Preliminary
Stormwater Control Plan

RANCHO MEADOWS
ANTIOCH, CALIFORNIA

SEPTEMBER 2024

For Stormwater C.3 Guideline Compliance

Civic Rancho Meadows, LLC
1500 Willow Pass Court
Concord, CA 94520
Kerri Watt

Prepared By:

CARLSON, BARBEE & GIBSON, Inc.
CIVIL ENGINEERS • SURVEYORS • PLANNERS

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I. PROJECT DATA

Table 1 – Project Data

Project Name/Number	Rancho Meadows
Application Submittal Date	September 2024
Project Location	E. 18th Street, Antioch, CA
Name of Developer	Civic Rancho Meadows, LLC
Project Type and Description	135 Single Family Homes
Project Watershed	East County Delta Drainages
Total Project Site Area (acres)	17.1 Acres
Total Area of Land Disturbed (acres)	17.1 Acres
Total New Impervious Surface Area (acres)	10.6 Acres
Total Replaced Impervious Surface Area (acres)	0.0 Acres
Total Pre-Project Impervious Surface Area	0.0 Acres
Total Post-Project Impervious Surface Area	10.6 Acres
50% Rule	Applies
Project Density	135/17.1 = 7.9 DU/Acres
Applicable Special Project Categories	None
Percent LID and non-LID treatment	100% LID
HMP Compliance	Exempt – project drains to pipes or hardened channels that extend to the delta.

II. SETTING

A. Project Name, Location and Description

The 17.1 acre Rancho Meadows project is located at E. 18th Street in the City of Antioch, Contra Costa County, CA. The site is located north of E. 18th Street and Vineyard Avenue. To the north of the project is the Santa Fe Railroad, with Walnut Avenue to the west and existing industrial properties to the south. See Figure 1 for the project vicinity map.

The site is bound by existing residential areas to the west, industrial properties to the south, the Santa Fe Railroad to the north, and open space to the east.

The project proposes to construct 135 single family dwelling units with accompanying landscape, open space, and community amenities. The overall proposed site consists of approximately 62% impervious surfaces, and 38% pervious surfaces.

B. Existing Site Features and Conditions

The property consists of orchards and dirt roads. The site is encumbered by an existing PG&E property along the southeastern portion of the project boundary, as well as an existing easement for storm drain facilities at the northeast corner of the site. The existing site consists of no impervious surfaces, as the site is covered in existing orchards.

There are no existing storm drain facilities on-site that collect and convey drainage. The site generally sheet flows to the east, where an existing regional basin detains stormwater and then discharges it to the north to the San Joaquin River Delta.

The Rancho Meadows project site is part of the moderate climate of the San Francisco Bay Area Region. The mean annual precipitation on site is 12.8 inches, based on The Mean Seasonal Isohyets Map by Contra Costa County Flood Control and Water Conservation District. Precipitation is evenly distributed throughout the fall, winter, and spring, but is very low in the summer. Moisture occurring in the summer is generally from the coastal fog.

C. Opportunities and Constraints for Storm Water Control

Stormwater constraints include:

- *Low Soil Permeability:* The soil on the project site is designated as hydrologic soils group C, indicating low to no infiltration.

- *Existing Storm Drain System*: There are no existing storm drain facilities within the project boundary. As such, the project is limited to only being able to connect to the existing 60" storm drain trunk mainline south of the project in Vineyard Drive.

- *Subsurface Utilities:* The project requires various utility connections to existing systems, such as sewer, water, electric, gas, and telecommunication facilities, that are limited to Santa Fe Avenue and Vineyard Drive. As such, this area will be largely made up of hardscape with subsurface utilities below it.

- *Existing County Drainage Plan:* The project site reflects drainage to an existing regional basin to the northeast which ultimately discharges north to the San Joaquin River Delta.

Stormwater opportunities include:

- *Space for Stormwater Bioretention Areas:* Open space parcels have been reserved for stormwater treatment facilities. Each bioretention area provides a centralized location for stormwater treatment at the downstream node of the project's storm drain network.

- *Landscaping Areas:* Throughout the project site there are proposed landscape areas that provide a natural buffer between single-family homes. The proposed walkways will provide pedestrian connectivity within the development.

III. LOW IMPACT DEVELOPMENT DESIGN STRATEGIES

A. Optimization of Site Layout

(1) Limitation of Development Envelope

The project will take advantage of a compact site design within the areas being developed. The site design will allow space for stormwater treatment areas.

(2) Preservation of Natural Drainage Features

The project site will discharge to the existing Regional Detention Basin located adjacent to the northeast corner of the project boundary via the proposed storm drain network. Aside from installing new outfalls to serve the project, there are no proposed changes or impacts to the existing detention basin due to the proposed development.

(3) Use of Drainage as a Design Element

The design of the project is influenced by the need for drainage. The proposed bioretention treatment areas are designed to be integrated into the landscape design and flow with the project's elements

B. Integrated Management Practices

The Rancho Meadows project will consist of 5 integrated management practices (IMPs) that deliver treatment for on-site stormwater runoff (bioretention treatment facilities). The site is divided into 5 major drainage management areas (DMAs), consisting of various surface types. Each DMA consists of roof runoff, runoff from proposed streets, and surface runoff from site flatwork (such as walkways and driveways). All stormwater runoff will be conveyed to the respective bioretention treatment facility via the proposed storm drain network.

Calculations for the individual IMP areas were performed using the Contra Costa Clean Water Program Integrated Management Calculator Version 1.4. For detailed locations of different DMA and IMP areas, please refer to Figure 5. Refer to Attachment 1 for the IMP Calculator modeling report.

IV. DOCUMENTATION OF DRAINAGE DESIGN

A. Drainage Management Areas

Table 2 – Summary of Drainage Management Areas

IMP	DMA Number	Treatment Type	Surface Type	Total Impervious Area (SF)
1	1	Bioretention	Roof, pavement/concrete	193,515
2	2	Bioretention	Roof, pavement/concrete	148,440
3	3	Bioretention	Roof, pavement/concrete	15,890
4	4	Bioretention	Roof, pavement/concrete	95,070
5	5	Bioretention	Pavement/concrete	6,820

B. Integrated Management Practices

Table 3 – IMP Design Summary

Total Project Area (Acres)	17.1
Total Developable (Disturbed) Project Area (Acres)	17.1
Mean Annual Precipitation	12.8 inches
Total Pre-Project Impervious Area (Acres)	0.00
Total Post-Project Impervious Area (Acres)	10.6
IMPs Designed For:	Treatment Only
Sizing Methodology	CCC IMP Sizing Tool
Total Bioretention Treatment Area Provided (SF)	20,219

V. SOURCE CONTROL MEASURES

A. Site Activities and Potential Sources of Pollutants

Potential sources of stormwater pollutants for the Project include:

- The dumping of pollutants into the storm drain system
- Pesticides for indoor pest control
- Pesticides, herbicides, and fertilizer for landscape maintenance
- Nutrients from the waste of household pets
- Grease, Oil, and heavy metals due to vehicles

B. Source Control Table

Table 4 – Sources and Source Control Measures

Potential Source of Pollutants	Source Control BMPs	Operational Source Control BMPs
On-site dumping into storm drain system	All storm drain inlets will be marked with the words "No Polluting Drains to the Delta"	Residents will be provided with pollution prevention information. These markings will be repainted/replaced when needed. Storm drain inlets and pipes that connect to IMPs will be maintained per the Projects Operations and Maintenance Plan.
Indoor Pest Control		Residents will be provided with Integrated Pest Management information.
Landscape	The landscape will minimize the use of fertilizers, herbicides, and pesticides. It will decrease runoff and promote infiltration. The landscape will use plants that are suitable for the site's soil and weather conditions, as well as, choosing pest-resistant plants along hardscape where possible.	
Roofing, Gutters & Trim	The buildings roofing, gutters, and trimmings will not use copper or other unprotected metals to prevent leach into the stormwater.	
Fire Sprinkler Test	A means to drain water from a fire sprinkler test will be provided to the sanitary sewer system.	

VI. STORMWATER FACILITY MAINTENANCE

A. Ownership and Responsibility for Maintenance in Perpetuity

All stormwater management facilities in this stormwater control plan will be the responsibility of the owners (Civic Rancho Meadows, LLC) to manage and maintain. Upon completion, the management of stormwater facilities will transfer to the future homeowners' association (HOA). It will be the duty of Civic Rancho Meadows, LLC to provide a comprehensive Stormwater Control Operations and Maintenance Plan (O&M Plan) to the HOA.

B. Summary of Maintenance Requirements for Each Stormwater Facility

As stated, the O&M Plan will provide a full listing of operations and maintenance requirements. This will include monitoring and maintenance associated with the IMPs. For proper maintenance of the bioretention facilities, the management will have regular inspections of physical features including inlet and outlet structures. They will monitor water drawdown rates, verifying proper infiltration through the bioretention's soil. When necessary, the bioretention mulch will need to be leveled or replaced, the medium will need to be reconditioned or replaced and the underdrains will need clearing of debris. A regular inspection of the vegetation may necessitate pruning, replanting, or control over undesired invasive species.

VII. CONSTRUCTION PLAN C.3 CHECKLIST

The construction plan checklist will be completed when approved project improvement plans are available.

Table 5 – Construction Plan C.3 Checklist

IMP Description	*See Figure No.*
IMP 1 Bioretention Treatment	5
IMP 2 Bioretention Treatment	5
IMP 3 Bioretention Treatment	5
IMP 4 Bioretention Treatment	5
IMP 5 Bioretention Treatment	5

VIII. CERTIFICATIONS

The selection, sizing, and preliminary design of stormwater treatment and other control measures within this plan meet the requirements outlined in the Contra Costa Permittee currently subject to NPDES Permit No. CAS612008 issued by Order R2-2015-0049 on November 19, 2015, and amended by Order R2-2019-0004 on February 13, 2019.

_____ _____

Evan Dambacher, P.E., Q.S.D. Date
RCE # 85144

Figures

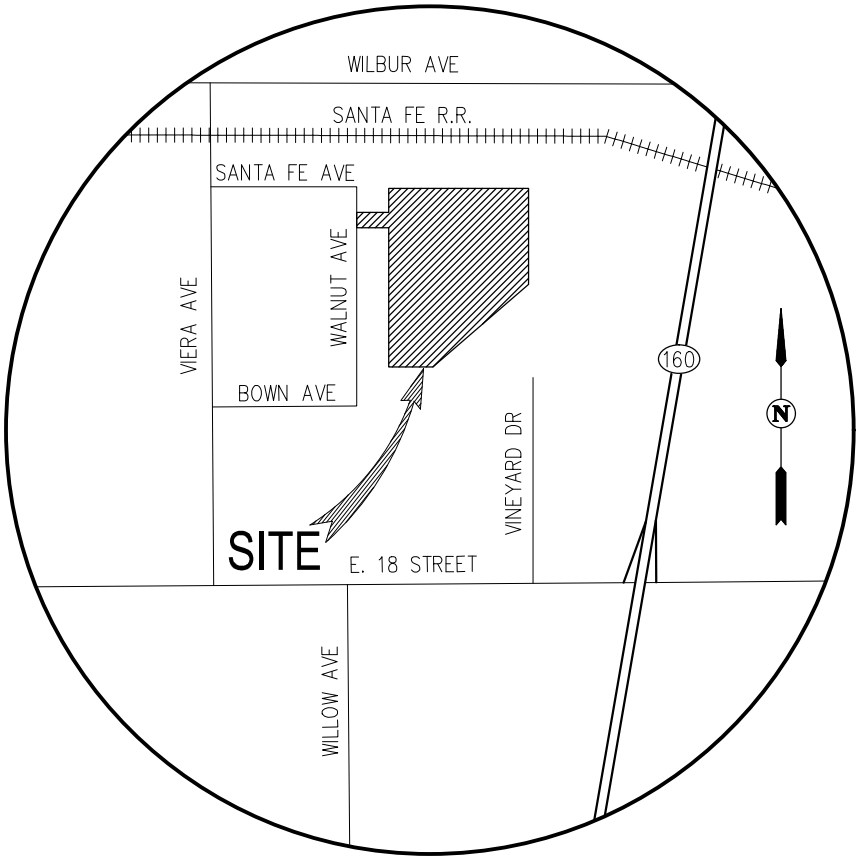

FIGURE 1
VICINITY MAP
RANCHO MEADOWS

CITY OF ANTIOCH CONTRA COSTA COUNTY CALIFORNIA

DATE: SEPTEMBER 2024 SCALE: NTS

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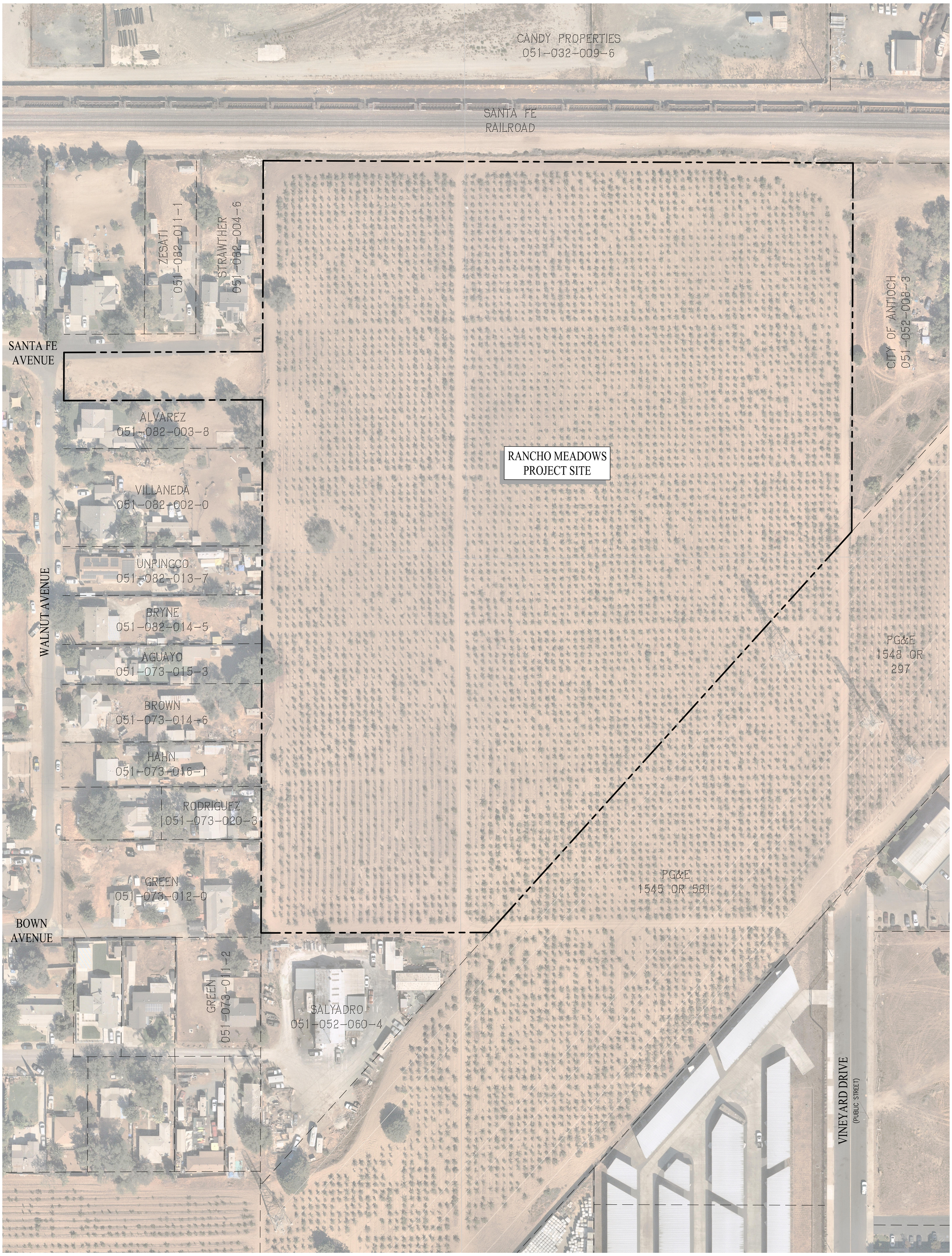

FIGURE 2
AERIAL MAP
RANCHO MEADOWS

CITY OF ANTIOCH CONTRA COSTA COUNTY CALIFORNIA

SCALE: 1"=60' DATE: SEPTEMBER 2024

0 60 120 180

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CANDY PROPERTIES
051-032-009-6

SANTA FE RAILROAD

10' EASEMENT FOR FLOOD CONTROL PURPOSES, GRANTED TO CONTRA COSTA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT PER BOOK 13516, PAGE 123

ZESATI
051-082-011-1

STRAWTHER
051-082-004-6

SANTA FE AVENUE

PARCEL TWO
0.42 AC±

PARCEL ONE
16.71 AC±

ALVAREZ
051-082-003-8

VILLANEDA
051-082-002-0

UNPINGCO
051-082-013-7

BRYNE
051-082-014-5

AGUAYO
051-073-015-3

BROWN
051-073-014-6

HAHN
051-073-016-1

RODRIGUEZ
051-073-020-3

GREEN
051-073-012-0

WALNUT AVENUE

BOWN AVENUE

GREEN
051-073-011-2

SALYADRO
051-052-060-4

CITY OF ANTIOCH
051-052-008-3

PG&E
1548 OR 297

PG&E
1545 OR 581

VINEYARD DRIVE
(PUBLIC STREET)

OHW

LEGEND:

- PROJECT BOUNDARY
- IMPERVIOUS SURFACE
- PERVIOUS SURFACE

FIGURE 3
EXISTING CONDITIONS
RANCHO MEADOWS

CITY OF ANTIOCH CONTRA COSTA COUNTY CALIFORNIA

SCALE: 1"=60' DATE: SEPTEMBER 2024

0 60 120 180

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CANDY PROPERTIES
051-032-009-6

SANTA FE RAILROAD

10' EASEMENT FOR FLOOD CONTROL PURPOSES, GRANTED TO CONTRA COSTA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT PER BOOK 13516, PAGE 123

ZESATI
051-082-011-1

STRAWTHER
051-082-004-6

SANTA FE AVENUE

PARCEL D

ALVAREZ
051-082-003-8

VILLANEDA
051-082-002-0

UNPINGCO
051-082-013-7

BRYNE
051-082-014-5

AGUAYO
051-073-015-3

BROWN
051-073-014-6

HAHN
051-073-016-1

RODRIGUEZ
051-073-020-3

GREEN
051-073-012-0

WALNUT AVENUE

BOWN AVENUE

PARCEL C

'B' STREET

'H' STREET

'A' STREET

'I' STREET

'J' STREET

'K' STREET

'G' STREET

'C' STREET

'F' STREET

PARCEL A

PARCEL B

ALLEY 'L'

ALLEY 'E'

'D' STREET

PARCEL E

VINEYARD DRIVE EXTENSION
(PUBLIC STREET)

CITY OF ANTIOCH
051-052-008-3

PG&E
1548 OR 297

PG&E
1545 OR 581

VINEYARD DRIVE
(PUBLIC STREET)

GREEN
051-073-011-2

SALYADRO
051-052-060-4

LEGEND:

PROJECT BOUNDARY

IMPERVIOUS SURFACE

PERVIOUS SURFACE

FIGURE 4
PROPOSED CONDITIONS
RANCHO MEADOWS

CITY OF ANTIOCH CONTRA COSTA COUNTY CALIFORNIA

SCALE: 1"=60' DATE: SEPTEMBER 2024

0 60 120 180

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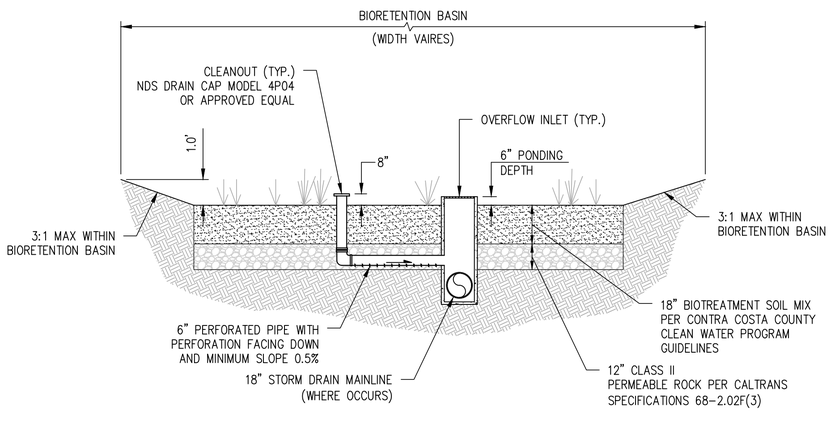
BIORETENTION SUMMARY						
DMA	TOTAL AREA (SF)	TOTAL IMPERVIOUS AREA (SF)	TOTAL PERVIOUS AREA (SF)	EFFECTIVE IMPERVIOUS AREA (SF)	BIORETENTION AREA REQUIRED (SF)	BIORETENTION AREA PROVIDED (SF)
1	302,160	193,515	108,645	204,380	8,175	8,455
2	225,280	148,440	76,840	156,124	6,245	6,307
3	32,620	15,890	16,730	17,563	703	952
4	165,420	95,070	70,350	102,105	4,084	4,133
5	19,910	6,820	13,090	8,129	325	372
TOTAL	745,390	459,735	285,655	488,301	19,532	20,219

NOTES:
1. ALL TREATMENT MEASURES AND TECHNICAL REQUIREMENTS FOR THIS PROJECT ARE BASED ON THE CONTRA COSTA COUNTY CLEAN WATER PROGRAM STORMWATER C.3 GUIDEBOOK (LATEST EDITION).
2. SEE STORMWATER MANAGEMENT PLAN REPORT FOR OTHER SIZING REQUIREMENTS, CALCULATIONS, AND OTHER INFORMATION.
3. 100% OF SITE STORMWATER TO BE TREATED USING TREATMENT FEATURES SHOWN ON THIS PLAN IN CONJUNCTION WITH OTHER FIGURES AND REQUIREMENTS IN THE STORMWATER MANAGEMENT PLAN.
4. SEE LANDSCAPE PLANS FOR PLANTING WITHIN BIORETENTION AREAS.
5. SHOULD FIELD CONDITIONS WARRANT MODIFICATIONS TO SHAPE OF TREATMENT FACILITIES, THE CONTRACTOR SHALL CONTACT THE ENGINEER FOR APPROVAL. IN ALL CASES THE CONTRACTOR SHALL MAINTAIN THE MINIMUM SURFACE AREA OF ALL BIORETENTION AREAS AS SHOWN ON THIS PLAN.



TYPICAL BIORETENTION DETAIL

NOT TO SCALE

LEGEND

- SUBDIVISION BOUNDARY
- DMA (DRAINAGE MANAGEMENT AREA)
- FLOW DIRECTION
- 18" SD — STORM DRAIN PIPE
- EX SD — EXISTING STORM DRAIN PIPE
- DRAINAGE INLET
- IMPERVIOUS AREA
- PERVIOUS AREA
- BIORETENTION TREATMENT AREA
- (1) — DMA ID
- CC — CURB CUT
- RSD — REVERSE SIDEWALK DRAIN

FIGURE 5

STORMWATER CONTROL PLAN

RANCHO MEADOWS

CITY OF ANTIOCH CONTRA COSTA COUNTY CALIFORNIA

SCALE: 1"=60' DATE: SEPTEMBER 2024

0 60 120 180

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JOB NO.: 3601-000

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Attachments

APPENDIX A - SIZING CALCULATIONS

Project Name: Rancho Meadows
Project Type: Standard LID WQ Treatment
APN: 051-052-053-9, 051-082-010-3
Drainage Area: 479,954 sq ft
Mean Annual Precipitation: 12.8 inches

IV. Areas Draining to IMPs

IMP Name: IMP1
IMP Type: Bioretention Facility
Soil Group: C

DMA Name	Area (sq ft)	Post Project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor
DMA1A	101,524	Concrete or Asphalt	1.00	101,524
DMA1B	91,991	Conventional Roof	1.00	91,991
			Total	193,515

	IMP Sizing Factor	Minimum	Proposed
Area	0.040	7,741 sq ft	8,455 sq ft

IMP Name: IMP2
IMP Type: Bioretention Facility
Soil Group: C

DMA Name	Area (sq ft)	Post Project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor
DMA2A	85,893	Concrete or Asphalt	1.00	85,893
DMA2B	62,547	Conventional Roof	1.00	62,547
			Total	148,440

	IMP Sizing Factor	Minimum	Proposed
Area	0.040	5,938 sq ft	6,307 sq ft

IMP Name: IMP3
IMP Type: Bioretention Facility
Soil Group: C

DMA Name	Area (sq ft)	Post Project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor
DMA3A	3,888	Concrete or Asphalt	1.00	3,888
DMA3B	12,002	Conventional Roof	1.00	12,002
			Total	15,890

	IMP Sizing Factor	Minimum	Proposed
Area	0.040	636 sq ft	952 sq ft

IMP Name: IMP4
IMP Type: Bioretention Facility
Soil Group: C

APPENDIX A - SIZING CALCULATIONS

DMA Name	Area (sq ft)	Post Project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor
DMA4A	41,982	Concrete or Asphalt	1.00	41,982
DMA4B	53,088	Conventional Roof	1.00	53,088
			Total	95,070

	IMP Sizing Factor	Minimum	Proposed
Area	0.040	3,803 sq ft	4,133 sq ft

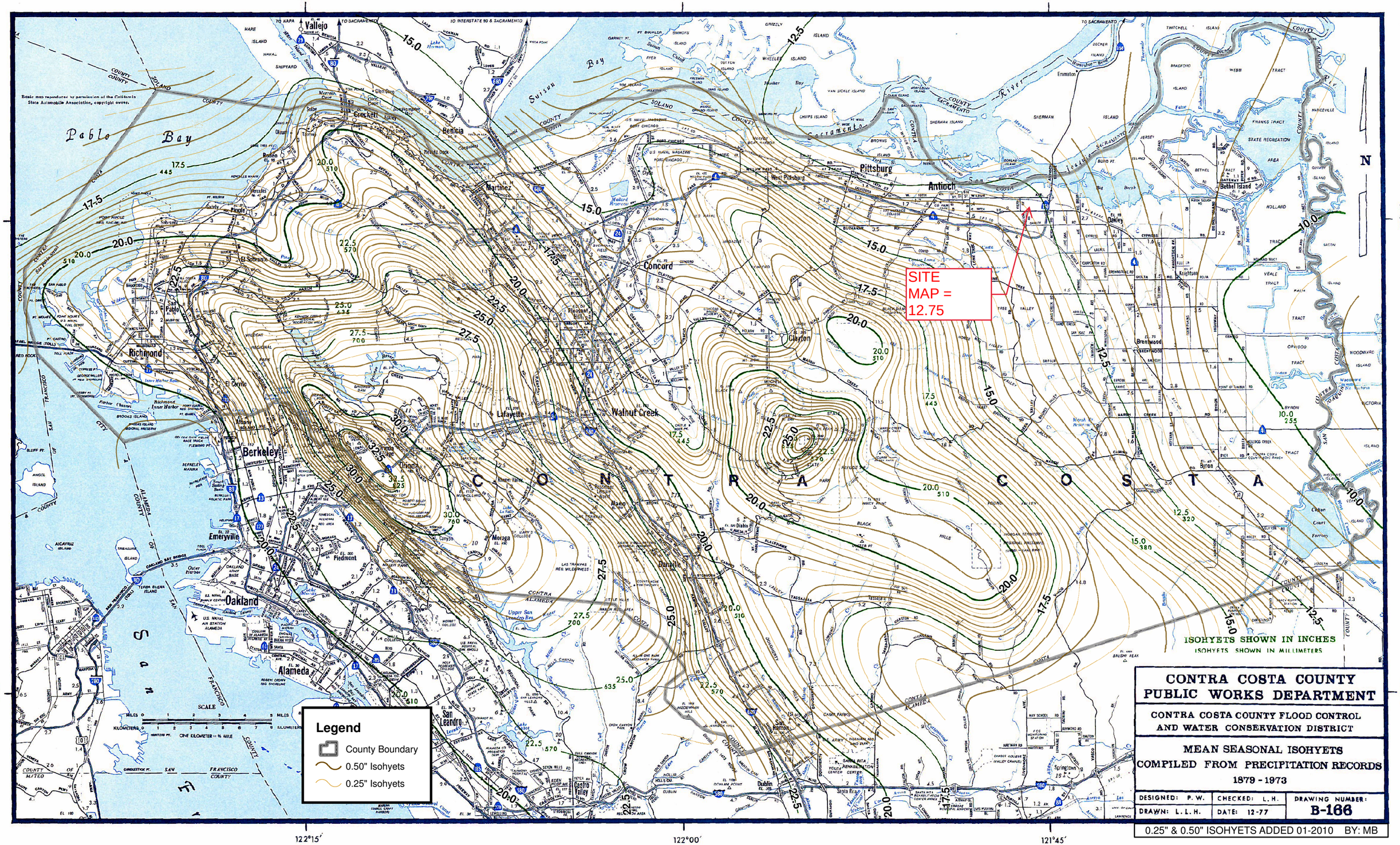
IMP Name: IMP5
IMP Type: Bioretention Facility
Soil Group: C

DMA Name	Area (sq ft)	Post Project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor
DMA5	6,820	Concrete or Asphalt	1.00	6,820
			Total	6,820

	IMP Sizing Factor	Minimum	Proposed
Area	0.040	273 sq ft	372 sq ft

Report generated on 09/05/2024 by the Contra Costa Clean Water Program IMP Sizing Tool software (version 1.4.0.0).

APPENDIX B - CONTRA COSTA COUNTY MEAN SEASONAL PRECIPITATION



APPENDIX C - CONTRA COSTA COUNTY FLOOD CONTROL DISTRICT MAP

STA. TO STA.	TYPE OF IMPROVEMENT	R/W
LINE A		
0+00 to 23+00	42"CP	10 Ft.
23+00 to 26+25	24"CP 27"	10 Ft.
26+25 to 27+25	24"RCP (Jacked)	10 Ft.
27+25 to 28+00	24"CP 27"	10 Ft.
LINE A-1		
0+00 to 3+30	24"CP	10 Ft.
LINE B		
0+00 to 4+00	36"CP	10 Ft.
4+00 to 9+20	30"CP	10 Ft.
9+20 to 12+20	27"CP	10 Ft.
LINE C		
0+00 to 18+50	54"CP	12 Ft.
18+50 to 28+25	60"CP	12 Ft.
28+25 to 34+85	48"CP	12 Ft.
LINE C-1		
0+00 to 9+00	36"CP	10 Ft.
9+00 to 22+00	30"CP	10 Ft.
LINE C-2		
0+00 to 5+00	36"CP	10 Ft.
LINE C-3		
0+00 to 12+05	42"CP	10 Ft.
LINE C-4		
0+00 to 18+25	36"CP	10 Ft.
18+25 to 21+55	24"CP	10 Ft.
LINE D		
0+00 to 10+80	30"CP	10 Ft.

BASIN AT ELEV. 25.5 A=2 Ac.

Approximate vicinity in which fill is required for drainage.

Area not suitable for infiltration basin even for an interim solution for "C-C"

Note:
See Construction plans for Lines "A" and "C" on Const. Plan Rack

APPROVED BY: Milton Fabrick 1-26-83
DEPUTY PUBLIC WORKS DIRECTOR R.E. CERT. NO. 19811

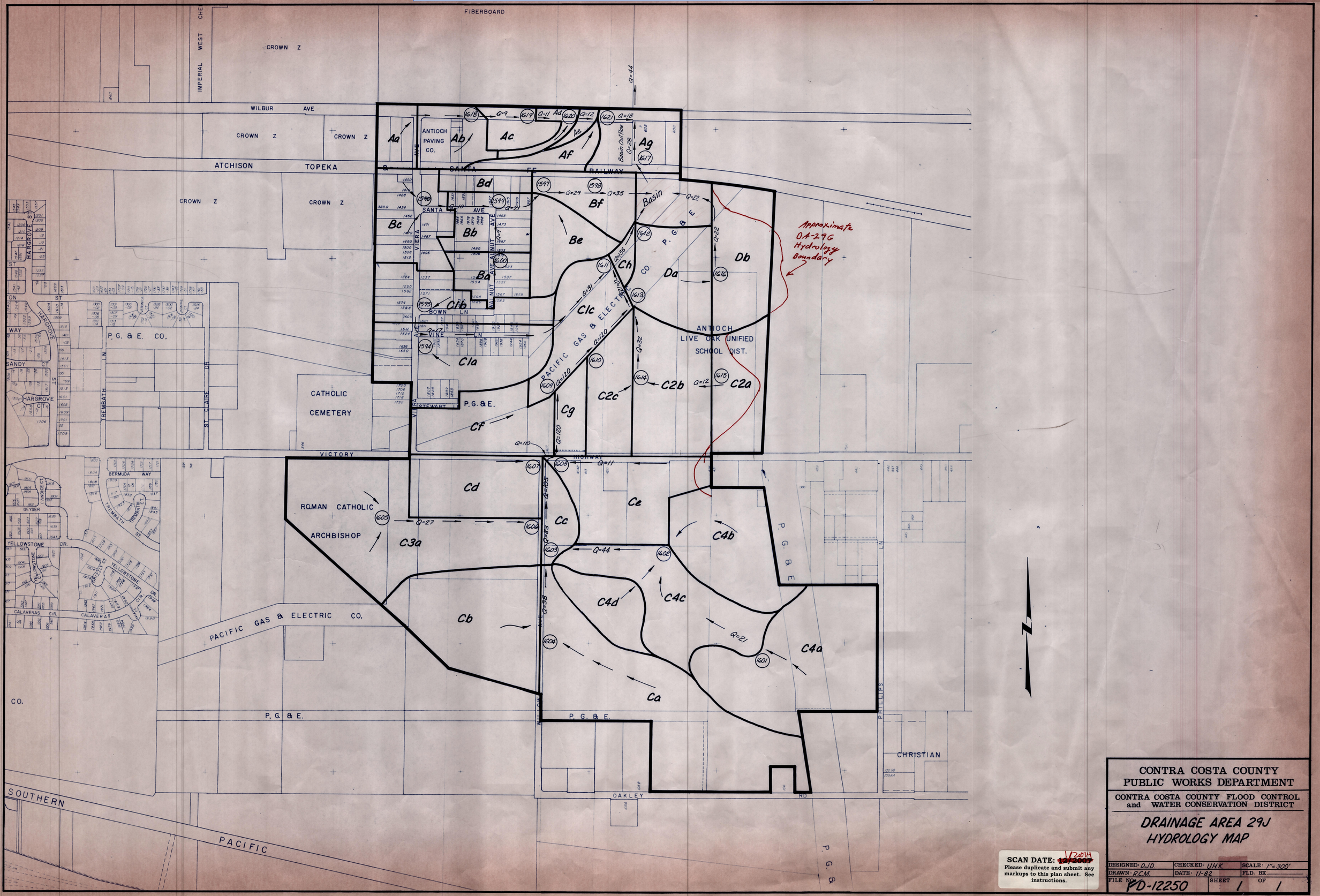
CONTRA COSTA COUNTY
PUBLIC WORKS DEPARTMENT

CONTRA COSTA COUNTY FLOOD CONTROL and WATER CONSERVATION DISTRICT

DRAINAGE AREA 29J BOUNDARY MAP & DRAINAGE PLAN

DESIGNED: D.J.D.	CHECKED: U.H.K.	SCALE: 1"=300'
DRAWN: R.C.M.	DATE: 11-82	FLD. BK.
FILE NO. F.D-12249	SHEET 1 OF 1	

APPENDIX C - CONTRA COSTA COUNTY FLOOD CONTROL DISTRICT MAP



CONTRA COSTA COUNTY
PUBLIC WORKS DEPARTMENT

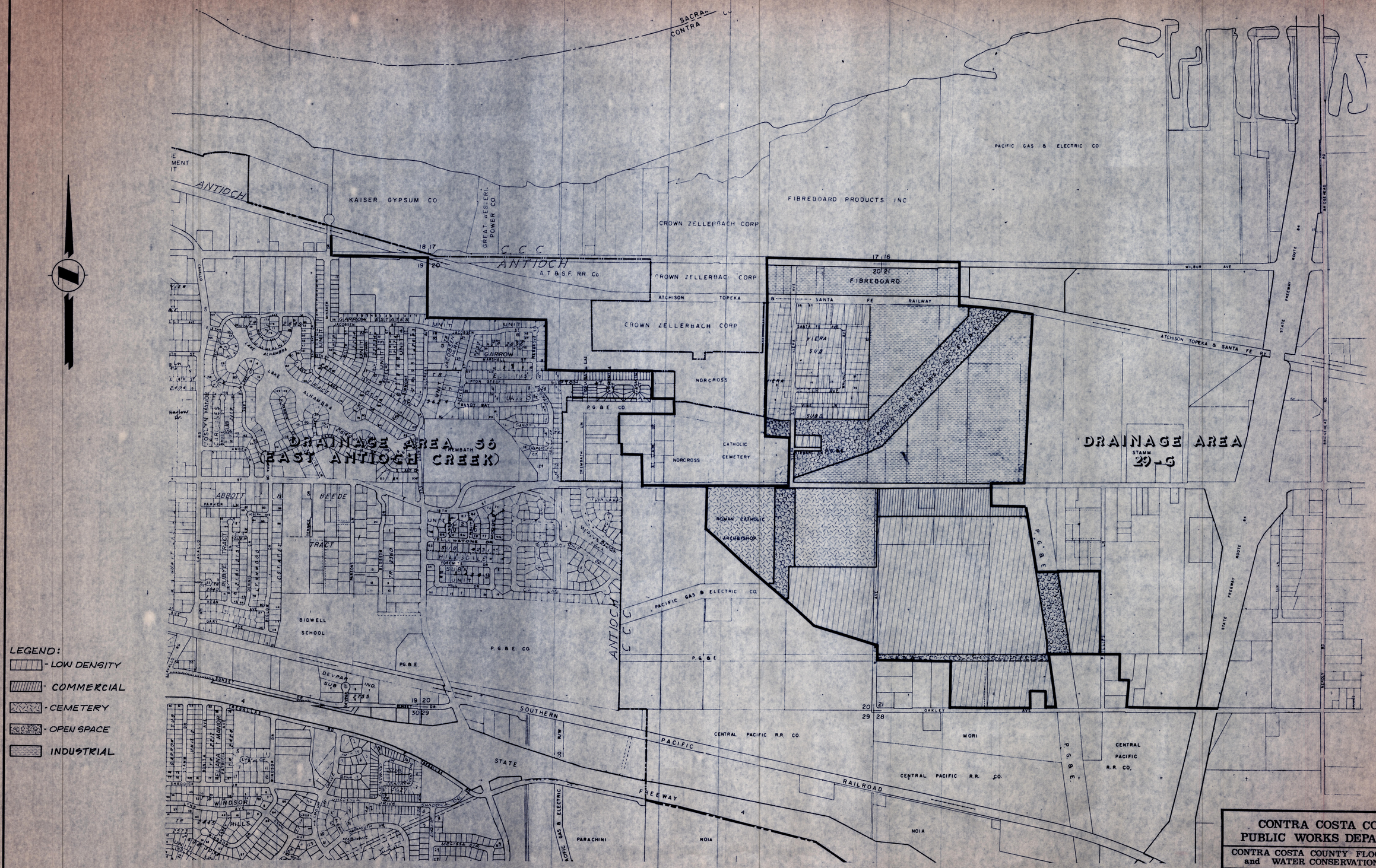
CONTRA COSTA COUNTY FLOOD CONTROL and WATER CONSERVATION DISTRICT

DRAINAGE AREA 29J
HYDROLOGY MAP

DESIGNED: D.J.D.	CHECKED: U.H.K.	SCALE: 1"=300'
DRAWN: R.C.M.	DATE: 11-82	FLD. BK.
FILE NO. FD-12250	SHEET 1 OF 1	

SCAN DATE: ~~12/2007~~ 1/2014
Please duplicate and submit any markups to this plan sheet. See instructions.

APPENDIX C - CONTRA COSTA COUNTY FLOOD CONTROL DISTRICT MAP



LEGEND:
- LOW DENSITY
- COMMERCIAL
- CEMETERY
- OPEN SPACE
- INDUSTRIAL

DATE: AUG, 81					AGENCY		
SCALE: 1" = 500'							
DESIGNED: M.E.M.							
DRAWN: J.A.S.							
CHECKED:							
PROJ. ENGR.: RJG							
PROJ. MGR.: M.R.M.	NO.	BY	DATE	REVISIONS	BY	DATE	

SUBMITTED

BY: _____

DATE: _____ R.C.E. _____

JAMES R. STEDMAN & ASSOCIATES, INC.
CIVIL ENGINEERS/SURVEYORS
375 NORTH WIGET LANE, SUITE 100
WALNUT CREEK, CALIFORNIA 94598 (415) 935-9140

SCAN DATE: 1/2014
Please duplicate and submit any markups to this plan sheet. See instructions.

CONTRA COSTA COUNTY
PUBLIC WORKS DEPARTMENT
CONTRA COSTA COUNTY FLOOD CONTROL and WATER CONSERVATION DISTRICT

DRAINAGE AREA 29-J
LAND USE MAP

DESIGNED:	CHECKED:	SCALE 1" = 500'
DRAWN:	DATE: AUG., 1981	FLD BK
FILE NO. FD-12224	SHEET 1 OF 1	

2017-81-01