



Date: May 20, 2024 BKF Job Number: C20210394

Deliver To: Alex Yuen
Daly City Engineering Department
333 90th Street
Daly City, CA 94015

From: Mike Burnfield, BKF

Subject: 455 Hickey Boulevard Redevelopment Project
Stormwater Retention Technical Memorandum

I. Introduction

This memo has been prepared to identify preliminary pre-development and post-development peak stormwater discharges from the site and estimate storm water retention needs to limit post-development peak discharge to pre-development levels for the 10-year, 120-minute storm event.

The project proposes to demolish the existing office building, parking garage, and site improvements for redevelopment on an approximately 3.2-acre site located at 455 Hickey Boulevard in Daly City, California. The 455 Hickey Boulevard project site is bounded by Hickey Boulevard to the north, Caltrans Interstate-280 to the east, Serra Lane to the south, and Serravista Avenue to the west. Refer to Attachment 1: Hydrology Exhibit 1.

II. Existing Conditions

The existing project site is comprised of landscape areas, concrete parking garage, concrete walkways and driveway, building roof, and an asphalt concrete roadway with asphalt concrete parking areas. The project site coverage consists of approximately 96,697 sf impervious area and 42,789 sf of pervious area (69% impervious). The site generally slopes down from the south to the north with approximate elevations varying from elevation 390 feet to 340 feet respectively, while the frontage along Hickey Boulevard slopes down to the east and the frontage along Serravista Avenue slopes down to the northwest. The on-site stormwater is currently collected in a series of on-site inlets that convey and discharge runoff to an underground existing 12" private storm drain line on the property. The 12" private storm drain line collects stormwater runoff from upstream residential properties, and connects to the 54" City storm drain main in Hickey Boulevard. There is also an existing 21" public storm drain line located in Serravista Avenue that also discharges to the existing 54" main in Hickey Boulevard. Currently, the project site does not discharge stormwater flow to the 21" line in SerraVista Avenue.

III. Proposed Conditions

The proposed project consists of asphalt concrete access roadways, concrete parking garage, landscaping, and a multi-story building. The proposed ground coverage consists of approximately 102,630 sf impervious and 36,856 sf pervious (74% impervious). The project will increase the amount of impervious surface from the existing condition and will require retention to control the peak flow and volume leaving the site. Overall, the proposed condition will increase the site's impervious footprint by approximately 5,933 sf and will therefore require stormwater retention.

The project proposes to maintain the existing drainage patterns with the storm water runoff ultimately discharging into the existing 54" City storm drain main located in Hickey Boulevard. The project will relocate the 12" private storm drain line that runs through the property along the eastern property line to maintain upstream flow discharge to the existing 54" City storm drain main in Hickey Boulevard. Site stormwater runoff will be collected and conveyed to the relocated 12" private storm drain line on the property, which will then connect to the existing 54" City storm drain main located in Hickey Boulevard. For the proposed site, refer to Attachment 1: Hydrology Exhibit 2.

IV. Stormwater Requirements

Per direction given by the city, the project shall not increase the flow or volume from the 10-year storm for a duration of 2 hours for any outfall. If a project increases the imperviousness of the site, stormwater retention will be required to retain the increased flow and volume. For the purposes of calculating the retention flow and volume, a time of concentration of 2 hours (or 120 minutes) shall be used to determine the rainfall intensity.

V. Stormwater Flows

The preliminary stormwater calculations for the site are prepared in accordance with the Daly City Engineering Standards. Peak rates of storm water runoff from the project site were calculated using the Rational Method. Table 1 illustrate the calculations for the weighted "C" factor and the calculations for the anticipated flow. The intensity is taken from the 1990 Daly City Design Standards and uses the Time of Concentration (Tc) of 120-minutes based on city requirements. The Tc of 120 minutes is used for the pre and post construction conditions.

Requirements and Assumptions:

$$Q=C*i*A$$

- Storm drainage design event: 10-year storm.
- Minimum Time of Concentration (Tc) is 120 minutes.
- Rainfall Intensity (i): 10-year, 120-minute = 0.72 in/hr
- Runoff Coefficient (C):
 - C = 0.30 for Open Space/Pervious Areas
 - C = 0.90 for Paved/Impervious Areas



Table 1: Peak Flows

Project Drainage Area	Total Area (acres)	Impervious Area (acres)	Percent Impervious (%)	Pervious Area (acres)	Percent Pervious (%)	C	10-Year Peak Flow (cfs)
Existing	3.20	2.22	69	0.98	31	0.72	1.65
Proposed	3.20	2.36	74	.85	26	0.74	1.71

VI. Stormwater Retention

Retention calculations are based on the increase between the pre-construction and post-construction flows and volumes over a period of 2-hours. Refer to Chart 1 for the runoff volume. The volume of runoff generated for the pre-construction and post-construction condition is calculated as the area under the perspective curves. This approved method assumes the rainfall intensity (I) occurs over the entire 120 minute time period regardless of site size or topography of the drainage area. The retention calculations shall not be used for hydraulics or determining pipe sizes. Refer to Table 2 for a summary of required retention volume.

$$V = (Q_{\text{post}} - Q_{\text{pre}}) * T_d$$

$$V_{\text{pre}} = T_d * Q_{\text{pre}}$$

$$V_{\text{post}} = T_d * Q_{\text{post}}$$

Where:

V = Retention Volume (cubic feet, cf)

V_{pre} = Pre construction runoff volume (cf)

V_{post} = Post construction runoff volume (cf)

Q_{post} = Post Construction Quantity of Run-off (cubic feet per second, cfs)

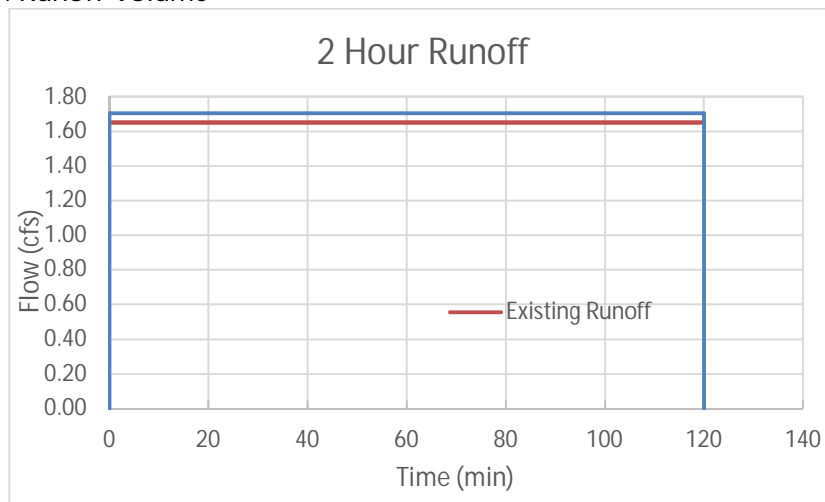
Q_{pre} = Pre Construction Quantity of Run-off (cubic feet per second, cfs)

T_d = Time (duration) = 120 minutes

Table 2: Required Retention Volume

OUTFALL	Q _{Pre} (cfs)	Q _{Post} (cfs)	T _d (min)	V _{Pre} (cf)	V _{Post} (cf)	V(cf)
PROJECT	1.65	1.70	120	11,885	12,308	424

Chart 1: Runoff Volume



Stormwater retention for the project will be satisfied by utilizing the open bottom portion of the flow-through planter in DMA 6 located in the landscape area at the southeast side of the proposed building. The proposed flow-through planter in DMA 6 will include an impervious bottom for a minimum of 10' from the building and the remaining planter bottom will be open. It is in an acceptable location to promote infiltration and will not have a liner or underdrain but will have an overflow inlet to accommodate the larger flows. The flow-through provides sufficient size to store and infiltrate a portion of the required retention volume of runoff. Refer to Table 3 for a summary of the available stormwater retention volume.

Table 3: Available Detention Volume – DMA 6 Flow-Through Planter

DMA	TREATMENT AREA PORTION WITH OPEN BOTTOM (sf)	PONDING DEPTH (ft)	PONDING VOLUME (cf)
6	1979	0.5	990

To ensure the required storage volume will be retained, the area tributary to the retention measure was studied. The tributary area to the DMA flow-through planter is based on the projects Stormwater Management Plan Drainage Management Areas (DMAs), see Attachment 2 for reference. Hydrology associated with DMA 6 is summarized in Table 4 below and it should be noted that the overflow retention volume will discharge into the relocated storm drain pipe along the northeast side of the site. The total provided site retention volume is summarized in Table 4 below.

Table 4: Flow to Retention Area

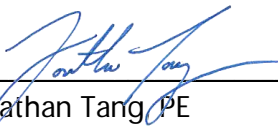
DMA	PERVIOUS AREA (sf) (C=0.30)	IMPERVIOUS AREA (sf) (C=0.90)	WEIGHTED C	i (intensity in/hr)	Q (cfs)	DURATION (min)	TOTAL VOLUME TO DMA 6 (cf)	RETAINED VOLUME (cf)
6	20,400	54,982	0.74	0.720	0.92	120	6,617	990



VII. Conclusions

The project will be required to retain water to match the preconstruction conditions. The 10-year, 120-minute storm event peak flow rate from the project site is approximately 1.65 cfs under existing conditions and 1.71 cfs under proposed. This project will require a total 424 cf retention volume. The proposed flow-through planter in DMA 6 will include a 1,979 sf footprint with a minimum ponding depth of 6" and an open bottom to provide 990 cf available retention volume. The project will not increase the rate or volume of runoff from the pre-construction conditions for the design storm.




Jonathan Tang, PE
PE License # C67726

05/20/2024
Date

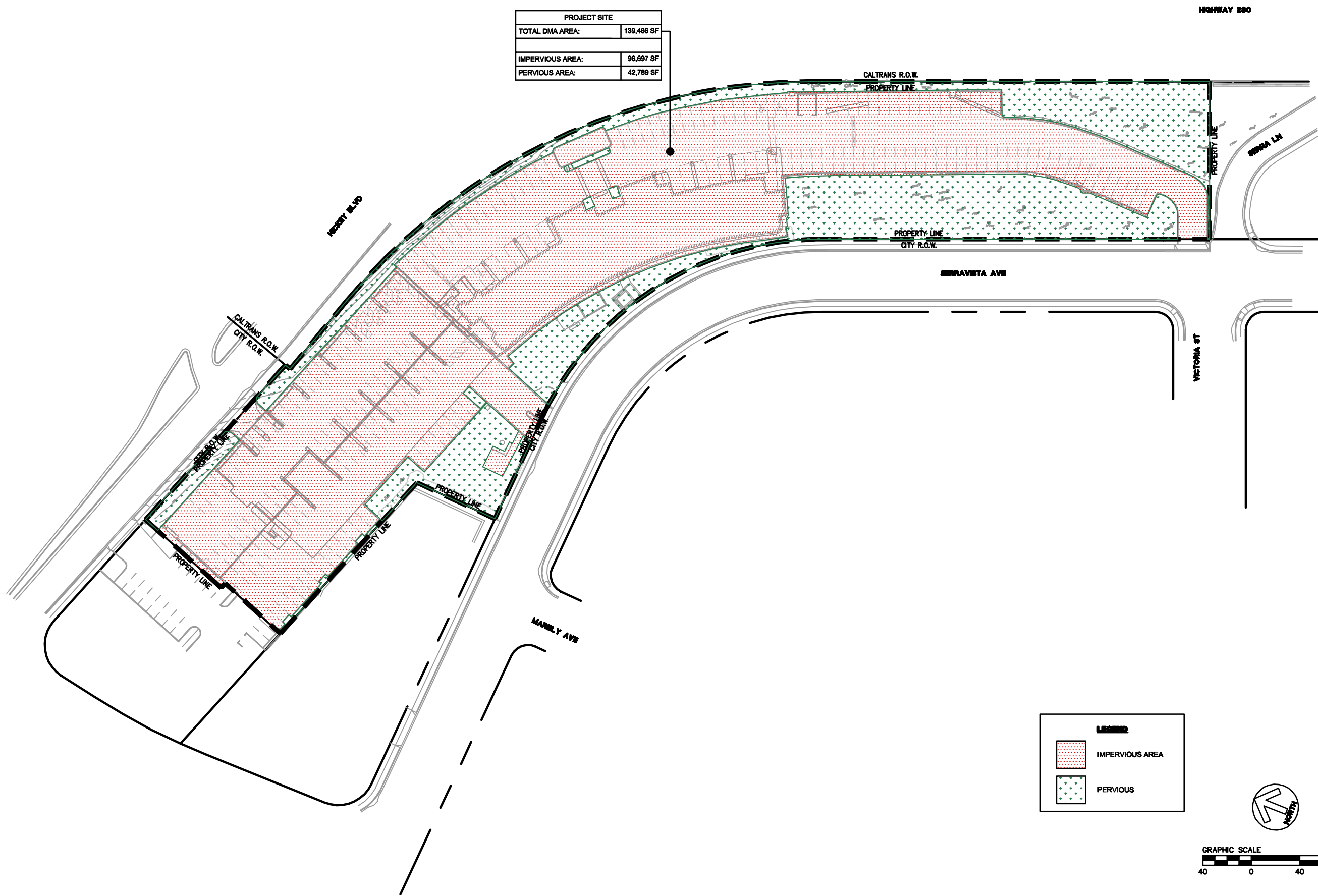


ATTACHMENT 1

(Hydrology Exhibits)



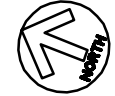
PROJECT SITE	
TOTAL DMA AREA:	139,486 SF
IMPERVIOUS AREA:	96,697 SF
PERVIOUS AREA:	42,789 SF



LEGEND

IMPERVIOUS AREA

PERVIOUS



DRAWING NAME: K:\2021\21039-455_Hickey_Bldg\ENR\EXHIBITS\Hydrology\EXHIBIT.dwg
 PLOT TIME: 08-16-24
 PLOTTED BY: burn

255 SHORELINE DRIVE, SUITE 200
 REDWOOD CITY, CA 94065
 PHONE (650) 482-6300
 FAX (650) 482-6399

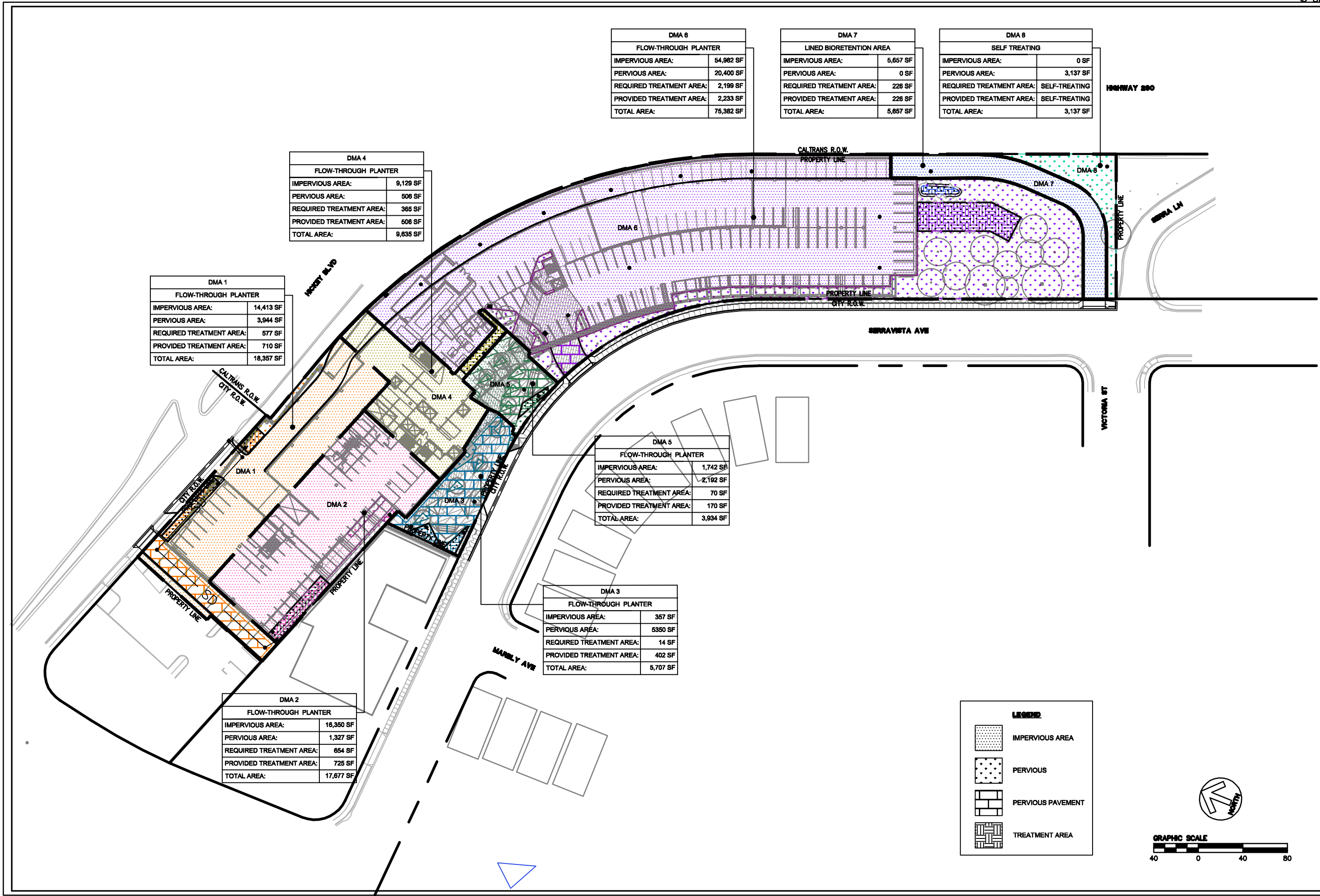


455 HICKEY BOULEVARD
 EXISTING SURFACE AREAS
 DALY CITY
 SAN MATEO COUNTY
 CALIFORNIA

Date	By	No.	Revisions
08/16/2024	MB		
	MB		
	JT		
	MB		

Drawing Number: **EXHIBIT**
1 OF **2**

DRAWING NAME: K:\2021\21039-455_Hickey_Blv\ENR\EXHIBITS\Hydrology\PHRYDA.dwg
 PLOT TIME: 08-16-24
 PLOTTED BY: burn



DMA 1	
FLOW-THROUGH PLANTER	
IMPERVIOUS AREA:	14,413 SF
PERVIOUS AREA:	3,944 SF
REQUIRED TREATMENT AREA:	577 SF
PROVIDED TREATMENT AREA:	710 SF
TOTAL AREA:	18,357 SF

DMA 4	
FLOW-THROUGH PLANTER	
IMPERVIOUS AREA:	9,129 SF
PERVIOUS AREA:	506 SF
REQUIRED TREATMENT AREA:	365 SF
PROVIDED TREATMENT AREA:	506 SF
TOTAL AREA:	9,635 SF

DMA 2	
FLOW-THROUGH PLANTER	
IMPERVIOUS AREA:	16,350 SF
PERVIOUS AREA:	1,327 SF
REQUIRED TREATMENT AREA:	654 SF
PROVIDED TREATMENT AREA:	725 SF
TOTAL AREA:	17,677 SF

DMA 3	
FLOW-THROUGH PLANTER	
IMPERVIOUS AREA:	357 SF
PERVIOUS AREA:	5350 SF
REQUIRED TREATMENT AREA:	14 SF
PROVIDED TREATMENT AREA:	402 SF
TOTAL AREA:	5,707 SF

DMA 5	
FLOW-THROUGH PLANTER	
IMPERVIOUS AREA:	1,742 SF
PERVIOUS AREA:	2,192 SF
REQUIRED TREATMENT AREA:	70 SF
PROVIDED TREATMENT AREA:	170 SF
TOTAL AREA:	3,934 SF

DMA 6	
FLOW-THROUGH PLANTER	
IMPERVIOUS AREA:	54,982 SF
PERVIOUS AREA:	20,400 SF
REQUIRED TREATMENT AREA:	2,199 SF
PROVIDED TREATMENT AREA:	2,233 SF
TOTAL AREA:	75,382 SF

DMA 7	
LINED BIORETENTION AREA	
IMPERVIOUS AREA:	5,657 SF
PERVIOUS AREA:	0 SF
REQUIRED TREATMENT AREA:	226 SF
PROVIDED TREATMENT AREA:	226 SF
TOTAL AREA:	5,657 SF

DMA 8	
SELF TREATING	
IMPERVIOUS AREA:	0 SF
PERVIOUS AREA:	3,137 SF
REQUIRED TREATMENT AREA:	SELF-TREATING
PROVIDED TREATMENT AREA:	SELF-TREATING
TOTAL AREA:	3,137 SF

LEGEND

- IMPERVIOUS AREA
- PERVIOUS
- PERVIOUS PAVEMENT
- TREATMENT AREA

GRAPHIC SCALE

40 0 40 80

255 SHORELINE DRIVE, SUITE 200
 REDWOOD CITY, CA 94065
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455 HICKEY BOULEVARD
PROPOSED SURFACE AREAS
 SAN MATEO COUNTY
 CALIFORNIA

DALY CITY

Revisions	No.	Date	By	Check	Job No.

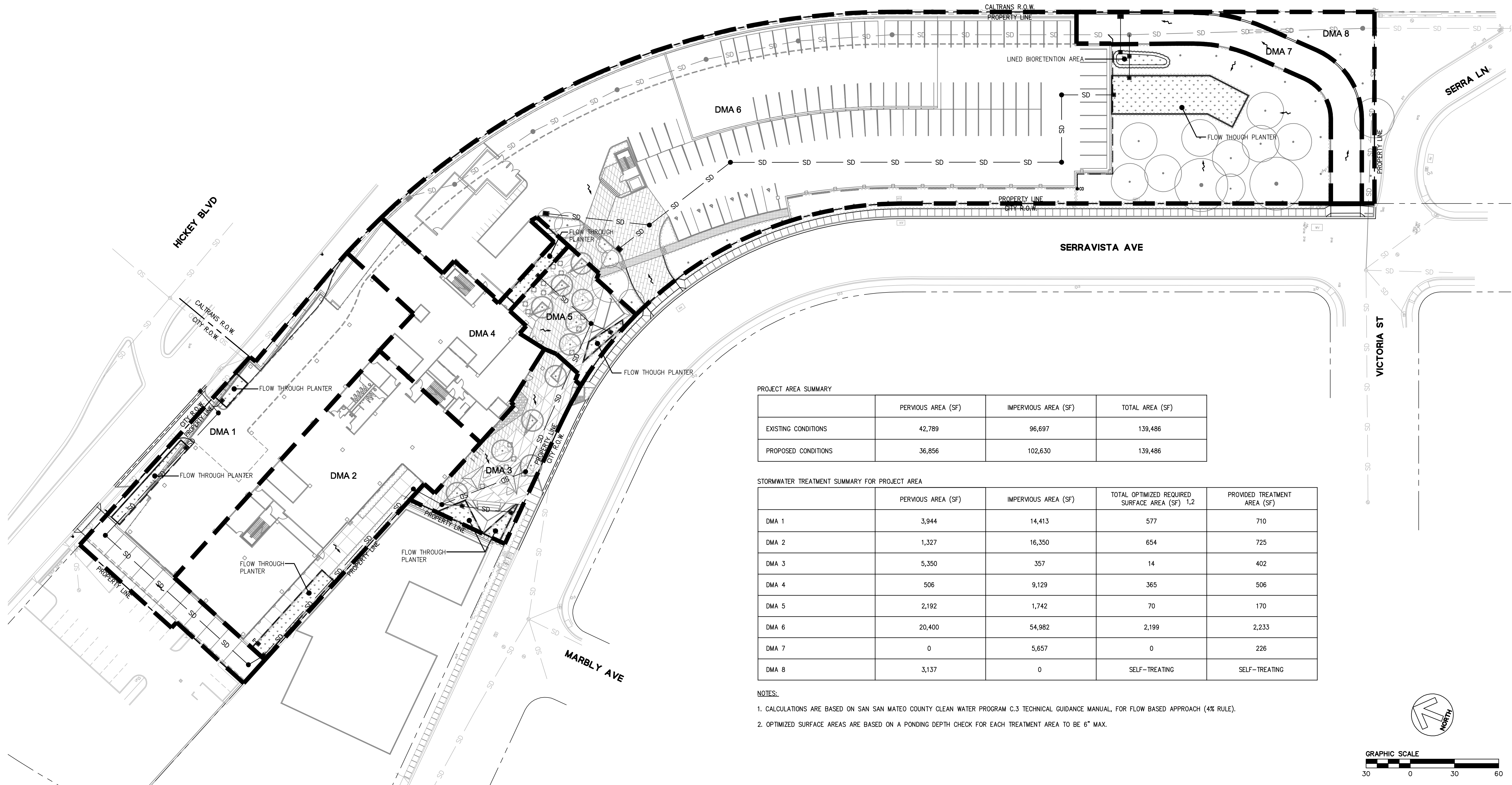
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2 of 2

ATTACHMENT 2

(Stormwater Management Plan)





PROJECT AREA SUMMARY

	PERVIOUS AREA (SF)	IMPERVIOUS AREA (SF)	TOTAL AREA (SF)
EXISTING CONDITIONS	42,789	96,697	139,486
PROPOSED CONDITIONS	36,856	102,630	139,486

STORMWATER TREATMENT SUMMARY FOR PROJECT AREA

	PERVIOUS AREA (SF)	IMPERVIOUS AREA (SF)	TOTAL OPTIMIZED REQUIRED SURFACE AREA (SF) 1,2	PROVIDED TREATMENT AREA (SF)
DMA 1	3,944	14,413	577	710
DMA 2	1,327	16,350	654	725
DMA 3	5,350	357	14	402
DMA 4	506	9,129	365	506
DMA 5	2,192	1,742	70	170
DMA 6	20,400	54,982	2,199	2,233
DMA 7	0	5,657	0	226
DMA 8	3,137	0	SELF-TREATING	SELF-TREATING

NOTES:

1. CALCULATIONS ARE BASED ON SAN MATEO COUNTY CLEAN WATER PROGRAM C.3 TECHNICAL GUIDANCE MANUAL, FOR FLOW BASED APPROACH (4% RULE).
2. OPTIMIZED SURFACE AREAS ARE BASED ON A PONDING DEPTH CHECK FOR EACH TREATMENT AREA TO BE 6" MAX.

