



Golden Oak Development

Oakley, CA

Preliminary Stormwater Control Plan

December 2021



Prepared for:
S&Y Properties



Prepared By:



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Abbreviations

BF#1	Bioretention Facility #1
BF#2	Bioretention Facility #2
BF#3	Bioretention Facility #3
BMP	Best Management Practices
DMA	Drainage Management Area
IMP	Integrated Management Practices
LID	Low Impact Development
SF	Square Feet

1 Project Data

Table 1. Project Data

Project Name/Number	Golden Oak Subdivision
Application Submittal Date	December 20, 2021
Project Location	4960 Fuschia Way, Oakley, CA 94561
Name of Developer	S&Y Properties
Project Phase No.	Not applicable
Project Type and Description	Seven single family homes with public and private streets and associated infrastructure
Project Watershed	East County Delta Drainages
Total Project Site Area (acres)	2.0 acres
Total Area of Land Disturbed (acres)	2.0 acres
Total New Impervious Surface Area (SF)	35,660 SF
Total Replaced Impervious Surface Area	3,497 SF
Total Pre-Project Impervious Surface Area	9,437 SF
Total Post-Project Impervious Surface Area	41,600 SF
50% Rule	Applies
Project Density	FAR = 0.27
Applicable Special Project Categories	None
Percent LID and non-LID treatment	100% LID
HMP Compliance	Not Applicable, project is located in a hardened subbasin and therefore exempt. Stormwater facilities on site have been designed for treatment only.

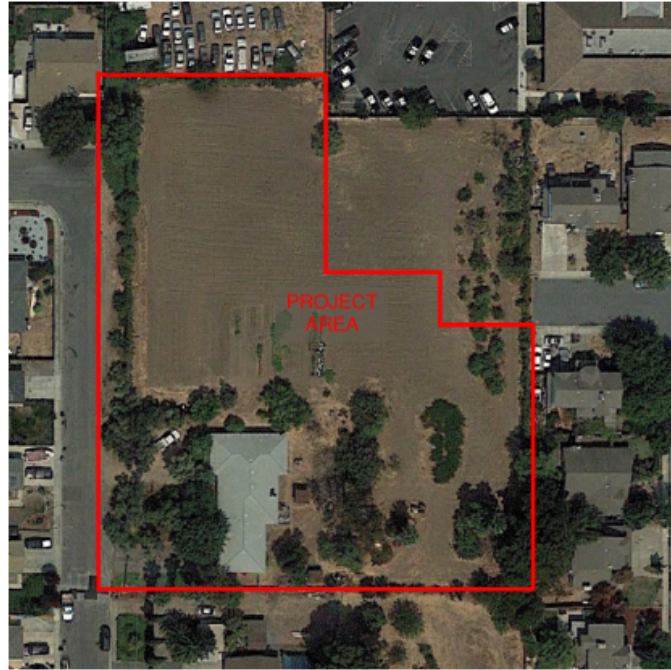
2 Setting

2.1 Project Location and Description

The project consists of seven new single family homes, one existing to remain, utility mains and service laterals, a new street with a tributary private access road, and sidewalks. The site is a 2-acre parcel on Fuschia Way, two miles east of CA-160. See Figure 1.

2.2 Opportunities and Constraints for Stormwater Control

In the existing condition, the onsite soils, being silty, clayey sand promote infiltration. Excess runoff primarily flows into Fuschia Way and West Ruby Road and into the existing catch basins on either side of the site. The planned development includes single family homes with front, side, and rear yards. Site runoff will be managed by dispersal in the planned landscaped areas, permeable pavement, or through treatment by bioretention facilities. Easement space has been allocated to serve as facilities for proposed bioretention to treat runoff as it flows into the main line which will connect to the future Line J storm drain, running north on the east side of Fuschia Way.



Source: Google Earth, 2021

Figure 1 Existing Site Conditions

3 Low Impact Development Design Strategies

3.1 Optimization of Site Layout

The proposed site is consistent with the existing development in zoning and land use. Minimum requirements dictated by the City and Fire District have been met to allow minimization of impervious areas (streets, sidewalks, driveways, pavements, etc.) to achieve a low impact design. Some easements adjacent to the proposed streets will have bioretention facilities that will act as buffers to the residences and public access points respectively. To offset the lack of available space for bioretention treatment in certain areas, enough bioretention space has been allocated along Fuschia Way to treat equal amounts of runoff. Areas not readily accessible to available bioretention have been designated as tradeoff areas.

3.2 Use of Permeable Pavement

Construction of the hardscaped areas including the streets, sidewalks, and driveways, will be paved using conventional concrete and asphalt. Use of permeable pavement on the private road will be used to offset the amount of stormwater running off impervious area that would need to be treated post construction. The private road is then self-treating, allowing for the areas designated for Bioretention Facility #2 and #3 to be sufficient in treating their respective Drainage Management Area (DMA).

3.3 Dispersal of Runoff to Pervious Areas

Runoff from impervious areas of each lot is proposed to drain out to pervious areas. Excess runoff from the lot frontage, front yard, and side yards will flow to the respective bioretention facility through careful grading of each lot. Runoff from areas on the rear portion of the house/property will infiltrate into landscaped rear yards. Grading of the landscapes adjacent to the homes will meet the City’s minimum requirements and as recommended by the Project’s geotechnical report, provided by Engeo dated April 2021, to prevent ponding and promote proper flow of runoff.

3.4 Bioretention or other Integrated Management Practices (IMPs)

Runoff to be directed to bioretention facilities has been portioned out per DMA to flow in specific directions depending on the parcel, surface, and facility (See Appendix A).

4 Documentation of Drainage Design

4.1 Descriptions of each Drainage Management Area

Table 2. Drainage Management Areas

	<i>DMA ID</i>	<i>Area (SF)</i>	<i>Surface Type</i>	<i>Description</i>	<i>DMA Type/Drains to</i>
Parcel 1	1.11	4,502	Roof	Roofs	Drains to IMP (Facility #1)
	1.21	1,438	Paved	Driveways	Drains to IMP (Facility #1)
	1.31	10,225	Landscaped	Landscape	Drains to IMP (Facility #1)
Parcel 2	1.12	3,568	Roof	Roofs	Drains to IMP (Facility #1)
	1.22	468	Paved	Driveways	Drains to IMP (Facility #1)
	1.32	5,122	Landscaped	Landscape	Drains to IMP (Facility #1)
Parcel 3	1.13	1,648	Roof	Roofs	Drains to IMP (Facility #1)
	1.23	549	Paved	Driveways	Drains to IMP (Facility #1)
	1.33	5,190	Landscaped	Landscape	Drains to IMP (Facility #1)
Parcel 4	2.11	1,438	Roof	Roofs	Drains to IMP (Facility #2)
	2.21	379	Paved	Driveways	Drains to IMP (Facility #2)
	2.31	3,516	Landscaped	Landscape	Drains to IMP (Facility #2)
Parcel 5	2.12	2,863	Roof	Roofs	Drains to IMP (Facility #2)
	2.22	507	Paved	Driveways	Drains to IMP (Facility #2)
	2.32	3,125	Landscaped	Landscape	Drains to IMP (Facility #2)

	<i>DMA ID</i>	<i>Area (SF)</i>	<i>Surface Type</i>	<i>Description</i>	<i>DMA Type/Drains to</i>
Parcel 6	3.11	2,706	Roof	Roofs	Drains to IMP (Facility #3)
	3.21	504	Paved	Driveways	Drains to IMP (Facility #3)
	3.31	3,464	Landscaped	Landscape	Drains to IMP (Facility #3)
Parcel 7	3.12	2,706	Roof	Roofs	Drains to IMP (Facility #3)
	3.22	504	Paved	Driveways	Drains to IMP (Facility #3)
	3.32	3,142	Landscaped	Landscape	Drains to IMP (Facility #3)
Parcel 8	3.13	2,343	Roof	Roofs	Drains to IMP (Facility #3)
	3.23	402	Paved	Driveways	Drains to IMP (Facility #3)
	3.33	3,129	Landscaped	Landscape	Drains to IMP (Facility #3)
Public Road	1.41	3,346	Paved	Sidewalks, Fuschia, and W Ruby Extension	Drains to IMP (Facility #1)
Public Road	2.41	5,600	Paved	Sidewalks, Fuschia, and W Ruby Extension	Drains to IMP (Facility #2)
Private Road	4.51	5,892	Permeable Pavement	Sidewalks, Fuschia, and W Ruby Extension	Self-Treating
Public Road	5.41	5,986	Paved	Tradeoff Area	Equivalent area to be treated by Facility #1

4.1.1 Drainage Management Area Descriptions

Roofs (DMAs 1.11, 1.12, 1.13, 2.11, 2.12, 3.11, 3.12, and 3.13, totaling 21,965 square feet), drain via gutters to driveways or swales adjacent to the driveways and from there to the street gutters, which drain to Bioretention Facilities #1, #2, and #3, respectively.

Driveways (DMAs 1.21, 1.22, 1.23, 2.22, 2.23, 3.21, 3.22, and 3.23, totaling 5,427 square feet drain to the street gutters, which drain to Bioretention Facilities #1, #2, and #3, respectively.

Sidewalks, Fuschia, and W Ruby Extension (DMAs 1.41 and 2.41 totaling 8,946 square feet) drain to Bioretention Facilities #1, and #2 respectively.

Private Road (4.51, totaling 5,892) is permeable pavement and self-treating.

Landscape (DMAs 1.31,1.32, 1.33, 2.31, 2.32, 3.31, 3.32, and 3.33, totaling 36,557 square feet) will be graded slightly concave to promote runoff retention and to direct excess run off to Bioretention Facilities #1, #2, and #3 respectively.

Tradeoff Areas, (DMA 5.41, totaling 5,896 square feet) equivalent amount of runoff from Fuschia Way to be treated by Bioretention Facility #1 in lieu of runoff from West Ruby that cannot be accommodated by Bioretention Facility #2.

4.2 Integrated Management Practices

Runoff directed from hardscaped areas will flow down and be directed to their respective treatment facilities either through landscaping grades or curbs and gutters lining the adjacent streets. Easements on the east side of Fuschia Way have been used for **Bioretention Facility #1**, treating run off from Parcels 1,2, and 3 and the adjacent road front. Street gutters on the public road will direct runoff from the northwest residences, Parcels 4 and 5, and the northern half of the West Ruby Extension to **Bioretention Facility #2**, adjacent to the future police parking lot and within an easement on the north side of the West Ruby extension. **Bioretention Facility #3** is located in the easements lining the front of Parcels 6, 7, and 8 on the east side of the private road (See Exhibit). Due to the limited space available to size **Bioretention Facility #2**, **Bioretention Facility #1** has been designed with extra area to treat runoff on the east side of Fuschia Way to compensate for runoff from West Ruby Extension as a tradeoff.

Facilities will be designated to meet criteria in the Stormwater C.3 Guidebook, 7th Edition. Detail of the design and construction will be finalized further in the improvement plans, but will include at a minimum:

- Flat and level layers of gravel, soil, sand, compost and/or mulch
- Concrete curb perimeter
- Overflow grates, underdrains, irrigation systems
- Water-wise plantings

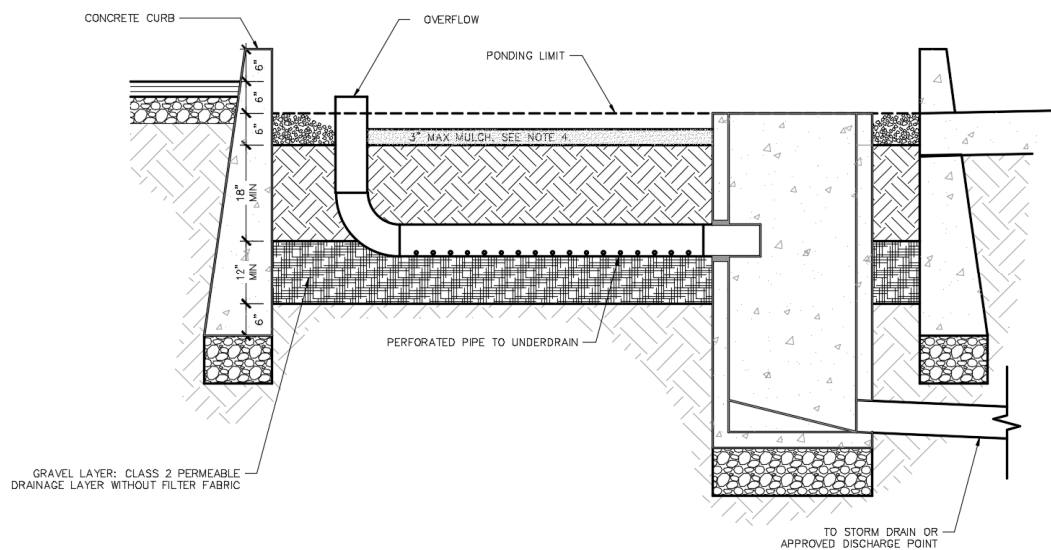


Figure 2. Bioretention Facility Cross-Section

4.3 Tabulation and Sizing Calculations

See Appendix B, Output from the IMP Sizing Calculator.

5 Source Control Measures

5.1 Site activities and potential sources of pollutants

Indoor and structural pest control, as well as landscape maintenance, can potentially produce stormwater pollutants if done onsite.

5.2 Source Control Table

Table 3. Source Control Table

<i>Potential Source of Runoff Pollutants</i>	<i>Permanent Source Control BMPs</i>	<i>Operation Source Control BMPs</i>
Indoor and structural pest control	Decreasing pest entry potential with new construction	New homeowners to be provided with IPM information
Landscape maintenance	Plants to be included in the landscape design will account for ecological consistency and typical conditions of the site. Increasing pest resistance to minimize need for synthetic fertilizer or pesticide will be accounted for in the overall landscape design.	New homeowners to be provided with IPM information. Maintenance of landscape will use little to no fertilizer or pesticide.

6 Stormwater Facility Maintenance

6.1 Ownership and Responsibility for Maintenance in Perpetuity

Easements behind the back of walk have been allocated for use by the recommended IMPs in order to facilitate the joint maintenance required per Table 4.

Table 4. Facility Maintenance Designation

IMP	Location	Joint Maintenance By
Bioretention Facility # 1	East side of Fuschia Way	<ul style="list-style-type: none"> • Homeowner's Association • Owners of Parcels 1, 2, and 3
Bioretention Facility # 2	Adjacent to Oakley Police Department parking lot	<ul style="list-style-type: none"> • Homeowner's Association
Bioretention Facility # 3	Private Road	<ul style="list-style-type: none"> • Owners of Parcels 6, 7, and 8

Provisions in the subdivision map, Conditions, Covenants, and Restrictions (CC&Rs) recorded now and in the future for the continued operation and maintenance of the facilities must be reviewed and followed by all future owners. Responsibility of operations and maintenance to continue by all parties until transfer of ownership is finalized.

6.2 Summary of Maintenance Requirements for Each Stormwater Facility

A Stormwater Facility Operation and Maintenance Plan, containing maintenance responsibilities and procedures information, will be submitted for review and approval. Maintenance requirements per Table 5 will be upkept to a minimum for all facilities.

Table 5. Maintenance Requirements

Timing	Maintenance Requirements
Weekly/Quarterly	<ul style="list-style-type: none"> • Removal of visible trash or graffiti
After Significant Rain Events	<ul style="list-style-type: none"> • Inspection for: <ul style="list-style-type: none"> ○ Debris needing to be removed ○ Surface mulch needing replacement or adjustment ○ Any observable signs of ponding
September	<ul style="list-style-type: none"> • Inspection for: <ul style="list-style-type: none"> ○ Debris needing to be removed ○ Surface mulch needing replacement or adjustment
Annually	<ul style="list-style-type: none"> • Landscape Maintenance <ul style="list-style-type: none"> ○ Concrete status and upkeep ○ Trimming of vegetation ○ Replacement of plants, soil, and mulch as needed

Synthetic pesticides or fertilizer or extraneous soil amendments be will be avoided.

7 Construction Plan C.3 Checklist

This section will be finalized upon development of the improvement plans to be provided at a later date.

Table 5. Construction Plan C.3 Checklist

<i>Stormwater Control Plan Page #</i>	<i>BMP Description</i>	<i>See Plan Sheet #s</i>
4 and Exhibit	Drainage from DMAs 4, 5, 6, and 7 is retained by surrounding curbs.	TBD
p.2 and Exhibit	Drainage from rear roofs is directed and dispersed to rear yards	TBD
p.2 and Exhibit	Rear yards are graded concave	TBD
p.2 and Exhibit	Front yards are graded concave	TBD
p.2 and Exhibit	Front roofs and driveways drain to street	TBD
p. 2 and Exhibit	Street drains to bioretention facilities. High point/grade break as shown on Exhibit	TBD
pp. 2-3 and Exhibit	Bioretention facilities are constructed per criteria in the <i>Stormwater C.3 Guidebook</i>	TBD

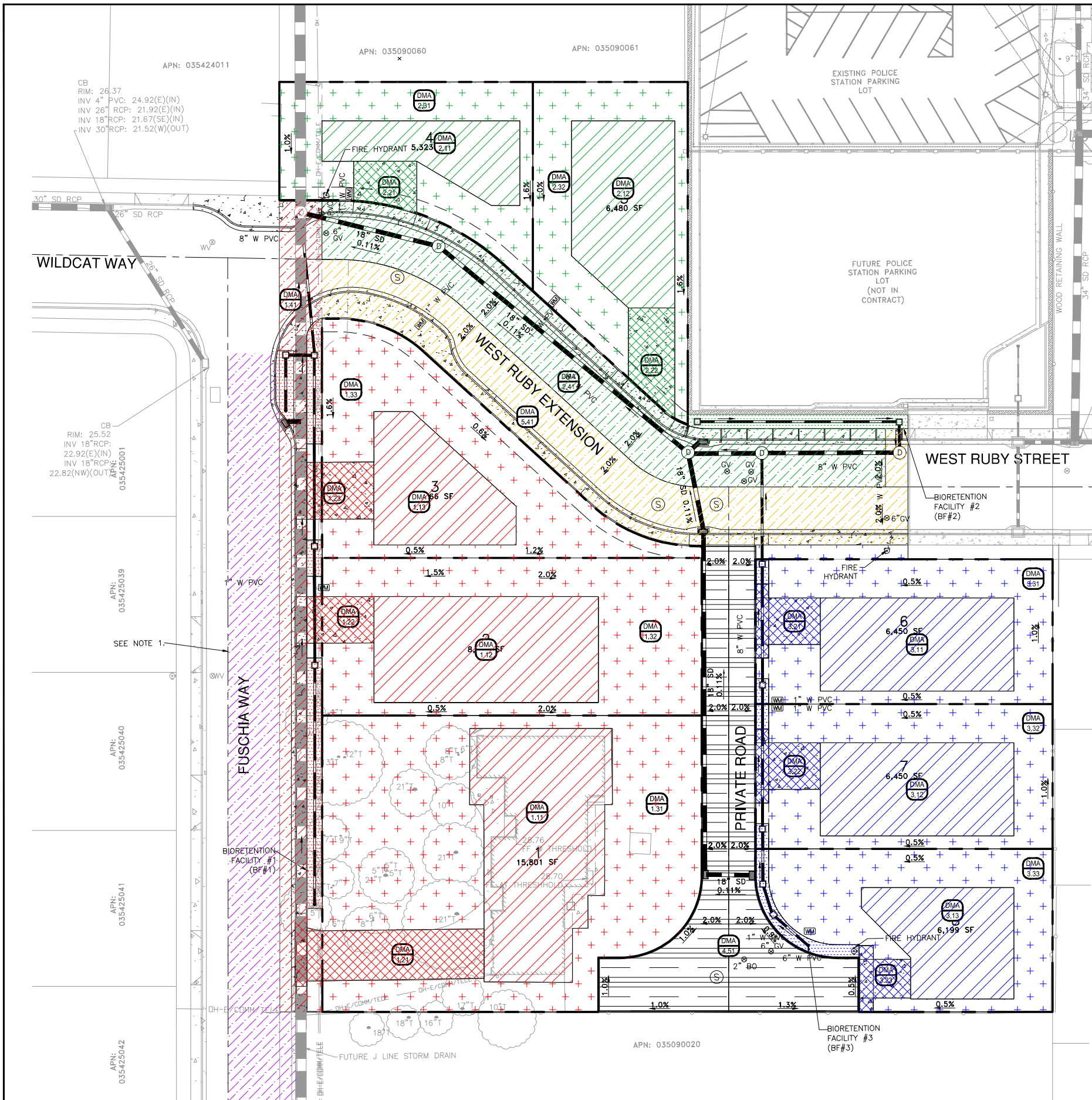
8 Certifications

The selection, sizing, and preliminary design of stormwater treatment and other control measures in this plan attempt to meet the requirements of Regional Water Quality Control Board Order R2-2015-0049. Certification to be stated upon issuance of final storm water control plan.

9 References

- | | |
|---|---|
| Contra Costa Clean Water Program | Stormwater C.3 Guidebook – Stormwater Quality Requirements for Development Applications prepared by Contra Clean Water Program 7 th Edition dated May 17, 2017. |
| California State Water Resources Control Board, 2011 | Runoff Coefficient (C) Fact Sheet prepared by the California State Water Resources Control Board dated 2011. |
| National Oceanic and Atmospheric Administration, 2017 | NOAA Atlas 14 Point Precipitation Frequency Estimates: Ca prepared by the U.S. Department of Commerce – National Oceanic and Atmospheric Administration dated April 21, 2017. |
| Contra Costa County, 1973 | Roughness Factor (Manning’s n) for Pipes and Channels prepared by Contra Costa County, October 1973. |
| Engeo, 2021 | Geotechnical Exploration prepared by Engeo dated April 23, 2021. |
| National Resources Conservation Service | GIS prepared by the National Resources Conservation Service accessed April, 2021. |

APPENDIX A: PRELIMINARY STORM WATER CONTROL PLAN



LEGEND

- BF#1 - BIORETENTION AREA
- BF#1 - SURFACE TYPE: 1 - ROOF
- BF#1 - SURFACE TYPE: 2 - DRIVEWAY
- BF#1 - SURFACE TYPE: 3 - LANDSCAPE
- BF#1 - SURFACE TYPE: 4 - ROADWAY
- BF#2 - BIORETENTION AREA
- BF#2 - SURFACE TYPE: 1 - ROOF
- BF#2 - SURFACE TYPE: 2 - DRIVEWAY
- BF#2 - SURFACE TYPE: 3 - LANDSCAPE
- BF#2 - SURFACE TYPE: 4 - ROADWAY
- BF#3 - BIORETENTION AREA
- BF#3 - SURFACE TYPE: 1 - ROOF
- BF#3 - SURFACE TYPE: 2 - DRIVEWAY
- BF#3 - SURFACE TYPE: 3 - LANDSCAPE
- BF#3 - SURFACE TYPE: 4 - ROADWAY
- TRADE OFF AREA - SURFACE TYPE: 4 - ROADWAY
- EQUIVALENT SPACE - SURFACE TYPE: 4 - ROADWAY
- SURFACE TYPE: 5 - PERMEABLE PAVEMENT
- DRAINAGE MANAGEMENT ID
- SURFACE ID
- SURFACE TYPE
- BIORETENTION FACILITY ID
- DIRECTION OF PIPE FLOW

NOTE:
 1. EQUIVALENT RUNOFF FROM FUSCHIA WAY TO BE TREATED IN BIORETENTION FACILITY #1 IN EXCHANGE FOR RUNOFF FROM DMA 5.41, AS REPRESENTED BY THE PURPLE AREA IN DMA 5.41B.

PARCEL #	DMA ID	AREA (SF)	DESCRIPTION	DMA TYPE/DRAINS TO
1	1.11	4502	ROOFS	BF#1
1	1.21	1438	DRIVEWAYS	BF#1
1	1.31	10225	LANDSCAPE	BF#1
2	1.12	3568	ROOFS	BF#1
2	1.22	468	DRIVEWAYS	BF#1
2	1.32	5122	LANDSCAPE	BF#1
3	1.13	2111	ROOFS	BF#1
3	1.23	573	DRIVEWAYS	BF#1
3	1.33	4704	LANDSCAPE	BF#1
4	2.11	1640	ROOFS	BF#2
4	2.21	430	DRIVEWAYS	BF#2
4	2.31	3267	LANDSCAPE	BF#2
5	2.12	2676	ROOFS	BF#2
5	2.22	647	DRIVEWAYS	BF#2
5	2.32	3172	LANDSCAPE	BF#2
6	3.11	2706	ROOFS	BF#3
6	3.21	504	DRIVEWAYS	BF#3
6	3.31	3464	LANDSCAPE	BF#3
7	3.12	2706	ROOFS	BF#3
7	3.22	504	DRIVEWAYS	BF#3
7	3.32	3142	LANDSCAPE	BF#3
8	3.13	2056	ROOFS	BF#3
8	3.23	359	DRIVEWAYS	BF#3
8	3.33	3461	LANDSCAPE	BF#3
FUSCHIA WAY	1.41	3497	SIDEWALKS, FUSCHIA, AND W RUBY EXTENSION	BF#1
WEST RUBY EXTENSION	2.41	5600	SIDEWALKS, FUSCHIA, AND W RUBY EXTENSION	BF#2
WEST RUBY EXTENSION	4.51	5892	PERMEABLE PAVEMENT	SELF-TREATING
WEST RUBY EXTENSION	5.41	5986	TRADEOFF AREA	TO-BF#1
FUSCHIA WAY	5.41B	5986	EQUIVALENT SPACE	BF#1

DATE:	12/20/2021
SCALE:	AS SHOWN
DESIGNED:	CSM
DRAWN:	CSM
CHECKED:	RJL
PROJ. ENGR:	LFH

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DATE	DESCRIPTION OF REVISIONS	APPD

PRELIMINARY STORMWATER CONTROL PLAN

TENTATIVE PARCEL MAP NO. 9580
 GOLDEN OAK SUBDIVISION
 OAKLEY, CALIFORNIA

SHEET	10
OF 12 SHEETS	
JOB NO.	316002

APPENDIX B: IMP SIZING CALCULATOR OUTPUT

Project Name: Golden Oak Subdivision
Project Type: Treatment Only
APN: 035-090-080
Drainage Area: 85,000
Mean Annual Precipitation: 11.3

Self-Treating DMAs

DMA Name	Area (sq ft)
DMA 4.51	5,892.0

IV. Areas Draining to IMPs

IMP Name: Bioretention Facility #1
IMP Type: Bioretention Facility
Soil Group: Bioretention Facility #1

DMA Name	Area (sq ft)	Post Project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	IMP Sizing	IMP Sizing	Rain Adjustment Factor	Minimum Area or Volume	Proposed Area or Volume					
DMA 1.11	4,502	Conventional Roof	1.00	4,502										
DMA 1.21	1,438	Concrete or Asphalt	1.00	1,438										
DMA 1.31	10,225	Landscape	0.10	1,023										
DMA 1.12	3,568	Conventional Roof	1.00	3,568										
DMA 1.22	468	Concrete or Asphalt	1.00	468										
DMA 1.32	5,122	Landscape	0.10	512										
DMA 1.41	3,346	Concrete or Asphalt	1.00	3,346										
DMA 1.13	2,111	Conventional Roof	1.00	2,111										
DMA 1.23	573	Concrete or Asphalt	1.00	573										
DMA 1.33	4,704	Landscape	0.10	470										
Total				18,011										
				Area						0.040	1.000	720	1,118	

IMP Name: Bioretention Facility #2
IMP Type: Bioretention Facility
Soil Group: Bioretention Facility #2

DMA Name	Area (sq ft)	Post Project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	IMP Sizing	IMP Sizing	Rain	Minimum	Proposed
DMA 2.11	1,640	Conventional	1.00	1,640					

		Roof			Factor	Adjustment Factor	Area or Volume	Area or Volume
DMA 2.21	430	Concrete or Asphalt	1.00	430				
DMA 2.31	3,267	Landscape	0.10	327				
DMA 2.12	2,676	Conventional Roof	1.00	2,676				
DMA 2.22	647	Concrete or Asphalt	1.00	647				
DMA 2.32	3,172	Landscape	0.10	317				
DMA 2.41	5,600	Concrete or Asphalt	1.00	5,600				
Total				11,637				
				Area	0.040	1.000	465	466

IMP Name: Bioretention Facility #3

IMP Type: Bioretention Facility

Soil Group: Bioretention Facility #3

DMA Name	Area (sq ft)	Post Project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	IMP Sizing IMP Sizing Factor	Rain Adjustment Factor	Minimum Area or Volume	Proposed Area or Volume
DMA 3.11	2,706	Conventional Roof	1.00	2,706				
DMA 3.21	504	Concrete or Asphalt	1.00	504				
DMA 3.31	3,464	Landscape	0.10	346				
DMA 3.12	2,706	Conventional Roof	1.00	2,706				
DMA 3.22	504	Concrete or Asphalt	1.00	504				
DMA 3.32	3,142	Landscape	0.10	314				
DMA 3.13	2,056	Conventional Roof	1.00	2,056				
DMA 3.23	359	Concrete or Asphalt	1.00	359				
DMA 3.33	3,461	Landscape	0.10	346				
Total				9,842				
				Area	0.040	1.000	394	517

IMP Name: Tradeoff Area to BF#1

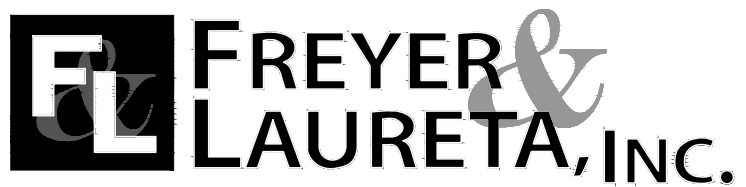
IMP Type: Bioretention Facility

Soil Group: Tradeoff Area to BF#1

DMA Name	Area (sq ft)	Post Project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	IMP Sizing IMP Sizing Factor	Rain Adjustment Factor	Minimum Area or Volume	Proposed Area or Volume
DMA 5.41	5,986	Concrete or Asphalt	1.00	5,986				
Total				5,986				

Area	0.040	1.000	239	239
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Report generated on 12/7/2021 12:00:00 AM by the Contra Costa Clean Water Program IMP Sizing Tool software (version 1.3.1.0).



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