Site.

This report was prepared based on review of the data as described herein, in accordance with generally accepted professional practices, applicable to work of similar nature and complexity of similar localities, at the time the services were performed. No warranty, express or implied, is made. The scope of this report is intended to provide a preliminary evaluation of the current readily observable/obvious environmental conditions at the Site at the time of the site reconnaissance and report preparation and does not constitute a definitive or in-depth review of all of the potential environmental impairments and situations. Tetra Tech assumes no responsibility for conditions of which it is unaware and/or to which there was no opportunity or request for review.

It is important to recognize that even the most comprehensive scope of services may not detect all the environmental liabilities at a particular site. Therefore, nothing herein shall be construed as a representation or certification that the Site is either fully characterized or is free of environmental impairments and/or contamination.

In order to conduct the investigation for this report, Tetra Tech reviewed readily available information, as discussed in this report, and unless explicitly included in our scope included no verification of the accuracy or completeness of documentation or data or possible withholding of information by the interviewees, agencies, or other parties.

1.1 PURPOSE

Pursuant to the scope of work and the applicable ASTM standard, the purpose of this ESA is to identify recognized environmental conditions (RECs) in connection with the Site. As defined in Section 1.1.1 of ASTM Standard E1527-13, "recognized environmental conditions" means "the presence or likely presence of any hazardous substances or petroleum products on a property; (1) due to any release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of a future release to the environment." A "hazardous substance or petroleum product" is not intended to include *de minimis* conditions that generally do not present a threat to human health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies."

1.2 LIMITING CONDITIONS AND METHODOLOGY USED

The scope of work includes interviews with the property owners, occupants and/or operators, regulatory database review, visual noninvasive reconnaissance of the Site, compilation and evaluation of data, and preparation of this report.

Tetra Tech's assessment is limited strictly to identifying RECs, controlled recognized environmental conditions (CRECs), and historical recognized environmental conditions (HRECs) associated with the Site. Tetra Tech's assessment did not include evaluation of structural conditions of any buildings on the Site, nor were sampling of soils, groundwater, or surface water within the scope of work. In addition, this assessment did not attempt to identify the presence of environmental contamination that exists in areas that were not able to be visually inspected. This includes surface soils located under pavement, interiors of structures, landfills, vehicles, or other media interference; subsurface soils; groundwater; or areas of the Site or buildings on the Site which were otherwise inaccessible due to locked or blocked accesses; geographic or vegetation impediments; weather interferences; or size of the Site.

The site reconnaissance was conducted by ground inspection and vehicle inspection completed as warranted based on visual observations and data developed during a pre-site reconnaissance desktop review of aerial photography, historic topographic maps, and regulatory agency database search. A complete description of the site reconnaissance is provided in Section 4.0. The inspection covered the Site with particular focus on areas of suspected chemical and petroleum usage and/or storage, discharges, soil disturbance, review of groundwater investigation data, and/or unusual vegetation. Tetra Tech did not inspect subsurface features such as underground utilities or utility corridors. Additionally, Tetra Tech did not inspect the interior of related structures.

Tetra Tech did not sample the Site for the potential for liabilities associated with the following:

- Asbestos-containing building materials
- Biological Agents
- Radon
- Lead-based paint
- Lead in drinking water
- Wetlands
- Regulatory compliance
- Cultural and historic resources
- Industrial hygiene
- Health and safety
- Ecological resources
- Endangered species
- Indoor air quality
- Mold

This list is not all-inclusive, and no implication is intended as to the relative importance of inquiry. These can present environmental liabilities to a property owner but are not included in the ASTM Standard E1527-13 scope of work for Phase I ESAs.

1.3 SIGNIFICANT ASSUMPTIONS

In reviewing the information from the client, Tetra Tech evaluated the thoroughness and reliability of the information provided. Tetra Tech cannot, however, warrant or guarantee either the accuracy or the comprehensiveness of such information.

1.4 LIMITATIONS AND EXCEPTIONS

Results of this assessment are based upon the visual site inspection of readily accessible areas of the Site conducted by Tetra Tech personnel, information from interviews with knowledgeable persons regarding the Site, information reviewed regarding historical uses, information provided by contacted regulatory agencies, and review of publicly available and practically reviewable information identifying current and historical uses of the Site and surrounding properties. A title search was not conducted for the Phase I ESA. No environmental samples were collected from the Site.

1.5 SPECIAL TERMS AND CONDITIONS

In accordance with the agreed upon scope of work between RWE and Tetra Tech, there are no special terms and conditions. In the event of any conflict between the terms and conditions of this report and the terms and conditions of the consulting services agreement between RWE and Tetra Tech, the consulting services agreement shall control.

1.6 USER RELIANCE

This report was prepared for the sole use of RWE and its beneficiaries and any entity in which it has an ownership interest, whether directly or indirectly. This report was prepared in accordance with generally accepted professional practices, applicable to work of similar nature and complexity of similar localities, at the time the services were performed. No warranty, express or implied, is made. Tetra Tech's services, and the resulting scope and conclusions of this report are in accordance with the criteria of ASTM practice E1527-13 governing Phase I ESAs and All Appropriate Inquiries Final Rule 40 CFR Part 312.

2.0 PROJECT DESCRIPTION

2.1 LOCATION OF THE SITE

The Site is located in Williams, California in a rural/agricultural area at 1830 and 1961 Spring Valley Road (Figures 1 and 2). The Site is located in Colusa County, east of the Cortina Ridge and is approximately 8 miles southwest of the City of Williams.

2.2 CHARACTERISTICS OF THE SITE AND VICINITY

The Site is comprised of three parcels totaling approximately 967 acres and is surrounded by rural residential, agricultural fields, and undeveloped land. The Site boundaries as pertaining to this report exclude approximately 56 acres of land west of Spring Valley Road (Figure 2). The Favero Corral Area contains all buildings associated with the above listed addresses and will be considered part of this report, however, no construction or activities are expected to take place within this space. The Favero Corral Area is improved with six buildings and one large open-air garage as well as corral areas used for cattle. The six buildings include a warehouse, a maintenance shop, a small shed and three residential-like buildings. No other buildings are listed or found on the Site besides what is found in the Favero Corral Area and the Favero retained areas to the west (Figure 3). The Site is configured with one rectangular-like parcel to the west of Spring Valley Road and two larger rectangular-like parcels to the east of Spring Valley Road. The Site parcels according to the Colusa County, California assessor database (Appendix A) include:

- 018-050-005-000, approximately 620 acres, is associated with the 1830 Spring Valley Road address and contains the Favero cattle ranch corral property as well as most of the grazing areas. Two aboveground storage tanks (ASTs) containing water can be found on this parcel along with a derelict windmill. The corral portion of the property is not part of this Phase I ESA.
- 018-050-006-000, approximately 250 acres, to the east of the 018-050-005-000 parcel. No improvements are found on this parcel.
- 018-050-013-000, approximately 148.08 acres, is associated with the 1961 Spring Valley Road address. A residential house is found on this parcel however it is not part of this Phase I ESA. Approximately 56 acres of land is taken out of this to be retained by Favero.

Section 8.2.4 of the ASTM Standard E1527-13 states “a current United States Geological Survey (USGS) 7.5 Minute Topographic Map (or equivalent) showing the area on which the property is located shall be reviewed. It is the only standard physical setting source and the only physical setting source that is required to be obtained.” A topographic map of the Site was reviewed (Figure 1). Discretionary physical setting sources shall be sought when (1) conditions have been identified in which hazardous substances or petroleum products are likely to migrate to the property or from or within the property into the groundwater or soil and (2) more information than is provided in the current USGS 7.5 Minute Topographic Map (or equivalent) is generally obtained, pursuant to local good commercial and customary practice in initial environmental site assessments in the type of commercial real estate transaction involved, in order to assess the impact of such migration on RECs in connection with the Site.

The Site is located within the Sacramento Valley and is approximately 324 feet above sea level. The Site and surrounding area are underlain by soils of the Capay Formation (Environmental Data Resources Inc. [EDR] Radius Map). The Capay Formation is described as a clay loam with very slow infiltration rates and are moderately well drained. There is also some Corning Formation which is also described as a silt loam with very slow infiltration rates and are well drained. The rock stratigraphic is from the Upper Cretaceous of the Mesozoic era.

Federal Emergency Management Agency

According to Federal Emergency Management Agency information Flood Insurance Rate Map (Appendix B) the Site is mostly located in Zone X. According to Federal Emergency Management Agency website information, Zone X includes areas outside of the 0.2 percent annual chance flood (500-year flood). There are a few portions that are in Zone A which are areas that are subject to inundation by the 1 percent annual chance of a flood event in any given year. These Zone A areas appear to overlay areas that contain the ephemeral creek beds of Spring Creek which enter into part of the Site.

2.3 USER PROVIDED INFORMATION

Phase I ESA questionnaires were provided to the current landowner, Favero Ranch, for completion. The questionnaire was completed by Rex Favero, one of the owners at Favero Ranch. Information from the questionnaire, as well as other documentation provided to Tetra Tech by Favero Ranch or RWE Solar Development, LLC, is referenced below and included in applicable sections of this Phase I ESA report. A copy of the completed questionnaire is provided in Appendix C.

2.3.1 Title Records

A title search was not conducted by Tetra Tech as part of this Phase I ESA and is not required as part of ASTM-1527-13 requirements. The lack of this information does not represent a significant data gap.

2.3.2 Environmental Liens

No information regarding environmental liens or activity and use limitations was provided to Tetra Tech by Favero or RWE and none were indicated based on the files received for this Phase I.

2.3.3 Site Improvements

The Site, as described in Section 2.2, Characteristics of the Site and Vicinity, contain six buildings and one large open-air garage as well as corral fencing used for cattle. The six buildings include a warehouse, a maintenance shop, a small shed and three residential-like buildings. The Site does not have any other improvements besides dirt roads, fencing, concrete culverts, water tanks, and a windmill. The use of the remainder of the Site is comprised of grazing areas and retainment ponds for cattle ranching (Figure 2).

3.0 RECORDS REVIEW

This section includes the results of the database search, review of physical setting services, and historical uses of the Site and adjoining properties.

3.1 STANDARD ENVIRONMENTAL RECORD SOURCES

A search of readily available federal, state, regional, and local agency database listings was conducted by EDR. The EDR Radius Map and GeoCheck report (and related source documentation) is presented in Appendix D. EDR searched numerous government databases as described in detail in its report, including, but not limited to the following databases specified in Section 8.2.1 of ASTM E1527-13.

Table 3-1. Records Review

Data Source*	Search Distance, Miles	# of Records on Site	# Of Records Within Search Area
National Priorities List (NPL) Sites	1.0	0	0
Proposed NPL	1.0	0	0
NPL Liens	TP	0	NR
Delisted NPL	1.0	0	0
Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS)	0.5	0	0
Federal Facility	0.5	0	0
CERC-NFRAP	0.5	0	0
CORRACTS (Corrective Action Reports)	1.0	0	0
Resource Conservation and Recovery Act (RCRA) Treatment, Storage, and Disposal Facilities (TSDF)	0.5	0	0
RCRA Large Quantity Generator (LQG)	0.25	0	0
RCRA Small Quantity Generator (SQG)	0.25	0	0
RCRA Very Small Quantity Generator (VSQ)	0.25	0	0
LUCIS	0.5	0	0
US Engineering Controls	0.5	0	0
US and State Institutional Controls	0.5	0	0
US Brownfields	0.5	0	0
Emergency Response Notification System (ERNS)	TP	0	NR
State and Tribal Equivalent NPL (Response)	1.0	0	0
State and Tribal Landfills	0.5	0	0
State and Tribal CERCLIS (Envirostor)	0.5	0	0
State Leaking Underground Storage Tank (LUST)	0.5	0	0
Tribal LUST	0.5	0	0
FEMA UST	0.25	0	0
State and Tribal Registered UST	0.25	0	**1**
State and Tribal Registered AST	0.25	0	0
Indian UST	0.25	0	0

Data Source*	Search Distance, Miles	# of Records on Site	# Of Records Within Search Area
State and Tribal Voluntary Cleanup Sites (VCP)	0.5	0	0
Institutional Controls	0.5	0	0
State and Tribal Brownfield	0.5	0	0
Drycleaners	0.25	0	0
US Clandestine Drug Lab (CDL)/Historical US CDL	TP	0	NR
Local Lists of Landfill/Solid Waste Disposal Sites	0.5	0	0
Liens / Liens 2	TP	0	0
Deed	0.5	0	0
SPILLS	TP	0	NR
Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)/Toxic Substances Control Act (TSCA) Tracking System (FFTS)/Historical FFTS	TP	0	NR
RCRA NonGen/NLR	0.25	0	0
Integrated Compliance Information System (ICIS)	TP	0	NR
Facility Index System/Facility Registry System (FINDS)	TP	0	NR
US MINES	0.25	0	0
Enforcement and Compliance History Information (ECHO)	TP	0	NR
Risk Management Plans (RMP)	TP	0	NR
US Aerometric Information Retrieval System (AIRS)	TP	0	NR
CERS	0.25	0	**1**
CIWQS	1.0	0	**1**
U.S. Environmental Protection Agency (EPA) Watch List	TP	0	NR
EDR Manufactured Gas Plant (MGP)	1.0	0	0
EDR US Historical Auto Stations	0.25	0	0
EDR US Historical Cleaners	0.25	0	0

TP- target property, NR- not required

* Not all databases are listed in Table 3-1. A complete listing of databases searched are included in Appendix D.

3.1.1 National Priorities List (Superfund)

The National Priorities List (NPL) identifies federal Superfund sites with the highest priority for cleanup. ASTM Standard E 527-13 requires the identification of NPL sites within 1 mile of the Site. There are no NPL sites identified within 1 mile of the boundaries of the Site.

3.1.2 Comprehensive Environmental Response, Compensation, and Liability Information System

The Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) list identifies sites that the U.S. Environmental Protection Agency (EPA) has investigated or is in the process of investigating for potential hazardous substance contamination. A CERCLIS site may or may not become an NPL site. The ASTM Standard E1527-13 requires the identification of CERCLIS sites within 0.5 mile of the Site. The standard also requires the identification of CERCLIS No Further Remedial Action Planned sites on a Property or adjoining properties. There are no federal CERCLIS No Further Remedial Action Planned sites identified within

0.5 mile of the boundaries of the Site and no State and tribal equivalent CERCLIS, Confirmed and Suspected Contaminated Sites List (CSCSL), identified within 1 mile of the boundaries of the Site.

3.1.3 Resource Conservation and Recovery Act Corrective Action Reports

The Resource Conservation and Recovery Act (RCRA) Corrective Action Reports (CORRACTS) is used to track the status and filing of any corrective actions that have taken place at a facility. ASTM Standard E1527-13 requires the identification of RCRA CORRACTS facilities within 1 mile of the Site. There are no RCRA CORRACTS sites identified within 1 mile of the boundaries of the Site.

3.1.4 Resource Conservation and Recovery Act Non-Corrective Action Reports Treatment, Storage, and Disposal Facilities

The RCRA non-CORRACTS treatment, storage, and disposal facilities (TSDF) lists those facilities where treatment, storage, and/or disposal of hazardous wastes takes place and where corrective remedial action has not been required by EPA, as defined and regulated by RCRA. ASTM Standard E1527-13 requires the identification of RCRA non-CORRACTS TSDF within 0.5 mile of the Site. There are no RCRA non-CORRACTS TSDF within 0.5 mile of the boundaries of the Site.

3.1.5 Resource Conservation and Recovery Act Generator List

The EDR Report lists no RCRA generator property within 0.25 mile of the Site (ASTM E1527-13 criteria is to identify RCRA generator sites that are on, adjacent to, or adjoining, the Site).

3.1.6 Federal Emergency Response Notification System List

The federal Emergency Response Notification System (ERNS) list records and stores information on reported releases of oil and hazardous substances. ASTM Standard E1527-13 requires the identification of ERNS on the Site. The Site and adjacent properties were not listed on the ERNS list.

3.1.7 State Hazardous Waste List (State-Equivalent NPL and CERCLIS)

ASTM Standard E1527-13 requires that state-equivalent NPL (Hazardous Sites List), Response, and CERCLIS (CSCSL) properties be identified within 1 mile of the Site. There are no sites identified on CSCSL within 1 mile of the Site.

3.1.8 State Landfills and/or Solid Waste Disposal Sites

Landfills and/or solid waste disposal sites are facilities that used to accept or currently accept waste of any kind for disposal onsite. ASTM Standard E1527-13 requires the identification of these sites within 0.5 mile of the subject properties. There are no state landfills and/or solid waste disposal sites within 0.5 mile of the boundaries of the Site.

3.1.9 California State Leaking Underground Storage Tank Sites

The Leaking Underground Storage Tank (LUST) database is a listing of confirmed or suspected releases to soil or groundwater from underground storage tanks (USTs) that have been reported to the state. ASTM Standard E1527-13 requires the identification of LUST sites within 0.5 mile of the Site. No LUST sites were identified within 0.5 miles of the Site.

3.1.10 California State Registered Underground Storage Tanks

The UST database contains registered USTs. USTs are regulated under Subtitle I of the RCRA. A review of the UST list, as provided by EDR, and dated October 31, 2019 revealed one UST site within approximately 0.25 miles of the target property, however on review of the data, the address and the name of the owner is associated with a different location within Williams. The address of the associated UST is for a Love’s Travel Stop #652 located at 100 Margurite Street in Williams, California. The address given appears to contain the business listed however the location of the address and business is approximately 8.75 miles to the northeast of the Site, on the other side of the city of Williams. The coordinates for the site may be incorrectly listed in the database.

3.1.11 California State Voluntary Cleanup Sites and/or Independent Remedial Action Program

A review of the California State Voluntary Cleanup Program sites list by EDR has no listed Voluntary Cleanup Program within 0.5 mile of the boundaries of the Site.

3.1.12 Orphaned / Unmappable Properties

The EDR Report listed no properties as “orphaned” or unmappable due to incomplete or incorrect location information.

3.1.13 California Integrated Water Quality System

The California Integrated Water Quality System is a system used by the state and regional water quality boards to track information about places of environmental interest. One site was listed by the California Integrated Water Quality System within 1 mile of the Site and it is for a National Pollutant Discharge Elimination System permit (CAG990005) to the Reclamation District 1004 to discharge residual aquatic pesticides to waterways in the area for algae and aquatic weed control (Appendix E). No environmental violations were found.

3.1.14 California Environmental Protection Agency Regulated Site Portal

The California EPA Regulated Site Portal (CERS) is a database that combines data about environmentally regulated sites and facilities in California into one database. One site was listed by CERS within 1 mile of the Site which is for the National Pollutant Discharge Elimination System permit discussed above.

3.1.15 Other Historical or Regulatory Findings

EDR US Historical Auto Stations: EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR’s review was limited to those categories of sources that might, in EDR’s opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, service station, etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR’s HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns but may not show up in current government records searches. A review of the addresses and historic addressed associated with the Site and adjacent properties revealed that none of the properties are located on or adjacent to the Site. There are also no listed properties found within 0.25 miles of the Site.

EDR US Historical Cleaners: EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR’s review was limited to those categories of sources that might, in EDR’s opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, Laundromat, cleaning/laundry, wash and dry etc. This database falls within a category of information EDR classifies as HRHR. EDR’s HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns but may not show up in current government records searches. A review of the addresses and historic addressed associated with the Site and adjacent properties revealed that none of the properties are located on or adjacent to the Site. There are also no listed properties found within 0.25 miles of the Site.

Based on Tetra Tech’s review, the remaining surrounding properties listed in the EDR Report are not likely to present a significant environmental concern to the Site, based on the nature of their hazardous waste operations, releases and/or their distance/gradient location relative to the Site.

3.2 VAPOR ENCROACHMENT SCREEN

Tetra Tech completed an initial vapor encroachment screen to determine if a vapor encroachment condition (VEC) exists in the subsurface below any existing structures at the subject property from hazardous substances, petroleum, and petroleum products that can include volatile organic compounds, semi volatile organic compounds, and inorganic volatile compounds. The Tier 1 non-invasive vapor encroachment screen was performed for the chemicals of concern and the approximate recommended minimum search distances included in ASTM E2600-10, *Standard Guide for Vapor Encroachment Screening on Sites Involved in Real Estate Transactions*. The following minimum search distances are outlined in ASTM E2600-10 (ASTM 2010) and Table 3-2 below.

Table 3-2. Vapor Encroachment Screen Approximate Minimum Search Distances Surrounding the Subject Property (miles)

Standard Environmental Record Sources (where available)	Chemicals of Concern	Petroleum Hydrocarbon Chemicals of Concern
Federal NPL	0.33	0.1
Federal CERCLIS	0.33	0.1
Federal RCRA CORRACTS	0.33	0.1
Federal RCRA non-CORRACTS TSDF	0.33	0.1
Federal RCRA Generators	Subject Property Only	Subject Property Only
Federal Institutional Control/Engineering Control	Subject Property Only	Subject Property Only
Federal ERNS	Subject Property Only	Subject Property Only
State and Tribal-equivalent NPL	0.33	0.1
State and Tribal-equivalent CERCLIS	0.33	0.1
State and Tribal Landfill or Solid Waste Disposal Sites	0.33	0.1
State and Tribal LUST	0.33	0.1
State and Tribal UST	Subject Property Only	Subject Property Only
State and Tribal Institutional Control/Engineering Control	Subject Property Only	Subject Property Only
State and Tribal Voluntary Cleanup	0.33	0.1
State and Tribal Brownfield	0.33	0.1

Based on the results of the Tier 1 vapor encroachment screening, no potential VEC sites were identified, therefore no Tier 2 screening was conducted to further evaluate whether these facilities pose a VEC with respect to the Site.

3.3 AGENCY RECORDS

The following agencies were contacted for information related to environmental issues associated with the Site and surrounding properties:

- City of Williams – City Clerk's Office
- Colusa County – Environmental Health Division
- California Department of Pesticide Regulation
- California Department of Toxic Substances Control
- California Office of Environmental Health Hazard Assessment
- EPA Comprehensive Environmental Response, Compensation, and Liability Act Region 9

Regulatory correspondence documents are provided as Appendix B.

City of Williams – City Clerk's Office

On November 17, 2019 Tetra Tech emailed the City of Williams - City Clerk's Office in an effort to obtain any records that include groundwater or soil sampling reports/analytical results, reports of spills of petroleum or hazardous chemicals (both closed and open), ASTs and USTs closure reports/certificates, inspection reports, wastewater permits, air permits, building permits, and reports of chemical odors or fumes. At the time of writing this report, Tetra Tech has not received any response prudent to the request.

Colusa County – Department of Environmental Health

On November 17, 2019, Tetra Tech filled out a public records release request and sent an email to the County of Colusa in an effort to obtain any records that include groundwater or soil sampling reports/analytical results, reports of spills of petroleum or hazardous chemicals (both closed and open), ASTs and USTs closure reports/certificates, inspection reports, wastewater permits, air permits, building permits, and reports of chemical odors or fumes. Colusa County responded on November 18, 2019 with well and septic applications for the Site.

California Department of Pesticide Regulation

On November 17, 2019, Tetra Tech submitted a records request through California Department of Pesticide Regulation. A response from Department of Pesticide Regulation indicated that they do not have any records pertaining to Site. A suggestion to reach out to the Colusa County Agricultural Commissioner's Office was given (Appendix F).

Colusa County Agricultural Commissioner's Office

On November 25, 2019, Tetra Tech reached out to the Colusa County Agricultural Commissioner's Office for any permits that might pertain to environmental issues. A response from the Commissioner's Office gave a National Pollutant Discharge Elimination System permit (CAG990005) to the Reclamation District 1004 to discharge residual aquatic pesticides to waterways in the area for algae and aquatic weed control.

U.S. Environmental Protection Agency, Region 9

On November 26, 2019 Tetra Tech submitted a records request to the EPA Region 9. At the time of writing this report, Tetra Tech has not received any response prudent to the request.

No other responses from the remaining contacted agencies have been received as of the date of this Phase I ESA. Any future responses will be evaluated, and if deemed appropriate, the responses will be forwarded as an addendum to this Phase I ESA under separate cover. Based on its review of other sources, however, Tetra Tech considers it unlikely that any further regulatory records would alter the conclusions or recommendations of this report.

3.4 PREVIOUS ENVIRONMENTAL REPORTS

Previous environmental investigation reports were not provided to Tetra Tech by either RWE Solar Development, LLC or by the current owners. Based on a review of available records and during the performance pf the current Phase I ESA, it does not appear that any previous environmental reports exist for the Site.

3.5 Additional Environmental Record Sources

Prior uses of the Site and surrounding properties were drawn from review of agency records and historical information obtained from EDR including aerial photographs, city directories, and topographic maps; fire insurance maps were not available. Table 3-3 below is a summary of historical information drawn from the EDR records (provided in Appendix D).

3.5.1 Prior Uses of the Site and Surrounding Properties

Table 3-3. Prior Uses and Features of Site and Surrounding Properties

Decade Starting	Site	Surrounding Properties	Sources
1890	No Sources Found	No Sources Found	N/A
1900	No sources found for the Site, however a topographic map for land immediately to the east of the Site boundaries is found.	E: The scale of the map is too large to discern specific details regarding the Site and surrounding areas; however, the land appears to be mostly undeveloped with Spring Valley spring and a road running west to east. A single rectangular building can be found to the east of the Site along the road. Walters Creek is located running west to east to the southeast.	T(1907)
1910	No sources found for the Site, however a topographic map for land immediately to the east of the Site boundaries is found.	E: The scale of the map is too large to discern specific details regarding the Site and surrounding areas; however, the surrounding areas appears to be in a similar configuration as the previous map with the exception of an additional rectangular structure to the southeast of the Site.	T(1918)
1920	No Sources Found	No Sources Found	N/A
1930	The Site appears to be mostly undeveloped plowed open land with a spring running across it going west to east through the middle. Two rectangular buildings can now be located in the northwest corner of the middle parcel. Some light vegetation can be seen along the spring. A small grouping of trees forming a rectangular formation around two structures can be found along the southern border of the Site. There appears to be a dirt road truncating the Site from west to east near the north of the Site. Spring Valley Road can be seen running through the Site going from north to south	N: The area immediately north of the Site appears to be undeveloped open land. Further to the north is Spring Valley Road. E: Based on the scale and extent of the maps no information can be discerned however it is assumed that the land immediately to the east of the Site is undeveloped open land. S: The area immediate to the south of the Site is a small creek and dirt road that boarders the property boundary. Most of the land is undeveloped open land with the exception of a couple small plots of land adjacent to the Site to the southwest that have a few rectangular structures. Further to the south is another plot of land that appears to have a few man-made rectangular structures. W: The area immediately west of the Site appears to be undeveloped open land. Further to the northwest of the Site is a plot of land containing a couple of man-made structures.	A(1937)
1940	The Site appears as undeveloped land with a creek truncating the Site from west to east. Two rectangular structures can be found along the southern border of the Site property.	N: Based on the scale and extent of the maps no information can be discerned however it is assumed that the land immediately to the north of the Site is undeveloped open land. E: The area immediately to the east of the Site appears to be undeveloped land with the creek that runs through the Site and the creek that runs along the southern border meeting to continue further east. S:The area immediately to the south of the Site is a small creek and road that runs along the border of the Site. Further to the south is a road that leads to a man-made structure. W:The area immediately to the west appears to be open undeveloped land with the exception of a road that goes westward away from the Site.	T(1944)

Decade Starting	Site	Surrounding Properties	Sources
1950	The Site appears to be in a similar configuration as the previous years with the exception of the two small rectangular structures in the southern portion of the Site are now gone.	No significant changes could be discerned in the surrounding properties to the Site.	A(1952, 1957)
1960	The Site appears to be in a similar configuration as the previous years.	No significant changes could be discerned in the surrounding properties to the Site with the exception of the road to the south continuing to the south.	T(1961)
1970	Aerial resolution of the Site is too poor to discern any changes to the Site or the surrounding properties, however a topographic map for land immediately to the east of the Site boundaries is found. It is assumed that the Site is in a similar configuration as the previous years.	N: Aerial resolution of the areas to the north are too poor to discern any changes. It is assumed that the area to the north is in a similar configuration as previous years. E: No significant changes can be noted in the area immediately to the east of the Site besides three new structures and a road going to them further to the east. S: Aerial resolution of the areas to the south are too poor to discern any changes. It is assumed that the area to the south is in a similar configuration as previous years. W: Aerial resolution of the areas to the west are too poor to discern any changes. It is assumed that the area to the west is in a similar configuration as previous years.	A(1974) T(1973)
1980	The Site appears to be in a similar configuration as the previous years.	No significant changes could be discerned in the surrounding properties to the Site with the exception of multiple other buildings being added to the property adjacent to the southwest.	A(1983, 1987) T(1989)
1990	Aerial resolution is poor however it appears that the Site is in a similar configuration as the previous years. The 1994 topographic map indicates that there is a wind operated device or windmill located on the Site. According to the city directory, Charles Marsh Ranch is located at 1830 Spring Valley Road in 1996.	Aerial resolution however, no significant changes could be discerned in the surrounding properties to the Site.	A(1993, 1998) CD(1996) T(1994)
2000	No significant changes noted. Site appears in a configuration largely matching that of the current property configuration. Can now discern individual buildings in detail. According to the city directory Gaylene Parker is located at 1830 Spring Valley Road in 2001, 2005, and 2009.	No significant changes could be discerned in the surrounding properties to the Site.	A(2005) CD(2001, 2005, 2009)
2010	No significant changes noted. According to the city directory, Thomas A. Corriea is located at 1830 Spring Valley Road in 2014.	No significant changes could be discerned in the surrounding properties to the Site.	A(2010, 2012, 2014, 2016) T(2012) CD(2014)

N= north, E = east, S = south, W= west

Sources:
A = aerial photograph (year in parentheses), CD = city directory abstract (year in parentheses), T = topographic map (year in parentheses), FIM=Fire Insurance Maps, and NA = not applicable (no sources found).

3.6 PROPERTY HISTORY SUMMARY

Based on a review of historical documentation, the Site appears as partially developed land as far back as 1937 with at least a couple of man-made structures located in a planted tree patch along the southern border and evidence of tilling and agriculture activities throughout the Site. Documentation of surrounding areas show some land improvements of a road and some buildings to the north and east as far back as 1907. Land improvements to the Site appear to be minimal with mostly dirt roads and cattle fencing. In 1989, the historical topographic map shows a windmill located on the Site. Most of the land improvements appear to be to the surrounding areas and adjacent properties which include residential agricultural structures and the creation of dirt roads. According to the City Directories provided in the November 2019 EDR Reports, the Site was owned by the Charles Marsh Ranch in 1996 then by Gaylene Parker from 2001 through 2009 then Thomas A. Corriea in 2014. However, according to the questionnaire provided by the current owner, Mr. Favero, Favero Ranch has owned the Site since 1984 with the previous owner being “Kron.” No Sanborn maps exist to confirm to confirm previous ownership for the Site or the surrounding areas. Based on aerial imagery and the questionnaire the Site was used for agriculture, mainly the grazing of cattle throughout its history.

4.0 SITE RECONNAISSANCE

The objective of the site reconnaissance is to obtain information about the Site and surrounding properties indicating the likelihood of RECs associated with the Site. This includes describing the exterior and interior of the Site buildings and the general Site setting and obtaining photographs of the Site which document the site reconnaissance. The photographs taken during this site reconnaissance are included in Appendix F.

A site reconnaissance was completed by Mr. Kian Lew of Tetra Tech on November 20, 2019. Weather at the time of the site reconnaissance was sunny and very windy with an ambient air temperature of approximately 68 degrees Fahrenheit.

4.1 METHODOLOGY AND LIMITATIONS

The site reconnaissance consisted of a visual assessment of the facility and a curbside review of adjacent properties and was conducted consistent with the methodology specified in ASTM E1527-13. The purpose of the site reconnaissance was to evaluate the Site for evidence of current or previous activities that may have resulted in adverse environmental impacts. The following subsections detail visual observations of the Site and other potential sources of contamination identified during the site reconnaissance. All portions of the Site were accessible to Tetra Tech personnel and no specific limitations to our inspection were noted. Site features identified during the site reconnaissance are illustrated in Figure 2 and Figure 3.

4.2 CURRENT PROPERTY USE

The Site consists of approximately 967 acres of land within an agricultural setting in the outskirts of the City of Williams. The Site is currently utilized as a cattle ranch with grazing land.

4.3 PAST PROPERTY USE

Details regarding the past property use of the Site are provided in Section 3.5 and 3.6.

4.4 OBSERVATIONS

4.4.1 Interior and Exterior Observations

At the time of the site reconnaissance by Tetra Tech, the Site was observed to be improved with six buildings and one large open-air garage as well as corral areas used for cattle. The six buildings include a warehouse, a maintenance shop, a small shed and three residential-like buildings. Other improvements include dirt roads, fencing, concrete culverts, water tanks, and a windmill. The concrete culverts, windmill and the water tanks were located in the middle of the Site on parcel 018-050-005-000 (see photolog). All other Site improvements include dirt roads to provide access across the Site and fencing to keep cattle in certain areas. What appears to be a man-made tree stand can be found in the southern portion of the Site. Access most of the Site can be reached by going through the Favero Corral Area in the northwestern portion of the middle parcel. The Favero Corral Area has most of the man-made improvements to the area and consists of multiple buildings and storage structures used in cattle ranching. The dirt road, Spring Valley Road truncates the Site going from north to south and splits the parcels 018-050-013-000 and 018-050-005-000. Baker Road runs along the southern border of the 018-050-013-000 parcel and an unnamed dirt road runs along the southern border of the 018-050-005-000 and 018-050-005-000 parcels.

4.4.2 Chemical Usage/Waste Storage

Tetra Tech observed a couple of areas in the Favero Corral Area of the Site that were utilized for chemical storage and/or hazardous waste storage. Storage on the Favero Corral Area include waste oil, water, liquid cattle feed, and gasoline/diesel storage tanks (Figure 3). A scrap metal and small junk yard was also observed in the field north of the main Corral Area however all staining appeared to be *de minimis*. The only other storage tanks that were observed on the Site included two ASTs containing water located in the middle of the Site.

Table 4-1 summarizes the storage tanks located at the Site, which were observed during the site reconnaissance.

Table 4-1. Storage Tank Summary

Tank #	Description	Contents	Capacity (gallons)	Location
1	Metal aboveground storage tank #1	Water	~5,000	Middle of parcel 018-050-005-000
2	Metal aboveground storage tank #2	Water	~5,000	Middle of parcel 018-050-005-000
3	Poly aboveground storage tank #1	Empty, Liquid Feed	~5,000	Corral Area
4	Poly aboveground storage tank #2	Empty, Liquid Feed	~275	Corral Area
5	Metal aboveground storage tank #3	Gasoline	~1,000	Corral Area
6	Metal aboveground storage tank #4	Gasoline	~1,000	Corral Area
7	Metal aboveground storage tank #5	Diesel	~1,000	Corral Area
8	Metal aboveground storage tank #6	Diesel	~1,000	Corral Area
9	Poly aboveground storage tank #3	Empty	~1,000	Corral Area
10	Poly aboveground storage tank #4	Water	~20,000	Corral Area
11	Poly aboveground storage tank #5	Water	~20,000	Corral Area
12	Poly aboveground storage tank #6	Water	~20,000	Corral Area
13	Metal aboveground storage tank #7	Water	~10,000	Corral Area
14	Metal aboveground storage tank #8	Empty, Gasoline	~1,000	Corral Area
15	Poly aboveground storage tank #7	Empty, Unknown	~10,000	Corral Area
16	Poly aboveground storage tank #8	Empty, Unknown	~10,000	Corral Area

4.4.3 Abandoned or Unidentified Containers

Some abandoned or unidentified containers were observed on the Site during the site reconnaissance on the outskirts of the Favero Corral Area and in a junkyard area north of the corral area. No significant staining was observed.

4.4.4 Catch Basins, Pits, Ponds, Lagoons and Drains

Several retention basins most likely used for runoff were observed on the Site during the site reconnaissance. No evidence of dumping was observed near basins.

4.4.5 Dry Wells

No evidence of dry wells was observed at the site during the site reconnaissance.

4.4.6 Soil Staining

No evidence of soil staining was observed at the site during the site reconnaissance.

4.4.7 Vegetative Stress

Due to the time of year and that most of the land is used for grazing or is plowed, most of the vegetation was dry or dead. As a result, no stressed vegetation out of the ordinary was observed during the site reconnaissance.

4.4.8 Sheens

No evidence of sheens was observed during the site reconnaissance.

4.4.9 Soil Disturbance

Some soil disturbance evidence near retention basins and tree stands were observed, most likely due to cattle activities.

4.4.10 Odors

Some noticeable odors were detected during the site reconnaissance near retention basins, however they were attributed to cattle activities.

4.4.11 Underground Storage Tanks

No evidence of the presence of existing or previous USTs was observed on the Site during the site reconnaissance.

4.4.12 Aboveground Storage Tanks

Tetra Tech observed two water ASTs associated with the operation and maintenance of the Site, which are listed in Table 4-1.

4.4.13 Oil and Gas Wells/Activities

During the site reconnaissance, no visual evidence of current or historical oil wells and/or oil and gas activities was observed at the Site or in its immediate vicinity.

4.4.14 Polychlorinated Biphenyl-Containing Materials

No polychlorinated biphenyl-containing materials were observed during the site reconnaissance.

4.4.15 Monitoring Wells and Soil Borings

No previous boring locations were observed during the site reconnaissance.

4.4.16 Spills/Releases

No evidence of spills or releases was observed during the site reconnaissance besides some *de minimis* staining near waste oil drums.

4.4.17 Surface Debris

No evidence of surface debris was found on the Site during the site reconnaissance, however some debris was observed in the Favero Corral Area with a small junkyard area in the field north of the main cattle ranch buildings containing scrap metal, spare parts, and old tires. No evidence of ground staining or additional contamination was noted.

4.4.18 Hydraulic Equipment

No hydraulic equipment was observed during the site reconnaissance.

4.4.19 Air Compressor Usage

No air compressor equipment was observed during the site reconnaissance.

4.4.20 Asbestos-Containing Materials

No buildings or structures are located on the Site. However, based on the age of construction materials at the Site (1930s), the potential for asbestos-containing materials was identified in the Favero corral property. At the time of the site reconnaissance, an asbestos-containing material survey was not conducted to evaluate the presence of such materials.

4.4.21 Lead-Based Paint and Other Lead-Containing Materials

No evidence of lead-based paint or other lead containing materials were observed on the Site during the site reconnaissance. However, based on the age of construction materials at the Site (1930s), the potential for lead-based paint and other lead-containing materials was identified in the Favero corral property. At the time of the site reconnaissance, a lead-based paint survey was not conducted to evaluate the presence of such materials.

4.4.22 Lead in Drinking Water

Drinking water supplied to the Site is expected to comply with state standards, such that lead is unlikely to be present at elevated levels. No information was provided or obtained suggesting elevated lead levels in drinking water at the Site. Drinking water is provided to the Site via wells located onsite.

4.4.23 Microbial Growth and Moisture Intrusion

Tetra Tech observed no evidence of potential mold/microbial growth and/or moisture intrusion at the Site during the site reconnaissance.

4.4.24 Waste Disposal

Tetra Tech observed no evidence of waste disposal at the Site during the site reconnaissance.

4.4.25 Wastewater Discharges

No wastewater discharges were observed on the Site during the site reconnaissance.

4.4.26 Storm Water Discharges

No stormwater drains or grates were observed on the Site during the site reconnaissance. However, there are several retention basins located throughout the Site that appear to contain and runoff that may occur from the Site.

4.4.27 Utilities

Overhead power lines were observed along the Spring Valley Road and leading to buildings located in the Favero Corral Area and adjacent to the Site. Electricity utilities are provided to the area by Pacific Gas and Electric; natural gas (propane) is provided to the area by Ferrell Gas; and the Site does not have any sewer services.

4.5 CURRENT USE OF ADJOINING PROPERTIES

The Site is surrounded by mostly open land in the adjoining properties with areas to the north and northwest retained by the Favero cattle ranching. Some residential buildings are also located to the west northwest. Spring Valley Road truncates the Site between parcels 018-050-13-000 and 018-050-005-000 and continues past the Site boundaries to the north and south. The Site is bounded to the south by Baker Road along the southwestern portion of the Site and by an unnamed dirt road and Spring Creek along the rest of the southern borders. Some small residential buildings are located to the southwest of the Site. Based on the Site and area history, the land in the adjoining properties are used for cattle ranching and agriculture.

4.6 PAST USE OF ADJOINING PROPERTIES

Past uses of the adjoining properties are discussed in Section 4.3 and in Table 3-3.

The adjoining properties to the Site were historically noted primarily for agricultural use since development of the surrounding area beginning in the 1900s.

5.0 INTERVIEWS

5.1 PAST AND/OR PRESENT OWNERS AND/OR OCCUPANTS

An owner/occupant questionnaire was completed by Mr. Rex Favero, one of the owners of Favero Ranch, on November 12, 2019. Mr. Favero indicated in the owner questionnaire that he was not aware of any environmental cleanup liens or activity/land use limitations at the Site. Mr. Favero indicated that he is not aware of any environmental issues pertaining to the Site than already noted.

The completed Owner/Occupant questionnaire is provided in Appendix C.

5.2 STATE AND LOCAL GOVERNMENT OFFICIALS

State and local government agencies were contacted for information related to the Site as discussed in Section 3.3. No other interviews with state or local government agency officials were deemed necessary, based on the information available for the Site.

6.0 FINDINGS AND CONCLUSIONS

6.1 CHARACTERISTICS OF THE SITE AND VICINITY

The Site is comprised of three parcels totaling approximately 967 acres and is surrounded by rural residential, agricultural fields, and undeveloped land. The Site boundaries as pertaining to this report exclude approximately 56 acres of land west of Spring Valley Road (Figure 2). The Favero Corral Area contains all buildings associated with the above listed addresses and will be considered part of this report, however, no construction or activities are expected to take place within this space. The Favero Corral Area is improved with six buildings and one large open-air garage as well as corral areas used for cattle. The six buildings include a warehouse, a maintenance shop, a small shed and three residential-like buildings. No other buildings are listed or found on the Site besides what is found in the Favero Corral Area and the Favero retained areas to the west (Figure 3). The Site is configured with one rectangular-like parcel to the west of Spring Valley Road and two larger rectangular-like parcels to the east of Spring Valley Road. At the time of the site reconnaissance by Tetra Tech, the Site was observed to be improved with dirt roads, fencing, concrete culverts, water tanks, and a windmill. The concrete culverts, windmill and the water tanks were located in the middle of the Site on parcel 018-050-005-000 (see Appendix F). Other Site improvements include dirt roads to provide access across the Site and fencing to keep cattle in certain areas. What appears to be a man-made tree stand can be found in the southern portion of the Site. Access to the Site can be made via Spring Valley Road and by going through the Favero Corral Area in the northwestern adjacent property. The location of the Site is depicted on Figure 1.

6.2 SUMMARY OF FINDINGS

Tetra Tech has performed a Phase I ESA in conformance with the scope and limitations of ASTM Practice E1527-13 of the Site. Any exceptions to, or deletions from, this practice are described in Section 1.4 of this report.

Based on a review of historical documentation, the Site appears as partially developed land as far back as 1937 with at least some dirt roads and possible fencing. Buildings possible associated with cattle ranching can also be seen in adjacent properties. No buildings besides those found in the Favero Corral Area are currently occupying the Site. Further details regarding the history of the Site, previous site occupants, and surrounding vicinity are provided in Section 3.5.

Tetra Tech conducted a site reconnaissance on November 20, 2019. No significant environmental concerns were noted or observed during the site reconnaissance.

6.3 RECs

Section 3.2.78 of ASTM Standard E1527-13 defines RECs as the "*presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: (1) due to release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of a future release to the environment. De minimis conditions are not recognized environmental conditions.*"

This Phase I ESA was performed in general conformance with the scope and limitations of ASTM Practice E1527-13 of the Site. Any exceptions to, or deletions from, this practice are described in Section 6.8 of this report.

This Phase I ESA has revealed no REC(s) in connection with the Site as defined by ASTM E1527-13.

6.4 HRECS

Section 3.2.42 of ASTM Standard E1527-13 defines HRECs as "*a past release of any hazardous substances or petroleum products that has occurred in connection with the property and has been addressed to the satisfaction of the applicable regulatory authority or meeting unrestricted use criteria established by a regulatory authority, without subjecting the property to any required controls (e.g., property use restrictions, activity and use limitations*

[AULs], institutional controls or engineering controls)." Before calling the past release an HREC, the Environmental Professional (EP) must determine whether the past release is a REC at the time the Phase I ESA is conducted (e.g., if there has been a change in the regulatory criteria). If the EP considers this past release to be a REC at the time the Phase I ESA is conducted, the condition shall be included in the conclusions section of the report as a REC."

This Phase I ESA has revealed no HRECs in connection with the Site as defined by ASTM E1527-13.

6.5 CRECs

Section 3.2.18 of ASTM Standard E1527-13 defines CRECs as an "*a past release of any hazardous substances or petroleum products that has occurred in connection with the property and has been addressed to the satisfaction of the applicable regulatory authority (e.g., as evidenced by the issuance of a no further action letter or equivalent, or meeting risk-based criteria established by regulatory authority), with hazardous substances allowed to remain in place subject to the implementation of required controls. A condition considered by the environmental professional to be a CREC shall be listed in the findings section of the ESA and as a REC in the conclusions section of the ESA.*"

This Phase I ESA has revealed no CRECs with respect to the Site as defined by ASTM E1527-13.

6.6 BUSINESS ENVIRONMENTAL RISKS

Section 3.2.11 of ASTM Standard E1527-13 defines business environmental risk as "*a risk which can have a material, environmental, or environmentally-driven impact on the business associated with the current or planned use of a parcel of commercial real estate, not necessarily limited to those environmental issues required to be investigated in this practice. Consideration of business environmental risk issues may involve addressing one or more non-scope considerations*."

This Phase I ESA has revealed no business environmental risks in connection with the Site as defined by ASTM E1527-13.

6.7 NON-ASTM ENVIRONMENTAL ISSUES

Tetra Tech identified some *de minimis* staining near waste oil storage next to the maintenance building. Due to the size and nature of the staining, this is not considered a REC or environmental concern.

6.8 LIMITATIONS AND EXCEPTIONS OF ASSESSMENTS

This report is prepared for the sole use of the RWE and its representatives and assignees, pursuant to the Consulting Services Agreement between RWE and Tetra Tech, and is based on review of the available data, as described herein, in accordance with generally accepted professional practices, applicable to work of similar nature and complexity at similar localities, at the time the services were performed. No warranty, expressed or implied, is made.

The scope of this report is limited in nature and intended to provide a preliminary evaluation of the current conspicuous environmental conditions at the site at the time of the report and does not constitute definitive or in-depth review of all the potential environmental impairments and situations. Tetra Tech assumes no responsibility for conditions of which it is unaware and/or as to which there was no opportunity or request for review.

It is important to recognize that even the most comprehensive scope of services may not detect all the environmental liabilities at a particular site. Therefore, nothing herein shall be construed as a representation or certification that the site is either fully characterized or is free of environmental impairments and/or contamination.

To conduct the ESA for this report, Tetra Tech evaluated the readily available information. Tetra Tech cannot, however, warrant or guarantee either the accuracy or the comprehensiveness of such information.

6.8.1 Data Failures, Data Gaps, and Other Opinions

Through the course of this assessment, Tetra Tech may have encountered data failures or data gaps. These failures or gaps, if any, are discussed below. The following provides the opinion of the EP as to the significance of the data gaps in terms of defining recognized environmental conditions at the Site. Data failures may or may not be significant data gaps, and the discussion also provides information pertaining to whether the data failures resulted in significant data gaps.

6.8.1.1 Data Failures

Data failure is a failure to achieve the historical (property use) research objectives specified in the ASTM Standard Practice even after reviewing the standard historical sources that are reasonably ascertainable and likely to be useful. Data failure is one type of data gap.

Tetra Tech identified no data failures during the course of this Phase I ESA.

6.8.1.2 Data Gaps

A data gap is a lack of or inability to obtain information required by the ASTM Standard Practice, despite good faith efforts by the EP to gather such information. This could include any component of the Practice, e.g., standard environmental records, interviews, or a complete reconnaissance. A data gap by itself is not inherently significant, but if other information and/or the EP's experience raise reasonable concerns about the gap, it may be judged to be significant.

7.0 SIGNATURE OF ENVIRONMENTAL PROFESSIONALS

I declare that, to the best of my professional knowledge and belief, I meet the definition of EP as defined in Section 312.10 of 40 CFR 312. I have the specific qualifications based on education, training and experience to assess a property of the nature, history and setting of the property (Appendix G). I have developed and performed all the appropriate inquires in conformation with the standards and practices set forth in 40 CFR Part 312.

Preparation of this Report was conducted by the following Tetra Tech personnel:

Kian Lew
Environmental Scientist

Review of the Report was performed by the following Tetra Tech personnel:

Jennifer Merrick
Senior Project Manager

8.0 REFERENCES

Resources Consulted:

- Environmental Data Resources Inc. (EDR) of Shelton, Connecticut, Regulatory Agency Database Report, dated October 31, 2019.
- EDR Aerial Photo Decade Package, dated November 05, 2019.
- EDR City Directory Image Report, dated November 06, 2019.
- EDR Historical Topographic Map Report, dated November 01, 2019.
- EDR Radius Map Report, dated October 31, 2019
- EDR Certified Sanborn® Map Report, dated October 31, 2019.

Regulatory Agencies Contacted:

- City of Williams – City Clerk's Office
- Colusa County – Environmental Health Division
- California Department of Pesticide Regulation
- California Department of Toxic Substances Control
- California Office of Environmental Health Hazard Assessment
- U.S. Environmental Protection Agency Comprehensive Environmental Response, Compensation, and Liability Act Region 9

Documents and Maps:

- State Water Resources Control Board, Notice of Applicability; Reclamation District 1004, March 28, 2014.
- FEMA FIRM Map, USGS April 2019.
- Colusa County Health & Human Services, Application for Well/Pump Permit, May 23, 2003.
- Colusa County Health & Human Services, Application for Sewage Disposal System Permit, June 25, 2003.
- ASTM, "Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process," ASTM Designation E1527-13, 2013.
- ASTM, "Standard Guide for Vapor Encroachment Screening on Sites Involved in Real Estate Transactions," ASTM Designation E2600-10, 2010.

APPENDIX G: QUALIFICATIONS OF ENVIRONMENTAL PROFESSIONALS

TETRA TECH

Jay Neuhaus, PG, MS

Senior Geologist/Senior Project Manager

EXPERIENCE SUMMARY

Jay Neuhaus is an environmental project and technical manager with 33 years of experience. He has managed projects involving remedial investigations, remedial actions, remediation implementation/operation, site investigations/assessments, Phase I and II Environmental Site Assessments (ESAs), and surface water and groundwater programs. He has written proposals, met with clients and obtained new work, and managed scopes and budgets as high as $6 million. Many of his projects involve redevelopment of brownfields while others are for government entities including local, state, and federal entities.

- His project/client experience includes major commercial (chemical, industrial, energy, petroleum, real estate, transportation, communications), municipal (transportation authorities, schools, public works), and U.S. Department of Defense (Navy, Defense Energy Support Center, and Air Force).
- He has worked on many redevelopment sites.
- He manages remediation projects including chemical injection, excavation, vapor extraction.
- He has obtained closure on numerous sites involving metals, volatile organic compounds (VOCs), hydrocarbons, and/or semi-VOCs (SVOCs).
- He participates in public meetings and is involved in public participation.
- He performs subsurface geological and hydrogeological interpretations and creates cross-sections.
- He performs natural attenuation and low-risk evaluations, and indoor air/vapor migration assessments.

CORPORATE PROJECT EXPERIENCE

Project Manager, July 2017–Present
City of Lynwood, Successor Agency to the Redevelopment Agency, Site Assessment and Remediation of Soil Vapor and Groundwater, South Gate, CA

Project Manager of the State-funded underground storage tanks (UST) case closure project. Has managed the writing of work plans, the implementation of a variety of site assessment and remedial field activities, and the associated report writing. Activities under his management include:

- Completion of a soil vapor survey with 5-foot- and 10-foot-deep probes at six locations.
- Abandonment of four dry groundwater monitoring wells.
- Installation of five groundwater monitoring wells.
- Development of Traffic Control Plans.
- Sampling of borings downgradient of the Site.
- Installation of two horizonal soil vapor extraction wells.
- Installation of Three vertical soil vapor extraction wells.

EDUCATION

MS, Geological Sciences, San Diego State University, 1989

BS, Geology (Magna Cum Laude), California Lutheran University, 1984

AREA OF EXPERTISE

Project Management

Remedial Investigations/Actions

Environmental Site Assessments

Site Investigations/ Assessments

REGISTRATIONS/ CERTIFICATIONS

Professional Geologist, CA, Number 5501, Earned 1/1/92

Registered Environmental Assessor (REA) Level II, CA, Number 20037, Earned 1/1/99

TRAINING

Contracts and Subcontracting Training; AMEC

Leadership Training "Leadership for Results"; AchieveGlobal; 2003

Stormwater Professional Class

See additional at end

OFFICE

Irvine, CA

YEARS OF EXPERIENCE

33

YEARS WITHIN FIRM

5

- Installation of a soil vapor extraction (SVE) system in a designated compound and operation for 1 year 2 months. Request for closure of vadose zone has been submitted.
- SVE Wells from a previous consultant, that were paved over, were located with geophysical tools and added to the SVE system.
- After demonstrating vapor extraction was complete the two horizontal and nine vertical vapor extraction wells and vapor monitoring probes were destroyed (pressure-grouted) and the system demobilized.
- Two rounds of in situ chemical oxidation remediation using injection of persulfate and an activator were performed on an off-site benzene hot spot.
  - 1,300 gallons of 12% persulfate (PersulfOx™) were injected in 2020.
  - 20,500 gallons of 14% persulfate high pH NaOH-activated solution were injected in 2022 into 19 points at depths of 40-50 feet below ground surface.
  - Benzene concentrations have dropped by 87% in the target area (12,000 to 1,600 ug/L benzene).

Project Manager, 2016–Present
Hibco Corporation, Site Assessment and Remediation of Soil and Groundwater, Hawthorne, CA

The site is a former latex manufacturing plant dating back to the 1950s. Chemical storage and recycling occurred. As Project Manager, has supervised the following activities:

- Performed site assessment activities including sampling of soil borings and installation and sampling of soil vapor probes and Membrane Interface Probe survey.
- Installation and monitoring of eight monitoring wells.
- Excavation of 650 tons of contaminated soil.
- A pilot test involving injection of pH activated sodium persulfate into shallow groundwater
- Performed under a Waste Discharge Requirements Permit.
- Submitted a Remedial Action Plan for groundwater.
- Plume delineation was completed to the south, west, and northwest of the Site.
- Performed an enhanced reductive dechlorination (ERD) pilot test that demonstrated that ERD is effective.
  - Injected 17,300 gallons of molasses and EVO solution into 12 points
    - Included injecting dehalococcoides bacteria, 2,430 gallons molasses
    - Performed effectiveness monitoring to show that organic carbon increased and bacteria thrived in a reduced environment
  - Planning a full-scale ERD
- A SVE system is installed. Startup is planned for November 2023.

Project Manager and Technical Oversight, 2021–2022
BayWa r.e., Noosa Battery Energy Storage System, Phase II and Soil Removal, Ripon, CA

The property was assessed by another company to determine the potential impacts to the environment from historic and current activities. The due diligence activities were conducted following the ASTM standard. Based on the findings, a large removal was planned in the rear outdoor area of the property where drums and equipment had been stored. A work plan was written and approved by the buyer's consultant as well. 40 drums were consolidated and sampled for waste characterization and disposal. Tetra Tech's subcontractor performed soil removal including 34 cubic yards and collected soil confirmation samples. Provided technical oversight during operations.

Project Manager, 2019–2020
Horrocks Engineers, Basalt Hill Quarry Reopening Project, Stormwater Pollution Prevention Plan and Monitoring Services, CA

Developed a Stormwater Pollution Prevention Plan identifying potential pollutant sources and specified structural and/or non-structural best management practices (BMPs).

- Weekly Site Inspection and Rain Event services were provided during the grading operation.

- A Tetra Tech QSP performed weekly BMP inspections at the Site over an approximately 6-week project duration. During site inspections, Tetra Tech identified BMPs that needed maintenance to operate effectively, that failed, or that could fail to operate as intended; utilized a SWRCB-approved inspection form; and coordinated with the construction contractor to address any findings within 72 hours.
  - Tetra Tech inspected catchments within the Site boundaries for non-stormwater discharges during regular dry weather inspections. Completed forms will be submitted to the Client.
- When rain was predicted by the National Weather Service Forecast Office at 50 percent or greater, a Tetra Tech QSP performed a pre-rain event inspection within 48 hours of the rain event. During the rain event, daily and post-rain event (within 48 hours of the end rain event) inspections were performed for storms producing precipitation of 0.5-inch or more at the time of discharge.
- Provided a Best Management Practice Plan for Area 6.

Project Manager and Technical Reviewer, 2023
Multiple Clients, Multiple Projects, Phase I Environmental Site Assessments, CA

Project Manager for the preparation of Phase I ESAs for four properties each approximately 2000+ acres of land, in three areas of unincorporated areas of California. The due diligence activities were conducted following ASTM standards 1527-21 and 2247-16 and included the review of facility information, collection of independent environmental information, a site reconnaissance, and review of potential environmental and cultural issues. recognized environmental conditions (RECs) were determined and described, including Historical RECs and Controlled RECs. Projects included:

- Clearway Energy Group, Luna Valley and Daggett 3 Solar Projects
- Confidential Client, Montezuma II
- BayWa r.e, Resurgence and Edom Hills Projects

Phase I Environmental Site Assessment Technical Reviewer, 2022–2023
Multiple Clients, Multiple Projects, CA, NV, UT, TX, NC, VA

Provided technical review and in some cases was Environmental Professional for Phase I ESAs for the following clients and projects:

- AES, Sycamore Cross, VA
- AEP, Boulder, UT
- Invenergy, Edgecombe, NC
- Origis, Dog Creek and Chalan, CA
- Engie, Swenson County, TX
- Goldman Sachs, Boulder City and Las Vegas, NV

Project Manager and Technical Reviewer, 2023
BayWa r.e., Tazaca and Olivine BESS Projects, Due Diligence (Critical Issues Analysis, Phase I ESA), Tucson, AZ

Project Manager for the preparation of Phase I ESA and Critical Issues Analyses (CIAs) of approximately 60 acres of land each, in unincorporated Gila County, Arizona. The property was assessed for critical issues, primarily related to local zoning, historical cultural assets, and to determine the potential impacts to the environment from historic and current activities. The Phase I ESA due diligence activities were conducted following ASTM standards 2247-16 and 1527-21 and included the review of facility information, collection of independent environmental information, a site reconnaissance, and review of potential environmental and cultural issues. RECs were determined and described, including Historical RECs and Controlled RECs.

Project Manager and Technical Reviewer, 2023
BayWa r.e., Canela and Cabrera BESS Projects, Critical Issues Analysis, Folsom and Hesperia, CA

Project Manager for the preparation of CIAs of approximately 50 acres of land each, in unincorporated San Bernardino County, California, and in the City of Folsom, California, respectively. The properties were assessed for critical issues, primarily related to local zoning, historical cultural assets, and to determine the potential impacts to the environment from historic and current activities.

Project Manager and Technical Reviewer, 2022
Eurus Energy, Saltbrush Plains Battery Storage Project, Phase I Environmental Site Assessment, Avenal, CA

Project Manager for the preparation of Phase I ESAs for the Saltbrush Plains Battery Energy Storage System Project on approximately 3 acres of land, in Avenal, California. The due diligence activities were conducted following ASTM standards E1527-21 and E2247-16. Tasks included the review of facility information, collection of independent environmental information, a site reconnaissance, and review of potential environmental and cultural issues. RECs were determined and described, including Historical RECs and Controlled RECs.

Project Manager and Technical Reviewer, 2022
BayWa r.e., Gold Rush, Wild Stallion, and Caverna BESS Projects, Due Diligence (Critical Issues Analysis, Cultural Survey, Phase I ESA), Mariposa County, AZ

Project Manager for the preparation of Phase I ESAs, CIAs and Cultural Surveys for three properties each on approximately 40 acres of land, in three areas of unincorporated areas of Mariposa County, Arizona (two near Surprise, Az, and one near north Phoenix). The properties were assessed for critical issues, primarily related to local zoning, historical cultural assets, and to determine the potential impacts to the environment from historic and current activities. The due diligence activities were conducted following ASTM standards and included the review of facility information, collection of independent environmental information, a site reconnaissance, and review of potential environmental and cultural issues. Two of the properties were owned by the Arizona State Land Division. RECs were determined and described, including Historical RECs and Controlled RECs.

Technical Oversight and Project Professional Reviewer, 2020–2021
Gannett Media Corporation, Desert Sun Phase I & II ESA and Soil Removal, Palm Springs, CA

Provided technical oversight of staff scientist for the preparation of a Phase I ESA for the news company building property in Palm Springs. The property was assessed to determine the potential impacts to the environment from historic and current activities. The due diligence activities were conducted following the ASTM standard, and included the review of facility information, collection of independent environmental information, a site reconnaissance. Based on the findings, a small removal was planned in the rear outdoor area of the property near a drain outfall. Tetra Tech performed the soil removal and collected confirmation samples. Mr. Neuhaus provided technical oversight for the team including determining cleanup levels.

Technical Oversight and Project Professional Reviewer, 2020–2021
AES North America Development LLC, Mountain View Wind Repower Project Phase I ESAs, Whitewater, CA

Environmental scientist for the preparation of Phase I ESAs of seven parcels for the Mountain View Wind Repower Project in Riverside County, California. The property was assessed to determine the potential impacts to the environment from historic and current activities. The due diligence activities were conducted following the ASTM standard, and included the review of facility information, collection of independent environmental information, a site reconnaissance, and review of potential environmental issues.

Project Technical Reviewer and Oversight, 2020 and 2023
Clearway Energy Group LLC, Luna Valley Solar Power Phase I ESA, Fresno County, CA

Environmental scientist for the preparation of Phase I ESA for approximately 1,300 acres of land, in unincorporated western Fresno County, California. The property was assessed to determine the potential impacts to the environment from historic and current activities. The due diligence activities were conducted following the ASTM standard, and included the review of facility information, collection of independent environmental information, a site reconnaissance, and review of potential environmental issues.

Technical Reviewer, August, 2021
Haven Health Properties, Laguna Beach Phase I ESA, CA

Technical Oversight for the preparation of Phase I ESA for three story office building in Laguna Beach, CA. The property was assessed to determine the potential impacts to the environment from historic and current activities. The due diligence activities were conducted following the ASTM standard, and included the review of facility information, collection of independent environmental information, a site reconnaissance, and review of potential environmental issues.

Project Manager, March 2019–May 2021
Jim Pattison Developments, Environmental Audits Phase I Environmental Site Assessments of Fish Processing and Packaging Plants, Various Coastal Locations, AK

Managed the project including the performance of Phase I Environmental Site Assessments for large plants on coastal remote properties.

- Performed ASTM Phase I Environmental Site Assessments for 8 fish plants from Sitka and Yakutat in the south-peninsular area to King Salmon in the Alaskan Peninsula.
- Wrote Phase I ESA's for client and reviewed other documents;

Project Technical Reviewer
Jim Pattison Developments (US) Inc., Pattison Yakama, Three Juice Plant Locations, WA

Project technical reviewer and Registered Professional for the preparation of two Phase I ESAs located in Selah and Wapato, Washington. The due diligence activities were conducted following the ASTM E1527-13 standard and comprised of a database search, historical aerial photographs, Sanborn fire insurance maps, and/or historical USGS topographic maps, the collection of independent environmental information, a site reconnaissance (performed by a local Environmental Professional), and a review of potential environmental issues. The results of the Phase I ESAs are used by the seller and potential buyers to determine the magnitude of identified environmental issues and associated costs for remedial actions.

Project Manager, March 2017–May 2018
Planet Home Living, Phase I and II Environmental Site Assessment and Soil Reuse Plan, Corona, CA

Managed the project including the performance of a Phase I and Phase II Environmental Site Assessment and reporting. Was responsible for development and completion of the Soil Reuse Plan that was approved by the County for the grading/use permit.

- Developed a creative approach to manage the hazardous soils by having them placed in a cell beneath a roadway.
- Saved the client thousands of dollars by foregoing trucking and off-site disposal of pesticide impacted soil.
- Met with the Water Board and County to gain buy-in and approvals, including closure of USTs.

Project Manager, August 2016–December 2017
Shea Properties, Former ITT Cannon Manufacturing Facility, Phase II Environmental Site Assessment/Investigation, Santa Ana, CA

Managed an extensive Phase II ESA of a 42-acre industrial property in Santa Ana, California, that was being remediated and later sold for redevelopment. The property had been used for manufacturing (primarily electromechanical components such as connectors and connector assemblies). Contaminants included polychlorinated biphenyls (PCBs), solvents, metals, and petroleum hydrocarbons. The following sampling was completed: 39 soil borings were sampled in and around 15 areas of concern; 70 soil gas sample locations were sampled; and 10 membrane interface probe survey locations were surveyed, and 3D modelling was performed of the data.

The sampling of this Site was challenged by the ongoing pre-demolition activities and in some cases active demolition of the manufacturing buildings. Additionally, this Site was challenging from a Health and Safety standpoint since some areas were highly impacted with PCBs and potentially with metals.

- Tetra Tech additionally provided oversight of active remediation primarily consisting of oversight of excavation of areas of concern that had elevated levels of soil impacts.
- Tetra Tech personnel, including Mr. Neuhaus, attended meetings with the client and the buyer and their consultants to discuss the findings and the recommendations for additional sampling and/or excavation of impacted soils, and confirmatory sampling (handled by the owner's consultant primarily) and to protect the client from future liability.
- Tetra Tech made recommendations for vapor barrier design based on remaining risk.
- Tetra Tech provided a Site Management Plan for oversight during in-grading.
- The property is currently being readied for new construction of office buildings and warehouses.

Project Manager, March 2017–June 2017
Confidential Client, Phase I & II Environmental Site Assessment, 945-1065 Carlsbad Village Drive, Carlsbad, CA

Performed a Phase I/II ESA in accordance with the American Society for Testing and Materials standard at a Site comprised of approximately 4.2 acres and improved with commercial buildings. Two Recognized Environmental Concerns were investigated including a dry cleaner and an adjacent service station with possible migration of contaminant onto the subject property. Tetra Tech performed:

- Eight soil borings to a depth of 15 feet below ground surface with samples at 5-foot intervals.
- Seven of the borings were advanced to groundwater for hydropunch sampling.
- Samples were analyzed for total petroleum hydrocarbon, VOCs, polycyclic aromatic hydrocarbons, and PCBs.
- Four borings near the dry cleaner were converted to soil vapor probes and sampled following the DTSC Advisory (2015).
- Sample analytical results were compared with established screening levels.
- Results were presented in a report to the client.

Project Manager, April 2017–October 2017
Confidential Owners under Site Cleanup Subaccount Program (SCAP) Funding of the State Water Resources Control Board, Site Investigation of Serrano Plaza, Los Angeles, CA

Under oversight of the State Water Resources Control Board a site investigation work plan was written and submitted for review and approval for this open Case Site at a property with ongoing businesses and restaurants. The following work was performed:

- Eight soil borings were drilled and sampled.
- Four groundwater monitoring wells were sampled (soil and groundwater) and installed.
- A soil vapor survey was performed at 12 vapor probe locations. Vapor probes were installed at both 5 and 10 feet deep.
- Some risk assessment and evaluation were completed to determine if there was a risk at the Site.
- A Site investigation report was written and submitted to the State Water Resources Control Board including recommendations for additional off-site delineation.

PREVIOUS EXPERIENCE

Project Manager
Soil and Groundwater Investigation, Remediation and Closure Services for a former Chrome Plating Facility Site, US Chrome, South Bay Area, CA

As project manager, was responsible for the following:

- Oversaw the site assessment and groundwater monitoring of the Site with the focus on hexavalent chromium contamination.
- Under his management an Interim Remedial Action Plan was written to address hexavalent chromium in soil;
- The preferred remedial alternative: injection of calcium polysulfide in soil and shallow groundwater to cause the reduction of hexavalent chromium to chromium III. A Waste Discharge Requirement permit was obtained.
- Three rounds of chemical injection were completed followed by confirmatory sampling.
- His team produced a Health Risk Assessment for indoor and outdoor exposures (air and soil) was submitted and a Case Review was completed.
- Brought in $400,000 of $1.2 million revenue project. Closure of the site was granted.

Project Manager
Former Foam and Latex Manufacturing Site Property (Confidential Client), Site Investigation and Remediation, South Bay Area, Los Angeles, CA

- Long-term client. Managed complex 5-acre site where latex and other chemical products were manufactured, and a temporary storage disposal facility once operated.
- Responsible for characterization of the subsurface for chlorinated solvents and other VOCs, 1,4-dioxane, and hexavalent chromium in the vadose zone (soil and vapor) and groundwater.
- Led implementation of various field methods including membrane interface probe, cone penetrometer test (CPT), direct push sampling, grab groundwater sampling and vapor probe installation and sampling.
- Oversaw installation of four monitoring wells. Ten nested vapor probes have been installed and monitored.
- Managed the excavation of 660 tons of VOC-impacted soil from two hotspots.
- Managed a soil vapor extraction design, and implementation is planned in accordance with the approved remedial action plan.
- Brought in $1.2 million budget/revenue. Long-term client. Plans for Redevelopment

Program Manager
Environmental Services for Redevelopment of Los Angeles County Hospital Property, Los Angeles County Department of Public Works, Los Angeles County, CA

- Managed contract task orders pertaining to performing site investigation/assessments for portions of a 100-acre area of land in Downey. The site had been subdivided into 13 areas.
- Responsible for performing ESAs of 11 areas. Some areas required risk evaluations.
- Reviewed existing reports of eight USTs and investigated five USTs, four pesticide storage facilities, hazardous waste storage facilities, transformers, and generators. Recommendations were made for construction/redevelopment purposes.
- Oversaw the removal of USTs, wrote the UST closure reports for eight UST removals and gained case closures for the client.
- Brought in $300,000 of $500,000.

Principal and Site Manager
Former Metal Die-Casting Facility, Los Angeles, CA

Former die-casting facility impacted by chlorinated VOCs, benzene, and hydrocarbons. The hydrogeology and geology beneath the site were complex due to the Newport-Inglewood Fault Zone being located nearby. The following work was performed at this site:

- Led team that performed soil sampling of 36 soil borings under.
- Oversaw installation of six groundwater monitoring wells and monitoring of 22 wells.
- Obtained an access agreement with the current owner.
- Under his supervision 200 tons of high tetrachloroethylene contaminated soil was excavated inside of a building as part of a remedial action. Procured the excavation contractor.
- Coordinated with the client, technical, and legal team on strategies to address data gaps and toward obtaining closure of the shallow groundwater.
- In charge of offsite characterization of chlorinated solvent plumes in shallow and deep groundwater zones using CPT, soil and groundwater sampling, well installations and groundwater monitoring. A groundwater Remedial Action Plan was submitted recommending closure of shallow groundwater and further investigation.
- $3.5 million of revenue was billed; $350,000 brought in.

Project Principal
Confidential Fortune 500 Client, Resource Conservation and Recovery Act Facility Investigation and Risk–Based Closure, Former Photo-Chemical Processing Plant, Vernon, CA

Led a team through a Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) at a site where formerly a photo-chemical processing plant had operated. Contaminants included trichloroethylene and acids. Under a Consent Order Agreement, investigation of the site included investigating soil gas, subsurface soil, concrete, groundwater; and finally, subslab vapor. The site was regulated by the DTSC.

- Responsible for over 38 borings and 25 soil gas probes were installed and sampled. Four groundwater monitoring wells were installed and monitored for two years. Analyzed for metals, VOCs, and SVOCs.
- Responsible for delineation of low pH soils below a former interceptor pit/clarifier that had leaked.
- Utilized field pH measuring instruments that could reach a pH of 1 as well as lab sample analyses.
- Wrote final RFI report and prepared and case closure with a Land Use Covenant. The Site has been closed by the DTSC. $1 million budget; brought in $300,000.

Project Manager Major Hotel
Dry Cleaning Area, Site Assessment and Site Closure, Downtown Los Angeles, CA

Project Manager of a Phase II ESA, feasibility study, risk assessment and closure at a site in downtown Los Angeles, where dry cleaning operations were ongoing.

- Worked closely with the Los Angeles RWQCB to characterize the shallow soils and groundwater contaminated with low levels of tetrachloroethylene.
- Under Mr. Neuhaus' management, crews sampled soil, soil gas, and groundwater.
- Oversaw installation of five groundwater monitoring wells using limited-access rig.
- Wrote site assessment report and developed Remedial Action Plan.
- Demonstrated that groundwater was not threatened and obtained closure from RWQCB.
- $400,000 budget brought in and managed. Client satisfaction letter.

Task Manager
Metro Westside Subway Extension Project, Advanced Conceptual Engineering and Preliminary Engineering Phases of Purple Line, Parson's Brinkerhoff Subway Team Contract with Metropolitan Transportation Authority, Los Angeles and Santa Monica, CA

Project principal and major task manager, in charge of collecting and compiling dangerous gases data along the proposed alignment on Wilshire Boulevard (Miracle Mile).

- Participated in planning stages reviewing EDR reports, delineating problem areas of line.
- Managed subsurface gas investigation and assessment along the proposed line alignment.
- In charge of assessing dangerous gases including installation and sampling of 23 new multi-stage wells along a busy traffic corridor as well as the sampling of 30 existing vapor wells. The additional deep vapor concentration data and flow data enabled designers and planners to position the stations and drill shafts. Vapor data was key in understanding health and safety requirements during the design and construction phases of the tunnel project.
- Wrote sections for the preliminary design report and made recommendations for controlling gases. Managed $500,000 budget.

Project Manager, Operations & Management (O&M) Services, Chevron El Segundo Refinery, CA

Managed a crew of six technicians who worked full time at the refinery providing O&M services for the environmental department at the refinery.

- Services included system maintenance, troubleshooting and management, regulatory permitting and response. Awarded several health and safety awards. $400K budget.
- Decommissioning and Redevelopment at Former Refrigerant and Acid Manufacturing Facility, Fortune 500 Company, El Segundo, CA. 2004-2010
- Performed site management during remediation and new construction at 46-acre former refrigerant manufacturing facility Site. Site was developed into a high-end award-winning shopping/home center.
- Oversaw safety, regulatory compliance, and quality control during remediation (dig and haul; vapor extraction system installation) and construction activities.
- Oversaw protection of 26 groundwater monitoring and 36 vapor wells.

- Provided oversight and documentation during the installation of vapor capture and venting systems, and vapor barriers beneath the new buildings.

Site Inspection, Naval Weapons Station Seal Beach, Seal Beach, CA

Coordinated two investigative crews for 1.5 months in the field including lab and waste management.

Focused Site Inspection, Seal Beach Naval Weapons Station, Seal Beach, CA

With a $600,000 budget, studied eight sites with surface water and soil contamination impacts including hydrocarbons, solvents, waste oil, acid, and metals.

Ground & Surface Water Assessments/Geophysical Studies, Vandenberg Air Force Base, CA

Performed groundwater/surface water assessments and geophysical studies (including a Ground Penetrating Radar System) of three sites. Provided oversight on an Oxygen Release Compound (ORC®) barrier injection. Performed a remedial action plan for a VOC-impacted site. Met with Air Force Center for Environmental Excellence, Base, RWQCB, and DTSC. Managed contracts.

Investigation and Remediation Projects toward Closure of Marine Airfield Stations El Toro and Tustin, U.S. Navy, Southwest Division, CA

Managed three delivery orders of $2.5, $3 and $6 million budgets to remediate and close sites for future development. Regularly attended team and program meetings with Navy managers. Conducted monthly budget and progress reporting and coordinated with cost/schedule engineers. Some of the project activities he managed included:

- UST removals of up to 100,000-gallon tanks; soil excavation; verification drilling; 50 UST sites closed under Mr. Neuhaus' oversight.
- Closed 40 temporary hazardous waste storage units under RCRA, using risk analysis.
- Conducted testing, O&M, and optimization of plume remediation product (jet-fuel) removal system, including extraction wells, augmented with vapor extraction system of large regional chlorinated VOC plume at a site with complex geology. Abandoned monitoring and water supply wells.
- Managed the abandonment of 20 groundwater monitoring wells and one deep water supply well.
- Coordinated with Air Station personnel regarding health and safety around jets, transport planes, cargo planes, and helicopters.
- Natural attenuation study of multiple plumes through water chemistry analysis.
- Managed soil vapor extraction well testing (40 wells) at large regional chlorinated plume hot spot (vadose zone).
- Data were utilized in designing final multi-million-dollar system at Hangar 60.

Remedial Action Contract, U.S. Navy and Marine Installations Southwest, Remedial Investigation, Marine Corps Air Station Yuma, AZ

Part of team that implemented "Observational Method" (real-time characterization of Superfund site). Managed 20 people on a $1 million budget. Soil-gas survey, 3-D modeling, Hydropunch groundwater sampling, and lithologic logging and sampling of 1,000 CPT borings. Characterized fuel spill and landfill sites.

Site Assessment/Feasibility Study Oversight, City Redevelopment Anaheim, Anaheim, CA

Provided oversight for an on-site assessment/feasibility study at former industrial lock plating facility that was to be redeveloped for residential (low and middle income) and commercial uses.

San Pedro Defense Fuels Supply Center, Los Angeles County, CA

Managed fuel remediation project at large tank farm and distribution center. Implemented and operated a duel-phase system with total fluids recovery. Monitored discharge water for National Pollutant Discharge Elimination System requirements. Assisted in renewing permits with Los Angeles RWQCB. Recovered cost by recommending reduced analytical monitoring program. Performed hydrocarbon source characterization study around pipelines using Rapid Optical Screening Tool (ROST) testing.

School Site Evaluations, Preliminary Endangerment Assessments, Remedial Investigations, Feasibility Studies, Los Angeles, CA

Managed teams of people for $2 million contract covering preliminary environmental assessments, remedial investigations/feasibility study, remedial action plan, and phase I site assessments for several school sites throughout Los Angeles area; included one school site on the State superfund list (former dump site in Cudahy). Worked with California Environmental Protection Agency/DTSC on nine preliminary endangerment assessments and two remedial assessments, including: work plan, design and install wells, sampling soil vapor, outdoor air, soil, groundwater, drinking water; performed risk and toxicology assessment, and budget and schedule management; worked with the client on a daily basis. High profile sites with variety of contaminant situations. Responsible for assisting in public participation, and risk communication. Involved in organizing 8 public meetings and presentations. Coordinated with Los Angeles City and County Sanitation for sites involving landfill issues.

NEPA Phase I ESAs and Cultural Studies and Permit Compliance, Cell Tower Sites, Cingular Wireless (now Verizon)

Performed 80 Phase I due diligence assessments for a cellular company expansion.

OTHER INFORMATION (ADDITIONAL TRAINING, PUBLICATION(S), AWARD(S), ETC.)

ADDITIONAL TRAINING

Project Management Level 2 – Tetra Tech, 2018

Corporate Team Building and Certified Project Manager and Principal; MACTEC

Professional Ethics Training

Project Management Certificate Classes; UC Irvine

PUBLICATIONS & PRESENTATIONS

Neuhaus, J.N., Joseph Trani, Daoud Alsawaf, 2003, "Enhancing Hydrocarbon Recovery in the Vadose Zone", Joint Services Pollution Prevention Conference, San Antonio, Texas, Abstracts.

Gastil, R.G., J. Neuhaus, M. Cassidy, et al, 1999, "Geology and Paleontology of Southwestern Isla Tiburon, Sonora, Mexico", Revista Mexicana de Ciencias Geologicas, Vol. 16, No. 1 Geological Society of Mexico, Mexico City.

Neuhaus, J.N., S. Lin, and D. Guth, 1994, "A Background Geochemistry Study of Soils and Groundwater, NWS Seal Beach, "Abstracts with Programs, Geological Society of America, Cordilleran Section, Vol. 26, No. 2.

TETRA TECH

Daniel Juarez O'Connell
Environmental Engineer

EXPERIENCE SUMMARY

Daniel O'Connell has provided support for a broad range of site investigations, environmental remediation, and assessment report development throughout his career as an Environmental Engineer. Daniel has experience in consulting for unplanned releases of contaminants and identifying hazards. Experience in communicating with regulatory agencies and executing work plans that remain in compliance of established regulatory law regarding recognized environmental conditions. Daniel has utilized skills in scientific investigation, state of the art sampling techniques, technical report production, safety supervising and consulting. Additional responsibilities include site reconnaissance processes for contaminated areas, remediation projects, various forms of sampling, and site monitoring contractors' execution of planned work.

CORPORATE PROJECT EXPERIENCE

Staff Environmental Engineer, January 2023–Present
South Gate Tweedy Site Remediation of Groundwater, South Gate, CA

Staff Engineer of the State-funded underground storage tanks (UST) case closure project. Has coordinated routine groundwater monitoring activities and reports. Has performed oversight of a variety of site assessment and remediation field activities. Activities include in situ chemical oxidation remediation was performed on a benzene hot spot off-site and performance and semi-annual groundwater monitoring/sampling.

Staff Environmental Engineer, January 2023–Present
Hibco Corporation, Site Remediation of Soil and Groundwater, Hawthorne, CA

Staff Engineer of the former latex manufacturing plant dating back to the 1950s. Prepared writing and analytical components necessary for routine groundwater monitoring reports. Has performed oversight of a variety of site assessment and remedial field activities. Has performed oversight on the construction of a Soil Vapor Extraction System and associated piping.

Staff Environmental Engineer, January 2023–Present
Kapital The Alameda, Site Remediation of Groundwater, Santa Clara, CA

Staff Engineer of the underground storage tanks (UST) case closure project. Coordinating groundwater and soil vapor sampling events and developing assessment reports. Activities that have been involved with include the following:

Staff Environmental Engineer, January 2023–Present
Griffon Corporation, Rancho Dominguez Site Remediation of Groundwater, Rancho Dominguez, CA

Staff Engineer on the project responsible for coordinating groundwater monitoring activities and soil vapor extraction system operation and maintenance. Conduct semi-annual groundwater sampling for a cluster of active manufacturing facilities situated on top of a chlorinated solvent plume that was the result of several historical releases from former facility operators. Prepare soil/groundwater monitoring reports after each monitoring event. Periodically performing O&M activities on the active SVE system at the site.

EDUCATION

BS, Environmental Engineering, University of California, Merced, 2018

AREA OF EXPERTISE

Environmental Engineering

Phase I and Phase II ESAs

Subsurface Hydrology

Industrial Hygiene

Soil/Water/Bulk Sampling

Report Writing

Health and Safety

TRAINING

40-Hour HAZWOPER

8-Hour HAZWOPER refresher

30-Hour OSHA Construction

First Aid/CPR/AED

REGISTRATIONS/ CERTIFICATIONS

Engineer-in-Training Certification (NCEES) (Certification No. 177748)

Division of Occupational Safety and Health Certified Asbestos Consultant (Certification No. 22-7145)

OFFICE

Irvine, CA

YEARS OF EXPERIENCE

4

YEARS WITHIN FIRM

>1

Staff Environmental Engineer, January 2023–Present
Live Wire Cleaners, Laguna Presbyterian Church, Site Investigation of Soil and Human Health Risk Evaluation, Laguna Beach, CA

Staff environmental engineer working on designing and implementing groundwater remediation strategies to address chlorinated solvent impacts associated with a dry-cleaning facility. Assisted in the management of the installation of soil vapor probes and the collection of concurrent air sampling to assess human health risks. Managed the development of an assessment report and a human health risk evaluation to determine recommended facility occupation times.

Staff Environmental Engineer, March 2023–April 2023
Blythe Energy, Spill Prevention Control and Countermeasure Plan, Blythe, CA

Staff environmental engineer developing the SPCC plan for a peaking power plan in rural California. Performed the field assessment and correspondence with facility contacts to develop a site-specific plan to prevent and control oil releases to the environment in accordance Title 40, Code of Federal Regulations (CFR), Part 112. Under 40 CFR 112.

Staff Engineer, April 2023–Present
Glenn Springs Holdings, DJ Basin Groundwater Monitoring and Remediation, CO

Staff engineer working on groundwater monitoring and site remediation of 33 sites with former/current oil drilling operations. Monitoring and reporting on 750 monitoring wells on a quarterly basis. Design conceptual site models for each site and prepare scopes of work for well installations, soil sampling and groundwater monitoring. Prepare form 27 and implementation schedule updates to the state agency monthly. The work is being conducted under the regulatory oversight of Colorado Energy and Carbon Management Commission (ECMC).

Environmental Scientist, April 2023–May 2023
Clearway, Daggett 2 Solar Project Phase I ESA, Daggett, CA

Environmental scientist for the technical preparation of Phase I ESA in accordance with ASTM standard E2247-16 for approximately 1,260 acres of land, in San Bernardino County, California. The property was assessed to determine the potential impacts to the environment, and included the review of facility information, collection of independent environmental information, a site reconnaissance, and review of potential environmental issues.

Environmental Scientist, April 2023–May 2023
BayWa r.e., Solar Projects, Olivine BESS Phase I ESA, Tucson, AZ

Environmental scientist for the technical preparation of Phase I ESA in accordance with ASTM standard E1527-21 for approximately 14 acres of land, in Pima County, Arizona. The property was assessed to determine the potential impacts to the environment, and included the review of facility information, collection of independent environmental information, a site reconnaissance, and review of potential environmental issues.

Environmental Scientist, June 2023–July 2023
BayWa r.e., Solar Projects, Tazaca BESS Phase I ESA, Tucson, AZ

Environmental scientist for the technical preparation of Phase I ESA in accordance with ASTM standard E1527-21 for approximately 11 acres of land, in Pima County, Arizona. The property was assessed to determine the potential impacts to the environment, and included the review of facility information, collection of independent environmental information, a site reconnaissance, and review of potential environmental issues.

Environmental Scientist, August 2023–September 2023
Clearway, Luna Valley Solar Project Phase I ESA, Fresno, CA

Environmental scientist for the technical preparation of Phase I ESA in accordance with ASTM standard E2247-16 for approximately 1,300 acres of land, in Fresno County, CA. The property was assessed to determine the potential impacts to the environment, and included the review of facility information, collection of independent environmental information, a site reconnaissance, and review of potential environmental issues.

Environmental Scientist, August 2023–September 2023
Confidential Client, Resurgence Solar Projects, Phase I ESA, Boron, CA

Environmental scientist for the technical preparation of Phase I ESA in accordance with ASTM standard E2247-16 for approximately 1,000 acres of land, in San Bernardino County, CA. The property was assessed to determine the potential impacts to the environment, and included the review of facility information, collection of independent environmental information, a site reconnaissance, and review of potential environmental issues.

Environmental Scientist, December 2023–January 2024
Confidential Client, Resurgence Solar Projects, Hazardous Material Business Plan, Boron, CA

Staff engineer for the technical preparation of a Hazardous Material Business Plan (HMBP) in accordance with California Health and Safety Code, Division 20, Chapter 6.95, Article 1, Sections 25500 to 25519. Performed site assessments and prepared forms for the facility to submit to the local CUPA.

PREVIOUS EXPERIENCE

Project Manager December 2021–July 2022
Envirocheck, Inc.

Managed teams of technicians using leadership and in-depth investigative techniques to uncover environmental, industrial hygiene concerns. Interpreted samplings by evaluating laboratory data to provide technical reports, data analysis, and solutions. Creation of proposals/cost estimates, planning sampling procedures, solutions / scopes of work for remediation

Environmental Technician/Environmental Consultant, December 2018–July 2021

Strategically collected environmental/industrial hygiene samples. Evaluated laboratory data and created technical written reports under the direct supervision of a senior consultant.

OTHER INFORMATION

ADDITIONAL REGISTRATIONS/CERTIFICATIONS

American Council for Accredited Certification, Fire and Smoke Damage Technician (Registration No. 2201017)

National Institute for Occupational Safety & Health 582 Certified (Sampling and Evaluating Airborne Asbestos Fibers)

State of California Department of Public Health Lead-Related Construction Certification (No. LRC-00002277)

ESRG
ENERGY SAFETY
RESPONSE GROUP

TESLA

TESLA MEGAPACK 2/XL

HAZARD MITIGATION ANALYSIS

February 22nd, 2023 | Rev. 4

SUMMARY

This document serves as a product-specific* Hazard Mitigation Analysis performed for the Tesla Megapack 2 and Megapack 2 XL.

*This document does not address site-specific hazards, barriers, and mitigations.

Prepared For:

Tesla, Inc.
45500 Fremont Blvd
Fremont, CA 94538

Energy Safety Response Group, LLC
8350 US Highway 23 North
Delaware, OH 43015

www.energyresponsegroup.com
1-833-SAFE-ESS

PROJECT DESCRIPTION

Project Name	Tesla Megapack 2/XL Hazard Mitigation Analysis
Project No.	22-20231
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Prepared By:

Nick Petrakis
Senior Consultant
nick.petrakis@energyresponsegroup.com

Michael Bowes
Senior Project Engineer
michael.bowes@energyresponsegroup.com

Reviewed By:

Nick Warner
Founding Principal
nick.warner@energyresponsegroup.com

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1 INTRODUCTION

1.1 Background

Energy Safety Response Group (ESRG) has been retained by Tesla, Inc. to perform a product specific Hazard Mitigation Analysis (HMA) in accordance with *NFPA 855 Standard for the Installation of Stationary Energy Storage Systems §4.1.4 Hazard Mitigation Analysis* and the *2021 International Fire Code (IFC) §1207.1.4.1*. This HMA can be utilized to assess the anticipated overall effectiveness of protective barriers in place to mitigate the consequences of a battery-related failure. The analysis was performed based on the current documentation available at the time of the report.

1.2 Applicable Codes and Standards

The 2020 edition of *NFPA 855 Standard for the Installation of Energy Storage Systems §4.1.4 Hazard Mitigation Analysis* requires an evaluation on the consequences of the following failure modes:

1) *Thermal runaway condition in a single module, array, or unit*
2) *Failure of an energy storage management system*
3) *Failure of a required ventilation or exhaust system*
4) *Failure of a required smoke detection, fire detection, fire suppression, or gas detection system*

Additionally, for the completeness, this report also includes two additional failure modes required per *2021 International Fire Code (IFC) §1207.1.4.1:*

5) *Voltage surges on the primary electric supply*
6) *Short circuits on the load side of the ESS*

For the purposes of this report, only single failures modes shall be considered for each mode given above.

Per *NFPA 855 §4.1.4.2, Analysis Approval,* the AHJ shall be permitted to approve the hazardous mitigation analysis as documentation of the safety of the ESS installation provided the consequences of the analysis demonstrate the following:

1) *Fires will be contained within unoccupied ESS rooms for the minimum duration of the fire resistance rating specified in NFPA 855 §4.3.6.*
2) *Suitable deflagration protection is provided where required.*
3) *ESS cabinets in occupied work centers allow occupants to safely evacuate in fire conditions.*
4) *Toxic and highly toxic gases released during normal charging, discharging, and operation will not exceed the PEL in the area where the ESS is contained.*

5) *Toxic and highly toxic gases released during fires and other fault conditions will not reach concentrations in excess of immediately dangerous to life or health (IDLH) level in the building or adjacent means of egress routes during the time deemed necessary to evacuate from that area.*

6) *Flammable gases released during charging, discharging, and normal operation will not exceed 25 percent of the LFL.*

The following key codes, standards, and local requirements are referenced throughout the report:

- *NFPA 855 Standard for the Installation of Stationary Energy Storage Systems*, 2020 Edition
- *International Fire Code §1207 Electrical Energy Storage Systems*, 2021 Edition
- *UL 9540A Standard for Test Method for Evaluation Thermal Runaway Fire Propagation in Battery Energy Storage Systems,* 4th Edition
- *UL 9540 Standard for Energy Storage Systems and Equipment,* 2nd Edition

1.3 Summary of Findings

Based on review of documentation provided by Tesla, Inc., ESRG finds that adequate protections are provided for the fault conditions listed per *NFPA 855 §4.1.4* and *IFC §1207.1.4.1,* as well as for analysis approval requirements per *NFPA 855 §4.1.4.2*. Key findings include:

- The Tesla Megapack 2/XL is equipped with a number of protection systems (e.g., deflagration control system consisting of overpressure vents and sparker system, BMS control, electrical shutdowns and disconnects, etc.) that are anticipated to effectively manage all applicable fault conditions required per *NFPA 855 §4.1.4* and *IFC §1207.1.4.1.*

NFPA 855 §4.1.4* and *IFC §1207.1.4.1 Hazard Mitigation Analysis Requirements	
Thermal runaway condition in a single module, array, or unit	The system is provided with several passive and active measures to mitigate or contain a propagating thermal runaway condition. UL 9540A testing further shows that the effects of thermal runaway are contained within the module and Unit.
Failure of an Energy Storage Management System	Multiple levels of system monitoring provide redundant protection in the unlikely event of a failure of the energy storage management system.
Failure of a Required Ventilation or Exhaust System	The Megapack 2/XL is not required to have a ventilation or exhaust system. A proprietary explosion protection system is designed to mitigate the effects of flammable gasses generated during an abnormal condition.

Failure of a Required Smoke Detection, Fire Detection, Fire Suppression, or Gas Detection System	The Megapack 2/XL does not rely on dedicated smoke detection, fire suppression, or gas detection systems to mitigate the hazards associated with thermal runaway. Along with subsequent safety actions, the BMS fault notifications are transmitted to Tesla's 24/7 Operations Center, alerting key stakeholders of any abnormal conditions.
Voltage Surges on the Primary Electric Supply	Voltage surges on the primary electric supply are mitigated by BMS and inverter controls, voltage monitoring, and automatic disconnects.
Short Circuits on the Load Side of the ESS	Short circuits on the load side are mitigated by BMS controls and automatic safety actions.

- The Tesla Megapack 2/XL is compliant with all applicable Analysis Approval requirements per *NFPA 855 §4.1.4.2.*

***NFPA 855 §4.1.4.3* – Analysis Approval**	
Fires will be contained within unoccupied ESS rooms for the minimum duration of the fire resistance rating specified in NFPA 855 §4.3.6.	N/A – The Megapack 2/XL is intended for outdoor installations.
Suitable deflagration protection is provided where required.	The Megapack 2/XL is provided with a proprietary explosion protection system. The effectiveness of the explosion protection system was validated during internal destructive fire testing.
ESS cabinets in occupied work centers allow occupants to safely evacuate in fire conditions.	N/A – The Megapack 2/XL is not intended for installation within occupied work centers.
Toxic and highly toxic gases released during normal charging, discharging, and operation will not exceed the PEL in the area where the ESS is contained.	N/A – Lithium-ion batteries do not release toxic or highly toxic gases during normal charging or discharging operations.
Toxic and highly toxic gases released during fires and other fault conditions will not reach concentrations in excess of immediately dangerous to life or health (IDLH) level in the building or adjacent means of egress routes	Internal Unit level testing conducted on the products of combustion from the Megapack 2/XL indicated that there was no Mercury (Hg) observed, and trace levels of HF far below NIOSH Immediately Dangerous to Life or Health (IDLH) levels.

during the time deemed necessary to evacuate from that area.	
Flammable gases released during charging, discharging, and normal operation will not exceed 25 percent of the LFL.	N/A – Lithium-ion batteries do not release flammable gasses during charging, discharging, or normal operations.

- The effectiveness of the Megapack 2/XL's proprietary explosion mitigation system has been validated by UL 9540A Unit level and additional large-scale fire and destructive testing and has shown to be effective in preventing the occurrence of any hazardous pressure waves, debris, shrapnel, or ejection of enclosure pieces during a failure event.
- When subjected to a near-simultaneous failure of 6 cells within a module during UL 9540A full-scale fire testing, the Tesla Megapack 2 has proven that the system is provided with robust thermal runaway propagation prevention. As indicated in the UL 9540A Unit Level testing report by TUV, "the testing performed on MP2 is considered harsher with higher gas concentrations, and fundamental engineering analysis for MP2XL shows comparable behavior as worst case" therefore the testing results for the Megapack 2 can be utilized as comparable results for the Megapack 2 XL. The Megapack 2/XL does not rely on any internal or external fire suppression systems to prevent cascading thermal runaway propagation at the module and unit (Megapack-to-Megapack) level.
- Additional voluntary destructive testing was conducted by Tesla on a representative Megapack 2/XL. This testing utilized a more aggressive approach than typical UL 9540A testing by initiating a thermal runaway of all 48 cells within a module simultaneously and forcing a catastrophic failure of a battery module. Results of this testing showed that due to the robustness of the system design the following is noted:
    - It is difficult to initiate and maintain any cascading thermal runaway within the unit.
    - In the unlikely event of a fire, the system will consume itself slowly in a safe and controlled manner, without any explosive bursts, projectiles, or unexpected hazards.
- During the aforementioned testing, third-party analysis on products of combustion collected indicated no Hg and trace levels of HF far below NIOSH Immediately Dangerous to Life or Health (IDLH) levels.
- Voluntary fire propagation modeling was conducted by Tesla to determine the anticipated impacts on representative target Megapack 2 units from an external heat flux generated by a failing unit. Even with worst-case wind scenarios taken into account, in the unlikely event of a Megapack 2/XL fire, the model shows that thermal runaway would not propagate to the adjacent units that are installed as per Tesla's site design requirements.

2 ENERGY STORAGE SYSTEM DESCRIPTION

2.1 Megapack 2/XL Overview

The Tesla Megapack 2 and Megapack 2 XL (which may also be referred to as Megapack 2/XL or MP2/XL throughout this report), is a modular, fully integrated, AC-coupled battery energy storage system (BESS or ESS). The Megapack 2 is an updated version of the original Megapack 1 and utilizes similar deflagration control systems in the form of pressure-sensitive vents and sparker systems to manage explosion risk. The Megapack 2 XL is a design evolution of Megapack 2, which leverages the same core technology platform (cells, vents, sparker system, etc.) The Megapack 2/XL, however, utilizes lithium iron phosphate (LFP) battery cells provided by CATL, as opposed to the nickel manganese cobalt oxide (NMC) and nickel cobalt aluminum oxide (NCA) cells used in the Megapack 1.

Megapack 1	Megapack 2
	
Cells and Battery Modules:	
Cylindrical 2170 NMC	Prismatic LFP
1,000 Cells per Tray, 12 Cell Trays 12,000 Cells per Battery Module	112 Cells per Tray, 3 Cell Trays 336 Cells per Battery Module
Each Module Equipped with an Integrated BMS	
Layout/Construction:	
Modular Cabinet Design, Not Occupiable	
Thermal Bay, Customer Interface Bay, IP66 Battery Module Bay, and Thermal Roof	
23.5 x 5.4 x 8.3 ft	23.75 x 5.4 x 8.2 ft
Up to 17 Battery Modules	Up to 19 Battery Modules
Safety Features:	
Thermal Management System: Closed Loop Liquid Coolant System and R-134A Refrigerant	
Customer Interface Bay: User-accessible Area Designed for Operation and Servicing	
Electrical Fault Protection: Passive and Active Safety Control Mechanisms (Fuses, Circuit Interrupters, Pyrotechnic Fuse) Installed within the Battery Module Circuits and Distribution Circuit	
Autonomous BMS with 24/7 Remote Monitoring by Tesla Operation Facilities	
No Integral Fire Detection or Fire Suppression System	
Thermal Insulation	No Thermal Insulation[1]
Explosion Control System:	
33 Overpressure Vents, 8 Sparkers	22 Overpressure Vents, 12 Sparkers[1]

[1] Modified explosion control system and thermal insulation to account for the different cells (NMC vs. LFP) utilized in the MP2.

<table>
<tr><th>Megapack 1</th><th>Megapack 2</th></tr>
<tr><td></td><td></td></tr>
<tr><td colspan="2">Listings and Certifications</td></tr>
<tr><td colspan="2">Component and BESS Design Certifications/Listings (UL9540 and IEC 62933-5-2)</td></tr>
<tr><td colspan="2">Installation Level Codes and Standards (IFC and NFPA 855)</td></tr>
<tr><td colspan="2">UL 9540A Unit Level Test Results</td></tr>
<tr><td>Internally Heated Cells:
Led to Cascading Thermal Runaway of All Cells</td><td>Internally Heated Cells:
Led to Thermal Runaway of One Additional Cell</td></tr>
<tr><td>Fire Propagation:
Consumed the Entire Cabinet</td><td>No Fire Propagation:
No Evidence of Sustained Flaming</td></tr>
<tr><td>Flames Observed Outside the Cabinet Exiting via the Thermal Roof</td><td>No Flames Observed Outside the Cabinet</td></tr>
<tr><td>Heat Fluxes Recorded at Distances of up to 20-30 ft From the Cabinet</td><td>No Heat Fluxes Recorded at Distances of up to 20-30 ft From the Cabinet</td></tr>
<tr><td colspan="2">Explosion hazards, including but not limited to, observations of a deflagration, projectiles, flying debris, detonation, or other explosive discharge of gases were not observed.</td></tr>
<tr><td colspan="2">No Fire Propagation to Adjacent Cabinets at 6-inch (150 mm) Spacing to the Sides and Behind</td></tr>
<tr><td colspan="2">No Fire Propagation to Adjacent Cabinets at 8 ft (2.44 m) Spacing Directly in Front</td></tr>
<tr><td colspan="2">Integral Fire Suppression Not Required to Stop Cabinet to Cabinet Fire Spread</td></tr>
<tr><td colspan="2">Manual Fire Suppression (Hose Lines) Not Required to Stop Cabinet to Cabinet Fire Spread</td></tr>
<tr><td colspan="2">No Free-Flowing Liquid Runoff Observed After the Test</td></tr>
</table>

Megapack 2	Megapack 2XL
	
Cells and Battery Modules:	
Same Cells, Battery Modules and Integrated BMS	
Layout/Construction:	
Same Modular Cabinet Design, Not Occupiable with the Same or Substantially Similar Thermal Bay, Customer Interface Bay, IP66 Battery Module Bay, and Thermal Roof	
23.75 x 5.40 x 8.20 ft	28.83 x 5.42 x 9.17 ft
Up to 19 Battery Modules (3,100.8 kWh)	Up to 24 Battery Modules (3,854.0 kWh)
Safety Features:	
Same or Substantially Similar Thermal Management System, Customer Interface, Electrical Fault Protections and Autonomous BMS with 24/7 Remote Monitoring by Tesla Operation Facilities	
No Integral Fire Detection or Fire Suppression System	
Explosion Control System:	
22 Overpressure Vents, 12 Sparkers	26 Overpressure Vents, 12 Sparkers
Listings and Certifications	
Has the Same Component and BESS Design Certifications/Listings (UL 9540 and IEC 62933-5-2)	
Meets the Same Installation Level Codes and Standards (IFC and NFPA 855)	
UL 9540A Unit Level Test Results	
Same UL 9540A Fire Test Results: No Fire Propagation or Evidence of Sustained Flaming, No Flames Observed Outside the Cabinet, No Fire Propagation to Adjacent Cabinets, Integral Fire Suppression or Manual Fire Suppression (Hose Lines) Not Required to Stop Cabinet to Cabinet Fire Spread, No Observations of Explosion Hazards, No Free-Flowing Liquid Runoff Observed After the Test	

Each Megapack 2 unit contains up to 19 modules with inverters, a thermal bay and associated thermal roof components, an AC circuit breaker, and a set of customer interface terminals and internal controls circuit boards. The Megapack 2 XL uses identical components to the Megapack 2, including batteries, converters, and explosion protection systems. The main difference (other than the footprint) to the Megapack 2 is that that the Megapack 2 XL contains 24 AC battery modules rather than 19. Depending on the system configuration (2-hour or 4-hour), each Megapack can be configured with different quantities of battery modules which, together with the site's grid voltage, determine Megapack's nominal power rating. All components are housed in a cabinet-style enclosure, with access for maintenance provided via enclosure doors. The Megapack 2/XL, therefore, cannot be physically entered by any person and is thus not considered a walk-in container, occupied building, or structure as defined by *NFPA 855* and *IFC*. Thermal management is provided to the internal Megapack 2/XL components via active liquid cooling and heating system utilizing 50/50 ethylene glycol and water and R-134a refrigerant.

The Megapack 2/XL and constituent components are tested and certified to UL 9540, UL 1642, UL 1973, IEC 62619, and IEC 62933-5-2. UL 9540A (4^{th} Edition) large-scale fire testing was performed at the Cell, Module, and Unit level (Installation level testing was not required, as all Unit level performance criteria were met). From the UL 9540A Unit level report by TUV, "Based on the limited module propagation observed during MP2 testing (7 cells in runaway) the behavior would be the same with MP2XL. With the increase in volume and sparker count, the deflagration risk is minimized. The testing performed on MP2 is considered harsher with higher gas concentrations, and fundamental engineering analysis for MP2XL shows comparable behavior as worst case".

Figure 2-1 - Tesla Megapack 2

Figure 2-2 - Megapack Internal Architecture

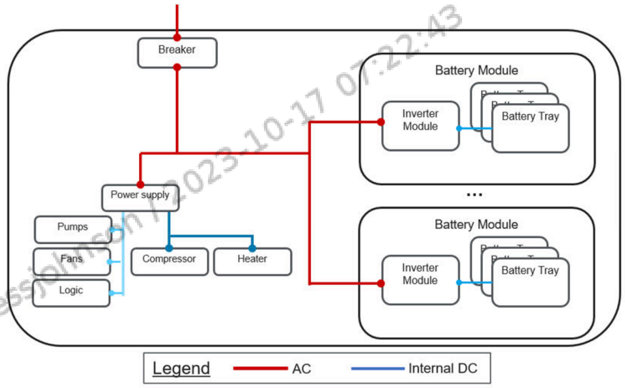


Figure 2-3 - Battery Module

Figure 2-4 - Tesla Megapack 2 Thermal Management System

Figure 2-5 - Tesla Megapack 2 XL

1. Battery modules with active and passive fuses – externally serviceable
2. Touch-safe Customer Interface Bay
3. Non-walk-in IP66 enclosure and deflagration mitigation
4. Thermal roof with overpressure vents

For more information on the Tesla Megapack 2 and Megapack 2 XL, please refer to official product documentation provided by Tesla.

2.2 Fire Safety Features

The Tesla Megapack 2/XL is equipped with a number of fire safety features designed to mitigate the propagation of a battery failure or prevent the failure from occurring altogether. These protections are aligned with the requirements of the 2020 Edition of NFPA 855, as well as the 2021 International Fire Code §1207 Electrical Energy Storage Systems.

2.2.1 Deflagration Control System

Each Megapack 2/XL is provided with an integral and proprietary explosion mitigation system (deflagration control). This explosion mitigation system is comprised of numerous pressure-sensitive (overpressure) vents located at the top of the Megapack and a sparker system; working in conjunction to ignite any flammable gasses that could be generated within the unit during a failure event. The Megapack 2 is provided with twenty-two (22) overpressure vents and 12 sparkers, while the Megapack 2 XL is provided with twenty-six (26) overpressure vents and 12 sparkers. Any overpressures generated from the ignition of flammable gasses within the unit will be relieved via the nearest pressure-sensitive vents and routed upwards, protecting the Megapack's structural integrity and preventing any hazardous pressure build-up within. The sparkers are located throughout the Megapack at various heights and continuously operate to ensure that any flammable gas build-up is ignited early – limiting the concentration of flammable gas within the unit and activating the pressure-sensitive vents to create a natural ventilation pathway to the exterior.

2.2.2 Battery Management System (BMS)

An integrated Battery Management System (BMS) monitors key datapoints such as voltage, current, and state of charge (SOC) of battery cells, in addition to providing control of corrective and protective actions in response to any abnormal conditions. Each battery module is equipped with a dedicated BMS, with a Megapack-level bus controller supervising output of all modules at the AC bus level. Critical BMS sensing parameters include battery module over / under voltage, cell string over / under voltage, battery module over temperature, temperature signal loss, and battery module over current. In the event of any abnormal conditions, the BMS will generally first raise an information warning, and then trigger a corresponding corrective action should certain levels be reached.

2.2.3 Fire Detection

In addition to monitoring of thermal sensors within the Megapack by the BMS – which may be transmitted to Tesla's 24/7 Operations Center, described below, and made available to a Subject Matter Expert (SME) if abnormal conditions are detected –External multi-spectrum infrared (IR) flame detectors can be provided to meet compliance with prescriptive requirements for automatic fire detection systems if they are mandated by the site-specific installation codes and standards.

While the IR detectors were not activated during UL 9540A unit level testing for the Megapack 2/XL (as no fire occurred), full-scale testing of previous Megapack systems showed that the external third-party multi-spectrum IR detectors effectively detected failure conditions that initiated within the unit.

2.2.4 Site Controller and Monitoring

The Tesla Site Controller provides a single point of interface for the utility, network operator, or customer SCADA systems to control and monitor the entire energy storage site. It hosts the control algorithm that dictates the charge and discharge functions of the battery system units, aggregating real-time information and using the information to optimize the commands sent to each individual Megapack unit.

The Megapack 2/XL is supported by Tesla's 24/7 Operations Center , which is designed to support the global fleet of energy storage products. In conjunction with local operation centers, the Megapack 2/XL has 24/7 remote monitoring, diagnostics, and troubleshooting capabilities. In the event of an emergency, this information may be made available to a Subject Matter Expert (SME) responsible for the system to inform emergency response personnel.

2.2.5 Fire Suppression Systems

NFPA 855 and the *2021 IFC Chapter 12* both require fire control and suppression systems to be provided in certain installation conditions for battery ESS. These fire suppression systems, however, are typically required for rooms, areas within buildings, and "walk-in" units when installed outdoors.

All components of the Tesla Megapack 2/XL are housed in a cabinet-style enclosure, with access for maintenance provided via enclosure doors that cannot be physically entered by any person. The installation codes and standards, thus, would not consider the Tesla Megapack 2/XL walk-in container, occupied building, or structure as defined by *NFPA 855* and *IFC*.

The Tesla Megapack 2/XL does not rely on any external or internal fire suppression systems to limit cascading thermal runaway. Additional bespoke testing and subsequent fire modeling has indicated that the Megapack's passive construction provides a robust thermal resistance from the impacts of an adjacent Megapack during a large-scale failure.

2.2.6 Electrical Fault Protection Devices

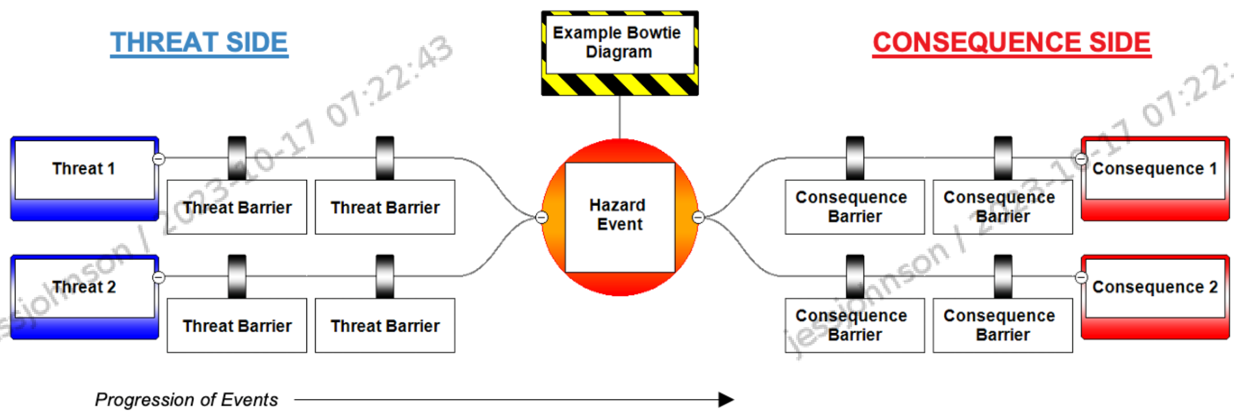
Multiple levels of passive and active electrical protections are provided for the Megapack 2/XL. At the battery module level, overcurrent protection is provided for each module in the form of single-use fusible links, providing interruption of overcurrent in the battery module in the case of an abnormal electrical event. Inverter modules, which are installed at each of the battery modules, are equipped with both DC protection via high-speed pyrotechnic fuse for passive or active isolation of battery module, as well as dedicated AC contactor and AC fuses should an abnormal electrical event occur at the inverter module on the AC side of the circuit. Additionally, the Megapack 2/XL is equipped with DC ground fault detection system and AC circuit breaker with ground fault trip settings for distribution system protection.

3 HAZARD MITIGATION ANALYSIS

3.1 HMA Methodology

ESRG utilizes the bowtie methodology for hazard and risk assessments, as is described in *ISO.IEC IEC 31010 §B.21*, as it allows for in-depth analysis on individual mitigative **barriers** and serves as a strong tool for visualizing the chronological pathway of **threats** leading to critical hazard events, and ultimately to greater potential **consequences**, as depicted in the figure below. This simple diagrammatic way of describing and analyzing the pathways of a risk from hazards to outcomes can be considered to be a combination of the logic of a fault tree analyzing the cause of an event and an event tree analyzing the consequences.

Figure 3-1 - Example Bowtie Diagram



Each fault condition per *NFPA 855* and *IFC* assessed in Sections 3.4.1 – 3.4.6 below is accompanied by a corresponding bowtie diagram indicating critical *threat* and *consequence* pathways and the mitigative barriers between them. As the most critical risk posed by lithium-ion battery cells comes from the propagation of thermal runaway from a failing cell (or multiple cells) to surrounding cells, this serves as the primary critical hazard for the subsequent failure scenarios.

In addition to main barriers for fault conditions on the *threat* side of the diagram, the *consequence* barriers on the right side of the diagram (e.g., explosion protection and emergency response plan) **also** contribute added layers of safety on top of the main threat barriers shown. It is important to note that the barriers on the left side, along a threat path, are intended to keep the threat from becoming a thermal runaway, while the barriers on the right side, along the consequence pathway, are intended to keep that single thermal runaway from evolving into one of the more severe consequences such as fire spread beyond containment, off-gassing leading to explosion, or fire spread beyond containment. For more on the methodology and relevant terminology, see Appendix B of this report.

3.2 Relevant Supporting Information

3.2.1 UL 9540A Large-Scale Fire Testing

UL 9540A (4th Edition) testing was performed for the constituent Cell, Module, and Unit levels of the Tesla Megapack 2/XL.

Cell Level Test Report [1]

UL 9540A (4th Edition) Cell level testing was performed on the Contemporary Amperex Technology Co., Ltd. (CATL) 3.22V, 157.2Ah lithium iron phosphate (LFP) battery cell at UL LLC (Changzhou) Quality Technical Service Co., LTD. in July 2021. The test was re-run on February 25th, 2022.

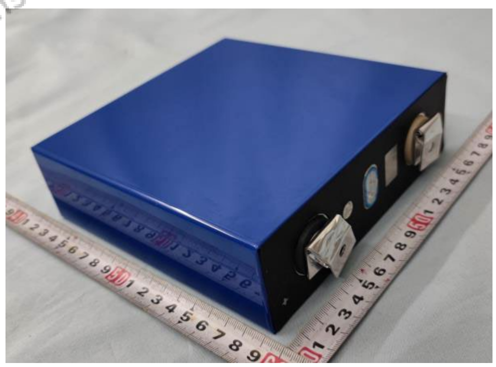
Thermal runaway was initiated via film strip heater, resulting in average cell surface temperature of 174°C and average cell surface temperature at thermal runaway of 239°C. Gas analysis of the gas generated from the well were identified as flammable. As these performance criteria per *UL 9540A Clause 7.7* and *Figure 1.1* were not met, Module level testing was required.

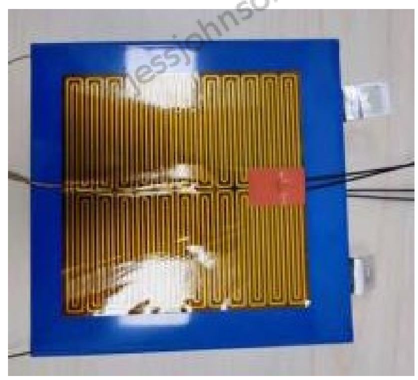
Table 3-1 – Results of Gas Analysis (Excluding O_2 and N_2)

Gas Component	Measured %	Component LFL
Carbon Monoxide (CO)	10.881	10.9
Carbon Dioxide (CO_2)	27.107	N/A
Hydrogen (H_2)	50.148	4.0
Methane (CH_4)	6.428	4.4
Acetylene (C_2H_2)	0.264	2.3
Ethylene (C_2H_4)	3.283	2.4
Ethane (C_2H_6)	1.100	2.4
Propane (C_3H_8)	0.125	1.7
C4 (Total)	0.190	N/A
C5 (Total)	0.027	N/A
C6 (Total)	0.005	N/A
Benzene (C_6H_6)	0.004	1.2
Toluene (C_7H_8)	0.002	1.0

Dimethyl Carbonate ($C_3H_6O_3$)	0.055	N/A
Ethyl Methyl Carbonate ($C_4H_8O_3$)	0.004	N/A
Total	100	-

Figure 3-2 – Cell Level Testing – Flexible Film Heater Installation





<u>Module Level Test Report</u> [2]

UL 9540A (4th Edition) Module level testing was performed on the Contemporary Amperex Technology Co., Ltd. (CATL) MP2 360.64Vdc, 156Ah battery module at TÜV SÜD SW Rail Transportation Technology (Jiangsu) Co., Ltd. in December of 2021 and repeated in May of 2022.

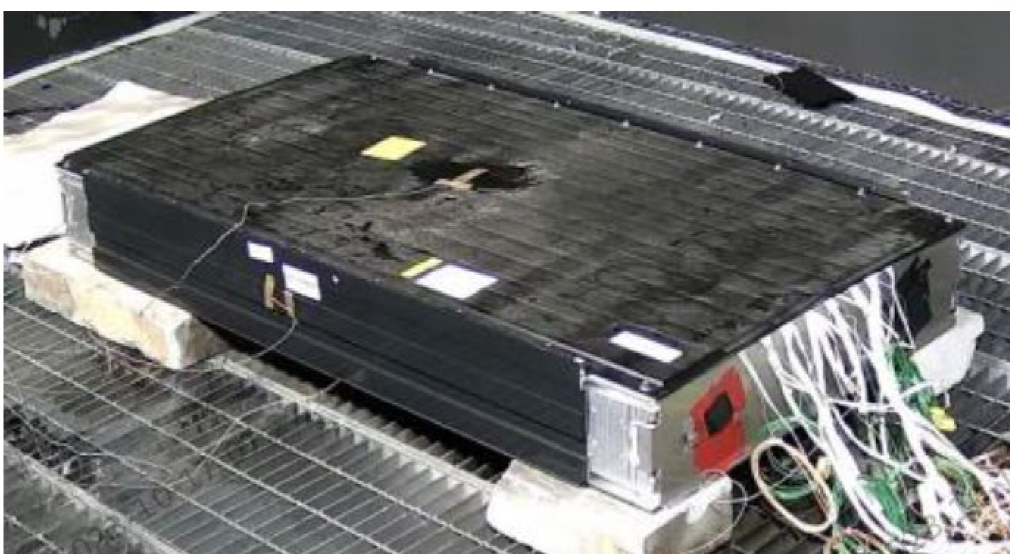
Thermal runaway was initiated via film strip heaters installed on both of the wide side surfaces of each cell, similar to the cell level test. In the module level test, however, two cells were heated simultaneously to force multiple cells into thermal runaway at the same time.

Thermal runaway propagated from the initiating cells to all cells within the MP2 tray (module). Sparks and flying debris were observed, however, there were no explosive discharges of gases. Gases generated from the cell were identified as flammable, but there was no detection of toxic gases that are sometimes associated with lithium-ion battery failure such as HF, HCL, and HCN. Unit level testing to the UL 9540A test method is required due to the fact that the gases generated are flammable.

Table 3-2 - Module Level Test Gas Analysis

Gas Name	Chemical Structure	Measurement Peak (ppm)	Detection Method
Carbon Monoxide	CO	204.84	FTIR
Carbon Dioxide	CO_2	6720.62	FTIR
Methane	CH_4	67.83	FTIR
Acetylene	C_2H_2	17.11	FTIR
Ethene	C_2H_4	Not Detected	FTIR
Ethane	C_2H_6	Not Detected	FTIR
Propane	C_3H_8	Not Detected	FTIR
Butane	C_3H_4	Not Detected	FTIR
Pentane	C_3H_6	Not Detected	FTIR
Benzene	C_6H_6	9.01	FTIR
Hexane	C_7H_{14}	Not Detected	FTIR
Hydrofluoric Acid	HF	Not Detected	FTIR
Hydrogen Chloride	HCL	Not Detected	FTIR
Hydrogen Cyanide	HCN	Not Detected	FTIR
Hydrogen	H_2	446	Hydrogen Sensor
Total Hydrocarbons	(Propane Equivalent)	246.53	FID

Figure 3-3 - Highlights of Module Testing



Unit Level Test Report [3]

UL 9540A (4th Edition) Unit level testing was performed for the Tesla Megapack 2/XL model 1748844-XX-Y at TUV Rheinland of North America, Inc. May 9, 2022.

Burn marks were observed on initiating AC battery module, though no external damage was observed. No damage to target units or adjacent walls were observed. All performance criteria for outdoor ground mounted non-residential use ESS were met, therefore Installation level testing was not required.

A full review of Unit level testing was provided by Fisher Engineering, Inc., as is briefly summarized below.

3.2.2 Tesla Megapack 2/XL: Fire Protection Engineering Analysis

A fire protection engineering analysis and UL 9540A Unit level fire test analysis report was provided by Fisher Engineering, Inc. (FEI) which includes review of the Megapack 2 construction, design, fire safety features, and large-scale fire test data [4]. A brief summary of key takeaways is provided below. For more information, please refer to **Tesla_Megapack_2_and_XL_-_FPE Report_Final.pdf**.

Key takeaways from the report include:

1. The MP2 XL design is almost identical to the MP2 other than being greater in length to accommodate the additional battery modules. Given the limited module propagation observed during UL 9540A unit level testing of the MP2 (seven cells went into runaway) the behavior is expected to be no different with the MP2 XL. As such, a stand-alone UL9540A unit level fire test for the MP2XL was not performed. The UL 9540A unit level fire test results, described above for the MP2, can be applied to the MP2XL.
    a. Similarly, after reviewing the MP2 unit level fire test results and comparing the MP2 and MP2 XL to one another, TÜV determined the MP2 UL 9540A unit level fire test results can be applied to the MP2XL and an additional UL 9540A unit level fire test for the MP2XL was not required for its listing.

2. The largest variant of the Megapack 2 was tested at a worst-case scenario (i.e., 100% SOC with BMS and TMS disabled) to the UL 9540A Unit level fire test method in which six cells within a battery module of the initiating Megapack 2 unit were forced into thermal runaway. Thermal runaway propagated to a seventh cell but did not propagate any further. No propagation to adjacent battery modules or target Megapack units occurred.
3. All Unit level performance criteria outlined in 9540A, Table 9.1 for outdoor, ground-mounted ESS were met, therefore Installation level testing was not required. Specifically, these results included:
    a. No flaming was observed outside of the unit.

b. Surface temperatures of battery modules within the target units did not exceed the temperature at which thermally initiated cell venting occurs. The maximum temperatures recorded at the battery modules of the adjacent cabinets were 13.8°C and 13.2°C, which are significantly below the temperature at which cell venting occurs (174°C).

c. Surface temperatures of exposures 5 ft (1.52 m) to the side and 8 ft (2.44 m) in front of the initiating unit did not exceed 97°C (175°F) above ambient. The maximum external surface temperatures recorded at the instrumented wall 5 ft to the side was 25.9°C (78.6°F) with a temperature rise above ambient of 5.5°C (9.9°F). The maximum external surface temperatures recorded at the front target 8 ft directly in front of the initiating unit was 16.8°C with a temperature rise above ambient of 5.5°C. These temperatures are significantly below the maximum permitted temperature rise above ambient of 97°C (175°F).

d. Explosion hazards, including, but not limited to, observations of a deflagration, projectiles, flying debris, detonation, or other explosive discharge of gases were not observed.

e. Heat flux did not exceed 1.3 kW/m2. The maximum heat flux recorded was 0.0000016 W/m2, which was the sensor installed on the front target cabinet and was the ambient heat flux the sensor was exposed to throughout the test.

4. A maximum surface temperature of 16.8°C was measured on the front target Megapack 2 unit installed 8 ft in front of the initiating Megapack 2 unit, and 13.8°C and 13.2°C at the battery modules of the adjacent unit. Based on cell venting and thermal runaway temperatures from 9540A Cell level test report (174°C and 239°C, respectively), propagation to the battery modules within a unit at clearances of 8 ft is not possible.

5. Smaller capacity MP2 cabinets, populated with less than nineteen battery modules, would be expected to perform similarly given they are designed and constructed substantially similar (with the same cells, battery modules, fire safety features, etc.) than the larger capacity 3,100 kWh MP2 cabinet tested and described in the Fisher report.

6. None of the fire detectors activated during the fire test (two multi-spectrum IR flame detectors and two thermal imagers), which is expected, as no flaming was observed outside of the cabinet during the test; however, previous testing on the Tesla Megapack 1 units demonstrated that multi-spectrum IR flame detectors can detect a fire should flames exit the cabinet through the roof.

7. An internal fire suppression system or an external fire suppression system is not required to stop propagating thermal runaway from cell to cell, module to module, or MP2 cabinet to cabinet when near simultaneous failure of up to six cells occurs within the same battery module.

8. Manual fire suppression (hose lines) is not required to stop propagating thermal runaway and the spread of fire from a MP2 cabinet to adjacent MP2 cabinets installed

6 in (150 mm) behind and to the sides when a near simultaneous failure of up to six cells occurs within the same battery module.

3.2.3 Tesla Megapack 2/XL: Internal Fire Testing

3.2.3.1 Destructive Unit Level Testing

Voluntary destructive testing was conducted by Tesla on a representative and fully populated Megapack 2 XL. This destructive fire testing utilized a more aggressive approach than what is required by the UL 9540A test method in order to force the system into a more severe cascading thermal runaway event. This destructive test was conducted to demonstrate the Megapack 2/XL's ability to fail in a safe manner, even in the extreme event of a catastrophic failure within an entire battery module. Additionally, the destructive testing further validated the design of the Megapack 2/XL proprietary explosion mitigation system.

This testing was conducted at the Northern Nevada Research Center on May 19th, 2022. The test utilized film heaters to simultaneously heat forty-eight (48) cells within a module, creating a severe failure scenario that is well beyond what is contemplated by the UL 9540A test method. The goal of this testing was to assess the risk of a large-scale fire resulting from an initiating Megapack 2/XL during a thermal runaway event propagating to an adjacent Megapack 2/XL. The results of this testing show some key takeaways, as detailed in the Fisher Engineering FPE report:

- Thermal runaway propagated from the initiating cells to all the cells in the initiating tray.
- A thermal event occurred, likely initiated by the ignition of flammable gases by the sparker system. An overpressure vent installed above the initiating battery module opened and was visually confirmed through video. The cabinet doors immediately adjacent to the initiating battery module remained closed. No hazardous pressure waves, debris, shrapnel, or pieces of the cabinet were ejected.
- After approximately 10 minutes of smoking, a sustained fire began within the initiating battery module. The fire spread to the adjacent battery bays until reaching the CIB and stopped. The fire only burned half of the cabinet.
- Fire spread from battery bay to battery bay was a slow progressing event. In total, visible flames were observed for 6 hours and 40 minutes while the four battery bays (bays 7-10) burned, as shown in Figure 18 of the Fisher report.
- Maximum flame heights were observed to be 11.5 ft (3.5 m) from ground to the top of the flame, 2.5 ft (0.75 m) above the top of the cabinet and had a base (a width) of 3.3 ft (1 m) during peak flame intensity. This peak flame intensity occurred approximately 60-90 minutes after initial flaming was observed.
- An analysis of the pressure profile inside the cabinet during the test demonstrated the operation of the explosion control system, as shown in Figure 19 of the Fisher report. Pressure inside the cabinet increased to nearly 11 kPa (1.60 psi) until the deflagration vent opened and the pressure diminished. The overpressure vents

are designed to operate at approximately 12 kPa (1.74 psi), or 2.5 times below the cabinet's strength of 30 kPa (4.35 psi).

3.2.3.2 Fire Modeling – Propagation Model

Subsequent fire propagation modeling was conducted to assess the fire propagation risk to adjacent Megapack 2/XL units during a more severe event such as what was observed during the internal destructive testing referenced in Section 3.2.3.1. This fire propagation model showed that due to the robustness of the system design, it is unlikely that a fire from an initiating Megapack 2/XL would propagate to the adjacent Megapack 2/XL, even during worst-case scenario wind conditions. The modeling assessed two scenarios – a non-flaming event and the impact of heat transfer on a target Megapack 2/XL as well as a flaming event and the impact of radiative heat transfer on a target Megapack 2/XL installed per Tesla's recommendations.

3.2.3.3 Product of Combustion - Unit Level Testing

Tesla conducted additional internal Unit Level testing to obtain and analyze the products of combustion from a failing Megapack Unit. The products of combustion were collected at locations 20 ft upwind and 5 ft downwind from the initiating unit to assess airborne contaminants which may be present during an incident. Subsequent third-party analysis concluded that no traces of Mercury was present over the entire 2.5-hour test duration. Hydrogen Fluoride (HF) was detected at values of 0.10 and 0.12 parts per million (ppm) in the two sampling locations over the course of the test – far below accepted NIOSH Immediately Dangerous to Life or Health (IDLH) value of 30 ppm for HF.

3.2.4 Emergency Response Guide

A product-level Emergency Response Guide (ERG) was provided by Tesla and provides an overview of the product materials, handling and use precautions, hazards, emergency response procedures, and storage and transportation instructions. Tesla's Emergency Response Guide is publicly available to all First Responders and can be found at: https://www.tesla.com/firstresponders

In addition to this product-level guide, a site-specific Emergency Response Plan (ERP) will provide an additional level of safety and familiarization for first responders who may be arriving on-scene to an incident at an installation utilizing the Megapack 2/XL system.

3.3 Primary Consequences of ESS Failure and Mitigative Barriers

The dynamics of lithium-ion ESS failures are extremely complex, and the pathway of failure events may vary widely based on system design, mitigative approaches utilized, and even small changes in environmental or situational conditions. However, the primary consequences stemming from a propagating lithium-ion battery failure largely fall into a number of specific hazard scenarios, as depicted in the diagram and associated table below (though other scenarios not listed may certainly also occur). These primary consequences serve as the basis for the consequence side of the majority of the fault condition diagrams in the following sections of this report.

While not explicitly detailed in the simplified diagram below, the criticality and effectiveness of the barriers may vary based on associated threat or consequence pathway. For example, a water-based suppression system may be more critical for mitigation of cell or module combustion from spreading, ultimately leading to fire spread beyond containment, than it is for preventing off-gassing within the enclosure, potentially leading to explosion. Similarly, the same water-based suppression system may be more effective for mitigating spread of fire throughout the system than it is for reducing risk of explosion).

Figure 3-4 - Primary Consequence Diagram

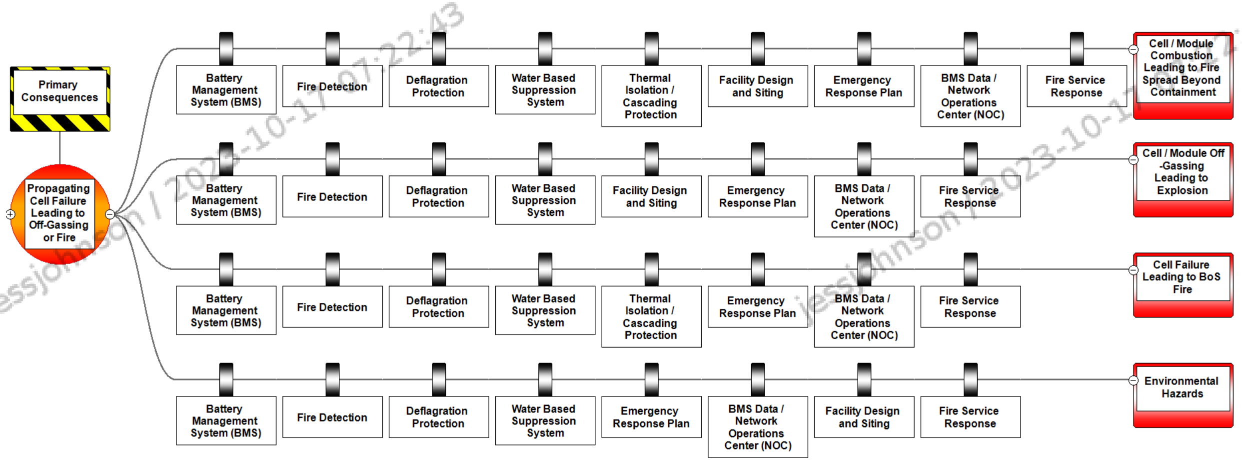


Table 3-3 - Primary Consequence Barriers

PRIMARY CONSEQUENCE BARRIERS	
Battery Management System (BMS)	Critical BMS sensing parameters for the Megapack 2/XL include battery module over / under voltage, cell string over / under voltage, battery module over temperature, temperature signal loss, and battery module over current. In the event of any abnormal conditions, the BMS will generally first raise an information warning, and then trigger a corresponding corrective action should certain levels be reached.

Fire Detection	Multi-spectrum infrared detectors can be provided to satisfy automatic fire detection requirements of the regulations adopted for that installation.
Water-Based Suppression System*	The Megapack 2/XL does not rely on any external or internal water-based suppression system to prevent or mitigate hazards resulting from large-scale failure.
Deflagration Protection	The Megapack 2/XL is equipped with deflagration protection in the form of pressure-sensitive vents and sparker system designed to ignite any flammable gases and release in a controlled manner before they are allowed to accumulate and create an explosive atmosphere within the enclosure.
Electrical Fault Protection Devices	The Megapack 2/XL is equipped with a number of electrical fault protection in the form of battery module overcurrent protection, inverter DC and AC protection, and ground fault protection.
Facility Design and Siting*	Proper siting based on appropriate separation distances from nearby exposures, land area and use, facility type, and other design factors may increase strength of this barrier. Project developers using the Megapack 2/XL should follow Tesla recommended installation guidelines.
Emergency Response Plan / First Responders*	A product-level Emergency Response Guide (ERG) is provided for the Tesla Megapack 2/XL, outlining key product information, safety hazards, and general emergency response procedures. A site-specific Emergency Response Plan (ERP) in accordance with the requirements of the locally adopted codes/standards will provide an additional level of safety for individual installations utilizing the Megapack 2/XL. Additionally, adequate familiarization designated subject matter experts (SMEs) and corporate first responders can greatly improve the strength of this barrier.
BMS Data Availability / Operations Center	Tesla Site Controller provides point of interface for the utility, network operator or customer SCADA systems to control and monitor the energy storage site. 24/7 remote monitoring by Tesla's Operations Center can be provided if requested.
Fire Service Response*	It is unknown if an adequate water supply or source will be available at most sites for firefighting purposes. As recommended in Tesla's Emergency Response Guide (ERG); a defensive firefighting approach shall be utilized, with water sprayed on neighboring exposures and neighboring enclosures if advised by Tesla or at the discretion of the first responders. Site-specific training and installation familiarization for local responding stations may further increase the strength of this barrier, and that fire department equipment and capabilities will be strong with this familiarization.
** Barrier may vary on site-by-site basis and are therefore not fully assessed within the scope of this report.*	

3.4 Fault Condition Analysis

Per *NFPA 855 §4.1.4.2*, the analysis shall evaluate the consequences of the following failure modes and others deemed necessary by the AHJ:

1) *Thermal runaway condition in a single module, array, or unit*
2) *Failure of an energy storage management system*
3) *Failure of a required ventilation or exhaust system*
4) *Failure of a required smoke detection, fire detection, fire suppression, or gas detection system*

For completeness, additional failure modes required per *2021 IFC §1207.1.4.1* are also considered in the analysis.

5) *Voltage surges on the primary electric supply*
6) *Short circuits on the load side of the ESS*

For the purposes of this report, it shall be assumed that all construction, equipment, and systems that are required for the ESS shall be installed, tested, and maintained in accordance with local codes and the manufacturer's instructions. The assessment is based on the most recent information provided by the Tesla, Inc. at the time of this writing.

The following table provides a summary of findings from the hazard mitigation analysis performed in fulfillment of *NFPA 855 §4.1.4.2,* with each fault condition described in greater detail, accompanied by simplified bowtie diagrams for visualization of mitigative barriers. Additionally, full bowtie diagrams with barrier descriptions are provided in Appendix A.

Table 3-4 - Summary of Fault Condition Analysis

Compliance Requirement	Comments
1. Thermal runaway condition in a single module, array, or unit	A number of passive and active measures are implemented to reduce the potential of a thermal runaway event from occurring including BMS control and active cooling to internal components. Battery modules and cells have been listed to UL 1973 and UL 1642. Should a thermal runaway event occur, additional mitigative measures are provided to prevent further propagation of failure throughout the system (see Section 3.3 above for list of all consequence barriers).
2. Failure of an energy storage management system	In the event of a failure of module-level BMS, the Megapack-level BMS (which may be considered "ESMS")

	shall isolate effected modules, mitigating against further propagation of failure across the system. Should a failure of the Megapack-level BMS occur, each module is equipped with a dedicated BMS to provide corrective actions in case of detection of abnormal operation outside of set parameters. To further isolate any failure stemming from a failure of the energy storage management system, passive and active electrical fault protections are provided at multiple levels, as described in Section 2.2.6 above.
3. Failure of a required ventilation or exhaust system	The Megapack 2/XL does not utilize a system to exhaust flammable gasses, as lithium-ion batteries do not release flammable gas during normal operations. Flammable gasses generated during abnormal operations are mitigated by the Megapack 2/XL's proprietary explosion mitigation system.
4. Failure of a required smoke detection, fire detection, fire suppression, or gas detection system	The Tesla Megapack 2/XL does not rely on a dedicated smoke detection, fire detection, or gas detection system. Multi-spectrum infrared (IR) detection can be provided to satisfy the automatic fire detection requirements of the locally adopted codes/standards. Should IR detection systems fail, it is anticipated that BMS fault notifications shall be transmitted to Tesla's 24/7 Operations Center, alerting system owner to abnormal conditions. Data from the BMS may be communicated to Certificate of Fitness holder to provide guidance to the fire department in case of emergency. The Megapack 2/XL does not rely on an integrated fire suppression system (such as internal water-based or gas-phase suppression system) to mitigate the hazards associated with propagating thermal runaway. Bespoke fire testing and subsequent fire modeling has shown that the robust passive thermal protection of the Megapack 2/XL design will prevent an unlikely fire from cascading to an adjacent Megapack from the initiating system. Furthermore, UL 9540A Unit level testing indicates that no flaming occurred and that no propagation of heat from the initiating unit to adjacent units / modules reached levels capable of initiating cell venting or thermal runaway.

5. **Voltage surges on the primary electric supply** *(IFC §1207.1.4.1(4))*	Voltage surges on the primary electric side are anticipated to be mitigated by the provided BMS and inverter controls, voltage monitoring and automatic disconnect provided by the BMS, in addition to a number of passive circuit protections briefly noted in Section 2.2.6 of this report.
6. **Short circuits on the load side of the ESS** *(IFC §1207.1.4.1(5))*	Short circuits on the load side of the ESS are anticipated to be mitigated by BMS control and subsequent safety actions, in addition to a number of passive circuit protections briefly noted in Section 2.2.6 of this report.

3.4.1 Thermal Runaway Condition

Thermal runaway, as defined per *NFPA 855 §3.3.20*, is defined as the condition when an electrochemical cell increases its temperature through self-heating in an uncontrollable fashion and progresses when the cell's heat generation is at a higher rate than it can dissipate, potentially leading to off-gassing, fire, or explosion. The cause of a thermal runaway event can range from a manufacturer defect in the cell, external impact, exposure to dangerously high temperatures, or a multitude of controls and electrical failures. Furthermore, a thermal runaway event in a single cell can propagate to nearby cells, thus creating a cascading runaway event across battery modules and racks, leading to more heat generation, fire, off-gassing, and increased potential for a deflagration event.

The Tesla Megapack 2/XL is equipped with a number of passive and active mitigations such as BMS Control and active thermal management system for cooling of internal components to reduce the potential of a thermal runaway event from occurring, as is depicted on the *threat* side of the diagram below. Threat scenarios accounted for include single-cell thermal runaway, multi-cell thermal runaway, and internal defect or failure not resulting in thermal runaway, leading to the primary hazard event (propagating cell failure leading to off-gassing or fire).

Should thermal runaway occur within a battery module, a number of key barriers are provided to mitigate against propagation of failure throughout the system leading to more severe consequences, which are described in detail in Section 3.3 of this report above.

Figure 3-5 - Thermal Runaway Condition Diagram

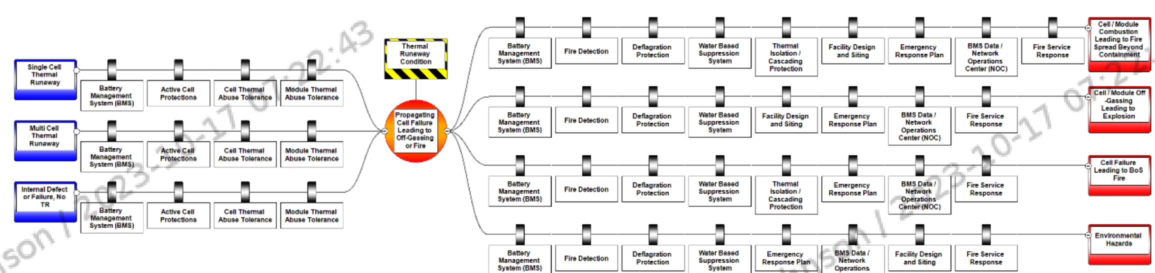


Table 3-5 - Thermal Runaway Condition Barriers

Barrier	Barrier Description
THREAT BARRIERS	
Battery Management System (BMS)	BMS provides sensing and control of critical parameters and triggers protective or corrective actions if system is operating out of normal parameters. Parameters include battery module over / under voltage, cell string over / under voltage, battery module over temperature, temperature signal loss, and battery module over current. In the event of any abnormal conditions, the BMS will first raise an information warning and then trigger a corresponding corrective action should certain levels be reached.
Thermal Management System	Active thermal management system provides liquid cooling to internal components within the Megapack 2/XL to limit heat diffusion.
Cell Thermal Abuse Tolerance	Cell has been tested and listed to UL 1973 in which thermal abuse tolerance was tested.
Module Thermal Abuse Tolerance	Module has been tested and listed to UL 1973 in which thermal abuse tolerance was tested.
CONSEQUENCE BARRIERS	
See Section 3.3 above for list of primary consequence barriers.	

3.4.2 Failure of an Energy Storage Management System

The loss, failure, or abnormal operation of an energy storage control system (controllers, sensors, logic / software, actuators, and communications networks) may directly impact the proper function of the system. The Tesla Megapack 2/XL utilizes a tiered hierarchy of controls starting at the module level up to the site level.

In the event of a failure of module-level BMS, the Megapack-level BMS (which may be considered “ESMS”) shall isolate effected modules, mitigating against further propagation of failure across the system. Should a failure of the Megapack-level BMS occur, each module is equipped with a dedicated BMS to provide corrective actions in case of detection of abnormal operation outside of set parameters. To further isolate any failure stemming from a failure of the energy storage management system, passive and active electrical fault protections are provided at multiple levels, as described in Section 2.2.6 above.

Finally, should a propagating thermal runaway occur, a number of key barriers are provided to mitigate against propagation of failure throughout the system leading to more severe consequences, which are described in detail in Section 3.3 of this report above.

Figure 3-6 - Failure of an Energy Storage Management System Diagram

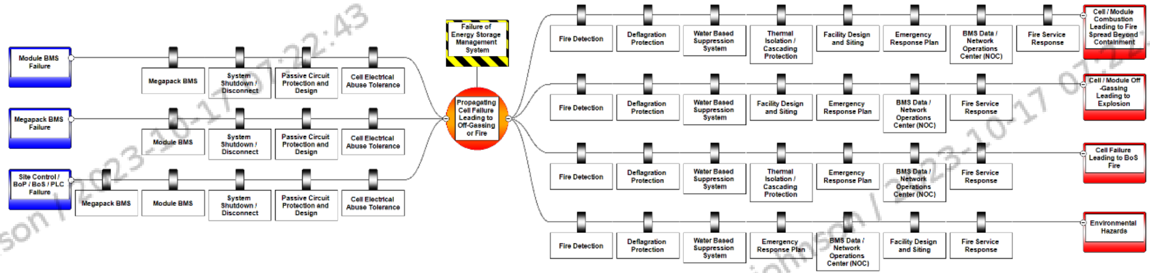


Table 3-6 - Failure of an Energy Storage Management System Barriers

Barrier	Barrier Description
THREAT BARRIERS	
Energy Storage Management System (ESMS)	Megapack-level Energy Storage Management System (ESMS) supervising output of all modules at AC bus level to provide isolation / protective actions in case of module BMS failure.
Module BMS	Module-level BMS to provide isolation / protective actions in case of ESMS failure.
System Shutdown / Disconnect	Multiple levels of passive and active electrical protections are provided for the Megapack 2/XL including module overcurrent protection via fusible links on the DC side of the modules, inverter DC and AC protections, and ground fault detection.
Passive Circuit Protection and Design	Fused disconnects and DC disconnect switches, in addition to ground fault detection / interruption and over voltage protection provided.
Cell Electrical Abuse Tolerance	Cell tested and certified to UL 1642 Standard for Lithium Batteries.
CONSEQUENCE BARRIERS	
See Section 3.3 above for list of primary consequence barriers.	

3.4.3 Failure of a Required Ventilation or Exhaust System

The Megapack 2/XL does not utilize a system to exhaust flammable gasses, as lithium-ion batteries do not release flammable gas during normal operations. Flammable gasses generated during abnormal operations are mitigated by the Megapack 2/XL's proprietary explosion mitigation system.

3.4.4 Failure of a Required Smoke Detection, Fire Detection, Fire Suppression, or Gas Detection System

The Tesla Megapack 2/XL does not rely on a dedicated smoke detection, fire detection, or gas detection system. Multi-spectrum infrared (IR) detection can be provided to satisfy the automatic fire detection requirements of the locally adopted codes/standards. Should IR detection systems fail, it is anticipated that BMS fault notifications shall be transmitted to Tesla's 24/7 Operations Center, alerting system owner to abnormal conditions. Data from the BMS may be communicated to a Subject Matter Expert to provide guidance to the fire department in case of emergency.

The Megapack 2/XL does not inherently rely on an integrated or external fire suppression system. A fire is not expected to propagate through the system or to nearby exposures based on UL 9540A Unit level testing, indicating that no flaming occurred and that no propagation of heat from the initiating unit to adjacent units / modules reached levels capable of initiating cell venting or thermal runaway. Bespoke fire testing and subsequent fire modeling has further assessed the robustness of the Megapack 2/XL system design and resistance to propagating failures. Furthermore, fire department response is expected to be strong based on training, robust firefighting capabilities and timely response.

Figure 3-7 - Failure of Smoke Detection, Fire Detection, Fire Suppression, or Gas Detection System Diagrams

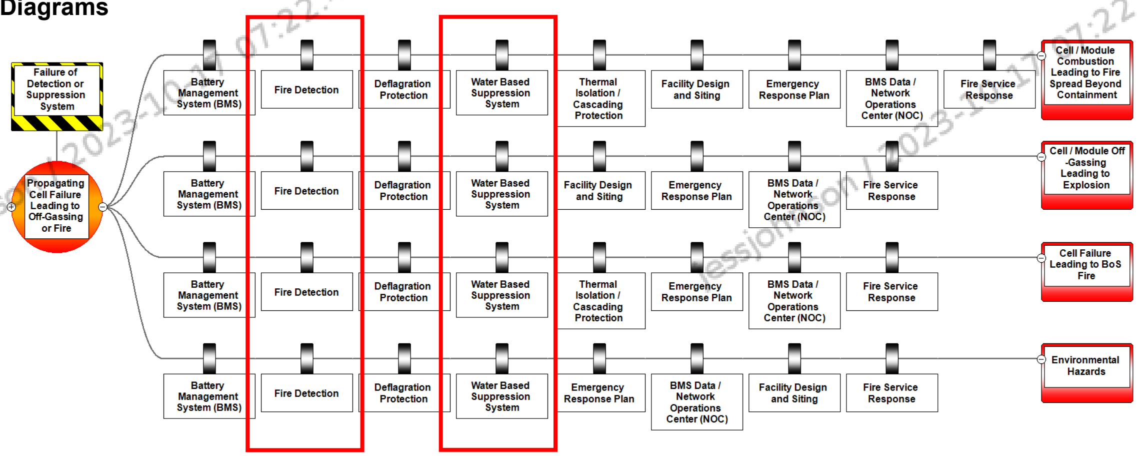


Table 3-7 - Failure of Smoke Detection, Fire Detection, Fire Suppression, or Gas Detection System Barriers

Barrier	Barrier Description
CONSEQUENCE BARRIERS	
Battery Management System (BMS)	BMS provides sensing and control of critical parameters and triggers protective or corrective actions if system is operating out of normal parameters. Parameters include battery module over / under voltage, cell string over / under voltage, battery module over temperature, temperature signal loss, and battery module over current. In the event of any abnormal conditions, the BMS will first

	raise an information warning and then trigger a corresponding corrective action should certain levels be reached.
Deflagration Protection	The Megapack 2/XL is equipped with deflagration protection in the form of pressure-sensitive vents and sparker system designed to ignite any flammable gases and release in a controlled manner before they are allowed to accumulate and create an explosive atmosphere within the enclosure.
Thermal Isolation / Cascading Protection	Thermal isolation shown to be effective in limiting heat transfer between Megapacks in UL 9540A Unit level testing.
Facility Design and Siting*	Facility design and siting may vary based on site-by-site basis. It should be ensured that sites follow Tesla recommended guidance for siting and other installation specifications be followed.
Emergency Response Plan / First Responders*	Product-level Emergency Response Guide (ERG) provided by Tesla. Additional level of safety may be provided via site-specific Emergency Response Plans (ERP) in accordance with the locally adopted codes/standards.
BMS Data / Operations Center	Megapack data accessible remotely via Tesla's 24/7 Operations Center.
Fire Service Response	Site-specific training and installation familiarization for local responding stations will increase the strength of this barrier, and fire department equipment and capabilities will be strong with this familiarization.
** Barrier may vary on site-by-site basis and are therefore not fully assessed within the scope of this report.*	

3.4.5 Voltage Surges on the Primary Electric Supply

Voltage surges on the primary electric supply are expected to be largely mitigated by voltage monitoring and corrective actions taken by the BMS. Should corrective actions triggered by the BMS fail to prevent further propagation of failure, a number of electrical fault protections are provided for the Megapack 2/XL, as are briefly described in Section 2.2.6 of this report.

Figure 3-8 - Voltage Surges on the Primary Electric Supply Diagram

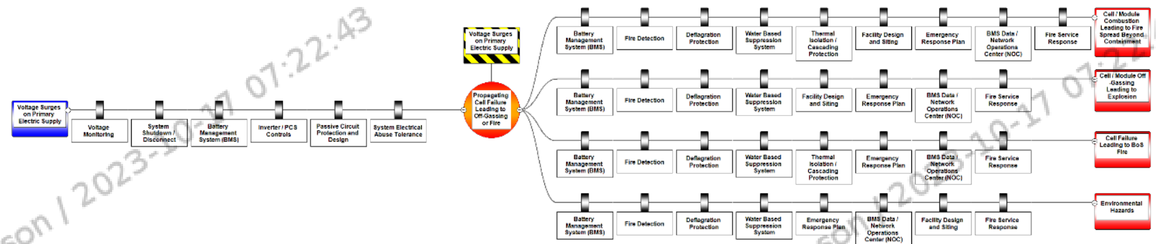


Table 3-8 - Voltage Surges on the Primary Electric Supply Barriers

Barrier	Barrier Description
THREAT BARRIERS	
Voltage Monitoring	Voltage is measured by BMS, triggering fault and alarm monitor indicators, and potential system disconnect or other corrective actions if operating out of normal parameters.
System Shutdown / Disconnect	Multiple levels of passive and active electrical protections are provided for the Megapack 2/XL including module overcurrent protection via fusible links on the DC side of the modules, inverter DC and AC protections, and ground fault detection.
Battery Management System (BMS)	BMS provides sensing and control of critical parameters and triggers protective or corrective actions if system is operating out of normal parameters. Parameters include battery module over / under voltage, cell string over / under voltage, battery module over temperature, temperature signal loss, and battery module over current. In the event of any abnormal conditions, the BMS will first raise an information warning and then trigger a corresponding corrective action should certain levels be reached.
Inverter / PCS Controls	Inverter modules equipped with both DC protection via high-speed pyrotechnic fuse for passive or active isolation of battery module, as well as dedicated AC contactor and AC fuses should an abnormal electrical event occur at the inverter module on the AC side of the circuit.
Passive Circuit Protection / Design	Fused disconnects and DC disconnect switches, in addition to ground fault detection / interruption and over voltage protection provided.
System Electrical Abuse Tolerance	System tested and listed to UL 9540.
CONSEQUENCE BARRIERS	

See Section 3.3 above for list of primary consequence barriers.

3.4.6 Short Circuits on the Load Side of the ESS

Short circuits on the load side of the ESS are anticipated to be largely mitigated by BMS control and passive circuit protection and design (e.g., fused disconnects, ground fault detection / interruption, and overvoltage protection), as described in previous sections of this report. The Megapack 2/XL has been tested and listed to UL 9540A, demonstrating adequate system electrical abuse tolerance and compatibility of constituent components.

Finally, as is consistent across all previous fault conditions covered above, should propagating thermal runaway occur, a number of key barriers are provided to mitigate against propagation of failure throughout the system leading to more severe consequences, which are described in detail in Section 3.3 of this report above.

Figure 3-9 - Short Circuits on the Load Side of the ESS Diagram

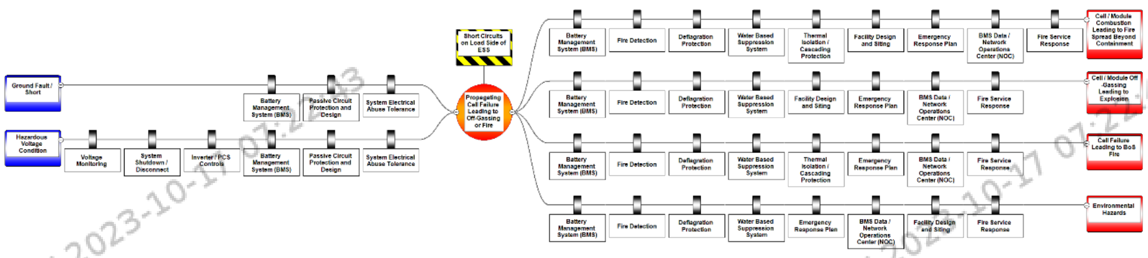


Table 3-9 - Short Circuits on the Load Side of the ESS Barriers

Barrier	Barrier Description
THREAT BARRIERS	
Battery Management System (BMS)	BMS provides sensing and control of critical parameters and triggers protective or corrective actions if system is operating out of normal parameters. Parameters include battery module over / under voltage, cell string over / under voltage, battery module over temperature, temperature signal loss, and battery module over current. In the event of any abnormal conditions, the BMS will first raise an information warning and then trigger a corresponding corrective action should certain levels be reached.
Voltage Monitoring	Voltage is measured by BMS, triggering fault and alarm monitor indicators, and potential system disconnect or other corrective actions if operating out of normal parameters.

System Shutdown / Disconnect	Multiple levels of passive and active electrical protections are provided for the Megapack 2/XL including module overcurrent protection via fusible links on the DC side of the modules, inverter DC and AC protections, and ground fault detection.
Passive Circuit Protection / Design	Fused disconnects and DC disconnect switches, in addition to ground fault detection / interruption and over voltage protection provided.
System Electrical Abuse Tolerance	System tested and listed to UL 9540.
CONSEQUENCE BARRIERS	
See Section 3.3 above for list of primary consequence barriers.	

3.5 Analysis Approval

Per *NFPA 855 §4.1.4.3*, the AHJ shall be permitted to approve the hazardous mitigation analysis as documentation of the safety of the ESS installation provided the consequences of the analysis demonstrate the following:

1) *Fires will be contained within unoccupied ESS rooms for the minimum duration of the fire resistance rating specified in NFPA 855 4.3.6.*
2) *Suitable deflagration protection is provided where required.*
3) *ESS cabinets in occupied work centers allow occupants to safely evacuate in fire conditions.*
4) *Toxic and highly toxic gases released during normal charging, discharging, and operation will not exceed the PEL in the area where the ESS is contained.*
5) *Toxic and highly toxic gases released during fires and other fault conditions will not reach concentrations in excess of immediately dangerous to life or health (IDLH) level in the building or adjacent means of egress routes during the time deemed necessary to evacuate from that area.*
6) *Flammable gases released during charging, discharging, and normal operation will not exceed 25 percent of the LFL.*

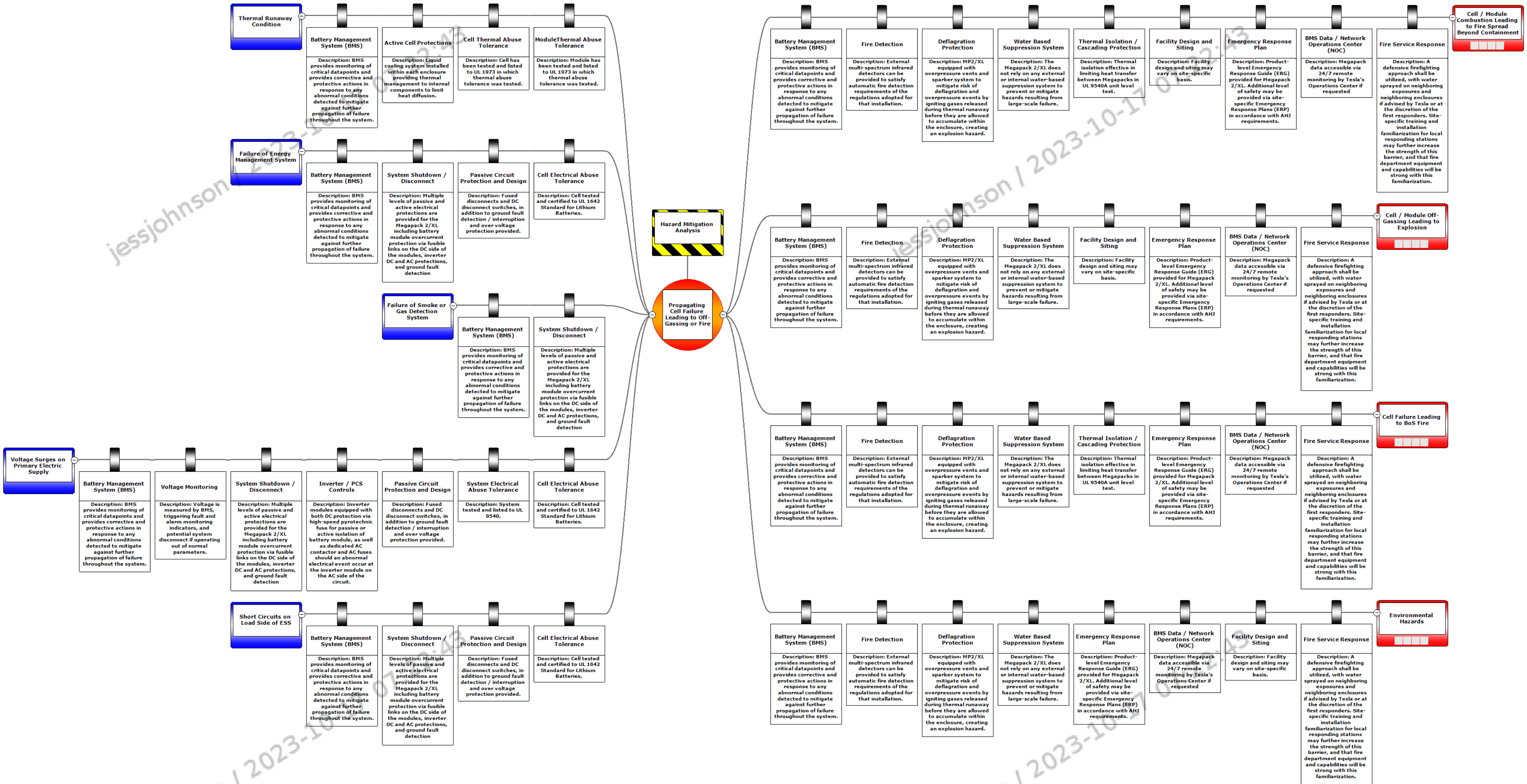
Table 3-10 - Summary of Analysis Approval

Compliance Requirement	Comments
1. Fires will be contained within unoccupied ESS rooms for the minimum duration of the fire resistance rating specified in NFPA 855 4.3.6.	**Not applicable.** The Megapack 2/XL is intended for outdoor ground-mounted installations only and shall not be installed within any ESS rooms or structures.
2. Suitable deflagration protection is provided where required.	**Compliant.** The Megapack 2/XL is equipped with deflagration protection in the form of pressure-sensitive vents and sparker system designed to ignite any flammable gases and release in a controlled manner before they are allowed to accumulate and create an explosive atmosphere within the enclosure.
3. ESS cabinets in occupied work centers allow occupants to safely evacuate in fire conditions.	**Not applicable.** The Megapack 2/XL is not intended to be installed in any occupied work centers.
4. Toxic and highly toxic gases released during normal charging, discharging,	**Not applicable.** Lithium-ion batteries do not release toxic gases during normal operation.

and operation will not exceed the PEL in the area where the ESS is contained.	
5. Toxic and highly toxic gases released during fires and other fault conditions will not reach concentrations in excess of immediately dangerous to life or health (IDLH) level in the building or adjacent means of egress routes during the time deemed necessary to evacuate from that area.	**Compliant.** Additional testing and third-party analysis performed on products of combustion from the Megapack 2/XL at locations 20 ft and 5 ft conclude no traces of Mercury or 27 different metals tested for. HF was detected at values of 0.10 and 0.12 ppm over the course of the test – far below accepted NIOSH Immediately Dangerous to Life or Health (IDLH) value of 30 ppm for HF. Environmental considerations (e.g., facility siting, nearby buildings, exposures, or public ways) should be taken into account on a site-by-site basis.
6. Flammable gases released during charging, discharging, and normal operation will not exceed 25 percent of the LFL.	**Not applicable.** Lithium-ion batteries do not release flammable gases during charging, discharging, or normal operation. In the case of flammable off-gases being released due to a thermal runaway event, the Megapack 2/XL is equipped with pressure-sensitive vents and sparker system designed to ignite any flammable gases and release in a controlled manner before they are allowed to accumulate and create an explosive atmosphere within the enclosure.

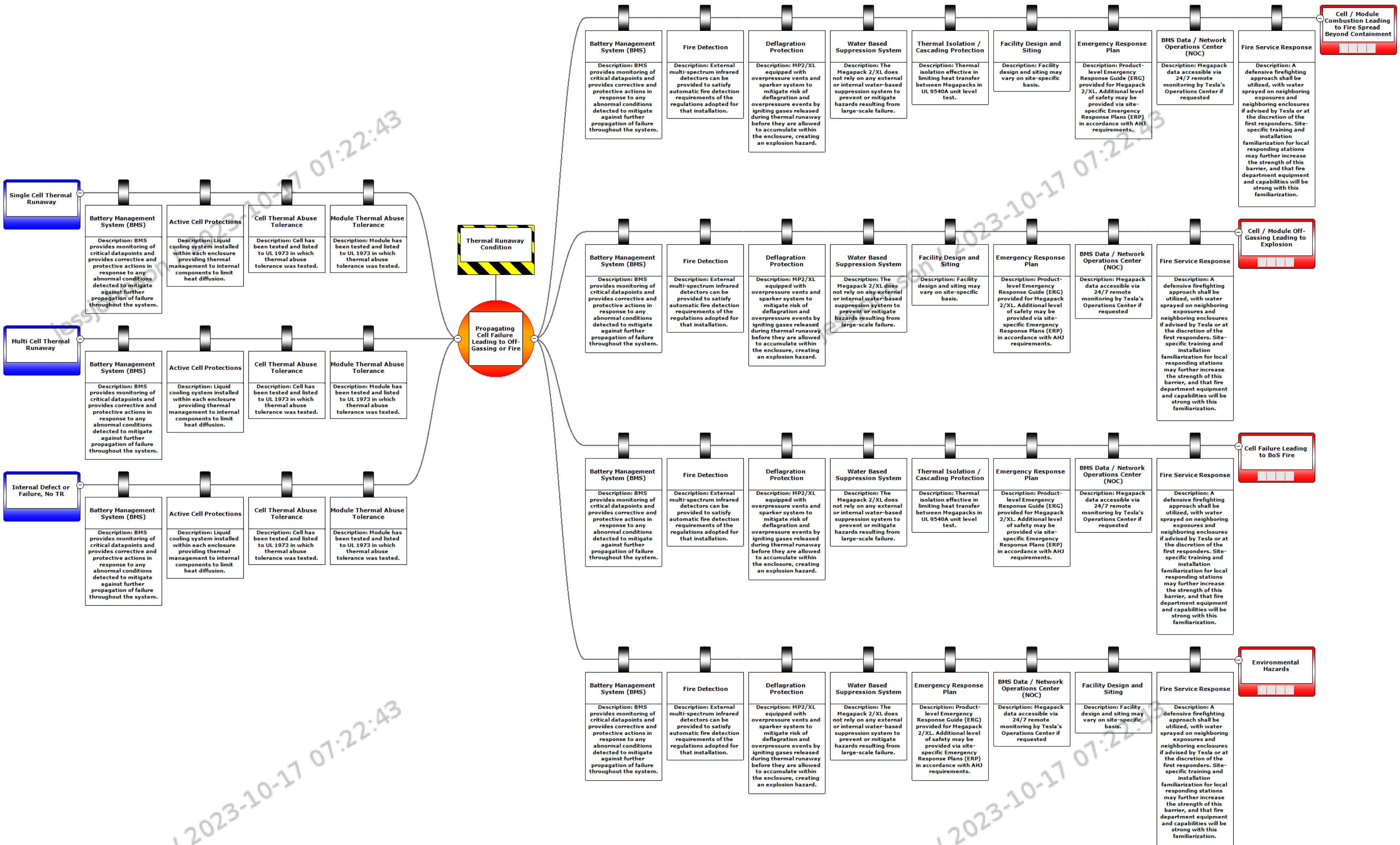
APPENDIX A – DETAILED HMA DIAGRAMS AND BARRIER DESCRIPTIONS

3.6 A.1 All Fault Conditions

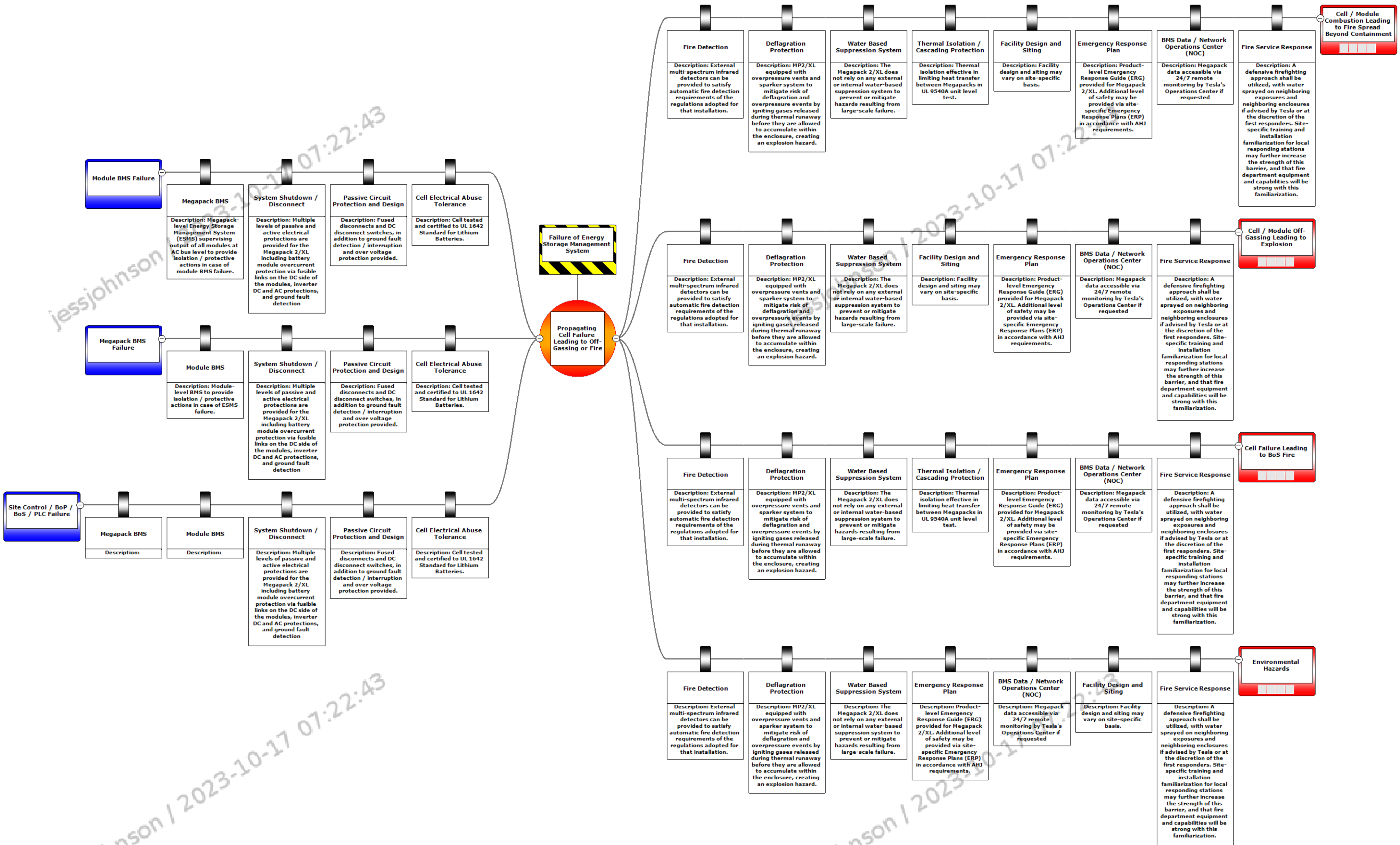


3.6.1

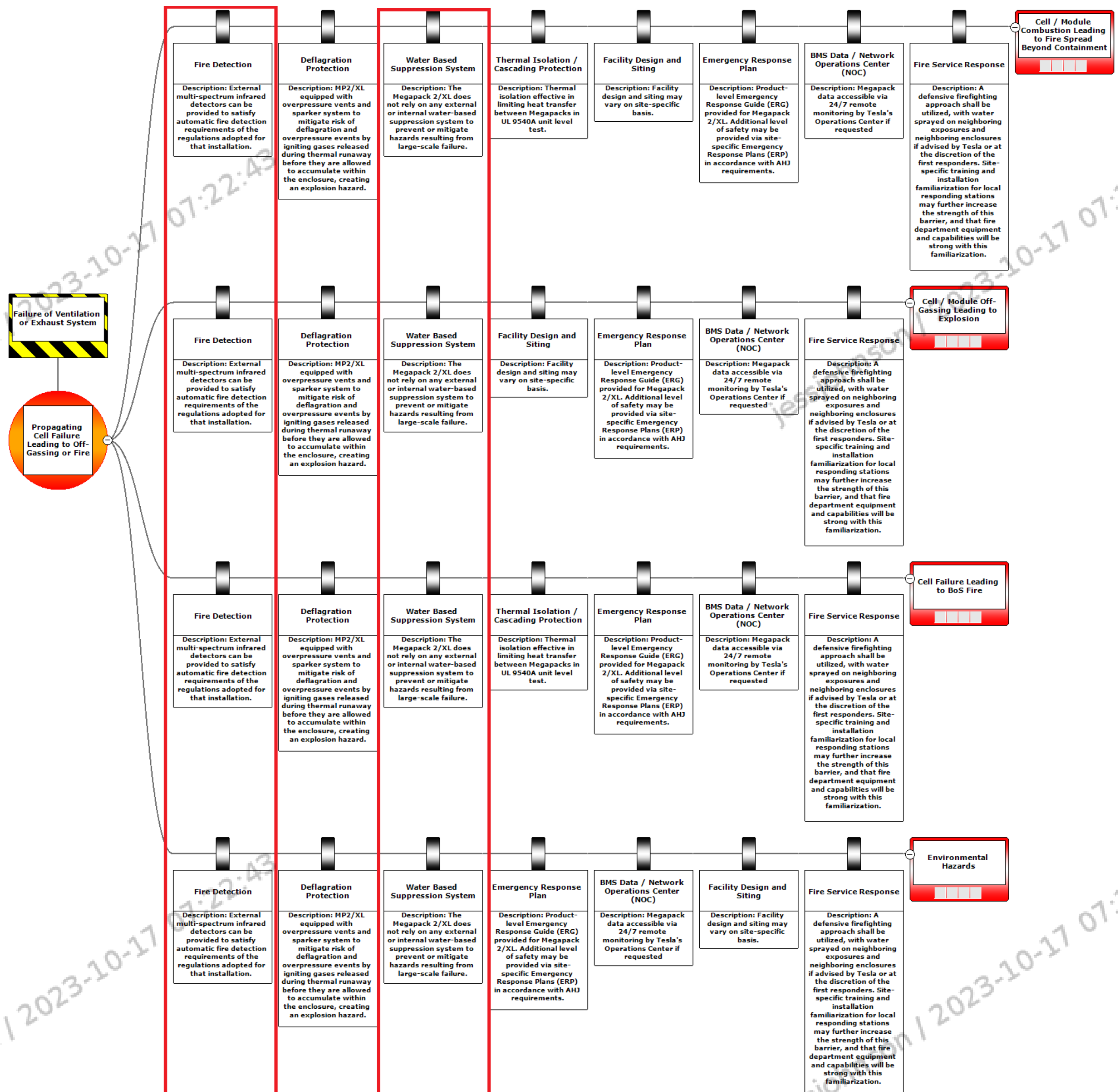
3.7 A.2 Thermal Runaway Condition



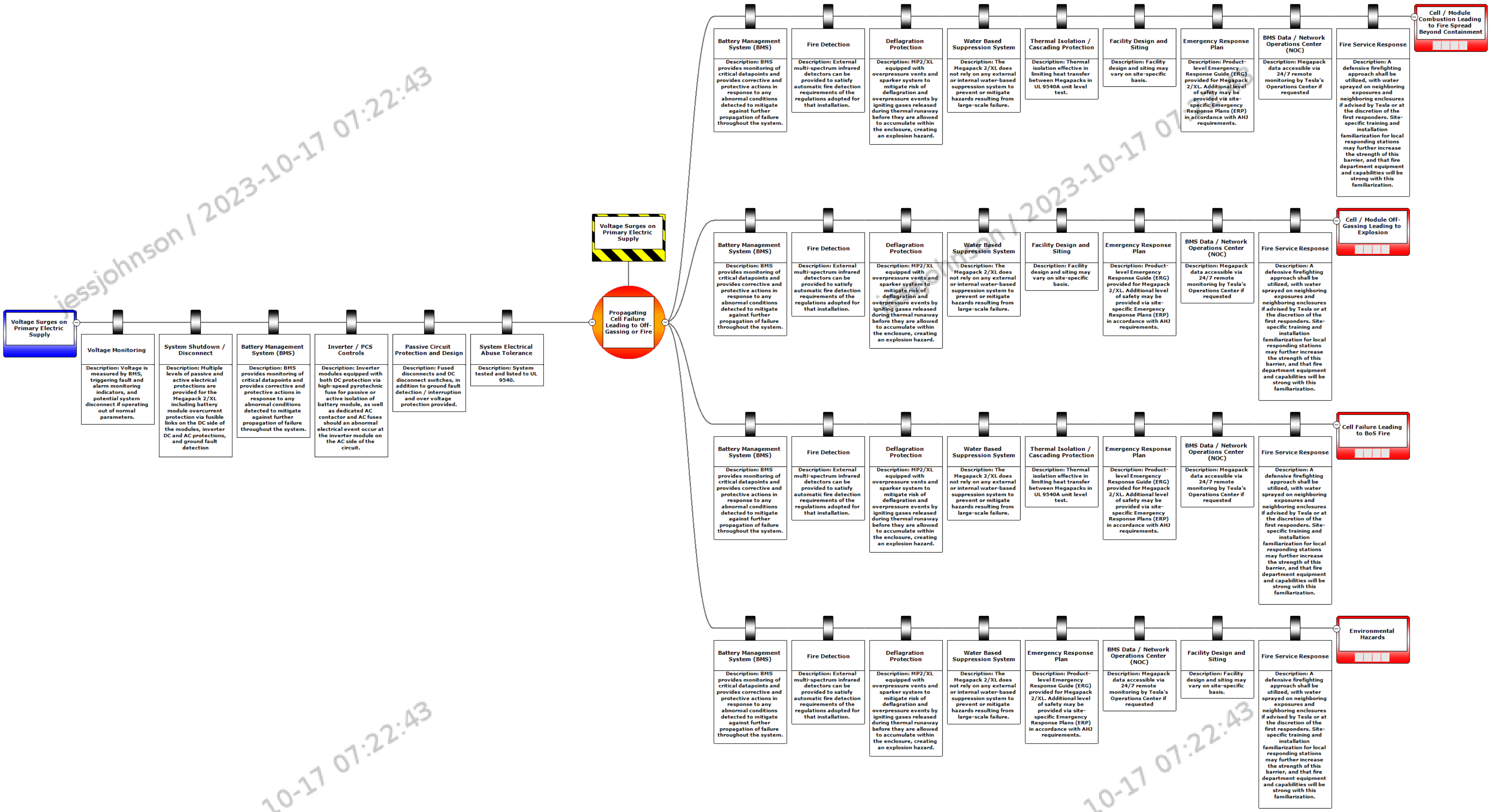
3.8 A.3 Failure of an Energy Storage Management System



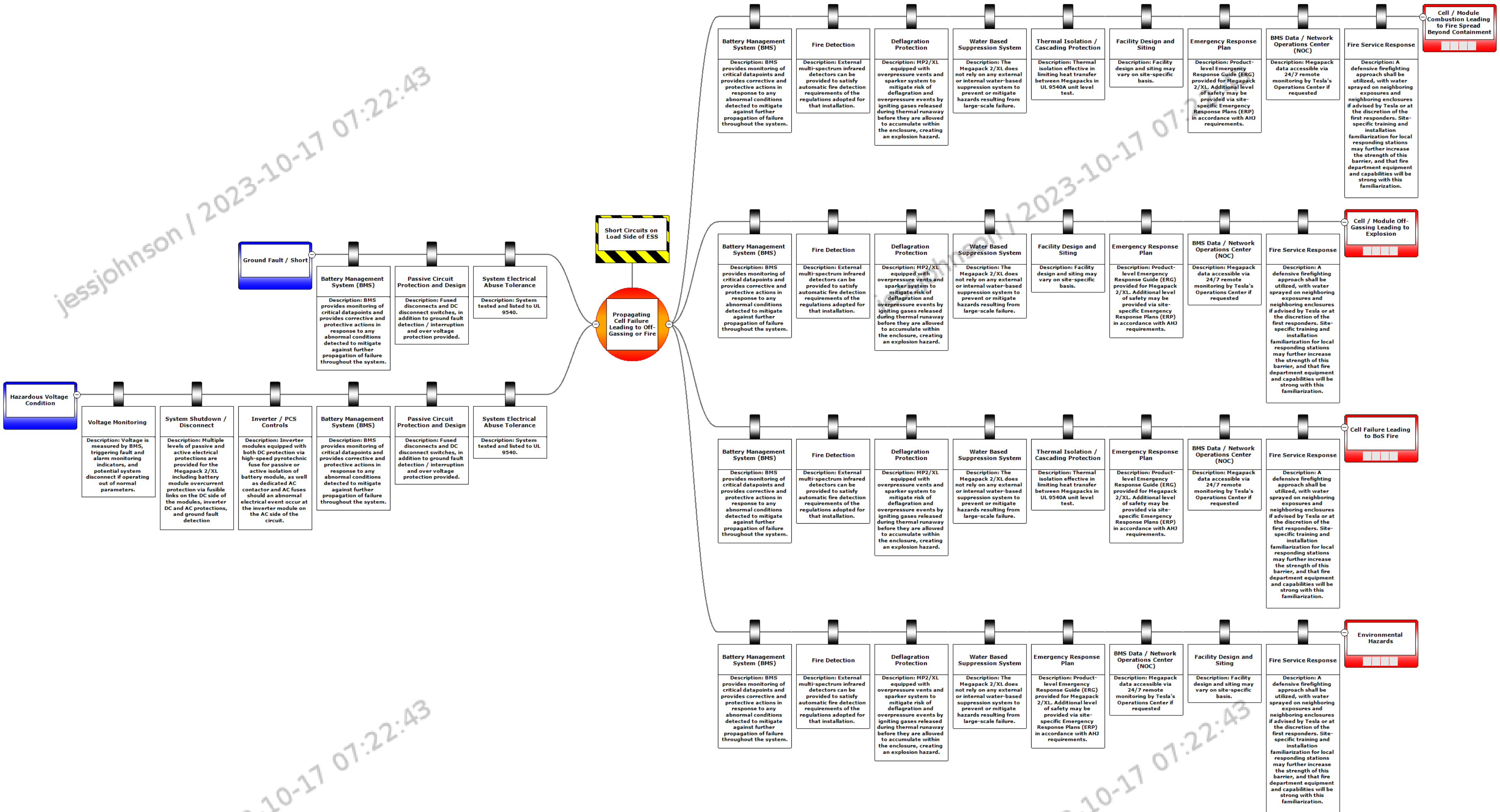
3.9 A.4 Failure of a Required Smoke Detection, Fire Detection, Fire Suppression, or Gas Detection System



3.10 A.5 Voltage Surges on the Primary Electric Supply



3.11 A.6 Short Circuits on the Load Side of the ESS

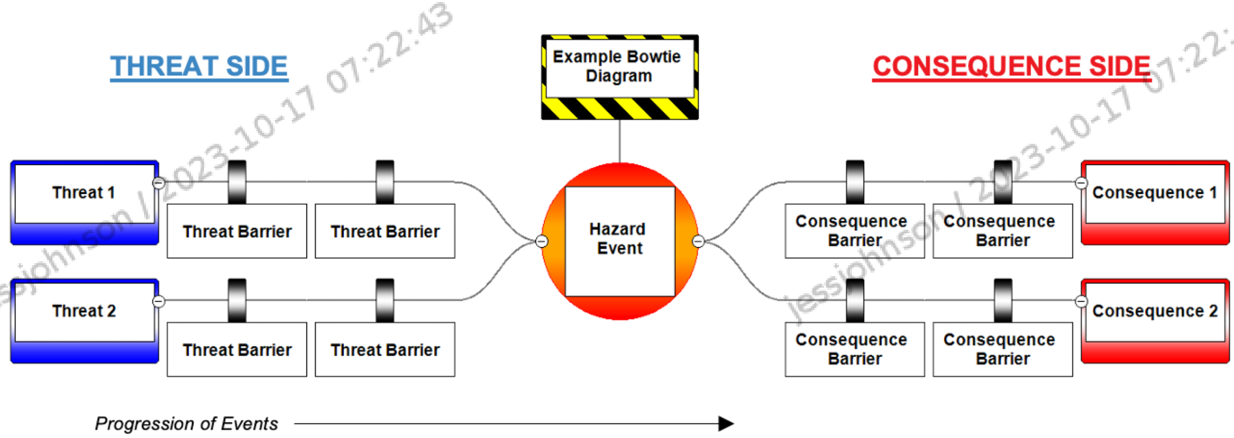


APPENDIX B – HMA METHODOLOGY

This Appendix serves as a supplemental write up for the overall Hazard Mitigation Analysis (HMA) and provides additional context on the Bowtie methodology used, as well as key definitions and concepts.

ESRG utilizes the bowtie methodology for hazard and risk assessments, as is described in *ISO.IEC IEC 31010 §B.21*, as it allows for in-depth analysis on individual mitigative **barriers** and serves as a strong tool for visualizing the chronological pathway of **threats** leading to critical hazard events, and ultimately to greater potential **consequences**, as depicted in the figure below. This simple diagrammatic way of describing and analyzing the pathways of a risk from hazards to outcomes can be considered to be a combination of the logic of a fault tree analyzing the cause of an event and an event tree analyzing the consequences.

The strength of the bowtie approach comes from its visual nature, which forgoes complex, numerical tables for threat pathways which show a single risk or consequence and all the barriers in place to stop it. On the left side are the threats, which are failures, events, or other actions which all result in a single, common hazard event in the center. For our model, many of these threats are the requirements of the fire code such as an unexpected thermal runaway.



- **Hazard Event / Top Event**

  The hazard (or "top") event – depicted as the center point in the middle of the bowtie diagram – represents a deviation from the desired state during normal operations (in this case, a thermal runaway or cell failure event), at which point control is lost over the hazard and more severe consequences ensue. This event happens before major damage has occurred, and it is still possible to prevent further damage.

- **Threats**

  There often may be several factors that cause a "top event". In bowtie methodology, these are called threats. Each threat itself has the ability to cause the center event. Examples of threats are hazardous temperature conditions, BMS failure, and water damage from condensation, each leading to cell failure (the center event for many of the following bowtie diagrams for lithium-ion ESS failures).

Threats may not necessarily address a fully involved system fire or severe explosion, but rather smaller, precursor events which could lead to these catastrophic consequences. Some threats occur without any intervention, such as defect propagation or weather-related events, while others represent operational errors (either human or system-induced). Often threats may also be consequences of even earlier-stage threats, spawning a new bowtie model that includes the threat at the center point or right side of the new bowtie. The diagrams that follow include careful selection and placement of each of the elements to best capture the perspective of system owners and operators responsible for ensuring safe operation.

- **Consequences**

  Consequences are the results of a threat pathway reaching and exceeding its center event. For the models described here, the center events were selected as the event in which proactive protections give way to reactive measures mostly related to fire protection systems and direct response. As the center event then is defined as either "cell failure" or propagating cell failure, the consequences in the models described assume a condition exists in which flammable gas is being released into the system or a fire is burning within the system.

  Consequence pathways include barriers that may help to manage or prevent the consequence event. Threat pathways are often consequence pathways from a separate hazard assessment, as is the case with thermal runaway. In other words, thermal runaway may result from many different threats at the end of a separate hazard pathway (if not properly mitigated) and may also be the threat that could result in several other consequences. The task force identified a set of common consequences representing areas of key concern to utilities, energy storage system operators, and first responders.

- **Barriers**

  In order to control risks, mitigative "barriers" are placed to prevent propagation of failure events across the system. A barrier can be any measure taken that acts against an undesirable force or intention, in order to maintain a desired state, and can be included as proactive threat barriers or reactive consequence barriers.

  Each barrier in these models is more indicative of a concept that may include a single approach or may consist of a complex series of combined measures. Similarly, the analysis may not include barriers required to prevent the threats at the far left of the diagram (which would be placed even further left) to ensure the models do not extend infinitely, though the incorporation of these variables into site-specific safety evaluations may provide additional benefit. This list does not contain all possible solutions and in some designs, these barriers may not exist at all. Many of the same barriers apply to a number of threats.

Barriers may mitigate hazards or consequences in a variety of ways. For example, common barriers to thermal runaway include active electrical monitoring and controls, redundant failure detection, and even passive electrical safeties (such as over-current protection devices and inherent impedances). Should these systems fail to detect the threat, shutdown the system, or otherwise prevent thermal runaway from occurring, the hazard may persist.

APPENDIX D – REFERENCED DOCUMENTATION

[1] *Tesla_Megapack 2_-_ANSI-UL_9540A_Cell_Level_Report_Redacted.pdf*

[2] *Tesla_Megapack 2_-_ANSI-UL_9540A_Module_Level_Report.pdf*

[3] *Tesla_Megapack 2_Megapack 2XL-_ANSI-UL_9540A_Unit_Level_Report.pdf*

[4] *22035-01R (MP2 UL9540A).pdf*

[5] *Tesla Megapack 2 – FPE Report – Final.pdf*

APPENDIX E – REFERENCED CODES AND STANDARDS

- *NFPA 855 Standard for the Installation of Stationary Energy Storage Systems*, 2020 Edition
- *International Fire Code §1207 Electrical Energy Storage Systems*, 2021 Edition
- *UL 9540A Standard for Test Method for Evaluation Thermal Runaway Fire Propagation in Battery Energy Storage Systems,* 4th Edition
- *UL 9540 Standard for Energy Storage Systems and Equipment,* 2nd Edition

APPENDIX H
WATER SUPPLY ASSESSMENT

Janus Solar, LLC

Janus Solar Water Supply Assessment

TETRA TECH

July 21, 2021

Janus Solar Water Supply Assessment

July 21, 2021

PREPARED FOR

RWE Solar Development, LLC
20 California Street, Suite 500
San Francisco, CA 94111

PREPARED BY

Tetra Tech
160 Via Verde, Suite 240
San Dimas, CA 91773
Phone: 909.305.2930
tetratech.com

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Figure 1. Graph of the historical groundwater elevation is provided by the 2021 Draft of the Colusa Subbasin Groundwater Sustainability Plan. 6

1 INTRODUCTION

1.1 PROJECT OVERVIEW

Janus Solar PV, LLC is proposing a photovoltaic (PV) electricity generating facility, with a battery energy storage system and associated facilities and infrastructure, to be known as the Janus Solar Project (Project). The Project would generate and store up to 80 megawatts on approximately 1,024 acres of land in unincorporated western Colusa County. The proposed battery energy storage system would extend the period of time each day that the Project could contribute PV-generated energy to the electrical grid. The Project would connect to the electrical grid at the existing Cortina Substation, which is owned and operated by Pacific Gas and Electric Company, approximately 3 miles northeast of the Project site.

1.2 PURPOSE OF WATER SUPPLY ASSESSMENT

The purpose of the Water Supply Assessment (WSA) is to evaluate whether the total projected water supplies for the Project during normal, single dry, and multiple dry water years during a 20-year projection, will meet the projected water demand associated with the proposed Project.

1.3 SENATE BILL 610 OVERVIEW AND APPLICABILITY

Senate Bill (SB) 610, passed in 2002, amended the California Water Code to require detailed analysis of water supply availability for certain types of development projects, and to improve the link between information on water supply availability and certain land use decisions made by cities and counties. SB 610 requires detailed information regarding water availability to be provided to the city and county decision-makers prior to approval of specified large development projects. This information is to be included in the administrative record that serves as the evidentiary basis for an approval action by the city or county on such projects. SB 610 recognizes local control and decision making regarding the availability of water for projects and the approval of projects.

SB 610 requires that a project be supported by a WSA if the project is subject to the California Environmental Quality Act and is an industrial project of more than 40 acres in size regardless of size or type, or would demand an amount of water equivalent to, or greater than, the amount of water required by a 500-dwelling unit project. According to SB 610 Guidelines, one dwelling unit typically consumes 0.3 to 0.5-acre feet per year (AFY), which would amount to 150 to 250 AFY for 500 units. Projects must analyze whether the total projected water supplies determined to be available for the respective project during normal, single dry, and multiple dry water years during a 20-year projection, will meet the projected water demand associated with the proposed project, in addition to the existing and planned future uses, including agricultural and manufacturing uses. The primary question to be answered in a WSA is as follows:

> *Will the total projected water supplies available during normal, single dry, and multiple dry water years during a 20-year projection meet the projected water demand of the proposed project, in addition to existing and planned future uses of the identified water supplies, including agricultural and manufacturing uses?*

2 PROJECT LOCATION, DESCRIPTION, AND WATER DEMAND

2.1 PROJECT LOCATION

The Project is approximately 6.5 miles southwest of the city of Williams. State Route 20 runs about 1 mile from the Project site, north and west. The proposed Project would be located on three parcels totaling 1,023.9 acres of private property currently used for cattle grazing in Colusa County, California. The Project would connect to the Cortina Substation, located on Walnut Drive, approximately 3 miles northeast of the Project site. To interconnect the Project with the electrical grid, the Applicant (Janus Solar PV, LLC) would construct a new, 4.1-mile-long overhead, 60-kilovolt generation tie line, partially located on the County's right-of-way on Walnut Drive and Spring Valley Road and partially on land administered by the United States Bureau of Reclamation, from the Project site to the point of interconnection at the Cortina Substation.

2.2 PROJECT DESCRIPTION

2.2.1 Project Improvements

The Project covers an area of 1,023.9 acres and includes the following components:

- PV solar panels
- Centralized inverters
- One proposed on-site substation
- One battery energy storage system
- 4.1-mile overhead generation tie line of 60 kilovolt electrical circuits along Walnut Drive and Spring Valley Road
- 20-foot wide interior and perimeter access roads

2.2.2 Existing Public Water System

There is no public water system serving the site. The Project site is located approximately 11.4 miles from the city of Williams which owns a public water system.

2.2.3 Existing Land Use

Existing land use is for cattle grazing. The area is not irrigated and cattle graze on naturally grown plants which use water in the form of evapotranspiration.

2.3 PROJECTED WATER DEMANDS

The construction related water demand for the Project is determined by the site preparation activities required, which includes dust control, moisture conditioning when grading/compacting soil, labor workforce needs, and by the duration of the construction period. Only necessary portions of the site will be disturbed for construction reducing the need for water for dust control. To avoid environmental constraints, only approximately 768 acres of the 1,024 acre site would be used for the Project. It is estimated that the construction will occur over a period of 11 months and that it will require approximately 46 acre-feet (AF) of water over the course of construction.

After construction, a solar PV facility requires very little operational water. Operational water is used for panel washing and for drinking water for workers when present. Panel washing is only performed occasionally and as needed. Typically dust and other debris collect on the panels and this is naturally rinsed off during rainstorms. When panels accumulate dust to the point of power generation being significantly affected, the panels may be washed. Washing occurs infrequently (months to years between washings), such that operational water use is estimated to be 1 AFY. If water were unavailable for panel washing, the panels could be cleaned with waterless techniques or cleaning could simply be deferred.

3 WATER SUPPLY

3.1 CITY OF WILLIAMS

The city of Williams is the purveyor of a public water system located approximately 11.4 miles from the site. The City has indicated that it can provide water for the Project through a fire hydrant located at 180 N. Virginia Way in the city of Williams. Water obtained from the fire hydrant would be trucked to the Project site.

The City's potable water system consists of 2,126 service connections and serves a population of 5,698. The City depends on the Colusa Subbasin for water supply and utilizes three active and two standby groundwater wells (which pump from the Colusa Subbasin). The wells are approximately 120 to 500 feet deep.

3.2 LOCAL GROUNDWATER SUPPLY – COLUSA SUBBASIN

General

The Colusa Subbasin is located in the Sacramento Valley and spans both the Colusa and Glenn Counties. The Project site overlays the southwestern area of the Colusa Subbasin and is bounded by Stony Creek to the north, the Coast Ranges to the west, the Sacramento River to the east, and the Yolo Subbasin to the south. The Colusa Subbasin covers approximately 1,131 square miles and contains 73 public supply wells, 3,500 domestic wells, and 2,600 agriculture wells. The current groundwater storage in the Colusa Subbasin is estimated to be 26 million AF.

The climate in Colusa County can be described as cool, wet winters and hot, dry summers. There is a wide variation in annual precipitation, as there are periodic multiple-year dry periods. Climate data from the Colusa County weather station (NCEI)[1] is representative of the regional climate. Between 2010 and 2020, the average maximum temperature was 75.7 degrees Fahrenheit (°F), average minimum temperature was 47.4°F, and the average temperature was 61.1°F. The average annual rainfall in the same period was approximately 14.1 inches, with the highest rainfall of 21.45 inches in 2010 and the lowest rainfall of 6.73 inches in 2015 (NCEI 2021). The annual rainfall fluctuated significantly because of the 2007 to 2015 dry period.

Adjudication

The Colusa Subbasin is not adjudicated.

Groundwater Sustainability Plan

The groundwater levels in the Colusa Subbasin have been in decline and a Groundwater Sustainability Plan (GSP) is currently being developed to create a framework to maintain the long-term sustainability of the Colusa Subbasin. The Colusa Groundwater Authority and Glenn Groundwater Authority are working together to develop the GSP for the Colusa Subbasin. The development of the GSP began in September 2020 and a draft of the first four chapters of the GSP was distributed for public review in May 2021. The final draft with all eight chapters is expected to be completed by January 2022.

The GSP utilizes data from various sources and reports. The reports often require monitoring data and analyses. In addition, the reports may not be updated on a regular basis and can therefore be several years old. The GSP, at this time, is based on information through the year 2015 (CGA 2021).

Groundwater Monitoring and Management Programs

Both Glenn County and Colusa County work together to monitor and manage the Colusa Subbasin groundwater. These agencies closely monitor the groundwater levels, groundwater quality, and land subsidence. To monitor the groundwater levels, both counties utilize programs such as the National Water Information System, Water Data Library, California's Statewide Groundwater Elevation Monitoring Program, and County-Specific Groundwater Level Monitoring Programs. The groundwater levels are monitored to evaluate groundwater elevations, reduction in groundwater storage, and stream-aquifer interactions throughout the Colusa Subbasin. The primary concern with the groundwater quality within the Colusa Subbasin is salinity, as there can be an upwelling of brackish water into the principal aquifer (CGA 2021). The land subsidence monitoring network consists of the Interferometric Synthetic Aperture Rader Surveys, Continuous Global Positioning System Benchmarks, Extensometers, and Sacramento Valley Height-Modernization Project. Land subsidence can cause structural damage infrastructure, so the land surface displacement must be monitored. All the data networks to monitor the Colusa Subbasin are used in an effort to prevent the Colusa Subbasin from being critically over drafted.

Groundwater Sustainability Plan

The groundwater levels in the Colusa Subbasin have been in decline and a GSP is currently being developed to create a framework to maintain the long-term sustainability of the Colusa Subbasin. The Colusa Groundwater Authority and Glenn Groundwater Authority are working together to develop the GSP for the Colusa Subbasin. The development of the GSP began in September 2020 and a draft of the first four chapters of the GSP was distributed for public review in May 2021. The final draft with all eight chapters is expected to be completed by January 2022.

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Groundwater Level Trends

Changes in land use and multiple-year droughts over the last 23 years have led to increased groundwater pumping, which has created new cones of depression and enlarged existing cones of depression. The groundwater elevations declined during the dry period after 2006 but recovered in 2017 when the drought was over, which is displayed in Figure 1 (CGA 2021). However, there are areas that have not fully recovered from the 2006 to 2016 drought. The communities affected are in Orland, Artois, Williams, Arbuckle, and College Cities. Current groundwater elevations are similar to those measured in 2017, which means the regional groundwater levels have been stable since the end of the drought in 2017 (CGA 2021). It should be noted that the groundwater elevations of the wells in Figure 1 represent the overall elevation trends in response to the wet and dry years and may not accurately display the groundwater elevation of all the wells, as the elevations differ in every well.

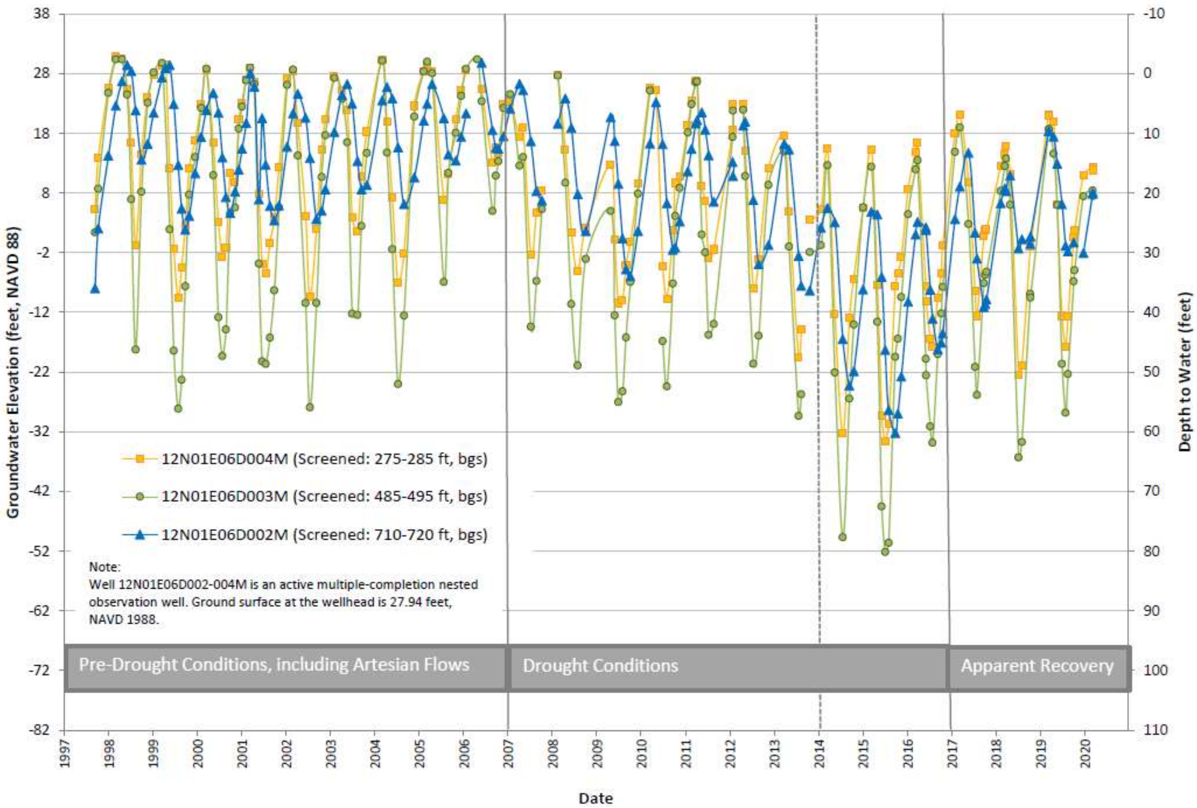

Figure 1**.** Graph of the historical groundwater elevation is provided by the 2021 Draft of the Colusa Subbasin Groundwater Sustainability Plan.

The current groundwater storage volume has a wide range of estimated volume of between 26 million AF and 140 million AF. For this study, the more conservative estimate of 26 million AF will be used. There was an average annual reduction in storage of 28 thousand AFY between 1990 and 2015. This represents anywhere between about 0.02 to 0.1 percent of the estimated capacity of the Colusa Subbasin. The region experienced a series of consecutive, multiple-year droughts between 2007 and 2015.

Safe Yield

The sustainable yield, also referred to as the safe yield, is the maximum quantity of water that can be withdrawn annually from a groundwater supply without causing overdraft. The sustainable yield for current and future scenarios, according to the Colusa Subbasin GSP, is displayed in Table 1 below.

Table 1. Estimated Groundwater Pumping, Change in Groundwater Storage, and Sustainable Yield by Baseline Scenario (Thousands of AFY)

Baseline Scenario	Groundwater Pumping	Change in Groundwater Storage	Sustainable Yield
Current	499.4	0.6	500.1
Future, No Climate Change	498.8	0.6	499.4
Future, 2030 Climate Change	525.4	-2.7	522.7
Future, 2070 Climate Change	558.6	-7.3	551.2

Subsurface Inflow

The Colusa Subbasin receives subsurface inflow from Corning, Butte, Sutter, and Yolo Subbasins, which are neighboring subbasins. The average annual subsurface inflow is approximately 200,000 AF, with a range from 190,000 AF to 210,000 AF.

Seepage Inflow

Seepage into the groundwater occurs when altitude of the water table in the vicinity of the stream is lower than the altitude of the stream-water surface. This causes a seepage inflow into the groundwater from surface water sources such as canals, drains, and streams. There is an average annual inflow of 208,211 AF from streams and 144,457 AF from drains and canals in the Colusa Subbasin.

20-Year Historical Inflow

Data from the 2021 draft of the Colusa and Glenn GSA's GSP for the historical inflow during the 20-year period of 1996 to 2015 is presented in Table 2[2]. During that period, the annual inflow ranged from 740,000 AF to 1,130,000 AF, with an average annual inflow of 1,006,247 AF. The fluctuation in the annual inflow is due to the dry period between 2007 to 2015, which is when less rainfall percolated into the Colusa Subbasin.

20-Year Historical Outflow

The 20-year historical outflow data in Table 2 was taken from the 2021 draft of the Colusa and Glenn GSA's GSP (CGA 2021). Between 1996 and 2015, the annual outflow fluctuated between 900,000 AF and 1,140,000 AF, with an average of 1,031,512 AF. The outflow has increased significantly since 1996 because of the increase in groundwater pumping during the dry period, as there is less surface water that is readily available for use.

Table 2. 20-Year Historical Water Budget (1996-2015)

Water Inflow Source	[a]Average	1996[b]	1997[b]	1998[b]	1999[b]	2000[b]	2001[b]	2002[b]	2003[b]	2004[b]	2005[b]	2006[b]	2007[b]	2008[b]	2009[b]	2010[b]	2011[b]	2012[b]	2013[b]	2014[b]	2015[b]
Subsurface Water Inflow	200,027	192,310	200,117	188,933	191,711	193,979	194,506	198,449	192,506	199,804	194,420	196,864	204,638	205,946	207,844	207,110	201,677	203,767	206,758	206,595	212,601
Deep Percolation – Precipitation	169,597	218,722	200,022	310,164	159,467	188,007	145,891	170,567	192,840	179,280	228,652	228,717	97,824	128,709	101,788	178,340	206,544	125,171	134,224	75,275	121,738
Deep Percolation – Applied Surface Water	202,174	188,144	210,973	196,951	192,463	237,227	207,134	246,916	224,756	248,871	206,796	200,859	218,858	222,677	169,184	198,939	191,397	166,391	217,662	140,443	156,844
Deep Percolation – Applied Groundwater	76,480	50,426	86,158	64,566	56,851	69,663	74,746	100,199	68,791	106,682	82,093	78,676	84,821	101,927	72,111	99,368	81,184	70,872	84,460	41,576	54,427
Seepage – Streams	208,211	219,097	221,979	258,661	198,235	200,565	163,569	193,730	236,497	223,251	207,009	253,379	160,723	187,991	190,554	227,109	250,219	184,695	212,971	161,670	212,321
Seepage – Canals and Drains	144,457	126,137	137,599	111,029	132,223	139,386	153,975	161,171	149,907	164,522	157,163	149,048	166,261	157,398	145,188	151,508	149,124	155,165	161,055	114,680	106,603
Total Groundwater Inflows	**1,000,946**	**1,056,848**	**1,130,304**	**930,950**	**1,028,827**	**939,821**	**1,071,032**	**1,065,297**	**1,122,410**	**1,076,133**	**1,107,543**	**933,125**	**1,004,648**	**886,669**	**1,062,374**	**1,080,145**	**906,061**	**1,017,130**	**740,239**	**864,534**	**994,836**
Water Outflow Source																					
Subsurface Water Outflow	200,027	192,310	200,117	188,933	191,711	193,979	194,506	198,449	192,506	199,804	194,420	196,864	204,638	205,946	207,844	207,110	201,677	203,767	206,758	206,595	212,601
Groundwater Pumping – Agriculture	169,597	218,722	200,022	310,164	159,467	188,007	145,891	170,567	192,840	179,280	228,652	228,717	97,824	128,709	101,788	178,340	206,544	125,171	134,224	75,275	121,738
Groundwater Pumping – Urban and Industrial	202,174	188,144	210,973	196,951	192,463	237,227	207,134	246,916	224,756	248,871	206,796	200,859	218,858	222,677	169,184	198,939	191,397	166,391	217,662	140,443	156,844
Groundwater Pumping – Managed Wetlands	76,480	50,426	86,158	64,566	56,851	69,663	74,746	100,199	68,791	106,682	82,093	78,676	84,821	101,927	72,111	99,368	81,184	70,872	84,460	41,576	54,427
Stream Gain from Groundwater	208,211	219,097	221,979	258,661	198,235	200,565	163,569	193,730	236,497	223,251	207,009	253,379	160,723	187,991	190,554	227,109	250,219	184,695	212,971	161,670	212,321
Total Groundwater Outflows	**1,031,512**	**931,933**	**1,053,594**	**900,473**	**1,006,519**	**1,001,240**	**1,049,333**	**1,106,263**	**969,336**	**1,104,497**	**990,116**	**998,065**	**1,115,277**	**1,145,373**	**1,089,255**	**1,021,949**	**967,179**	**1,037,129**	**1,069,732**	**1,014,623**	**1,058,363**
Change in Storage (Inflow – Outflow)	**62,903**	**3,254**	**229,831**	**-75,569**	**27,587**	**-109,512**	**-35,231**	**95,961**	**17,913**	**86,017**	**109,478**	**-182,152**	**-140,725**	**-202,586**	**40,425**	**112,966**	**-131,068**	**-52,602**	**-274,384**	**-193,829**	**62,903**

[a] 20-year average from 1996 through 2015

[b] Estimates are from ‘Colusa GSA and Glenn GSA Draft Report of Groundwater Sustainability Plan’ April 2021

3.3 OTHER WATER

Construction of the Project will reduce the natural vegetation at the Project site. This vegetation currently consumes water through the evapotranspiration process. Based on aerial imagery, it is estimated that vegetation covers approximately 15 percent of the Project site. The evapotranspiration rate of the natural vegetation was estimated based on the average of the estimated evapotranspiration rates of pastures from the Sacramento San Joaquin Delta for the 2014 to 2015 water year and equates to 3.82 feet per year (Medellín-Azuara et al. 2016). Based on a disturbed Project area of 768 acres, the estimated water consumption of the natural vegetation is estimated to be 440 AFY.

Eliminating the natural vegetation at the Project site will result in an increase of 440 AFY of water percolating through the soils and down to the Colusa Subbasin and can be considered a new source of water.

4 SUPPLY SUFFICIENCY ANALYSIS

The primary question to be answered in a WSA that is compliant with SB 610 requirements is:

> *Will the total projected water supply available during normal, single dry, and multiple dry water years during a 20-year projection meet the projected water demand of the proposed project, in addition to existing and planned future uses of the identified water supplies, including agricultural and manufacturing uses?*

4.1 CITY OF WILLIAMS

The City's potable water supply comes solely from groundwater, which is pumped directly from the Colusa Subbasin through three wells. The city of Williams has indicated that it can provide water to the Project through a fire hydrant located at 180 N. Virginia Way in the city of Williams. The water obtained from the fire hydrant would be trucked to the Project site.

4.2 COLUSA SUBBASIN

Groundwater Budget

A water budget is an identification, estimate, and comparison of the groundwater inputs and outputs that affect the overall trend of groundwater balance in the Colusa Subbasin. The inputs include subsurface water inflow, deep percolation, and seepage while the outputs include subsurface water outflow, groundwater pumping, and stream gain from groundwater.

Normal Year

The baseline water budget for a normal year in Table 3 is based on the average of historical inflow and outflow between 1996 and 2015 (CGA 2021). Over the 20-year period, there is a loss in groundwater storage of 30,566 AF, which has caused the groundwater elevations to drop.

Table 3. Water Budget Normal (Average) Year[2]	
Water Inflow Source	
Subsurface Water Inflow	**200,027**
Deep Percolation – Precipitation	**169,597**
Deep Percolation – Applied Surface Water	**202,174**
Deep Percolation – Applied Groundwater	**76,480**
Seepage – Streams	**208,211**
Seepage – Canals and Drains	**144,457**
Total Groundwater Inflows	**1,000,946**
Water Outflow Source	
Subsurface Water Outflow	**150,316**
Groundwater Pumping – Agriculture	**471,462**
Groundwater Pumping – Urban and Industrial	**11,271**
Groundwater Pumping – Managed Wetlands	**29,385**
Stream Gain from Groundwater	**369,078**
Total Groundwater Outflows	**1,031,512**
Change in Storage (AF)	**-30,566**

Dry Year

According to the historical precipitation data from 1996 to 2015 from the National Centers for Environmental Information at the Colusa weather station, the lowest annual rainfall occurred in 2015, with 6.73 inches (NCEI 2021). However, the annual water budget with the largest deficit occurred in 2013 and resulted in a reduction of 274,384 AF from the Colusa Subbasin (CGA 2021). The dry year is intended to be the single year worst case for impacts to the water supply and water demand and therefore 2013 was used as the dry year for this study.

Table 4 presents a water budget for a single dry year, which is based on the water inflow and outflow in 2013. Inflow in 2013 was 740,239 AF and outflow was 1,014,623 AF for a deficit of 274,384 AF (CGA 2021). It should be noted that the water budget dry year is based on historical data that may not accurately represent a dry year in the future, as the guidelines set by the GSP will help balance the inflow and outflow volume.

Table 4. Water Budget Dry Year[2]	
Water Inflow Source	
Subsurface Water Inflow	**206,595**
Deep Percolation – Precipitation	**75,275**
Deep Percolation – Applied Surface Water	**140,443**
Deep Percolation – Applied Groundwater	**41,576**
Seepage – Streams	**161,670**
Seepage – Canals and Drains	**114,680**
Total Groundwater Inflows	**740,239**
Water Outflow Source	
Subsurface Water Outflow	**138,604**
Groundwater Pumping – Agriculture	**493,760**
Groundwater Pumping – Urban and Industrial	**9,145**
Groundwater Pumping – Managed Wetlands	**36,349**
Stream Gain from Groundwater	**336,765**
Total Groundwater Outflows	**1,014,623**
Change in Storage (AF)	**-274,384**

Multiple Dry Year

The multiple dry-year water budget is based on the driest, consecutive years of below average precipitation on record. For the Colusa Subbasin, the multiple dry year period is between 2011 and 2015 (CGA 2021). In that specific period, the annual average precipitation was 9.35 inches, which is approximately 30 percent lower than the precipitation during a normal year. As a result, the water budget from 2011 to 2015 represents the scenario for a multiple dry-year period.

Table 5 displays a cumulative groundwater deficit of approximately 538,917 AF, which is estimated to be 2 percent of the conservatively estimated groundwater storage volume of 26 million AF (CGA 2021). The cumulative groundwater deficit is due to the decrease in deep percolation from precipitation and the increase groundwater pumping for agriculture. During the dry years, there is a significant increase in groundwater pumping for agriculture, as the dry years would increase the evapotranspiration rate, which will then increase irrigation demand for crops.

Table 5. Water Budget Multi-Dry Year					
Water Inflow Source	**1 (2011)**	**2 (2012)**	**3 (2013)**	**4 (2014)**	**5 (2015)**
Subsurface Water Inflow	201,677	203,767	206,758	206,595	212,601
Deep Percolation – Precipitation	206,544	125,171	134,224	75,275	121,738
Deep Percolation – Applied Surface Water	191,397	166,391	217,662	140,443	156,844
Deep Percolation – Applied Groundwater	81,184	70,872	84,460	41,576	54,427
Seepage – Streams	250,219	184,695	212,971	161,670	212,321
Seepage – Canals and Drains	149,124	155,165	161,055	114,680	106,603
Total Groundwater Inflows	**1,080,145**	**906,061**	**1,017,130**	**740,239**	**864,534**
Water Outflow Source					
Subsurface Water Outflow	150,444	142,515	149,252	138,604	134,908
Groundwater Pumping – Agriculture	425,013	497,334	530,508	493,760	526,047
Groundwater Pumping – Urban and Industrial	9,359	9,992	10,812	9,145	7,590
Groundwater Pumping – Managed Wetlands	24,568	29,273	29,799	36,349	37,073
Stream Gain from Groundwater	357,795	358,015	349,361	336,765	352,745
Total Groundwater Outflows	**967,179**	**1,037,129**	**1,069,732**	**1,014,623**	**1,058,363**
Change in Storage (AF)	**112,966**	**-131,068**	**-52,602**	**-274,384**	**-193,829**
Cumulative Change in Storage (AF)	**112,966**	**-18,102**	**-70,704**	**-345,088**	**-538,917**

Source: CGA 2021.

4.3 GROUNDWATER BUDGET WITH JANUS SOLAR POWER

Existing Water Consumption

The existing land use of the Project site is cattle grazing and the Project area that will be disturbed is approximately 768 acres. There are no public water services within the Project boundaries but the natural vegetation on-site consumes water through evapotranspiration. The natural vegetation makes up approximately 15 percent of the existing land, such that the annual water demand is estimated to be 440 AF.

Project Water Requirement

The PV solar facility requires a minimal amount of water for construction and operational use. Most of the water demand will occur during construction because very little water is required for annual operational uses. During construction, the water is used to keep the dust down and condition the soil for compaction. The soil must maintain adequate moisture levels to be properly compacted, as the soil will act as a subbase for concrete foundation. For the construction phase, it is estimated the Project will require 46 AF of potable water over a period of 11 months. Additionally, some of the natural vegetation will be cleared for the PV solar facility, which may result in a higher percent of return water for construction than the return of water from evapotranspiration.

To operate the PV solar facility, a small amount of water will be used for panel washing, as panel washing is not required regularly and will be conducted only as needed. Rainfall is anticipated to provide occasional cleaning and additional water is only required for cleaning when the performance of the solar panels degrades significantly between precipitation events. Any rainfall or additional water used to clean the panels is expected to return to the basin. The annual operational water demand is estimated to be approximately 1 AF.

Projects Impacts to Water Supply

The water required for construction is significantly lower than the estimated water required for the natural vegetation, which will result in a reduction of water consumption of approximately 394 AF during the construction period of 11 months. After construction, Project water consumption would be reduced even further, as the operational water use is dramatically lower than the construction water use. The operational use of the solar facility is estimated to reduce the typical water consumption by 439 AFY.

The overall reduction in water consumption at the Project site will provide a benefit to the Colusa Subbasin. The Colusa Subbasin will not be negatively impacted with the construction and operation of the PV solar facility.

20-Year Projection with Project

The Project will reduce water consumption on the site, which will positively impact the Colusa Subbasin. In the 20-year water budget projection, the Project will contribute a total of approximately 8,800 AF of water to the Colusa Subbasin due to water that is usually lost to evapotranspiration directly recharging the Colusa Subbasin. With the Project, the Colusa Subbasin will experience a cumulative groundwater deficit of 600,000 AF, compared to a deficit of 612,000 AF without the Project. The 20-year deficit represents less than 3 percent of the groundwater capacity (26 million AF). The calculations for the 20-year projected water budget with the Project are summarized in Table 6 below.

The water budget for a single dry year with the Project is presented in Table 7 below. Similar to the single dry-year water budget without the Project, a groundwater deficit is still expected with the Project, but it is estimated to reduce the deficit from 274,384 AF to 273,990 AF. For a single dry year, the Project will save approximately 400 AFY because of the decrease in water consumption for construction and operational use compared to the current use for cattle grazing.

Table 8 displays the results of an estimated 5-year groundwater budget with the Project that is based on the water budget between 2011 to 2015 (the driest consecutive years at the Colusa Subbasin). At the end of the 5-year period, the cumulative deficit will be reduced from 538,917 AF to 536,767 AF, which equates to less than 3 percent of the total groundwater storage. This reduction results in water savings of approximately 2,150 AF in 5 years.

Table 6. 20-Year Projected Water Budget with Project (2021–2040)																				
Water Inflow Source	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**
Inflow[a]	1,000,946	1,000,946	1,000,946	1,000,946	1,000,946	1,000,946	1,000,946	1,000,946	1,000,946	1,000,946	1,000,946	1,000,946	1,000,946	1,000,946	1,000,946	1,000,946	1,000,946	1,000,946	1,000,946	1,000,946
Janus Solar Facility Project Inflow	440	440	440	440	440	440	440	440	440	440	440	440	440	440	440	440	440	440	440	440
Total Groundwater Inflows	**1,001,386**	**1,001,386**	**1,001,386**	**1,001,386**	**1,001,386**	**1,001,386**	**1,001,386**	**1,001,386**	**1,001,386**	**1,001,386**	**1,001,386**	**1,001,386**	**1,001,386**	**1,001,386**	**1,001,386**	**1,001,386**	**1,001,386**	**1,001,386**	**1,001,386**	**1,001,386**
Water Outflow Source																				
Outflow[b]	1,031,512	1,031,512	1,031,512	1,031,512	1,031,512	1,031,512	1,031,512	1,031,512	1,031,512	1,031,512	1,031,512	1,031,512	1,031,512	1,031,512	1,031,512	1,031,512	1,031,512	1,031,512	1,031,512	1,031,512
Janus Solar Facility Project Outflow	46	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Total Groundwater Outflows	**1,031,558**	**1,031,513**	**1,031,513**	**1,031,513**	**1,031,513**	**1,031,513**	**1,031,513**	**1,031,513**	**1,031,513**	**1,031,513**	**1,031,513**	**1,031,513**	**1,031,513**	**1,031,513**	**1,031,513**	**1,031,513**	**1,031,513**	**1,031,513**	**1,031,513**	**1,031,513**
Change in Storage (Inflow – Outflow)	**-30,172**	**-30,127**	**-30,127**	**-30,127**	**-30,127**	**-30,127**	**-30,127**	**-30,127**	**-30,127**	**-30,127**	**-30,127**	**-30,127**	**-30,127**	**-30,127**	**-30,127**	**-30,127**	**-30,127**	**-30,127**	**-30,127**	**-30,127**

[a]Data from the total inflow of a normal year in Table 3
[b]Data from the total outflow of a normal year in Table 3

Table 7. Water Budget Dry Year with Project	
Water Inflow Source	
Subsurface Water Inflow	**206,595**
Deep Percolation – Precipitation	**75,275**
Deep Percolation – Applied Surface Water	**140,443**
Deep Percolation – Applied Groundwater	**41,576**
Seepage – Streams	**161,670**
Seepage – Canals and Drains	**114,680**
Janus Solar Facility Project Inflow	**440**
Total Groundwater Inflows	**740,679**
Water Outflow	
Subsurface Water Outflow	**138,604**
Groundwater Pumping – Agriculture	**493,760**
Groundwater Pumping – Urban and Industrial	**9,145**
Groundwater Pumping – Managed Wetlands	**36,349**
Stream Gain from Groundwater	**336,765**
Janus Solar Facility Project Outflow	**46**
Total Groundwater Outflows	**1,014,669**
Change in Storage (AF)	**-273,990**

Table 8. Water Budget Multi-Dry Year with Project					
Water Inflow Source	**1 (2011)**	**2 (2012)**	**3 (2013)**	**4 (2014)**	**5 (2015)**
Subsurface Water Inflow	201,677	203,767	206,758	206,595	212,601
Deep Percolation – Precipitation	206,544	125,171	134,224	75,275	121,738
Deep Percolation – Applied Surface Water	191,397	166,391	217,662	140,443	156,844
Deep Percolation – Applied Groundwater	81,184	70,872	84,460	41,576	54,427
Seepage – Streams	250,219	184,695	212,971	161,670	212,321
Seepage – Canals and Drains	149,124	155,165	161,055	114,680	106,603
Janus Solar Facility Project Inflow	440	440	440	440	440
Total Groundwater Inflows	**1,080,585**	**906,501**	**1,017,570**	**740,839**	**864,974**
Water Outflow					
Subsurface Water Outflow	150,444	142,515	149,252	138,604	134,908
Groundwater Pumping – Agriculture	425,013	497,334	530,508	493,760	526,047
Groundwater Pumping – Urban and Industrial	9,359	9,992	10,812	9,145	7,590
Groundwater Pumping – Managed Wetlands	24,568	29,273	29,799	36,349	37,073
Stream Gain from Groundwater	357,795	358,015	349,361	336,765	352,745
Janus Solar Facility Project Outflow	46	1	1	1	1
Total Groundwater Outflows	**967,225**	**1,037,130**	**1,069,733**	**1,014,624**	**1,058,364**
Change in Storage (AF)	**113,360**	**-130,629**	**-52,163**	**-273,945**	**-193,390**
Cumulative Change in Storage (AF)	**113,360**	**-17,269**	**-68,432**	**-342,377**	**-536,767**

5 SUMMARY AND CONCLUSIONS

The Project will replace approximately 768 acres of cattle grazing land, which is estimated to consume about 440 AFY of water. The Project will require 46 AF of water for the 11-month construction period and one AFY for subsequent years. The water used for construction will be used to control dust and condition soil while the water for operational use is needed to wash panels. Since the Project will consume a significantly lower amount of water than existing conditions, a decrease in consumption of approximately 437 AF a year or a total of 8,740 AF over the next 20 years is anticipated. Therefore, there is ample water supply for the Project for the next 20 years.

During a single dry year with the Project, there will be an estimated groundwater deficit of 273,990 AF, which is a 394 AF smaller deficit than without the Project. Similarly, a 5-year dry period with the Project is estimated to reduce the cumulative deficit to approximately 537,000 AF with a total water savings of 2,150 AF.

Although the Colusa Subbasin groundwater inflow and outflow is not yet balanced, the Colusa and Glenn GSA are drafting a GSP with the goal of balancing flows in the Colusa Subbasin. The Project will facilitate the goals of the GSP.

6 REFERENCES

National Centers for Environmental Information (NCEI). 2021. Colusa County Precipitation Data; [online]; https://www.ncdc.noaa.gov/cdo-web/results; Accessed July 6, 2021

Colusa Groundwater Authority (CGA). 2021. Colusa Subbasin Groundwater Sustainability Plan. April. Available at: https://colusagroundwater.org/draft-gsp-chapters-available-for-review/.

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TETRA TECH

Memo

To: Greg Plucker, Community Development Director, Colusa County

From: Jennifer Merrick, Senior Technical Advisor, Tetra Tech, Inc.

Cc: Anna Shamey, Project Manager, Tetra Tech, Inc.

Date: September 14, 2024

Subject: Addendum to the Water Supply Assessment for the Janus Solar Project, Colusa County, California

1.0 INTRODUCTION

In February 2021, Tetra Tech prepared a Water Supply Assessment (WSA) for the Janus Solar Project (Project). At that time, the Project was sited on three parcels (Assessor Parcel Numbers 018-050-005-000, 018-050-006-000, and 018050-013-000), which are 630.5, 255.7, and 137.7 acres in size, respectively, for a total area of approximately 1,024 acres. The Project also included a 4-mile-long generation interconnect (gen-tie) line to connect to the electrical grid at the existing Cortina Substation. In 2024, the Project was re-designed, removing parcel 018050-013-000 and reducing the project site size to approximately 886 acres, with the 4-mile-long gen-tie line.

2.0 WATER SUPPLY ASSESSMENT

The purpose of this memo is to update the 2021 Water Supply Assessment to reflect the new Project design and schedule.

In 2021, the WSA concluded that the total water supply that would be available during normal, single dry, and multiple dry years over a 20-year projection would meet the demand projected for the Project, in addition to that of existing and planned future uses, including agricultural and manufacturing uses.

The 20-year projection, reported as 2021–2040 in the 2021 WSA, has been shifted to 2025–2044. As described in the 2021 WSA, the Project would reduce the natural vegetation at the Project site that currently consumes water through the evapotranspiration process. Because the Project footprint was decreased by approximately 13 percent, the annual existing water demand of the natural vegetation is estimated to be approximately 383 acre feet (AF), rather than the previous calculation of 440 AF. The information presented in Tables 6 through 8 in the 2021 WSA have been revised to reflect these changes and are provided below.

Tetra Tech, Inc.
17885 Von Karman Ave, Suite 100, Irvine, CA
Tel 949.809.5000 | tetratech.com

Revised Table 6. 20-Year Projected Water Budget with Project (Years 2025–2044) (Flows in Acre-Feet)

Water Inflow Source	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044
Inflow[a]	1,000,946	1,000,946	1,000,946	1,000,946	1,000,946	1,000,946	1,000,946	1,000,946	1,000,946	1,000,946	1,000,946	1,000,946	1,000,946	1,000,946	1,000,946	1,000,946	1,000,946	1,000,946	1,000,946	1,000,946
Janus Solar Facility Project Inflow	383	383	383	383	383	383	383	383	383	383	383	383	383	383	383	383	383	383	383	383
Total Groundwater Inflows	**1,001,329**	**1,001,329**	**1,001,329**	**1,001,329**	**1,001,329**	**1,001,329**	**1,001,329**	**1,001,329**	**1,001,329**	**1,001,329**	**1,001,329**	**1,001,329**	**1,001,329**	**1,001,329**	**1,001,329**	**1,001,329**	**1,001,329**	**1,001,329**	**1,001,329**	**1,001,329**
Water Outflow Source																				
Outflow[b]	1,031,512	1,031,512	1,031,512	1,031,512	1,031,512	1,031,512	1,031,512	1,031,512	1,031,512	1,031,512	1,031,512	1,031,512	1,031,512	1,031,512	1,031,512	1,031,512	1,031,512	1,031,512	1,031,512	1,031,512
Janus Solar Facility Project Outflow	40	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Total Groundwater Outflows	**1,031,552**	**1,031,513**	**1,031,513**	**1,031,513**	**1,031,513**	**1,031,513**	**1,031,513**	**1,031,513**	**1,031,513**	**1,031,513**	**1,031,513**	**1,031,513**	**1,031,513**	**1,031,513**	**1,031,513**	**1,031,513**	**1,031,513**	**1,031,513**	**1,031,513**	**1,031,513**
Change in Storage (Inflow – Outflow)	**-30,223**	**-30,184**	**-30,184**	**-30,184**	**-30,184**	**-30,184**	**-30,184**	**-30,184**	**-30,184**	**-30,184**	**-30,184**	**-30,184**	**-30,184**	**-30,184**	**-30,184**	**-30,184**	**-30,184**	**-30,184**	**-30,184**	**-30,184**

[a]Data from the total inflow of a normal year
[b]Data from the total outflow of a normal year

Revised Table 7. Water Budget Dry Year with Project (Acre-Feet)

Water Inflow Source	
Subsurface Water Inflow	**206,595**
Deep Percolation – Precipitation	**75,275**
Deep Percolation – Applied Surface Water	**140,443**
Deep Percolation – Applied Groundwater	**41,576**
Seepage – Streams	**161,670**
Seepage – Canals and Drains	**114,680**
Janus Solar Facility Project Inflow	**383**
Total Groundwater Inflows	**740,622**
Water Outflow	
Subsurface Water Outflow	**138,604**
Groundwater Pumping – Agriculture	**493,760**
Groundwater Pumping – Urban and Industrial	**9,145**
Groundwater Pumping – Managed Wetlands	**36,349**
Stream Gain from Groundwater	**336,765**
Janus Solar Facility Project Outflow	**40**
Total Groundwater Outflows	**1,014,663**
Change in Storage (AF)	**-274,041**

Table 8. Water Budget Multiple Dry Years with Project (Acre-Feet)

Water Inflow Source	1 (2011)	2 (2012)	3 (2013)	4 (2014)	5 (2015)
Subsurface Water Inflow	201,677	203,767	206,758	206,595	212,601
Deep Percolation – Precipitation	206,544	125,171	134,224	75,275	121,738
Deep Percolation – Applied Surface Water	191,397	166,391	217,662	140,443	156,844
Deep Percolation – Applied Groundwater	81,184	70,872	84,460	41,576	54,427
Seepage – Streams	250,219	184,695	212,971	161,670	212,321
Seepage – Canals and Drains	149,124	155,165	161,055	114,680	106,603
Janus Solar Facility Project Inflow	**383**	**383**	**383**	**383**	**383**
Total Groundwater Inflows	**1,080,528**	**906,444**	**1,017,513**	**740,622**	**864,917**
Water Outflow					
Subsurface Water Outflow	150,444	142,515	149,252	138,604	134,908
Groundwater Pumping – Agriculture	425,013	497,334	530,508	493,760	526,047
Groundwater Pumping – Urban and Industrial	9,359	9,992	10,812	9,145	7,590
Groundwater Pumping – Managed Wetlands	24,568	29,273	29,799	36,349	37,073
Stream Gain from Groundwater	357,795	358,015	349,361	336,765	352,745
Janus Solar Facility Project Outflow	40	1	1	1	1
Total Groundwater Outflows	**967,219**	**1,037,130**	**1,069,733**	**1,014,624**	**1,058,364**
Change in Storage (AF)	**113,309**	**-130,686**	**-52,220**	**-274,002**	**-193,447**
Cumulative Change in Storage (AF)	**113,366**	**-17,3877**	**-69,597**	**-343,599**	**-537,046**

3.0 CONCLUSION

The Project footprint has been reduced by 13 percent, such that the annual existing water demand of the natural vegetation within that area is also reduced by 13 percent and is now estimated to be approximately 383 AF. Based on a conservative assumption that 15 percent of the vegetation on the Project site would be removed, the water required for construction is significantly lower than the estimated water currently required for the natural vegetation (approximately 383 AF), which would result in a reduction of water consumption of approximately 343 AF during the construction period. The Project would require approximately 40 AF of water during the 11-month construction period and 1 AF annually for subsequent years. During construction, water would be used to control dust and condition soil, while in subsequent years, water for operational use is needed to wash panels. The Project's operational water consumption would be reduced even further, as the operational water use is dramatically lower than the construction water use. The operational use of the solar facility is estimated to reduce the typical water consumption by 382 AFY. Overall, the Project would consume a significantly lower amount of water compared to existing conditions; therefore, there is expected to be ample water supply for the Project over the next 20 years.

Although the Colusa Subbasin groundwater inflow and outflow is not yet balanced, as shown in the revised Tables 6–8 from the WSA, the Project would reduce the anticipated deficits. During a single dry year with the Project, there will be an estimated groundwater deficit of 274,041 AF, a smaller deficit by 343 AF than without the Project[1]. Similarly, a 5-year dry period with the Project is estimated to reduce the cumulative deficit to approximately 537,000 AF, with a total water savings of approximately 2,150 AF[2].

The Colusa Groundwater Authority held a public hearing and adopted the Colusa Subbasin Groundwater Sustainability Plan on December 13, 2021, and the Glenn Groundwater Authority held a public hearing and adopted the Colusa Subbasin Groundwater Sustainability Plan on December 14, 2021 (DWR 2021). The Project would facilitate the goals of the Colusa Subbasin Groundwater Sustainability Plan.

4.0 REFERENCES

Department of Water Resources (DWR). 2021. Colusa Subbasin Groundwater Sustainability Plan. Available at: Sustainable Groundwater Management Act (SGMA) Portal - Department of Water Resources (ca.gov). Accessed July 2024.

[1] Based on a deficit of 274,384 AF reported as the largest one-year deficit in 2013 in the 2021 Colusa Subbasin (DWR 2021).

[2] Based on a cumulative deficit of 538,917 AF reported in the 2021 Colusa Subbasin Groundwater Sustainability Plan (DWR 2021).

APPENDIX I
SOUND SURVEY ANALYSIS AND REPORT

DRAFT
SOUND SURVEY AND ANALYSIS REPORT

Janus Solar Project

Colusa County, California

August 1, 2021

RWE Solar Development, LLC

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ACRONYMS AND ABBREVIATIONS

μPa	microPascal
CEQA	California Environmental Quality Act
dB	decibel
dBA	A-weighted decibel
dBL	unweighted (linear) decibel
FTA	Federal Transit Authority
Hz	hertz
in/sec	inch per second
ISO	International Organization for Standardization
Ldn	Day-night average sound level
Leq	equivalent sound level
LP	sound pressure level
kV	kilovolt
ML	monitoring location
NSA	Noise Sensitive Area
PG&E	Pacific Gas and Electric
PPV	Peak-Particle-Velocity
Project	Janus Solar Project
Tetra Tech	Tetra Tech, Inc.
USEPA	United States Environmental Protection Agency
VdB	vibration decibel

1.0 OVERVIEW

Tetra Tech, Inc. (Tetra Tech) has prepared this noise impact assessment for the proposed Janus Solar Project (Project) to support a California Environmental Quality Act (CEQA) evaluation. The Project is proposed on approximately 1,024 acres of land located approximately 6.5 miles southwest of the city of Williams within Colusa County. The Project consists of constructing and operating a photovoltaic solar electric generating facility and energy storage system and associated infrastructure that would produce up to 80 megawatts of power at the Point of Interconnection. The Project would include the construction of solar arrays, an electrical substation and electrical interconnection facilities, an energy storage system and other necessary infrastructure.

1.1 PROJECT SETTING

The Project site is on three parcels of private land that total approximately 1,024 acres and is currently operated as a cattle ranch. To avoid environmental constraints, approximately 768 acres of the 1,024-acre site would be used for the Project. The Project site is surrounded by rural residential, agricultural fields, and undeveloped land. The nearest residential property lines are located directly adjacent to the southern Project boundary and the northwestern Project boundary, while a mixed residential/agricultural property line is located directly adjacent to the northern Project boundary.

Spring Valley Road runs through the Project site from north to south. The generation tie line follows Spring Valley Road north to Walnut Drive at which point it follows Walnut Drive to Pacific Gas and Electric's (PG&E's) Cortina Substation. The nearest community to the Project site is the city of Williams, which is located approximately 6.5 miles northeast. Figure 1 provides an overview of the Project site as well as the surrounding area.

1.2 ACOUSTIC METRICS AND TERMINOLOGY

All sounds originate with a source, whether it is a human voice, motor vehicles on a roadway, or a combustion turbine. Energy is required to produce sound and this sound energy is transmitted through the air in the form of sound waves – tiny, quick oscillations of pressure just above and just below atmospheric pressure. These oscillations, or sound pressures, impinge on the ear, creating the sound we hear. A sound source is defined by a sound power level (abbreviated "LW"), which is independent of any external factors. By definition, sound power is the rate at which acoustical energy is radiated outward and is expressed in units of watts.

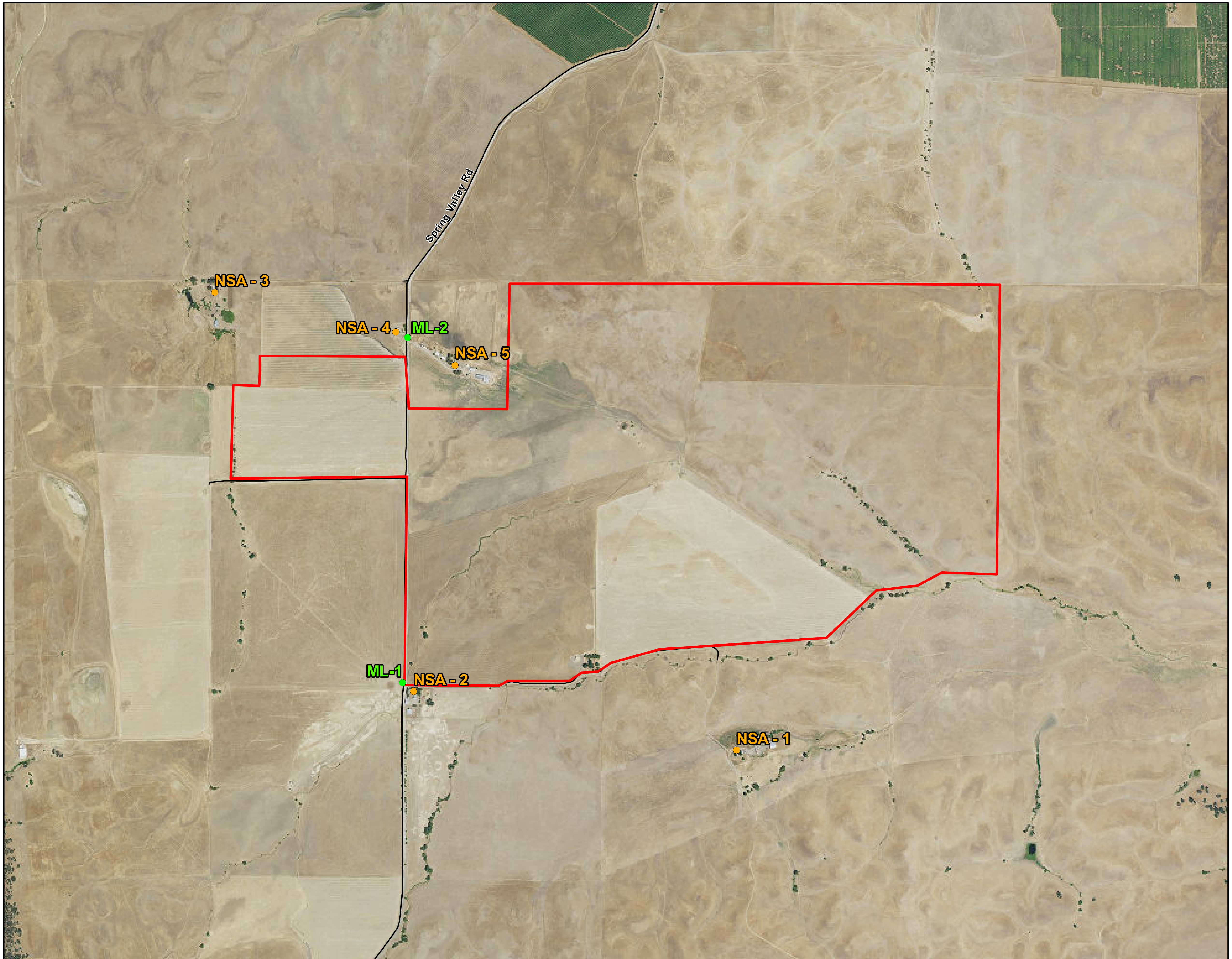
A source sound power level cannot be measured directly. It is calculated from measurements of sound intensity or sound pressure at a given distance from the source outside the acoustic and geometric near-field. A sound pressure level (abbreviated "L_P") is a measure of the sound wave fluctuation at a given receiver location and can be obtained through the use of a microphone or calculated from information about the source sound power level and the surrounding environment. The sound pressure level in decibels (dB) is the logarithm of the ratio of the sound pressure of the source to the reference sound pressure of 20 microPascals (μPa), multiplied by 20. The range of sound pressures that can be detected by a person with normal hearing is very wide, ranging from about 20 μPa for very faint sounds at the threshold of hearing, to nearly 10 million μPa for extremely loud sounds such as a jet during take-off at a distance of 300 feet.

Janus Solar Project

Colusa County, CA

Noise Report

Figure 1: Project Location



Project Area

Noise Monitoring Location

Noise Sensitive Receptor

0 0.25 0.5 Miles

Scale is 1:15,000 when printed at 11"x17"

NOT FOR CONSTRUCTION

Broadband sound includes sound energy summed across the entire audible frequency spectrum. In addition to broadband sound pressure levels, analysis of the various frequency components of the sound spectrum can be completed to determine tonal characteristics. The unit of frequency is hertz (Hz), measuring the cycles per second of the sound pressure waves. Typically, the frequency analysis examines 11 octave bands ranging from 16 Hz (low) to 16,000 Hz (high). Since the human ear does not perceive every frequency with equal loudness, spectrally-varying sounds are often adjusted with a weighting filter. The A-weighted filter is applied to compensate for the frequency response of the human auditory system and is represented in A-Weighted Decibel (dBA).

Sound can be measured, modeled, and presented in various formats, with the most common metric being the equivalent sound level (L_{eq}). The L_{eq} has been shown to provide both an effective and uniform method for comparing time-varying sound levels and is widely used in acoustic assessments in the State of California. Estimates of noise sources and outdoor acoustic environments, and the comparison of relative loudness are presented in Table 1. Table 2 presents additional reference information on terminology used in the report.

Table 1. Sound Pressure Levels (L_P) and Relative Loudness of Typical Noise Sources and Acoustic Environments

Noise Source or Activity	Sound Level (dBA)	Subjective Impression
Vacuum cleaner (10 feet)	70	Moderate
Passenger car at 65 miles per hour (25 feet)	65	
Large store air-conditioning unit (20 feet)	60	
Light auto traffic (100 feet)	50	Quiet
Quiet rural residential area with no activity	45	
Bedroom or quiet living room; Bird calls	40	Faint
Typical wilderness area	35	
Quiet library, soft whisper (15 feet)	30	Very quiet
Wilderness with no wind or animal activity	25	Extremely quiet
High-quality recording studio	20	
Acoustic test chamber	10	Just audible
	0	Threshold of hearing

Adapted from: Kurze and Beranek (1988) and USEPA (1971)

Table 2. Acoustic Terms and Definitions

Term	Definition
Noise	Typically defined as unwanted sound. This word adds the subjective response of humans to the physical phenomenon of sound. It is commonly used when negative effects on people are known to occur.
Sound Pressure Level (L_P)	Pressure fluctuations in a medium. Sound pressure is measured in dB referenced to 20 μPa, the approximate threshold of human perception to sound at 1,000 Hz.
Sound Power Level (L_W)	The total acoustic power of a noise source measured in dB referenced to picowatts (one trillionth of a watt). Noise specifications are provided by equipment manufacturers as sound power as it is independent of the environment in which it is located. A sound level meter does not directly measure sound power.

Term	Definition
Equivalent Sound Level (L_{eq})	The L_{eq} is the continuous equivalent sound level, defined as the single sound pressure level that, if constant over the stated measurement period, would contain the same sound energy as the actual monitored sound that is fluctuating in level over the measurement period.
A-Weighted Decibel (dBA)	Environmental sound is typically composed of acoustic energy across all frequencies. To compensate for the auditory frequency response of the human ear, an A-weighting filter is commonly used for describing environmental sound levels. Sound levels that are A-weighted are presented as dBA in this report.
Unweighted (Linear) Decibels (dBL)	Unweighted sound levels are referred to as linear. Linear decibels are used to determine a sound's tonality and to engineer solutions to reduce or control noise as techniques are different for low and high frequency noise. Sound levels that are linear are presented as dBL in this report.
Propagation and Attenuation	Propagation is the decrease in amplitude of an acoustic signal due to geometric spreading losses with increased distance from the source. Additional sound attenuation factors include air absorption, terrain effects, sound interaction with the ground, diffraction of sound around objects and topographical features, foliage, and meteorological conditions including wind velocity, temperature, humidity, and atmospheric conditions.

1.3 VIBRATION METRICS AND TERMINOLOGY

Vibration is an oscillatory motion that is described in terms of displacement, velocity, or acceleration. Velocity is the most common descriptor used when evaluating human perception or structural damage. Velocity represents the instantaneous speed of movement and more accurately describes the response of humans, buildings, and equipment to vibrations.

Peak-Particle-Velocity (PPV) and root mean square velocity are typical metrics used to describe vibration levels in units of inches per second in the United States. However, to evaluate annoyance to humans, the vibration dB (VdB) notation is commonly used. The decibel notation acts to compress the range of numbers required to describe vibration. In the United States, the accepted velocity reference for converting to dB is 1×10^{-6} inches per second. The abbreviation "VdB" is used for vibration dB to reduce the potential for confusion with sound decibels.

In contrast to airborne noise, ground-borne vibration is not an everyday occurrence for humans. The background vibration velocity levels within residential areas are usually 50 VdB or lower, which is well below the human perception threshold of approximately 65 VdB. However, human response to vibration is not usually significant unless the vibration exceeds 70 VdB. For a significant impact to occur, vibration levels must exceed 72 VdB during frequent events, 75 VdB for occasional events, and 80 VdB during infrequent events (FTA 2006). Outdoor sources that generate perceptible ground-borne vibrations are typically construction equipment, steel-wheeled trains, and traffic on rough roadways. Table 3 provides common vibration sources as well as human and structural response to ground-borne vibrations.

Table 3. Typical Levels of Ground-Borne Vibration

Human/Structural Response	PPV (in/sec)	Velocity Level (VdB)*	Typical sources (50 feet from source)
Threshold, Minor Cosmetic Damage, Fragile Buildings	0.4	100	Blasting from Construction Projects
	0.17-0.2	92-94	Heavy Tracked Construction Equipment
Difficulty with Tasks, Such as Reading a Computer Screen	0.125	90	
	0.074	85	Commuter Rail, Upper Range

Human/Structural Response	PPV (in/sec)	Velocity Level (VdB)*	Typical sources (50 feet from source)
Residential Annoyance, Infrequent Events	0.04	80	Rapid Transit, Upper Range
	0.013	75	Commuter Rail, Typical
	0.023	72	Bus or Truck Bump Over
Residential Annoyance, Frequent Events	0.013	70	Rapid Transit, Typical
Approximate Threshold of Human Perception	0.007	65	
	0.005	62	Bus or Truck, Typical
	0.0013	50	Typical Background Vibration Levels

*RMS Vibration Velocity in VdB reference to 10^{-6} inches/second
Source: FTA (2006)

The degree of annoyance cannot always be explained by the magnitude of the vibrations alone. Phenomena, such as ground-borne noise and rattling, visual effects (e.g., movement of hanging objects), and time of day, all influence the response of individuals. The American National Standards Institute and the International Organization for Standardization (ISO) have developed criteria for evaluation of human exposure to vibrations. The recommendations of these standards and other studies evaluating human response to vibrations have been incorporated into the Federal Transit Administration's (FTA) Transit Noise and Vibration Impact Assessment Manual (May 2006). The criteria within this manual are used to assess noise and vibration impacts from transit operations.

1.4 SENSITIVE RECEPTORS

Human response to noise varies considerably from one individual to another. Effects of noise at various levels can include interference with sleep, concentration, and communication, and can cause physiological and psychological stress and hearing loss. Given these effects, some land uses are considered more sensitive to ambient noise levels than others. In general, residences, schools, hotels, hospitals, and nursing homes are considered to be the most sensitive to noise. These locations are referred to as noise sensitive areas (NSAs). Places such as churches, libraries, and cemeteries, where people tend to pray, study, and/or contemplate also are NSAs. Commercial and industrial uses are considered the least noise-sensitive. As shown in Figure 1, there are multiple residences near the Project site (NSA 1-5). NSA-5 is the residence of the landowner participating in the Project, such that NSA-5 is not considered a sensitive receptor

1.5 NOISE AND VIBRATION LEVEL REQUIREMENT AND GUIDELINES

Potential noise impacts associated with the Project were evaluated with respect to the applicable noise requirements prescribed by CEQA, the Colusa County General Plan (2012), and the Colusa County Code. Details regarding each set of requirements are provided below.

1.5.1 California Environmental Quality Act

CEQA requires that significant environmental impacts be identified and that such impacts be eliminated or mitigated to the extent feasible. Appendix G of the CEQA Statutes and Guidelines (State Clearing House, Office of Planning and Research and the Natural Resources Agency 2016) sets forth a series of suggested thresholds for determining a potentially significant impact. Under the thresholds suggested in Appendix G, the proposed Project could be considered to have significant noise and vibration impacts if it results in one or more of the following:

a) Generation of substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or in other applicable local, state, or federal standards?

b) Generation of excessive groundborne vibration or groundborne noise level?

c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan had not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

The CEQA Statutes and Guidelines Appendix G thresholds for items (c) and (d) do not define the term "substantial"; however, the Colusa County General Plan Noise Element states that an increase in ambient noise levels by more than 3 dB would be considered significant, as discussed below.

1.5.2 Colusa County General Plan

The Colusa County General Plan includes a Noise Element with noise policies to manage sources of noise and protect noise sensitive land uses. This Noise Element contains goals, objectives, policies, and action items that seek to reduce community exposure to excessive noise levels through the establishment of noise level standards for a variety of land uses. The Noise Element contains the following policies to address noise.

Policy N 1-1 New proposed stationary noise sources shall not result in noise levels that exceed the standards of Table N-1, as measured immediately within the property line of lands designated for noise-sensitive uses.

Policy N 1-2 Ensure that noise sources do not interfere with sleep by applying an interior maximum noise level criterion (L_{max}) of 45 dBA in sleeping areas, for sensitive receptors.

Policy N 1-6 Require new land use development proposals to address potential stationary and mobile noise impacts and land use incompatibilities from aircraft noise, train travel, and truck travel.

Policy N 1-12 Where noise mitigation measures are required to achieve the standards of Tables N-1 or N-2, the emphasis of such measures shall be placed upon site planning and project design. The use of noise barriers shall be considered a means of achieving the noise standards only after all other practical design-related noise mitigation measures have been considered and integrated into the project. Landscaped berms shall be considered as a preferred mitigation option over sound walls.

Policy N 1-13 An acoustical analysis shall be prepared and submitted to the County according to the requirements of Table N-3 when:

- Noise sensitive land uses are proposed in areas exposed to existing or projected noise levels exceeding the Table N-1 (stationary) or Table N-2 (mobile) noise level standards.
- A proposed project has the potential to create new noise levels exceeding the noise level standards of Table N-1 or Table N-2.

Policy N 1-15 As part of the review of new development projects, consider vibration impacts and require mitigation to reduce any significant adverse impacts to the maximum extent feasible and practical.

Policy N 1-16 In making a determination of impact under the California Environmental Quality Act (CEQA), a significant impact will occur if the project results in an exceedance of the noise level standards contained in the Noise Element, or the project will result in an increase in ambient noise levels by more than 3 dB.

Policy N 1-17 Require use of site design measures, such as the use of building design and orientation, buffer space, use of berms, and noise attenuation measures applied to the noise source, to reduce impacts to the maximum extent feasible and practical before mitigating noise impacts through use of sound walls. The use of sound walls or noise barriers to attenuate noise from existing noise sources is discouraged, but may be allowed if the wall is architecturally incorporated into the project design, blends into the natural landscape, and does not adversely affect significant public view corridors.

Action N 1-J: As part of the project review and approval process, require that all acoustical studies be prepared in accordance with Table N-3.

Action N 1-K: As part of the project review and approval process, require construction projects and new development anticipated to generate a significant amount of ground borne vibration to ensure acceptable interior vibration levels at nearby noise-sensitive uses based on Federal Transit Administration criteria.

The tables in the Noise Element referred to as Table N-1 and Table N-3 are shown below as Table 4 and Table 5, respectively.

Table 4. Exterior and Interior Noise Level Performance Standards for Projects Affected by or Including Non-transportation Noise Sources

Type of Use	Interior Noise Level Standard	Exterior Noise Level, Leq[1]	
		Day Time (7 A.M. to 10 P.M.)	Nighttime (10 P.M. to 7 A.M.)
All sensitive land uses	45 dB L_{max}	55 dB	45 dB
New residential affected by existing seasonal agricultural noise	40 dB L_{dn}	N/A	N/A

[1] Exterior noise level standard to be applied at the property line of the receiving land use or at a designated outdoor activity area (at the discretion of the Planning Director) of the new development. For mixed-use type projects, the exterior noise level standard may be waived (at the discretion of the Planning Director) if the project does not include a designated activity area and mitigation of property line noise is not practical. In this case, the interior standard would still apply.

Each of the exterior noise levels specified above shall be lowered by five dB for simple tone noises, noises consisting primarily of speech or music, or for recurring impulsive noises (e.g., humming sounds, outdoor speaker systems). These noise level standards do not apply to residential units established in conjunction with industrial or commercial uses (e.g., caretaker dwellings).

The County can impose noise level standards that are more restrictive than those specified above based upon determination of existing low ambient noise levels.

Notes:

Fixed noise sources which are typically of concern include, but are not limited to the following:

Air Compressors
Blowers
Boilers
Cooling Towers/Evaporative Condensers
Conveyor Systems
Cutting Equipment
Drill Rigs
Emergency Generators
HVAC Systems
Fans
Gas or Diesel Motors
Gas Wells

Generators
Grinders
Heavy Equipment
Lift Stations
Outdoor Speakers
Pile Drivers
Pump Stations
Rice Dryers
Steam Turbines
Steam Valves
Transformers
Welders

The types of uses which may typically produce the noise sources described above include but are not limited to: various industrial and agricultural facilities, trucking operations, tire shops, auto maintenance shops, metal fabricating shops, shopping centers, drive-up windows, car washes, loading docks, public works projects, batch plants, bottling and canning plants, recycling centers, electric generating stations, race tracks, landfills, sand and gravel operations, and athletic fields

Source: Colusa County General Plan 2012

Table 5. Requirements For an Acoustical Analysis

An acoustical analysis prepared pursuant to the Noise Element shall: A. Be the financial responsibility of the applicant. B. Be prepared by a qualified person experienced in the fields of environmental noise assessment and architectural acoustics. C. Include representative noise level measurements with sufficient sampling periods and locations to adequately describe local conditions and the predominant noise sources. D. Estimate existing and projected cumulative (20 years) noise levels in terms of Ldn or CNEL and/or the standards of Table N-1, and compare those levels to the adopted policies of the Noise Element. E. Recommend appropriate mitigation to achieve compliance with the adopted policies and standards of the Noise Element, giving preference to proper site planning and design over mitigation measures which require the construction of noise barriers or structural modifications to buildings which contain noise-sensitive land uses. F. Estimate noise exposure after the prescribed mitigation measures have been implemented. G. Describe a post-project assessment program that could be used to evaluate the effectiveness of the proposed mitigation measures.

Source: Colusa County General Plan 2012

1.5.3 Colusa County Code

Chapter 13 of the Colusa County Code establishes the noise limits in Table 6 that shall not be exceeded when measured at the property boundary of the affected property.

Table 6. Colusa County Code Noise Criteria

Land Use*	Maximum Noise Level (dBA)	
	Day	Night
Residential	55	50
Commercial	60	55
High Noise Traffic Corridor	65	65
* Determination of which land use and time period applies to a noise source shall be based upon the affected (complainant's) property's land use. Decibel levels shall be measured at the affected (complainant's) property plane at the point closest to the noise source. The high noise traffic corridors include the following: Highway 20 and Interstate 5. The land uses as shown in the above table are defined using the county general plan.		

Source: Colusa County Code 2021

The Colusa County Code also establishes the following exemptions from the Table 6 limits:

> (b) Construction and Landscape Maintenance Equipment. Notwithstanding any other provision of this chapter, between the hours of seven a.m. and seven p.m. on Mondays through Fridays, and between the hours of eight a.m. and eight p.m. on Saturdays and Sundays, construction, alteration, repair, or maintenance activities which are authorized by valid county permit or business license, carried out by employees or contractors of the county, or private activities not requiring a permit shall be allowed if they meet at least one of the following noise limitations:

(1) No individual piece of equipment produces a noise level exceeding eighty-three dBA at a distance of twenty-five feet. If the device is housed within a structure on the property, the measurement shall be made outside the structure at a distance as close to twenty feet from the equipment as possible.

(2) The noise level at any point outside of the property plane of the project does not exceed eighty-six dBA.

(A) The provisions of subsections (b)(1) and (2) of this section shall not be applicable to impact tools and equipment; provided, that such impact tools and equipment shall have intake and exhaust mufflers recommended by manufacturers thereof and approved by the director of public works as best accomplishing maximum noise attenuation, and that pavement breakers and jackhammers shall also be equipped with acoustically attenuating shields or shrouds recommended by the manufacturers thereof and approved by the director of public works as best accomplishing maximum noise attenuation. In the absence of manufacturer's recommendations, the director of public works may prescribe such means of accomplishing maximum noise attenuation as he/she may determine to be in the public interest. Construction projects located more than two hundred feet from existing homes may request a special use permit to begin work at six a.m. on weekdays from June 15th until September 1st. No percussion type tools (such as ramsets or jackhammers) can be used before seven a.m. The permit shall be revoked if any noise complaint is received by the sheriff's department.

(B) No individual powered blower shall produce a noise level exceeding seventy dBA measured at a distance of fifty feet.

(C) No powered blower shall be operated within a one-hundred-foot radius of another powered blower simultaneously.

(D) On single-family residential property, the seventy dBA at fifty feet restriction shall not apply if operated for less than ten minutes per occurrence.

(c) Air Conditioners and Similar Equipment. Air conditioners, pool pumps and similar equipment are exempt from this chapter, provided they are in good working order.

(d) Work Required for the Public Health and Safety. Work performed by the county, county franchises, persons under contract with the county for repairs or maintenance of roads, water wells, water service lines, trees, and landscape, as well as street sweeping, garbage removal, and similar activities, are exempt from this chapter.

(e) Safety Devices. Aural warning devices which are required by law to protect the health, safety, and welfare of the community shall be exempt from the provisions of this chapter.

(f) Emergencies. Emergencies are exempt from this chapter. (Ord. No. 730, § 13.20.030.)

1.5.4 Federal Transit Authority Construction Noise Guidelines

There is no standardized state or federal regulatory standards developed for assessing construction noise impacts. However, the FTA has developed and published a guideline criterion that is considered to be reasonable to assess noise impacts from construction operations. The FTA criteria is summarized in Table 7 below.

Table 7. Federal Transit Authority Construction Noise Criteria

Land Use	8-hour (dBA L_{eq})		30-Day Average L_{dn} (dB) or L_{eq} (dBA)
	Day	Night	
Residential	80	70	75[a]
Commercial	85	85	80[b]
Industrial	90	90	85[b]

[a] In urban areas with very high ambient noise levels (Ldn > 65 dB), Ldn from construction operations should not exceed existing ambient + 10 dB.
[b] Twenty-four-hour Leq, not Ldn.

2.0 EXISTING SOUND ENVIRONENMENT

Tetra Tech conducted a series of ambient sound level measurements to characterize the existing acoustic environment near the Project during both daytime and nighttime periods. This section summarizes the methodology used by Tetra Tech to conduct the sound survey and describes the measurement locations.

2.1 FIELD METHODOLOGY

To document the existing conditions, baseline sound level measurements were performed on March 17, 2020. The measurement locations were selected to be representative of the surroundings of potential receptors nearest to the proposed Project site. The ambient sound survey included short-term measurements in the presence of an acoustics expert for a minimum duration of 30 minutes. The short-term measurements were made during both daytime (10:00 a.m. to 4:00 p.m.) and nighttime (10:00 p.m. to 2:00 a.m.) periods at noise-sensitive areas.

All the measurements were conducted using a Larson Davis Model 831 precision integrating sound-level meter that meets the requirements of the American National Standards Institute standards for Type 1 precision instrumentation. This sound analyzer has an operating range of 5 dB to 140 dB, and an overall frequency range of 8 to 20,000 Hz. During the measurement program, microphones were fitted with a windscreen, set upon a tripod at a height of approximately 1.5 meters (5 feet) above the ground and located out of the influence of any vertical reflecting surfaces. The sound analyzer was calibrated at the beginning and end of the measurement period using a Larson Davis Model CAL200 acoustic calibrator following procedures that are traceable to the National Institute of Standards and Technology. Table 8 lists the measurement equipment employed during the survey. The sound level meters were programmed to sample and store A-weighted and octave band sound level data, including L_{eq} and the percentile sound levels.

Table 8. Measurement Equipment

Description	Manufacturer	Type
Signal Analyzer	Larson Davis	831
Preamplifier	Larson Davis	PRM902
Microphone	PCB	377B02
Windscreen	ACO Pacific	7-inch
Calibrator	Larson Davis	CAL200

During the survey, weather conditions were conducive to accurate data collection. Weather conditions were mainly sunny with few clouds and no precipitation occurring during the measurement period. Temperatures ranged from 50 to 57 degrees Fahrenheit during the day, and 50 degrees Fahrenheit during the night.

2.2 FIELD MEASUREMENTS

Two short-term, attended sound measurements were performed at public locations near residential properties proximate to the Project site. The monitoring locations, ML-1 and ML-2 were selected to represent ambient conditions at land uses in the vicinity of the Project site. The short-term monitoring locations are described in Table 9 and mapped on Figure 1.

Table 9. Sound Level Monitoring Locations

Monitoring Location	Coordinates (Universal Transverse Mercator Zone 10S)		Distance and Direction from Project Site Boundary
	Easting (m)	Northing (m)	
ML-1	562114	4326636	50 feet southwest
ML-2	562120	4328054	250 feet north

2.2.1 Location ML-1

This monitoring location is located on Spring Valley Road approximately 2.3 miles south of Walnut Dr, and 50 feet from the southwestern Project boundary line. This location represents the closest residence to the south.

During the daytime measurement period, the most prominent noise was generated from distant farm equipment and songbirds. During the nighttime measurement period, the most prominent noise came from distant coyotes howling and the occasional buzz from a transmission line.

2.2.2 Location ML-2

This monitoring location is on Spring Valley Road approximately 1.3 miles south of Walnut Drive, and 250 feet from the northern Project boundary line. This location represents the closest residence to the north.

During the daytime measurement period, the most prominent noise was generated by distant farm equipment, cattle, and occasional vehicles along Spring Valley Road. During the nighttime measurement period, the most prominent noise came from distant coyotes howling.

2.3 MEASUREMENT RESULTS

Table 10 provides a summary of the measured ambient sound levels observed at each of the monitoring locations for both the daytime and nighttime L_{eq}.

Table 10. Sound Measurement Results – L_{eq} Sound Levels

Monitoring Location	Time Period	L_{eq} (dBA)
ML-1	Day	32
	Night	24
ML-2	Day	34
	Night	28

Ambient sound levels exhibited typical diurnal patterns. Daytime L_{eq} sound levels at the measurement locations ranged from a low of 32 dBA at ML-1 to a high of 34 dBA at ML-2. Nighttime sound levels ranged from a low of 24 dBA at ML-1 to a high of 28 dBA at ML-2.

3.0 PROJECT CONSTRUCTION

3.1 NOISE CALCULATION METHODOLOGY

Acoustic emission levels for activities associated with Project construction were based upon typical ranges of energy equivalent noise levels at construction sites, as documented by the United States Environmental Protection Agency (USEPA 1971) and the USEPA's "Construction Noise Control Technology Initiatives" (USEPA 1980). The USEPA methodology distinguishes between type of construction and construction stage.

The basic model assumed spherical wave divergence from a point source located at the closest boundary line of the Project site to each receptor structure. Furthermore, the model conservatively assumed that all pieces of construction equipment associated with an activity would operate simultaneously for the duration of that activity. An additional level of conservatism was built into the construction noise model by excluding potential shielding effects due to intervening structures and buildings along the propagation path from the site to receiver locations.

3.2 PROJECTED NOISE LEVELS DURING CONSTRUCTION

The construction processes are anticipated to occur during a period of approximately 11 months and begin in late 2022. Project construction would consist of five major stages. The first stage would include mobilization, site preparation, fencing, and laydown. The second stage would involve excavation, trenching and trench backfill.The third stage includes installation of cables and utilities. The fourth stage includes construction of the inverters, PV modules, and battery energy storage system units, and also includes commissioning and testing.

Table 11 summarizes the projected noise levels at the NSAs due to Project construction.

Table 11. Projected Construction Noise Levels by Stage (dBA L_{eq})

Construction Stage	Equipment				Construction Noise Level, dBA					
	Equipment Type	Quantity	Usage Factor (%)	USEPA Construction Noise Level (50 feet), dBA	Project Boundary (50 feet)	NSA-1 (1,430 feet)[1]	NSA-2 (100 feet)[1]	NSA-3 (1080 feet)[1]	NSA-4 (300 feet)[1]	NSA-5 (250 feet)[1]
Preparation	Backhoes	4	40	80	93	64	87	66	76	79
	Plate Compactors	2	20	80						
	Crawler Tractors	2	40	84						
	Dump Trucks	5	40	84						
	Forklifts	2	20	85						
	Generator Sets	4	50	82						

Construction Stage	Equipment				Construction Noise Level, dBA					
	Equipment Type	Quantity	Usage Factor (%)	USEPA Construction Noise Level (50 feet), dBA	Project Boundary (50 feet)	NSA-1 (1,430 feet)[1]	NSA-2 (100 feet)[1]	NSA-3 (1080 feet)[1]	NSA-4 (300 feet)[1]	NSA-5 (250 feet)[1]
	Graders	2	40	85						
	Scrapers	2	40	85						
	Skid Steer Loaders	4	40	80						
Excavation	Backhoes	4	40	80	93	64	87	66	77	79
	Plate Compactors	2	20	80						
	Crawler Tractors	2	40	84						
	Dump Trucks	5	40	84						
	Forklifts	2	20	85						
	Generator Sets	4	50	82						
	Graders	2	40	85						
	Scrapers	2	40	85						
	Skid Steer Loaders	2	40	80						
Utilities/ Sub-grade	Backhoes	4	40	80	93	64	87	66	76	79
	Plate Compactors	2	20	80						
	Crawler Tractors	2	40	84						
	Dump Trucks	5	40	84						
	Forklifts	2	20	85						
	Generator Sets	4	50	82						
	Graders	2	40	85						
	Scrapers	2	40	85						
	Skid Steer Loaders	2	40	80						
Construction	Backhoes	7	40	84	98	69	92	71	82	84
	Bore/Drill Rigs	10	20	85						
	Cement Mixers	10	40	85						
	Forklifts	5	20	85						
	Concrete Saws	3	20	90						
	Plate Compactors	1	20	80						
	Cranes	1	16	85						

Construction Stage	Equipment				Construction Noise Level, dBA					
	Equipment Type	Quantity	Usage Factor (%)	USEPA Construction Noise Level (50 feet), dBA	Project Boundary (50 feet)	NSA-1 (1,430 feet)[1]	NSA-2 (100 feet)[1]	NSA-3 (1080 feet)[1]	NSA-4 (300 feet)[1]	NSA-5 (250 feet)[1]
	Dump Truck	5	40	84						
	Excavators	2	40	85						
	Generator Sets	4	50	82						
	Pavers	1	50	85						
	Paving Equipment	1	40	85						
	Skid Steer Loaders	2	40	80						
	Trenchers	10	50	82						
	Rollers	1	20	85						
Paving	Rollers	1	20	85	78	50	72	51	62	64

[1]Distance to residential structure.

The construction of the Project may cause short-term, but unavoidable noise impacts that could be loud enough at times to temporarily interfere with speech communication outdoors and indoors with windows closed at NSA-2 and NSA-4, and with windows open at NSA-3 and NSA-5. The noise levels resulting from the construction activities would vary significantly depending on several factors such as the type and age of equipment, specific equipment manufacture and model, the operations being performed, and the overall condition of the equipment and exhaust system mufflers.

Project construction would occur between 7:00 a.m. and 7:00 p.m., Monday through Friday, and between 8:00 a.m. and 8:00 p.m., Saturday and Sunday in compliance with the Colusa County's Code. Furthermore, all reasonable efforts would be made to minimize the impact of noise resulting from construction activities including implementation of standard noise reduction measures. Due to the infrequent nature of loud construction activities at the site, the limited hours of construction and the implementation of noise mitigation measures, the temporary increase in noise due to construction is considered to be a less than significant impact.

3.3 CONSTRUCTION NOISE MITIGATION

Since construction machines operate intermittently, and the types of machines in use at the Project site change with the stage of construction, noise emitted during construction would be mobile and highly variable, making it challenging to control. The construction management protocols would include the following noise mitigation measures to minimize noise impacts:

- Maintain all construction tools and equipment in good operating order according to manufacturers' specifications.
- Limit use of major excavating and earth-moving machinery to daytime hours.
- To the extent practicable, schedule construction activity during normal working hours on weekdays when higher sound levels are typically present and are found acceptable. Some limited activities, such as concrete pours, would be required to occur continuously until completion.
- Equip any internal combustion engine used for any purpose on the job or related to the job with a properly operating muffler that is free from rust, holes, and leaks.

- For construction devices that utilize internal combustion engines, ensure the engine's housing doors are kept closed, and install noise-insulating material mounted on the engine housing consistent with manufacturers' guidelines, if possible.
- Limit possible evening shift work to low noise activities such as welding, wire pulling, and other similar activities, together with appropriate material handling equipment.
- Utilize a Complaint Resolution Procedure to address any noise complaints received from residents.

3.4 VIBRATION CALCULATION METHODOLOGY

Vibration levels for activities associated with Project construction were based on the average of source levels in PPV published with the FTA (2006) Noise and Vibration Manual, which documents several types of construction equipment measured under a wide variety of construction activities. Using the documented vibration levels as input into a basic propagation model, construction vibration levels were calculated at the nearest Project site boundary and then at the NSA structure.

3.5 PROJECTED VIBRATION LEVELS DURING CONSTRUCTION

As discussed in Section 3.2, Project construction would be completed in five work stages. This vibration analysis evaluated the worst-case vibration source, which would be the roller. Based on vibration propagation calculations, construction vibration levels are predicted to range from 0.0007 PPV inches per second (in/sec; 45 VdB) to 0.0263 PPV in/sec (76 VdB) dBA at the NSAs. These levels are based on the worst-case vibration producing equipment and it is expected that other vibration generating equipment proposed for the Project construction would result in lower vibration levels. Table 12 summarizes the predicted vibration levels at each of the NSAs based on the highest vibration generating equipment. As shown in Table 12, vibration levels may be perceptible at the nearest sensitive receptors but will be below the maximum vibration level of 80 VdB. This level is considered acceptable for impacts to sensitive receptors.

Table 12. Projected Construction Vibration Levels

Construction Operation	Vibration Level Metric	Project Boundary (50 feet)	NSA-1 (1,430 feet)[1]	NSA-2 (100 feet)[1]	NSA-3 (1,080 feet)[1]	NSA-4 (300 feet)[1]	NSA-5 (250 feet)[1]
Roller	PPV in/sec	0.0743	0.0005	0.0263	0.0007	0.0051	0.0067
	VdB	85	41	76	45	62	64

[1]Distance to residential structure.

4.0 OPERATIONAL NOISE

This section describes the model utilized for the assessment; input assumptions used to calculate noise levels due to the Project's normal operation; a conceptual noise mitigation strategy; and the results of the noise impact analysis.

4.1 NOISE PREDICTION MODEL

The Cadna-A® computer noise model was used to calculate sound pressure levels from the operation of the Project equipment in the vicinity of the Project site. An industry standard, Cadna-A® was developed by DataKustik GmbH to provide an estimate of sound levels at distances from sources of known emission. It is used by acousticians and acoustic engineers due to the capability to accurately describe noise emission and propagation from complex facilities consisting of various equipment types like the Project and in most cases, yields conservative results of operational noise levels in the surrounding community.

The current ISO standard for outdoor sound propagation, ISO 9613 Part 2 – "Attenuation of Sound during Propagation Outdoors," was used within Cadna-A (ISO 1996). The method described in this standard calculates sound attenuation under weather conditions that are favorable for sound propagation, such as for downwind propagation or atmospheric inversion, conditions which are typically considered worst-case. The calculation of sound propagation from source to receiver locations consists of full octave band sound frequency algorithms, which incorporate the following physical effects:

- Geometric spreading wave divergence;
- Reflection from surfaces;
- Atmospheric absorption at 10 degrees Celsius and 70 percent relative humidity;
- Screening by topography and obstacles;
- The effects of terrain features including relative elevations of noise sources;
- Sound power levels from stationary and mobile sources;
- The locations of noise-sensitive land use types;
- Intervening objects including buildings and barrier walls, to the extent included in the design;
- Ground effects due to areas of pavement and unpaved ground;
- Sound power at multiple frequencies;
- Source directivity factors;
- Multiple noise sources and source type (point, area, and/or line); and
- Averaging predicted sound levels over a given time.

Cadna-A allows for three basic types of sound sources to be introduced into the model: point, line, and area sources. Each noise-radiating element was modeled based on its noise emission pattern. Larger dimensional sources such as the transformers and inverters were modeled as area sources.

Off-site topography was obtained using the publicly available United States Geological Survey digital elevation data. A default ground attenuation factor of 0.5 was assumed for off-site sound propagation over acoustically "mixed" ground.

The output from Cadna-A includes tabular sound level results at selected receiver locations and colored noise contour maps (isopleths) that show areas of equal and similar sound levels.

4.2 INPUT TO THE NOISE PREDICTION MODEL

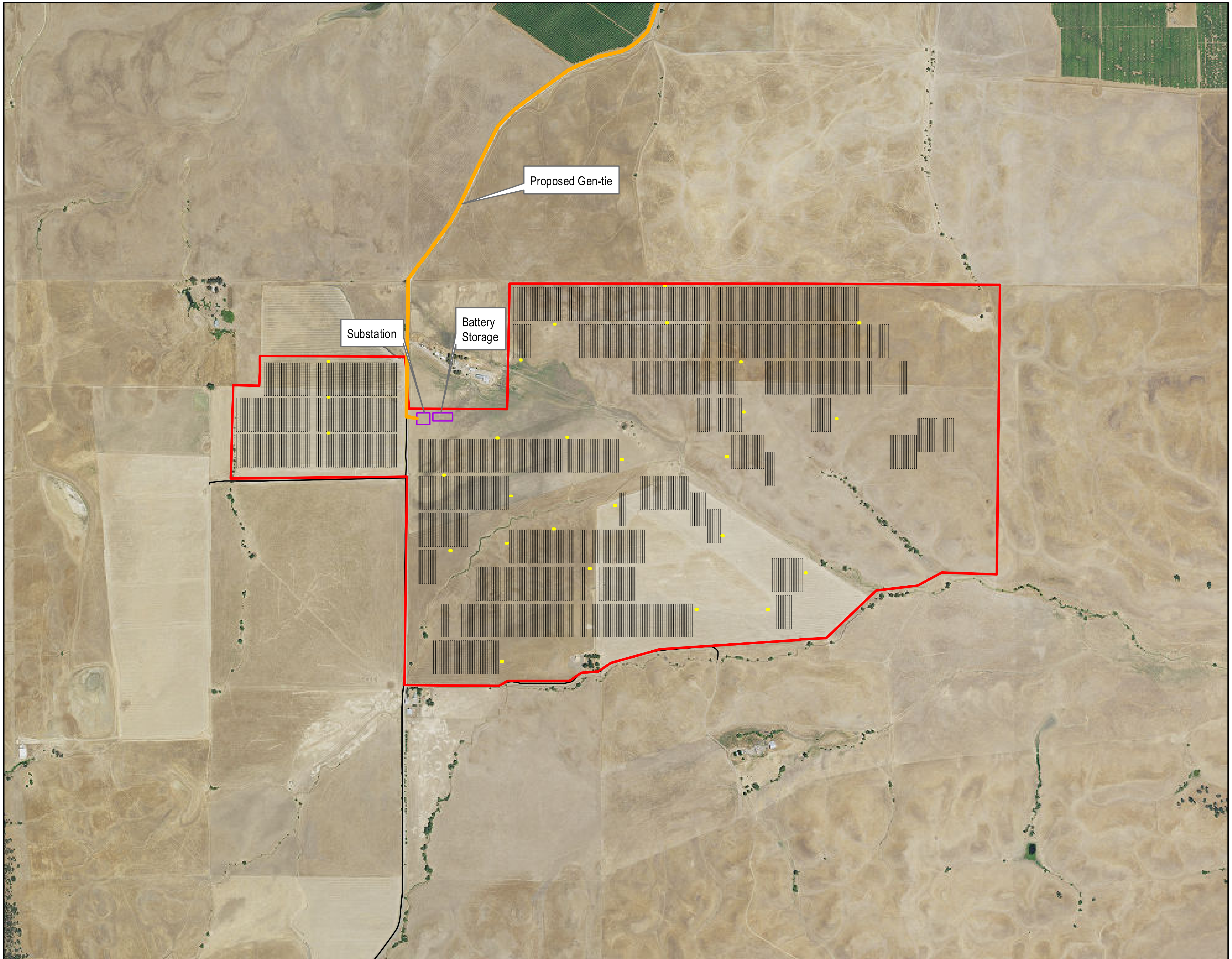
The Project's general arrangement was reviewed and directly imported into the acoustic model so that on-site equipment could be easily identified; buildings and structures could be added; and sound emission data could be assigned to sources as appropriate. Figure 2 shows the Project equipment layout based on the version 4 layout which RWE provided to Tetra Tech on June 28, 2021.

Janus Solar Project

Colusa County, CA

Noise Report

Figure 2: Facility Equipment Layout



- Project Area
- Solar Array
- Substation and Battery Storage
- Inverter
- Proposed Gen-tie

0 0.25 0.5 Miles

Scale is 1:15,000 when printed at 11"x17"

NOT FOR CONSTRUCTION

The primary noise sources during operations are the inverters, transformers, battery storage heating, ventilation, and air conditioning (HVAC) units, and battery storage inverters. It is expected that all equipment would operate during the daytime period. During the nighttime period the battery storage would discharge electricity resulting in the operation only of the battery storage HVAC units, battery storage inverters, and substation transformer. It is assumed that the solar panel inverters and the solar panel inverter distribution transformers would not operate during the nighttime period. Reference sound power levels input to Cadna-A were provided by equipment manufacturers, based on information contained in reference documents or developed using empirical methods. The source levels used in the predictive modeling are based on estimated sound power levels that are generally deemed to be conservative. The projected operational noise levels are based on applicant-supplied sound power level data for the major sources of equipment. Table 13 summarizes the equipment sound power level data used as inputs to the initial modeling analysis.

Table 13. Modeled Sound Power Level (L_W) for Major Pieces of Project Equipment

Sound Source	Sound Power Level (L_P) by Octave Band Frequency dBL									Broadband Level
	31.5	63	125	250	500	1k	2k	4k	8k	dBA
Inverter Distribution Transformer	56	66	71	72	71	68	63	65	68	78
Substation Transformer	57	63	64	60	60	53	49	44	37	60
Battery Storage Inverter	67	71	74	74	74	68	65	66	61	75
Battery Storage HVAC	-	78	77	74	69	68	62	57	51	72

4.3 NOISE PREDICITION MODEL RESULTS

Broadband (dBA) sound pressure levels were calculated for expected normal Project operation assuming that all components identified previously are operating continuously and concurrently at the representative manufacturer-rated sound. It is expected that all equipment would operate during the daytime period, while only the battery storage HVAC units, battery storage inverters, and substation transformer would operate during the nighttime period. The sound energy was then summed to determine the equivalent continuous A-weighted downwind sound pressure level at a point of reception. Sound contour plots displaying broadband (dBA) sound levels presented as color-coded isopleths are provided in Figure 3 for daytime levels, and Figure 4 for the nighttime levels. The noise contours are graphical representations of the cumulative noise associated with full operation of the equipment and show how operational noise would be distributed over the surrounding area of the Project site. The contour lines shown are analogous to elevation contours on a topographic map, i.e., the noise contours are continuous lines of equal noise level around some source, or sources, of noise. Figure 3 and Figure 4 also show the ambient sound monitoring locations, representative of proximate noise sensitive land uses, that were used to assess potential noise impacts on a cumulative basis.

Table 14 and Table 15 show the projected exterior sound levels at the property boundary of each receptor, while Table 16 and Table 17 show the projected exterior sound levels near the residential structure of each receptor. The tables also provide the total predicted net increase in sound energy at each of the receptors.

Janus Solar Project

Colusa County, CA

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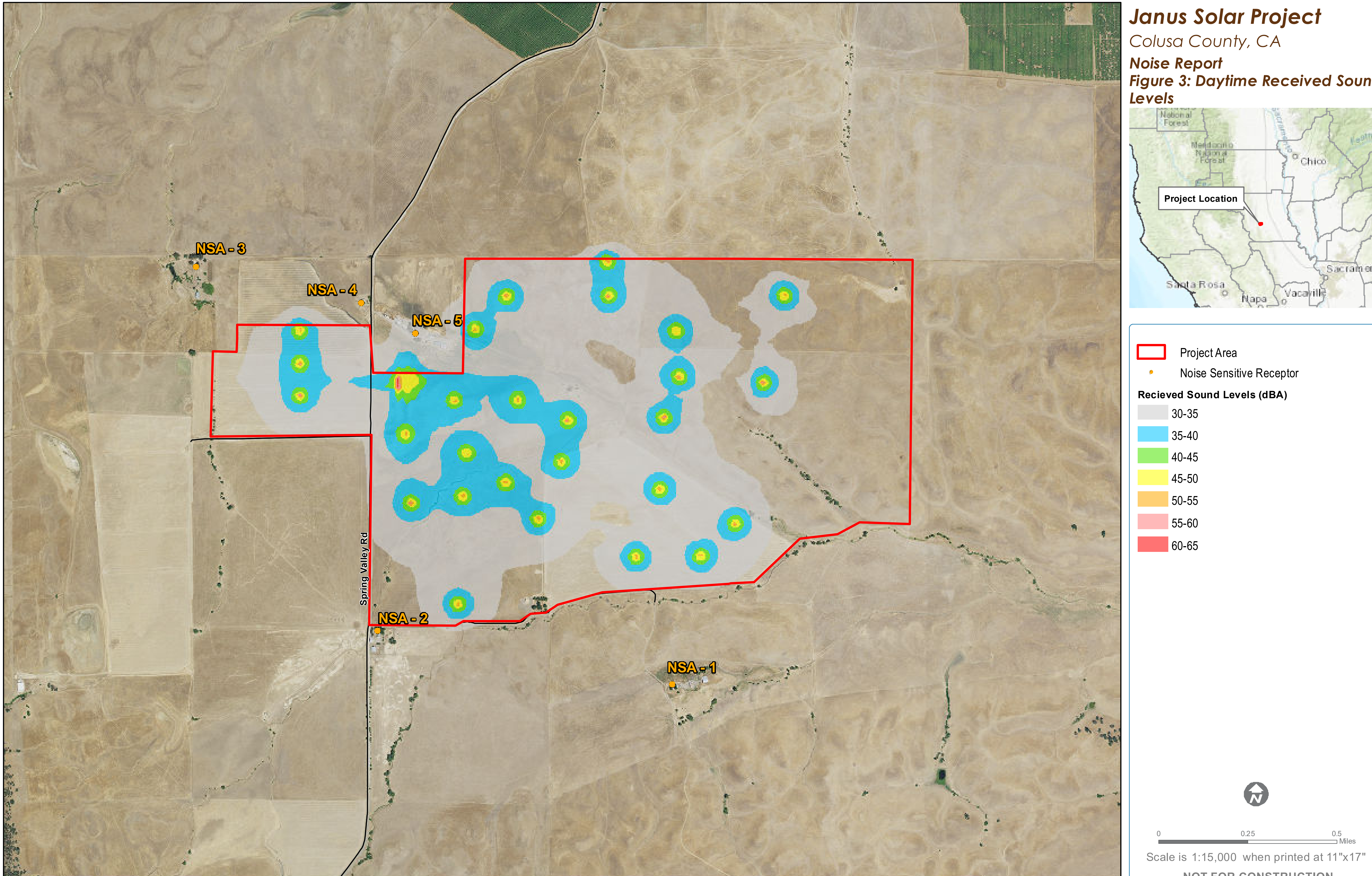
Figure 3: Daytime Received Sound Levels



Scale is 1:15,000 when printed at 11"x17"

NOT FOR CONSTRUCTION

Janus Solar Project

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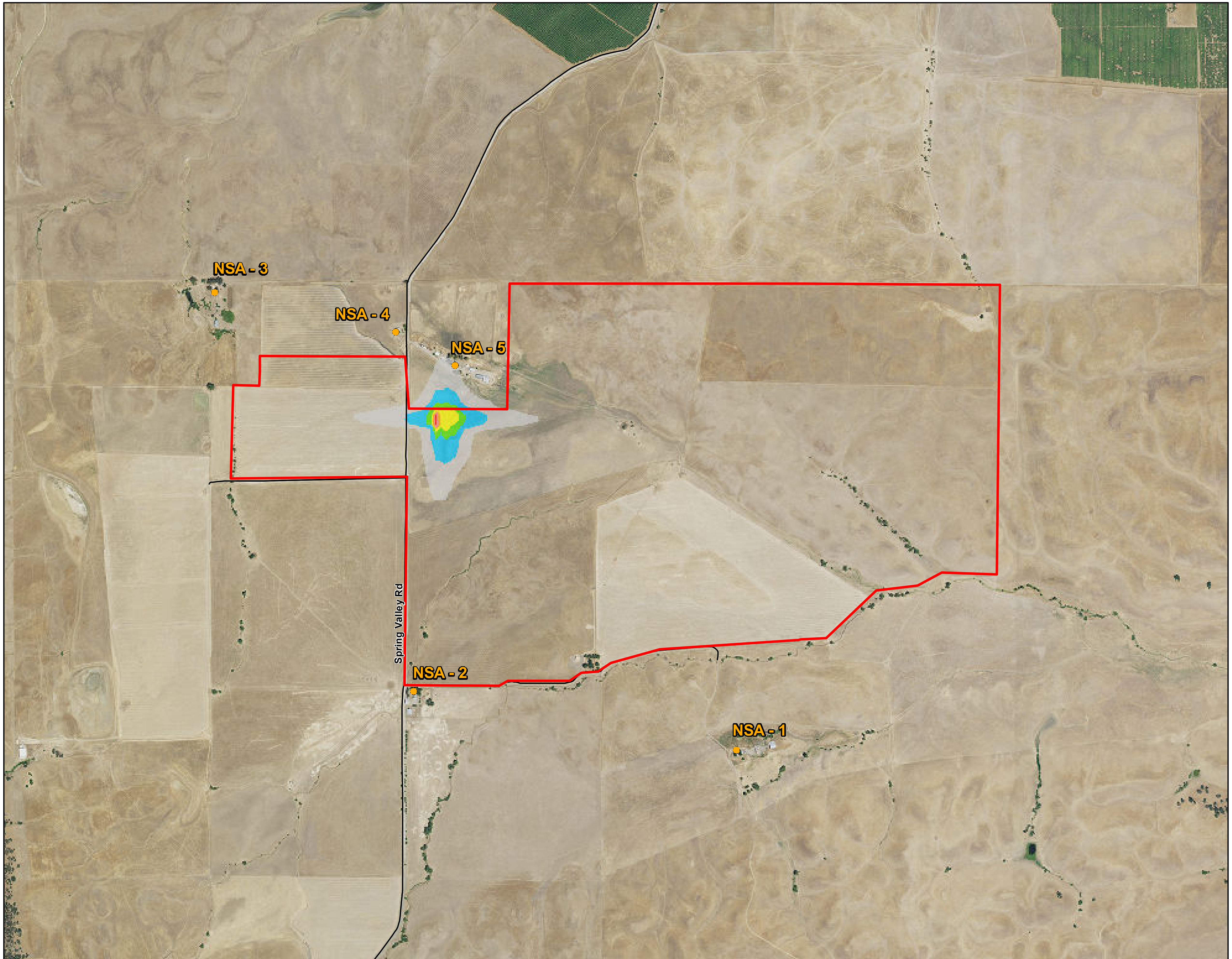
Figure 4: Nighttime Received Sound Levels



Project Area

Noise Sensitive Receptor

Recieved Sound Levels (dBA)

30-35

35-40

40-45

45-50

50-55

55-60

60-65

0 0.25 0.5 Miles

Scale is 1:15,000 when printed at 11"x17"

NOT FOR CONSTRUCTION

Table 14. Daytime Acoustic Modeling Results Summary – County Limits

NSA Property Line	Participation Status	UTM Coordinates (meters)		Daytime Ambient L_{eq}, dBA	Project Sound Level, dBA	Total Sound Level (Ambient + Project), dBA
		Easting	Northing			
NSA-1	Non-participant	563475	4326765	32	27	33
NSA-2	Non-participant	562516	4326624	32	32	35
NSA-3	Non-participant	561506	4327674	34	27	35
NSA-4	Non-participant	562084	4328070	34	27	35
NSA-5	Participant	532273	4327769	34	46	46
Noise Element Exterior Daytime Noise Level Limit						55 dB
Colusa County Code Daytime Noise Level Limit						55 dB

Table 15. Nighttime Acoustic Modeling Results Summary – County Limits

NSA Property Line	Participation Status	UTM Coordinates (meters)		Nighttime Ambient L_{eq}, dBA	Project Sound Level, dBA	Total Sound Level (Ambient + Project), dBA
		Easting	Northing			
NSA-1	Non-participant	563475	4326765	24	3	24
NSA-2	Non-participant	562516	4326624	24	14	24
NSA-3	Non-participant	561506	4327674	28	16	28
NSA-4	Non-participant	562084	4328070	28	22	29
NSA-5	Participant	532273	4327769	28	45	45
Noise Element Exterior Nighttime Noise Level Limit						45 dB
Colusa County Code Nighttime Noise Level Limit						50 dB

Table 16. Daytime Acoustic Modeling Results Summary – CEQA Thresholds

NSA Structure	Participation Status	UTM Coordinates (meters)		Daytime Ambient L_{eq}, dBA	Project Sound Level, dBA	Total Sound Level (Ambient + Project), dBA	Net Increase in Sound Level, dBA
		Easting	Northing				
NSA-1	Non-participant	563489	4326375	32	17	32	0
NSA-2	Non-participant	562162	4326600	32	24	33	1
NSA-3	Non-participant	561324	4328230	34	21	34	0
NSA-4	Non-participant	562072	4328230	34	27	35	1
NSA-5	Participant	562316	4327942	34	32	36	3
Noise Element CEQA Threshold							3 dB

Table 17. Nighttime Acoustic Modeling Results Summary – CEQA Thresholds

NSA Structure	Participation Status	UTM Coordinates (meters)		Nighttime Ambient L_{eq}, dBA	Project Sound Level, dBA	Total Sound Level (Ambient + Project), dBA	Net Increase in Sound Level, dBA
		Easting	Northing				
NSA-1	Non-participant	563489	4326375	24	0	24	0
NSA-2	Non-participant	562162	4326600	24	14	24	0

NSA Structure	Participation Status	UTM Coordinates (meters)		Nighttime Ambient L_{eq}, dBA	Project Sound Level, dBA	Total Sound Level (Ambient + Project), dBA	Net Increase in Sound Level, dBA
		Easting	Northing				
NSA-3	Non-participant	561324	4328230	28	10	28	0
NSA-4	Non-participant	562072	4328230	28	21	29	1
NSA-5	Participant	562316	4327942	28	31	33	5
Noise Element CEQA Threshold							3 dB

Table 14 and Table 15 show the highest total sound levels, inclusive of ambient and project operational levels, are associated with participating receptor NSA-5, which would comply with the Colusa County Noise Element daytime threshold limit of 50 dBA, as well as the nighttime threshold of 45 dBA. Table 16 and Table 17 shows compliance with the CEQA limits at all non-participating receptors, and 1 exceedance during the nighttime at participating receptor NSA-5.

4.4 TRANSMISSION LINE NOISE ANALYSIS

A 3-mile-long overhead, 60 kilovolt (kV) transmission line would be located partially on the Colusa County's right-of-way on Walnut Drive and Spring Valley Road and partially on private land from the Project Site to the point of interconnection at the Cortina Substation.

When a subtransmission line is in operation, an electric field is generated in the air surrounding the conductors, forming a corona. The corona results from the partial breakdown of the electrical insulating properties of the air surrounding the conductors. When the intensity of the electric field at the surface of the conductor exceeds the insulating strength of the surrounding air, a corona discharge occurs at the conductor surface, representing a small dissipation of heat and energy. Some of the energy may dissipate in the form of small local pressure changes that result in audible noise or in radio or television interference. Audible noise generated by corona discharge is characterized as a hissing or crackling sound that may be accompanied by a 120 Hz hum. Slight irregularities or water droplets on the conductor and/or insulator surface accentuate the electric field strength near the conductor surface, thereby making corona discharge and the associated audible noise more likely. Therefore, audible noise from subtransmission lines is generally a foul-weather phenomenon that results from wetting of the conductor. However, during fair weather, insects and dust on the conductors can also serve as sources of corona discharge.

The Electric Power Research Institute has conducted several studies of corona effects (EPRI 1978, 1987). The typical noise levels for transmission lines with wet conductors are shown in Table 18.

Table 18. Transmission and Subtransmission Line Voltage and Audible Noise Levels

Line Voltage (kV)	Audible Noise Level Directly Below the Conductor (dBA)
138	34
240	40
360	51

As shown in Table 18, the audible noise associated with transmission and subtransmission lines decreases as the line voltage decreases; the audible noise associated with the 66-kV line is lower than 34 dBA. This noise level would comply with the County's noise threshold.

5.0 CONCLUSIONS

The construction of the Project has been organized into five major work stages. Based on sound propagation calculations, construction sound levels are predicted to range from 50 to 92 dBA at the NSAs. Periodically, sound levels may be higher or lower than those presented in Table 11; however, the overall sound levels should generally be lower due to excess attenuation and the trend toward quieter construction equipment in the intervening decades since these data were developed. As shown in Table 11, the highest projected sound level from construction-related activity is expected to occur at NSA-2 during Stage 4 construction. Furthermore, reasonable efforts would be made to minimize the impact of noise resulting from construction activities at proximate noise sensitive areas through the use of noise mitigation. Because of the temporary nature of the construction noise, no adverse or long-term effects are expected.

During Project construction, the worst-case vibration source would be rollers. Based on vibration propagation calculations, construction vibration levels are predicted to range from 0.0007 PPV in/sec (45 VdB) to 0.0263 PPV in/sec (76 VdB) dBA at the NSAs. These levels are based on the worst-case vibration producing equipment and it is expected that other vibration generating equipment proposed for the Project construction would result in lower vibration levels. As shown in Table 12, vibration levels may be perceptible at the nearest sensitive receptors but will be below the maximum vibration level of 80 VdB. This level is considered acceptable for impacts to sensitive receptors.

Normal Project operations would occur during the daytime period, while only the battery storage HVAC units, battery storage inverters, and substation transformer would operate during the nighttime period. The highest total sound levels, inclusive of ambient and project operational levels, are associated with participating receptor NSA-5, which would be 46 dBA during the day and 45 dBA during the night at the property line, and 36 dBA during the day and 33 dBA during the night at the residential structure. The highest levels for a non-participating receptor are associated with NSA-4, which would be 35 dBA during the day and 29 dBA during the night at the property line and at the residential structure. As NSA-5 is a participating landowner, these levels show compliance with the Colusa County Noise Element daytime threshold limit of 50 dBA, the nighttime threshold of 45 dBA, and the CEQA threshold of 3 dB above ambient.

The Project substation would connect to a transmission line that would be constructed to connect the Project's output to the existing Cortina Substation. The audible noise associated with the 66-kV line is lower than 34 dBA. This noise level would comply with the County's nighttime threshold of 45 dBA.

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TETRA TECH

Memo

To: Greg Plucker, Community Development Director, Colusa County

From: Chris Hulik, Senior Acoustical Engineer, Tetra Tech, Inc.

Cc: Anna Shamey, Project Manager, Tetra Tech, Inc.

Date: August 16, 2024

Subject: Addendum to the Sound Survey and Analysis Report for the Janus Solar Project, Colusa County, California

INTRODUCTION

In July 2021, Tetra Tech prepared a Sound Survey and Analysis Report for the Janus Solar Project (Project). In 2021, the Project was sited on three parcels (Assessor Parcel Numbers 018-050-005-000, 018-050-006-000, and 018050-013-000), which are 630.5, 255.7, and 137.7 acres in size, respectively, for a total area of approximately 1,024 acres. The Project also included a 4-mile-long generation interconnect (gen-tie) line to connect to the electrical grid at the existing Cortina Substation. In 2024, the Project removed parcel 018050-013-000, reducing the Project site size to approximately 886 acres, and the 4-mile-long gen-tie line.

SOUND SURVEY AND ANALYSIS REPORT

The construction and vibration noise calculations and operational noise model have been updated to reflect the Project re-design. This Addendum addresses updates associated with construction and vibration impacts resulting from changes to the Project boundary and operational noise impacts associated with changes to the Project layout. All other details used to inform the noise analysis (e.g. ambient sound levels and operational equipment source levels) are consistent with what was presented in Appendix I-1, Sound Survey and Analysis Report (Tetra Tech 2021).

Project Construction

Acoustic emission levels for activities associated with Project construction were based upon typical ranges of energy equivalent noise levels at construction sites, as documented by the United States Environmental Protection Agency's "Noise from Construction Equipment and Operations, US Building Equipment, and Home Appliances" (USEPA 1971) and "Construction Noise Control Technology Initiatives" (USEPA 1980). The USEPA methodology takes into consideration the type of construction and the construction stage.

The basic model assumed spherical wave divergence from a point source located at the closest boundary line of the Project site to each noise sensitive area (NSA) receptor. Furthermore, the model conservatively assumed that all pieces of construction equipment associated with an activity would operate simultaneously for the duration of that activity. An additional level of conservatism was built into the construction noise model by excluding potential shielding effects due to intervening structures and buildings along the propagation path from the site to NSAs.

Table 1 summarizes the projected noise levels at the NSAs due to Project construction based on the model.

Table 1. Projected Construction Noise Levels by Stage (dBA Leq)

Construction Stage	Equipment				Construction Noise Level, dBA					
	Equipment Type	Quantity	Usage Factor (%)	USEPA Construction Noise Level (50 feet), dBA	Project Boundary (50 feet)	NSA-1 (1,375 feet)[1]	NSA-2 (100 feet)[1]	NSA-3 (2,625 feet)[1]	NSA-4 (200 feet)[1]	NSA-5 (50 feet)[1]
Preparation	Backhoes	4	40	80	93	64	87	59	81	93
	Plate Compactors	2	20	80						
	Crawler Tractors	2	40	84						
	Dump Trucks	5	40	84						
	Forklifts	2	20	85						
	Generator Sets	4	50	82						
	Graders	2	40	85						
	Scrapers	2	40	85						
	Skid Steer Loaders	4	40	80						
Excavation	Backhoes	4	40	80	93	64	87	56	81	93
	Plate Compactors	2	20	80						
	Crawler Tractors	2	40	84						
	Dump Trucks	5	40	84						
	Forklifts	2	20	85						
	Generator Sets	4	50	82						
	Graders	2	40	85						
	Scrapers	2	40	85						
	Skid Steer Loaders	2	40	80						
Utilities/ Sub-grade	Backhoes	4	40	80	93	64	87	59	81	93
	Plate Compactors	2	20	80						
	Crawler Tractors	2	40	84						
	Dump Trucks	5	40	84						
	Forklifts	2	20	85						
	Generator Sets	4	50	82						
	Graders	2	40	85						

Construction Stage	Equipment: Equipment Type	Equipment: Quantity	Equipment: Usage Factor (%)	Equipment: USEPA Construction Noise Level (50 feet), dBA	Construction Noise Level, dBA: Project Boundary (50 feet)	Construction Noise Level, dBA: NSA-1 (1,375 feet)[1]	Construction Noise Level, dBA: NSA-2 (100 feet)[1]	Construction Noise Level, dBA: NSA-3 (2,625 feet)[1]	Construction Noise Level, dBA: NSA-4 (200 feet)[1]	Construction Noise Level, dBA: NSA-5 (50 feet)[1]
	Scrapers	2	40	85						
	Skid Steer Loaders	2	40	80						
Construction	Backhoes	7	40	84	98	69	92	63	86	98
	Bore/Drill Rigs	10	20	85						
	Cement Mixers	10	40	85						
	Forklifts	5	20	85						
	Concrete Saws	3	20	90						
	Plate Compactors	1	20	80						
	Cranes	1	16	85						
	Dump Trucks	5	40	84						
	Excavators	2	40	85						
	Generator Sets	4	50	82						
	Pavers	1	50	85						
	Paving Equipment	1	40	85						
	Skid Steer Loaders	2	40	80						
	Trenchers	10	50	82						
	Rollers	1	20	85						
Paving	Rollers	1	20	85	78	49	72	51	66	78

[1]Distance to residential structure.

The construction of the Project may cause short-term, but unavoidable noise impacts that could be loud enough at times to temporarily interfere with speech communication outdoors, and indoors with windows closed at non-participating receptor NSA-2, and participating receptors NSA-4 and NSA-5. The noise levels resulting from the construction activities would vary significantly depending on several factors, such as the type and age of equipment, specific equipment manufacturer and model, the operations being performed, and the overall condition of the equipment and exhaust system mufflers.

Project construction would occur between 7:00 a.m. and 7:00 p.m., Monday through Friday, and between 8:00 a.m. and 5:00 p.m., Saturday and Sunday. Furthermore, all reasonable efforts would be made to minimize the impact of noise resulting from construction activities, including implementation of standard noise reduction measures, included as mitigation measure NOISE-1. Due to the infrequent nature of loud construction activities at the site, the limited hours of construction and the implementation of mitigation measure NOISE-1, the temporary increase in noise due to construction is considered to be a less than significant impact.

Since construction machines operate intermittently, and the types of machines in use at the Project site change with the stage of construction, noise emitted during construction would be mobile and highly variable, making it challenging to control. The following mitigation measure is recommended to minimize noise impacts.

Mitigation Measure NOISE-1: The Project shall implement the following construction management protocols to minimize noise impacts during construction:

- Use temporary noise walls that provide 10 to 15 dBA of reduction so that construction noise does not exceed 86 dBA at the Project boundary;
- Maintain all construction tools and equipment in good operating order according to manufacturers' specifications;
- Limit use of major excavating and earth-moving machinery to daytime hours;
- Schedule construction activity during normal working hours on weekdays, when higher sound levels are typically present and are found acceptable. Some limited on-site activities may be allowed, provided that the standards of Table 1 of Chapter 13-6 of the County Code at the property line are not exceeded;
- Equip any internal combustion engine used for any purpose on the job or related to the job with a properly operating muffler that is free from rust, holes, and leaks;
- For construction devices that utilize internal combustion engines, ensure the engine's housing doors are kept closed, and install noise-insulating material mounted on the engine housing consistent with manufacturers' guidelines, if possible;
- Limit possible evening shift work to low noise activities such as welding, wire pulling, and other similar activities, together with appropriate material handling equipment provided that the standards of Table 1 of Chapter 13-6 of the County Code at the property line are not exceeded; and
- Prior to construction, a single point of contact shall be identified and their contact information shall be provided to the County and adjacent property owners who shall receive all construction related complaints, including but not limited to noise, dust, and traffic. A single point of contact shall be assigned at all times during and after construction and shall be responsible for investigating and responding to all complaints.

Vibration levels for activities associated with Project construction were based on the average of source levels in peak particle velocity (PPV) published with the FTA (2018) Noise and Vibration Manual, which documents several types of construction equipment measured under a wide variety of construction activities. Using the documented vibration levels as input into a basic propagation model, construction vibration levels were calculated at the nearest Project site boundary and then at the NSA structure.

The vibration analysis evaluated the worst-case vibration source, which would be the roller. Based on vibration propagation calculations, construction vibration levels are predicted to range from 0.0002 PPV inches per second (in/sec; 33 VdB) to 0.0263 PPV in/sec (76 VdB) at the non-participating NSAs, and 0.0743 (85 VdB) at the participating NSA. These levels are based on the worst-case vibration-producing equipment, and it is expected that other vibration-generating equipment proposed for the Project construction would result in lower vibration levels. Table 2 summarizes the predicted vibration levels at each of the NSAs based on the highest vibration-generating equipment. As shown in Table 2, vibration levels may be perceptible at the nearest NSAs but would be below the maximum vibration level of 80 VdB at all non-participating NSAs. This level is considered acceptable for impacts to NSAs.

Table 2. Projected Construction Vibration Levels

Construction Operation	Vibration Level Metric	Project Boundary (50 feet)	NSA-1 (1,375 feet)[1]	NSA-2 (100 feet)[1]	NSA-3 (2,625 feet)[1]	NSA-4 (200 feet)[1]	NSA-5 (50 feet)[1]
Roller	PPV in/sec	0.0743	0.0005	0.0263	0.0002	0.0093	0.0743
	VdB	85	41	76	45	62	64

[1]Distance to residential structure.

Project Operations

The Cadna-A® computer noise model was used to calculate sound pressure levels from the operation of the Project equipment in the vicinity of the Project site. An industry standard, Cadna-A® was developed by DataKustik GmbH to provide an estimate of sound levels at distances from sources of known emission. It is used by acousticians and acoustic engineers due to the capability to accurately describe noise emission and propagation from complex facilities consisting of various equipment types, like the Project, and in most cases, yields conservative results for operational noise levels in the surrounding community.

The Project's general arrangement was reviewed and directly imported into the acoustic model so that on-site equipment could be easily identified; buildings and structures could be added; and sound emission data could be assigned to sources as appropriate. Off-site topography was obtained using the publicly available United States Geological Survey digital elevation data. A default ground attenuation factor of 0.5 was assumed for off-site sound propagation over acoustically "mixed" ground. Figure 1 shows the Project equipment layout based on the version 4 layout, which RWE provided to Tetra Tech on June 28, 2021.

Broadband (A-weighted decibels, dBA) sound pressure levels were calculated for expected normal Project operation assuming that all components identified previously are operating continuously and concurrently at the representative manufacturer-rated sound. It is expected that all equipment would operate during the daytime period, while only the battery storage HVAC units, battery storage inverters, and substation transformer would operate during the nighttime period. The sound energy was then summed to determine the equivalent continuous A-weighted downwind sound pressure level at a point of reception. Sound contour plots displaying broadband (dBA) sound levels presented as color-coded isopleths are provided in Figure 3 for daytime levels, and Figure 4 for the nighttime levels. The noise contours are graphical representations of the cumulative noise associated with full operation of the equipment. They show how operational noise would be distributed over the surrounding area of the Project site. The contour lines shown are analogous to elevation contours on a topographic map, i.e., the noise contours are continuous lines of equal noise level around some source, or sources, of noise. Figure 3 and Figure 4 also show the ambient sound monitoring locations, representative of proximate noise sensitive land uses, that were used to assess potential noise impacts on a cumulative basis.

Table 3 and Table 4 show the projected exterior sound levels at the property boundary of each NSA, while Table 5 and Table 6 show the projected exterior sound levels near the residential structure of each NSA. The tables also provide the total predicted net increase in sound energy at each of the NSAs.

Figure 1. Facility Equipment Layout

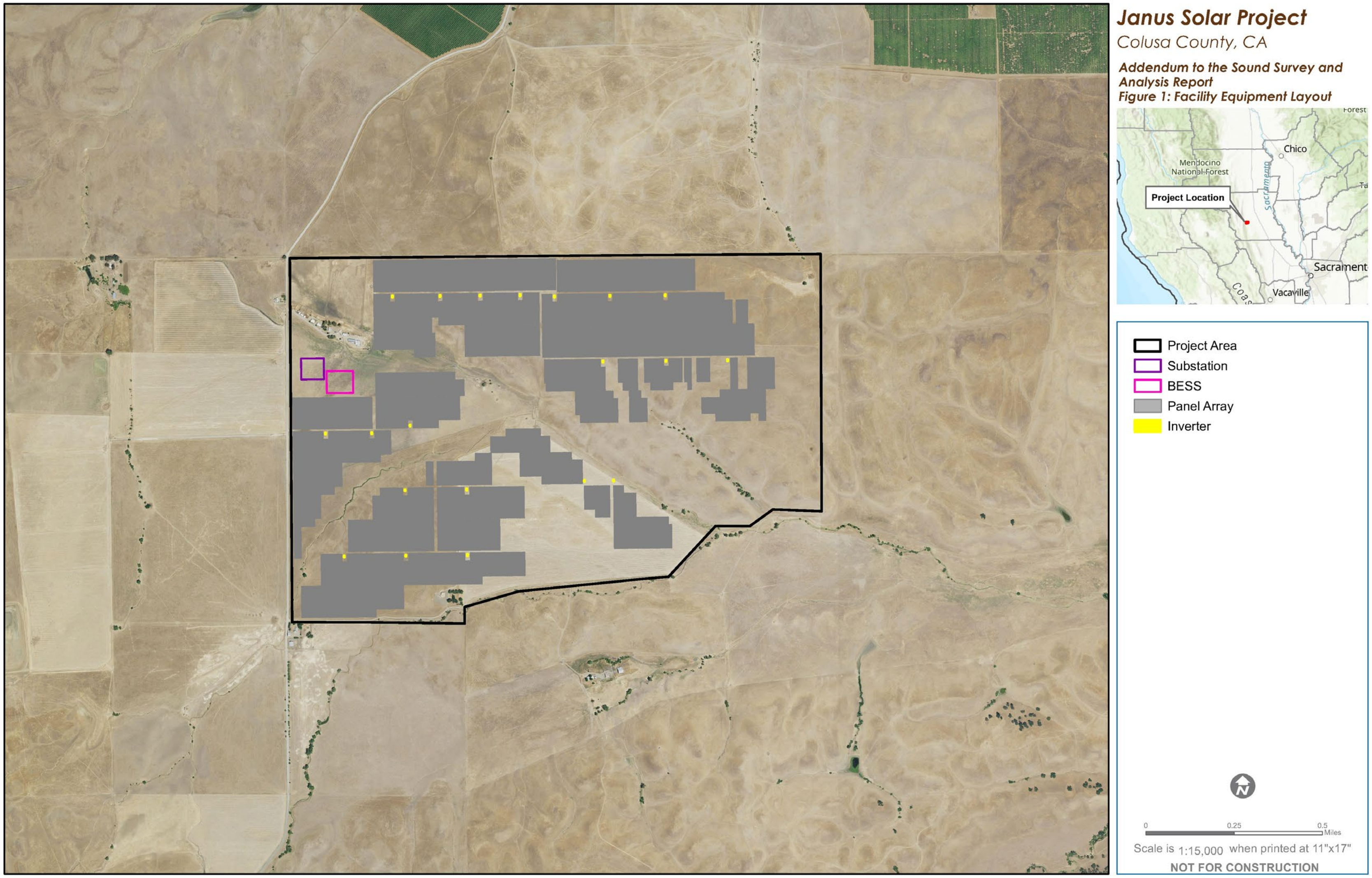

Figure 2. Daytime Received Sound Levels

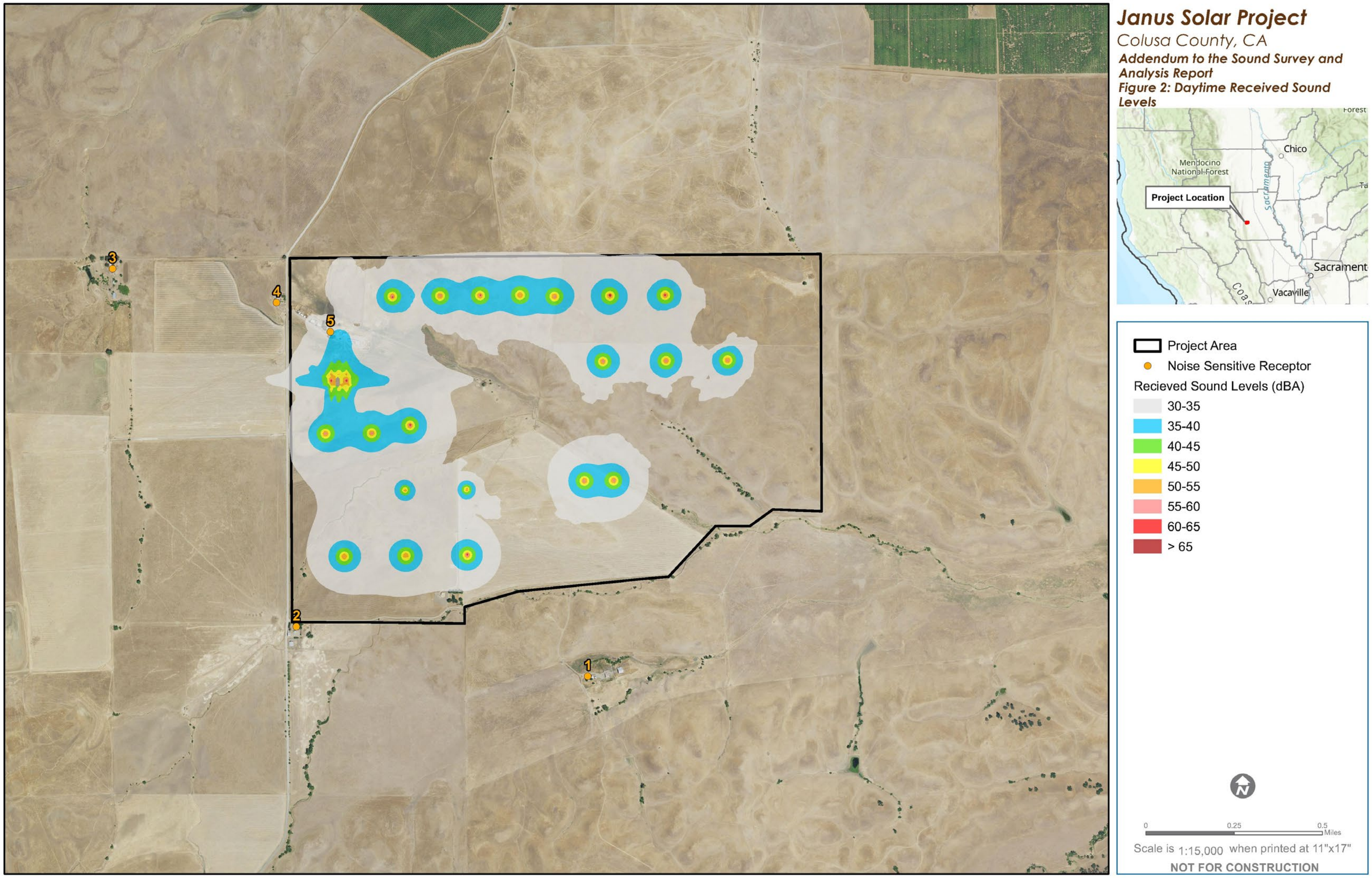

Figure 3. Nighttime Received Sound Levels

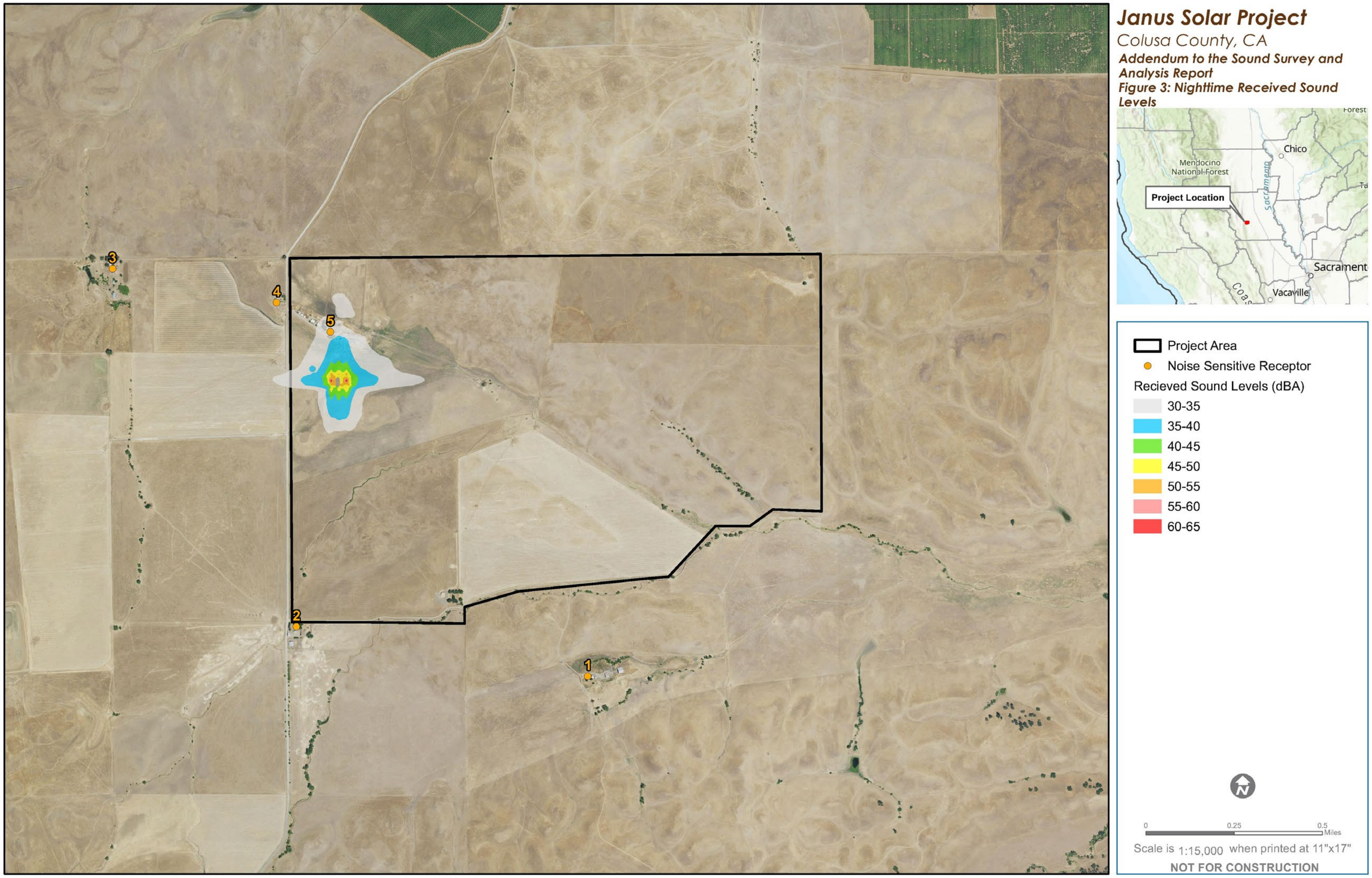

Table 3. Daytime Acoustic Modeling Results Summary – County Limits

NSA Property Line	Participation Status	UTM Coordinates (meters)		Daytime Ambient L_{eq}, dBA	Project Sound Level, dBA	Total Sound Level (Ambient + Project), dBA
		Easting	Northing			
NSA-1	Non-participant	563475	4326765	32	22	33
NSA-2	Non-participant	562516	4326624	32	28	34
NSA-3	Non-participant	561506	4327674	34	22	34
NSA-4[1]	Participant	562084	4328070	34	31	36
NSA-5[2]	Participant	--	--	--	--	--
Noise Element Exterior Daytime Noise Level Limit						55 dB
Colusa County Code Daytime Noise Level Limit						55 dB

[1] NSA-4 is owned by the Project site landowner and located across Spring Valley Road from the Project.
[2] NSA-5 is owned by the Project site landowner and located within the Project Boundary.

Table 4. Nighttime Acoustic Modeling Results Summary – County Limits

NSA Property Line	Participation Status	UTM Coordinates (meters)		Nighttime Ambient L_{eq}, dBA	Project Sound Level, dBA	Total Sound Level (Ambient + Project), dBA
		Easting	Northing			
NSA-1	Non-participant	563475	4326765	24	4	24
NSA-2	Non-participant	562516	4326624	24	15	25
NSA-3	Non-participant	561506	4327674	28	12	28
NSA-4[1]	Participant	562084	4328070	28	22	29
NSA-5[2]	Participant	--	--	--	--	--
Noise Element Exterior Nighttime Noise Level Limit						45 dB
Colusa County Code Nighttime Noise Level Limit						50 dB

[1] NSA-4 is owned by the Project site landowner and located across Spring Valley Road from the Project.
[2] NSA-5 is owned by the Project site landowner and located within the Project Boundary.

Table 5. Daytime Acoustic Modeling Results Summary – CEQA Thresholds

NSA Structure	Participation Status	UTM Coordinates (meters)		Daytime Ambient L_{eq}, dBA	Project Sound Level, dBA	Total Sound Level (Ambient + Project), dBA	Net Increase in Sound Level, dBA
		Easting	Northing				
NSA-1	Non-participant	563489	4326375	32	16	32	0
NSA-2	Non-participant	562162	4326600	32	24	33	1
NSA-3	Non-participant	561324	4328230	34	19	34	0
NSA-4[1]	Participant	562072	4328230	34	31	36	2
NSA-5[2]	Participant	562316	4327942	34	39	40	6
Noise Element CEQA Threshold							3 dB

[1] NSA-4 is owned by the Project site landowner and located across Spring Valley Road from the Project.
[2] NSA-5 is owned by the Project site landowner and located within the Project Boundary.

Table 6. Nighttime Acoustic Modeling Results Summary – CEQA Thresholds

NSA Structure	Participation Status	UTM Coordinates (meters)		Nighttime Ambient L_{eq}, dBA	Project Sound Level, dBA	Total Sound Level (Ambient + Project), dBA	Net Increase in Sound Level, dBA
		Easting	Northing				
NSA-1	Non-participant	563489	4326375	24	<1	24	0
NSA-2	Non-participant	562162	4326600	24	13	24	0
NSA-3	Non-participant	561324	4328230	28	8	28	0
NSA-4[1]	Participant	562072	4328230	28	21	29	1
NSA-5[2]	Participant	562316	4327942	28	34	35	8
Noise Element CEQA Threshold							3 dB

[1] NSA-4 is owned by the Project site landowner and located across Spring Valley Road from the Project.
[2] NSA-5 is owned by the Project site landowner and located within the Project Boundary.

As NSA-4 and NSA-5 are participating receptors, Table 3 shows the highest daytime property noise level will be 34 dBA at NSA-2 and NSA-3, while Table 4 shows the highest nighttime property noise level will be 28 dBA at NSA-3. These levels comply with the Colusa County Noise Element daytime threshold limit of 50 dBA, as well as the nighttime threshold of 45 dBA. Table 5 and Table 6 show compliance with the CEQA limits at all non-participating NSAs, and one exceedance during daytime and nighttime at participating receptor NSA-5; however, NSA-5 is the participating landowner on which the Project is located and is not considered a sensitive receptor.

CONCLUSION

Based on sound propagation calculations, construction sound levels are predicted to range from 49 to 98 dBA at the NSAs. Periodically, sound levels may be higher or lower than those presented in Table 1; however, the overall sound levels should generally be lower due to excess attenuation and the trend toward quieter construction equipment in the intervening decades since these data were developed. As shown in Table 1, the highest projected sound level from construction-related activity is expected to occur at participating receptor NSA-5 during Stage 4 construction. Furthermore, reasonable efforts would be made to minimize the impact of noise resulting from construction activities at proximate NSAs through the implementation of noise mitigation. Because of the temporary nature of the construction noise, no adverse or long-term effects are expected.

During Project construction, the worst-case vibration source would be rollers. Based on vibration propagation calculations, construction vibration levels are predicted to range from 0.0002 PPV inches per second (in/sec; 45 VdB) to 0.0263 PPV in/sec (76 VdB) at the non-participating NSAs, and 0.0093 PPV in/sec (62 VdB) and 0.0743 PPV in/sec (64 VdB) at the participating NSAs. These levels are based on the worst-case vibration producing equipment and it is expected that other vibration generating equipment proposed for the Project construction would result in lower vibration levels. As shown in Table 2, vibration levels may be perceptible at the non-participating nearest sensitive receptors but will be below the maximum vibration level of 80 VdB. This level is considered acceptable for impacts to sensitive receptors.

Normal Project operations would occur during the daytime period, while only the battery storage HVAC units, battery storage inverters, and substation transformer would operate during the nighttime period. As NSA-5 is within the Project parcel and a participating receptor, and NSA-4 is also a participating receptor, Table 3 shows the highest daytime property noise levels will be at 34 dBA at NSA-2 and NSA-3, while Table 4 shows the highest nighttime property noise level will be 28 dBA at NSA-3. These levels comply with the Colusa County Noise Element daytime threshold limit of 50 dBA, as well as the nighttime threshold of 45 dBA. Table 5 and Table 6 show compliance with the CEQA limits at all non-participating receptors, and one exceedance during daytime and nighttime at participating receptor NSA-5. As NSA-5 is a participating landowner, these levels show compliance with the Colusa County Noise Element daytime threshold limit of 50 dBA, the nighttime threshold of 45 dBA, and the CEQA threshold of 3 dB above ambient.

REFERENCES

Colusa County. 2012. Colusa County General Plan Noise Element.

Federal Transit Authority (FTA). 2018. Transit Noise and Vibration Impact Assessment Manual.

Tetra Tech. 2021. Sound Survey and Analysis Report. Janus Solar Project.

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APPENDIX J
TRAFFIC ANALYSIS TECHNICAL MEMORANDUM

TRAFFIC ANALYSIS TECHNICAL MEMORANDUM

Janus Solar Project

Colusa County, California

July 2021

RWE Solar Development, LLC

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Appendix A. LOS Calculation at Walnut Drive and Spring Valley Road

ACRONYMS AND ABBREVIATIONS

CEQA	California Environmental Quality Act
GHG	greenhouse gas
LOS	Level of Service
Project	Janus Solar Project
VMT	Vehicle Miles Traveled

1.0 OVERVIEW

In 2013, the State of California passed Senate Bill 743, which stated the most appropriate measure of transportation impacts is Vehicle Miles Traveled (VMT) as guided by the California Environmental Quality Act (CEQA). Jurisdictions had until July 1, 2020 to adopt and begin implementing VMT thresholds for traffic analysis. Prior to July 1, 2020, jurisdictions had the option to continue using Level of Service (LOS) analysis or converting to VMT analysis once such thresholds were adopted.

This Traffic Analysis Memorandum focuses on the following potential impacts:

- Peak construction impacts during the month(s) of construction that will have the largest number of workers and deliveries as well as implications for the remaining construction process.
- A discussion of the results and implications of the estimated Project traffic on the existing transportation system.
- A discussion of the Project's VMT impacts as required by the State CEQA Guidelines.

The purpose of this Traffic Analysis Memorandum is to qualify and quantify impacts of construction and operations traffic to the local transportation infrastructure and to provide Colusa County with the information necessary for approval of the Project and to satisfy requirements within the State CEQA Guidelines.

In accordance with Appendix G of the State CEQA Guidelines, a proposed project would have a significant transportation impact if the project would:

1. Conflict with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities;
2. Conflict or be inconsistent with CEQA Guidelines Section 15064.3, subdivision (b);
3. Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment); or
4. Result in inadequate emergency access.

2.0 PROJECT DESCRIPTION

The Janus Solar Project (Project) consists of constructing and operating a photovoltaic solar electricity generating facility and battery energy storage system and associated infrastructure that would produce up to 80 megawatts of alternating current energy at the point of electrical grid interconnection on approximately 1,024 acres of privately owned agricultural land (Figure 1) in Colusa County. The Project would include the construction of solar arrays, an electrical substation and electrical interconnection facilities, a battery energy storage system and other necessary infrastructure, including an operation and maintenance building, septic system and leach field, a supervisory control and data acquisition system, a meteorological data system, buried conduit for electrical wires, collector lines, on-site access roads, and security fencing.

2.1 PROJECT LOCATION

The Project site is located at 1830 and 1961 Spring Valley Road in Williams, California, approximately 8 miles southwest of the city of Williams. The Project site is currently operated as a cattle ranch and is comprised of three parcels totaling approximately 1,024 acres and is surrounded by rural residential, agricultural fields, and undeveloped land.

2.2 PROJECT SCHEDULE

The Project is planned to begin construction between mid-2022 and early 2023 and will take approximately 11 months to be fully constructed. The peak construction period will last 2–3 months and is expected to be operational by early 2024.

2.3 METHODOLOGY

This study was designed to evaluate potential impacts associated with routing Project traffic to and from the Project via the major local intersections on the haul route. This was accomplished primarily using the VMT for construction and operations. Additionally, because traffic count data is not available for the rural roads surrounding the Project, LOS will be considered qualitatively, and a conservative approximation of LOS is calculated. Because traffic counts were not collected and none were available for the roads and intersections near the Project, the approximation is based on land use, road connectivity and nearest locations where traffic counts are available. Additionally, because the LOS calculation is a conservative approximation, it is reasonably appropriate for both the intersection at Walnut Drive and Spring Valley Road and Walnut Dive and East Camp Road where construction traffic is concentrated. General conclusions about the operational quality of the local infrastructure are drawn from this analysis..

The VMT metric is implemented to help quantify traffic induced by construction and operations. The VMT metric is used to align effects on traffic with greenhouse gas (GHG) emissions. VMT is presented as a total value for the entire Project. The California Natural Resources Agency adopted changes to the CEQA identifying VMT as "the most appropriate metric to evaluate a project's transportation impacts… Thus, to achieve the State's long-term climate goals, California needs to reduce per capita VMT." The VMT values calculated should be compared to a jurisdictionally determined threshold of significance which ultimately dictates whether a project's traffic impacts are significant and require mitigation or are a less than significant impact.

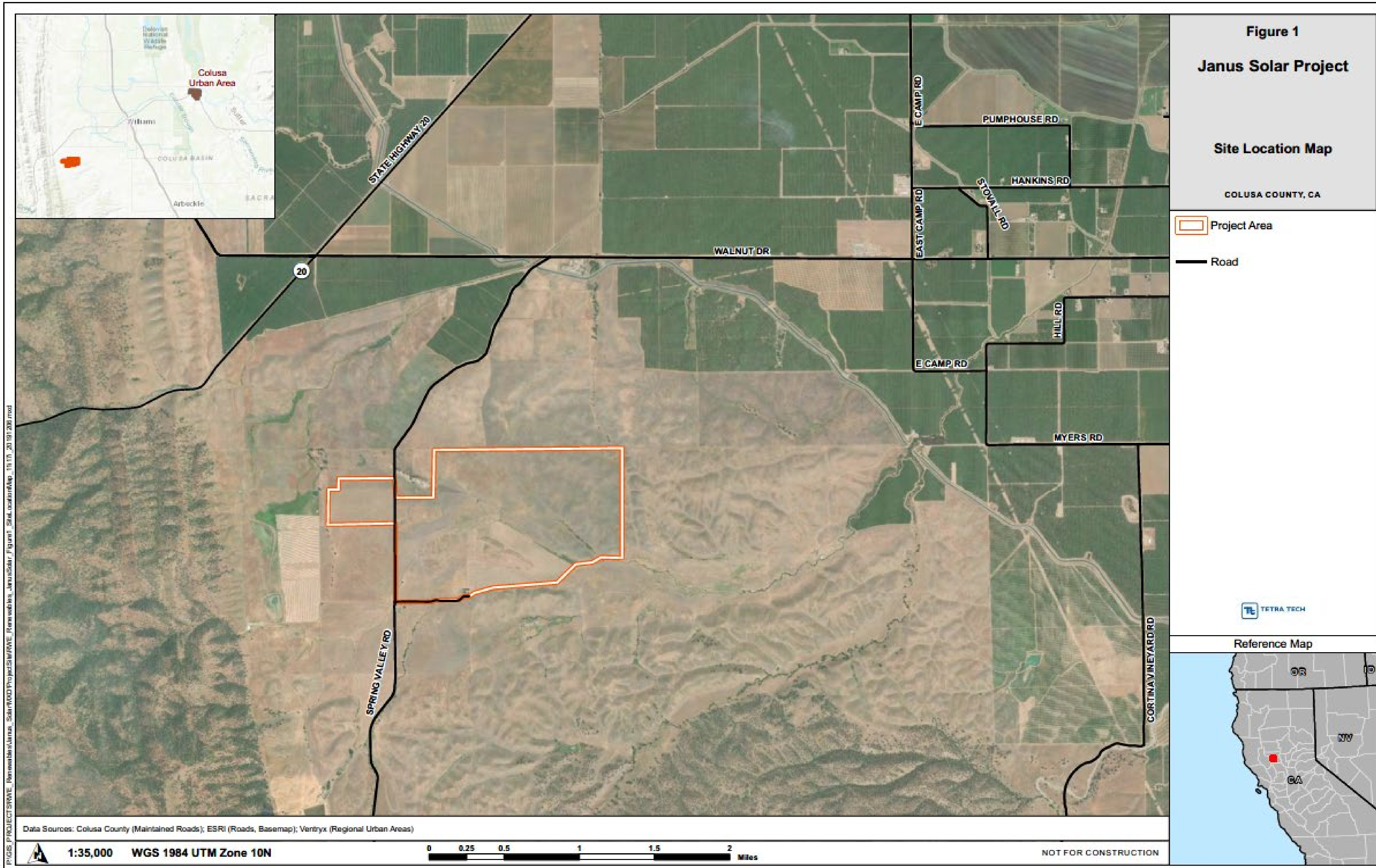
Figure 1
Janus Solar Project
Site Location Map
COLUSA COUNTY, CA
Project Area
Road
Reference Map
OR
ID
NV
CA
Colusa Urban Area
Williams
COLUSA BASIN
Arbuckle
STATE HIGHWAY 20
20
WALNUT DR
E CAMP RD
EAST CAMP RD
PUMPHOUSE RD
HANKINS RD
STOVALL RD
HILL RD
MYERS RD
SPRING VALLEY RD
CORTINA VINEYARD RD
Data Sources: Colusa County (Maintained Roads); ESRI (Roads, Basemap); Ventryx (Regional Urban Areas)
1:35,000 WGS 1984 UTM Zone 10N
0 0.25 0.5 1 1.5 2
Miles
NOT FOR CONSTRUCTION
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Colusa County has no threshold of significance for VMT, such that the criteria included in the Technical Advisory on Evaluating Transportation Impacts in CEQA (CEQA 2018) will apply;

> "*The VMT metric can support the three statutory goals: "the reduction of greenhouse gas emissions, the development of multimodal transportation networks, and a diversity of land uses." (Pub. Resources Code, § 21099, subd. (b)(1), emphasis added.) However, in order for it to promote and support all three, lead agencies should select a significance threshold that aligns with state law on all three. State law concerning the development of multimodal transportation networks and diversity of land uses requires planning for and prioritizing increases in complete streets and infill development but does not mandate a particular depth of implementation that could translate into a particular threshold of significance. Meanwhile, the State has clear quantitative targets for GHG emissions reduction set forth in law and based on scientific consensus, and the depth of VMT reduction needed to achieve those targets has been quantified. Tying VMT thresholds to GHG reduction also supports the two other statutory goals. Therefore, to ensure adequate analysis of transportation impacts, OPR recommends using quantitative VMT thresholds linked to GHG reduction targets when methods exist to do so*."

3.0 TRAFFIC CONDITIONS

3.1 EXISTING TRAFFIC AND INFRASTRUCTURE

There are two primary routes into the Project area depending on the origin of workers and materials. Workers and materials from Sacramento or the Port of San Francisco will arrive via Interstate 5 to Meyers Road, Zumwalt Road, Beauchamp Road (which changes to Walnut Drive), and finally to Spring Valley Road for access to the Project site. The other route from Colusa, Yuba City, or Williams will utilize State Route 20, to East Camp Road to Walnut Drive, and finally to Spring Valley Road.

Because of the site's rural location, current traffic on the roads immediately adjacent to the Project is light. The Caltrans data available for Colusa County includes Interstate 5 and State Route 20. Interstate 5 included 30,800 vehicles per day, and State Route 20 included 5,900 vehicles per day within Colusa County (Caltrans 2019). Near the Project location the roads are rural without dedicated turn lanes. The existing traffic is expected to be light, and based on experience with similar projects and the lack of connectivity to commercial, industrial, or higher density residential areas; the rural roads are estimated to have between 500 and 800 vehicles per day, or less than 100 vehicles during peak hour.

3.2 PROJECT TRAFFIC GENERATION

The Project traffic will peak at about 200 workers, of which approximately 25 percent are likely to carpool. As mentioned, the peak is only expected to last 2–3 months, however traffic volume will be somewhat near the peak for 7 months. All Project workers will commute to the Project location at about the same time resulting in 150 vehicles during peak hour. The 150 workers are expected to come from several different locations and construction traffic will not be combined until the intersection of Walnut Drive and East Camp Road. From that intersection all workers will head west to Spring Valley Road and south to the Project access location. LOS impacts would be most pronounced along this stretch of roadways and intersections.

Table 1. Trip Generation

Phase	Daily		Trip Generation			
			AM Peak Hour		PM Peak Hour	
	Workers	Trucks	in	out	in	out
Peak Construction Traffic	200	15	150	8	8	150
Operations	1-2*	2*	1*	1*	1*	1*

*Traffic during site Operations is expected to be intermittent during the week, and not daily.

4.0 PROJECT IMPACTS

The LOS analysis performed for this Traffic Analysis Memorandum relies on the following conservative estimates due to the lack of traffic count data. Given the remoteness of the Project site, the local roads are believed to have far fewer vehicles than their capacity. Applying the conservative estimate of 800 vehicles per day under current conditions, during the peak hour there would be 80 or fewer vehicles on the road using the Highway Capacity Manual (HCM) standard estimation method of peak hour being 10% of the daily. The HCM capacity for a single free flow lane is 1,800 vehicles per hour (TRB 2016). These intersections are two-way stop-controlled intersections, so they have one free-flowing lane in each direction. The estimated total number of vehicles during the peak hours, taking into account 80 vehicles per hour at Walnut Drive and at East Camp Road currently, plus 150 vehicles generated by Project construction, would be 230 to 310. The actual capacity of the intersection is far less than the sum of the two lanes since there would be a break in the traffic for stopped vehicles; however, the estimated 230 to 310 vehicles during the peak hour is far below the capacity of the infrastructure, and the roadways surrounding the Project site would still function desirably during Project construction. The LOS calculation for Walnut Drive and Spring Valley Road is provided as Appendix A, and yields a LOS A during peak construction. Based on this conservative estimate, it can be reasonably concluded that the LOS will be C or better during construction.

The VMT analysis quantifies the total number of vehicle miles added to the roads as a direct result of the construction and operations of the Project. The analysis includes the estimated number of workers on a weekly basis, reduced by the number that are likely to carpool, and multiplied by the approximate distance traveled and the number of times per week that distance is traversed (i.e., commutes happen 10 times per week = 2 times per day). A total VMT of 721,453 was calculated for the Project, which is relatively low compared to similarly sized projects within California. Additionally, solar projects are being built in order to reduce GHG emissions and provide a more secure energy future. Diversifying energy production sources is both critical as well as a stated goal of California and the United States.

The details of the VMT calculations are included in Table 2.

Table 2. Construction Vehicle Miles Traveled

Type	Source Location	Distance	Times per week	Percent of Total	Percent Carpool	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
Worker Trip	Williams	9.3	10	15	25	697.5	697.5	1395	2790	2790	2790	2790	2790	2790	279
Worker Trip	Colusa	18.4	10	10	25	920	920	1840	3680	3680	3680	3680	3680	3680	368
Worker Trip	Yuba City	42.2	10	10	25	2110	2110	4220	8440	8440	8440	8440	8440	8440	844
Worker Trip	Sacramento	64.4	10	65	25	20930	20930	41860	83720	83720	83720	83720	83720	83720	8372
Equipment Trip	Sacramento	64.4	2	100	N/A	644	644	128.8	128.8	128.8	128.8	128.8	128.8	128.8	644
Materials Trip	Port of SF	118	2	60	N/A	708	708	1416	1416	2124	2124	2124	2124	708	0
Materials Trip	Sacramento	64.4	2	40	N/A	257.6	257.6	515.2	515.2	772.8	772.8	772.8	772.8	515.2	0
Total:		**721,453**													

5.0 CONCLUSION

Impacts to LOS caused by the Project are anticipated to be minimal or negligible. The Project is not expected to result in serious delays or deterioration of function of the local infrastructure in Colusa County or surrounding areas that would be utilized for transportation of materials, workers, and equipment.

As noted in Section 2.3, there is no established threshold of significance for VMT in Colusa County. Since no quantitative, qualitative, or performance level is identified, the significance of 721,453 additional miles traveled must be evaluated based on the three guidance criteria from the CEQA Technical Advisory, including “the reduction of greenhouse gas emissions, the development of multimodal transportation networks, and a diversity of land uses.” Based on the following CEQA criteria, the Project results in a less than significant impact for VMT:

1. Reduction of GHG emissions – The Project is a solar facility and the chief aim of constructing solar facilities is the reduction of dependence on GHG emitting fossil fuel energy sources. The Project will provide clean renewable energy for 30 years once completed. Additionally, the *Air Quality and Greenhouse Gas Technical Report* for the Janus Solar Project concluded a “less than significant impact” for both construction and operations emissions. The technical report identified a quantitative threshold of significance for GHG emissions. The analysis included in that report accounted for construction traffic emissions to determine the total emissions for the Project. Using this definitive quantitative metric yielded a “less than significant impact.” Based on this conclusion a threshold value for VMT would likely be much higher than the Project generated VMT. This assertion is in line with the fact that the guidance for conducting VMT analysis originated with GHG emissions reduction regulations and goals and the guidance states “OPR recommends using quantitative VMT thresholds linked to GHG reduction targets when methods exist to do so.”
2. Diversity of land use – Diversity of land use is a much more difficult criteria to quantify for a comparative analysis; however, the Project expands land use diversity to accommodate the increase in energy demand. This development changes land use from undeveloped grazing land to renewable energy production. Put simply, in order for California to reach its energy goals many thousands of acres will need to be converted to alternative energy sources. Because the Project assists in that goal and there are very few means of reducing the VMT while constructing the Project, the additional VMT are considered insignificant.

6.0 REFERENCES

California Environmental Quality Act (CEQA). 2018. *Technical Advisory on Evaluating Transportation Impacts in CEQA.* State of California, Governors Department of Planning and Research.

Caltrans. 2019. *Traffic Census Program.* https://dot.ca.gov/programs/traffic-operations/census

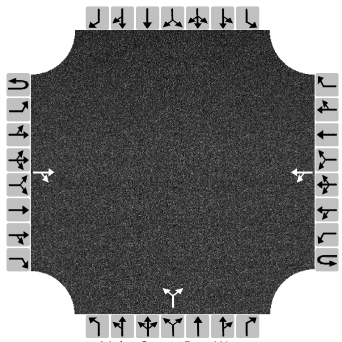
Transportation Research Board (TRB). 2016. Highway Capacity Manual. 6th Ed. Washington, D.C.

APPENDIX A – LOS CALCULATION AT WALNUT DRIVE AND SPRING VALLEY ROAD

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	ENM	Intersection	Primary Project Int.
Agency/Co.		Jurisdiction	Colusa County
Date Performed	7/13/2021	East/West Street	Walnut Drive
Analysis Year	2021	North/South Street	Spring ValleyRoad
Time Analyzed	AM Peak Hour	Peak Hour Factor	0.92
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description			

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			36	4		150	40			10		70				
Percent Heavy Vehicles (%)						3				3		3				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Base Critical Headway (sec)						4.1				7.1		6.2				
Critical Headway (sec)						4.13				6.43		6.23				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.23				3.53		3.33				

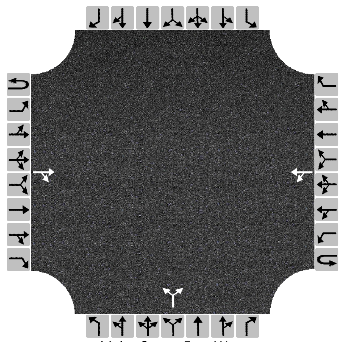
Delay, Queue Length, and Level of Service

	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Flow Rate, v (veh/h)						163					87					
Capacity, c (veh/h)						1559					920					
v/c Ratio						0.10					0.09					
95% Queue Length, Q_{95} (veh)						0.3					0.3					
Control Delay (s/veh)						7.6					9.3					
Level of Service (LOS)						A					A					
Approach Delay (s/veh)					6.2				9.3							
Approach LOS									A							

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	ENM	Intersection	Primary Project Int.
Agency/Co.		Jurisdiction	Colusa County
Date Performed	7/13/2021	East/West Street	Walnut Drive
Analysis Year	2021	North/South Street	Spring ValleyRoad
Time Analyzed	AM Peak Hour	Peak Hour Factor	0.92
Intersection Orientation	East-West	Analysis Time Period (hrs)	0.25
Project Description			

Lanes



Major Street: East-West

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	0	1	0	0	0	1	0		0	1	0		0	0	0
Configuration				TR		LT					LR					
Volume (veh/h)			36	4		4	36			10		220				
Percent Heavy Vehicles (%)						3				3		3				
Proportion Time Blocked																
Percent Grade (%)									0							
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)						4.1				7.1		6.2				
Critical Headway (sec)						4.13				6.43		6.23				
Base Follow-Up Headway (sec)						2.2				3.5		3.3				
Follow-Up Headway (sec)						2.23				3.53		3.33				

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						4					250					
Capacity, c (veh/h)						1559					1021					
v/c Ratio						0.00					0.24					
95% Queue Length, Q_{95} (veh)						0.0					1.0					
Control Delay (s/veh)						7.3					9.7					
Level of Service (LOS)						A					A					
Approach Delay (s/veh)					0.8				9.7							
Approach LOS									A							

TETRA TECH

Memo

To: Greg Plucker, Community Development Director, Colusa County

From: Jennifer Merrick, Senior Technical Advisor, Tetra Tech, Inc.

Cc: Anna Shamey, Project Manager, Tetra Tech, Inc.

Date: August 14, 2024

Subject: Addendum to the Traffic Analysis Technical Memorandum for the Janus Solar Project, Colusa County, California

1.0 INTRODUCTION

In July 2021, Tetra Tech prepared a Traffic Analysis Technical Memorandum for the Janus Solar Project (Project). In 2021, the Project was sited on three parcels with Assessor Parcel Numbers 018-050-005-000, 018-050-006-000, and 018050-013-000, which are 630.5, 255.7, and 137.7 acres- in size, respectively, for a total area of approximately 1,024 acres. The Project also included a 4-mile-long generation interconnect (gen-tie) line to connect to the electrical grid at the existing Cortina Substation. In 2024, the Project was re-designed to include two parcels (018-050-005-000 and 018-050-006-000) totaling approximately 886 acres and the 4-mile-long gen-tie line. The Applicant has also proposed a new route for construction traffic, directing it from Interstate 5 (I-5) to Highway 20, to Walnut Drive, and then continuing to Spring Valley Road to the Project site.

2.0 UPDATED TRAFFIC ANALYSIS

This memorandum updates the discussion of potential impacts associated with routing Project construction traffic to and from the Project site, including an analysis of vehicle miles traveled (VMT) and a conservative estimate of level of service (LOS) at the nearest intersection to the Project site at Walnut Drive and Spring Valley Road.

2.1 Vehicle Miles Traveled

The 2021 Traffic Analysis Technical Memorandum provided a calculation of VMT to determine the traffic induced by construction, as well as to identify the effects traffic would have on greenhouse gas emissions (GHGs).

In 2021, the Traffic Analysis Technical Memorandum calculated a total VMT of 721,453 for the Project and that VMT and the Project would result in a less than significant impact for VMT. The Project, as currently proposed, includes the same number of construction trips as those proposed in 2021, such that the VMT and the conclusion that the Project would result in less than significant VMT impacts are unchanged.

2.2 Level of Service

In the 2021 analysis, the impact to LOS at the intersection of Walnut Drive and Spring Valley Road was anticipated to be minimal or negligible. Although the currently proposed Project identified an alternate route

Tetra Tech, Inc.
17885 Von Karman Avenue, Suite 500, Irvine, CA 92614
Tel +1.949.809.5000 **Cell** +1. 949.809.5010 | tetratech.com

from I-5, the intersection at Walnut Drive and Spring Valley Road remains the main intersection of concern for LOS analysis. In the vicinity of the Project site, there are sparse rural residences and because of the remoteness of the Project site, the local roads currently have far fewer vehicles than their capacity. Even with applying a conservative estimate of existing trips, the Project is not expected to result in serious delays or deterioration in function of the local infrastructure in Colusa County or surrounding areas that would be utilized for transportation of materials, workers, and equipment. Heavy equipment and construction materials deliveries are anticipated to occur throughout the day, such that they would not cause prolonged delays on surrounding roadways. The Project, as currently proposed, includes the same number of construction trips as those proposed in 2021, and conclusions about the change to LOS during Project construction are unchanged.

APPENDIX K
FIRE HAZARD ANALYSIS TECHNICAL MEMORANDUM

DUDEK
MAIN OFFICE
605 THIRD STREET
ENCINITAS, CALIFORNIA 92024
T 800.450.1818 F 760.632.0164

FIRE HAZARD ANALYSIS TECHNICAL MEMORANDUM

To: Greg Plucker, Community Development Director, Colusa County

From: Dudek Fire Protection Planning Team, Michael Huff – Principal, Matthew Crockett – Fire Protection Planner
Subject: Janus Solar and Battery Energy Storage Project
Date: September 26, 2024
Attachment(s): Figures

This technical memorandum provides a summary of Dudek's evaluation of potential fire behavior characteristics for the Janus Solar and Battery Energy Storage Project. Dudek has provided this fire behavior analysis as a stand-alone document to evaluate the Project site's anticipated fire behavior and the Fuel Modification Zone implications. This technical memo also provides recommendations for reducing wildfire risk at the Project site.

Project Information

The Project Site is situated on private land in Colusa County. The site is primarily used for cattle grazing, with some sections allocated for wheat cultivation. The closest community is Williams, located about 6.5 miles to the northeast. The site encompasses two parcels and a generation interconnect (gen-tie) that will connect to the Cortina Substation, located approximately 2 miles northeast on Walnut Drive.

Spring Valley Road borders the western edge of the site. The site can be reached via State Route 20, Walnut Drive, Spring Valley Road, and various unpaved internal routes. Most roads in the area are either unimproved or paved without curbs or sidewalks. Interstate 5 is located about 9 miles east of the project site. Surrounding land uses are comprised of grazing land, annual grasslands, and cropland in the form of wheat fields and orchards.

The Project involves the construction and operation of a photovoltaic solar electricity generating facility, a battery energy storage system (BESS), and related infrastructure roadways, drainage basins, and other features on roughly 886 acres. The project will include the following major components:

- A generation interconnect line to the Cortina Substation
- An electrical substation
- The battery energy storage system
- Solar panel arrays

Project Fire Environment

CLIMATE AND WEATHER

The regional climate is characterized by hot summers and mild winters with relatively dry weather. The region area is subject to seasonal weather conditions that can heighten the likelihood of fire ignition and spread, and considering the site's grassland vegetation, may result in fast moving high intensity wildfire. Live fuel moisture content, a measure of the relative mass of water and indicator of ignitability, for most vegetation within the greater region reaches the driest point in the late summer or early fall.

The Project site, along with the greater northern central valley, is subject to strong wind events that may exacerbate fire spread. These high wind events typically involve winds from the north which can dry fuels and create higher intensity, fast-moving, wind-driven wildfires. These wind events are commonly referred to as Diablo Winds. While Diablo winds are possible at the Project site, wind speeds are expected to be less severe compared to areas within and west of the coastal range. Although these weather events often present the greatest risk, they account for only a small fraction of all fires that occur each year (CAL FIRE LNU, 2020).

TERRAIN

Terrain affects wildfire movement and spread. Steep terrain typically results in faster upslope fire spread due to the pre-heating of uphill vegetation. Flat areas typically result in slower fire spread when absent of windy conditions. Topographic features such as saddles, canyons, and chimneys (land formations that collect and funnel heated air upward along a slope) may form unique circulation conditions that concentrate winds and funnel or accelerate fire spread. Various terrain features can also influence fire behavior, as summarized in Table 1.

Table 1. Effects of Topographic Features on Fire Behavior

Topographic Feature	Effect
Narrow Canyon	Surface winds follow canyon direction, which may differ from the prevailing wind; wind eddies/strong upslope air movement expected, which may cause erratic fire behavior; radiant heat transfer between slopes facilitates spotting/ignition on opposite canyon side.
Wide Canyon	Prevailing wind direction not significantly altered; aspect significant contributor to fire behavior. Wide canyons are not as susceptible to cross-canyon spotting except in high winds.
Box Canyon/ Chute	Air is drawn in from canyon bottom; strong upslope drafts. No gaps or prominent saddles to let heated air escape. Fires starting at the canyon bottom can move upslope very rapidly due to a chimney-like preheating of the higher-level fuels and upslope winds.
Ridge	Fires may change direction when reaching ridge/canyon edge; strong air flows likely at ridge point; possibility for different wind directions on different sides of the ridge. Ridges experience more wind. Fires gain speed and intensity moving toward a ridge. Fires burning at a ridge can exhibit erratic fire behavior. Strong air flows can cause a whirling motion by the fire. As the wind crosses a ridge it usually has a leeward eddy where the wind rolls around and comes up the leeward side.
Saddle	Potential for rapid rates of fire spread; fires pushed through saddles faster during upslope runs. Winds can increase when blowing through saddles due to the funneling effect of the constricted pass. On the other side, winds will slow, but erratic winds potentially occur at the saddle due to eddies.

Sources: NFPA 2011; Teie 1994.

The Project site and adjacent areas exhibit flat to gently rolling terrain with the majority of slopes ranging from 0-15% (See Figure 1 - Slope). The Project site is absent of any of the hazardous topographic features listed above and is therefore unlikely to experience terrain-exacerbated fire behavior.

VEGETATION

The Project site and adjacent lands are mainly comprised of herbaceous/grassland vegetation (Figure 2 – Vegetation). Grasses are fine fuels that are loosely compacted with a low fuel load.[1] Grasses have a high surface-area-to-volume ratio, requiring less heat to remove fuel moisture and raise the fuel to ignition temperature. They are also subject to early seasonal drying in late spring and early summer. Live fuel moisture content in grasses typically reaches its low point in early summer, and grasses begin to cure soon after. Due to these characteristics, grasses have the potential for a high rate of spread, rapid ignition, and facilitation of high severity fire behavior. Their low overall fuel loads typically result in faster moving fires with lower flame lengths and heat output. Unlike other fuels such as shrubs, grasses typically burn out quickly and do not present long extended periods of heat output.

In addition, spotting, or the transport of airborne embers ahead of the main fire front, is less likely to occur in grass fires compared to other more hazardous fuel types. Generally, airborne embers produced during grass fires are small and extinguish quickly in the air dur to rapid burn out times (Koo et al, 2009). Spotting intensity and ignition receptivity can be further reduced in grass fuels through reducing fuel loads. Grasslands within the Project site have historically been altered through wheat cultivation and cattle grazing. While wheat cultivation and grazing will continue to occur on adjacent lands, these practices will no longer occur within the Project site. Therefore, it is assumed that outside of the Project's development areas and Fuel Modification Zones, grasses will reestablish to mature, undisturbed conditions. However, reduced fire severity including reduced flame lengths, slower spread rates, and lower fireline intensity will occur within the Project's fuel modification zones. As presented in Table 4, reductions in fire severity due to fuel modification zones are expected to substantially reduce risks to PV arrays, and virtually eliminate risk to the BESS and Substation. In addition, some areas of natural vegetation will be converted into roadways free of flammable vegetation. Following development, these roadways will break up fuel continuity and function as fuel breaks.

FIRE HISTORY AND FACTORS INFLUENCING WILDFIRE LIKELIHOOD

Fire history is an important component of fire planning and can provide an understanding of fire frequency, fire type and behavior, and significant ignition sources, among others. Wildfire history data was obtained from the California Department of Forestry and Fire Protection (CAL FIRE) Fire and Resource Assessment Program (FRAP) database (CAL FIRE, 2024)[2]. FRAP summarizes fire perimeter data from the late 1800s to 2023, but which is partially incomplete due to the fact that it only includes fires over 10 acres in size. However, the data does provide a summary of recorded fires and can be used to show whether large fires have occurred in the vicinity of the Project site.

As presented in Figure 3 – Fire History, no fires greater than 10 acres have been recorded within the Project site. Generally, wildfires are uncommon in wildland areas surrounding the Project site. This is likely due to

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[1]The amount of available and potentially combustible material, usually expressed as tons per acre (NWCG 2022).

[2] https://www.fire.ca.gov/what-we-do/fire-resource-assessment-program/fire-perimeters

relatively flat terrain, less hazardous grassland vegetation, regional grazing practices, and agricultural fields which are less conducive to wildfire spread. Wildfires are more common in the steeper terrain to the northwest, west, and southeast of the Project site. However, wildfires burning in these areas have never encroached onto the Project site.

Wildfire risk at the Project site is believed to be highest during strong wind events with winds blowing from the north. However, extensive agricultural lands to the north of the Project site substantially reduce the risk of wildfires spreading towards the Project site from this direction. These agricultural areas function as large, continuous buffers between extensive open spaces to the north-northwest and the Project site. While grassland fires may occur near the Project site, current vegetation conditions, gentle terrain, and extensive agricultural areas reduce the potential for wildfire spread towards the Project site, especially when considering fire spread from the north.

Notably, the Sites Fire ignited on June 16th, 2024, roughly 18 miles northwest of the Project site near East Park Reservoir. The fire eventually grew to roughly 19,000 acres and burned within 9.5 miles of the Project site. Rapid fire growth and intensity was caused by strong northern winds, steep terrain, and heavy chaparral fuels. While this fire occurred within regional proximity to the Project site, the terrain and fuel type is drastically different and more hazardous than what is observed within and adjacent to the Project site (See Figure 4 – Sites Fire Perimeter). Wildfire behavior similar to what occurred during the 2024 Sites Fire is not likely to occur in grasslands within and surrounding the Project site due the absence of shrub vegetation, gentle terrain, and extensive agricultural lands which disrupt wildfire ignition and spread. This is highlighted through Figure 5 – Wildfire Hazard Potential, which combines wildfire likelihood and intensity to measure wildfire hazard (Pyrologix, 2021[3]). As presented, Wildfire Hazard Potential at the Project site is considered Low, with areas of high hazard potential occurring in steeper and more densely vegetated open space areas to the west and south of the site.

A review of historical vegetation fire ignition points was also conducted. Historical ignition data was obtained from 1992-2018 (Short, 2021[4]). Figure 6 – Ignition History provides historic ignition locations near the Project site. Ignitions are most common along major roadways such as Highway 20. Notably, many ignitions that have occurred have not resulted in fires of 10 acres or larger. This suggests that vegetation fires in the Project's vicinity are generally extinguished quickly and prevented from growing beyond 10 acres. In addition, the likelihood of ignition within the Project site will be further reduced following the implementation of fuel modification zones which reduce grassland fuel loads.

WILDFIRE SUPPRESSION DIFFICULTY

Wildfire suppression difficulty quantifies relative fire suppression effort based on a variety of factors including topography, fuel type, fire behavior under extreme fire weather, Fireline production rates in different fuel types using hand tools, and access (distance from roads, trails). The dataset for wildfire suppression difficulty was obtained from Pyrologix and the USDA Forest Service's Contemporary Wildfire Hazard Across California[5]. This dataset classifies wildfire suppression difficulty in six classes.

[3] https://databasin.org/datasets/122f9ea555e844fc9e2621e7db743275/
[4] https://www.fs.usda.gov/rds/archive/products/RDS-2013-0009.5/_metadata_RDS-2013-0009.5.html
[5] https://pyrologix.com/reports/Contemporary-Wildfire-Hazard-Across-California.pdf

As presented in Figure 7 – Wildfire Suppression Difficulty, the majority of the Project site is classified as lowest-low suppression difficulty. Areas within the site classified as moderate are confined to the eastern half where terrain is slightly steeper. These findings suggest that wildfires occurring within and surrounding the Project site would be capable of being quickly suppressed by responding personnel. Suppression difficulty is expected to be further reduced following the implementation of the Project's fuel modification zones which would convert a considerable portion of the site's vegetation into mowed grasses.

FIRE HAZARD SEVERITY ZONES

CAL FIRE's Fire Hazard Severity Zones depict wildfire hazard based on wildfire intensity and likelihood, in addition to firebrand hazard for non-wildland areas. It is important to note that Fire Hazard Severity Zone maps evaluate "hazard," not "risk". "Hazard" is based on the physical conditions that create a likelihood that an area will burn over a 30 to 50-year period without considering modifications such as fuel reduction efforts. "Risk" is the potential damage a fire can due to the area under existing conditions, including any modifications such as defensible space, and ignition resistant development. Fire Hazard Severity Zones are classified into three categories including Very High, High, and Moderate. The entirety of the Project site is mapped as a High Fire Hazard Severity Zone (OSFM, 2024[6]) (Figure 8 – Fire Hazard Severity Zones).

While wildfire hazard is mapped as High, wildfire associated with the project's infrastructure is considered low due to vegetation management implemented through fuel modification zones.

Fire Behavior Modeling Methods

Dudek utilized the BehavePlus (v6) fire modeling system to analyze potential fire behavior for the Project site, with experienced judgement and assumptions made for fuel conditions. Fire behavior outputs include flame lengths (feet), fireline intensities (Btu/feet/second), spotting distance (miles), and spread rates (feet/minute). Fire behavior modeling was conducted for existing and post-project conditions to evaluate the implications of project Fuel Modification Zones.

The following summarizes the inputs, data sources, and assumptions for the fire behavior modeling analysis:

Weather and Wind Analysis: Historical weather data for the region was utilized in determining appropriate fire behavior modeling inputs for the Project site. For this analysis, fuel moisture and wind values were derived from the closest Remote Automatic Weather Stations (RAWS). These data are used as fire weather inputs to represent extreme fire conditions during a summer wind driven wildfire event.
RAWS utilized for this analysis include:

- **County Line RAWS** – 041410 – located roughly 11 miles southwest of the Project site
- **SACRAMENTO NWR RAWS** – 041102 – located roughly 19 miles north of the Project site

Historic weather data was analyzed using the FireFamilyPlus software package to determine 97th percentile (extreme) weather conditions for the Project site. Weather data was analyzed from 2004-2024 between

[6]https://www.fire.ca.gov/osfm/what-we-do/community-wildfire-preparedness-and-mitigation/fire-hazard-severity-zones/fire-hazard-severity-zones-maps-2022

the months of July-September to determine weather conditions during peak fire season. To account for the varied distances between both weather stations and the Project, a Special Interest Group (SIG) was created. Weather data from the County Line RAWS was assigned a greater weighting (0.7) compared to data from the Sacramento NRW RAWS (0.3) to account for the station's closer proximity to the Project Site. Maximum wind speed observations were utilized to determine extreme wind speeds expected at the Project site. Although Diablo winds have been documented to result in wind speeds as high as 40 mph, these extreme wind speeds are more common in areas west of the Project site within and to the west of the coastal range. Regardless, fire behavior in the grass fuels present within and adjacent to the Project site reaches maximum severity at wind speeds of roughly 20 miles per hour. Therefore, the maximum 22 mile per hour wind speeds utilized for fire behavior modeling consider the most extreme possible fire behavior[7].

As presented below in Table 2, weather inputs utilized in this fire behavior analysis include 1-hour, 10-hour, and 100-hour fuel moistures, live herbaceous moisture, live woody moisture, and 20-foot sustained wind speed.

Table 2. BehavePlus Weather and Wind Inputs

Variable	Model Input Value
Wind Speed	22 miles per hour**
1-Hour Fuel Moisture	3%
10-Hour Fuel Moisture	4%
100-Hour Fuel Moisture	6%
Herbaceous Fuel Moisture*	30%
Woody Fuel Moisture*	60%

Source: County Line RAWS, Sacramento NWR RAWS
*These values represent fully cured vegetation conditions
**Maximum summer wind speeds observed at RAWS

Fuels: Vegetation types were derived from the Project's Biological Survey Report (RWE, 2024), satellite imagery, and expert assumptions. Vegetation types classified into fuel models for input into BehavePlus. The fuel model values were used in the modeling analysis for the fuel types on, and adjacent to the Project site. Vegetation types and corresponding fire behavior fuel models were classified for existing and post-project conditions to reflect development areas and Fuel Modification Zones. Fuel models for grasslands were assigned on the basis that current cattle grazing practices will not continue during the Project's construction and post-construction phases. In addition, vegetation conditions within designated High and Middle-High Crotch Bumble Bee habitat areas were assigned fuel models based on the assumption that no vegetation management would occur in these areas. Wheat fields were assigned fuel models to reflect pre-harvest conditions when grasses are fully cured, and herbaceous fuels are highly receptive to ignition and spread. Vegetation types and their corresponding fuel models are provided below in Table 3.

[7] Spotting distances may increase when wind speeds are increased to 40 mph as presented in Table 4.

Table 3. Vegetation Communities and Fuel Models

Vegetation Community	Fuel Model	Description
Annual Grassland	Gr2 – customized	Low load, dry climate grass
Yellow Starthistle Grassland	Gr2 – customized	Low load, dry climate grass, Fuel bed depth: ~ 2 feet, 1-h Fuel Load: 0.2 tons/ac
Wheat Fields*	Gr2 – customized	Low load, dry climate grass, Fuel bed depth: ~ 2 feet,
Riparian Grassland	Gr1	Very low load, dry climate grass/forb
Riparian Wash	Nb1	Unvegetated Wash
Developed	Nb1	Developed
Fuel Modification Zone 1	Nb1	Gravel, paved, or barren land
Fuel Modification Zone 2	Gr1-customized	Grass mowed to stubble height (~ 2 inches)
Fuel Modification Zone 3	Gr1	Grass mowed to height of 4 inches

Terrain: BehavePlus requires slope inputs to determine the influence of terrain on fire intensity and spread. For each vegetation type, the average slope was determined to represent the most typical terrain observed across the vegetation type.

Fire Behavior Modeling Results

As described above, fire behavior outputs for the Janus Solar and Battery Storage Project include flame lengths (feet), fireline intensities (Btu/feet/second), spotting distance (miles), and spread rates (feet/minute) for both existing and post-project conditions. Table 4 provides fire behavior outputs for each vegetation type present within the Project site and directly adjacent lands. Fire behavior outputs for existing and post-project conditions are presented graphically in Figures 9-14.

Table 4. Fire Behavior Modeling Results

Vegetation Type	Flame Length (feet)*	Fireline Intensity (BTU/feet/second)	Spread Rate (ft/min)	Spotting Distance (miles)
Annual Grassland	12	1,165	268	0.5 (0.7)**
Yellow Starthistle Grassland	15	2,053	449	0.6 (0.8)**
Wheat Fields	13	1,555	381	0.6 (0.8)**
Riparian Grassland	3	44	30	0.2 (0.3)**
Riparian Wash	0	0	0	0
Developed	0	0	0	0
Fuel Modification Zone 1	0	0	0	0
Fuel Modification Zone 2	2	26	14	0.2 (0.2)**
Fuel Modification Zone 3	3	44	30	0.2 (0.3)**

Note*: Flame length values were rounded to the nearest foot

Note:** Represents spotting distances when considering 40mph winds

Wildfire Behavior Findings

- A wildfire burning through the site's grasslands driven by 22 mph winds is modeled to result in flame lengths ranging from 12-15 feet depending on the vegetation type.
- Wildfire within grasslands within and adjacent to the Project has the potential to spread at rapid rates, with rates of spread ranging from 268-449 ft/min (3.0-5.1 mph)
- Spotting distances, or the maximum distance an airborne ember may travel, range from 0.5-0.6 miles under 22 mph winds. For a more detailed description of spotting, see the *Fire Environment – Vegetation* section.
- When considering pre-harvest conditions, wheat fields have the potential for wildfire ignition and spread similar to adjacent grasslands.

- Within the Projects Fuel Modification Zones, using the same weather inputs, the resulting post-Project flame lengths in the FMZ areas along the Project's permitter and surrounding PV arrays and BESS facilities would be significantly reduced.

  - Dudek assumed minimal vegetation maintenance in the areas between the arrays, so the planned up to 12 inches vegetation heights is appropriate and the hard assets would be protected by the maintenance at their perimeter and throughout the developed areas

  - Once reaching the Fuel Modification Zones, the wildfire behavior is altered noticeably; flame lengths are reduced to 3 feet in Zone 3, 2 feet in Zone 2, and 0 feet in Zone 1 due to the absence of vegetation.

- The modified vegetation closest to the arrays will provide the best protection for the solar modules and would greatly reduce the potential for an on-site fire to move off-site.

Effectiveness of Fuel Modification Zones

An important component of a fire protection system for the Project Site is the provision of fire-resistant landscapes and vegetation buffers. Fuel modification zones (FMZ) are designed to provide vegetation buffers that gradually reduce fire intensity and flame lengths from advancing fire by strategically placing reduced fuel zones adjacent to the Project's infrastructure. FMZs not only help protect from external wildfire risks, but FMZs also reduce the risk of fire originating from such new battery storage or solar equipment and spreading to surrounding areas (Braziunas et al., 2021; Cochrane et al., 2012; Price et al., 2021). FMZs thereby provide a duel benefit of buffering the Project site from encroaching wildfires while separating the development and infrastructure from surrounding open space or fuel sources (Bhandary & Muller, 2009; Braziunas et al., 2021; Cochrane et al., 2012; Fox et al., 2018).

As described in the following section, it is recommended that the Project implement fuel modification zones along the Project's permitter and surrounding PV arrays and BESS facilities to reduce wildfire risk and decrease the likelihood of offsite ignitions.

Recommendations

The following practices are recommended to manage wildfire risk to and from the Janus Solar and Battery Storage Project. These recommendations serve to minimize the risk from off-site fires encroaching towards the Project and reduce the capacity for on-site ignitions and their spread off-site.

Dudek recommends implementation of the following Fuel Modification Zones (See Figure 15 – Fuel modification Zones):

Zone 1: Non-combustible, pervious surface (gravel, DG, or similar): 0-30 feet from BESS and Substation

Zone 1 will be free of vegetation and all combustible materials. Zone 1 will occur surrounding the onsite BESS facility and substation. This Zone will be created to 30 feet from all electrical equipment and battery storage systems.

Zone 2: Grass mowed to stubble height (~ 2 inches): 0-20 feet from the Project's perimeter

Zone 2 will consist of mowed grass to stubble height within 20 feet of the Project's perimeter edge. It is expected that mowing will occur once annually at the beginning of June prior to fire season. However, mowing may occur twice annually depending on vegetation growth rates and other factors such as pre-season precipitation.

Zone 3: Grass mowed to 4 inches in height: 0-20 feet from all PV arrays, 30-100 feet from BESS and Substation

Zone 3 will result in the mowing of grasses to 4 inches in height within 20 feet of PV arrays and within 30-70 feet from the BESS and Substation to reduce wildfire behavior in the Project site's grasslands to an acceptable level. It is expected that mowing will occur once annually at the beginning of June prior to fire season. However, mowing may occur twice annually depending on vegetation growth rates and other factors such as pre-season precipitation. No vegetation management will be conducted within Crotch Bumble Bee Avoidance areas (see Figure 15 – Fuel Modification Zones)

Dudek recommends these additional measures to reduce wildfire risk at the Project site:

- Consider limitations and restrictions on-site during Red Flag Warning periods – potential ignition related activities (hot work, vehicle uses off road, smoking, etc.) should be restricted to specific, protected areas away from vegetation.
- Include internal visual warning flags posted during Red Flag Warning weather to indicate restrictions.
- Provide a water storage reservoir or tank to allow responding personnel quick and easy access to onsite water supply

These recommendations serve to minimize the risk from off-site fires spreading through the Project site, while also reducing the capacity for on-site ignitions and their spread off-site. By maintaining onsite vegetation annually along the Project's perimeter, reducing fuels around solar arrays, and removing all vegetation surrounding the BESS and substation, wildfire ignition potential, severity, and spread will be significantly lowered to an acceptable level.

Figures 1-15

DUDEK

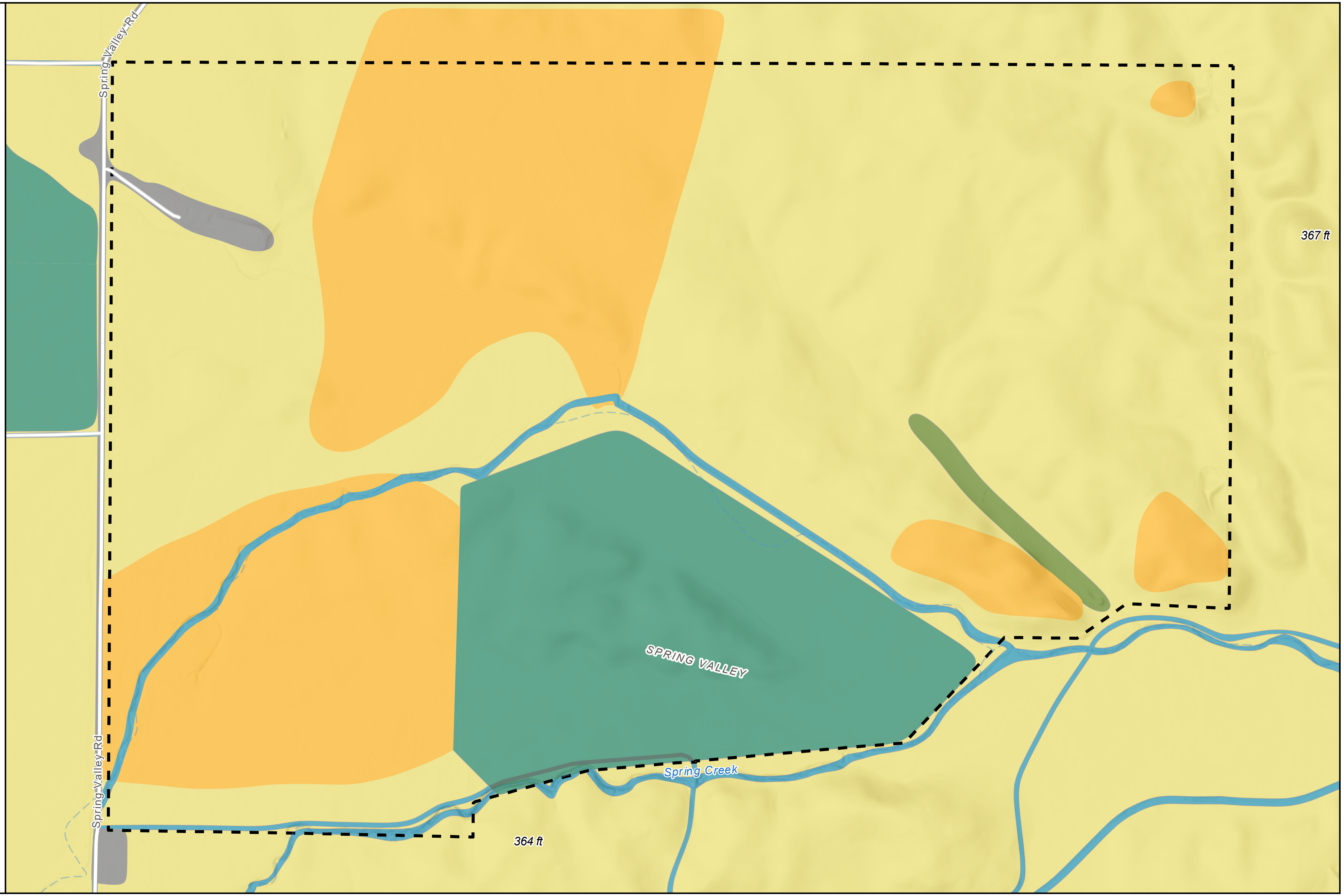
FIGURE 1

Slope - Existing Conditions

Janus Solar and Battery Storage Project

Vegetation
- Developed
- Riparian Wash
- Riparian Grasses
- Annual Grassland
- Yellow Star Thistle - Grassland
- Wheat Fields

Project Boundary



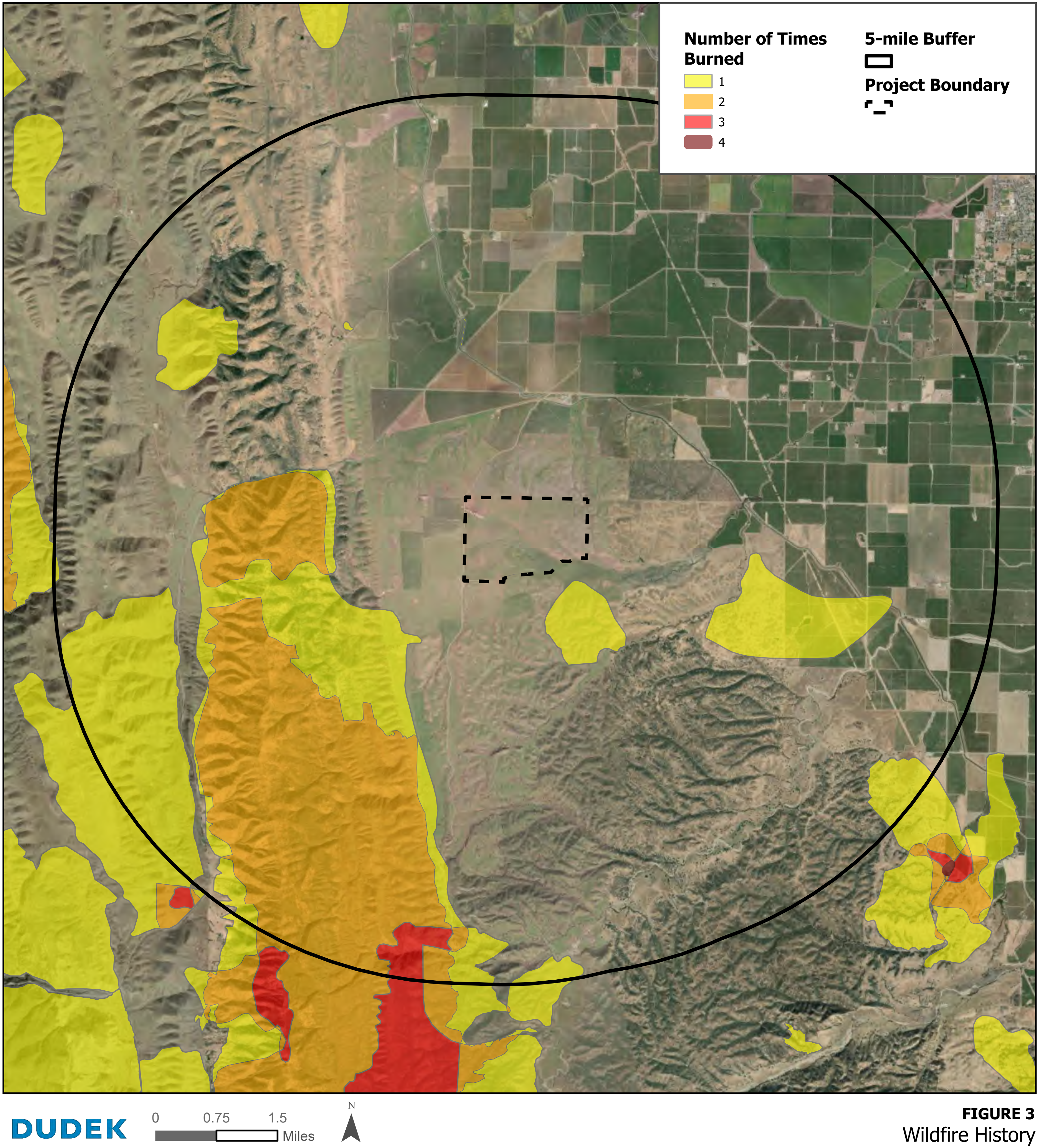
DUDEK

0 400 800 1,600 US Feet

N

FIGURE 2

Vegetation - Existing Conditions



DUDEK

FIGURE 3
Wildfire History

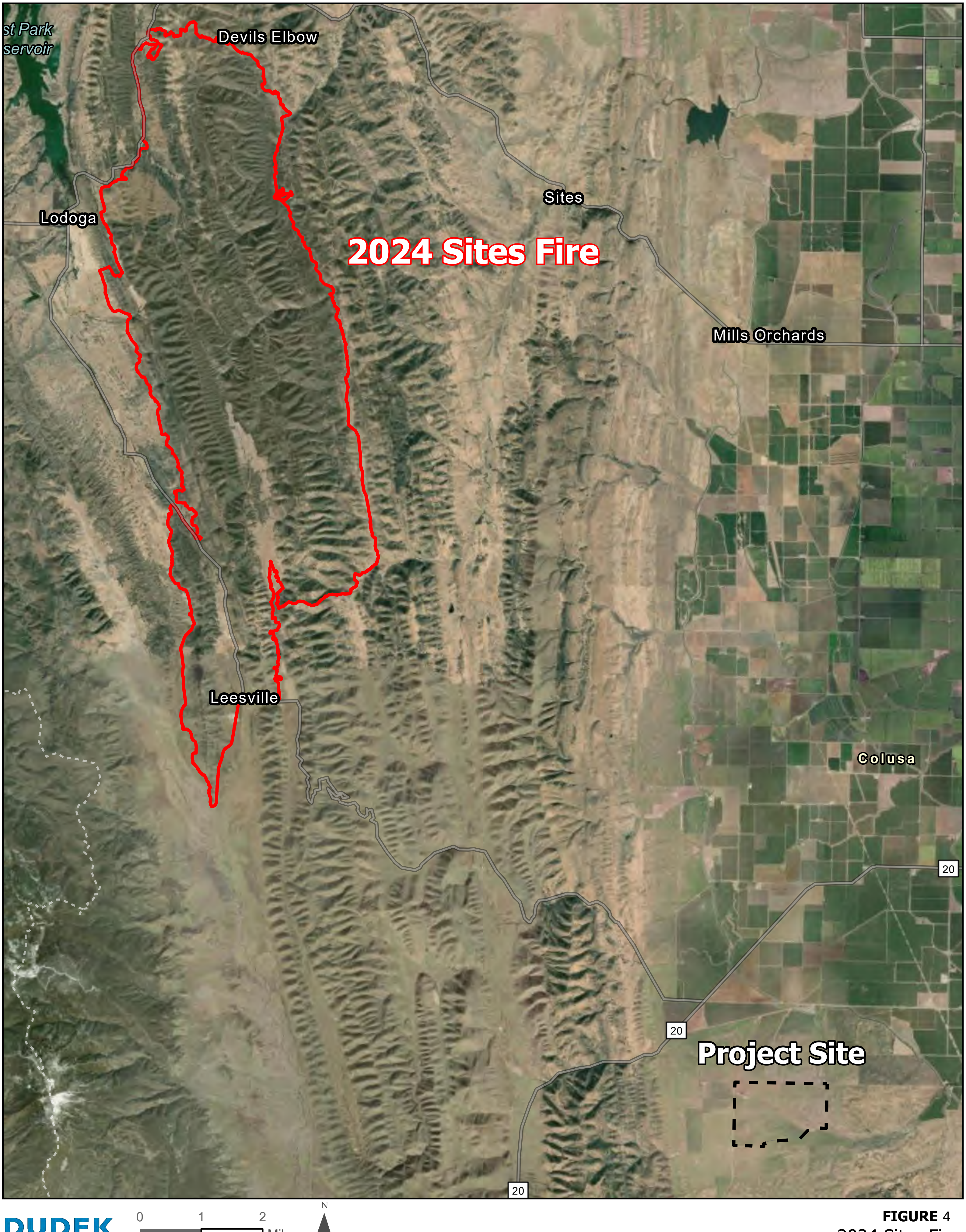
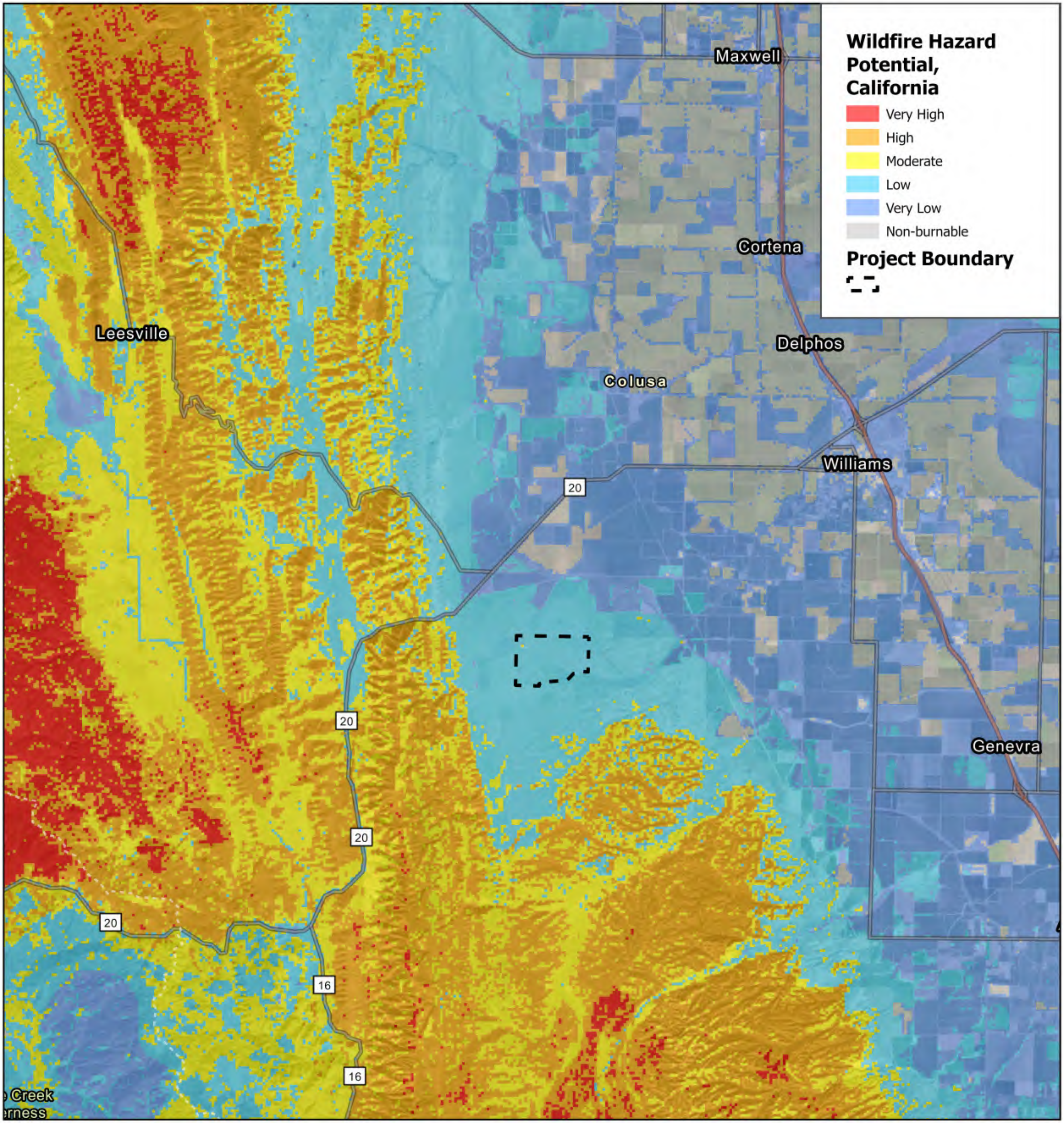
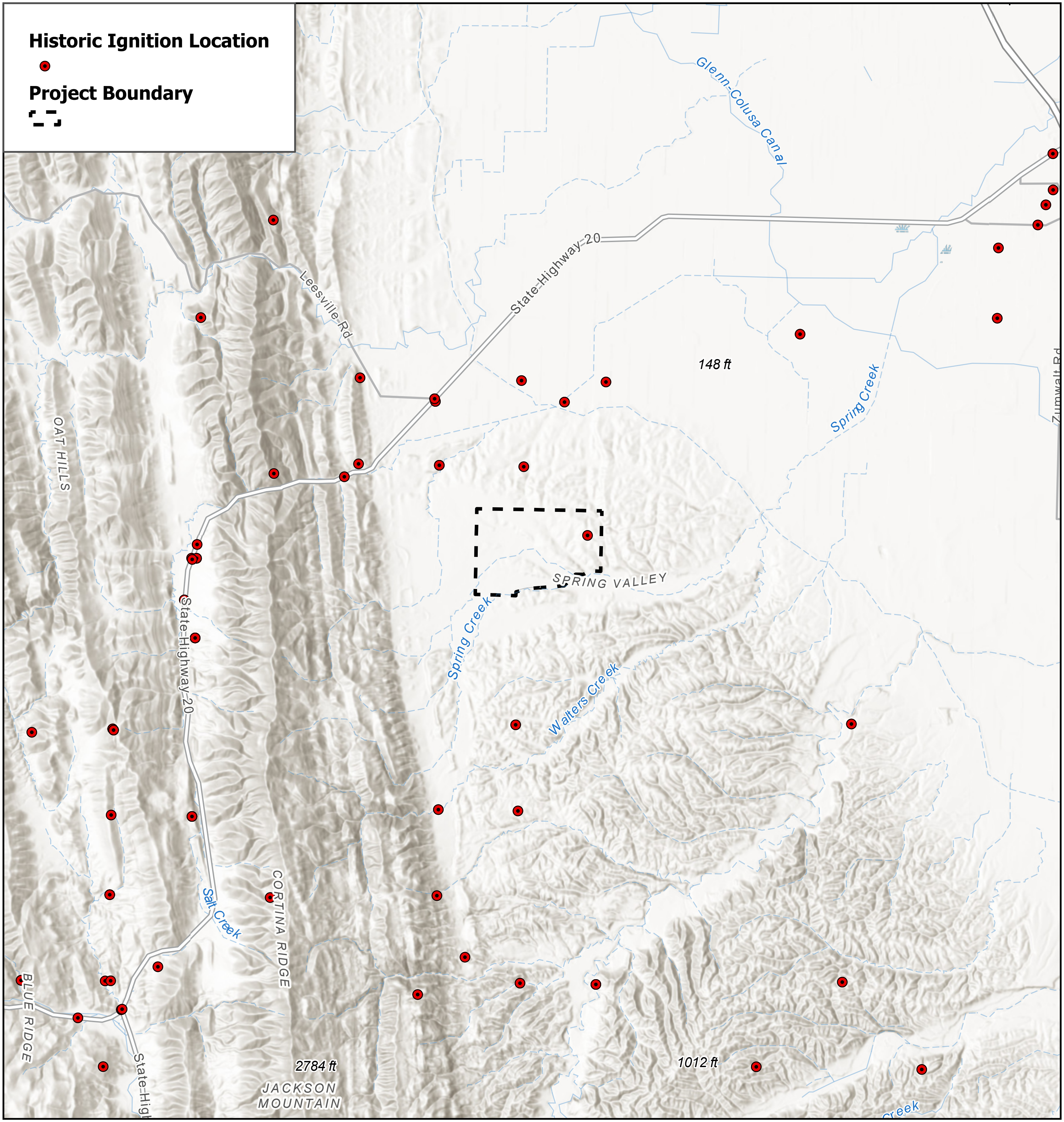


FIGURE 4
2024 Sites Fire



DUDEK

FIGURE 5
Wildfire Hazard Potential



DUDEK

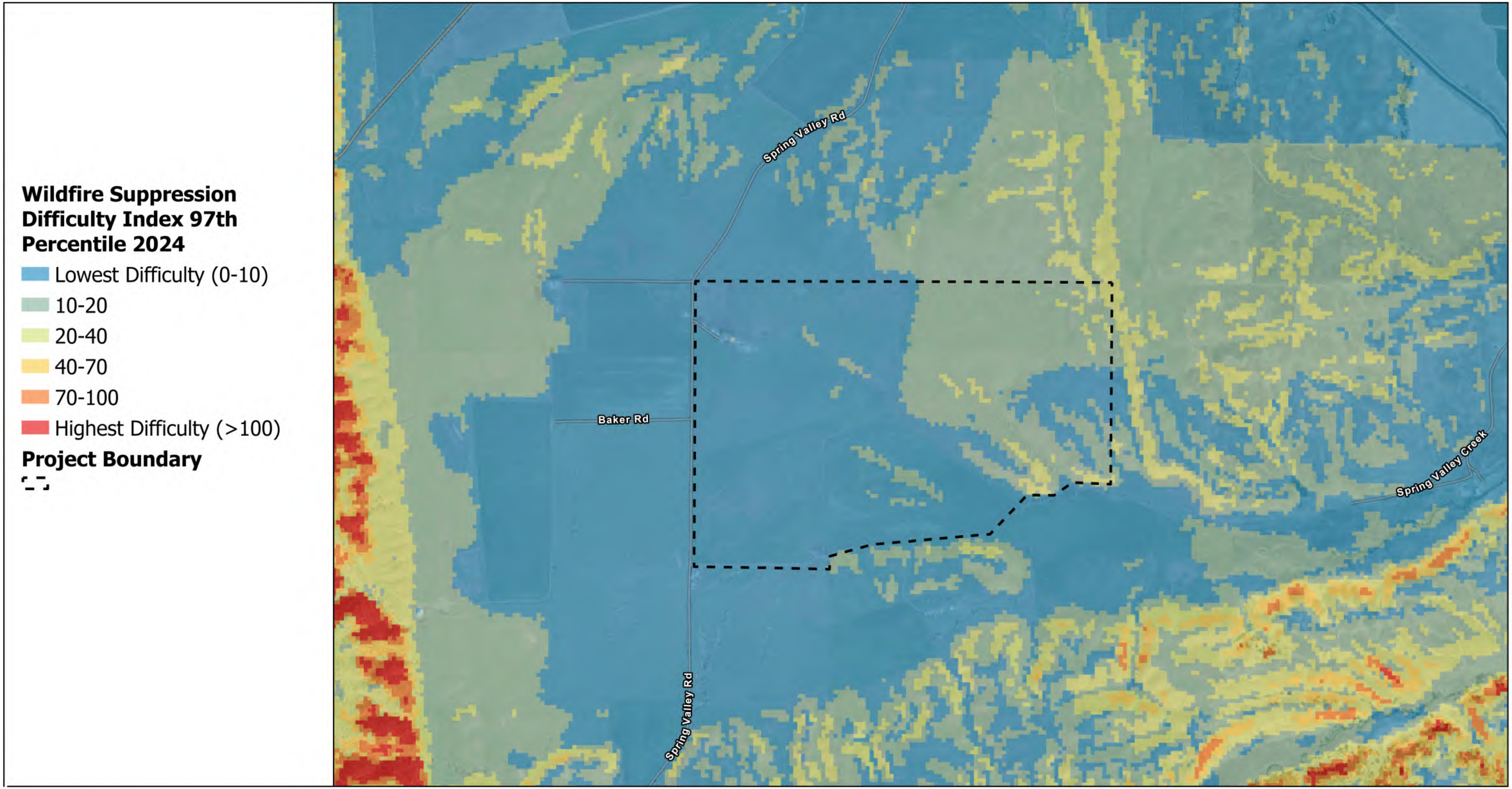
0 0.75 1.5 Miles

N

FIGURE 6

Ignition History

Janus Solar and Battery Storage Project



DUDEK

0 0.15 0.3 0.6 Miles

N

FIGURE 7

Wildfire Suppression Difficulty

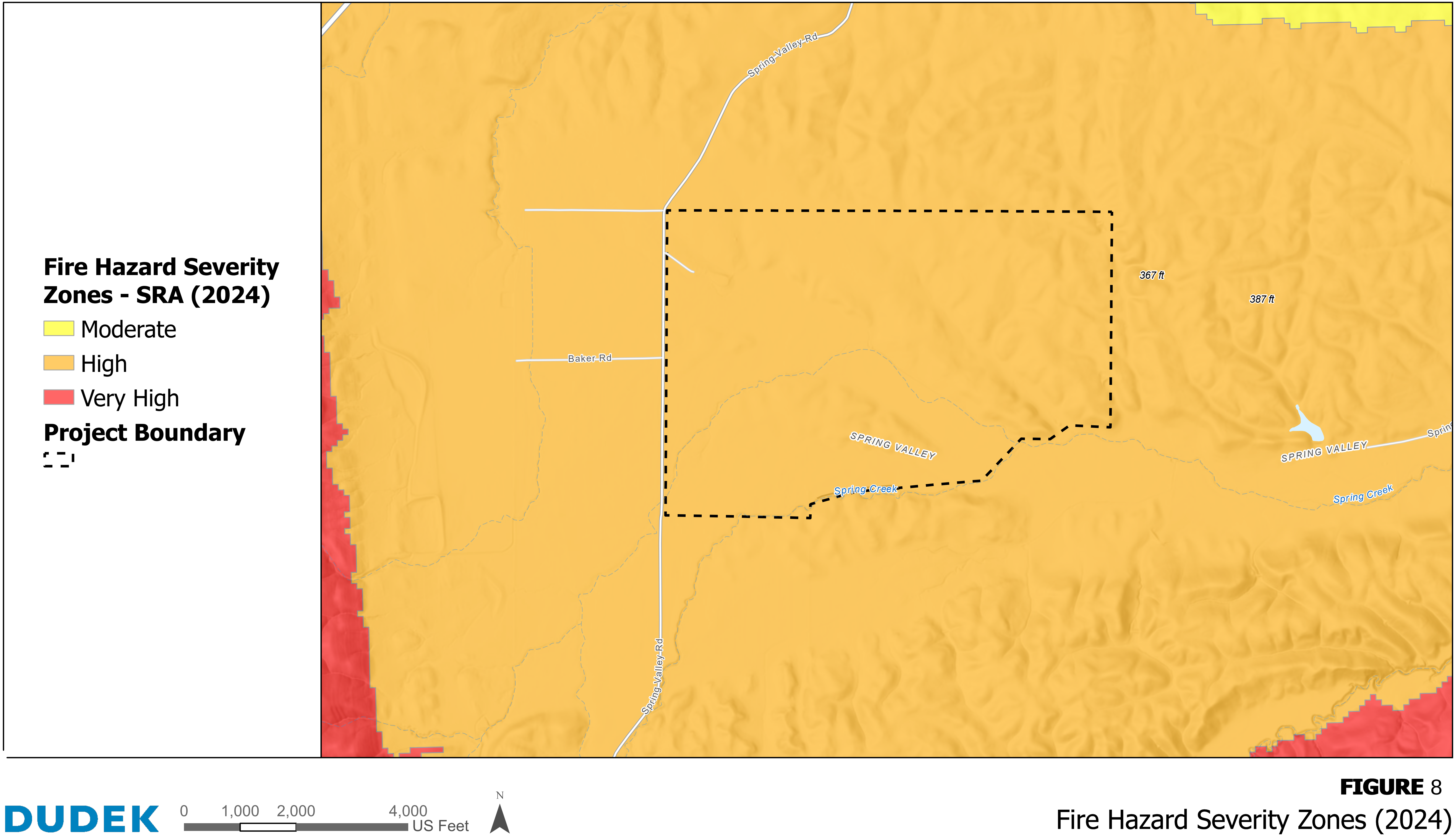


FIGURE 8

Fire Hazard Severity Zones (2024)

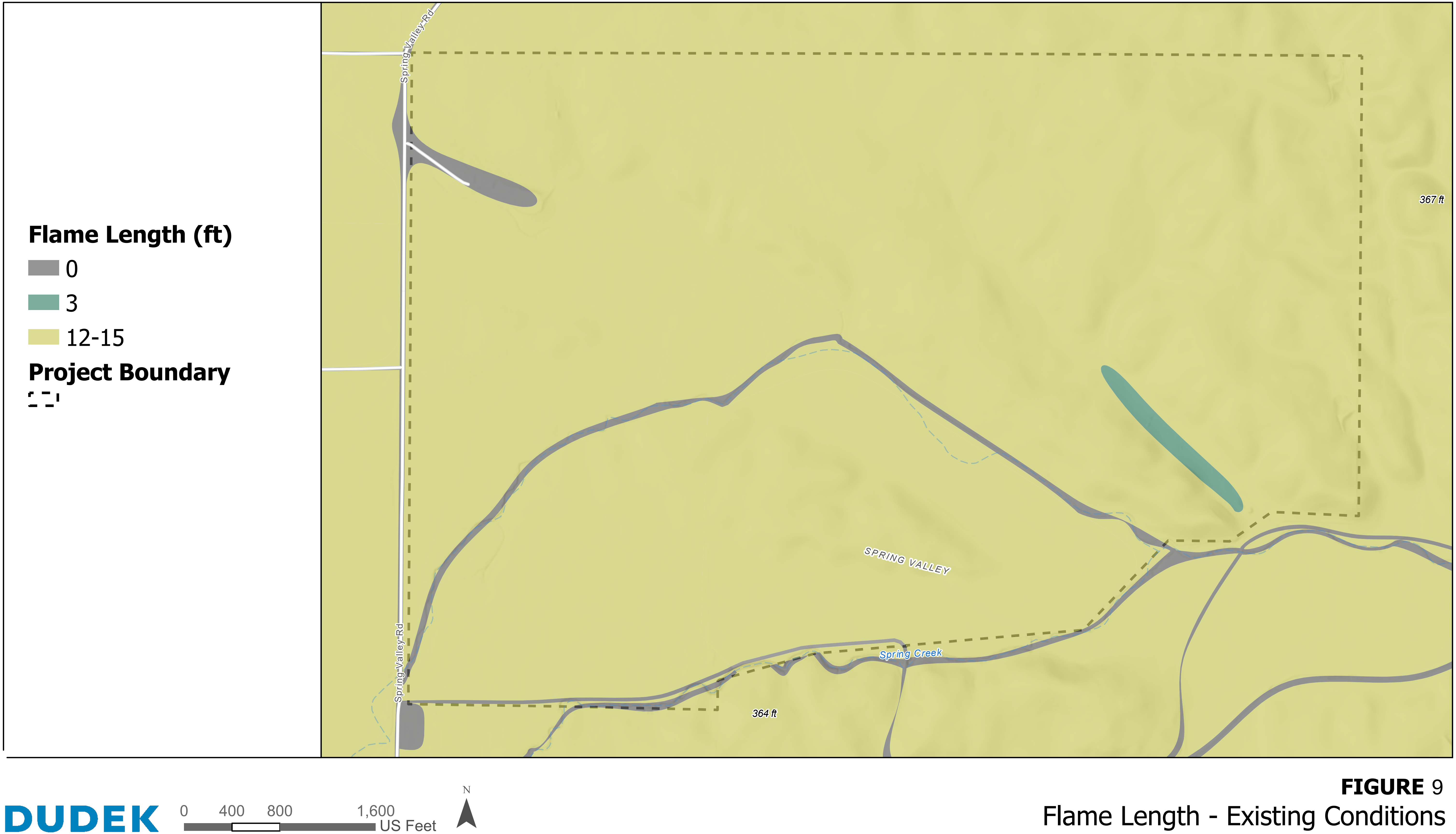
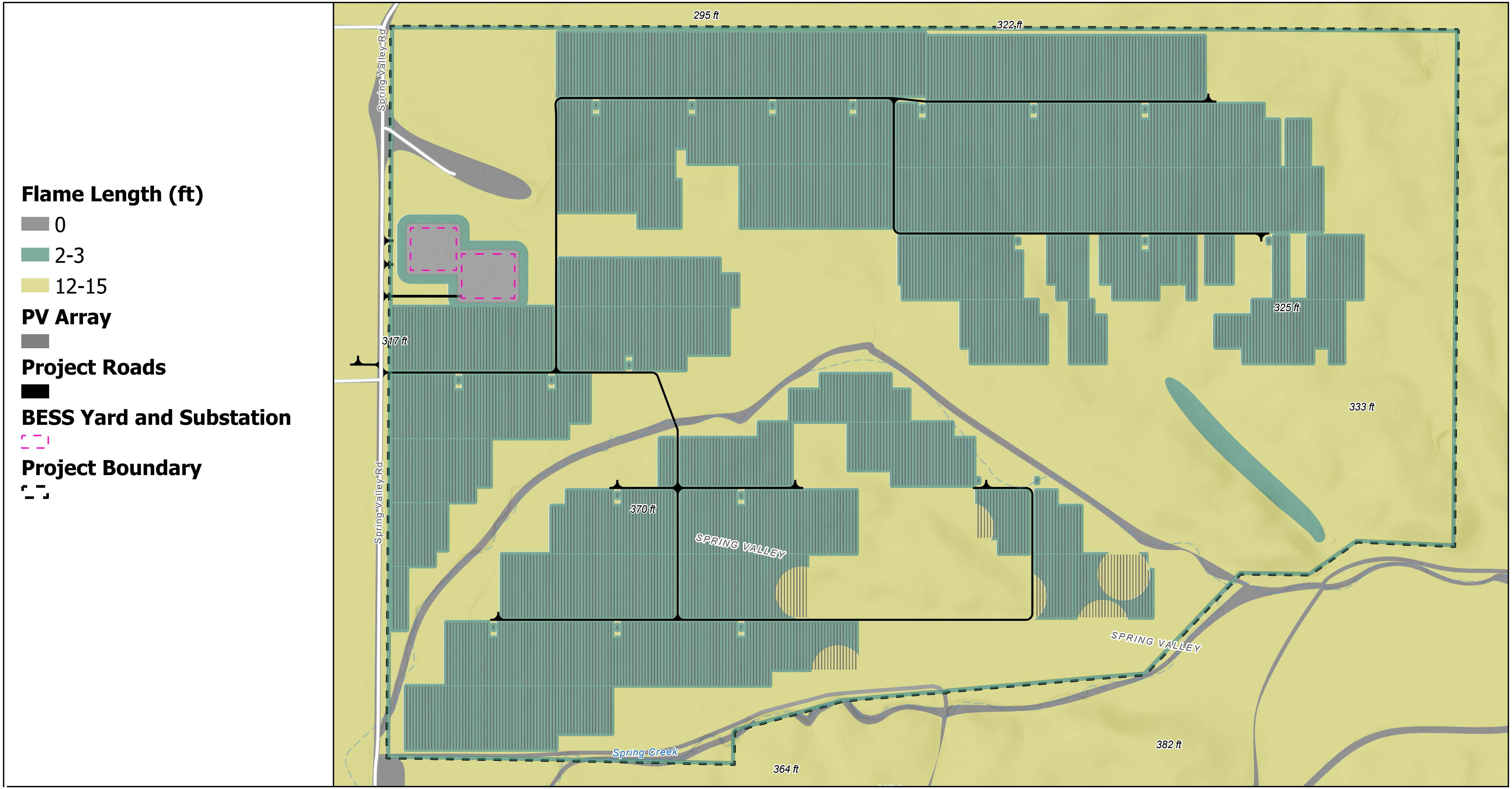


FIGURE 9
Flame Length - Existing Conditions



DUDEK

FIGURE 10

Flame Length - Post-Project Conditions

Janus Solar and Battery Storage Project

FIGURE 11
Rate of Spread - Existing Conditions

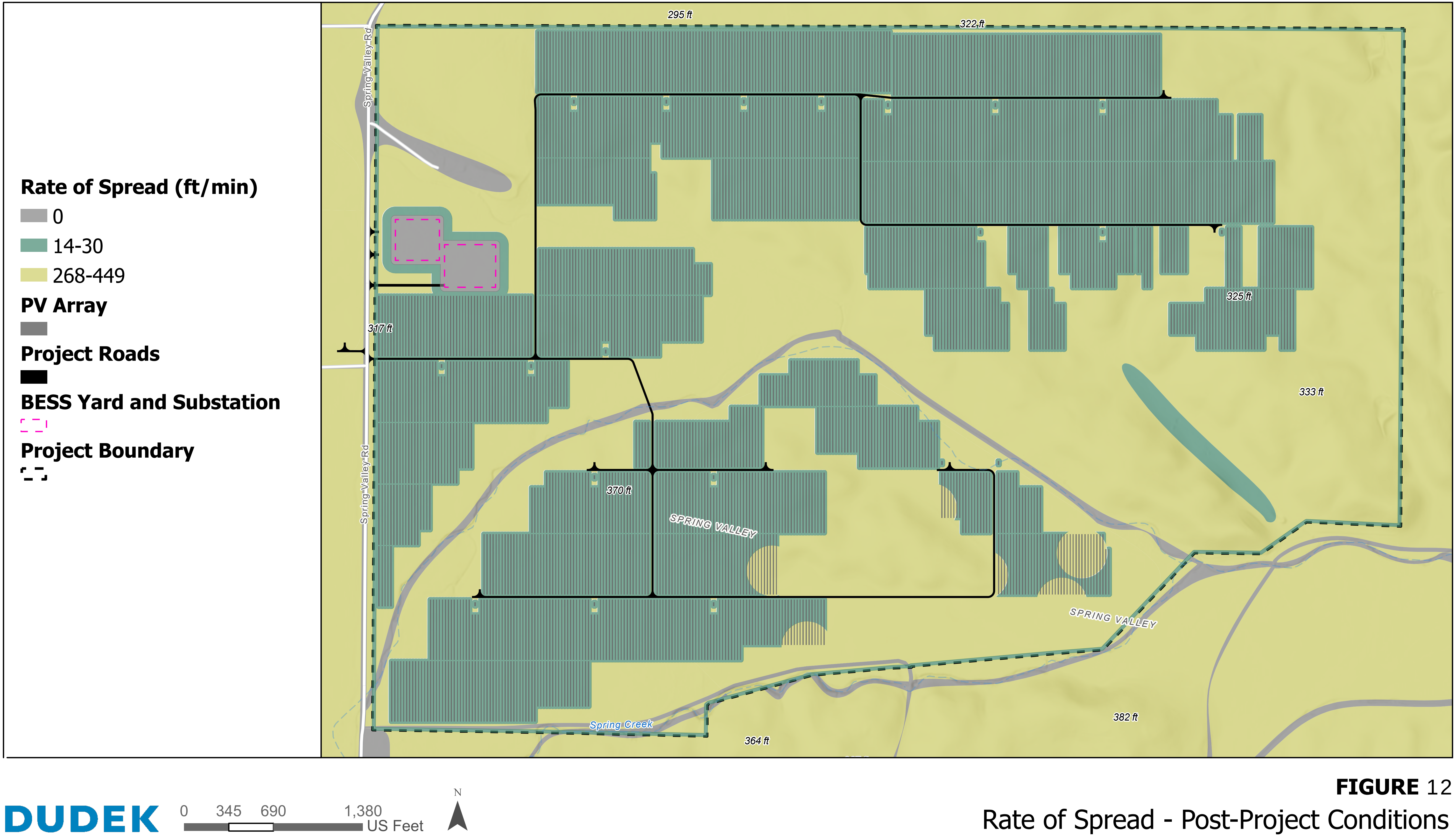


FIGURE 12

Rate of Spread - Post-Project Conditions

Janus Solar and Battery Storage Project

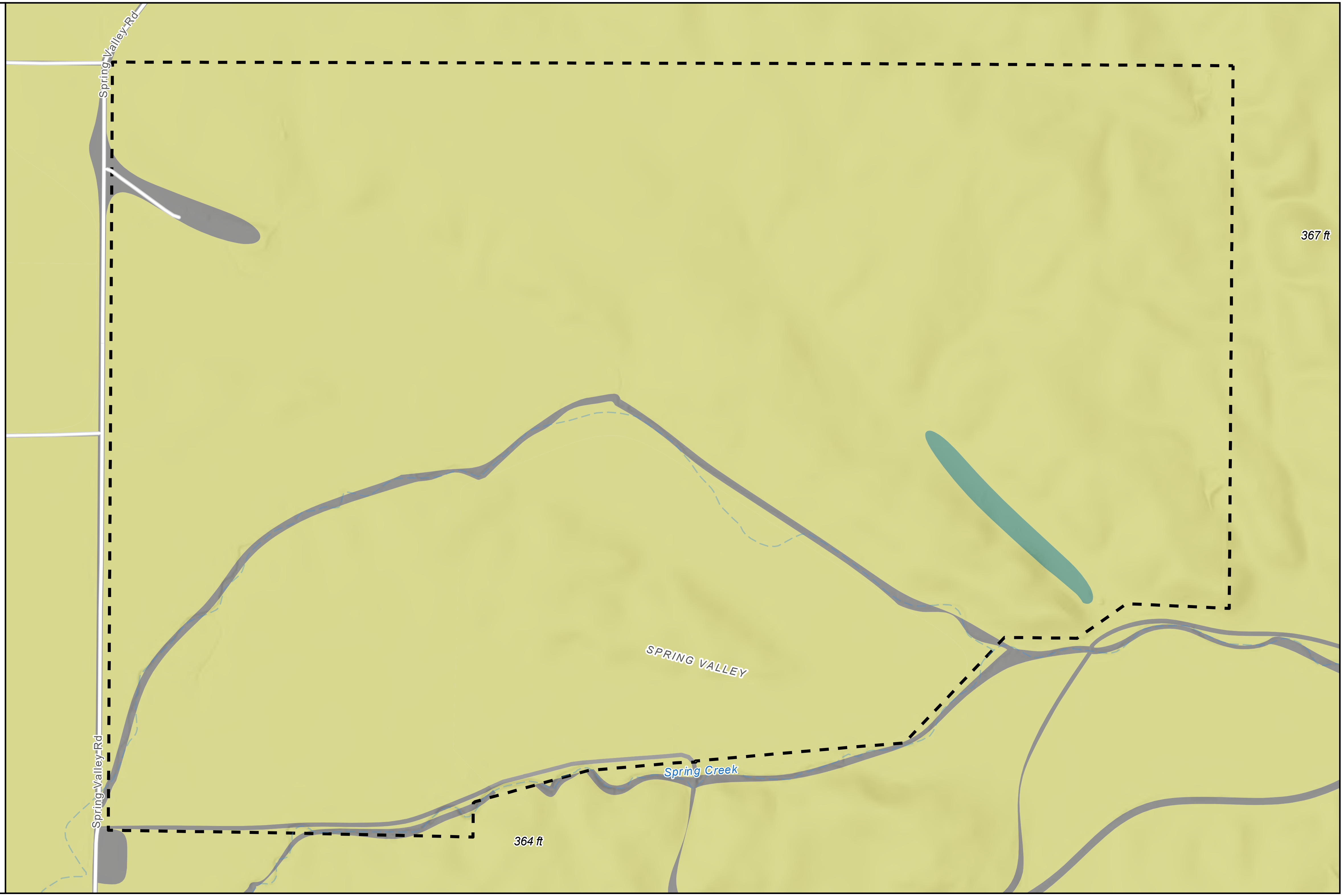
Fireline Intensity (BTU/ft/s)

0

44

1165-2053

Project Boundary

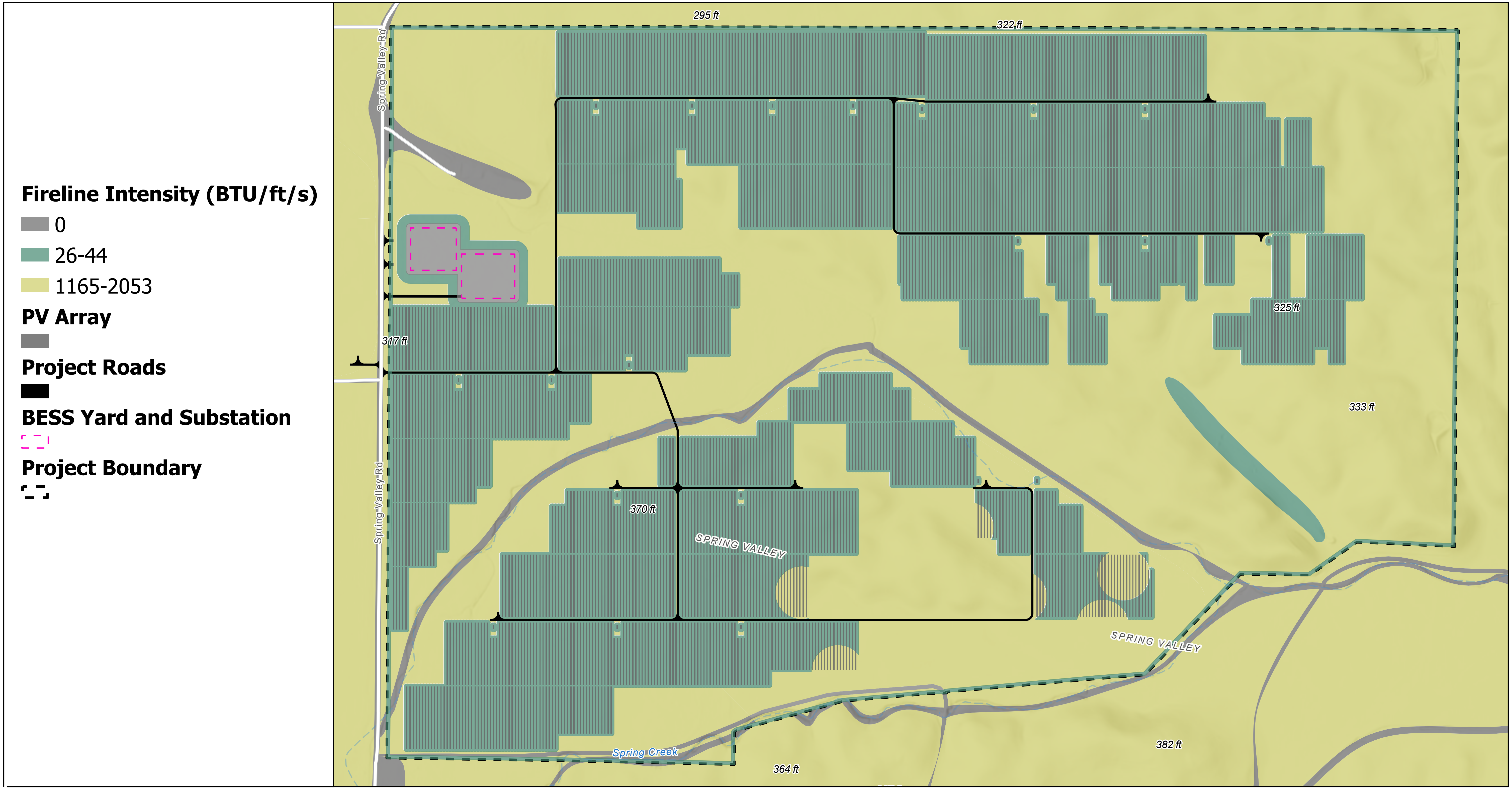


0 400 800 1,600 US Feet

N

FIGURE 13

Fireline Intensity - Existing Conditions



DUDEK

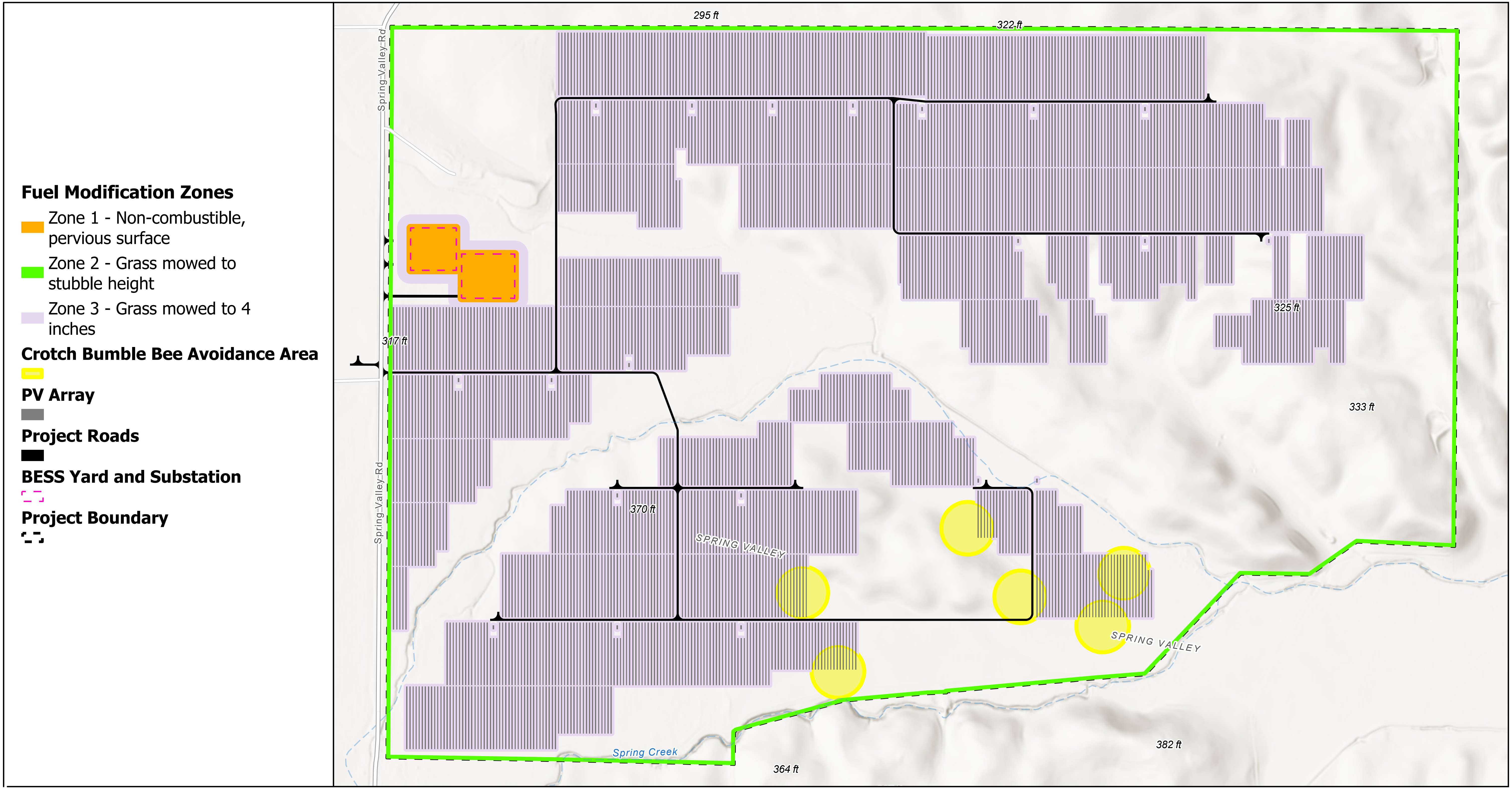
0 345 690 1,380 US Feet

N

FIGURE 14

Fireline Intensity - Post-Project Conditions

Janus Solar and Battery Storage Project



0 345 690 1,380
US Feet
N

FIGURE 15
Fuel Modification Plan

Janus Solar and Battery Storage Project