

APPENDIX G

DRAINAGE MEMORANDUM, PRELIMINARY STORMWATER CONTROL PLAN, AND DRAINAGE STUDY

MEMORANDUM

To: Adam Smith, Sancerra

From: Andrew D. Palffy, P.E., dk Engineering

Date: May 3, 2023, Revised November 17, 2023

Subject: Drainage Study for Vista Cove in Vallejo, California

The existing property at the intersection of Wildflower Ave and Shady Lane in Vallejo, California is 20.13 acres and consists of an undeveloped grassy hillside. The proposed project covers the northern 11.78 acres of the 20.13 acre property, consisting of 51 single-family homes complete with roadways and sidewalk areas. Please refer to the Development Review, Minor Use, Small-Lot Subdivision and Tentative Map Package prepared by dk Engineering on May 3, 2023 for the existing conditions and proposed site plans.

To accommodate the City of Vallejo's requirements for stormwater detention, Contra Costa Clean Water Program's C.3 guidebook, City of Vallejo Appendix A: Local Exceptions and Additional Requirements, the City of Vallejo Final Hydromodification Management Plan and the Solano County Water Agency Hydrology Manual were referred to for the site design. Per the City of Vallejo Final Hydromodification Report, the project uses the HEC-HMS software to design on-site hydromodification controls that provide flow duration control. To run the HEC-HMS simulation for the site, the Solano County Water Agency Report Chapter 3 guidelines were used. As shown on the proposed project site plan, the project is proposed with 2 detention basins that have treatment-only bioretention at the basin base.

The existing site has 3 ridges which split the existing drainage direction (show in Attachment A). Ultimately, all the existing drainage is directed downhill to the Benicia State Park, where the stormwater runoff converges and is directed to the Carquinez Strait. For the HEC-HMS simulation, all three existing drainage areas used the Solano County Water Agency Hydrology Manual recommended initial losses for Open Fields with Minimal vegetation, a value of 0.2 inches.

The proposed developed project has 2 drainage areas (Attachment B) that converge at one outfall where the stormwater runoff is directed to a detention basin and then treated with bioretention. For the HEC-HMS simulation, the drainage areas use the weighted average of the Solano County Water Agency Hydrology Manual recommended initial losses for Paved Areas and Lawn Grass (see Table 1). The Average for DA 2A is 0.172 inches and for DA 2B is 0.183 inches. Proposed Basin 2A is 3.33 feet deep. Proposed Basin 2B is 5.5 feet deep. The privately-owned basins are sized to have a minimum of one (1) foot of freeboard in the 100-year storm event and utilize side slopes of 3:1. Table 2 below summarizes the design flows for the 15 year and 100 year storm events. The project's storm water is directed to the detention basin via a storm drain pipe system as well as sheet flow over landscaped areas. The basins have an overflow inlet which has orifices sized to control the outfall flow rates. From the overflow inlet, the water runs through an 18" storm drain pipe to the east side of the property where it outfalls into the existing marshland area that is adjacent to the Benicia State Park. Please see attachment C for the existing drainage pathway.

Hydrology and basin sizing will be finalized during the final design phase of this project.

Table 1. HEC-HMS coefficients from the Solano County Water Agency Hydrology Manual Chapter 3

Hydrologic Soil Type: D	Recommended Constant Loss Rate: 0.02 in/hour
Recommend Initial Losses: Existing	<i>"Open Fields with Minimal vegetation"</i> = 0.2 inches
Recommended Initial Losses: DA 2A	Weighted average of <i>"Paved Area: 0.0 inches"</i> and <i>"Lawn Grass: 0.3 inches"</i> = 0.172 inches
Recommended Initial Losses: DA 2B	Weighted average of <i>"Paved Area: 0.0 inches"</i> and <i>"Lawn Grass: 0.3 inches"</i> = 0.183 inches
Snyder Standard Lag Times	(Equation 3-6) See Attachment A and Attachment B for specific lag times used.

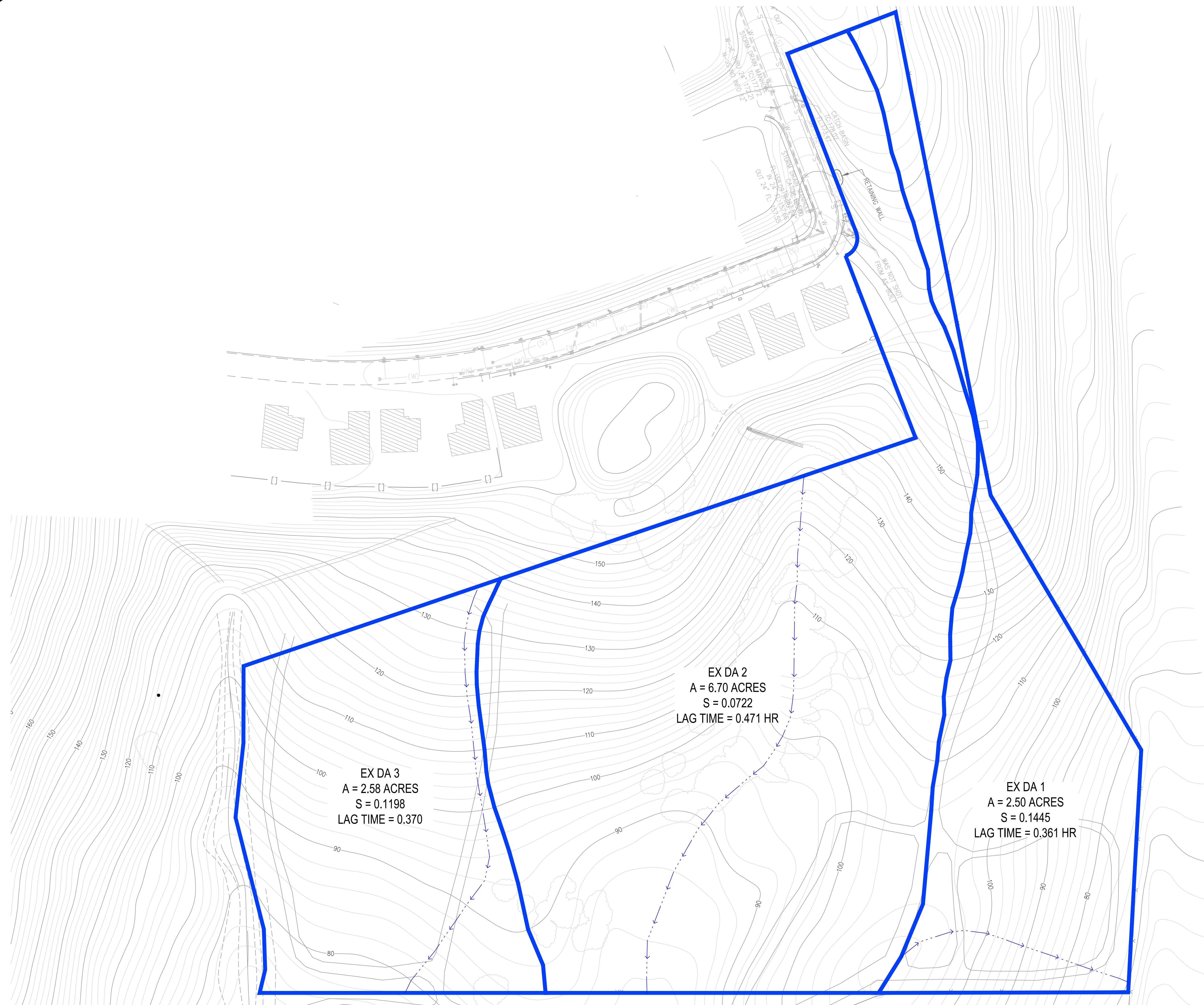
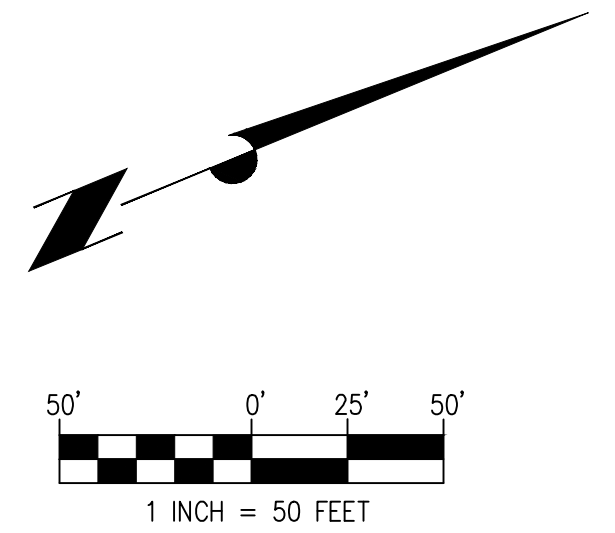
Table 2. Project Flow Rates

Pre-Development (cfs)				
	EX DA 1	EX DA 2	EX DA 3	Total
15-year, 24-hour	2.7	6.2	2.7	11.6
100-year, 24-hour	3.7	8.5	3.8	16.0

Post-Development (cfs)					
	Proposed DA 1	Combined DA 2A after Detention	Combined DA 2B after Detention	Proposed DA 3	Total
15-year, 24-hour	0.7	1.8	7.9	1.2	11.6
100-year, 24-hour	0.9	2.2	11.1	1.7	15.9

Appendix

Attachment A: Existing Drainage Areas
 Attachment B: Proposed Drainage Areas
 Attachment C: Existing Drainage Pathway



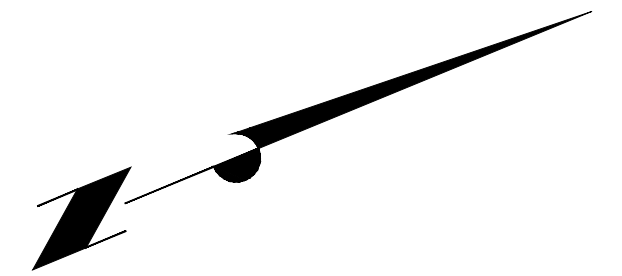
EX DA 2
A = 6.70 ACRES
S = 0.0722
LAG TIME = 0.471 HR

EX DA 3
A = 2.58 ACRES
S = 0.1198
LAG TIME = 0.370

EX DA 1
A = 2.50 ACRES
S = 0.1445
LAG TIME = 0.361 HR

SANCERRA
VISTA COVE
EXISTING DRAINAGE AREAS
VALLEJO, CALIFORNIA
APRIL 2023





PARCEL
A

PROPOSED DA 3
A = 1.17 ACRES
S = 0.0680
LAG TIME = 0.391 HR

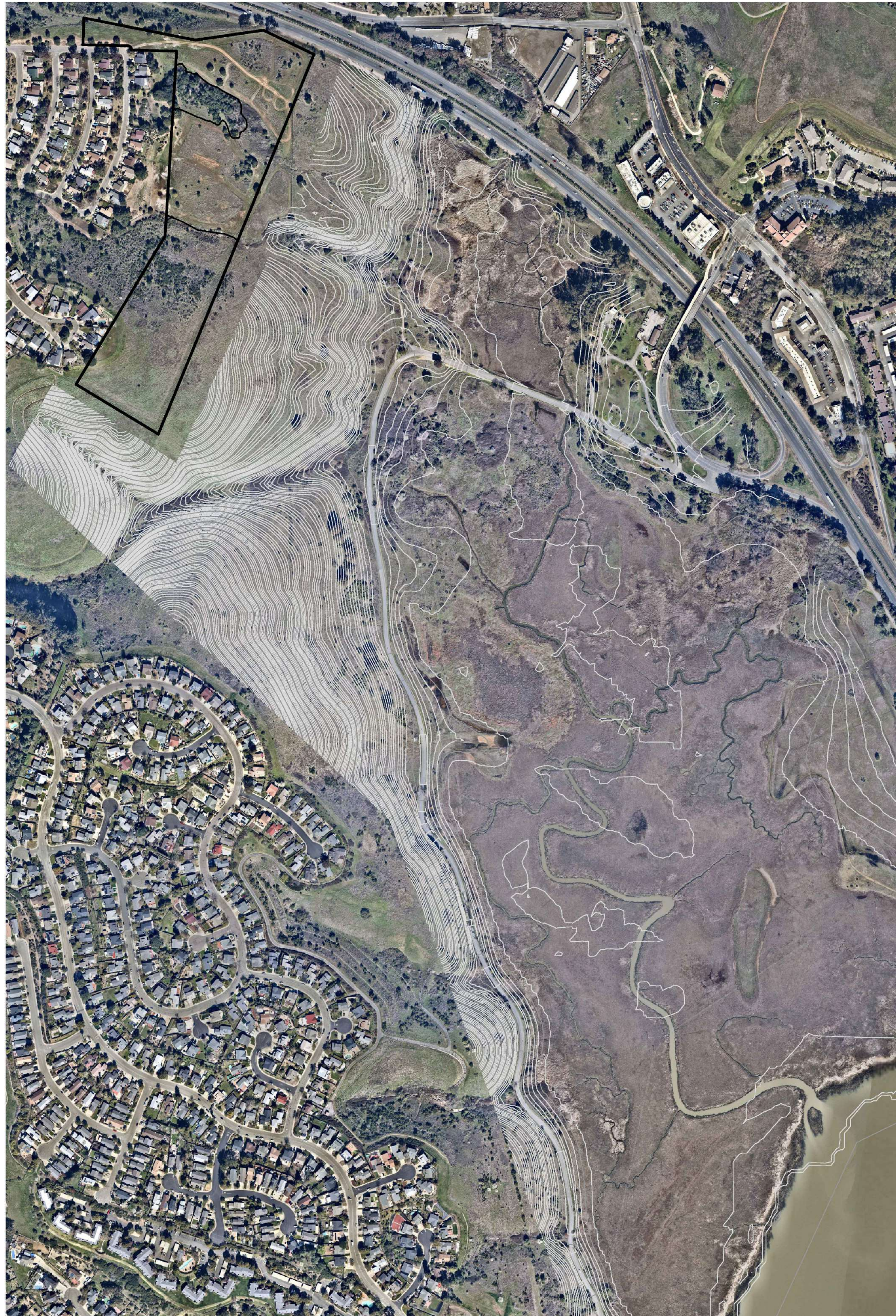
PROPOSED DA 2B
A = 8.55 ACRES
S = 0.0751
LAG TIME = 0.123 HR

PROPOSED DA 2A
A = 1.48 ACRES
S = 0.0211
LAG TIME = 0.098 HR

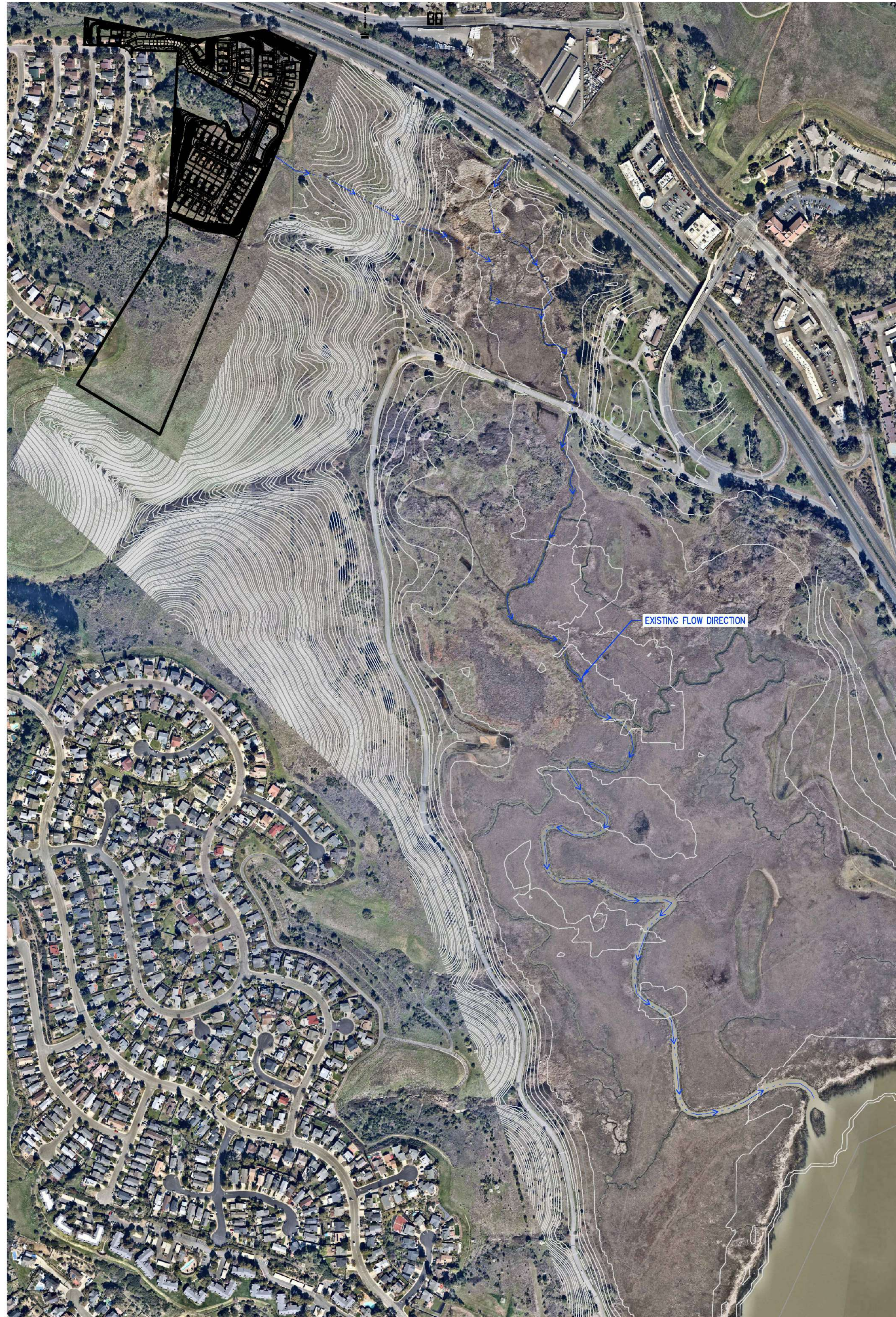
PROPOSED DA 1
A = 0.58 ACRES
S = 0.3353
LAG TIME = 0.332 HR

SANCERRA
VISTA COVE
PROPOSED DRAINAGE AREAS
VALLEJO, CALIFORNIA
NOVEMBER 2023





ADJACENT EXISTING TOPOGRAPHY
SCALE: 1"=300'

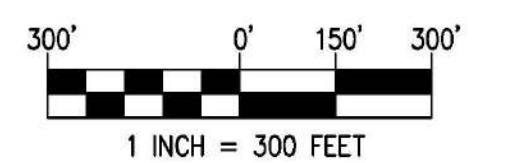


ADJACENT EXISTING TOPOGRAPHY WITH FLOW DIRECTION
SCALE: 1"=300'

IMAGE SOURCE: NEAR MAPS
CONTOURS: TOPOGRAPHIC FEATURES SHOWN
GENERATED FROM USGS AND ARE APPROXIMATE.
CONTOUR INTERVAL:
EXISTING: 2 FOOT AND 10 FOOT



DRAFT



**SANCERRA
VISTA COVE**
EXISTING DRAINAGE PATHWAY
VALLEJO, CALIFORNIA
NOVEMBER 17, 2023



**PRELIMINARY STORMWATER
CONTROL PLAN
for
VISTA COVE**

November 2023

**Sancerra
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prepared by:

**dk Engineering
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Vicinity Map

Stormwater Control Plan Exhibit with IMP Sizing Calculator Output

This Stormwater Control Plan was prepared using the template dated February 2023.

I. PROJECT DATA

Table 1. Project Data

Project Name/Number	Vista Cove
Application Submittal Date	November 2023
Project Location	A portion of 0079-120-100, 0079-171-170, 0079-220-070; Shady Lane and Wildflower Road Vallejo, CA
Name of Developer	Sancerra
Project Phase No.	NA
Project Type and Description	Residential development with 51 single family homes
Project Watershed	Glen Cove
Total Project Site Area (acres)	Total Site Area (Lot 1): 10.395 Ac Parcel A: 8.356 Ac Parcel B: 1.381 Ac
Total Area of Land Disturbed (acres)	10.49 acres
Total New Impervious Surface Area (sq. ft.)	171, 896 sf
Total Replaced Impervious Surface Area	0 sf
Total Pre-Project Impervious Surface Area	0 sf
Total Post-Project Impervious Surface Area	171, 868 sf
50% Rule[*]	Applies
Project Density	2.53 units/acre
Applicable Special Project Categories	None.
Percent LID and non-LID treatment	100% LID treatment
HM Compliance [†]	Applies

[*50% rule applies if:

Total Replaced Impervious Surface Area > 0.5 x Pre-Project Impervious Surface Area]

[†HM required (unless project meets one of the exemptions on *Guidebook* p. 11) if:

(Total New Impervious Surface Area + Total Replaced Impervious Surface Area) ≥ 1 acre]

II. SETTING

II.A. Project Location and Description

The Vista Cove project site is located in the city of Vallejo, California at the intersection of Shady Lane and Wildflower Ave. The project plans to have 51 single family residential units with access roadways, bioretention areas and site landscaping. The site will have 51 lots and various sized landscaped parcels. The project's zoning is mix of Housing Types/Medium Density which requires lots to have front, corner side and rear yards and maximum lot coverage of 60% of the lot. The project is not anticipated to be phased. The property is located adjacent to the Glen Cove subdivision that consists of single-family homes. A vicinity map is provided as a supplemental attachment to this report.

II.B. Existing Site Features and Conditions

The existing undeveloped property is 20.13 acres and currently sits as fully vegetative covered area that slopes downhill to the southeastern side of the property. The property ranges in elevation from 75 to 155. There are currently no impervious areas on the site. There are 2 existing hydrologic features on the site, identified as a riparian area and a freshwater marsh. No existing municipal storm drain features exist on the property. The existing drainage for the site sheet flows off the site toward the adjacent 780 highway to the northeast, the riparian area in the property, the freshwater marsh in the property and off site to the adjacent City owned parcel to the southeast of the property. The existing soil type on the site includes lean clay with sand and sandstone and siltstone, the hydrologic soil group is category D and ground water was not encountered when borings were performed.

II.C. Opportunities for Stormwater Control

This site utilizes 100% LID treatment via bioretention areas. The existing site drains to the southeastern boundary of the site. The natural direction of the flow is maintained to allow for prime bioretention space opportunities. The large difference in elevation for the site encourages the stormwater to flow via gravity to these bioretention areas and be treated prior to out falling to the existing water way location.

III. LOW IMPACT DEVELOPMENT DESIGN STRATEGIES

III.A. Optimization of Site Layout

III.A.1. Limitation of development envelope

The developable area consists of 11.78 acres of the property boundary. Parcel A is not a part of the project. The existing riparian area is to be avoided.

III.A.2. Preservation of natural drainage features

The riparian area in the middle of the developed area is preserved on the site as an enhanced feature of the site.

III.A.3. Setbacks from creeks, wetlands, and riparian habitats

The riparian limits clarified by the project biologists are accounted for in the site plan.

III.A.4. Minimization of imperviousness

Project pathways are designed to minimum widths but offer a walkable environment and landscaped areas are provided in lieu of potential impervious beautification features.

III.A.5. Use of drainage as a design element

Bioretention facilities are incorporated into the site as a design element to the site landscaping.

III.B. Use of Permeable Pavements

Permeable pavement material is not used at the site. The bioretention features meet the treatment sizing requirements for stormwater control.

III.C. Dispersal of Runoff to Pervious Areas

Where feasible, drainage from impervious areas is directed to pervious spaces. Ultimately, drainage from the site is all directed to pervious bioretention areas that are placed throughout the site.

III.D. Bioretention or other Integrated Management Practices

Bioretention areas have been designed per the IMP sizing calculator requirements. The site is graded to drain to low points, which is where the bioretention spaces are located throughout the site.

IV. DOCUMENTATION OF DRAINAGE DESIGN

IV.A. Descriptions of each Drainage Management Area

IV.A.1. Table of Drainage Management Areas

Table 2. Drainage Management Areas

<i>DMA Name</i>	<i>Area (SF)</i>	<i>Surface Type/Description</i>	<i>DMA Type/Drains to</i>
DMA 1	59,945	Impervious area and pervious area	Drains to bioretention area IMP 1
DMA 2	282,178	Impervious area and pervious area	Drains to bioretention area IMP 2
Self-Treating	101,865	Pervious Area	Self-Treating Area

IV.A.2. Drainage Management Area Descriptions

DMA 1, totaling 59,945 square feet, drains towards the northwest corner of the property. DMA 1, with 27,427 sf impervious area and 32,518 sf pervious area, drains to IMP 1, a bioretention area that has a treatment area of 1,228 sf.

DMA 2, totaling 282,178 square feet, drains towards the northwest corner of the property. DMA 2, with 144,462 sf impervious area and 137,716 sf pervious area, drains to IMP 2, a bioretention area that has a treatment area of 6,390 sf.

Self-treating DMA, totaling 101,865 square feet, consists of pervious area and drains to adjacent pervious space at the northeastern side of the property and the southeastern side of the property.

IV.B. Integrated Management Practice Descriptions

The bioretention areas are designed for treatment only. Flow control measures are incorporated via detention basins that sit above the bioretention area. The base rock layer of the bioretention is 12" deep. The overflow structure is also set at 1' below freeboard of the 100-year storm event. to allow for ponding prior to being treated and then traveling directly into the storm drain system. The facilities are sized per the Contra Costa IMP calculator and the results are included on the Stormwater Control Plan attached. Refer to the separate drainage study memo prepared by dk Engineering, Revised November 2023 for discussion on the hydromodification element of the proposed basins.

IV.C. Tabulation and Sizing Calculations

See IMP calculator results on the Stormwater Control Plan sheet (Attachment B).

V. SOURCE CONTROL MEASURES

V.A. Site activities and potential sources of pollutants

Potential sources of pollutants may include on-site dumping into storm drain inlets, the need for future or structural pest control, landscape/outdoor pesticide use, streets and sidewalks debris. To account for these potential sources, the source control table below lists control opportunities.

V.B. Source Control Table

Table 3. Source Controls

Potential source of runoff pollutants	Permanent source control BMPs	Operational source control BMPs
On-site dumping into storm drain inlets	All accessible on-site inlets require stainless steel markers with statement “No Dumping – Drains to Bay” or similar	Markings will be periodically replaced. Inlets and pipes conveying stormwater to BMPs will be inspected and maintained as part of BMP Operation and Maintenance Plan.
Need for future indoor or structural pest control		Integrated Pest Management (IPM) information will be provided to property owners.
Landscape/outdoor pesticide use	Final landscape plans will: Be designed to minimize irrigation and runoff and to minimize use of fertilizers and pesticides that can contribute to stormwater pollution. Specific plantings within bioretention areas and swales that are tolerant of the sandy loam soil and periodic inundation. Include pest-resistant plants. Include plantings appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions.	Landscape will be maintained using minimum or no pesticides. IPM information will be provided to property owners
Streets and Sidewalks		Sweep streets and sidewalks to prevent accumulation of litter and debris. Collect debris from pressure washing to prevent entry into the storm drain system. Collect wash water containing any cleaning agent or degreaser and discharge to the sanitary sewer, not to the storm drain.

V.C.Features, Materials, and Methods of Construction of Source Control BMPs

Source control BMPs will be designed and implemented per the CASQA BMP fact sheets and project construction specifications.

VI. STORMWATER FACILITY MAINTENANCE

VI.A. Ownership and Responsibility for Maintenance in Perpetuity

The ownership and responsibility for maintenance of the facilities will be determined when approved project improvements are available.

VI.B. Summary of Maintenance Requirements for Each Stormwater Facility

The maintenance requirements will be provided when approved project improvements are available.

VII. CONSTRUCTION PLAN C.3 CHECKLIST

Table 4. Construction Plan C.3 Checklist

<i>Stormwater Control Plan Page #</i>	<i>BMP Description</i>	<i>See Plan Sheet #</i>
Attachment B	IMP & DMA 1-2 <i>Bioretention facility</i> <i>Self-Treating Area Pervious Area</i>	

VIII.CERTIFICATIONS

The selection, sizing, and preliminary design of stormwater treatment and other control measures in this plan meet the requirements of Regional Water Quality Control Board Order R2-2015-0049.

Andrew D. Palffy, P.E.
RCE #43704

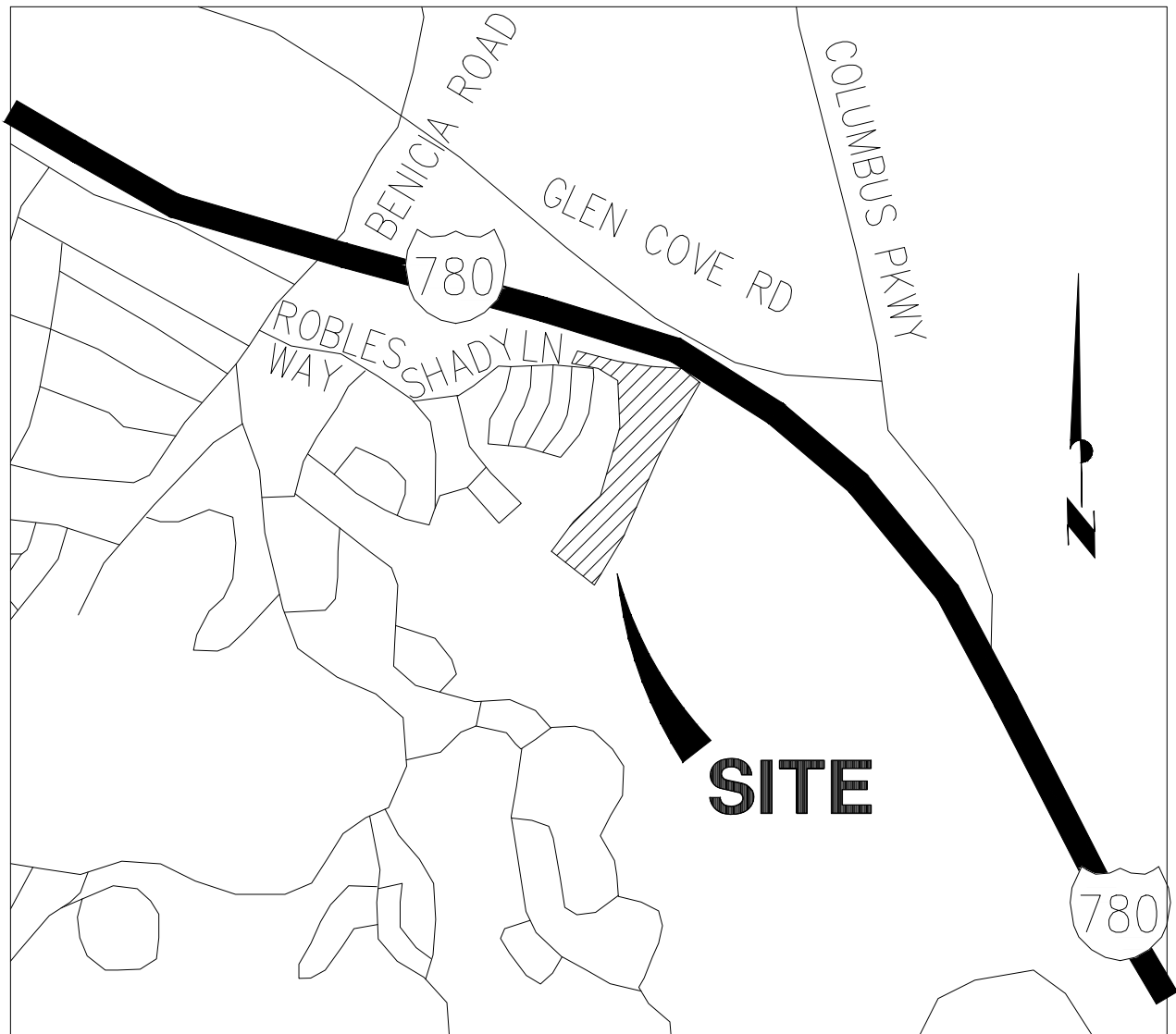
Print Name

SANCERRA VISTA COVE

VICINITY MAP

NOT TO SCALE

VALLEJO, CALIFORNIA



1901 SAN MIGUEL DRIVE, SUITE 100, WALNUT CREEK, CA 94596
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PROJECT INFORMATION	
SIZE OF PROPERTY	TOTAL SITE AREA (LOT 1): 10.395± ACRES PARCEL A: 8.356± ACRES PARCEL B: 1.381± ACRES
EXISTING IMPERVIOUS AREA	0 SF
IMPERVIOUS SURFACE AREA CREATED	171,896 SF
TOTAL IMPERVIOUS SURFACE AREA	171,896 SF
PERCENT INCREASE OF IMPERVIOUS AREA	100%
ESTIMATED AREA OF LAND DISTURBANCE _DURING CONSTRUCTION	10.31 AC± (449,027 SF±)

IMP 1			
DMA	DMA AREA	DMA RUNOFF FACTOR	DMA RUNOFF FACTOR
IMPERVIOUS AREA	27,427 SF	1.00	27,427
PERVIOUS AREA	32,518 SF	0.1	3,252
TOTAL			30,679

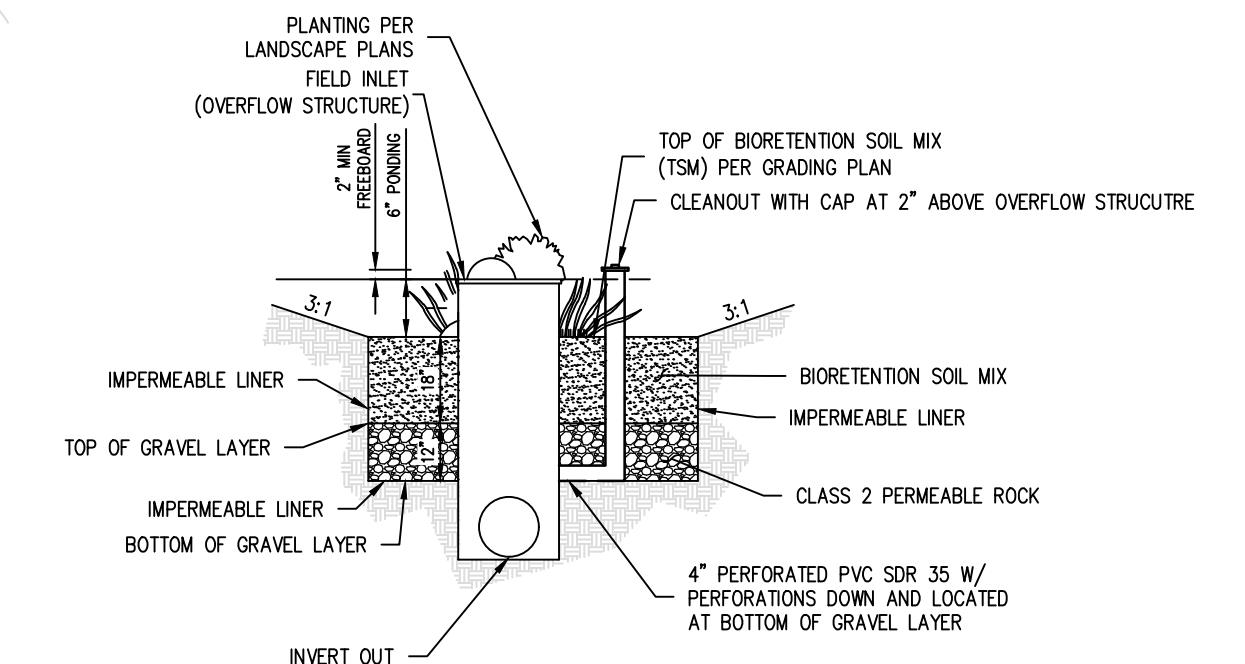
IMP 1 SIZING				
	IMP SIZING FACTOR	RAIN ADJUSTMENT FACTOR	MIN AREA OR VOLUME	PROPOSED AREA OR VOLUME
AREA	0.040	1.000	1.227	1.227

IMP 2			
DMA	DMA AREA	DMA RUNOFF FACTOR	DMA RUNOFF FACTOR
IMPERVIOUS AREA	144,462 SF	1.00	144,462
PERVIOUS AREA	137,716 SF	0.1	13,772
TOTAL			158,234

IMP 2 SIZING				
	IMP SIZING FACTOR	RAIN ADJUSTMENT FACTOR	MIN AREA OR VOLUME	PROPOSED AREA OR VOLUME
ARFA	0.040	1.000	6.329	6.390

SELF TREATING AREA	
DMA	DMA AREA
PERVIOUS AREA	93,649 SF

NOTE:
BIORETENTION TREATMENT-ONLY SIZING CALCULATIONS PER IMP CALCULATOR PROVIDED BY CONTRA COSTA COUNTY.



NOTES:

1. BIORETENTION FACILITY SHALL CONFORM TO THE REQUIREMENTS OF THE CURRENT CONTRA COSTA CLEAN WATER PROGRAM, C.3 GUIDEBOOK AND CITY OF VALLEJO APPENDIX A.
2. SOIL MIX SHALL HAVE A MINIMUM PERCOLATION RATE OF 5"/HOUR.
3. UNDERDRAIN SHALL HAVE CLEANOUTS CONSISTING OF RIGID, NON-PERFORATED PVC PIPE WITH A MINIMUM DIAMETER OF 4" AND A WATERTIGHT CAP.

TYPICAL BIORETENTION DETAIL
NOT TO SCALE

LEGEND

DMA DRAINAGE MANAGEMENT AREA
 IMP INTEGRATED MANAGEMENT PRACTICE
 DMA BOUNDARY
 EXISTING STORM DRAIN PIPE
 PROPOSED STORM DRAIN PIPE
 BIORETENTION

DEVELOPMENT REVIEW,

TENTATIVE MAP FOR CONDOMINIUM PURPOSES

FOR CREATING 51 CONDOMINIUM UNITS, OPEN SPACE PARCELS A AND B

STORMWATER CONTROL PLAN

NOVEMBER 17, 2023



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