JOB NO. # 20201331

# STORM WATER CONTROL PLAN

# FOR

# MALLARD POINTE

**BELVEDERE, CA**

**APN 060-072-27**

**APN 060-072-28**

**APN 060-072-18**

**OCTOBER 2022**

1646 N. California Blvd., Suite 400, Walnut Creek, CA 94596 | 925.940.2200

**APPLICANT/OWNER: Mallard Point 1915, LLC**

Applicant's Address: 39 Forrest Street, Suite 202, Mill Valley, CA 94941

As the Applicant/Owner, I declare that permanent storm water Best Management Practices will be installed and maintained in accordance with this document and municipal regulations.

**BY:** _____

**APPLICANT'S REPRESENTATIVE**

**CIVIL ENGINEER**

This document was prepared by BKF Engineers to summarize storm water Best Management Practices proposed with this development. Storm water elements reflected in this document have been designed using sound engineering principals in general conformance with the municipality's guidelines.


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**CHRIS MILLS, P.E. (No. C-72285)**

## Table of Contents

## Tables



## Attachments

## I. Project Data

**Table 1.** Project Data

| | |
|---|---|
| Project Name/Number | Mallard Pointe |
| Application Submittal Date | July 21, 2022 |
| Project Location | 1-22 Mallard Road, Belvedere Tiburon |
| Project Type and Description | Residential redevelopment with the construction of a new apartment building, 6 duplexes and 5 single family homes. |
| Total Project Site Area | ± 120,079 square feet (2.75 acres) |
| Total New and Replaced Impervious Surface Area | ± 76,429 square feet (1.75 acres) |
| Total Pre-Project Impervious Surface Area | ± 89,600 square feet (2.06 acres) |
| Total Post-Project Impervious Surface Area | ± 76,429 square feet (1.75 acres) |

## II. Setting

### II.A. Project Location and Description

Mallard Pointe is a residential development located at 1-22 Mallard Road in Belvedere Tiburon. The property is located on 3 separate parcels which contain 23 apartment units. The site is bounded by the Belvedere Lagoon on the north and east sides, Community Road on the west side, and residential units on the south side.

### II.B. Existing Site Features and Conditions

The existing site primarily functioned as residential use. The total site area is approximately 2.75-Acres (120,079-SF), with 2.63-Acres of that area being developable. The northern and eastern side of the site is bordered by the Belvedere Lagoon, which accounts for 0.12-Acres of the site. Within the developable area, roughly 78% is impervious area with 22% pervious area.

In the existing condition, the site roadway drainage is conveyed southwest to northwest via surface flow in the gutters along Mallard Road. This drainage is then carried to the lagoon via storm drain pipes. There are approximately 2 existing storm drain outfalls (#O1 and #O2) and one concrete swale that diverts portions of the surface drainage into the lagoon. These outfall locations are approximate and are based on a combination of visual inspections and available information per the Marin County GIS Mapper. For the purposes of this report, the outfalls will be designated as #O1 at the eastern most end of the project site and #O2 at the western most end of the project site (See Figure 2). The remaining drainage from the apartments and associated yards appear to drain directly into the Lagoon.

### II.C. Opportunities and Constraints for Stormwater Control

The grading of the roadways has been designed with consideration for untreated stormwater runoff in respect to the location of the lagoon.

The project is designed to treat stormwater in roadside bioretention areas, as well as self-retaining areas.

## III. Low Impact Development Design Strategies

### III.A. Optimization of Site Layout

III.A.1. Limitation of development envelope

The development envelope is limited by Community Road, residential units, and the Belvedere Lagoon. The project site is being developed to maximize use of land while also minimizing impact to the existing Lagoon. The proposed grading plan has been designed to mimic the existing, natural topography of the site.

III.A.2. Preservation of natural drainage features

Existing onsite lagoon is to be protected.

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

There are no jurisdictional creek, wetland and riparian habitat setbacks associated with the project.

III.A.4. Minimization of imperviousness

Landscape areas separate developed areas from the lagoon. In addition, impervious surfaces have been limited to the maximum extent practicable.

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

Roadside bioretention areas will be incorporated into the landscaping between the roadway and the residential units. The Landscape Architect will specify which water efficient plants to install in the bioretention areas to best compliment the surrounding areas.

### III.B. Use of Permeable Pavements

Pervious pavement is not anticipated for project improvements.

### III.C. Dispersal of Runoff to Pervious Areas

Bioretention areas comprising of at least 4% of the tributary impervious area will be installed throughout the site as "rain gardens" along roadways to capture the runoff from the roads and residential parcels. A majority of the onsite streets and walkways have been graded to sheet flow runoff directly into catch basins, where it is then piped to a sump pump located within Mallard Road. From there, it is pumped and piped to roadside bioretention areas located on Driveway Road. The surrounding landscape adjacent to the Belvedere Lagoon will act as self-retaining areas.

### III.D. Stormwater Control Measures

The development proposes to integrate bioretention facilities to treat runoff from the site. See Figure 3 for proposed bioretention area cross sections. Runoff from the roofs will be drain directly into the bioretention facilities by a gutter system. Additional runoff will drain to bioretention facilities flowing across the site through curb cuts. Storm drain catch basins, underground piping and bubble up structures will also be used to collect, convey and discharge runoff to bioretention areas.

The bioretention facilities will capture the runoff and filter the untreated storm water through plants and a minimum of 18 inches of bioretention soil separating and removing fine particles, suspended solids and pollutants. The runoff will percolate through the bioretention soil media and drain into a minimum of 12 inches of class II permeable rock. The leachate (water that has percolated) will be stored within the permeable rock layer. Once the entire permeable rock layer becomes saturated a perforated polyvinyl chloride underdrain pipe will convey the excess runoff to a precast concrete overflow drain which discharges to the underground storm drain system. Bioretention facilities that are adjacent to areas subjected to vehicular traffic will also require a concrete planter wall or a deep curb per the Marin County standard details.

For planning purposes, it was assumed that the backyard patio decking will be impervious area that will be treated with self-retaining areas. Layout is preliminary and final design of hardscaping within the backyards will be determined during permit submittal.

Storm drain utilities will be designed per the Marin County Municipal Code Section 24.04.510 for Drainage Facilities. In the proposed condition, the site will be comprised of roughly 71% impervious area with 29% pervious area (of the developable area). With a reduction in impervious area out falling into the lagoon, it is assumed no changes in the outfall sizing will be required. The proposed storm drain alignment along the new private roadway will be a minimum of 15 inches in diameter.

Additional hydrologic and hydraulic studies will be required for further analysis for future permit submittals.

## IV. Documentation of Drainage Design

### IV.A. Descriptions of each Drainage Management Area

| BOUNDARY | CONVENTIONAL SURFACE (SF) | | | DRAINS TO | REQUIRED LID OR BMP (SF) | PROVIDED LID OR BMP (SF) | TOTAL (SF) | TOTAL (ACRE) |
|---|---|---|---|---|---|---|---|---|
| WATERSHED | ROOF | HARDSCAPE | LSP | | | | | |
| DMA-1a | 1,287 | 151 | 662 | IMP 1a | 64 | 84 | 2,184 | 0.05 |
| DMA-1b | 1,285 | 90 | 177 | IMP 1b | 57 | 128 | 1,552 | 0.04 |
| DMA-2a | 3,033 | 72 | 370 | IMP 2a | 128 | 129 | 3,604 | 0.08 |
| DMA-2b | 443 | 127 | 148 | IMP 2b | 24 | 26 | 718 | 0.02 |
| DMA-3a | 909 | - | 116 | IMP 3a | 38 | 55 | 1,080 | 0.02 |
| DMA-3b | 2,319 | - | - | IMP 3b | 93 | 118 | 2,437 | 0.06 |
| DMA-4 | 2,253 | 154 | 338 | IMP 4 | 100 | 251 | 2,996 | 0.07 |
| DMA-5a | 2,373 | - | 601 | IMP 5a | 101 | 143 | 3,117 | 0.07 |
| DMA-5b | 1,500 | - | - | IMP 5b | 60 | 144 | 1,644 | 0.04 |
| DMA-6 | 2,252 | - | 99 | IMP 6 | 91 | 123 | 2,474 | 0.06 |
| DMA-7a | 2,704 | - | 282 | IMP 7 | 111 | 116 | 3,102 | 0.07 |
| DMA-7b | 523 | - | - | IMP 7b | 21 | 24 | 547 | 0.01 |
| DMA-8a | 2,455 | 60 | 173 | IMP 8a | 102 | 147 | 2,835 | 0.07 |
| DMA-8b | 1,019 | 151 | 254 | IMP 8b | 49 | 62 | 1,486 | 0.03 |
| DMA-9 | 3,220 | 207 | 505 | IMP 9 | 142 | 178 | 4,110 | 0.09 |
| DMA-10 | 2,070 | 220 | 693 | IMP 10 | 99 | 154 | 3,137 | 0.07 |
| DMA-11 | 4,025 | 2,121 | 607 | IMP 11 | 252 | 317 | 7,070 | 0.16 |
| DMA-12a | 908 | - | 273 | IMP 12a | 39 | 141 | 1,322 | 0.03 |
| DMA-12b | 1,945 | - | 30 | IMP 12b | 78 | 96 | 2,071 | 0.05 |
| DMA-12c | 1,967 | - | 34 | IMP 12c | 79 | 96 | 2,097 | 0.05 |
| DMA-12d | 1,970 | - | 29 | IMP 12d | 79 | 96 | 2,095 | 0.05 |
| DMA-12e | 2,895 | - | - | IMP 12e | 116 | 128 | 3,023 | 0.07 |
| DMA-12f | 1,412 | - | 38 | IMP 12f | 57 | 63 | 1,513 | 0.03 |
| DMA-12g | 5,020 | - | - | IMP 12g | 201 | 221 | 5,241 | 0.12 |
| DMA-12h | 897 | 259 | 508 | IMP 12h | 51 | 92 | 1,756 | 0.04 |
| DMA-13 | - | 22,129 | 4,096 | IMP 13 | 926 | 1,028 | 27,253 | 0.63 |
| DMA-14a | - | 585 | 2,168 | IMP 14a | 293 | 322 | 3,075 | 0.07 |
| DMA-14b | - | 553 | 1,814 | IMP 14b | 277 | 303 | 2,670 | 0.06 |
| DMA-14c | - | 711 | 1,221 | IMP 14c | 356 | 388 | 2,320 | 0.05 |
| DMA-14d | - | 887 | 1,321 | IMP 14d | 444 | 457 | 2,665 | 0.06 |
| DMA-14e | - | 534 | 1,684 | IMP 14e | 267 | 317 | 2,535 | 0.06 |
| DMA-14f | - | 362 | 1,805 | IMP 14f | 181 | 243 | 2,410 | 0.06 |
| DMA-14g | - | 832 | 3,334 | IMP 14g | 416 | 454 | 4,620 | 0.11 |
| DMA-14h | - | 356 | 1,877 | IMP 14h | 178 | 282 | 2,515 | 0.06 |
| DMA-14i | - | 504 | 840 | IMP 14i | 252 | 306 | 1,650 | 0.04 |
| DMA-14j | - | 890 | 843 | IMP 14j | 445 | 447 | 2,180 | 0.05 |
| DMA-14k | - | 933 | 1,575 | IMP 14k | 467 | 467 | 2,975 | 0.07 |
| OVERALL TOTAL | 50,684 | 32,888 | 28,515 | - | | | 120,079 | 2.76 |

### IV.B. Tabulation and Sizing Calculations

Integrated Management Practices (IMPs) are designed for treatment only.

DMAs 1 through13 will drain towards IMPs 1 through 13 and be treated via Bioretention Areas.

The bioretention facilities are sized using the 4% method per the BASMAA Post-Construction Manual. Impervious areas included roofs and paving with a runoff factor of 1. Pervious areas include landscaped areas with a runoff factor of 0.1. The following equation was used to determine the minimum bioretention area required:

$$Bioretention\ Area\ Required = (Impervious\ Area\ x\ 4\%\ x\ 1) + (Pervious\ Area\ x\ 4\%\ x\ 0.1)$$

DMAs 14a through14k will drain towards IMPs 14a through 14k and will be treated via Self-Retaining areas.

The self-retaining areas are sized considering the maximum ratio of 2 parts impervious area for every 1-part pervious area. The following equation was used to determine the minimum self-retaining areas required:

$$Self-retaining\ Area\ Required = \left(\frac{Impervious\ Area}{2}\right)$$

## V. Source Control Measures

### V.A. Site activities and potential sources of pollutants

BKF Engineers does not anticipate significant potential for pollutants on the project site. The sources listed in the table below are taken from the BASMAA *Post-Construction Manual: Design Guidance for Stormwater Treatment and Control for Projects in Marin, Sonoma, Napa, and Solano Counties (January 2019).*

### V.B. Sources and Source Control Measures

**Table 3.** Sources and Source Control Measures

| Potential source of runoff pollutants | Permanent source control BMPs | Operational Source control BMPs |
|---|---|---|
| On-site storm drain inlets | Mark all inlets with a "No Dumping! Flows to Lagoon" message. | Maintain and periodically repaint or replace inlet markings. |
| Landscape/Outdoor Pesticide Use/ Building and Grounds Maintenance | • Landscaping will be designed to minimize required irrigation and runoff, to promote surface infiltration, and to minimize the use of fertilizers and pesticides that can contribute to storm water pollution.<br>• Plantings for IMP's will be selected to be appropriate to | • Maintain landscaping using minimum or no pesticides.<br>• Person or contractor responsible for landscape maintenance to use IPM principles.<br>• Potential sources shall be swept regularly to prevent the accumulation of litter and debris. |

| | | |
|---|---|---|
| | anticipated soil and moisture conditions.<br>• Where possible, pest-resistant plants will be selected, especially for locations adjacent to hardscape.<br>• Plants will be selected appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions. | |
| Refuse areas | • State how site refuse will be handled and provide supporting detail to what is shown on plans.<br>• State that signs will be posted on or near dumpsters with the words "Do not dump hazardous materials here" or similar. | • Provide adequate number of receptacles. Inspect receptacles regularly; repair or replace leaky receptacles. Keep receptacles covered. Prohibit/prevent dumping of liquid or hazardous wastes. Post "no hazardous materials" signs. Inspect and pick up litter daily and clean up spills immediately. Keep spill control materials available on-site. See Fact Sheet SC-34, "Waste Handling and Disposal" in the CASQA Stormwater Quality Handbooks at www.casqa.org/resources/bmp-handbooks |

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

Hardscape is designed to direct runoff to vegetated landscaping where possible. Roadways are designed to drain to bioretention areas. Others methods to be determined at time of construction.

## VI. Stormwater Facility Maintenance

### VI.A. Ownership and Responsibility for Maintenance in Perpetuity

The applicant commits to execute any necessary agreements and/or annex into a fee mechanism in accordance with local requirements. The applicant will accept responsibility for operation and maintenance of facilities until that responsibility is formally transferred.

All storm water treatment facilities described in this report will be owned and maintained in perpetuity by the private owner of the subject property. The applicant will accept responsibility for interim operation and maintenance of the facilities until such time as this responsibility is formally transferred to subsequent owners.

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

Routine maintenance is needed to ensure that flow is unobstructed, that erosion is prevented, and that soils are held together by plant roots and are biologically active. Typical maintenance may consist of the following:

- Inspect outlets/outfalls for erosion or plugging
- Inspect side slopes for evidence of instability or erosion and correct as necessary
- Examine the vegetation to ensure that it is healthy and dense enough to provide filtering and to protect soils from erosion. Replenish mulch as necessary, remove fallen leaves and debris, prune large shrubs or trees, and now turf areas.

## VII. Construction Plan Checklist

**Table 4.** Construction Plan C.3 Checklist

| Page Number in Stormwater Control Plan | Source Control or Treatment Control Measure | See Plan Sheet #s |
|---|---|---|
| Figure 2 | Integrated Management Practices (IMP) sizes as specified and designed to capture and route drainage from areas delineated on Exhibit. | Storm Water Control Plan Exhibit |

## VIII. Certifications

The preliminary design of stormwater treatment facilities and other stormwater pollution control measures in this plan are in accordance with the current edition of the BASMAA *Post-Construction Manual: Design Guidance for Stormwater Treatment and Control for Projects in Marin, Sonoma, Napa, and Solano Counties (January, 2019).*

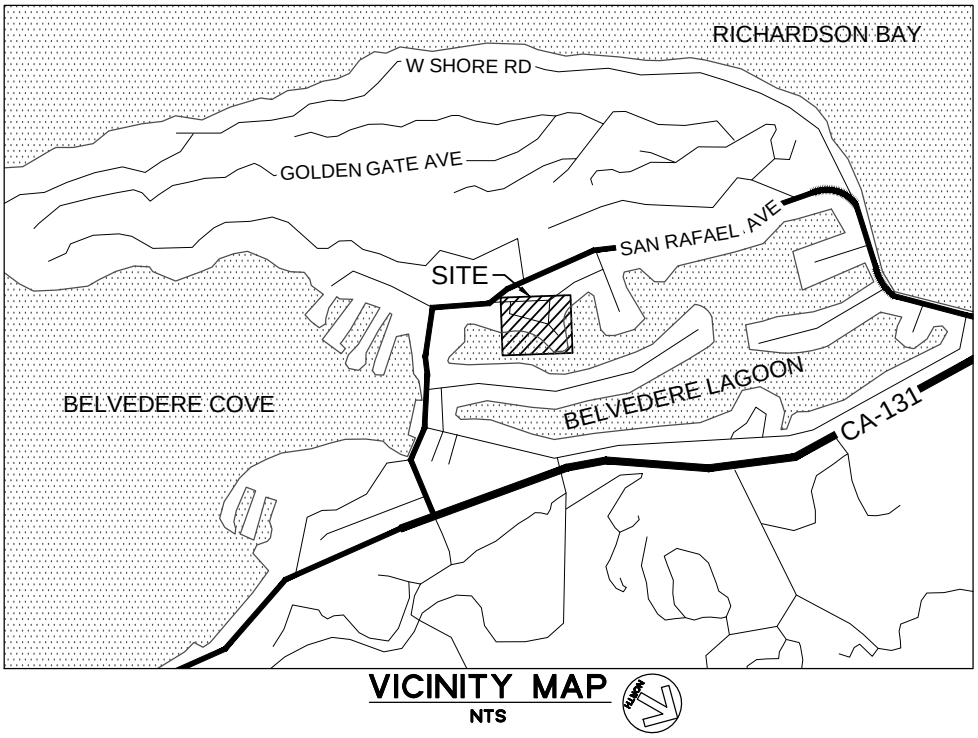
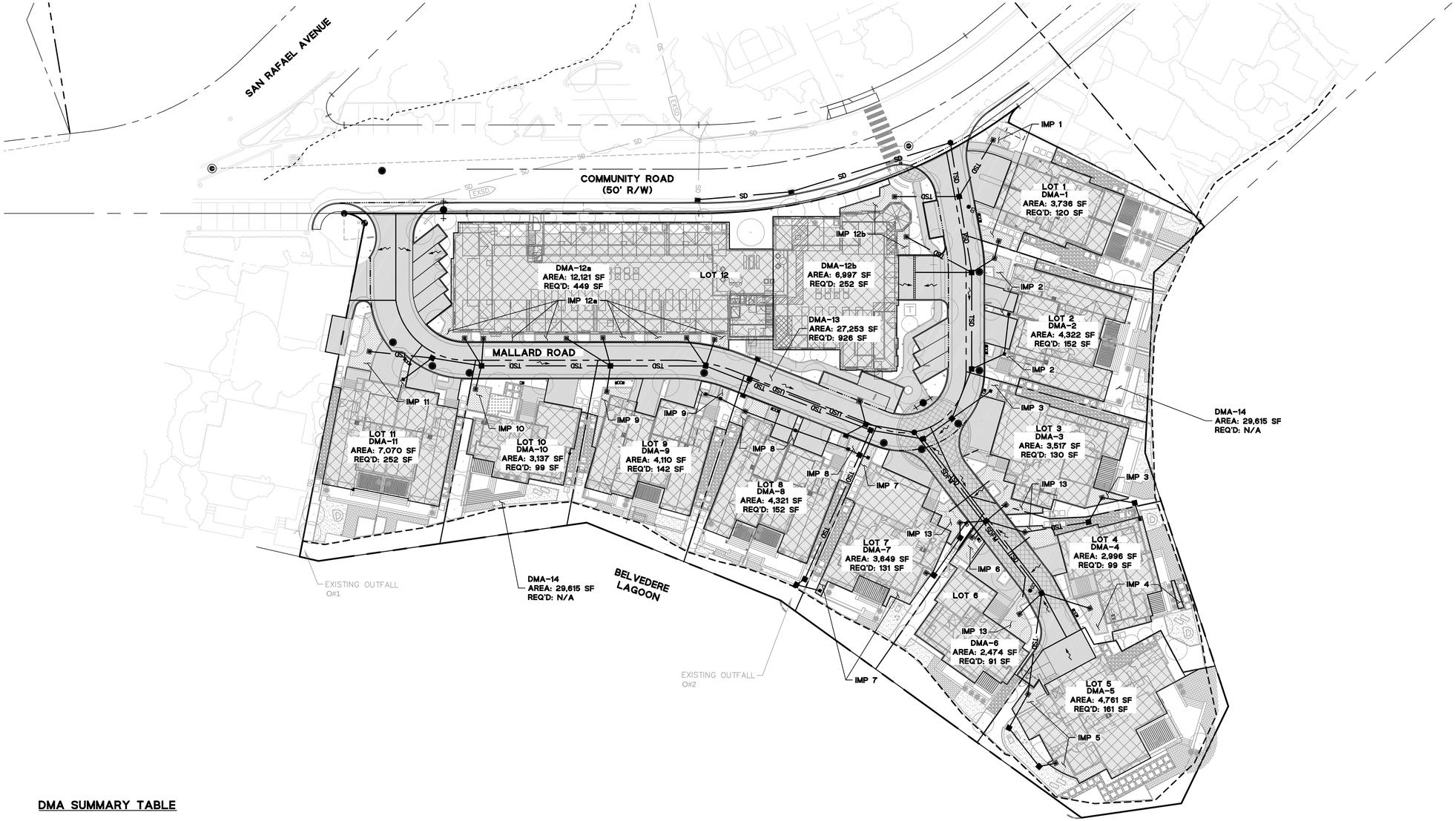



**FIGURE 1**

# VICINITY MAP

MALLARD POINT




## DMA SUMMARY TABLE

| BOUNDARY | CONVENTIONAL SURFACE (SF) | | | DRAINS TO | LID OR BMP (SF) | TOTAL (SF) | TOTAL (ACRE) |
|---|---|---|---|---|---|---|---|
| WATERSHED | ROOF | HARDSCAPE | LSP | | | | |
| DMA-1 | 2,572 | 244 | 710 | IMP 1 | 210 | 3,736 | 0.09 |
| DMA-2 | 3,476 | 199 | 452 | IMP 2 | 195 | 4,322 | 0.10 |
| DMA-3 | 3,228 | - | 115 | IMP 3 | 174 | 3,517 | 0.08 |
| DMA-4 | 2,253 | 154 | 315 | IMP 4 | 274 | 2,996 | 0.07 |
| DMA-5 | 3,873 | - | 599 | IMP 5 | 289 | 4,761 | 0.11 |
| DMA-6 | 2,252 | - | 99 | IMP 6 | 123 | 2,474 | 0.06 |
| DMA-7 | 3,227 | - | 201 | IMP 7 | 221 | 3,649 | 0.08 |
| DMA-8 | 3,474 | 211 | 425 | IMP 8 | 211 | 4,321 | 0.10 |
| DMA-9 | 3,220 | 208 | 474 | IMP 9 | 208 | 4,110 | 0.09 |
| DMA-10 | 2,070 | 220 | 693 | IMP 10 | 154 | 3,137 | 0.07 |
| DMA-11 | 4,025 | 2,121 | 588 | IMP 11 | 336 | 7,070 | 0.16 |
| DMA-12a | 11,097 | - | 462 | IMP 12a | 562 | 12,121 | 0.28 |
| DMA-12b | 5,917 | 259 | 507 | IMP 12b | 314 | 6,997 | 0.16 |
| DMA-13 | - | 22,129 | 4,096 | IMP 13 | 1,028 | 27,253 | 0.63 |
| DMA-14 | - | - | 29,615 | SELF-TREATING | - | 29,615 | 0.68 |
| OVERALL TOTAL | 50,684 | 25,745 | 39,351 | - | | 120,079 | 2.76 |

## LEGEND

- EXISTING PROPERTY LINE
- PROPOSED PROJECT BOUNDARY
- PROPOSED PROPERTY LINE
- BUILDING SETBACK
- BULKHEAD LIMITS
- 100 YEAR BASE FLOOD ELEVATION
- ROAD CENTERLINE
- DRAINAGE MANAGEMENT AREA
- ROOF AREA
- IMPERVIOUS AREA
- LANDSCAPE AREA
- BIORETENTION AREA

## NOTES

1. PROPOSED BUILDINGS ARE SHOWN FOR REFERENCE ONLY, REFER TO ARCHITECTURAL DRAWINGS FOR ADDITIONAL INFORMATION.

## ABBREVIATIONS

| | |
|---|---|
| DMA | DRAINAGE MANAGEMENT AREA |
| REQ'D | REQUIRED |
| SF | SQUARE FEET |

***STORMWATER CONTROL PLAN***

*May 10, 2022*

*Graphic Scale*

1"=30'

30' 15' 0 30' 60'

# MALLARD POINTE

*Belvedere, California*

**MALLARD POINTE 1951 LLC**
Project Sponsor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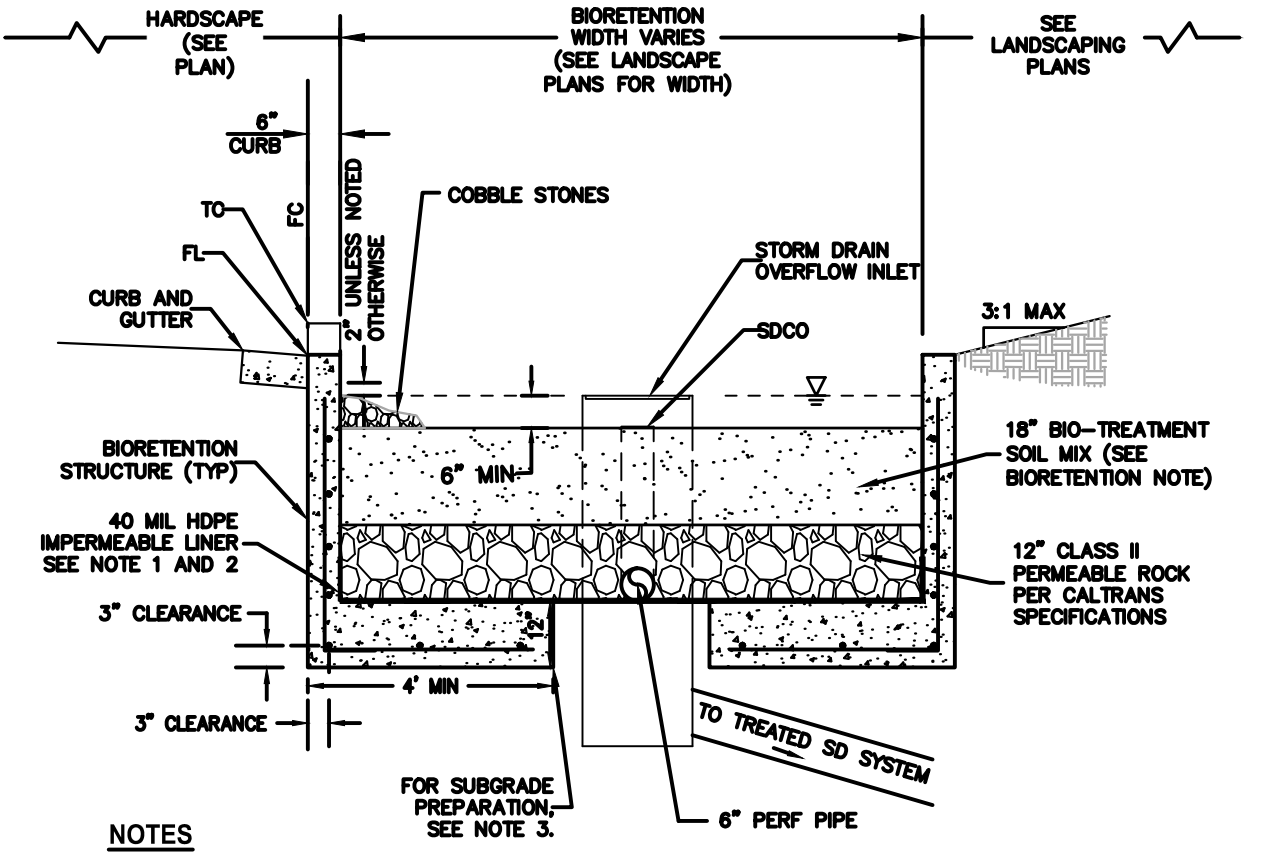
**TM-6**




NOTES

1. IF BIORETENTION AREA EXCEEDS 7 FT IN WIDTH, IMPERMEABLE LINER SHALL BE INSTALLED AT BOTTOM AND EXTEND 7 INCH UP THE SIDE OF THE CLASS II PERMEABLE LAYER. SEE DETAIL 3.
2. IMPERMEABLE LINER TO BE USED WHEN BIORETENTION AREA IS NOT STRUCTURALLY CONTAINED BY WALL FOOTING.
3. BIORETENTION AREA FOOTING/FOUNDATION SUBGRADE SHALL BE COMPACTED TO 90% RELATIVE COMPACTION. FOR CONSTRUCTION OF BIORETENTION AREAS ON BAY MUD, CONTRACTOR TO INSTALL 24 INCHES OF CLASS II AB. PRIOR TO PLACEMENT OF CLASS II AB, PLACE A LAYER OF GEOTEXTILE FABRIC (MIRAFI 500X OR EQUIVALENT) AT THE BASE OF THE EXCAVATION.

TYPICAL RETAINED BIORETENTION AREA CROSS SECTION

NTS

FIGURE 3
BIORETENTION AREA CROSS SECTION
MALLARD POINT