Table 2-1: Runoff Coefficients [1,2]

Land Use Category	2-10 Year		25 Year		50 Year		100 Year	
	min	max	min	max	min	max	min	max
Very Low Density Residential[3]	0.33	0.42	0.36	0.46	0.40	0.50	0.41	0.53
Low Density Residential[3]	0.42	0.48	0.46	0.53	0.50	0.58	0.53	0.60
Medium Density Residential[3]	0.48	0.65	0.53	0.72	0.58	0.78	0.60	0.82
Multiple Family Residential[3]	0.65	0.75	0.72	0.83	0.78	0.90	0.82	0.94
Industrial 1[3]	0.60	0.70	0.66	0.77	0.72	0.84	0.75	0.88
Industrial 2[3]	0.70	0.80	0.77	0.88	0.84	0.95	0.88	0.95
Commercial 1[3]	0.55	0.65	0.61	0.72	0.66	0.78	0.69	0.81
Commercial 2[3]	0.75	0.85	0.83	0.94	0.90	0.95	0.94	0.95
Pavement and Rooftops	0.75	0.85	0.83	0.94	0.90	0.95	0.94	0.95
Gravel Roadways & Shoulders	0.60	0.70	0.66	0.77	0.72	0.84	0.75	0.88
Agricultural	0.10	0.20	0.11	0.22	0.12	0.24	0.13	0.25
Lawns/Parks/Cemeteries	0.10	0.25	0.11	0.28	0.12	0.30	0.13	0.31
Desert Landscaping 1	0.55	0.85	0.61	0.94	0.66	0.95	0.69	0.95
Desert Landscaping 2	0.30	0.40	0.33	0.44	0.36	0.48	0.38	0.50
Undeveloped Desert Rangeland	0.30	0.40	0.33	0.44	0.36	0.48	0.38	0.50
Hillslopes, Sonoran Desert	0.40	0.55	0.44	0.61	0.48	0.66	0.50	0.69
Mountain Terrain	0.60	0.80	0.66	0.88	0.72	0.95	0.75	0.95

[1] Runoff coefficients for 25-, 50-, and 100-Year storm frequencies were derived using adjustment factors of 1.10, 1.20 and 1.25, respectively, applied to the 2-10 Year values with an upper limit of 0.95

[2] The ranges of runoff coefficients shown for urban land uses were derived from lot coverage standards specified in the zoning ordinances for Maricopa Pinal County

[3] Runoff coefficients for urban land uses are for lot coverage only and do not include the adjacent street and right-of-way, or alleys.

Weighted runoff coefficients

Many times the ground surface in a tributary area cannot be properly represented using a single runoff coefficient. This is usually because of differences in ground cover. For example, between the right-of-way and the inlet some ground may have vegetative cover while other ground is paved.

A weighted runoff coefficient can be computed by proportion to the subareas using Equation (2-2):

$$C_w = \frac{A_1C_1 + A_2C_2 + \ldots + A_nC_n}{A_1 + A_2 + \ldots + A_n} \qquad (2\text{-}2)$$

Where:

A_i =Area in the i_{th} subarea, ac
C_i =Runoff coefficient for the i_{th} subarea

The weighted coefficient (C_w) is used in the Rational Formula just as would a single coefficient.

Rainfall Intensity, i, and Time of Concentration, T_c

The Rational Equation is based on the concept that steady uniform rainfall intensity will produce a peak discharge at such a time when the entire drainage area is contributing to the outflow. This condition is met when the rainfall duration is equal to the time of concentration, T_c, which is defined as the time it takes for water to travel from the most remote part of the drainage area to the point of design. The time of concentration is computed by applying the following equation:

$$T_c = 11.4 L^{0.5} K_b^{0.52} S^{-0.31} i^{-0.38} \quad (2\text{-}2)$$

Where:

T_c = the time of concentration (hrs)
L = length of the longest flow path (miles)
K_b = watershed resistance coefficient
S = watercourse slope (ft/mi)
i = rainfall intensity (in/hr)

K_b is an approximation of the watershed "roughness" and accounts for its impact on the time it takes flow to travel across a particular type of land surface. The empirical equation for estimating K_b is:

$$K_b = m \log A + b \quad (2\text{-}3)$$

Where:

K_b = watershed resistance coefficient
A = drainage area (acres)
m and b = empirical equation parameters (unitless)

Table 2-2 provides the equation parameters to determine K_b values for typical land use types.

Since the equation for the time of concentration has two unknowns, T_c and i, the following iterative process using Intensity-Duration-Frequency (I-D-F) curves is required to converge upon the values of T_c and i. I-D-F curves are presented in a later section of this chapter.

1) Determine all the initial parameters (L, K_b, and S) and select the design storm return frequency (2-yr, 5-yr, 10-yr, etc.)

2) Make an initial trial estimate for T_c and obtain the rainfall intensity, i, from the I-D-F curve for the return frequency using T_c as the storm duration.

a. If the T_c value from Method 1 is the longest, compute the total peak discharge using the Method 1 intensity, the arithmetically area-weighted value of C for all three subareas and the total contributing drainage area at Concentration Point 2.

b. If the T_c value from Method 2 is the longest, determine i directly from the D-D-F statistics. Compute the total peak discharge at Concentration Point 2 using the arithmetically area-weighted value of C for all three subareas and the total contributing drainage area at Concentration Point 2.

c. If the T_c from subarea C is the longest, compute the total peak discharge using the i for subarea C, the arithmetically area-weighted value of C for all three subareas and the total contributing drainage area at Concentration Point 2.

8. As an alternative to the above procedure, the DDMSW program may be used to calculate the peak discharge at intermediate locations.

2.2.1.4 Detention/Retention Storage Volume Calculations

For purposes of determining on-site detention requirements utilizing the Rational Method, the following equation can be used:

$$V = C(\frac{P}{12})A \qquad (2\text{-}4)$$

Where:

V = Storage Volume (acre-ft)
C = Watershed Runoff Coefficient
P = 100-Year, 2-Hour Precipitation (inches)
A = Drainage Area (acres)

In the case of volume calculations for stormwater storage facility design, P equals the 100-year, 2-hour depth, in inches.

2.2.1.5 Flood Hydrographs

The procedure described within this section should be used in conjunction with the Rational Method for developing hydrographs from small watersheds, for the design of stormwater detention/retention basins, and for other stormwater routing analyses. As with the Rational Method, this hydrograph synthesis should not be used for watershed areas greater that 160 acres. This procedure was taken from Hickok, et. al, 1959, which presented a method of hydrograph synthesis for small watersheds within the Southwest.

Table 2-7: Rainfall data for Coolidge

PREFRE Program Input Data

2-yr, 6-hr =	1.20
2-yr, 24-hr =	1.40
100-yr, 6-hr =	3.20
100-yr, 24-hr =	3.80

Depth-Duration-Frequency (D-D-F)

	Frequency						
Duration	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr	500-Yr
5 min	0.33	0.43	0.50	0.60	0.68	0.76	0.94
10 min	0.49	0.65	0.77	0.92	1.04	1.16	1.44
15 min	0.59	0.82	0.97	1.17	1.33	1.49	1.86
30 min	0.79	1.09	1.30	1.58	1.80	2.02	2.53
1-hr	1.00	1.35	1.61	1.97	2.25	2.53	3.17
2-hr	1.04	1.47	1.76	2.15	2.45	2.76	3.46
3-hr	1.10	1.55	1.85	2.27	2.59	2.91	3.65
6-hr	1.20	1.70	2.03	2.49	2.85	3.20	4.01
12-hr	1.30	1.85	2.22	2.72	3.11	3.50	4.40
24-hr	1.40	2.00	2.40	2.95	3.38	3.80	4.78

*D-D-F data obtained from PREFRE Program

Localized Intensity-Depth-Frequency (I-D-F)

Duration	Frequency						
(minutes)	2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr	500-Yr
5	3.96	5.16	6.00	7.20	8.16	9.12	11.28
10	2.94	3.90	4.62	5.52	6.24	6.96	8.64
15	2.36	3.28	3.88	4.68	5.32	5.96	7.44
30	1.58	2.18	2.60	3.16	3.60	4.04	5.06
60	1.00	1.35	1.61	1.97	2.25	2.53	3.17

Appendix D – Existing Condition Exhibit Maps

Subbasin Map

Soils Map

Land Cover Map

Curve Number Map



200 0 200 400

(IN FEET)
1 inch = 200 ft.

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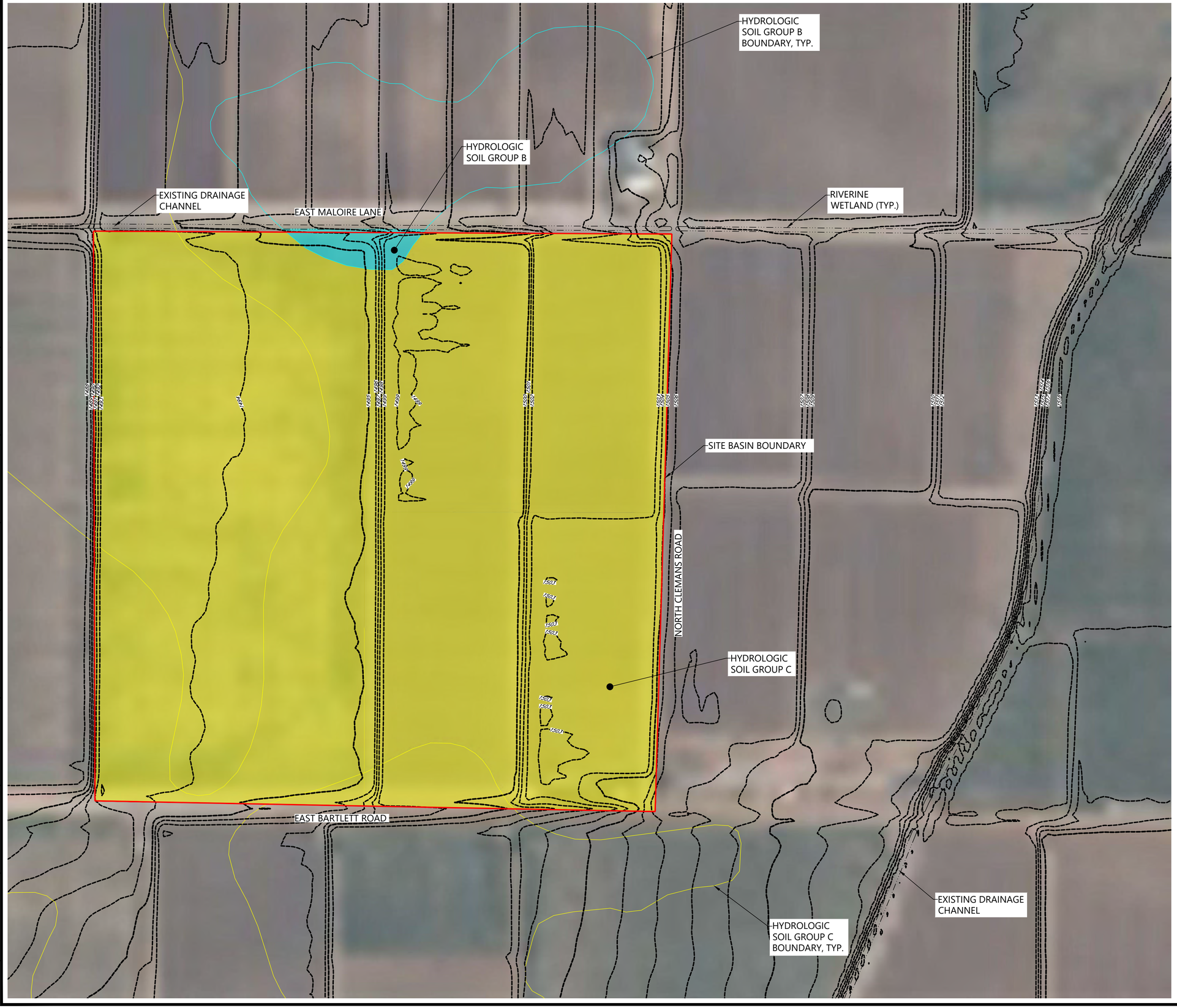
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LEGEND:

- HYDROLOGIC SOIL GROUP B
- HYDROLOGIC SOIL GROUP C

200 0 200 400

(IN FEET)
1 inch = 200 ft.

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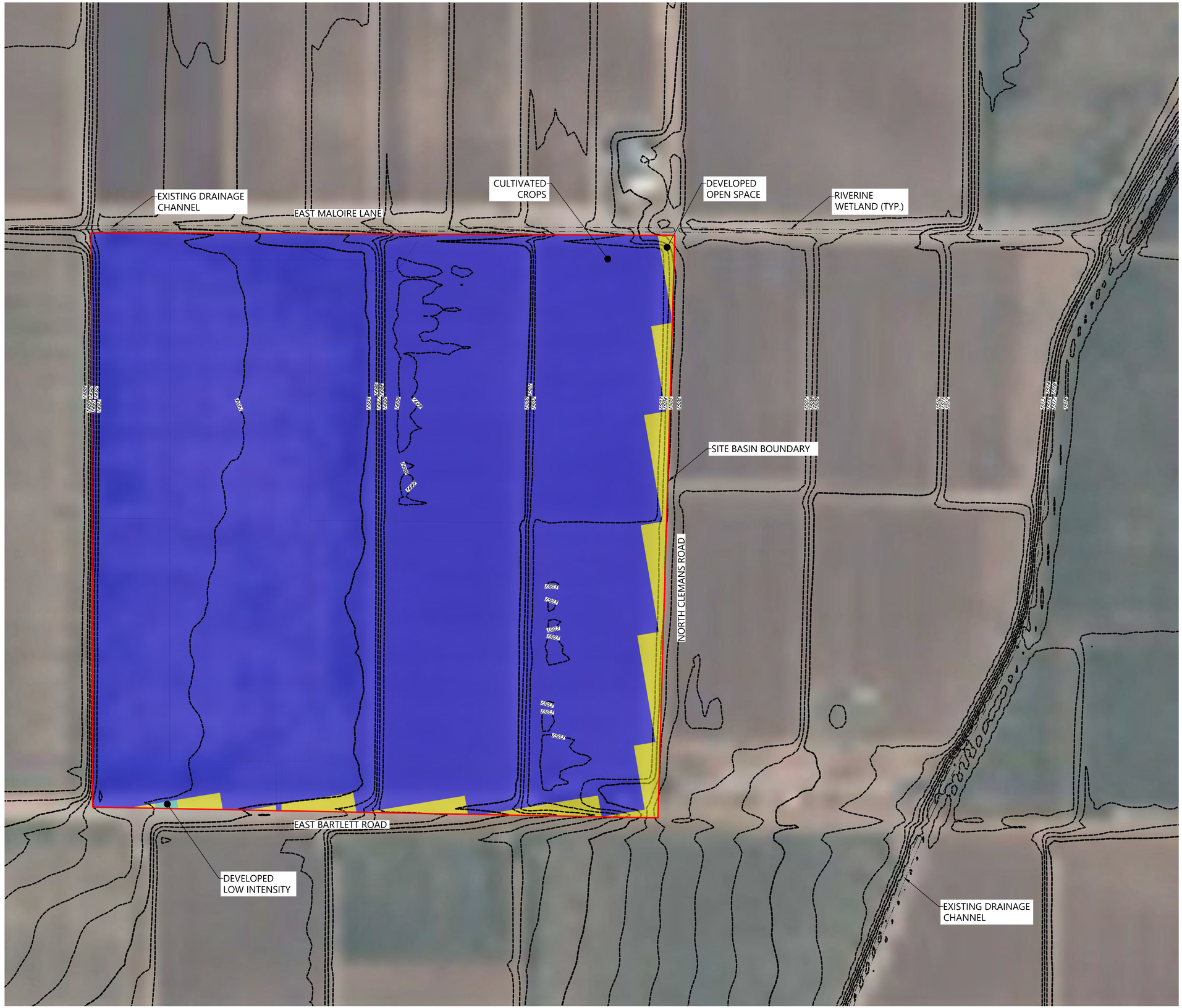
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LEGEND:

- BASIN - CULTIVATED CROPS
- BASIN - DEVELOPED OPEN SPACE
- BASIN - DEVELOPED LOW INTENSITY

200 0 200 400

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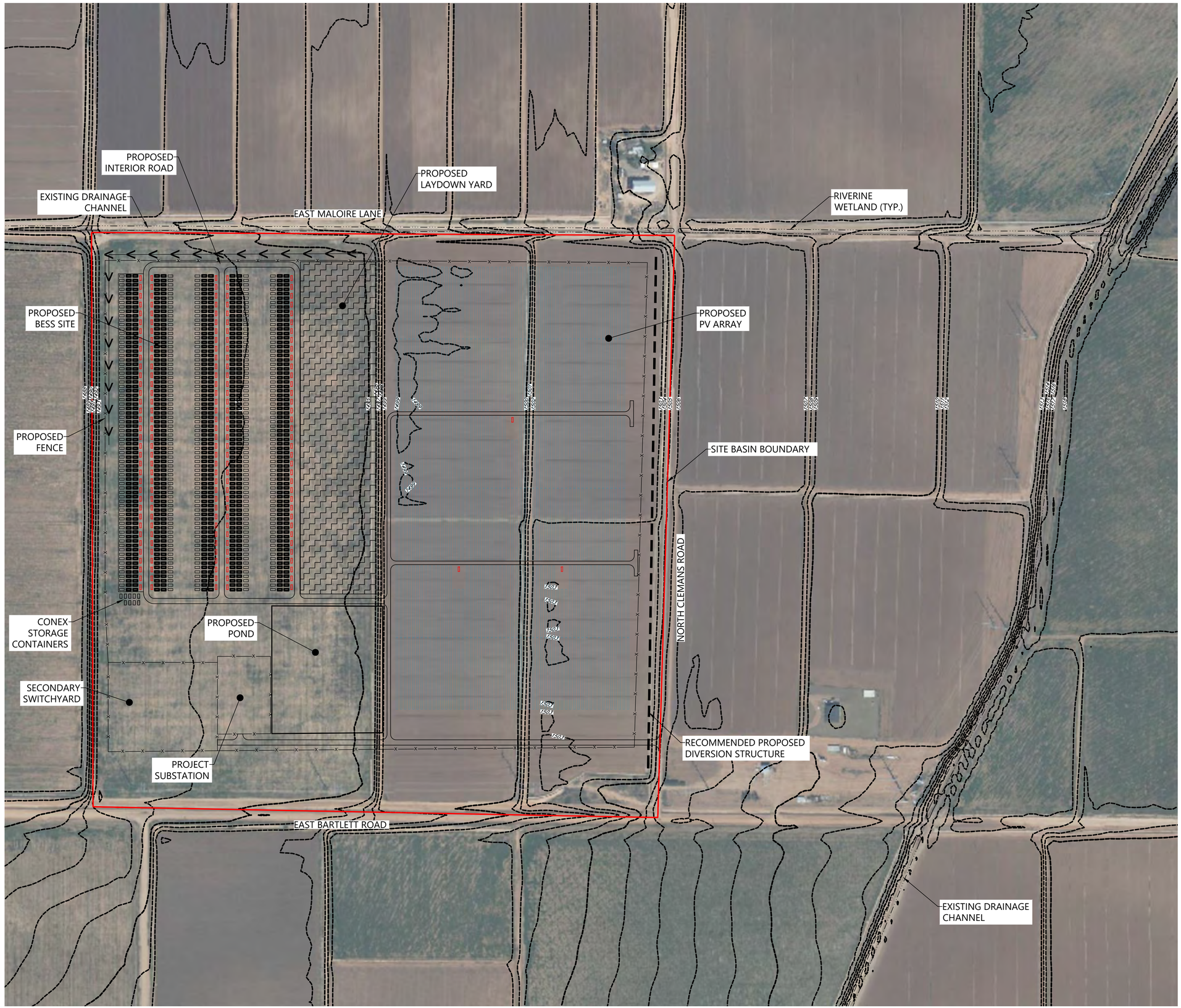
Appendix E – Proposed Condition Exhibit Maps

Subbasin Map

Soils Map

Land Cover Map

Curve Number Map



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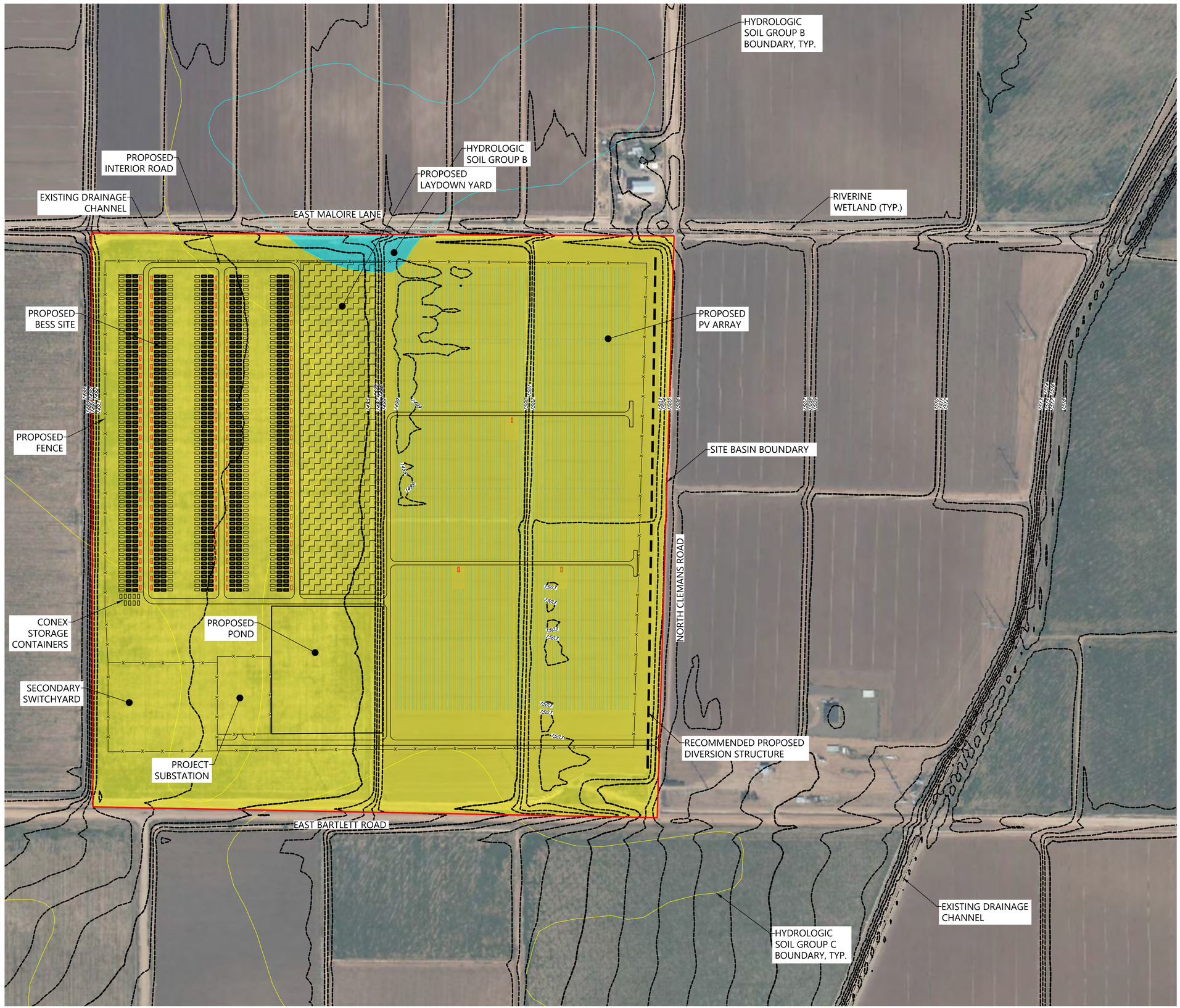
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LEGEND:

- HYDROLOGIC SOIL GROUP B
- HYDROLOGIC SOIL GROUP C

200 0 200 400

(IN FEET)
1 inch = 200 ft.

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LEGEND:

- BASIN - CULTIVATED CROPS
- BASIN - DEVELOPED OPEN SPACE
- BASIN - DEVELOPED LOW INTENSITY
- BASIN - PROPOSED SITE

200 0 200 400

(IN FEET)
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VALLEY FARMS BESS
HYDROLOGY PLAN EXHIBITS
PROPOSED CURVE NUMBER MAP

CLIENT
NEXTERA ENERGY
700 UNIVERSE BLVD
JUNO BEACH, FL 33408
PHONE: 847.736.6805

DATE 09/30/2024

REVISIONS

DR. AE | CH. SP
P.M. SP
BOOK
JOB 24000083
SHEET NO. 15

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CAD FILE: VALLEY FARMS BESS_EXHIBIT_MAPS_PROPOSED.DWG

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HYDROLOGY STUDY

VALLEY FARMS ENERGY CENTER
PINAL COUNTY, ARIZONA

Prepared for

NextEra Energy
700 Universe Blvd
Juno Beach, FL 33408

Atwell Project No. 24000083



Expires 3/31/2027

Submitted by Atwell, LLC

REVISION NO:	DATE:	REVISION:	PROJECT MANAGER APPROVAL (INITIAL & DATE)	CLIENT APPROVAL (INITIAL & DATE)
	09/06/2024	Final Report		

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1 Project Description

Valley Farms Energy Center, LLC (Applicant), a wholly owned indirect subsidiary of NextEra Energy Resources, is requesting a Zone Change and Planned Area Development (PAD) Overlay District to construct, operate, and maintain the Valley Farms Energy Center Project, a utility-scale photovoltaic (PV) solar facility and battery energy storage system (BESS) on approximately 160 acres of private land in unincorporated Pinal County, Arizona.

The proposed construction consists of a PV solar facility and a battery energy storage system and will include a substation and associated electrical equipment mounted on mat foundations.

Proposed earthwork will consist of typical clearing and grubbing of vegetation and grading with associated cuts and fills necessary for equipment installation. Dirt or gravel access and maintenance roads will be constructed to access the site and substation. Natural drainage patterns will be maintained through and around the site.

2 Location

The project is located in central Pinal County in southern Arizona, approximately 4.30 miles southeast of Coolidge, Arizona. The west edge of the project is approximately 2600' east of North Attaway Road. The north edge of the project is bounded by East Malorie Lane. The east edge of the project is bounded by North Clemans Road. The south edge of the project is bounded by East Bartlett Road. The site is part of the Middle Gila watershed.



Figure 1: Project Location

3. Soils

The site and surrounding areas are relatively flat with typical slopes ranging between 0-5%. The soil types are a mix of silty loams, sandy loams and clay loams. The surface runoff rate for the site is low. The runoff rate shows the amount of stormwater that is not infiltrated. The low rate shows that a large percentage of the stormwater for the site infiltrates into the soil before leaving the site and entering the waterways. The full Soils Report from the USDA is included in Appendix A.

4. Land Cover

4.1 Existing Conditions

The site is dominated by mostly flat, agricultural land that has historically been used for farming. The site is located within flood zone X, areas of minimal flood hazard, according to FIRM panel 04021C1250E dated 12/04/2007. This FIRM panel is located within Appendix A. The National Wetland inventory shows an existing drainage channel north of the site classified as Riverine habitat. Existing Conditions Exhibit Maps are shown in Appendix D.

4.2 Proposed Conditions

The Valley Farms Energy Center Project will be a battery energy storage and solar PV facility and will include associated electrical facilities mounted on mat foundations including high voltage equipment. The ground surface around the BESS equipment will likely be gravel, with surface runoff flowing off the equipment pads. Analysis within this report has assumed that proposed ground cover within the access roads, substation pad, and BESS equipment areas will be gravel, and the remainder of the site including the PV array areas will be seeded with low-maintenance tall grass that will maintain the hydrologic characteristics of the existing conditions. Natural drainage patterns will be maintained through and around the site, to the greatest extent practical, to minimize environmental impacts to the surrounding areas. A stormwater detention pond will be needed, with appropriate drainage swales to convey runoff into the pond. For the purposes of this report, it is assumed that offsite flows are to be diverted around the project site. Proposed Conditions Exhibit Maps are shown in Appendix E.

5. Weather and Climate

Pinal County, Arizona is situated at an average elevation of 2,340’ above sea level with temperatures ranging from an average daytime high in July of 105 degrees Fahrenheit to an average daily low in January of 38 degrees Fahrenheit. The county receives approximately 11 inches of rainfall in a typical year. August is the wettest month with 1.8 inches of rain, and the driest month is June with 0.1 inches of rain. Pinal County, Arizona averages 0.5 inches of snowfall in a typical year. On average, there are 292 days of sunshine per year.

6. Major Watersheds

The site is part of the Lower Colorado Resource Region (HCU 15), a region with an approximate size of 140,000 square miles. The region includes parts of Arizona, California, Nevada, New Mexico and Utah

The site is part of the Middle Gila watershed (15050100), within the Lower Colorado Water Resource Region. Runoff from the site currently flows westward into an existing drainage channel. This drainage channel then conveys runoff northwestward for approximately 5 miles until it reaches the Gila River. The watershed follows the Gila River west up until the Yuma, Arizona area where the confluence of the Gila River with the Colorado River occurs. The Colorado river then travels south until it reaches the Gulf of California.

7. Design Requirements

The Pinal County, Arizona Drainage Manual Volume I and II provide acceptable methods for hydrology calculations. Computer modeling with HEC software is provided as an acceptable method. This study uses a Hydrograph Computer Program (HEC-RAS). This software uses a hydrograph method for calculation, which is an acceptable conceptual method. The TR -55 method was used for determining time of concentration. Values used for this calculation are reviewed in the sections below. Modeling was completed to determine depth, velocity, and scour.

8. Design Methodology

The proposed site will attempt to preserve the existing runoff patterns to the extent possible. Waterways will not be impacted by the proposed development and careful ground preparation will preserve or even enhance the hydrologic properties of the existing soils.

9. Modified Soil Cover Complex Method

Also known as TR-55, this method is recommended to determine the peak discharge and a hydrograph from individual drainage areas up to 1 square mile. Only a peak discharge may be determined using the Graphical Peak Discharge method, thus is not used or described in this study. A peak discharge and a hydrograph may be determined using the Tabular Hydrograph method and is the method that was used in this study with the assistance of modern HEC-RAS software (described in more detail further in this report). Input requirements for both the Graphical Peak Discharge method and the Tabular Hydrograph method include:

1. Q – runoff (in). Variables used to calculate Q include P – rainfall (in), Ia – initial abstraction (in), and S – potential maximum retention after runoff begins (in). Values of P should be calculated for the project site based on the 24 hour rainfall events.
2. Tc – time of concentration (hours – minimum is 6 minutes or 0.1 hours).
3. Am – drainage area (sq. miles)
4. Appropriate rainfall distribution (Type I, IA, II, and III). This information is necessary to compute the unit peak discharge, Qu, for the Graphical method, and the tabular hydrograph unit discharge, Qt, for the Tabular method. Pinal County, Arizona has a Type II distribution.

10. HEC-RAS Modeling

HEC-RAS v6.4.1 was used as the primary hydraulic modelling tool in this study. The current version allows the creation of two-dimensional hydraulic models. These models can utilize a user-defined input array (mimicking TR-55 input data) along with available topographic information to create a hydraulic model that can be used to calculate peak flows, water surface elevations, flow velocities, arrival (lag) times for maximum values, and shear stress. In short, it can be used to route the individual “rainfall grids” and develop a hydraulic model that summarizes several flow results in waterways and other hydraulic conveyances as defined in the shape file / topography input.

Methods used in the software to estimate peak flows are similar to the TR-55 protocols described above. Most pertinently for this study, HEC-RAS was used to estimate water surface elevations (or flow depths) and velocity of runoff in and across the site during the specified rainfall event. This was done for existing and proposed conditions.

The scour on site is then calculated outside of HEC-RAS using the FHA equation published in “Hydraulic Engineering Circular No. 18”. This equation uses the flow depth, velocity, and a variety of constants to determine the scour depth. The reference equation is $y_s = 2.0 \times K_1 \times K_2 \times K_3 \times (a/y_1)^{0.65} \times F$, where K_1, K_2, and K_3 are constants, “a” is pier width, y_1 is depth and F is the Froude Number which is based on another common formula that relies on both depth and velocity.

11. HEC-RAS Input Parameters

HEC-RAS used a two-dimensional grid-based model that routed rainfall and runoff hydrographs over surface conditions using approximations similar to those described in TR-55 above. HEC-RAS produced not just peak flow rates and velocities in channel areas, but also peak flow depth estimates over the entire modeled surface. This is particularly useful where the project elements will be widely scattered.

The primary inputs are a digital terrain model, existing land cover, impervious percentages, existing runoff curve numbers (CN), soil types, precipitation values, and Manning's N values. No hydraulic structures, such as ponds, culverts, etc., were modeled in this preliminary analysis. As a result, roads, berms, and storm sewer are assumed to be overtopped.

Topography was provided for the Basin at approximately 10-meter spacing from the National Elevation Dataset (NED). On this project site, the project area was modeled using client provided surface data with a grid cell size of 50 feet squared. Each grid cell is read by the HEC-RAS program and averaged into a single elevation. The use of NED topography gives a reasonable estimate of runoff generated from beyond the project limits.

Rainfall was modelled for the 24-hr, 100-year storm event using the precipitation data described earlier (a copy is in the appendices). The 100-year storm is better termed a 1% annual chance storm. Also included in the model input data: NOAA Rainfall data and NRCS soil data for the region.

Existing land use was modeled using data from the National Land Cover Database (For exact inputs used in this study's modelling, see the appendices under existing (pre-development) conditions.)

12. HEC-RAS Results – Existing Conditions

The analysis looked at the water depth, water velocity and scour potential 100-year storm event modeling provided the following results. Exhibit maps showing the results are located in Appendix D.

The model shows that almost all of the site has flood depths less than 0.5'. However, there are small areas with flood depths from 0.5' to 1.0' and are located in the north central portion of the site and should not have a significant impact on the BESS site layout as these areas are not within the proposed BESS layout.

The model shows that the project has measurable velocity within the site. The maximum velocity is 1.55 fps, which occurs along the southern boundary of the site within the existing drainageway. However, a majority of the site has velocities less than 0.5 fps.

The analysis shows potential scour depth within the flooding areas. All scour on the site is under 1'. with, a majority of the site having scour less than 0.5'. The areas of 0.5' to 1.0' of scour are mainly located along the perimeter and the central portion of the site and should not have a significant impact on the BESS site layout as these areas are not within the proposed BESS layout.

13. HEC-RAS Results – Proposed Conditions

This analysis looks at the water depth, water velocity and scour potential from the 100-year storm event modeling. The proposed conditions model was completed with the existing grades since proposed grades were not available. This may impact the proposed condition results when proposed grades are modeled. Exhibit maps showing the results are provided in Appendix E.

The proposed model does not show a significant change in flood depths on the site. A majority of the proposed site still has flood depths less than 0.5'. A small area in the north central portion of the site has flood depths between 0.5' and 1.0'. Based on the current configuration of the BESS site this small portion of flood depths between 0.5' and 1.0' should not have a significant impact on the BESS site.

There is a slight increase in velocity in the proposed conditions compared to the existing conditions. A larger area now shows velocities between 0.50 to 0.75 fps. Isolated areas with velocities between 0.75 fps to 1.0 fps are also present on site, with the largest area located in the southwest portion of the site. These increased velocities are located in the center of the BESS site.

The proposed model indicates that scour depths are nearly unchanged. Areas of scour between 0.5’ and 1.0’ of depth increased slightly in the proposed condition. A majority of the site still has scour depths below 0.5’.

14. Hydrology Conclusions

Typically, BESS sites cannot have any amounts of flooding, no matter how minimal on the equipment pad during the 100-year storm event. In the proposed conditions (modeling the existing grades) there is flood depth between 0-0.5’. Since some minor flood depth is located within the BESS, it is recommended the site pad be lifted to at least 1’ above the anticipated flood depth.

Velocities over 4.0 fps and scour depths greater than 1.0’ require additional design considerations. Since the measured velocity is less than 4.0 fps, additional grading and/or BMPs to accommodate the runoff velocity are likely not to be needed. Further review of these measures should be completed during final design. The scour potential along the center of the site is lower than the recommended max of 1.0’ for the 100-year storm. Since the scour potential also does not exceed the maximum recommended 100-year storm value, additional grading and/or BMPs may not be needed.

During construction, measures should be taken to prevent erosion from taking place onsite and ensuring that sediment does not leave the site.

References

1. *Pinal County Arizona Drainage Manual Volume I and II*, August 2004

2. *Urban Hydrology for Small Watersheds, Technical Release 55*; US Dept of Agriculture, Natural Resources Conservation Service, June 1986

3. *HEC-RAS River Analysis System v6.0 Beta User's Manual*; US Army Corps of Engineers Hydrologic Engineering Center, December, 2020

4. *Stream Restoration Design Nation Engineering Handbook, Chapter 8 Threshold Channel Design*; Natural Resource Conservation Service, August, 2007

5. *Field Techniques for Estimating Water Fluxes Between Surface Water and Ground Water;* Charles J. Taylor and Earl A. Green, U.S. Geological Survey, 2008

6. *Bridge Scour and Stream Instability Countermeasures: Experience, Selection, and Design Guidance-Third Edition, Volume 2, HEC No. 23*, US Department of Transportation Federal Highway Administration, September 2009

Appendix A - Site Information

Soils Map

FEMA FIRM Map

USGS Rainfall Data

Rainfall Distribution

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Eastern Pinal and Southern Gila Counties, Arizona; and Pinal County, Arizona, Western Part



January 5, 2024

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

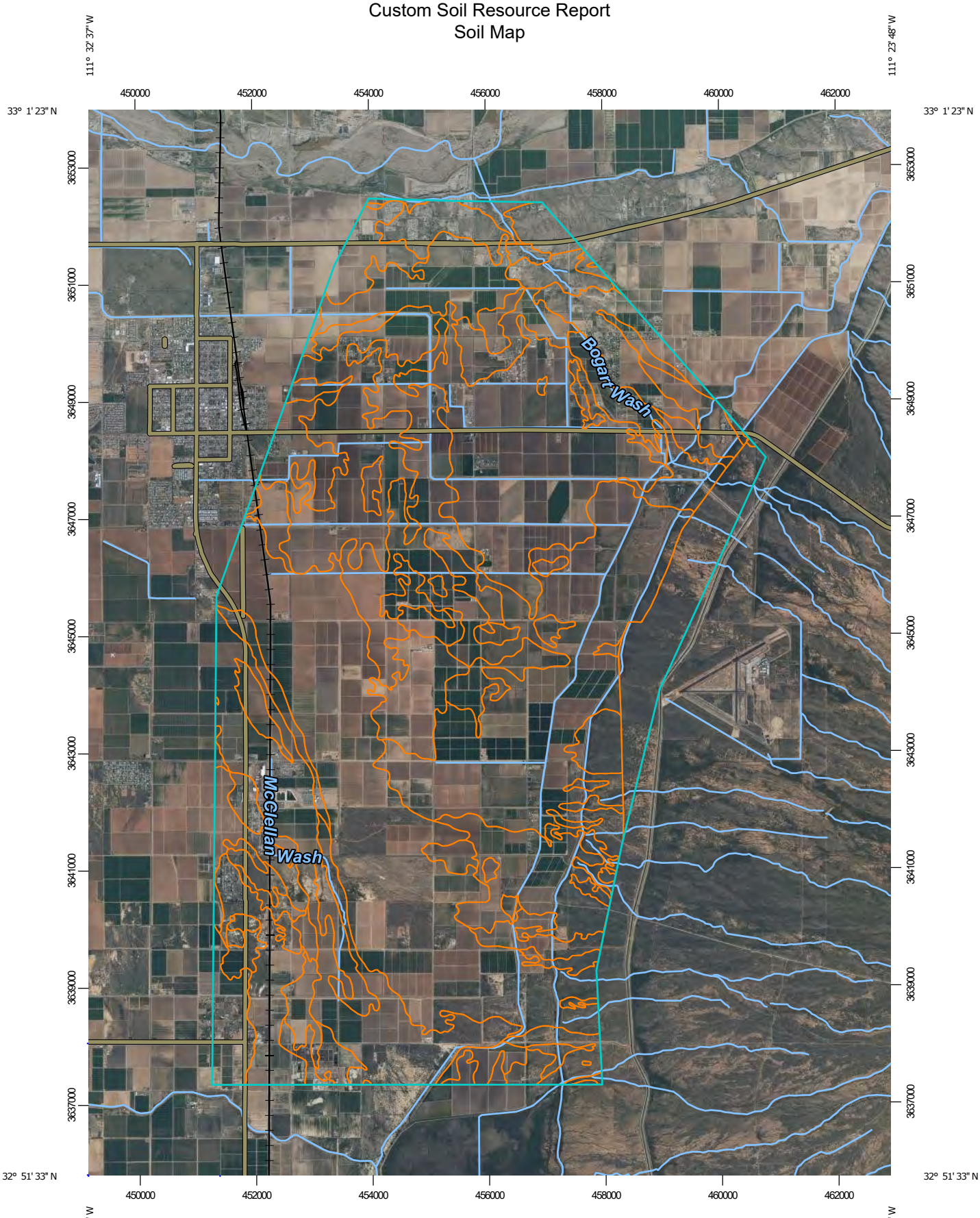
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



Map Scale: 1:88,800 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 1000 2000 4000 6000

Feet
0 4000 8000 16000 24000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 12N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Eastern Pinal and Southern Gila Counties, Arizona
Survey Area Data: Version 19, Sep 8, 2023

Soil Survey Area: Pinal County, Arizona, Western Part
Survey Area Data: Version 20, Sep 8, 2023

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Feb 18, 2020—Mar 7, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND

MAP INFORMATION

imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
24	Contine loam, 0 to 3 percent slopes	2.9	0.0%
67	Mohall-Contine complex, 0 to 5 percent slopes	1,036.1	4.0%
Subtotals for Soil Survey Area		**1,039.0**	**4.0%**
Totals for Area of Interest		**26,098.6**	**100.0%**

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
3	Casa Grande fine sandy loam, 0 to 3 percent slopes	4,570.6	17.5%
4	Casa Grande clay loam	178.3	0.7%
5	Cashion clay	68.2	0.3%
9	Contine clay loam	94.4	0.4%
11	Coolidge sandy loam	713.2	2.7%
13	Dateland fine sandy loam	1,192.2	4.6%
16	Denure sandy loam, 1 to 3 percent slopes	1,329.2	5.1%
19	Dumps-Pits association	67.8	0.3%
21	Gilman fine sandy loam, 0 to 2 percent slopes	1,201.5	4.6%
24	Glenbar clay loam, 0 to 2 percent slopes	1,146.2	4.4%
26	Gunsight-Pinamt complex, 1 to 8 percent slopes	482.3	1.8%
27	La Palma fine sandy loam	834.7	3.2%
28	Laveen loam	1,110.5	4.3%
30	Mohall sandy loam, 0 to 1 percent slopes	1,925.0	7.4%
31	Mohall loam MLRA 40	5,304.5	20.3%
32	Mohall clay loam	4,486.5	17.2%
42	Sasco silt loam	17.0	0.1%
43	Toltec fine sandy loam	337.1	1.3%
Subtotals for Soil Survey Area		**25,058.8**	**96.0%**
Totals for Area of Interest		**26,098.6**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas

shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Eastern Pinal and Southern Gila Counties, Arizona

24—Contine loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: plj9
Elevation: 1,540 to 2,000 feet
Mean annual precipitation: 7 to 10 inches
Mean annual air temperature: 70 to 72 degrees F
Frost-free period: 240 to 325 days
Farmland classification: Not prime farmland

Map Unit Composition

Contine and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Contine

Setting

Landform: Fan terraces, basin floors
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest, dip, rise
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed fan alluvium

Typical profile

A - 0 to 2 inches: loam
Bt - 2 to 25 inches: clay loam
Btk1 - 25 to 35 inches: clay
Btk2 - 35 to 60 inches: clay

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Very rare
Frequency of ponding: None
Calcium carbonate, maximum content: 35 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 9.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7c
Hydrologic Soil Group: C
Ecological site: R040XB213AZ - Loamy Upland 7"-10" p.z.
Hydric soil rating: No

Minor Components

Unnamed soils

Percent of map unit: 10 percent
Hydric soil rating: No

67—Mohall-Contine complex, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2262q
Elevation: 1,490 to 2,090 feet
Mean annual precipitation: 7 to 10 inches
Mean annual air temperature: 70 to 72 degrees F
Frost-free period: 240 to 325 days
Farmland classification: Not prime farmland

Map Unit Composition

Mohall and similar soils: 60 percent
Contine and similar soils: 30 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Mohall

Setting

Landform: Basin floors
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed fan alluvium

Typical profile

A - 0 to 3 inches: silt loam
AC - 3 to 12 inches: silt loam
Bt - 12 to 32 inches: clay loam
Btk1 - 32 to 48 inches: clay loam
Btk2 - 48 to 60 inches: loam

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Calcium carbonate, maximum content: 14 percent
Maximum salinity: Nonsaline to strongly saline (0.0 to 16.0 mmhos/cm)

Sodium adsorption ratio, maximum: 4.0
Available water supply, 0 to 60 inches: High (about 10.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7c
Hydrologic Soil Group: C
Ecological site: R040XB213AZ - Loamy Upland 7"-10" p.z.
Hydric soil rating: No

Description of Contine

Setting

Landform: Basin floors
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed fan alluvium

Typical profile

A - 0 to 1 inches: clay loam
Bt - 1 to 12 inches: clay
Btk1 - 12 to 20 inches: clay
Btk2 - 20 to 60 inches: clay

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Calcium carbonate, maximum content: 35 percent
Gypsum, maximum content: 3 percent
Maximum salinity: Slightly saline to moderately saline (4.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum: 30.0
Available water supply, 0 to 60 inches: High (about 9.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7c
Hydrologic Soil Group: C
Ecological site: R040XB207AZ - Limy Fan 7"-10" p.z.
Hydric soil rating: No

Minor Components

Unnamed soils

Percent of map unit: 10 percent
Hydric soil rating: No

Pinal County, Arizona, Western Part

3—Casa Grande fine sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2tdtb
Elevation: 950 to 2,200 feet
Mean annual precipitation: 7 to 10 inches
Mean annual air temperature: 70 to 72 degrees F
Frost-free period: 240 to 325 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Casa grande and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Casa Grande

Setting

Landform: Basin floors
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed alluvium

Typical profile

Ap - 0 to 13 inches: fine sandy loam
Btknz - 13 to 23 inches: sandy clay loam
Btkknz1 - 23 to 28 inches: sandy clay loam
Btkknz2 - 28 to 49 inches: sandy clay loam
2Bkknz - 49 to 60 inches: sandy clay loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: 13 to 23 inches to natric
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 25 percent
Gypsum, maximum content: 3 percent
Maximum salinity: Moderately saline to strongly saline (8.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum: 200.0
Available water supply, 0 to 60 inches: Very low (about 1.3 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 7c
Hydrologic Soil Group: C
Ecological site: R040XB225AZ - Loamy Upland, Saline 7"-10" p.z.
Hydric soil rating: No

Minor Components

Unnamed soils

Percent of map unit: 15 percent
Hydric soil rating: No

4—Casa Grande clay loam

Map Unit Setting

National map unit symbol: 1sqy
Elevation: 1,130 to 1,990 feet
Mean annual precipitation: 6 to 8 inches
Mean annual air temperature: 68 to 72 degrees F
Frost-free period: 240 to 325 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Casa grande and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Casa Grande

Setting

Landform: Basin floors
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Dip
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Mixed stream alluvium

Typical profile

Ap - 0 to 13 inches: clay loam
Btkn - 13 to 60 inches: sandy clay loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 25 percent
Gypsum, maximum content: 3 percent
Maximum salinity: Moderately saline to strongly saline (8.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum: 200.0
Available water supply, 0 to 60 inches: Moderate (about 6.2 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C
Ecological site: R040XB225AZ - Loamy Upland, Saline 7"-10" p.z.
Hydric soil rating: No

Minor Components

Unnamed soils

Percent of map unit: 15 percent
Hydric soil rating: No

5—Cashion clay

Map Unit Setting

National map unit symbol: 1sr9
Elevation: 1,130 to 1,990 feet
Mean annual precipitation: 6 to 8 inches
Mean annual air temperature: 68 to 72 degrees F
Frost-free period: 240 to 325 days
Farmland classification: Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season

Map Unit Composition

Cashion and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Cashion

Setting

Landform: Flood plains
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Recent fine textured mixed stream alluvium

Typical profile

Ap - 0 to 12 inches: clay
C1 - 12 to 35 inches: clay
2C2 - 35 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 10.5 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: C
Ecological site: R040XB203AZ - Clayey Swale 7"-10" p.z.
Hydric soil rating: No

Minor Components

Unnamed soils

Percent of map unit: 10 percent
Hydric soil rating: No

9—Contine clay loam

Map Unit Setting

National map unit symbol: 1srf
Elevation: 1,130 to 1,990 feet
Mean annual precipitation: 6 to 8 inches
Mean annual air temperature: 68 to 72 degrees F
Frost-free period: 240 to 325 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Contine and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Contine

Setting

Landform: Fan terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Fine textured mixed fan alluvium

Typical profile

Ap - 0 to 12 inches: clay loam
Btk1 - 12 to 51 inches: clay
Btk2 - 51 to 60 inches: clay loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 13.0
Available water supply, 0 to 60 inches: High (about 10.3 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C
Ecological site: R040XB205AZ - Clay Loam Upland 7"-10" p.z.
Hydric soil rating: No

Minor Components

Unnamed soils

Percent of map unit: 15 percent
Hydric soil rating: No

11—Coolidge sandy loam

Map Unit Setting

National map unit symbol: 1spy
Elevation: 1,130 to 1,990 feet
Mean annual precipitation: 6 to 8 inches
Mean annual air temperature: 68 to 72 degrees F
Frost-free period: 240 to 325 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Coolidge and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Coolidge

Setting

Landform: Stream terraces, fan terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex

Across-slope shape: Convex
Parent material: Mixed stream and fan alluvium

Typical profile
A - 0 to 7 inches: sandy loam
Bk1 - 7 to 44 inches: sandy loam
Bk2 - 44 to 60 inches: sandy clay loam

Properties and qualities
Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Maximum salinity: Slightly saline to moderately saline (4.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum: 40.0
Available water supply, 0 to 60 inches: Moderate (about 7.7 inches)

Interpretive groups
Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Ecological site: R040XB207AZ - Limy Fan 7"-10" p.z.
Hydric soil rating: No

Minor Components

Unnamed soils
Percent of map unit: 15 percent
Hydric soil rating: No

13—Dateland fine sandy loam

Map Unit Setting
National map unit symbol: 1sq0
Elevation: 1,130 to 1,990 feet
Mean annual precipitation: 6 to 8 inches
Mean annual air temperature: 68 to 72 degrees F
Frost-free period: 240 to 325 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition
Dateland and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Dateland

Setting

Landform: Fan terraces, stream terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed stream and fan alluvium

Typical profile

A - 0 to 2 inches: fine sandy loam
Bk - 2 to 40 inches: fine sandy loam
C - 40 to 60 inches: fine sandy loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 7.8 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 7c
Hydrologic Soil Group: B
Ecological site: R040XB207AZ - Limy Fan 7"-10" p.z.
Hydric soil rating: No

Minor Components

Unnamed soils

Percent of map unit: 10 percent
Hydric soil rating: No

16—Denure sandy loam, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: 1sq3
Elevation: 1,130 to 1,990 feet
Mean annual precipitation: 6 to 8 inches
Mean annual air temperature: 68 to 72 degrees F
Frost-free period: 240 to 325 days

Farmland classification: Prime farmland if irrigated

Map Unit Composition

Denure and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Denure

Setting

Landform: Fan terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Mixed fan alluvium

Typical profile

A - 0 to 2 inches: sandy loam
Bk - 2 to 54 inches: sandy loam
2Btk - 54 to 60 inches: sandy clay loam

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 7.4 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: A
Ecological site: R040XB207AZ - Limy Fan 7"-10" p.z.
Hydric soil rating: No

Minor Components

Unnamed soils

Percent of map unit: 15 percent
Hydric soil rating: No

19—Dumps-Pits association

Map Unit Composition

Dumps: 59 percent
Pits: 29 percent
Minor components: 12 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Minor Components

Unnamed soils

Percent of map unit: 12 percent
Hydric soil rating: No

21—Gilman fine sandy loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2tdtw
Elevation: 800 to 2,000 feet
Mean annual precipitation: 7 to 10 inches
Mean annual air temperature: 70 to 72 degrees F
Frost-free period: 240 to 325 days
Farmland classification: Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season

Map Unit Composition

Gilman and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Gilman

Setting

Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed fan and stream alluvium

Typical profile

Ap1 - 0 to 3 inches: fine sandy loam
Ap2 - 3 to 13 inches: loam
C1 - 13 to 26 inches: loam
C2 - 26 to 44 inches: loam
C3 - 44 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Calcium carbonate, maximum content: 4 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 9.8 inches)

Interpretive groups

Land capability classification (irrigated): 2w
Land capability classification (nonirrigated): 7c
Hydrologic Soil Group: A
Ecological site: R040XB211AZ - Loamy Swale 7"-10" p.z.
Hydric soil rating: No

Minor Components

Unnamed soils

Percent of map unit: 15 percent
Hydric soil rating: No

24—Glenbar clay loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 2tdtq
Elevation: 980 to 2,000 feet
Mean annual precipitation: 7 to 10 inches
Mean annual air temperature: 70 to 72 degrees F
Frost-free period: 240 to 325 days
Farmland classification: Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season

Map Unit Composition

Glenbar and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Glenbar

Setting

Landform: Flood plains
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear

Parent material: Mixed stream alluvium

Typical profile

Ap - 0 to 7 inches: clay loam
Ck1 - 7 to 18 inches: clay loam
Ck2 - 18 to 31 inches: silty clay loam
Ck3 - 31 to 60 inches: silty clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Gypsum, maximum content: 2 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 11.4 inches)

Interpretive groups

Land capability classification (irrigated): 3w
Land capability classification (nonirrigated): 7c
Hydrologic Soil Group: C
Ecological site: R040XB211AZ - Loamy Swale 7"-10" p.z.
Hydric soil rating: No

Minor Components

Unnamed soils

Percent of map unit: 15 percent
Hydric soil rating: No

26—Gunsight-Pinamt complex, 1 to 8 percent slopes

Map Unit Setting

National map unit symbol: 1sqg
Elevation: 1,130 to 1,990 feet
Mean annual precipitation: 6 to 8 inches
Mean annual air temperature: 68 to 72 degrees F
Frost-free period: 240 to 325 days
Farmland classification: Not prime farmland

Map Unit Composition

Gunsight and similar soils: 57 percent
Pinamt and similar soils: 30 percent
Minor components: 13 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Gunsight

Setting

Landform: Fan terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Very gravelly mixed fan alluvium

Typical profile

A - 0 to 3 inches: very gravelly fine sandy loam
Bk1 - 3 to 12 inches: gravelly loam
Bk2 - 12 to 60 inches: very gravelly loam

Properties and qualities

Slope: 1 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Gypsum, maximum content: 10 percent
Maximum salinity: Moderately saline to strongly saline (8.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum: 30.0
Available water supply, 0 to 60 inches: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Ecological site: R040XB208AZ - Limy Upland, Deep 7"-10" p.z.
Hydric soil rating: No

Description of Pinamt

Setting

Landform: Fan terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Mixed fan alluvium

Typical profile

A - 0 to 2 inches: very gravelly loam
Btk - 2 to 23 inches: very gravelly sandy clay loam
2Bk - 23 to 60 inches: extremely gravelly sandy loam

Properties and qualities

Slope: 1 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained

Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: C
Ecological site: R040XB208AZ - Limy Upland, Deep 7"-10" p.z.
Hydric soil rating: No

Minor Components

Unnamed soils

Percent of map unit: 13 percent
Hydric soil rating: No

27—La Palma fine sandy loam

Map Unit Setting

National map unit symbol: 1sqh
Elevation: 1,130 to 1,990 feet
Mean annual precipitation: 6 to 8 inches
Mean annual air temperature: 68 to 72 degrees F
Frost-free period: 240 to 325 days
Farmland classification: Farmland of unique importance

Map Unit Composition

La palma and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of La Palma

Setting

Landform: Basin floors
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Dip
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Mixed stream alluvium and/or loamy mixed eolian deposits

Typical profile

A - 0 to 3 inches: fine sandy loam

Btkn - 3 to 28 inches: clay loam
2Bkm - 28 to 60 inches: cemented material

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: 20 to 40 inches to petrocalcic
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Maximum salinity: Moderately saline to strongly saline (8.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum: 60.0
Available water supply, 0 to 60 inches: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: R040XB225AZ - Loamy Upland, Saline 7"-10" p.z.
Hydric soil rating: No

Minor Components

Unnamed soils

Percent of map unit: 5 percent
Hydric soil rating: No

28—Laveen loam

Map Unit Setting

National map unit symbol: 1sqj
Elevation: 1,130 to 1,990 feet
Mean annual precipitation: 6 to 8 inches
Mean annual air temperature: 68 to 72 degrees F
Frost-free period: 240 to 325 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Laveen and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Laveen

Setting

Landform: Stream terraces, fan terraces
Landform position (two-dimensional): Summit

Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Mixed stream and fan alluvium

Typical profile

Ap - 0 to 15 inches: loam
Bk1 - 15 to 42 inches: loam
Bk2 - 42 to 60 inches: gravelly fine sandy loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Maximum salinity: Nonsaline to moderately saline (0.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum: 40.0
Available water supply, 0 to 60 inches: High (about 9.3 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 7c
Hydrologic Soil Group: B
Ecological site: R040XB207AZ - Limy Fan 7"-10" p.z.
Hydric soil rating: No

Minor Components

Unnamed soils

Percent of map unit: 15 percent
Hydric soil rating: No

30—Mohall sandy loam, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: 2x7ms
Elevation: 1,000 to 2,000 feet
Mean annual precipitation: 7 to 10 inches
Mean annual air temperature: 70 to 72 degrees F
Frost-free period: 240 to 325 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Mohall and similar soils: 85 percent
Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Mohall

Setting

Landform: Basin floors, fan remnants, stream terraces, alluvial fans
Landform position (three-dimensional): Tread, rise
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Parent material: Mixed alluvium derived from igneous, metamorphic and sedimentary rock

Typical profile

Ap - 0 to 16 inches: sandy loam
Bt - 16 to 24 inches: clay loam
Btkk1 - 24 to 37 inches: clay loam
Btkk2 - 37 to 43 inches: clay loam
Bkk - 43 to 60 inches: sandy loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Gypsum, maximum content: 3 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.3 inches)

Interpretive groups

Land capability classification (irrigated): 1w
Land capability classification (nonirrigated): 7c
Hydrologic Soil Group: C
Ecological site: R040XB218AZ - Sandy Loam Upland 7"-10" p.z.
Hydric soil rating: No

Minor Components

Unnamed soils

Percent of map unit: 15 percent
Hydric soil rating: No

31—Mohall loam MLRA 40

Map Unit Setting

National map unit symbol: 2rfkt

Elevation: 1,000 to 1,990 feet
Mean annual precipitation: 6 to 10 inches
Mean annual air temperature: 68 to 74 degrees F
Frost-free period: 240 to 325 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Mohall and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Mohall

Setting

Landform: Stream terraces, basin floors, fan terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread, flat
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Mixed alluvium

Typical profile

Ap - 0 to 16 inches: loam
Bt - 16 to 24 inches: clay loam
Btk1 - 24 to 37 inches: clay loam
Btk2 - 37 to 43 inches: clay loam
Bk - 43 to 60 inches: sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Maximum salinity: Very slightly saline to strongly saline (2.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum: 13.0
Available water supply, 0 to 60 inches: High (about 9.9 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 7c
Hydrologic Soil Group: C
Ecological site: R040XB213AZ - Loamy Upland 7"-10" p.z.
Hydric soil rating: No

Minor Components

Unnamed soils

Percent of map unit: 20 percent
Hydric soil rating: No

32—Mohall clay loam

Map Unit Setting

National map unit symbol: 1sqp
Elevation: 1,130 to 1,990 feet
Mean annual precipitation: 6 to 8 inches
Mean annual air temperature: 68 to 72 degrees F
Frost-free period: 240 to 325 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Mohall and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Mohall

Setting

Landform: Fan terraces, basin floors
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread, dip
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Mixed fan alluvium

Typical profile

Ap - 0 to 16 inches: clay loam
Btk - 16 to 43 inches: clay loam
Bk - 43 to 60 inches: sandy loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 25 percent
Maximum salinity: Very slightly saline to strongly saline (2.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum: 13.0
Available water supply, 0 to 60 inches: High (about 9.9 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 7c
Hydrologic Soil Group: C
Ecological site: R040XB205AZ - Clay Loam Upland 7"-10" p.z.

Hydric soil rating: No

Minor Components

Unnamed soils

Percent of map unit: 10 percent
Hydric soil rating: No

42—Sasco silt loam

Map Unit Setting

National map unit symbol: 1sr1
Elevation: 1,130 to 1,990 feet
Mean annual precipitation: 6 to 8 inches
Mean annual air temperature: 68 to 72 degrees F
Frost-free period: 240 to 325 days
Farmland classification: Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season

Map Unit Composition

Sasco and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sasco

Setting

Landform: Stream terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Mixed stream silty alluvium

Typical profile

A - 0 to 2 inches: silt loam
Bw - 2 to 47 inches: silt loam
2Btb - 47 to 60 inches: clay loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Available water supply, 0 to 60 inches: High (about 11.1 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 7c
Hydrologic Soil Group: C
Ecological site: R040XB213AZ - Loamy Upland 7"-10" p.z.
Hydric soil rating: No

Minor Components

Unnamed soils

Percent of map unit: 15 percent
Hydric soil rating: No

43—Toltec fine sandy loam

Map Unit Setting

National map unit symbol: 1sr2
Elevation: 1,190 to 1,990 feet
Mean annual precipitation: 6 to 8 inches
Mean annual air temperature: 68 to 72 degrees F
Frost-free period: 240 to 325 days
Farmland classification: Farmland of unique importance

Map Unit Composition

Toltec and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Toltec

Setting

Landform: Basin floors
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Dip
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Mixed stream alluvium and/or mixed eolian deposits

Typical profile

Ap - 0 to 12 inches: fine sandy loam
Bk - 12 to 36 inches: very fine sandy loam
Bkq - 36 to 60 inches: extremely gravelly fine sandy loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Maximum salinity: Slightly saline to strongly saline (4.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum: 30.0
Available water supply, 0 to 60 inches: Moderate (about 6.7 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: B
Ecological site: R040XB225AZ - Loamy Upland, Saline 7"-10" p.z.
Hydric soil rating: No

Minor Components

Unnamed soils

Percent of map unit: 10 percent
Hydric soil rating: No

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United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Pinal County, Arizona, Western Part



May 14, 2024

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

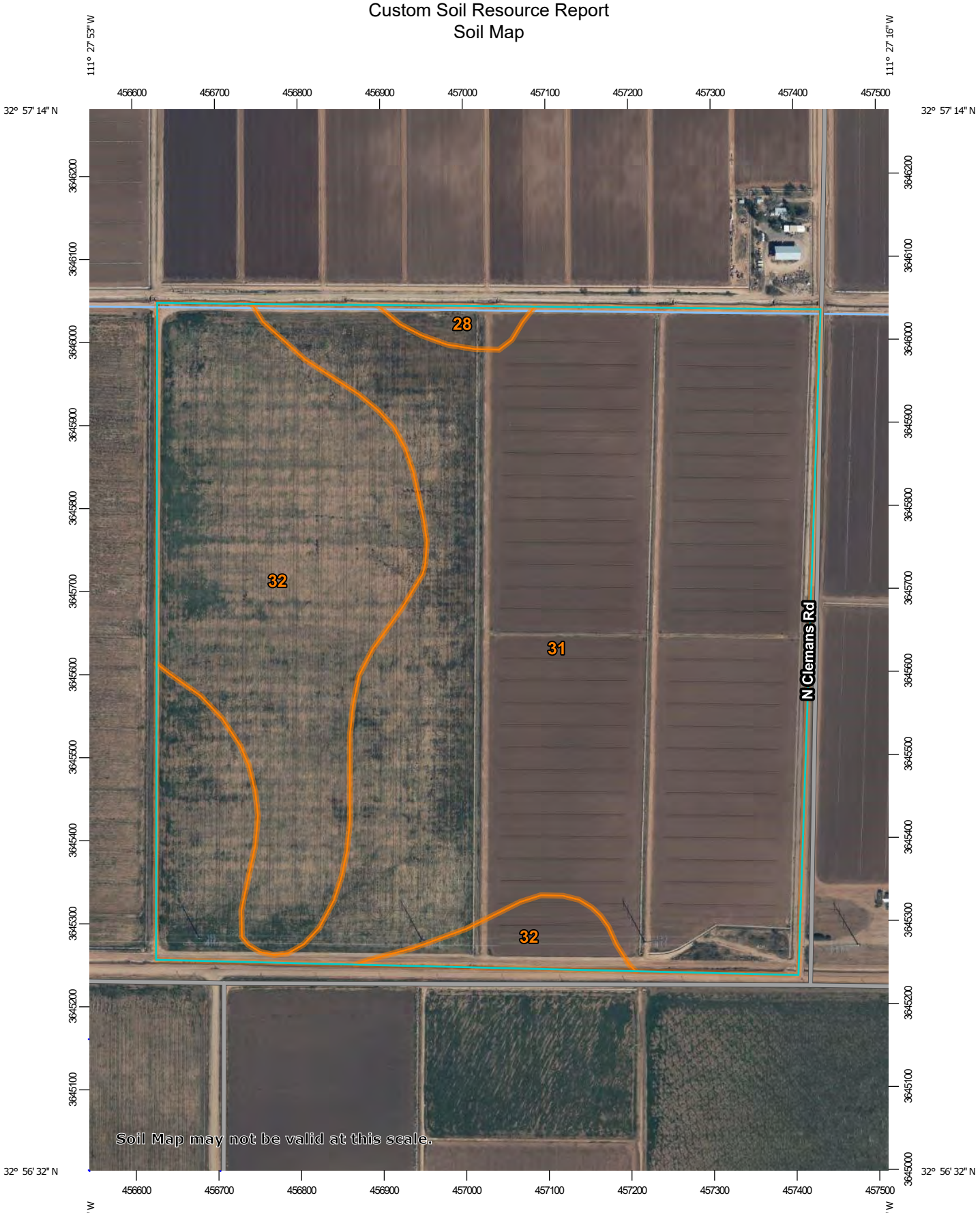
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



Map Scale: 1:6,240 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 50 100 200 300

Feet
0 300 600 1200 1800

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 12N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Pinal County, Arizona, Western Part
Survey Area Data: Version 20, Sep 8, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Feb 18, 2020—Mar 7, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
28	Laveen loam	1.7	1.1%
31	Mohall loam MLRA 40	110.6	70.8%
32	Mohall clay loam	44.0	28.1%
Totals for Area of Interest		**156.2**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however,

onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Pinal County, Arizona, Western Part

28—Laveen loam

Map Unit Setting

National map unit symbol: 1sqj
Elevation: 1,130 to 1,990 feet
Mean annual precipitation: 6 to 8 inches
Mean annual air temperature: 68 to 72 degrees F
Frost-free period: 240 to 325 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Laveen and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Laveen

Setting

Landform: Stream terraces, fan terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Mixed stream and fan alluvium

Typical profile

Ap - 0 to 15 inches: loam
Bk1 - 15 to 42 inches: loam
Bk2 - 42 to 60 inches: gravelly fine sandy loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Maximum salinity: Nonsaline to moderately saline (0.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum: 40.0
Available water supply, 0 to 60 inches: High (about 9.3 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 7c
Hydrologic Soil Group: B
Ecological site: R040XB207AZ - Limy Fan 7"-10" p.z.
Hydric soil rating: No

Minor Components

Unnamed soils

Percent of map unit: 15 percent
Hydric soil rating: No

31—Mohall loam MLRA 40

Map Unit Setting

National map unit symbol: 2rfkt
Elevation: 1,000 to 1,990 feet
Mean annual precipitation: 6 to 10 inches
Mean annual air temperature: 68 to 74 degrees F
Frost-free period: 240 to 325 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Mohall and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Mohall

Setting

Landform: Stream terraces, basin floors, fan terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread, flat
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Mixed alluvium

Typical profile

Ap - 0 to 16 inches: loam
Bt - 16 to 24 inches: clay loam
Btk1 - 24 to 37 inches: clay loam
Btk2 - 37 to 43 inches: clay loam
Bk - 43 to 60 inches: sandy loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Maximum salinity: Very slightly saline to strongly saline (2.0 to 16.0 mmhos/cm)

Sodium adsorption ratio, maximum: 13.0
Available water supply, 0 to 60 inches: High (about 9.9 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 7c
Hydrologic Soil Group: C
Ecological site: R040XB213AZ - Loamy Upland 7"-10" p.z.
Hydric soil rating: No

Minor Components

Unnamed soils

Percent of map unit: 20 percent
Hydric soil rating: No

32—Mohall clay loam

Map Unit Setting

National map unit symbol: 1sqp
Elevation: 1,130 to 1,990 feet
Mean annual precipitation: 6 to 8 inches
Mean annual air temperature: 68 to 72 degrees F
Frost-free period: 240 to 325 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Mohall and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Mohall

Setting

Landform: Fan terraces, basin floors
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread, dip
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Mixed fan alluvium

Typical profile

Ap - 0 to 16 inches: clay loam
Btk - 16 to 43 inches: clay loam
Bk - 43 to 60 inches: sandy loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 25 percent
Maximum salinity: Very slightly saline to strongly saline (2.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum: 13.0
Available water supply, 0 to 60 inches: High (about 9.9 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 7c
Hydrologic Soil Group: C
Ecological site: R040XB205AZ - Clay Loam Upland 7"-10" p.z.
Hydric soil rating: No

Minor Components

Unnamed soils

Percent of map unit: 10 percent
Hydric soil rating: No

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National Flood Hazard Layer FIRMette

FEMA

111°27'55"W 32°57'11"N



111°27'17"W 32°56'41"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 1/10/2024 at 11:24 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

NOAA Atlas 14, Volume 1, Version 5
Location name: Coolidge, Arizona, USA*
Latitude: 32.9526°, Longitude: -111.4634°
Elevation: 1494 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.206 (0.177-0.245)	0.269 (0.233-0.320)	0.366 (0.314-0.433)	0.439 (0.375-0.516)	0.538 (0.453-0.630)	0.613 (0.508-0.715)	0.690 (0.564-0.804)	0.769 (0.617-0.897)	0.872 (0.681-1.02)	0.952 (0.728-1.12)
10-min	0.314 (0.270-0.373)	0.410 (0.355-0.487)	0.557 (0.478-0.658)	0.668 (0.571-0.786)	0.819 (0.689-0.958)	0.933 (0.774-1.09)	1.05 (0.858-1.22)	1.17 (0.938-1.36)	1.33 (1.04-1.55)	1.45 (1.11-1.71)
15-min	0.389 (0.335-0.462)	0.508 (0.440-0.604)	0.690 (0.592-0.816)	0.828 (0.707-0.974)	1.02 (0.854-1.19)	1.16 (0.959-1.35)	1.30 (1.06-1.52)	1.45 (1.16-1.69)	1.64 (1.29-1.93)	1.80 (1.37-2.12)
30-min	0.523 (0.451-0.622)	0.684 (0.593-0.813)	0.930 (0.797-1.10)	1.12 (0.953-1.31)	1.37 (1.15-1.60)	1.56 (1.29-1.82)	1.75 (1.43-2.04)	1.95 (1.57-2.28)	2.21 (1.73-2.59)	2.42 (1.85-2.85)
60-min	0.647 (0.558-0.770)	0.846 (0.734-1.01)	1.15 (0.987-1.36)	1.38 (1.18-1.62)	1.69 (1.42-1.98)	1.93 (1.60-2.25)	2.17 (1.77-2.53)	2.42 (1.94-2.82)	2.74 (2.14-3.21)	2.99 (2.29-3.53)
2-hr	0.748 (0.648-0.876)	0.970 (0.841-1.14)	1.30 (1.12-1.52)	1.54 (1.32-1.80)	1.88 (1.58-2.18)	2.14 (1.78-2.48)	2.41 (1.97-2.78)	2.68 (2.15-3.10)	3.04 (2.38-3.53)	3.33 (2.55-3.89)
3-hr	0.811 (0.702-0.949)	1.04 (0.901-1.22)	1.37 (1.18-1.60)	1.62 (1.39-1.89)	1.98 (1.68-2.30)	2.27 (1.88-2.62)	2.57 (2.10-2.97)	2.88 (2.31-3.33)	3.31 (2.58-3.84)	3.66 (2.78-4.26)
6-hr	0.980 (0.864-1.13)	1.24 (1.09-1.43)	1.59 (1.40-1.83)	1.86 (1.63-2.14)	2.25 (1.94-2.56)	2.55 (2.16-2.90)	2.86 (2.38-3.25)	3.18 (2.60-3.62)	3.61 (2.88-4.12)	3.96 (3.07-4.53)
12-hr	1.12 (1.00-1.27)	1.42 (1.27-1.61)	1.80 (1.60-2.04)	2.10 (1.86-2.36)	2.51 (2.19-2.81)	2.82 (2.44-3.15)	3.14 (2.67-3.53)	3.47 (2.90-3.89)	3.91 (3.19-4.42)	4.24 (3.40-4.84)
24-hr	1.27 (1.15-1.40)	1.61 (1.47-1.78)	2.09 (1.90-2.30)	2.46 (2.23-2.71)	2.99 (2.69-3.28)	3.40 (3.04-3.72)	3.83 (3.39-4.19)	4.27 (3.76-4.68)	4.88 (4.24-5.37)	5.37 (4.61-5.91)
2-day	1.35 (1.22-1.49)	1.72 (1.56-1.91)	2.26 (2.04-2.50)	2.69 (2.42-2.96)	3.28 (2.94-3.62)	3.76 (3.35-4.14)	4.25 (3.76-4.69)	4.77 (4.19-5.28)	5.50 (4.77-6.10)	6.08 (5.21-6.77)
3-day	1.43 (1.30-1.58)	1.82 (1.66-2.02)	2.40 (2.17-2.64)	2.85 (2.58-3.14)	3.50 (3.14-3.85)	4.02 (3.59-4.42)	4.56 (4.04-5.02)	5.14 (4.52-5.67)	5.95 (5.16-6.58)	6.60 (5.67-7.33)
4-day	1.51 (1.38-1.67)	1.92 (1.75-2.12)	2.53 (2.30-2.79)	3.02 (2.74-3.32)	3.72 (3.34-4.09)	4.28 (3.82-4.70)	4.87 (4.32-5.36)	5.50 (4.84-6.06)	6.40 (5.55-7.06)	7.12 (6.12-7.89)
7-day	1.68 (1.52-1.86)	2.14 (1.94-2.36)	2.81 (2.55-3.11)	3.36 (3.04-3.72)	4.13 (3.71-4.56)	4.76 (4.24-5.25)	5.42 (4.80-5.98)	6.12 (5.38-6.76)	7.12 (6.17-7.88)	7.92 (6.79-8.80)
10-day	1.82 (1.65-2.02)	2.33 (2.12-2.59)	3.06 (2.78-3.40)	3.65 (3.30-4.05)	4.48 (4.02-4.96)	5.14 (4.59-5.69)	5.84 (5.18-6.47)	6.58 (5.79-7.30)	7.61 (6.62-8.48)	8.45 (7.27-9.43)
20-day	2.25 (2.04-2.49)	2.90 (2.62-3.20)	3.81 (3.45-4.20)	4.51 (4.06-4.96)	5.44 (4.89-5.98)	6.16 (5.50-6.77)	6.89 (6.13-7.58)	7.63 (6.76-8.41)	8.63 (7.57-9.54)	9.40 (8.18-10.4)
30-day	2.65 (2.42-2.90)	3.40 (3.11-3.72)	4.46 (4.08-4.88)	5.28 (4.81-5.76)	6.36 (5.76-6.94)	7.20 (6.49-7.85)	8.05 (7.23-8.79)	8.92 (7.96-9.76)	10.1 (8.92-11.1)	11.0 (9.64-12.1)
45-day	3.08 (2.82-3.38)	3.97 (3.62-4.36)	5.21 (4.75-5.71)	6.12 (5.57-6.71)	7.33 (6.64-8.02)	8.24 (7.43-9.02)	9.15 (8.22-10.0)	10.1 (8.99-11.0)	11.2 (9.98-12.4)	12.1 (10.7-13.4)
60-day	3.43 (3.14-3.76)	4.42 (4.04-4.84)	5.79 (5.28-6.33)	6.78 (6.18-7.40)	8.07 (7.33-8.80)	9.03 (8.16-9.85)	9.98 (8.99-10.9)	10.9 (9.78-11.9)	12.1 (10.8-13.3)	13.0 (11.5-14.3)

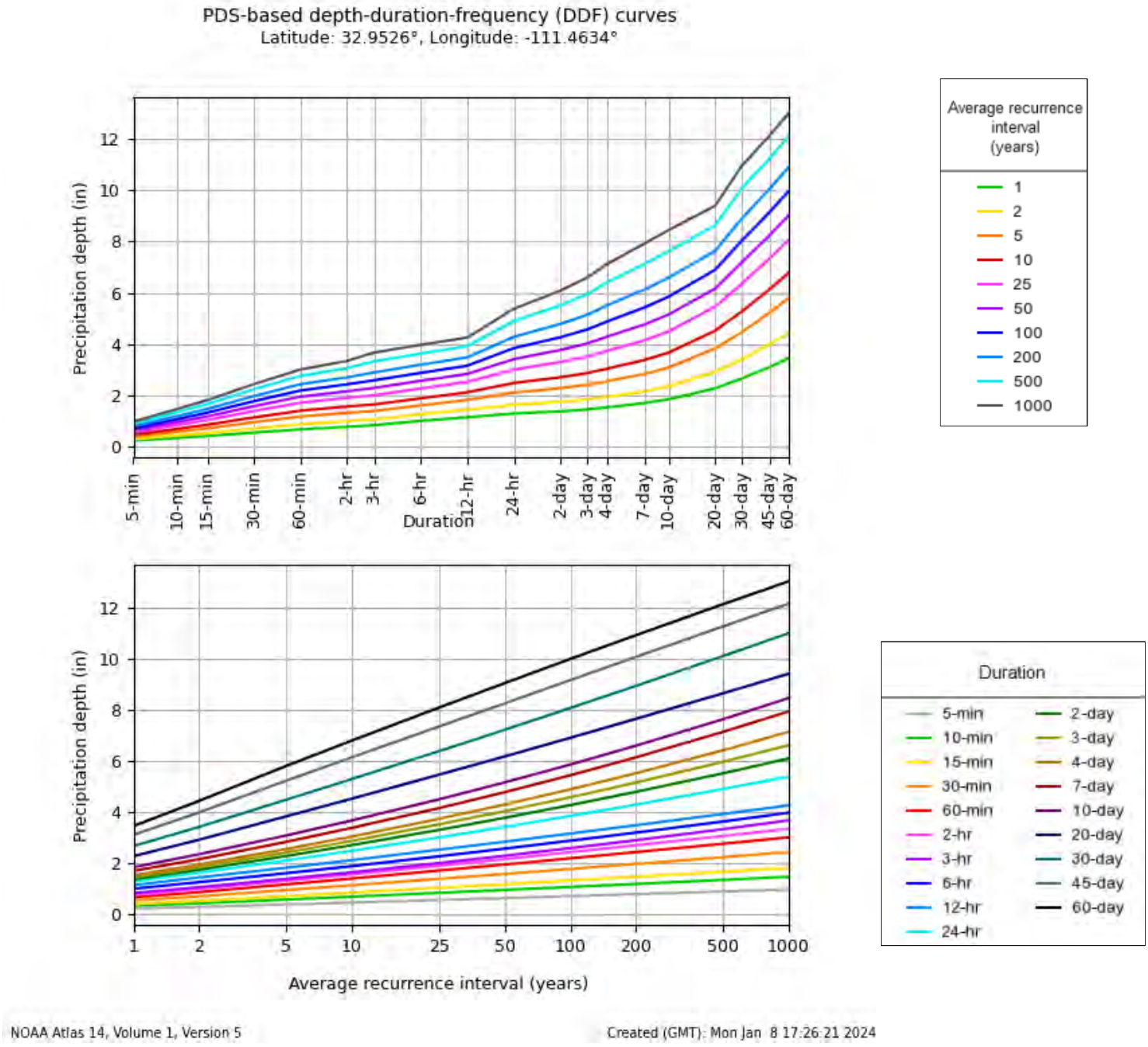
[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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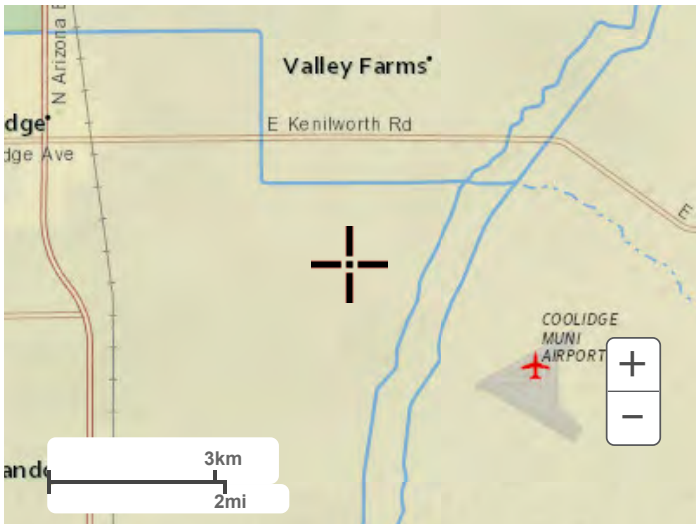
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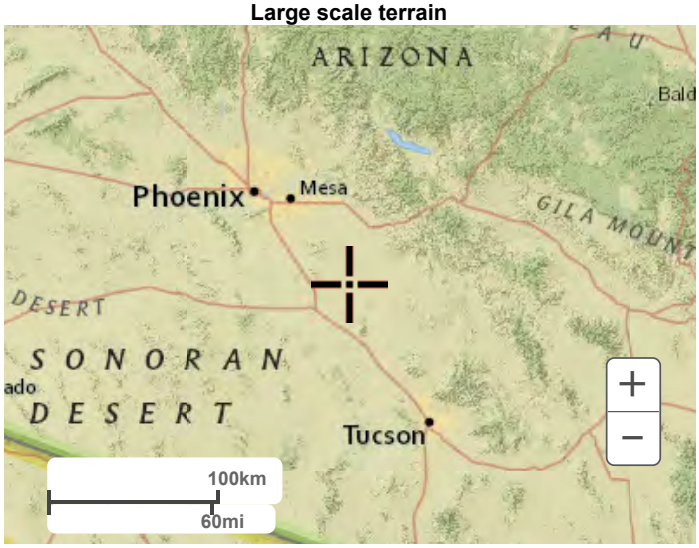
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Maps & aerials

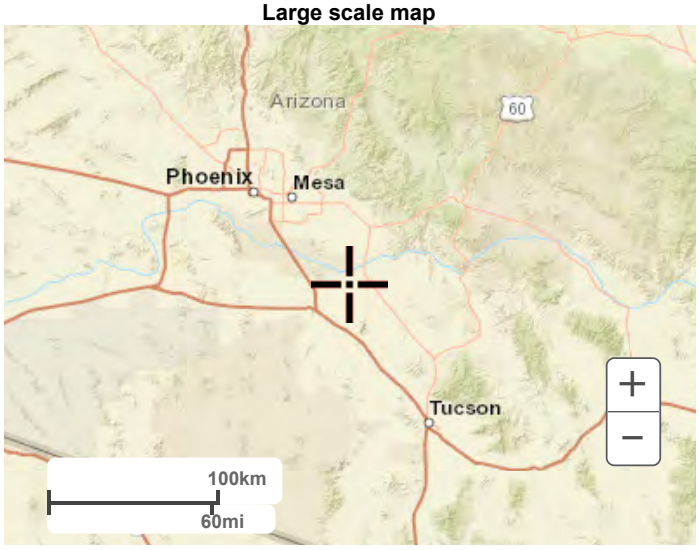
Small scale terrain



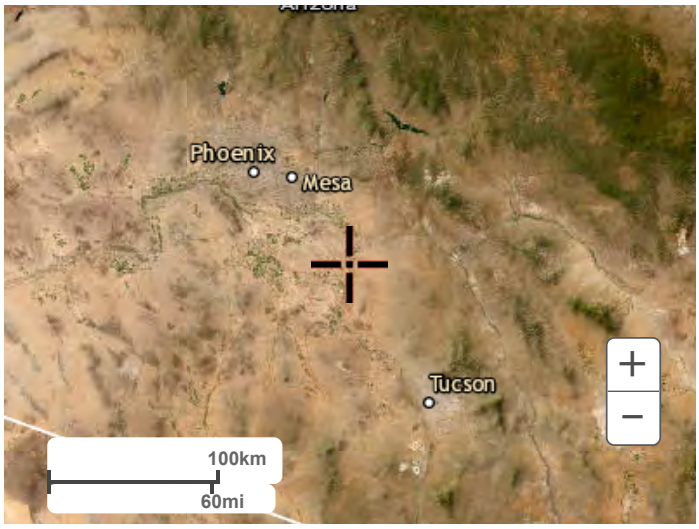
Large scale terrain



Large scale map



Large scale aerial



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Rainfall Distribution

Time	Time	Type II		10-Year		25-Year		50-Year		100-Year		500-Year	
Hrs	HH : MM	%		Depth=	2.46	Depth=	2.99	Depth=	3.4	Depth=	3.83	Depth=	4.88
0	00 : 00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
0.1	00 : 06	0.001	0.001	0.002	0.002	0.003	0.003	0.003	0.003	0.004	0.004	0.005	0.005
0.2	00 : 12	0.002	0.001	0.005	0.002	0.006	0.003	0.007	0.003	0.008	0.004	0.010	0.005
0.3	00 : 18	0.003	0.001	0.008	0.003	0.009	0.003	0.010	0.004	0.012	0.004	0.015	0.005
0.4	00 : 24	0.004	0.001	0.010	0.003	0.012	0.003	0.014	0.004	0.016	0.004	0.020	0.005
0.5	00 : 30	0.005	0.001	0.013	0.003	0.015	0.003	0.017	0.004	0.020	0.004	0.025	0.005
0.6	00 : 36	0.006	0.001	0.015	0.003	0.018	0.003	0.021	0.004	0.024	0.004	0.030	0.005
0.7	00 : 42	0.007	0.001	0.018	0.003	0.022	0.003	0.025	0.004	0.028	0.004	0.035	0.005
0.8	00 : 48	0.008	0.001	0.020	0.003	0.025	0.003	0.028	0.004	0.032	0.004	0.041	0.005
0.9	00 : 54	0.009	0.001	0.023	0.003	0.028	0.003	0.032	0.004	0.036	0.004	0.046	0.005
1	01 : 00	0.011	0.001	0.026	0.003	0.031	0.003	0.036	0.004	0.040	0.004	0.051	0.005
1.1	01 : 06	0.012	0.001	0.029	0.003	0.035	0.003	0.039	0.004	0.044	0.004	0.057	0.005
1.2	01 : 12	0.013	0.001	0.031	0.003	0.038	0.003	0.043	0.004	0.049	0.004	0.062	0.005
1.3	01 : 18	0.014	0.001	0.034	0.003	0.041	0.003	0.047	0.004	0.053	0.004	0.068	0.006
1.4	01 : 24	0.015	0.001	0.037	0.003	0.045	0.003	0.051	0.004	0.057	0.004	0.073	0.006
1.5	01 : 30	0.016	0.001	0.040	0.003	0.048	0.003	0.055	0.004	0.062	0.004	0.079	0.006
1.6	01 : 36	0.017	0.001	0.043	0.003	0.052	0.003	0.059	0.004	0.066	0.004	0.084	0.006
1.7	01 : 42	0.018	0.001	0.045	0.003	0.055	0.003	0.063	0.004	0.071	0.004	0.090	0.006
1.8	01 : 48	0.020	0.001	0.048	0.003	0.059	0.003	0.067	0.004	0.075	0.004	0.096	0.006
1.9	01 : 54	0.021	0.001	0.051	0.003	0.062	0.004	0.071	0.004	0.080	0.005	0.102	0.006
2	02 : 00	0.022	0.001	0.054	0.003	0.066	0.004	0.075	0.004	0.084	0.005	0.107	0.006
2.1	02 : 06	0.023	0.001	0.057	0.003	0.069	0.004	0.079	0.004	0.089	0.005	0.113	0.006
2.2	02 : 12	0.024	0.001	0.060	0.003	0.073	0.004	0.083	0.004	0.094	0.005	0.119	0.006
2.3	02 : 18	0.026	0.001	0.063	0.003	0.077	0.004	0.087	0.004	0.098	0.005	0.125	0.006
2.4	02 : 24	0.027	0.001	0.066	0.003	0.080	0.004	0.091	0.004	0.103	0.005	0.131	0.006
2.5	02 : 30	0.028	0.001	0.069	0.003	0.084	0.004	0.096	0.004	0.108	0.005	0.137	0.006
2.6	02 : 36	0.029	0.001	0.072	0.003	0.088	0.004	0.100	0.004	0.113	0.005	0.143	0.006
2.7	02 : 42	0.031	0.001	0.075	0.003	0.092	0.004	0.104	0.004	0.117	0.005	0.150	0.006
2.8	02 : 48	0.032	0.001	0.079	0.003	0.095	0.004	0.109	0.004	0.122	0.005	0.156	0.006
2.9	02 : 54	0.033	0.001	0.082	0.003	0.099	0.004	0.113	0.004	0.127	0.005	0.162	0.006
3	03 : 00	0.035	0.001	0.085	0.003	0.103	0.004	0.117	0.004	0.132	0.005	0.168	0.006
3.1	03 : 06	0.036	0.001	0.088	0.003	0.107	0.004	0.122	0.004	0.137	0.005	0.175	0.006
3.2	03 : 12	0.037	0.001	0.091	0.003	0.111	0.004	0.126	0.004	0.142	0.005	0.181	0.006
3.3	03 : 18	0.038	0.001	0.095	0.003	0.115	0.004	0.131	0.005	0.147	0.005	0.188	0.006
3.4	03 : 24	0.040	0.001	0.098	0.003	0.119	0.004	0.135	0.005	0.152	0.005	0.194	0.006
3.5	03 : 30	0.041	0.001	0.101	0.003	0.123	0.004	0.140	0.005	0.158	0.005	0.201	0.007
3.6	03 : 36	0.042	0.001	0.105	0.003	0.127	0.004	0.144	0.005	0.163	0.005	0.207	0.007
3.7	03 : 42	0.044	0.001	0.108	0.003	0.131	0.004	0.149	0.005	0.168	0.005	0.214	0.007
3.8	03 : 48	0.045	0.001	0.111	0.003	0.135	0.004	0.154	0.005	0.173	0.005	0.221	0.007
3.9	03 : 54	0.047	0.001	0.115	0.003	0.139	0.004	0.158	0.005	0.179	0.005	0.227	0.007
4	04 : 00	0.048	0.001	0.118	0.003	0.144	0.004	0.163	0.005	0.184	0.005	0.234	0.007
4.1	04 : 06	0.049	0.001	0.122	0.003	0.148	0.004	0.168	0.005	0.189	0.005	0.241	0.007
4.2	04 : 12	0.051	0.001	0.125	0.004	0.152	0.004	0.173	0.005	0.195	0.005	0.248	0.007
4.3	04 : 18	0.052	0.001	0.129	0.004	0.156	0.004	0.178	0.005	0.200	0.006	0.255	0.007
4.4	04 : 24	0.054	0.001	0.132	0.004	0.161	0.004	0.183	0.005	0.206	0.006	0.262	0.007
4.5	04 : 30	0.055	0.001	0.136	0.004	0.165	0.004	0.188	0.005	0.212	0.006	0.270	0.007
4.6	04 : 36	0.057	0.002	0.140	0.004	0.170	0.005	0.193	0.005	0.217	0.006	0.277	0.007
4.7	04 : 42	0.058	0.002	0.143	0.004	0.174	0.005	0.198	0.005	0.223	0.006	0.284	0.007
4.8	04 : 48	0.060	0.002	0.147	0.004	0.179	0.005	0.203	0.005	0.229	0.006	0.292	0.008
4.9	04 : 54	0.061	0.002	0.151	0.004	0.184	0.005	0.209	0.005	0.235	0.006	0.300	0.008
5	05 : 00	0.063	0.002	0.155	0.004	0.188	0.005	0.214	0.005	0.241	0.006	0.307	0.008
5.1	05 : 06	0.065	0.002	0.159	0.004	0.193	0.005	0.220	0.005	0.247	0.006	0.315	0.008
5.2	05 : 12	0.066	0.002	0.163	0.004	0.198	0.005	0.225	0.006	0.254	0.006	0.323	0.008
5.3	05 : 18	0.068	0.002	0.167	0.004	0.203	0.005	0.231	0.006	0.260	0.006	0.331	0.008
5.4	05 : 24	0.070	0.002	0.171	0.004	0.208	0.005	0.237	0.006	0.266	0.006	0.339	0.008
5.5	05 : 30	0.071	0.002	0.175	0.004	0.213	0.005	0.242	0.006	0.273	0.006	0.348	0.008
5.6	05 : 36	0.073	0.002	0.179	0.004	0.218	0.005	0.248	0.006	0.279	0.007	0.356	0.008
5.7	05 : 42	0.075	0.002	0.184	0.004	0.223	0.005	0.254	0.006	0.286	0.007	0.364	0.008
5.8	05 : 48	0.076	0.002	0.188	0.004	0.229	0.005	0.260	0.006	0.293	0.007	0.373	0.009
5.9	05 : 54	0.078	0.002	0.192	0.004	0.234	0.005	0.266	0.006	0.300	0.007	0.382	0.009
6	05 : 60	0.080	0.002	0.197	0.004	0.239	0.005	0.272	0.006	0.306	0.007	0.390	0.009
6.1	06 : 06	0.082	0.002	0.201	0.004	0.245	0.005	0.278	0.006	0.313	0.007	0.399	0.009
6.2	06 : 12	0.084	0.002	0.206	0.005	0.250	0.005	0.284	0.006	0.320	0.007	0.408	0.009
6.3	06 : 18	0.085	0.002	0.210	0.005	0.256	0.006	0.291	0.006	0.327	0.007	0.417	0.009

Time	Time	Type II		10-Year		25-Year		50-Year		100-Year		500-Year	
Hrs	HH : MM	%		Depth=	2.46	Depth=	2.99	Depth=	3.4	Depth=	3.83	Depth=	4.88
6.4	06 : 24	0.087	0.002	0.215	0.005	0.261	0.006	0.297	0.006	0.335	0.007	0.426	0.009
6.5	06 : 30	0.089	0.002	0.220	0.005	0.267	0.006	0.303	0.006	0.342	0.007	0.436	0.009
6.6	06 : 36	0.091	0.002	0.224	0.005	0.273	0.006	0.310	0.006	0.349	0.007	0.445	0.009
6.7	06 : 42	0.093	0.002	0.229	0.005	0.278	0.006	0.317	0.007	0.357	0.007	0.454	0.009
6.8	06 : 48	0.095	0.002	0.234	0.005	0.284	0.006	0.323	0.007	0.364	0.007	0.464	0.010
6.9	06 : 54	0.097	0.002	0.239	0.005	0.290	0.006	0.330	0.007	0.372	0.008	0.473	0.010
7	06 : 60	0.099	0.002	0.244	0.005	0.296	0.006	0.337	0.007	0.379	0.008	0.483	0.010
7.1	07 : 06	0.101	0.002	0.248	0.005	0.302	0.006	0.343	0.007	0.387	0.008	0.493	0.010
7.2	07 : 12	0.103	0.002	0.253	0.005	0.308	0.006	0.350	0.007	0.395	0.008	0.503	0.010
7.3	07 : 18	0.105	0.002	0.259	0.005	0.314	0.006	0.357	0.007	0.402	0.008	0.513	0.010
7.4	07 : 24	0.107	0.002	0.264	0.005	0.320	0.006	0.364	0.007	0.410	0.008	0.523	0.010
7.5	07 : 30	0.109	0.002	0.269	0.005	0.327	0.006	0.371	0.007	0.418	0.008	0.533	0.010
7.6	07 : 36	0.111	0.002	0.274	0.005	0.333	0.006	0.379	0.007	0.427	0.008	0.543	0.010
7.7	07 : 42	0.113	0.002	0.279	0.005	0.339	0.006	0.386	0.007	0.435	0.008	0.554	0.010
7.8	07 : 48	0.116	0.002	0.284	0.005	0.346	0.006	0.393	0.007	0.443	0.008	0.564	0.010
7.9	07 : 54	0.118	0.002	0.290	0.005	0.352	0.006	0.401	0.007	0.451	0.008	0.575	0.011
8	07 : 60	0.120	0.002	0.295	0.005	0.359	0.007	0.408	0.007	0.460	0.008	0.586	0.011
8.1	08 : 06	0.122	0.002	0.301	0.006	0.366	0.007	0.416	0.008	0.468	0.009	0.597	0.011
8.2	08 : 12	0.125	0.002	0.307	0.006	0.373	0.007	0.424	0.008	0.477	0.009	0.608	0.011
8.3	08 : 18	0.127	0.002	0.313	0.006	0.380	0.007	0.432	0.008	0.487	0.009	0.620	0.012
8.4	08 : 24	0.130	0.003	0.319	0.006	0.388	0.008	0.441	0.009	0.496	0.010	0.632	0.012
8.5	08 : 30	0.132	0.003	0.325	0.007	0.395	0.008	0.450	0.009	0.507	0.010	0.645	0.013
8.6	08 : 36	0.135	0.003	0.332	0.007	0.404	0.008	0.459	0.009	0.517	0.011	0.659	0.013
8.7	08 : 42	0.138	0.003	0.339	0.007	0.412	0.009	0.469	0.010	0.528	0.011	0.673	0.014
8.8	08 : 48	0.141	0.003	0.346	0.007	0.421	0.009	0.479	0.010	0.539	0.011	0.687	0.014
8.9	08 : 54	0.144	0.003	0.354	0.008	0.430	0.009	0.489	0.010	0.551	0.012	0.702	0.015
9	08 : 60	0.147	0.003	0.362	0.008	0.440	0.009	0.500	0.011	0.563	0.012	0.717	0.015
9.1	09 : 06	0.150	0.003	0.369	0.008	0.449	0.010	0.511	0.011	0.575	0.012	0.733	0.016
9.2	09 : 12	0.153	0.003	0.377	0.008	0.459	0.010	0.522	0.011	0.588	0.012	0.749	0.016
9.3	09 : 18	0.157	0.003	0.385	0.008	0.468	0.010	0.532	0.011	0.600	0.012	0.764	0.016
9.4	09 : 24	0.160	0.003	0.393	0.008	0.478	0.010	0.543	0.011	0.612	0.012	0.780	0.016
9.5	09 : 30	0.163	0.003	0.401	0.008	0.487	0.010	0.554	0.011	0.624	0.012	0.795	0.016
9.6	09 : 36	0.166	0.003	0.409	0.008	0.497	0.010	0.565	0.011	0.637	0.013	0.811	0.016
9.7	09 : 42	0.170	0.003	0.418	0.008	0.507	0.010	0.577	0.012	0.650	0.013	0.828	0.017
9.8	09 : 48	0.173	0.004	0.426	0.009	0.518	0.011	0.589	0.012	0.664	0.014	0.846	0.018
9.9	09 : 54	0.177	0.004	0.436	0.009	0.529	0.011	0.602	0.013	0.678	0.014	0.864	0.018
10	09 : 60	0.181	0.004	0.445	0.010	0.541	0.012	0.615	0.013	0.693	0.015	0.883	0.019
10.1	10 : 06	0.185	0.004	0.455	0.010	0.554	0.012	0.629	0.014	0.709	0.016	0.903	0.020
10.2	10 : 12	0.189	0.004	0.466	0.011	0.567	0.013	0.644	0.015	0.726	0.017	0.925	0.021
10.3	10 : 18	0.194	0.005	0.477	0.011	0.580	0.014	0.660	0.016	0.743	0.018	0.947	0.022
10.4	10 : 24	0.199	0.005	0.489	0.012	0.595	0.014	0.676	0.016	0.762	0.019	0.971	0.024
10.5	10 : 30	0.204	0.005	0.502	0.012	0.610	0.015	0.694	0.017	0.781	0.019	0.996	0.025
10.6	10 : 36	0.209	0.005	0.515	0.013	0.626	0.016	0.712	0.018	0.802	0.021	1.022	0.026
10.7	10 : 42	0.215	0.006	0.529	0.014	0.643	0.017	0.732	0.020	0.824	0.022	1.050	0.028
10.8	10 : 48	0.221	0.006	0.545	0.015	0.662	0.019	0.753	0.021	0.848	0.024	1.080	0.030
10.9	10 : 54	0.228	0.007	0.561	0.016	0.682	0.020	0.775	0.022	0.873	0.025	1.113	0.032
11	11 : 00	0.235	0.007	0.578	0.017	0.703	0.021	0.799	0.024	0.900	0.027	1.147	0.034
11.1	11 : 06	0.243	0.008	0.597	0.019	0.726	0.023	0.825	0.026	0.929	0.029	1.184	0.037
11.2	11 : 12	0.251	0.009	0.618	0.021	0.751	0.026	0.854	0.029	0.963	0.033	1.226	0.042
11.3	11 : 18	0.261	0.010	0.642	0.024	0.780	0.029	0.887	0.033	0.999	0.037	1.273	0.047
11.4	11 : 24	0.271	0.011	0.668	0.026	0.812	0.032	0.923	0.036	1.040	0.040	1.325	0.052
11.5	11 : 30	0.283	0.012	0.696	0.028	0.846	0.034	0.962	0.039	1.084	0.044	1.381	0.056
11.6	11 : 36	0.307	0.024	0.755	0.059	0.917	0.071	1.043	0.081	1.175	0.091	1.497	0.116
11.7	11 : 42	0.354	0.048	0.872	0.117	1.060	0.142	1.205	0.162	1.357	0.182	1.729	0.232
11.8	11 : 48	0.431	0.076	1.060	0.188	1.288	0.229	1.465	0.260	1.650	0.293	2.102	0.373
11.9	11 : 54	0.568	0.137	1.397	0.337	1.698	0.410	1.931	0.466	2.175	0.525	2.771	0.669
12	12 : 00	0.663	0.095	1.631	0.234	1.982	0.284	2.254	0.323	2.539	0.364	3.235	0.464
12.1	12 : 06	0.682	0.019	1.678	0.047	2.039	0.057	2.319	0.064	2.612	0.073	3.328	0.093
12.2	12 : 12	0.699	0.017	1.719	0.041	2.089	0.050	2.375	0.057	2.676	0.064	3.409	0.081
12.3	12 : 18	0.713	0.014	1.754	0.035	2.132	0.043	2.424	0.049	2.731	0.055	3.480	0.070
12.4	12 : 24	0.725	0.012	1.784	0.030	2.168	0.036	2.466	0.041	2.777	0.046	3.539	0.059
12.5	12 : 30	0.735	0.010	1.808	0.024	2.198	0.029	2.499	0.033	2.815	0.038	3.587	0.048
12.6	12 : 36	0.743	0.008	1.829	0.021	2.223	0.025	2.528	0.029	2.847	0.032	3.628	0.041
12.7	12 : 42	0.751	0.008	1.848	0.019	2.247	0.024	2.555	0.027	2.878	0.030	3.667	0.039
12.8	12 : 48	0.759	0.007	1.867	0.018	2.269	0.022	2.580	0.025	2.906	0.028	3.703	0.036
12.9	12 : 54	0.766	0.007	1.883	0.017	2.289	0.021	2.603	0.023	2.932	0.026	3.736	0.034

Time	Time	Type II		10-Year		25-Year		50-Year		100-Year		500-Year	
Hrs	HH : MM	%		Depth=	2.46	Depth=	2.99	Depth=	3.4	Depth=	3.83	Depth=	4.88
13	13 : 00	0.772	0.006	1.899	0.016	2.308	0.019	2.625	0.022	2.957	0.024	3.767	0.031
13.1	13 : 06	0.778	0.006	1.914	0.015	2.326	0.018	2.645	0.020	2.980	0.023	3.796	0.029
13.2	13 : 12	0.784	0.006	1.928	0.014	2.343	0.017	2.664	0.019	3.001	0.022	3.824	0.028
13.3	13 : 18	0.789	0.005	1.941	0.013	2.359	0.016	2.683	0.018	3.022	0.021	3.851	0.026
13.4	13 : 24	0.794	0.005	1.954	0.013	2.375	0.015	2.700	0.017	3.042	0.020	3.876	0.025
13.5	13 : 30	0.799	0.005	1.966	0.012	2.389	0.014	2.717	0.016	3.060	0.019	3.899	0.024
13.6	13 : 36	0.804	0.005	1.977	0.011	2.403	0.014	2.732	0.016	3.078	0.018	3.922	0.022
13.7	13 : 42	0.808	0.004	1.988	0.011	2.416	0.013	2.747	0.015	3.095	0.017	3.943	0.021
13.8	13 : 48	0.812	0.004	1.998	0.010	2.428	0.013	2.761	0.014	3.111	0.016	3.964	0.020
13.9	13 : 54	0.816	0.004	2.008	0.010	2.440	0.012	2.775	0.014	3.126	0.015	3.983	0.020
14	14 : 00	0.820	0.004	2.017	0.009	2.452	0.011	2.788	0.013	3.141	0.015	4.002	0.019
14.1	14 : 06	0.824	0.004	2.026	0.009	2.463	0.011	2.800	0.012	3.155	0.014	4.020	0.018
14.2	14 : 12	0.827	0.004	2.035	0.009	2.474	0.011	2.813	0.012	3.168	0.014	4.037	0.018
14.3	14 : 18	0.831	0.004	2.044	0.009	2.484	0.011	2.825	0.012	3.182	0.014	4.054	0.017
14.4	14 : 24	0.834	0.003	2.052	0.008	2.494	0.010	2.836	0.012	3.195	0.013	4.071	0.017
14.5	14 : 30	0.838	0.003	2.061	0.008	2.505	0.010	2.848	0.012	3.208	0.013	4.088	0.017
14.6	14 : 36	0.841	0.003	2.069	0.008	2.514	0.010	2.859	0.011	3.221	0.013	4.104	0.016
14.7	14 : 42	0.844	0.003	2.077	0.008	2.524	0.010	2.870	0.011	3.233	0.012	4.120	0.016
14.8	14 : 48	0.847	0.003	2.085	0.008	2.534	0.009	2.881	0.011	3.245	0.012	4.135	0.015
14.9	14 : 54	0.850	0.003	2.092	0.008	2.543	0.009	2.892	0.011	3.257	0.012	4.150	0.015
15	15 : 00	0.854	0.003	2.100	0.007	2.552	0.009	2.902	0.010	3.269	0.012	4.165	0.015
15.1	15 : 06	0.856	0.003	2.107	0.007	2.561	0.009	2.912	0.010	3.280	0.011	4.180	0.014
15.2	15 : 12	0.859	0.003	2.114	0.007	2.569	0.009	2.922	0.010	3.291	0.011	4.194	0.014
15.3	15 : 18	0.862	0.003	2.121	0.007	2.578	0.008	2.931	0.010	3.302	0.011	4.207	0.014
15.4	15 : 24	0.865	0.003	2.128	0.007	2.586	0.008	2.941	0.009	3.313	0.011	4.221	0.013
15.5	15 : 30	0.868	0.003	2.134	0.007	2.594	0.008	2.950	0.009	3.323	0.010	4.234	0.013
15.6	15 : 36	0.870	0.003	2.141	0.006	2.602	0.008	2.959	0.009	3.333	0.010	4.247	0.013
15.7	15 : 42	0.873	0.003	2.147	0.006	2.610	0.008	2.967	0.009	3.343	0.010	4.259	0.012
15.8	15 : 48	0.875	0.002	2.153	0.006	2.617	0.007	2.976	0.008	3.352	0.009	4.271	0.012
15.9	15 : 54	0.878	0.002	2.159	0.006	2.624	0.007	2.984	0.008	3.361	0.009	4.283	0.012
16	16 : 00	0.880	0.002	2.165	0.006	2.631	0.007	2.992	0.008	3.370	0.009	4.294	0.011
16.1	16 : 06	0.882	0.002	2.170	0.006	2.638	0.007	3.000	0.008	3.379	0.009	4.306	0.011
16.2	16 : 12	0.885	0.002	2.176	0.006	2.645	0.007	3.007	0.008	3.388	0.009	4.317	0.011
16.3	16 : 18	0.887	0.002	2.182	0.006	2.652	0.007	3.015	0.008	3.396	0.009	4.328	0.011
16.4	16 : 24	0.889	0.002	2.187	0.005	2.658	0.007	3.023	0.008	3.405	0.008	4.338	0.011
16.5	16 : 30	0.891	0.002	2.192	0.005	2.665	0.007	3.030	0.007	3.413	0.008	4.349	0.011
16.6	16 : 36	0.893	0.002	2.198	0.005	2.671	0.006	3.037	0.007	3.422	0.008	4.360	0.011
16.7	16 : 42	0.895	0.002	2.203	0.005	2.678	0.006	3.045	0.007	3.430	0.008	4.370	0.010
16.8	16 : 48	0.898	0.002	2.208	0.005	2.684	0.006	3.052	0.007	3.438	0.008	4.380	0.010
16.9	16 : 54	0.900	0.002	2.213	0.005	2.690	0.006	3.059	0.007	3.446	0.008	4.390	0.010
17	17 : 00	0.902	0.002	2.218	0.005	2.696	0.006	3.066	0.007	3.454	0.008	4.401	0.010
17.1	17 : 06	0.904	0.002	2.223	0.005	2.702	0.006	3.073	0.007	3.462	0.008	4.410	0.010
17.2	17 : 12	0.906	0.002	2.228	0.005	2.708	0.006	3.080	0.007	3.469	0.008	4.420	0.010
17.3	17 : 18	0.908	0.002	2.233	0.005	2.714	0.006	3.086	0.007	3.477	0.008	4.430	0.010
17.4	17 : 24	0.910	0.002	2.238	0.005	2.720	0.006	3.093	0.007	3.484	0.008	4.440	0.010
17.5	17 : 30	0.912	0.002	2.243	0.005	2.726	0.006	3.100	0.007	3.492	0.007	4.449	0.009
17.6	17 : 36	0.914	0.002	2.247	0.005	2.732	0.006	3.106	0.006	3.499	0.007	4.458	0.009
17.7	17 : 42	0.915	0.002	2.252	0.005	2.737	0.006	3.113	0.006	3.506	0.007	4.468	0.009
17.8	17 : 48	0.917	0.002	2.257	0.005	2.743	0.006	3.119	0.006	3.513	0.007	4.477	0.009
17.9	17 : 54	0.919	0.002	2.261	0.005	2.748	0.006	3.125	0.006	3.520	0.007	4.486	0.009
18	18 : 00	0.921	0.002	2.266	0.004	2.754	0.005	3.131	0.006	3.527	0.007	4.494	0.009
18.1	18 : 06	0.923	0.002	2.270	0.004	2.759	0.005	3.137	0.006	3.534	0.007	4.503	0.009
18.2	18 : 12	0.925	0.002	2.274	0.004	2.764	0.005	3.143	0.006	3.541	0.007	4.512	0.009
18.3	18 : 18	0.926	0.002	2.279	0.004	2.770	0.005	3.149	0.006	3.548	0.007	4.520	0.008
18.4	18 : 24	0.928	0.002	2.283	0.004	2.775	0.005	3.155	0.006	3.554	0.007	4.529	0.008
18.5	18 : 30	0.930	0.002	2.287	0.004	2.780	0.005	3.161	0.006	3.561	0.006	4.537	0.008
18.6	18 : 36	0.931	0.002	2.291	0.004	2.785	0.005	3.167	0.006	3.567	0.006	4.545	0.008
18.7	18 : 42	0.933	0.002	2.295	0.004	2.790	0.005	3.172	0.006	3.573	0.006	4.553	0.008
18.8	18 : 48	0.935	0.002	2.299	0.004	2.794	0.005	3.178	0.005	3.580	0.006	4.561	0.008
18.9	18 : 54	0.936	0.002	2.303	0.004	2.799	0.005	3.183	0.005	3.586	0.006	4.569	0.008
19	19 : 00	0.938	0.002	2.307	0.004	2.804	0.005	3.188	0.005	3.592	0.006	4.576	0.008
19.1	19 : 06	0.939	0.002	2.311	0.004	2.808	0.005	3.194	0.005	3.597	0.006	4.584	0.008
19.2	19 : 12	0.941	0.002	2.314	0.004	2.813	0.005	3.199	0.005	3.603	0.006	4.591	0.007
19.3	19 : 18	0.942	0.001	2.318	0.004	2.817	0.004	3.204	0.005	3.609	0.006	4.598	0.007
19.4	19 : 24	0.944	0.001	2.322	0.004	2.822	0.004	3.209	0.005	3.615	0.006	4.606	0.007
19.5	19 : 30	0.945	0.001	2.325	0.004	2.826	0.004	3.214	0.005	3.620	0.006	4.613	0.007

Time	Time	Type II		10-Year		25-Year		50-Year		100-Year		500-Year	
Hrs	HH : MM	%		Depth=	2.46	Depth=	2.99	Depth=	3.4	Depth=	3.83	Depth=	4.88
19.6	19 : 36	0.947	0.001	2.329	0.003	2.830	0.004	3.218	0.005	3.625	0.005	4.619	0.007
19.7	19 : 42	0.948	0.001	2.332	0.003	2.834	0.004	3.223	0.005	3.631	0.005	4.626	0.007
19.8	19 : 48	0.949	0.001	2.335	0.003	2.839	0.004	3.228	0.005	3.636	0.005	4.633	0.007
19.9	19 : 54	0.951	0.001	2.339	0.003	2.843	0.004	3.232	0.005	3.641	0.005	4.639	0.007
20	20 : 00	0.952	0.001	2.342	0.003	2.846	0.004	3.237	0.004	3.646	0.005	4.646	0.006
20.1	20 : 06	0.953	0.001	2.345	0.003	2.850	0.004	3.241	0.004	3.651	0.005	4.652	0.006
20.2	20 : 12	0.955	0.001	2.348	0.003	2.854	0.004	3.246	0.004	3.656	0.005	4.658	0.006
20.3	20 : 18	0.956	0.001	2.351	0.003	2.858	0.004	3.250	0.004	3.661	0.005	4.665	0.006
20.4	20 : 24	0.957	0.001	2.355	0.003	2.862	0.004	3.254	0.004	3.666	0.005	4.671	0.006
20.5	20 : 30	0.958	0.001	2.358	0.003	2.866	0.004	3.259	0.004	3.671	0.005	4.677	0.006
20.6	20 : 36	0.960	0.001	2.361	0.003	2.870	0.004	3.263	0.004	3.676	0.005	4.683	0.006
20.7	20 : 42	0.961	0.001	2.364	0.003	2.873	0.004	3.267	0.004	3.681	0.005	4.690	0.006
20.8	20 : 48	0.962	0.001	2.367	0.003	2.877	0.004	3.272	0.004	3.685	0.005	4.696	0.006
20.9	20 : 54	0.964	0.001	2.370	0.003	2.881	0.004	3.276	0.004	3.690	0.005	4.702	0.006
21	21 : 00	0.965	0.001	2.373	0.003	2.885	0.004	3.280	0.004	3.695	0.005	4.708	0.006
21.1	21 : 06	0.966	0.001	2.376	0.003	2.888	0.004	3.284	0.004	3.700	0.005	4.714	0.006
21.2	21 : 12	0.967	0.001	2.379	0.003	2.892	0.004	3.289	0.004	3.705	0.005	4.720	0.006
21.3	21 : 18	0.968	0.001	2.382	0.003	2.896	0.004	3.293	0.004	3.709	0.005	4.726	0.006
21.4	21 : 24	0.970	0.001	2.385	0.003	2.899	0.004	3.297	0.004	3.714	0.005	4.732	0.006
21.5	21 : 30	0.971	0.001	2.389	0.003	2.903	0.004	3.301	0.004	3.719	0.005	4.738	0.006
21.6	21 : 36	0.972	0.001	2.392	0.003	2.907	0.004	3.305	0.004	3.723	0.005	4.744	0.006
21.7	21 : 42	0.973	0.001	2.395	0.003	2.910	0.004	3.309	0.004	3.728	0.005	4.750	0.006
21.8	21 : 48	0.975	0.001	2.397	0.003	2.914	0.004	3.314	0.004	3.733	0.005	4.756	0.006
21.9	21 : 54	0.976	0.001	2.400	0.003	2.918	0.004	3.318	0.004	3.737	0.005	4.762	0.006
22	22 : 00	0.977	0.001	2.403	0.003	2.921	0.004	3.322	0.004	3.742	0.005	4.768	0.006
22.1	22 : 06	0.978	0.001	2.406	0.003	2.925	0.004	3.326	0.004	3.747	0.005	4.774	0.006
22.2	22 : 12	0.979	0.001	2.409	0.003	2.928	0.004	3.330	0.004	3.751	0.005	4.779	0.006
22.3	22 : 18	0.981	0.001	2.412	0.003	2.932	0.004	3.334	0.004	3.756	0.005	4.785	0.006
22.4	22 : 24	0.982	0.001	2.415	0.003	2.935	0.004	3.338	0.004	3.760	0.005	4.791	0.006
22.5	22 : 30	0.983	0.001	2.418	0.003	2.939	0.004	3.342	0.004	3.765	0.005	4.797	0.006
22.6	22 : 36	0.984	0.001	2.421	0.003	2.942	0.003	3.346	0.004	3.769	0.004	4.802	0.006
22.7	22 : 42	0.985	0.001	2.424	0.003	2.946	0.003	3.350	0.004	3.774	0.004	4.808	0.006
22.8	22 : 48	0.986	0.001	2.427	0.003	2.949	0.003	3.354	0.004	3.778	0.004	4.814	0.006
22.9	22 : 54	0.988	0.001	2.429	0.003	2.953	0.003	3.358	0.004	3.783	0.004	4.819	0.006
23	23 : 00	0.989	0.001	2.432	0.003	2.956	0.003	3.362	0.004	3.787	0.004	4.825	0.006
23.1	23 : 06	0.990	0.001	2.435	0.003	2.960	0.003	3.366	0.004	3.791	0.004	4.831	0.006
23.2	23 : 12	0.991	0.001	2.438	0.003	2.963	0.003	3.370	0.004	3.796	0.004	4.836	0.006
23.3	23 : 18	0.992	0.001	2.441	0.003	2.967	0.003	3.373	0.004	3.800	0.004	4.842	0.006
23.4	23 : 24	0.993	0.001	2.444	0.003	2.970	0.003	3.377	0.004	3.804	0.004	4.847	0.006
23.5	23 : 30	0.994	0.001	2.446	0.003	2.973	0.003	3.381	0.004	3.809	0.004	4.853	0.006
23.6	23 : 36	0.996	0.001	2.449	0.003	2.977	0.003	3.385	0.004	3.813	0.004	4.858	0.005
23.7	23 : 42	0.997	0.001	2.452	0.003	2.980	0.003	3.389	0.004	3.817	0.004	4.864	0.005
23.8	23 : 48	0.998	0.001	2.455	0.003	2.983	0.003	3.392	0.004	3.822	0.004	4.869	0.005
23.9	23 : 54	0.999	0.001	2.457	0.003	2.987	0.003	3.396	0.004	3.826	0.004	4.875	0.005
24	24 : 00	1.000	0.001	2.460	0.003	2.990	0.003	3.400	0.004	3.830	0.004	4.880	0.005

Appendix B – Existing Conditions Input Data

HEC-RAS Input Data

Existing Basin Calculations			
Variable	Value	Units	Comments
Cw 2/10 Year	0.16	N/A	Weighted Runoff Coefficeint found by using equation 2 in the Report
Cw 25 Year	0.18	N/A	Weighted Runoff Coefficeint found by using equation 2 in the Report
Cw 100 Year	0.20	N/A	Weighted Runoff Coefficeint found by using equation 2 in the Report
A1	150.31	Acres	Total Area for this land cover within the sub-basin
C1 - 2/10 Year	0.15	Agricultural	Average for the runoff Coefficeints of the storm event of the land cover found in Table 2-1
C1 - 25 Year	0.17	Agricultural	Average for the runoff Coefficeints of the storm event of the land cover found in Table 2-1
C1 - 100 Year	0.19	Agricultural	Average for the runoff Coefficeints of the storm event of the land cover found in Table 2-1
A2	5.84	Acres	Total Area for this land cover within the sub-basin
C1 - 2/10 Year	0.45	Developed, Low Intensity	Average for the runoff Coefficeints of the storm event of the land cover found in Table 2-1
C1 - 25 Year	0.50	Developed, Low Intensity	Average for the runoff Coefficeints of the storm event of the land cover found in Table 2-1
C1 - 100 Year	0.57	Developed, Low Intensity	Average for the runoff Coefficeints of the storm event of the land cover found in Table 2-1
A3	0.07	Acres	Total Area for this land cover within the sub-basin
C1 - 2/10 Year	0.38	Developed, Open Space	Average for the runoff Coefficeints of the storm event of the land cover found in Table 2-1
C1 - 25 Year	0.41	Developed, Open Space	Average for the runoff Coefficeints of the storm event of the land cover found in Table 2-1
C1 - 100 Year	0.47	Developed, Open Space	Average for the runoff Coefficeints of the storm event of the land cover found in Table 2-1
Tc	0.33	Hours	Time of Concentration found by using equation 3 in the Report
L	0.24	Miles	Length of longest flow path within the sub-basin
Kb	0.06	N/A	Watershed Resistance Coefficent found by using equation 4 in the report
m	-0.01375	N/A	Type B watershed Resistance Coefficients found in table 2-2
b	0.08	N/A	Type B watershed Resistance Coefficients found in table 2-2
S	26.4	ft/mi	Slope of the longest flow path within the sub-basin
i	5.96	N/A	Localized IDF value found in Table 2-7
Q 2/10 Year	150.19	CFS	Peak Flow of the 100-yr Storm Event found by using equation 1 in the report
Q 25 Year	165.21	CFS	Peak Flow of the 100-yr Storm Event found by using equation 1 in the report
Q 100 Year	190.06	CFS	Peak Flow of the 100-yr Storm Event found by using equation 1 in the report

Appendix C – Proposed Conditions Input Data

HEC-RAS Input Data

		CN	CN Adjusted	Abstraction Ratio	Min Infill Rate	Mannings N	% Impervious
0	NoData	92			0.05	0.05	0
1	NoData : C	90			0.05	0.05	0
10	Developed, Medium Intensity : NoData	86			0.05	0.3	80
11	Developed, Medium Intensity : C	81			0.05	0.3	80
12	Developed, Medium Intensity : B	72			0.05	0.3	80
13	Developed, Medium Intensity : A	57			0.05	0.3	80
14	Developed, Medium Intensity : D	86			0.05	0.3	80
15	Shrub-Scrub : NoData	77			0.05	0.06	0
16	Shrub-Scrub : C	70			0.05	0.06	0
17	Shrub-Scrub : B	56			0.05	0.06	0
18	Shrub-Scrub : A	35			0.05	0.06	0
19	Shrub-Scrub : D	77			0.05	0.06	0
2	NoData : B	85			0.05	0.05	0
20	Cultivated Crops : NoData	89			0.05	0.035	0
21	Cultivated Crops : C	85			0.05	0.035	0
22	Cultivated Crops : B	78			0.05	0.035	0
23	Cultivated Crops : A	67			0.05	0.035	0
24	Cultivated Crops : D	89			0.05	0.035	0
25	Woody Wetlands : NoData	86			0.05	0.04	0
26	Woody Wetlands : C	82			0.05	0.04	0
27	Woody Wetlands : B	73			0.05	0.04	0
28	Woody Wetlands : A	57			0.05	0.04	0
29	Woody Wetlands : D	86			0.05	0.04	0
3	NoData : A	76			0.05	0.05	0
30	Emergent Herbaceous Wetlands : NoData	93			0.05	0.04	0
31	Emergent Herbaceous Wetlands : C	87			0.05	0.04	0
32	Emergent Herbaceous Wetlands : B	80			0.05	0.04	0
33	Emergent Herbaceous Wetlands : A	70			0.05	0.04	0
34	Emergent Herbaceous Wetlands : D	93			0.05	0.04	0
35	Developed, Open Space : NoData	84			0.05	0.035	25
36	Developed, Open Space : C	79			0.05	0.035	25
37	Developed, Open Space : B	69			0.05	0.035	25
38	Developed, Open Space : A	49			0.05	0.035	25
39	Developed, Open Space : D	84			0.05	0.035	25
4	NoData : D	91			0.05	0.05	0
40	Developed, Low Intensity : NoData	84			0.05	0.035	25
41	Developed, Low Intensity : C	79			0.05	0.035	25
42	Developed, Low Intensity : B	68			0.05	0.035	25
43	Developed, Low Intensity : A	51			0.05	0.035	25
44	Developed, Low Intensity : D	84			0.05	0.035	25
45	Pasture, Hay : NoData	80			0.05	0.05	0
46	Pasture, Hay : C	74			0.05	0.05	0
47	Pasture, Hay : B	61			0.05	0.05	0
48	Pasture, Hay : A	39			0.05	0.05	0
49	Pasture, Hay : D	80			0.05	0.05	0
5	Developed, High Intensity : NoData	92			0.05	0.5	90
50	Grassland, Herbaceous : NoData	89			0.05	0.04	0
51	Grassland, Herbaceous : C	81			0.05	0.04	0
52	Grassland, Herbaceous : B	71			0.05	0.04	0
53	Grassland, Herbaceous : A	63			0.05	0.04	0
54	Grassland, Herbaceous : D	89			0.05	0.04	0
55	Barren Land : NoData	92			0.05	0.05	0
56	Barren Land : C	90			0.05	0.05	0
57	Barren Land : B	85			0.05	0.05	0
58	Barren Land : A	76			0.05	0.05	0
59	Barren Land : D	92			0.05	0.05	0
6	Developed, High Intensity : C	90			0.05	0.5	90
60	Open Water : NoData	100			0.05	0.015	100
61	Open Water : C	100			0.05	0.015	100
62	Open Water : B	100			0.05	0.015	100
63	Open Water : A	100			0.05	0.015	100
64	Open Water : D	100			0.05	0.015	100
7	Developed, High Intensity : B	85			0.05	0.5	90
8	Developed, High Intensity : A	77			0.05	0.5	90
9	Developed, High Intensity : D	92			0.05	0.5	90
	Proposed Roads : NoData	94			0.05	0.02	90
	Proposed Roads : A	91			0.05	0.02	90
	Proposed Roads : B	92			0.05	0.02	90
	Proposed Roads : C	93			0.05	0.02	90
	Proposed Roads : D	94			0.05	0.02	90

Appendix D – Existing Condition Exhibit Maps

Overall Basin Map

Max. Water Depth

Max. Water Velocity

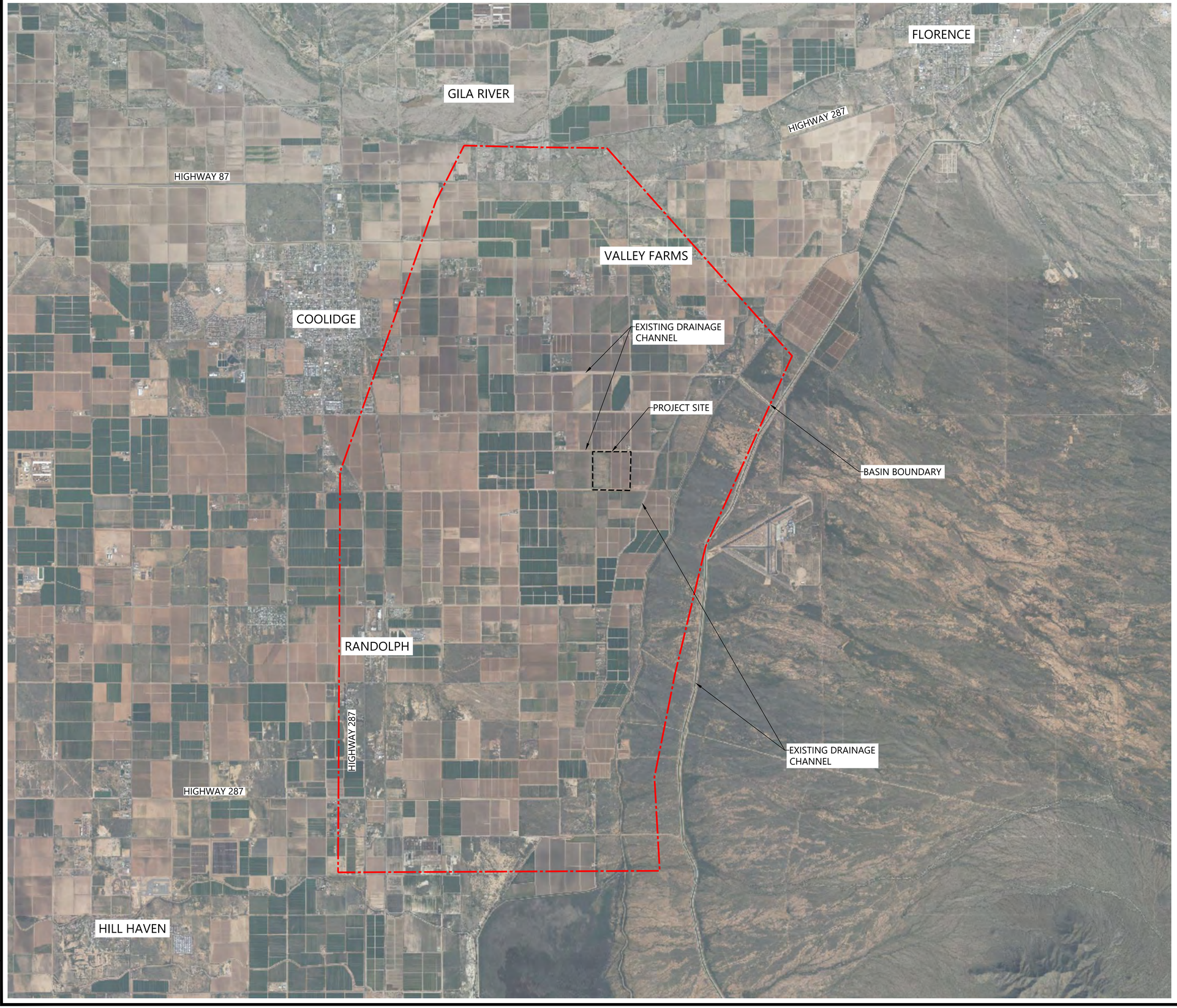
Max. Potential Scour

Subbasin Map

Soils Map

Land Cover Map

Curve Number Map



3000 0 3000 6000

(IN FEET)
1 inch = 3000 ft.

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CLIENT
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700 UNIVERSE BLVD
JUNO BEACH, FL 33408
PHONE: 847.736.6805

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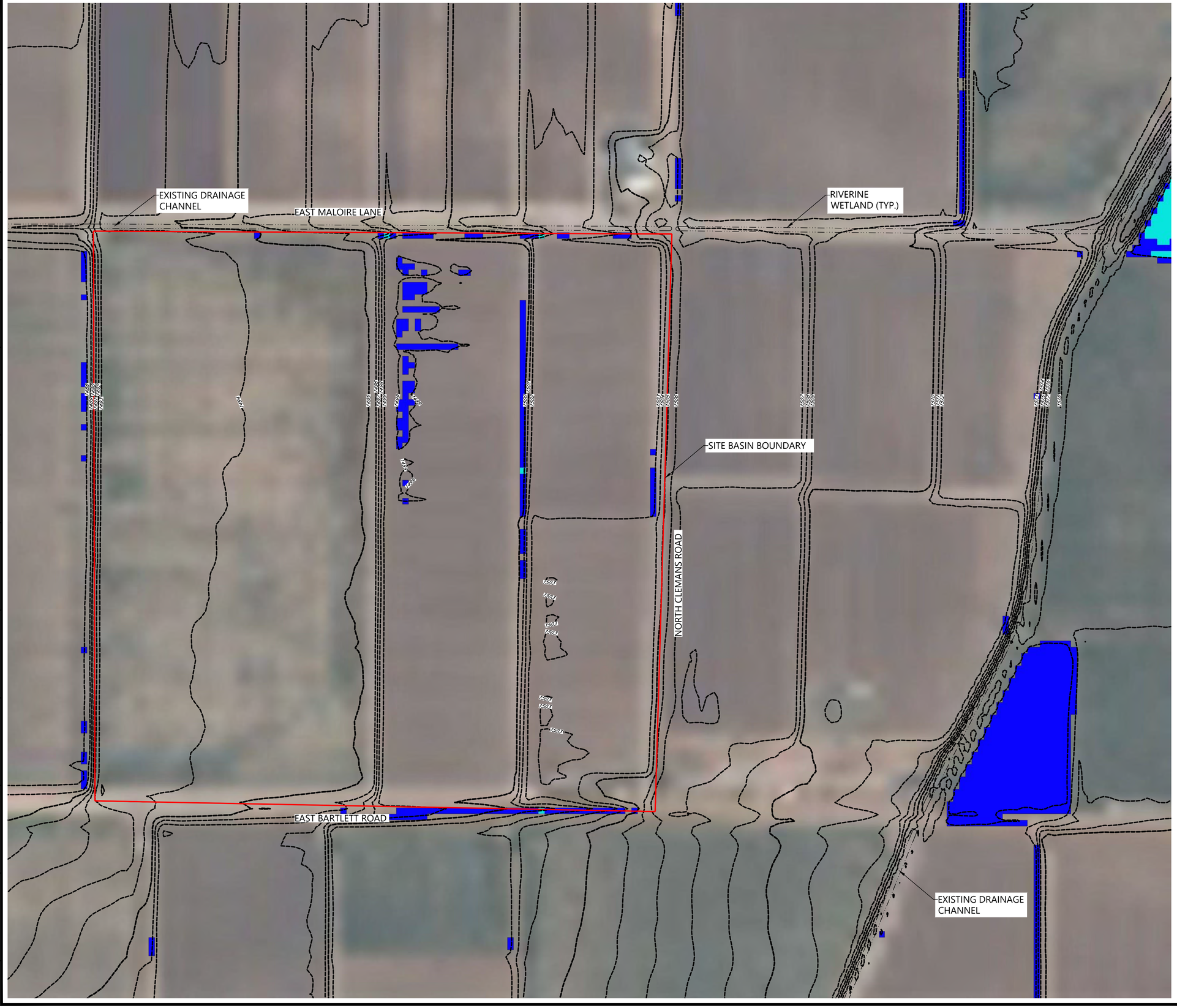
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CAD FILE: VALLEY FARMS BESS_EXHIBIT_MAPS_EXISTING2.DWG

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XREFDEPENDENCIES: Base Data Xrefs: 3.0 Design\3.4 Civil Design\3.4.9 HYDROLOGY\DRAWINGS\EXHIBIT DRAWINGS\VALLEY FARMS BESS_EXHIBIT_MAPS_EXISTING.DWG Hydrology Drawings\3.4.9 HYDROLOGY\DRAWINGS\ATTACHMENTS\ATTACHMENTS.DWG



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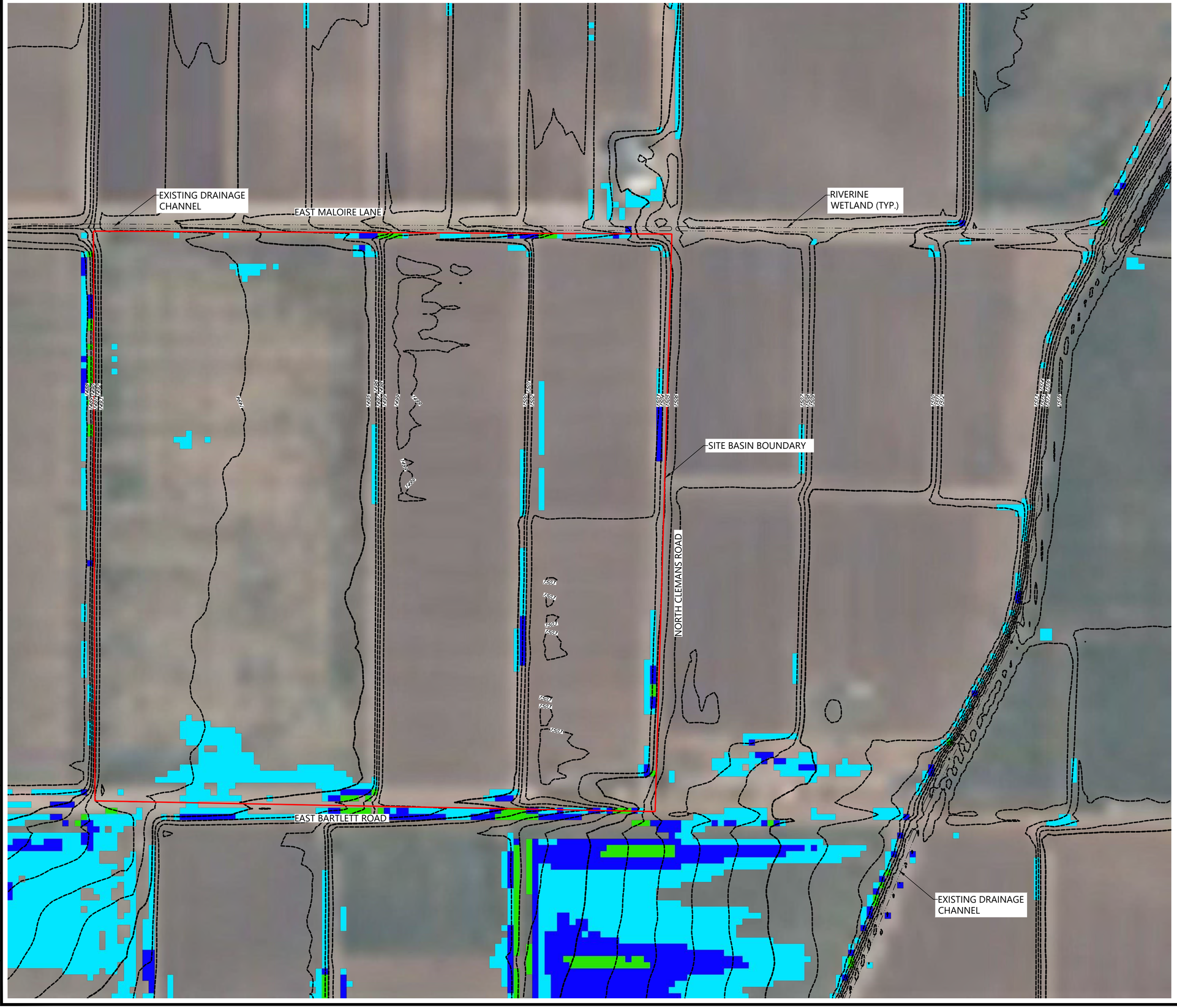
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200 0 200 400

(IN FEET)
1 inch = 200 ft.

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VALLEY FARMS BESS
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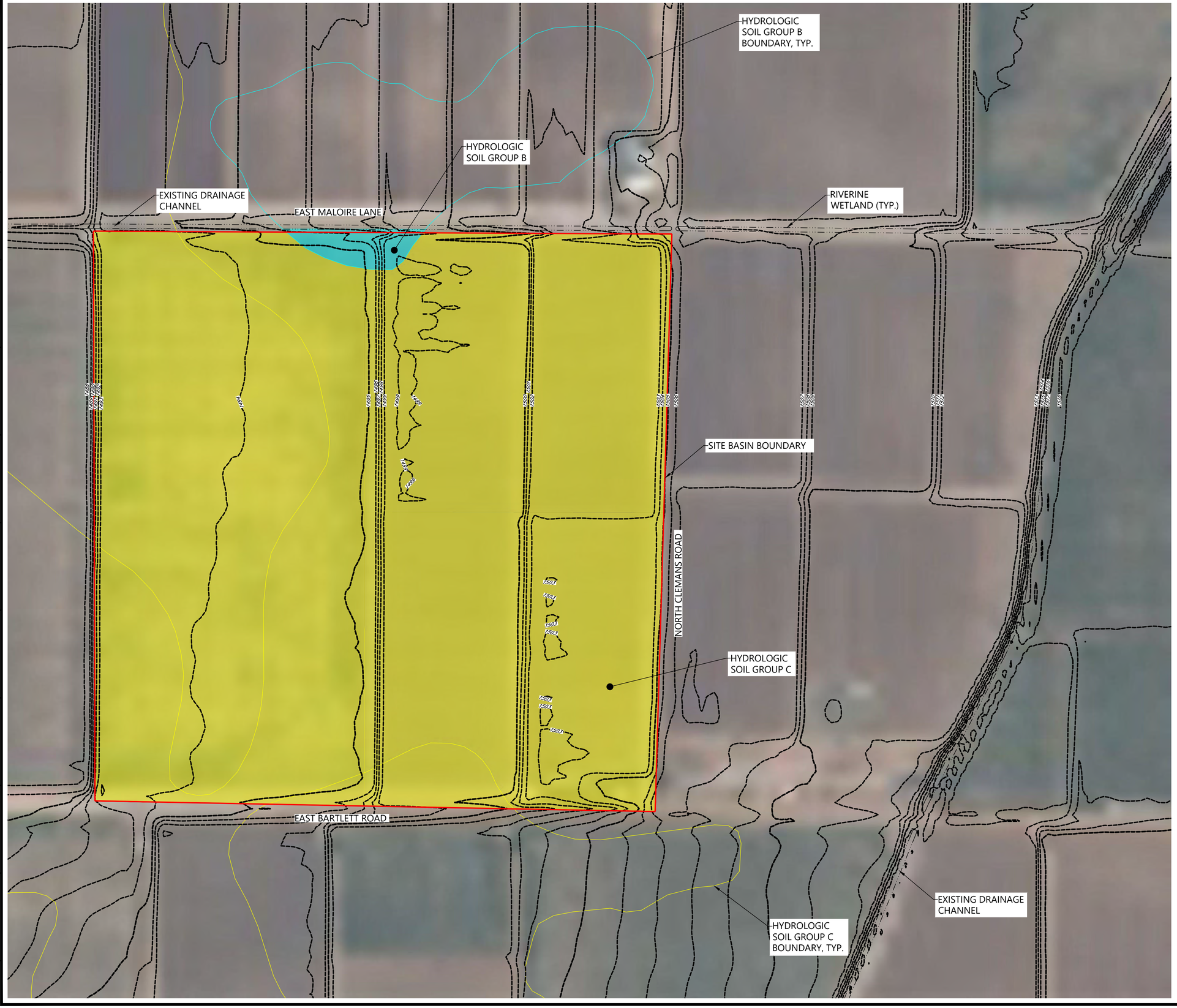
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XREFDEPENDENTS: Exhibit Civil Xrefs.dwg | Exhibit Civil Xrefs.dwg | EXHIBIT CIVILVALLEY FARMS BESS_EXHIBIT_MAPS_EXISTING.DWG



LEGEND:

- HYDROLOGIC SOIL GROUP B
- HYDROLOGIC SOIL GROUP C

200 0 200 400

(IN FEET)
1 inch = 200 ft.

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EXISTING SOILS MAP

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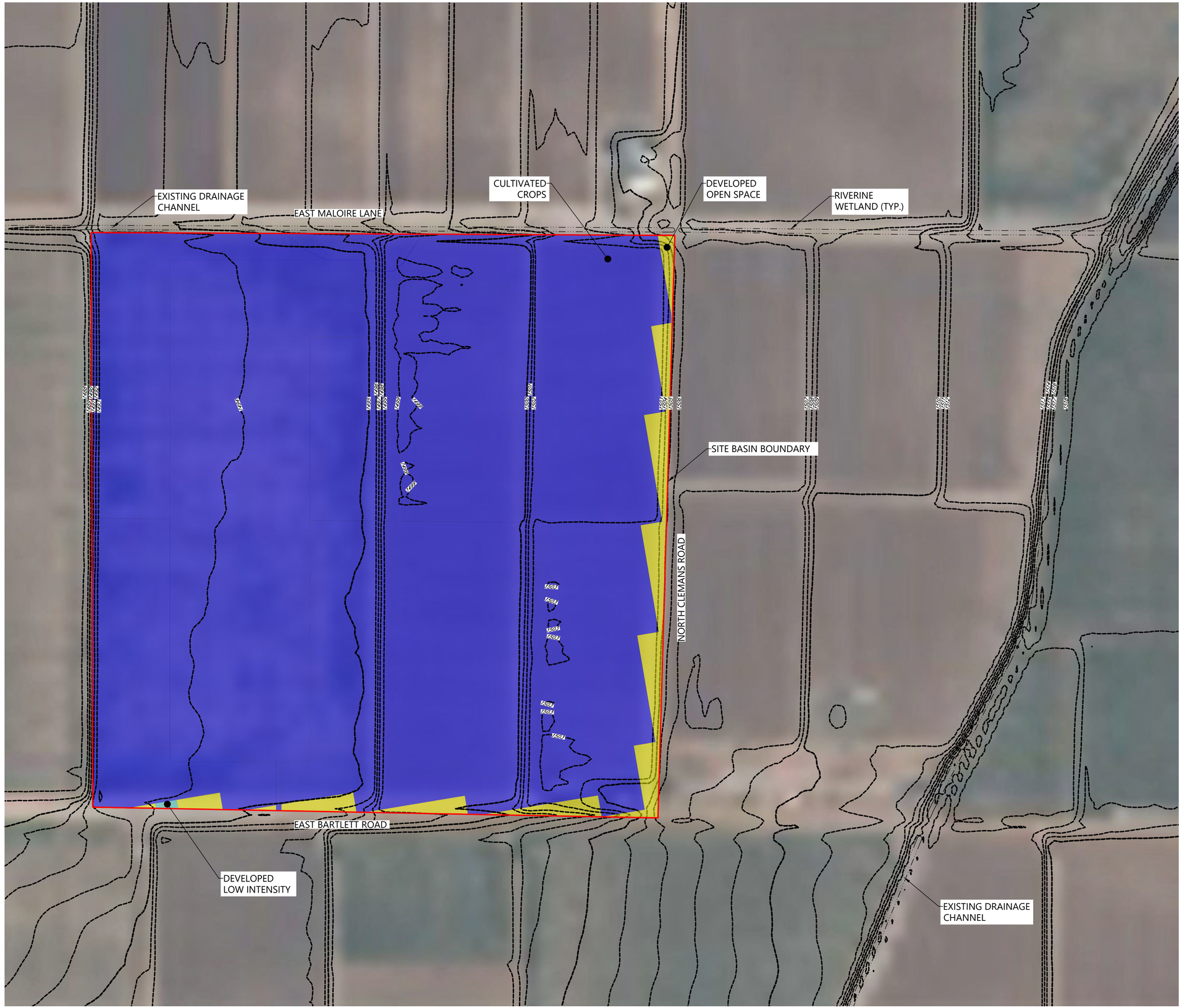
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CAD FILE: VALLEY FARMS BESS_EXHIBIT_MAPS_EXISTING.DWG



LEGEND:

- BASIN - CULTIVATED CROPS
- BASIN - DEVELOPED OPEN SPACE
- BASIN - DEVELOPED LOW INTENSITY

200 0 200 400

(IN FEET)
1 inch = 200 ft.

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VALLEY FARMS BESS
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EXISTING LAND COVER MAP

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CAD FILE: VALLEY FARMS BESS_EXHIBIT_MAPS_EXISTING.DWG

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VALLEY FARMS BESS
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EXISTING CURVE NUMBER MAP

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CAD FILE: VALLEY FARMS BESS_EXHIBIT_MAPS_EXISTING.DWG

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Appendix E – Proposed Condition Exhibit Maps

Max. Water Depth

Max. Water Velocity

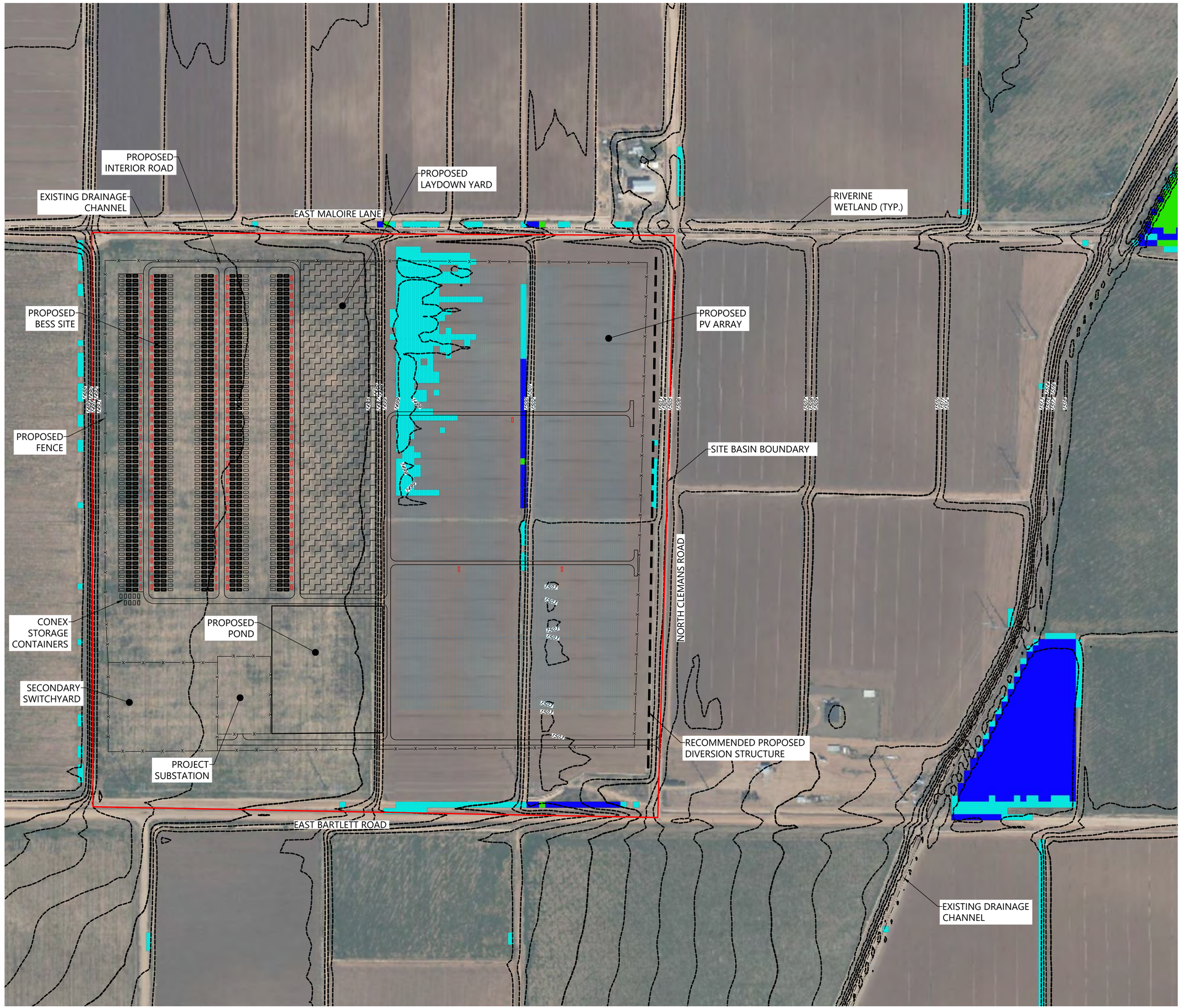
Max. Potential Scour

Subbasin Map

Soils Map

Land Cover Map

Curve Number Map



MAXIMUM DEPTH
100-YR EVENT, FT

- <=0.5
- 0.5 to 0.75
- 0.75 to 1.0
- 1.0 to 2.0
- 2.0 to 3.0
- 3.0 to 4.0
- >4.0

200 0 200 400

(IN FEET)
1 inch = 200 ft.

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PROPOSED 100-YR DEPTH

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DATE 09/30/2024

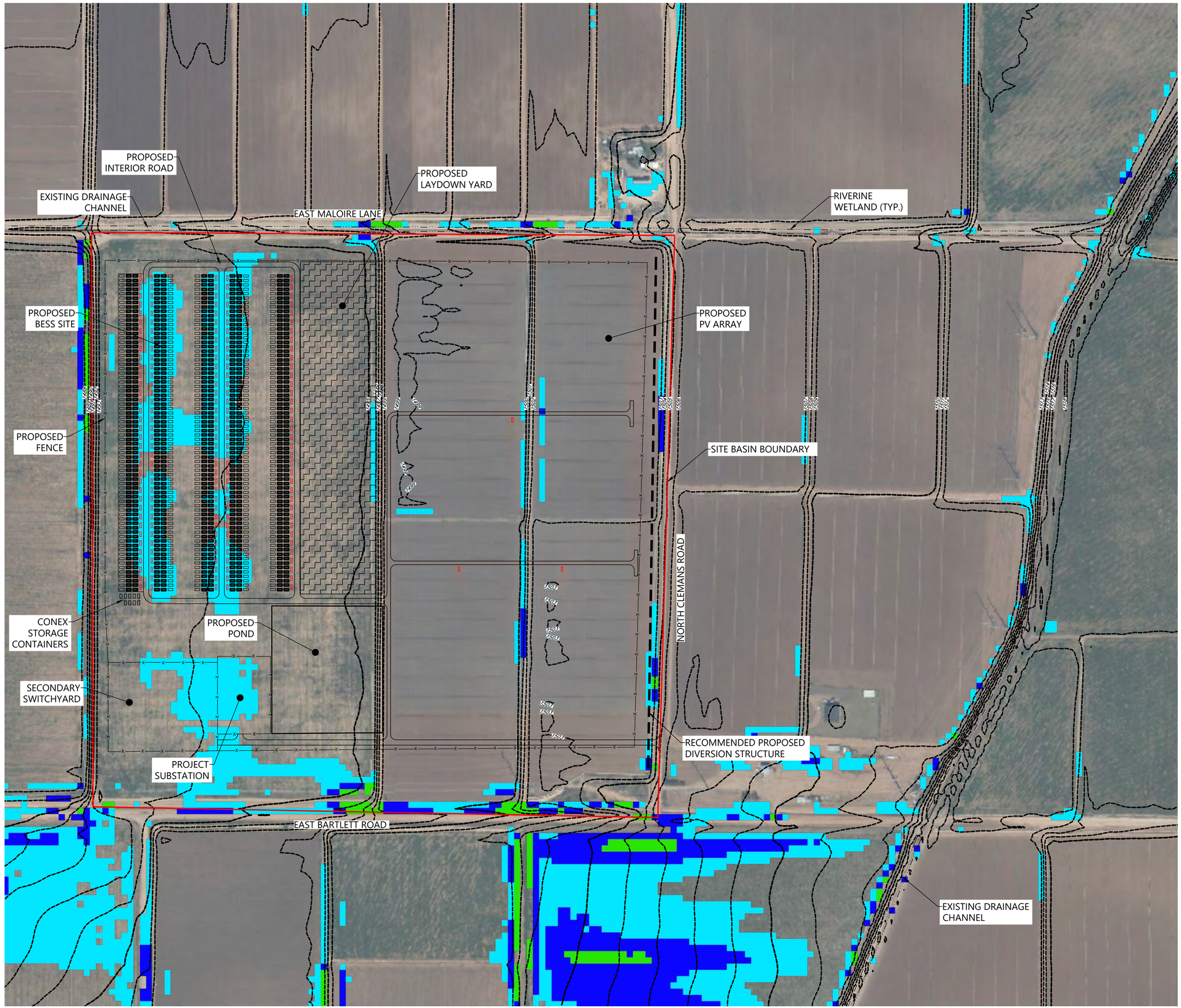
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CAD FILE: VALLEY FARMS BESS_EXHIBIT_MAPS_PROPOSED.DWG

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MAXIMUM VELOCITY
100-YR EVENT, FPS

- <=0.5
- 0.5 to 0.75
- 0.75 to 1.0
- 1.0 to 2.0
- 2.0 to 3.0
- 3.0 to 4.0
- >4.0

200 0 200 400
(IN FEET)
1 inch = 200 ft.

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VALLEY FARMS BESS
HYDROLOGY PLAN EXHIBITS
PROPOSED 100-YR VELOCITY

CLIENT
NEXTERA ENERGY
700 UNIVERSE BLVD
JUNO BEACH, FL 33408
PHONE: 847.736.6805

DATE 09/30/2024

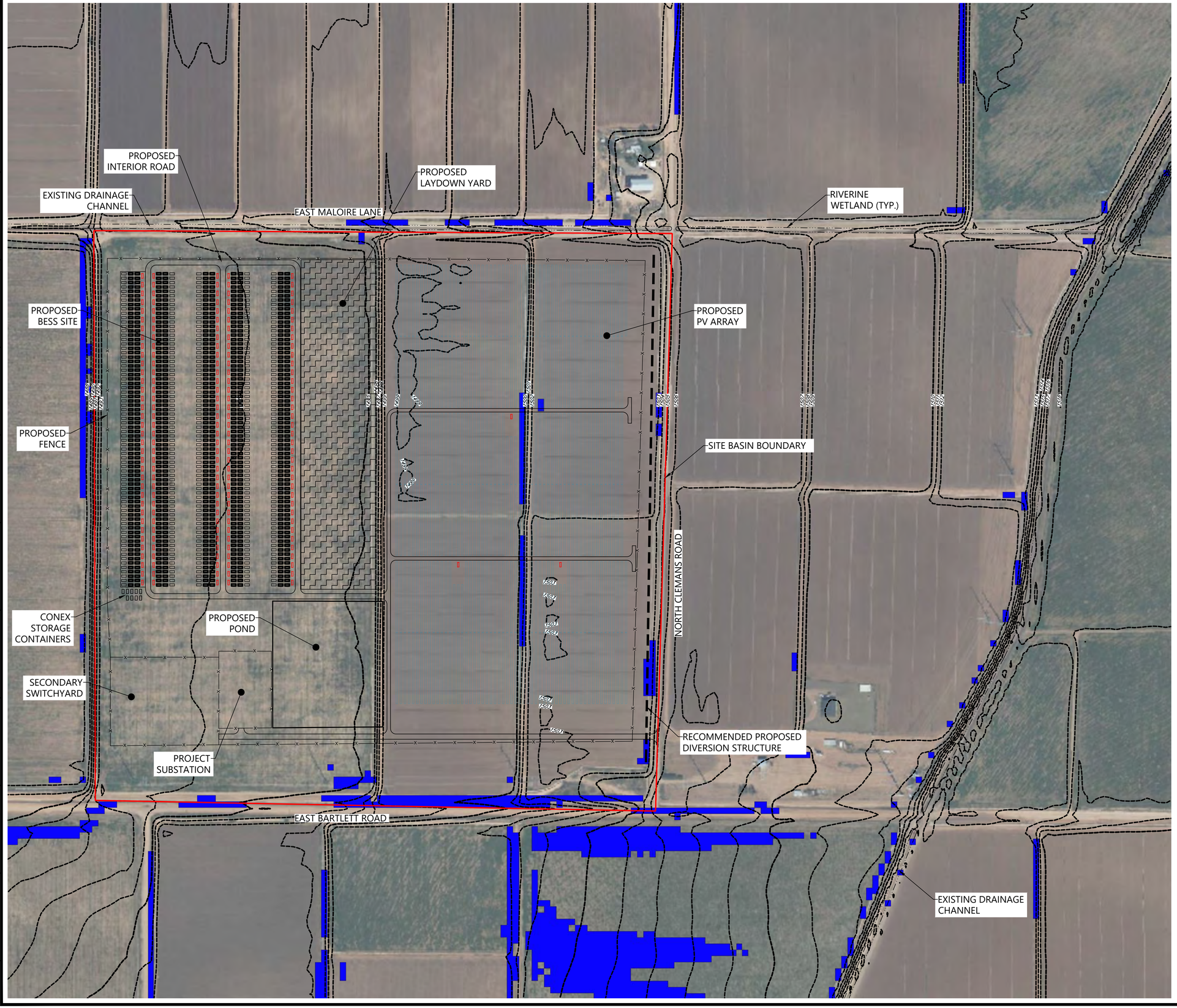
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P.M. SP	
BOOK	
JOB 24000083	
SHEET NO. 10	

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MAXIMUM SCOUR
100-YR EVENT, FT

- <=0.5
- 0.5 to 1.0
- 1.0 to 2.0
- 2.0 to 4.0
- 4.0 to 8.0
- >8.0

200 0 200 400

(IN FEET)
1 inch = 200 ft.

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PROPOSED 100-YR SCOUR

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JUNO BEACH, FL 33408
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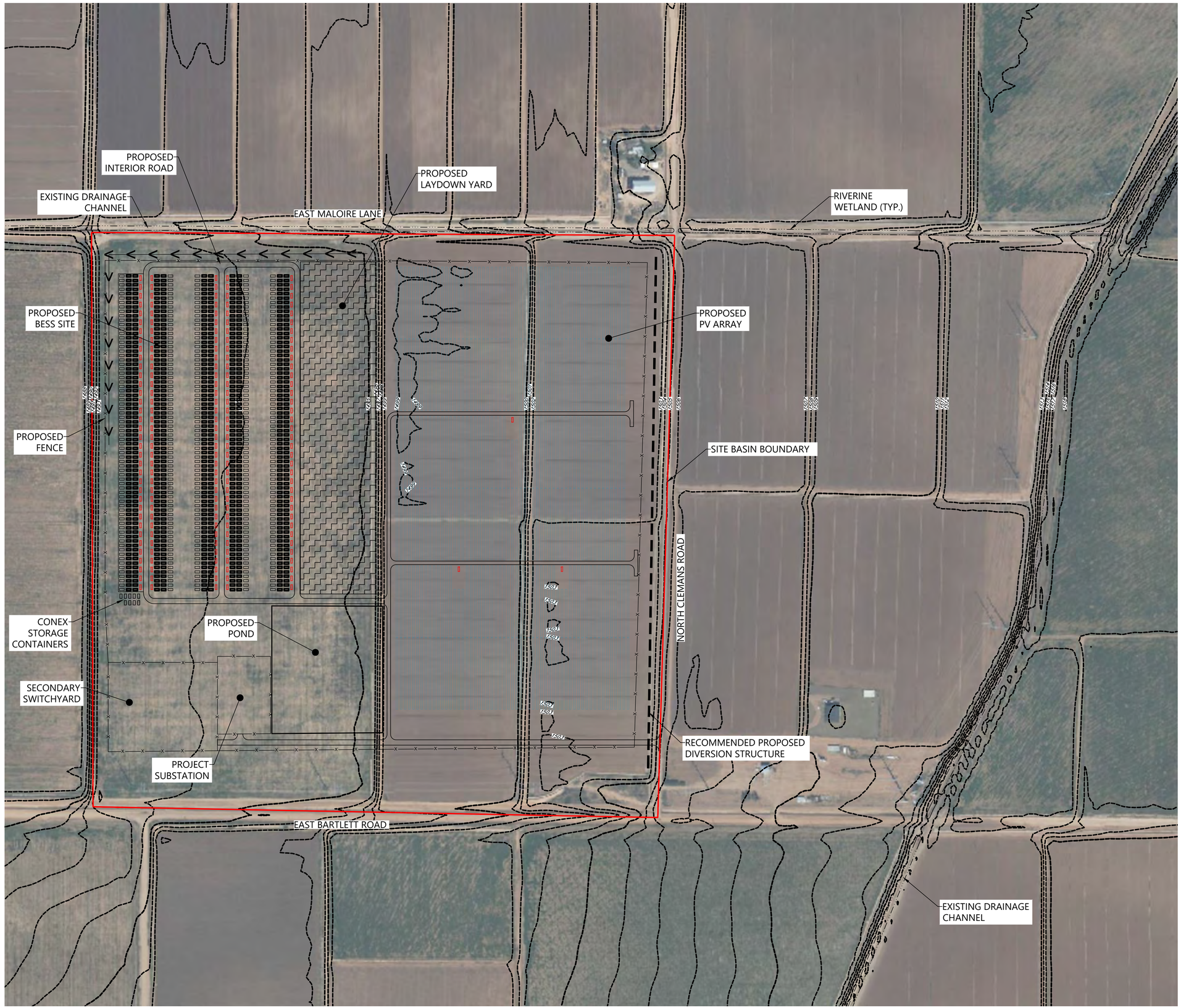
DR. AE	CH. SP
P.M. SP	
BOOK	
JOB 24000083	
SHEET NO. 11	

NOT-ISSUED-FOR-CONSTRUCTION

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VALLEY FARMS BESS
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PROPOSED BASIN MAP

CLIENT
NEXTERA ENERGY
700 UNIVERSE BLVD
JUNO BEACH, FL 33408
PHONE: 847.736.6805

DATE 09/30/2024

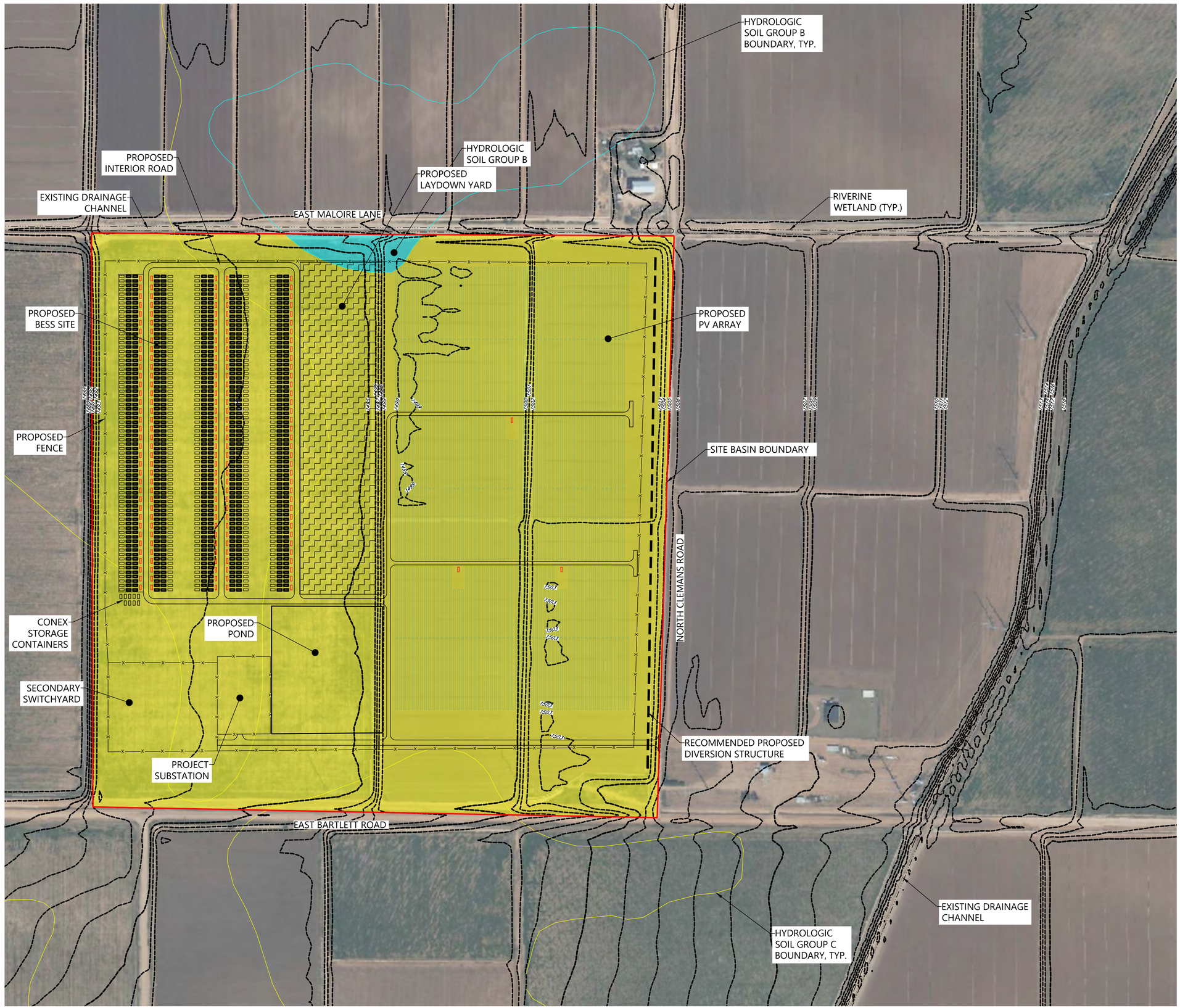
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LEGEND:

- HYDROLOGIC SOIL GROUP B
- HYDROLOGIC SOIL GROUP C

200 0 200 400

(IN FEET)
1 inch = 200 ft.

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VALLEY FARMS BESS
HYDROLOGY PLAN EXHIBITS
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CAD FILE: VALLEY FARMS BESS_EXHIBIT_MAPS_PROPOSED.DWG

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LEGEND:

- BASIN - CULTIVATED CROPS
- BASIN - DEVELOPED OPEN SPACE
- BASIN - DEVELOPED LOW INTENSITY
- BASIN - PROPOSED SITE

200 0 200 400

(IN FEET)
1 inch = 200 ft.

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VALLEY FARMS BESS
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PROPOSED LAND COVER MAP

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700 UNIVERSE BLVD
JUNO BEACH, FL 33408
PHONE: 847.736.6805

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CAD FILE: VALLEY FARMS BESS_EXHIBIT_MAPS_PROPOSED.DWG

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VALLEY FARMS BESS
HYDROLOGY PLAN EXHIBITS
PROPOSED CURVE NUMBER MAP

CLIENT
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700 UNIVERSE BLVD
JUNO BEACH, FL 33408
PHONE: 847.736.6805

DATE 09/30/2024

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CAD FILE: VALLEY FARMS BESS_EXHIBIT_MAPS_PROPOSED.DWG

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VALLEY FARMS ENERGY CENTER PROJECT

Earth Fissure

Project Area

Fissure Line

Reported

Existing Infrastructure

230 kV Transmission Line

500 kV Transmission Line

Coolidge Municipal Airport

Pinal County, AZ
USGS 7.5' Quadrangle:
Valley Farms, AZ, 32111-H4
T5S R9E Sec 31
NAD 1983 UTM Zone 12N
111.4597°W 32.9482°N

0 2,000 4,000 Feet
0 590 1,180 Meters

1:55,000

N

SWCA ENVIRONMENTAL CONSULTANTS

Base Map: ESRI ArcGIS Online, accessed July 2024

Updated: 7/25/2024
Project No. 64841
File:64841 Project Earth Fissure

PRELIMINARY POTABLE WATER REPORT

VALLEY FARMS ENERGY CENTER
PINAL COUNTY, ARIZONA

Prepared for
save
NextEra Energy
700 Universe Blvd
Juno Beach, FL 33408

Atwell Project No. 24000083



Expires 3/31/2027

Submitted by Atwell, LLC

REVISION NO:	DATE:	REVISION:	PROJECT MANAGER APPROVAL (INITIAL & DATE)	CLIENT APPROVAL (INITIAL & DATE)
0	09/27/2024	Final Report	DM – 09/27/2024	

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1 Project Description 1
2 Location 1
3. Purpose of Report 1
4. Design Requirements 2
5. Existing Potable Water Infrastructure 2
6. Proposed Potable Water Infrastructure 2
References 2

Appendices

Appendix A – Site Plan

1 Project Description

Valley Farms Energy Center, LLC (Applicant), a wholly owned indirect subsidiary of NextEra Energy Resources, is requesting a Zone Change and Planned Area Development (PAD) Overlay District to construct, operate, and maintain the Valley Farms Energy Center Project, a utility-scale photovoltaic (PV) solar facility and battery energy storage system (BESS) on approximately 160 acres of private land in unincorporated Pinal County, Arizona.

The proposed construction consists of a PV solar facility and a battery energy storage system and will include a substation and associated electrical equipment mounted on mat foundations.

Proposed earthwork will consist of typical clearing and grubbing of vegetation and grading with associated cuts and fills necessary for equipment installation. Dirt or gravel access and maintenance roads will be constructed to access the site and substation. Natural drainage patterns will be maintained through and around the site.

2 Location

The project is located in central Pinal County in southern Arizona, approximately 4.30 miles southeast of Coolidge, Arizona. The west edge of the project is approximately 2600’ east of North Attaway Road. The north edge of the project is bounded by East Malorie Lane. The east edge of the project is bounded by North Clemans Road. The south edge of the project is bounded by East Bartlett Road. The site is part of the Middle Gila watershed.



Figure 1: Project Location

3. Purpose of Report

The purpose of this report is to identify existing and proposed potable water infrastructure within the proposed project site.

4. Design Requirements

Chapter 9 of the Pinal County, Arizona Subdivision and Infrastructure Design Manual provide design criteria and guidance for construction of potable water systems within Pinal County. Water systems within Arizona must also meet the requirements of the Arizona Department of Environmental Quality.

5. Existing Potable Water Infrastructure

The project is located in a rural area. Existing potable water facilities in the region would be specific to homes and would likely consist of well systems. An existing home is located adjacent to the northeast corner of the site, across East Maloire Lane.

Existing potable water infrastructure within the site has not been identified or analyzed. It is not anticipated that any such facilities exist within the project area.

If any potable water infrastructure is identified on site, appropriate measures should be taken to ensure that they are not disturbed or damaged during construction activities.

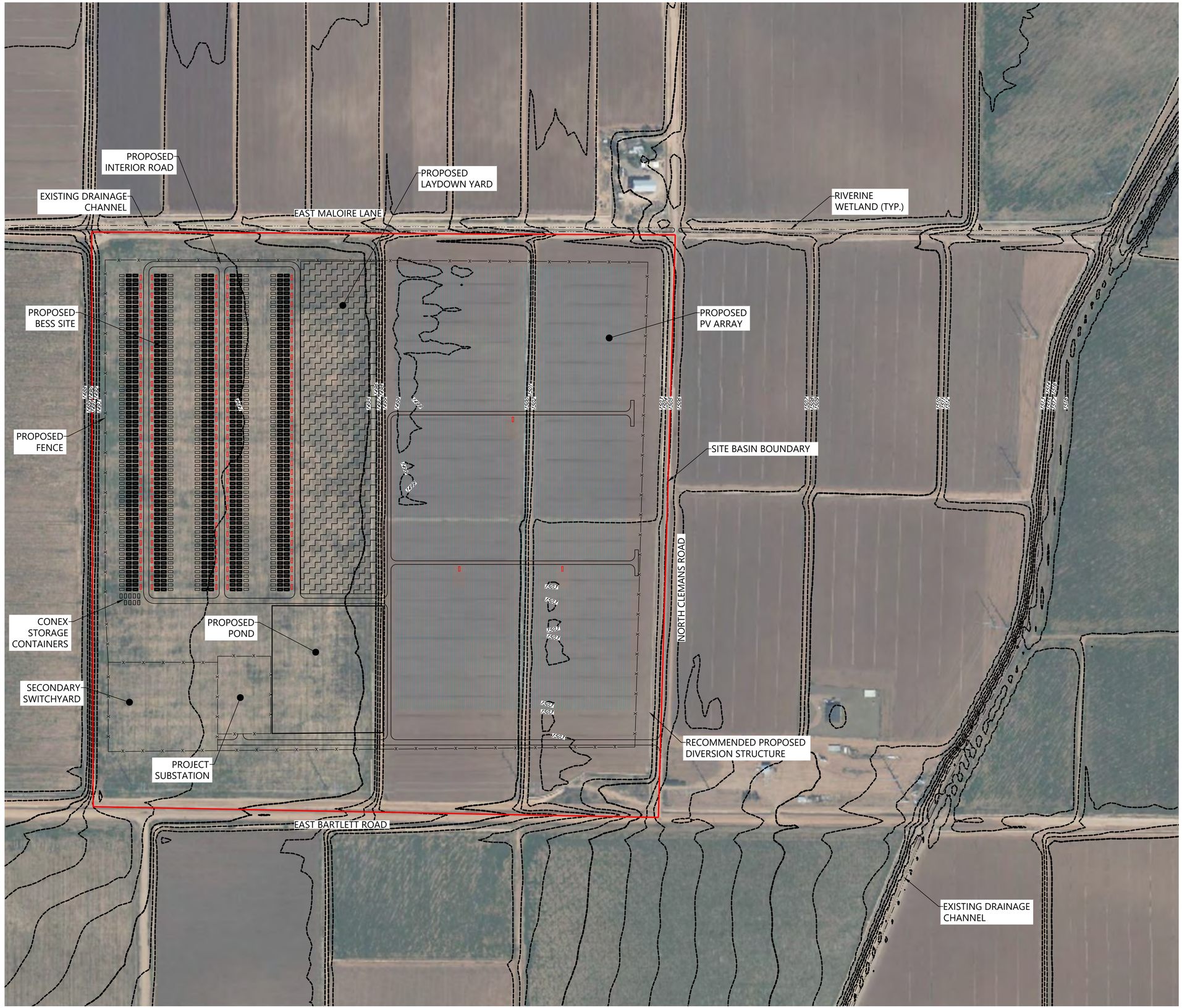
6. Proposed Potable Water Infrastructure

New potable water infrastructure is not proposed for this project. The proposed project is an energy utility facility which will not require a water supply.

References

1. *Pinal County Subdivision & Infrastructure Design Manual*, August 2004

Appendix A - Site Plan



200 0 200 400

(IN FEET)
1 inch = 200 ft.

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VALLEY FARMS BESS
HYDROLOGY PLAN EXHIBITS
PROPOSED SITE MAP

CLIENT
NEXTERA ENERGY
700 UNIVERSE BLVD
JUNO BEACH, FL 33408
PHONE: 847.736.6805

DATE 09/27/2024

REVISIONS

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SHEET NO. 1

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CAD FILE: VALLEY FARMS BESS_SITE MAP.DWG

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PRELIMINARY WASTEWATER REPORT

VALLEY FARMS ENERGY CENTER
PINAL COUNTY, ARIZONA

Prepared for
save
NextEra Energy
700 Universe Blvd
Juno Beach, FL 33408

Atwell Project No. 24000083



Expires 3/31/2027

Submitted by Atwell, LLC

REVISION NO:	DATE:	REVISION:	PROJECT MANAGER APPROVAL (INITIAL & DATE)	CLIENT APPROVAL (INITIAL & DATE)
	09/06/2024	Final Report		

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6. Proposed Wastewater Infrastructure 2
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Appendix A – Site Plan

1 Project Description

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2 Location

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Figure 1: Project Location

3. Purpose of Report

The purpose of this report is to identify existing and proposed wastewater infrastructure within the proposed project site.

4. Design Requirements

Chapter 10 of the Pinal County, Arizona Subdivision and Infrastructure Design Manual provide design criteria and guidance for construction of sewer systems within Pinal County. Sewer systems within Arizona must also

meet the requirements of the Arizona Administration Code Title, 18, Chapter 9, Articles 2 and 3 provided by the Arizona Department of Environmental Quality.

5. Existing Wastewater Infrastructure

The project is located in a rural area. Existing wastewater facilities in the region would be specific to homes and would likely consist of septic systems. An existing home is located adjacent to the northeast corner of the site, across East Maloire Lane.

Existing wastewater infrastructure within the site has not been identified or analyzed. It is not anticipated that any wastewater facilities exist within the project area.

If any wastewater infrastructure is identified on site, appropriate measures should be taken to ensure that they are not disturbed or damaged during construction activities.

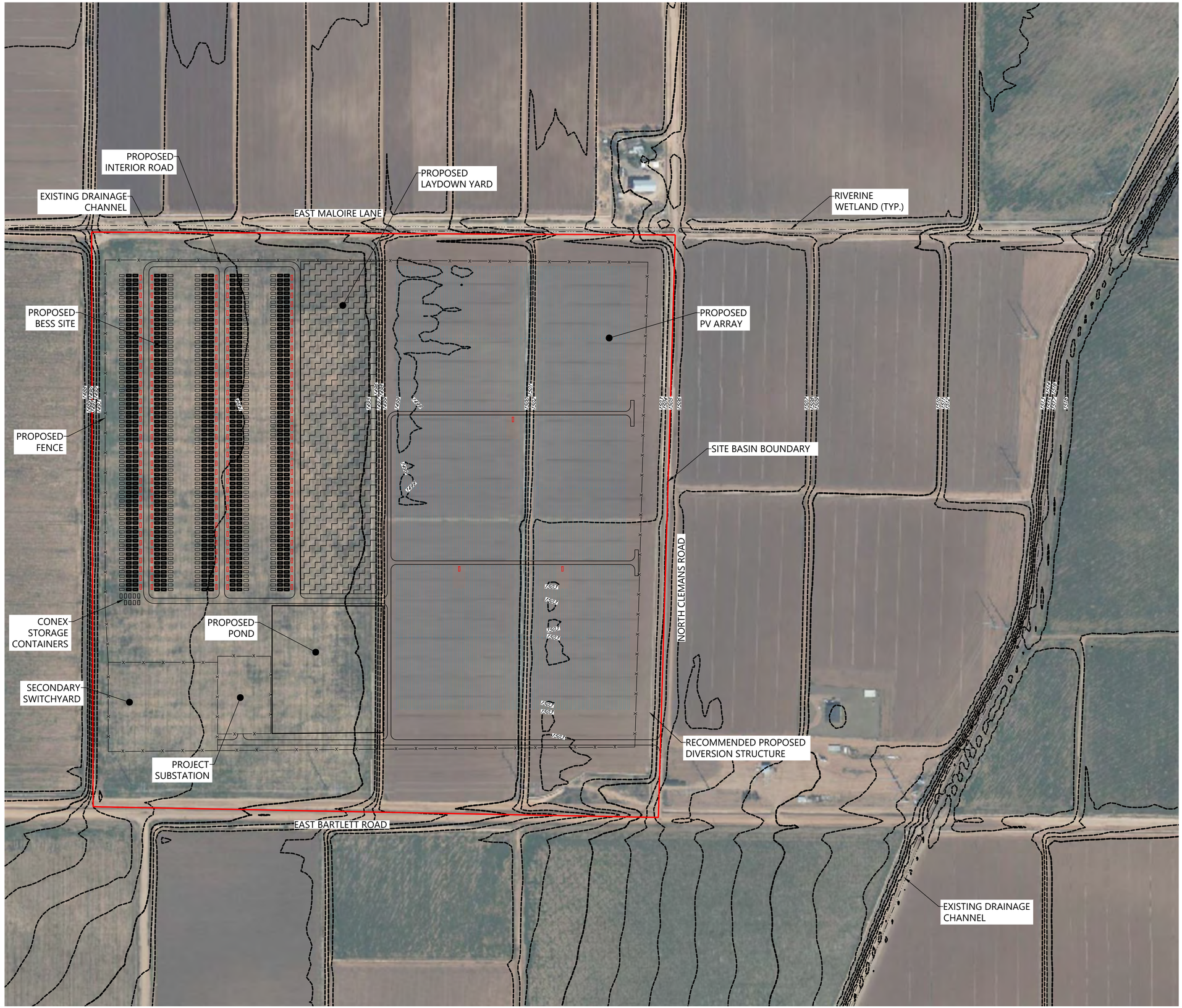
6. Proposed Wastewater Infrastructure

New wastewater infrastructure is not proposed for this project. The proposed project is an energy utility facility which will not include restrooms or other permanent facilities which would produce wastewater.

References

1. *Pinal County Subdivision & Infrastructure Design Manual*, August 2004

Appendix A - Site Plan



200 0 200 400

(IN FEET)
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JUNO BEACH, FL 33408
PHONE: 847.736.6805

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CAD FILE: VALLEY FARMS BESS_SITE MAP.DWG

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Pinal Central Dispatch

AFFIDAVIT OF PUBLICATION

State of Florida, County of Broward, ss:

Rachel Cozart, being first duly sworn, deposes and says: That (s)he is a duly authorized signatory of Column Software, PBC, duly authorized agent of Pinal Central Dispatch, a newspaper published at Casa Grande, Pinal County, Arizona,Thursday of each week; that a notice, a full, true and complete printed copy of which is hereunto attached, was printed in the regular edition of said newspaper, and not in a supplement thereto, for 1 issues. The publications thereof having been on the following dates:

PUBLICATION DATES:
Jan. 30, 2025

NOTICE ID: EZHEn99T1Py5BtbveDFB
NOTICE NAME: PZ-017-24

Rachel Cozart
(Signed)_____

SHERI SMITH
Notary Public - State of Florida
Commission # HH269383
Expires on May 31, 2026

VERIFICATION

State of Florida
County of Broward

Subscribed in my presence and sworn to before me on this: 01/31/2025

S Smith
_____
Notary Public
Notarized remotely online using communication technology via Proof.

NOTICE OF PUBLIC HEARING BY THE PINAL COUNTY PLANNING AND ZONING COMMISSION AT 9:00 A.M. ON THE 20th DAY OF FEBUARY, 2025, IN THE PINAL COUNTY EMERGENCY OPERATIONS CENTER, 85 N. FLORENCE STREET, FLORENCE, ARIZONA, TO CONSIDER THE APPLICATION FOR A REZONE AND A PLANNED AREA DEVELOPMENT IN AN UNINCORPORATED AREA OF PINAL COUNTY, ARIZONA
PZ-017-24 - PUBLIC HEARING/ ACTION: Gregory C. and Loralee Wuertz Family Trust owner, W. Ralph Pew, Pew & Lake PLC, applicant, requesting approval of a rezone from General Rural (GR) to Industrial Zoning (I-3) on approximately 160± acres to develop a photovoltaic solar energy production facility, situated in a portion of Section 31, T05S, R09E, G&SRB&M, tax parcels 202-35-0040, located in the Coolidge/Valley Farms area east of Highway 87, at the northwest corner of E Bartlett Rd and N Clemens Rd
PZ-PD-011-24 – PUBLIC HEARING/ACTION: Gregory C. and Loralee Wuertz Family Trust owner, W. Ralph Pew, Pew & Lake PCL, applicant, requesting approval of a 160± acres Planned Area Development (PAD) Overlay District consistent with case PZ-017-24 (160± acres); situated in a portion of Section 31, T05S, R09E, G&SRB&M, tax parcels 202-35-0040, located in the Coolidge/ Valley Farms area east of Highway 87, at the northwest corner of E Bartlett Rd and N Clemens Rd
At least 24 hours prior to the public hearing, documents pertaining to these requests are available for public inspection at the Pinal County Planning and Development Department, Pinal County Complex, 85 N. Florence Street, Florence, Arizona, Monday through Thursday between the hours of 7:30 a.m. and 5:30 p.m. and on the internet at: https://www.pinal.gov/236/Notice-of-Hearings
ALL PERSONS INTERESTED IN THESE MATTERS MAY APPEAR AT THE PUBLIC HEARING AT THE DATE, TIME AND PLACE DESIGNATED ABOVE AND STATE THEIR APPROVAL OR OBJECTION TO THE PROPOSED AMENDMENT.PROTESTS TO THE REZONING AND/OR PAD OVERLAY ZONE BY 20% OF THE PROPERTY OWNERS BY AREA AND NUMBER WITHIN 300 FEET OF THE PROPERTY PROPOSED FOR REZONING WILL REQUIRE AN AFFIRMATIVE VOTE OF THREE-FOURTHS OF ALL MEMBERS OF THE BOARD OF SUPERVISORS FOR APPROVAL.
DATED this 16th day of January 2025, Pinal County Community Development Dept.
A WRITTEN STATEMENT OF APPROVAL OR PROTEST MAY BE FILED WITH THE PINAL COUNTY PLANNING &

DEVELOPMENT DEPARTMENT, P.O. BOX 749, FLORENCE AZ 85132 STATEMENT MUST CONTAIN THE FOLLOWING INFORMATION:
1) Planning Case Number (see above)
2) Your name, address, telephone number and property tax parcel number (Print or type)
3) A brief statement of reasons for supporting or opposing the request
4) Whether or not your wish to appear and be heard at the hearing
Contacts for this matter: Kendall Riley, Planner
E-mail Address: Kendall.riley@pinal.gov
Phone #: (520) 866-6514 Fax: (520) 866-6530
No. of publications: 1: date of publication: Jan 30, 2025

* as directed by your staff Coordinator

AFFIDAVIT OF Mailing of Notice of Hearing*

I, **Vanessa MacDonald**, Applicant for case numbers **PZ-017-24 and PZ-PD-011-24**, personally caused **six (6)** mailers to be mailed by first class post regarding the public hearing associated with the aforementioned case numbers on **February 3, 2025**, on a form prescribed by the planning division at least 15 days before the Planning and Zoning Commission Public Hearing, regarding the proposed **Rezoning and Planned Area Development (PAD)** applications, in unincorporated Pinal County.

The notice(s) and mailing lists were mailed as attached.

Vanessa MacDonald
Applicant

STATE OF ARIZONA)
) ss:
COUNTY OF PINAL)

Subscribed and sworn to me by Vanessa MacDonald this 3rd day of February, 2025.

Cheryl Long
Notary Public
My Commission Expires:

CHERYL LONG
Notary Public - Arizona
Maricopa County
Commission # 596513
My Comm. Expires Feb 28, 2025

PINAL COUNTY
WIDE OPEN OPPORTUNITY

PINAL COUNTY
DEVELOPMENT SERVICES DEPARTMENT
P O BOX 749 (85 N FLORENCE ST, FIRST FLOOR)
FLORENCE, AZ 85132

Kendall Riley
Planner/ Development Services
85 N. Florence St First Floor
Florence, AZ 85132

NOTICE OF PUBLIC HEARING

NOTICE OF PUBLIC HEARING BY THE PINAL COUNTY PLANNING AND ZONING COMMISSION AT 9:00 A.M. ON THE **20th** DAY OF **FEBRUARY 2025**, AT THE PINAL COUNTY EMERGENCY OPERATIONS CENTER, 85 N FLORENCE, ARIZONA, TO CONSIDER AN APPLICATION FOR **A REZONE** AND **PLANNED AREA DEVELOPMENT (PAD).**

PZ-017-24 - PUBLIC HEARING/ACTION: Gregory C. and Loralee Wuertz Family Trust owner, W. Ralph Pew, Pew & Lake PLC, applicant, requesting approval of a **rezone** from **General Rural (GR)** to **Industrial Zoning (I-3)** on approximately 160± acres to develop a photovoltaic solar energy production facility, situated in a portion of Section 31, T05S, R09E, G&SRB&M, tax parcels 202-35-0040, located in the Coolidge/Valley Farms area east of Highway 87, at the northwest corner of E Bartlett Rd and N Clemens Rd

PZ-PD-011-24 – PUBLIC HEARING/ACTION: Gregory C. and Loralee Wuertz Family Trust owner, W. Ralph Pew, Pew & Lake PCL, applicant, requesting approval of a 160± acres **Planned Area Development (PAD) Overlay District** consistent with case PZ-017-24 (160± acres); situated in a portion of Section 31, T05S, R09E, G&SRB&M, tax parcels 202-35-0040, located in the Coolidge/Valley Farms area east of Highway 87, at the northwest corner of E Bartlett Rd and N Clemens Rd

DOCUMENTS PERTAINING TO THIS CASE CAN BE FOUND ON THE NOTICE OF HEARING PAGE FOR THE P&Z COMMISSION AT:
https://www.pinal.gov/236/Notice-of-Hearings

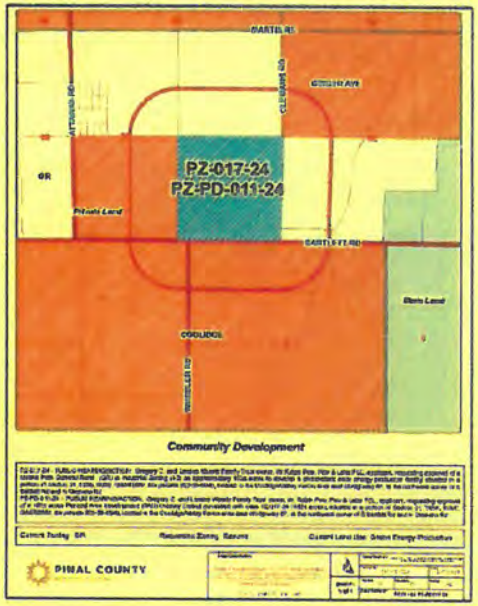
ALL PERSONS INTERESTED IN THIS MATTER MAY APPEAR AT THE HEARING AT THE TIME AND PLACE DESIGNATED ABOVE AND SHOW CAUSE, IF ANY, WHY THIS PETITION SHOULD OR SHOULD NOT BE GRANTED. YOUR STATEMENT MUST CONTAIN THE FOLLOWING INFORMATION:

Planning Case Number (see above), your name, address, telephone number and property tax parcel number (Print or type) A brief statement of reasons for supporting or opposing the request. Whether or not you wish to appear and be heard at the hearing.

PROTESTS TO THE REZONING AND/OR PAD OVERLAY ZONE BY 20% OF THE PROPERTY OWNERS BY AREA AND NUMBER WITHIN 300 FEET OF THE PROPERTY PROPOSED FOR REZONING WILL REQUIRE AN AFFIRMATIVE VOTE OF THREE-FOURTHS OF ALL MEMBERS OF THE BOARD OF SUPERVISORS FOR APPROVAL.

WRITTEN STATEMENTS FOR OR AGAINST THE PROPOSAL MUST BE FILED WITH: PINAL COUNTY COMMUNITY DEVELOPMENT DEPARTMENT PO BOX 749 (85 N.FLORENCE STREET) FLORENCE, AZ 85132, OR BY EMAIL TO THE CASE COORDINATOR INDICATED BELOW.

Contact for this matter: Kendall Riley, Planner
e-mail address: Kendall.riley@pinal.gov
Phone # (520) 866-6514



PINAL COUNTY
WIDE OPEN OPPORTUNITY



NOTICE

PLANNING & ZONING

PINAL COUNTY

PUBLIC HEARING

Any person who is interested may file written comments, in favor or in opposition, with Community Development Department in Pinal County or appear in person at the hearing.

Date Posted: 3 FEB 2025

POST COPY OF ACTUAL NOTICE BELOW.


NOTICE


PINAL COUNTY
Public Hearings
Case Number: PZ-017-24 and PZ-PD-011-24
Existing Zoning: General Rural
Proposed Zoning: Industrial Zoning District (I-3) With a Planned Area Development Overlay
Acreage: 160 Acres
Applicant Name: W. Ralph Pew, Pew & Lake, PLC.
Applicant Phone Number: 480-461-4670
Case Information Available at Pinal County Community Development
(520) 866-6442 or www.pinalcountyaz.gov
Public Hearing Information
NOTICE

NOTICE

PLANNING & ZONING
PINAL COUNTY
PUBLIC HEARING

Any person who is interested may file written comments, in favor or in opposition, with Community Development Department in Pinal County or appear in person at the hearing.

Date Posted: 3 FEB 2025

FIRST COPY OF ACTUAL NOTICE BELOW


PINAL COUNTY
Public Hearings

PINAL COUNTY
Public Hearings

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Applicant Phone Number: 480-461-4670

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Public Hearing Information

NOTICE

PLANNING & ZONING
PUBLIC HEARING

3 FEB 2025

