APPENDIX H2

Preliminary Stormwater Quality Management Plan

PRELIMINARY STORMWATER QUALITY MANAGEMENT PLAN LETTER REPORT

WAKELAND HOUSING AND DEVELOPMENT
4TH CORNER – AFFORDABLE HOUSING PROJECT

CITY OF SAN DIEGO, CALIFORNIA

JUNE 15, 2020
REVISED JULY 15, 2020

Prepared For:

WAKELAND HOUSING AND DEVELOPMENT
1230 Columbia Street, Suite 950
San Diego, CA 92101

Prepared By:

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I. INTRODUCTION

The purpose of this preliminary stormwater letter report is to outline the preliminary stormwater approach for the Wakeland Housing and Development 4th Corner Affordable Housing project including the preliminary sizing of the BMPs for use in the subsequent ministerial permit process.

II. PROJECT DESCRIPTION

The proposed project is 75-unit affordable housing apartment project located in the City Heights community in the City of San Diego. The project fronts Fairmount Avenue north of University and south of Polk Avenue. The proposed project will demolish the one existing building, parking lot, and community garden improvements. The proposed improvements will include the construction of a new apartment building, hardscape, landscape, private utilities, private storm drain, and construction and post construction stormwater BMPs.

III. STORMWATER TREATMENT AND HYDROMODIFICATION METHODOLOGY

The preliminary stormwater approach developed for the project is based on the current MS-4 permit and the City of San Diego's stormwater manual. The preliminary approach was developed in conjunction with the project's Infiltration Feasibility Letter dated 06-05-2020 by Leighton and Associates – See Appendix A. The feasibility to infiltrate was determined to be "zero"/"no Infiltration". The feasibility to harvest re-use runoff is assumed to be "not feasible". All the above was used to develop a preliminary treatment and hydromodification stormwater approach. The types of proposed BMPs include flow-thru planters sized for treatment and hydro-mod. Section IV. describes the proposed condition stormwater approach and BMPs in more detail.

IV. DEVELOPED CONDITION STORMWATER OVERVIEW

The stormwater approach for the 4th Corner project was developed based on the current stormwater permit and requirements. The following is a summary of the stormwater approach:

DMA #1 and DMA #4

DMA #1 consists of a portion of the proposed building, hardscape, and landscape improvements. DMA #4 consists of hardscape and landscape, including the parkway area of Fairmount Avenue. The runoff from DMA #1 will be directed to a flow-thru planter box sized for treatment and hydro-mod storage (i.e. BMP #1). Although the runoff from DMA #4 cannot physically drain to BMP #1, BMP#1 has been sized to accommodate the equivalent treatment and hydo-mod volume for DMA #4. The treated runoff will be directed via a propose storm drain to the existing public alley. The applicant reserves the right to explore the Green Street portion of the permit for DMA #4 during the ministerial permit application.

DMA #2 and DMA #5
DMA #2 consists of a portion of the proposed building, hardscape, and landscape improvements. DMA #5 consists of hardscape and landscape, including the parkway area of Fairmount Avenue. The runoff from DMA #2 will be directed to a flow-thru planter box sized for treatment and hydro-mod storage (i.e. BMP #2). Although the runoff from DMA #5 cannot physically drain to BMP #2, BMP#2 has been sized to accommodate the equivalent treatment and hydo-mod volume for DMA #5. The treated runoff will be directed via a propose storm drain to the Fairmount Avenue street gutter. The applicant reserves the right to explore the Green Street portion of the permit for DMA #5 during the ministerial permit application.

DMA#3 and DMA #6
DMA #3 consists of a portion of the proposed building, hardscape, and landscape improvements. DMA #6 consists of hardscape and landscape, including the parkway area of Fairmount Avenue. The runoff from DMA #3 will be directed to a flow-thru planter box sized for treatment and hydro-mod storage (i.e. BMP #3). Although the runoff from DMA #6 cannot physically drain to BMP #3, BMP #3 has been sized to accommodate the equivalent treatment and hydo-mod volume DMA #6. The treated runoff will be directed via a propose storm drain to the Fairmount Avenue street gutter. The applicant reserves the right to explore the Green Street portion of the permit for DMA #6 during the ministerial permit application.

DM#1
DM #1 consists of proposed hardscape and landscape improvements. The runoff from this DMA will be directed to the adjacent public alley. Although the runoff from DM #1 cannot physically drain to BMP #1, BMP #1 has been sized to accommodate the equivalent treatment and hydo-mod volume DM #1. The applicant reserves the right to explore the De Minimus portion of the permit for DM #1 during the ministerial permit application.

DM#2
DM #2 consists of proposed hardscape and landscape improvements. The runoff from this DMA will be directed to the adjacent public alley. Although the runoff from DM #2 cannot physically drain to BMP #3, BMP #3 has been sized to accommodate the equivalent treatment and hydo-mod volume DM #2. The applicant reserves the right to explore the De Minimus portion of the permit for DM #2 during the ministerial permit application.

Hydro-Modification
BMP #1, #2, and #3 are flow-thru planter boxes sized for treatment and hydro-mod.

Refer to Exhibit A for a depiction of the proposed condition stormwater BMPs.

V. PRELIMINARY BMP SIZING

The project is anticipated to be a Priority Development Project (PDP). It will incorporate appropriate LID Design Practices, Site Design BMPs, Source Control BMP's, and Treatment

Control BMPs. The treatment control BMPs are described by DMA above. BMPs include flow-thru planters sized for treatment and hydro-mod sized for treatment and hydro-modification. The preliminary sizing for the BMPs were based on the BMP sizing worksheets and spreadsheets. The preliminary estimate of the hydromodification volume of the proposed vault used the online BMP Sizing Spreadsheet.

Refer to Appendix B for the preliminary BMP sizing worksheets and spreadsheets.

VI. DISCUSSION AND CONCLUSIONS

The project is anticipated to be a Priority Development Project (PDP). It will incorporate appropriate LID Design Practices, Site Design BMPs, Source Control BMP's, and Treatment Control BMPs. The treatment control BMPs are described by DMA above. BMPs include flow-thru planters sized for treatment and hydro-modification storage. Wakeland Housing and Development will be responsible for the maintenance of the BMPs and will be executing the City required Storm Water Maintenance Agreement. Finally, a formal, detailed Stormwater Quality Management Plan (SWWQMP), addressing the projects stormwater approach and compliance with the stormwater permit in place at the time the grading plan/permit is obtained, will be prepared and submitted as part of the future grading plan/permit application. The applicant reserves the right to explore the Green Street portion of the permit for DMA #4, #5, and #6 during the ministerial permit application. Also, the applicant reserves the right to explore the De Minimus portion of the permit for DM #1 and #2 during the ministerial permit application

APPENDIX A

INFILTRATION FEASIBILITY LETTER BY LEIGHTON AND ASSOCIATES

Leighton and Associates, Inc.
A LEIGHTON GROUP COMPANY

June 5, 2020

Project No. 11534.003

To: Wakeland Housing and Development, Inc.
1230 Columbia Street
San Diego, CA 92101

Attention: Ms. Dani McMillin

Subject: Infiltration Feasibility Letter, Fourth Corner Residential Project, San Diego, California

As requested, we have prepared this letter to discuss the infiltration feasibility at the project site. Therefore, in general accordance with Section C.1.1 Infiltration Feasibility Condition Letter of the San Diego Storm Water Standards (City of San Diego, 2018), Leighton has prepared this summary letter discussing infiltration feasibility at the site. Items associated with C.1.1 of the City BMP Design Manual are included in italics and summarized below:

The phase of the project in which the geotechnical engineer first analyzed the site for infiltration feasibility.

The site was first analyzed for infiltration feasibility during the field investigation for the geotechnical report dated February 6, 2017 (Appendix A). At that time the site was not considered feasible for storm water infiltration.

Results of previous geotechnical analyses conducted in the project area, if any.

The results of the project geotechnical investigation, referenced in Appendix A, indicate that the site is underlain by undocumented fill soils (approximately 2 feet thick) apparently placed during the initial site development, were observed in our exploration locations across the site. Localized deeper unknown fills associated with past development may exist across the site. As encountered during our explorations, the fill soils were observed to generally consist of dark brown, moist, soft, high plasticity, sandy lean clay with variable amounts of gravel and cobble and light brownish gray, moist, loose to medium dense, silty sand. As observed in the off-site boring B-1 performed at

4089 Fairmount Avenue, we encountered undocumented fill to a depth of approximately 7 feet thick. The fill materials consist of light brownish gray, moist, loose to medium dense, silty sand. Pliocene-aged Normal Heights Mudstone was encountered underlying the undocumented fill and extended to depths of approximately 6 to 7 feet bgs at the subject site. The Normal Heights Mudstone, which caps the mesa, is generally composed of poorly consolidated claystone that is characteristically steel gray in color and highly cohesive. Where observed in our exploration, the Normal Heights Mudstone consists of very dark gray, moist, firm to very stiff, high plasticity, claystone with interbedded layers of gravel and cobble. Late Pleistocene-aged Very Old Paralic Deposits underlie the entire site. As encountered, these deposits consist primarily of light yellowish brown to yellowish brown, dense to very dense, moist, fine-grained, oxidized, clayey sandstone with gravel with interbedded layers of cobble conglomerate.

The development status of the site prior to the project application (i.e., new development with raw ungraded land, or redevelopment with existing graded conditions).

This is a redevelopment-type project. The subject site is a rectangular shaped parcel of land. Specifically, the proposed residential development will be located at 4021, 4029, 4035, and 4061 Fairmount Avenue in a previously developed area known as City Heights in the City of San Diego, California. The property at 4089 Fairmont Avenue was explored; however, it is our understanding that this property is not currently being proposed for redevelopment at this time. In general, the site is bounded by Fairmount Avenue to the west, an alleyway to the east and existing commercial developments to the north and south. Overall dimensions of the subject site are approximately 130 by 240 lineal feet. The site is currently occupied by asphalt paved parking lots, a two-story commercial building (i.e., United Women of East Africa Organization) and areas that are used for urban gardening. Other site improvements consist of underground utilities, concrete hardscaping, and perimeter security fences. Site topography is nearly level with surface elevations ranging from approximately 366 to 364 feet above mean sea level (msl) (i.e., drainage from the west to the east). The site was developed prior to the 1950's. There are no areas of exposed surface soils across the site where water infiltration might occur.

The history of design discussions for the project footprint, resulting in the final design determination.

Leighton was not involved in design discussions related to project footprint and final design determination. However, the footprint of the proposed building is a property line to property line footprint covering generally the central and northern portions of the City block (Figure 2).

Full/partial infiltration BMP standard setbacks to underground utilities, structures, retaining walls, fill slopes, and natural slopes applicable to the DMA that prevent full/partial infiltration.

Numerous existing underground utilities are located within 10 feet of the site within City of San Diego Right-of-Way. These utilities include settlement sensitive wet utilities such as storm drain and sewer lines. In addition, several dry utilities are located within 10 feet of the site which will be adversely impacted by infiltration of storm water.

The physical impairments (i.e., fire road egress, public safety considerations, etc.) that prevent full/partial infiltration.

Physical impairments that prevent infiltration were not observed at the site.

Conclusion or recommendation from the geotechnical engineer regarding the DMA's infiltration condition.

As previously mentioned above, the site is underlain by approximately 2 feet of undocumented fill which in turn is underlain by Normal Heights Mudstone. BMPs located in these soil units can be problematic and may induce adverse soil movement. In addition, numerous existing underground utilities are located within 10 feet of the site. These utilities include settlement sensitive wet utilities such as storm drain and sewer lines. In addition, several dry utilities are located within 10 feet of the site which will be adversely impacted by infiltration of storm water.

It is therefore our opinion that storm water infiltration at the site is not feasible.

If you have any questions regarding this letter, please do not hesitate to contact this office. We appreciate this opportunity to be of service.

Respectfully submitted
LEIGHTON AND ASSOCIATES, INC.

Mike D. Jensen

Mike Jensen, CEG 2457
Associate Geologist

Distribution: (1) email
Attachments (1) Appendix A - References

Leighton

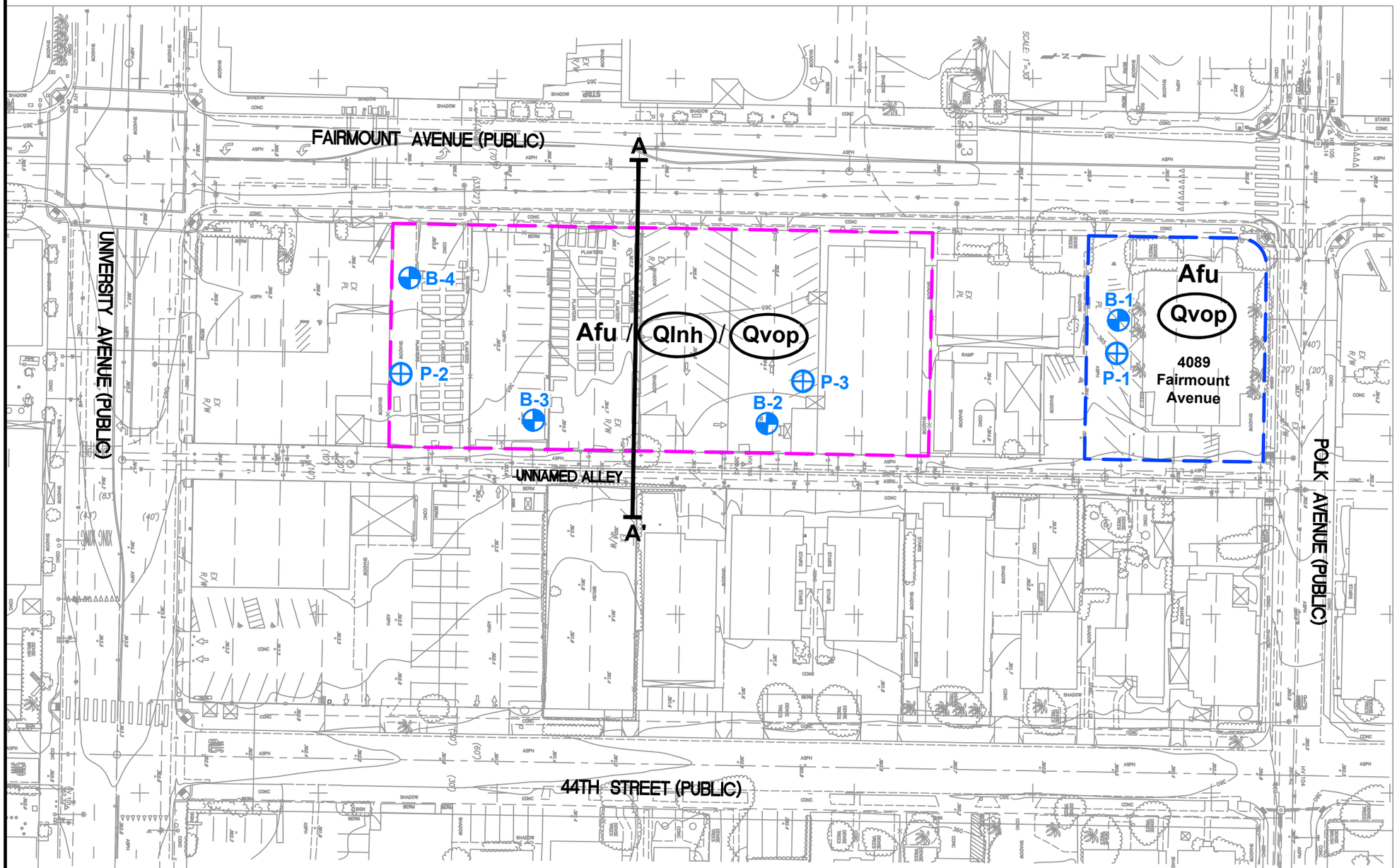
APPENDIX A

REFERENCES

Leighton and Associates, 2020, Updated Infiltration Feasibility Letter, Fourth Corner Residential Project, San Diego, California 92101, Project No 11534.003, dated April 15, 2020.

_____, 2020, Addendum Geotechnical Investigation, Fourth Corner Residential Project, Fairmount Avenue, San Diego, California 92101, Project No 11534.003, dated April 13, 2020.

_____, 2017, Preliminary Geotechnical Investigation, Fourth Corner Residential Project, Fairmount Avenue, San Diego, California 92101, Project No 11534.001, dated February 6, 2017.



LEGEND

B-4	Approximate Location of Exploration Boring
P-3	Approximate Location of Field Percolation Test
A — A'	Geologic Cross-Section
	Approximate Limits of Site and Remedial Grading
	Not Proposed for Development at the time of this Report was Issued
Afu	Undocumented Artificial Fill
Qlnh	Quarternary-aged Normal Heights Mudstone (circled where buried)
Qvop	Quarternary-aged Very Old Paralic Deposits (circled where buried)

N

0 60 120

Feet

Project: 11534.001	Eng/Geol: WDO/MJD
Scale: 1"=60'	Date: June 2020

Reference: Site Development Plan, Kettler Leweck, 4th Corner, 4089-4061-4035-4021 Fairmount Avenue, dated January 5, 2017.
Author: MAM

GEOTECHNICAL EXPLORATION MAP

4061, 4035, 4029, 4021 Fairmount Avenue
San Diego, California

Figure 2

Leighton

P:\DRAFTING\11534\001\CAD\11534-001_F02_GM_2017-01-24.DWG (01-30-17 3:41:30PM) Plotted by: mmurphy

APPENDIX B

PRELIMINARY STORMWATER BMP SIZING WORKSHEETS AND SPREADSHEETS

WAKELAND'S 4TH CORNER
CITY 2nd RESUBMITTAL
7/15/2020

DMA 1 (including DMA 4 and DM1)

	Runoff Factor (Cx)	Area (Ax)	Cx * Ax
Impervious Areas	0.9	10187.00	9168.30
Landscape	0.1	1702.00	170.20
Total		11889.00	
Weighted C			0.79

WAKELAND'S 4TH CORNER
CITY 2nd RESUBMITTAL
7/15/2020

DMA 2 (including DMA 5)

	Runoff Factor (Cx)	Area (Ax)	Cx * Ax
Impervious Areas	0.9	11937.00	10743.30
Landscape	0.1	4475.00	447.50
Total		16412.00	
Weighted C			0.68

WAKELAND'S 4TH CORNER
CITY 2nd RESUBMITTAL
7/15/2020

DMA 3 (including DMA 6 and DM2)

	Runoff Factor (Cx)	Area (Ax)	Cx * Ax
Impervious Areas	0.9	10737.00	9663.30
Landscape	0.1	917.00	91.70
Total		11654.00	
Weighted C			0.84

The City of SAN DIEGO	Project Name	Wakeland Housing - 4th Corner	
	BMP ID	BMP 1	
Sizing Method for Pollutant Removal Criteria		**Worksheet B.5-1**	
1	Area draining to the BMP	11889	sq. ft.
2	Adjusted runoff factor for drainage area (Refer to Appendix B.1 and B.2)	0.79	
3	85th percentile 24-hour rainfall depth	0.51	inches
4	Design capture volume [Line 1 x Line 2 x (Line 3/12)]	399	cu. ft.
BMP Parameters			
5	Surface ponding [6 inch minimum, 12 inch maximum]	12	inches
6	Media thickness [18 inches minimum], also add mulch layer and washed ASTM 33 fine aggregate sand thickness to this line for sizing calculations	18	inches
7	Aggregate storage (also add ASTM No 8 stone) above underdrain invert (12 inches typical) – use 0 inches if the aggregate is not over the entire bottom surface area	12	inches
8	Aggregate storage below underdrain invert (3 inches minimum) – use 0 inches if the aggregate is not over the entire bottom surface area	3	inches
9	Freely drained pore storage of the media	0.2	in/in
10	Porosity of aggregate storage	0.4	in/in
11	Media filtration rate to be used for sizing (maximum filtration rate of 5 in/hr. with no outlet control; if the filtration rate is controlled by the outlet use the outlet controlled rate (includes infiltration into the soil and flow rate through the outlet structure) which will be less than 5 in/hr.)	5	in/hr.
Baseline Calculations			
12	Allowable routing time for sizing	6	hours
13	Depth filtered during storm [Line 11 x Line 12]	30	inches
14	Depth of Detention Storage [Line 5 + (Line 6 x Line 9) + (Line 7 x Line 10) + (Line 8 x Line 10)]	21.6	inches
15	Total Depth Treated [Line 13 + Line 14]	51.6	inches
Option 1 – Biofilter 1.5 times the DCV			
16	Required biofiltered volume [1.5 x Line 4]	599	cu. ft.
17	Required Footprint [Line 16/ Line 15] x 12	139	sq. ft.
Option 2 - Store 0.75 of remaining DCV in pores and ponding			
18	Required Storage (surface + pores) Volume [0.75 x Line 4]	299	cu. ft.
19	Required Footprint [Line 18/ Line 14] x 12	166	sq. ft.
Footprint of the BMP			
20	BMP Footprint Sizing Factor (Default 0.03 or an alternative minimum footprint sizing factor from Line 11 in Worksheet B.5-4)	0.03	
21	Minimum BMP Footprint [Line 1 x Line 2 x Line 20]	282	sq. ft.
22	Footprint of the BMP = Maximum(Minimum(Line 17, Line 19), Line 21)	282	sq. ft.
23	Provided BMP Footprint	533	sq. ft.
24	Is Line 23 ≥ Line 22?	**Yes, Performance Standard is Met**	

The City of SAN DIEGO	Project Name	Wakeland Hosuing - 4th Corner	
	BMP ID	BMP 1	
Sizing Method for Volume Retention Criteria		**Worksheet B.5-2**	
1	Area draining to the BMP	11889	sq. ft.
2	Adjusted runoff factor for drainage area (Refer to Appendix B.1 and B.2)	0.79	
3	85th percentile 24-hour rainfall depth	0.51	inches
4	Design capture volume [Line 1 x Line 2 x (Line 3/12)]	399	cu. ft.
Volume Retention Requirement			
5	Measured infiltration rate in the DMA Note: When mapped hydrologic soil groups are used enter 0.10 for NRCS Type D soils and for NRCS Type C soils enter 0.30 When in no infiltration condition and the actual measured infiltration rate is unknown enter 0.0 if there are geotechnical and/or groundwater hazards identified in Appendix C or enter 0.05	0	in/hr.
6	Factor of safety	2	
7	Reliable infiltration rate, for biofiltration BMP sizing [Line 5 / Line 6]	0	in/hr.
8	Average annual volume reduction target (Figure B.5-2) When Line 7 > 0.01 in/hr. = Minimum (40, 166.9 x Line 7 +6.62) When Line 7 ≤ 0.01 in/hr. = 3.5%	3.5	%
9	Fraction of DCV to be retained (Figure B.5-3) When Line 8 > 8% = 0.0000013 x Line 8^3 - 0.000057 x Line 8^2 + 0.0086 x Line 8 - 0.014 When Line 8 ≤ 8% = 0.023	0.023	
10	Target volume retention [Line 9 x Line 4]	9	cu. ft.

The City of SAN DIEGO	Project Name	Wakeland - 4th Corner
	BMP ID	BMP 1

Volume Retention for No Infiltration Condition			Worksheet B.5-6	
1	Area draining to the biofiltration BMP	11889	sq. ft.	
2	Adjusted runoff factor for drainage area (Refer to Appendix B.1 and B.2)	0.79		
3	Effective impervious area draining to the BMP [Line 1 x Line 2]	9392	sq. ft.	
4	Required area for Evapotranspiration [Line 3 x 0.03]	282	sq. ft.	
5	Biofiltration BMP Footprint	533	sq. ft.	

Landscape Area (must be identified on DS-3247)

	Identification	1	2	3	4	5
6	Landscape area that meet the requirements in SD-B and SD-F Fact Sheet (sq. ft.)					
7	Impervious area draining to the landscape area (sq. ft.)					
8	Impervious to Pervious Area ratio [Line 7/Line 6]	0.00	0.00	0.00	0.00	0.00
9	Effective Credit Area If (Line 8 >1.5, Line 6, Line 7/1.5]	0	0	0	0	0

10	Sum of Landscape area [sum of Line 9 Id's 1 to 5]	0	sq. ft.
11	Provided footprint for evapotranspiration [Line 5 + Line 10]	533	sq. ft.

Volume Retention Performance Standard

12	Is Line 11 ≥ Line 4?	Volume Retention Performance Standard is Met	
13	Fraction of the performance standard met through the BMP footprint and/or landscaping [Line 11/Line 4]	1.89	
14	Target Volume Retention [Line 10 from Worksheet B.5.2]	9	cu. ft.
15	Volume retention required from other site design BMPs [(1-Line 13) x Line 14]	-8.01	cu. ft.

Site Design BMP

	Identification	Site Design Type	Credit	
16	1			cu. ft.
	2			cu. ft.
	3			cu. ft.
	4			cu. ft.
	5			cu. ft.
	Sum of volume retention benefits from other site design BMPs (e.g. trees; rain barrels etc.). [sum of Line 16 Credits for Id's 1 to 5] Provide documentation of how the site design credit is calculated in the PDP SWQMP.		0	cu. ft.
17	Is Line 16 ≥ Line 15?	Volume Retention Performance Standard is Met		

The City of SAN DIEGO	Project Name	Wakeland Housing - 4th Corner	
	BMP ID	BMP 2	
Sizing Method for Pollutant Removal Criteria		**Worksheet B.5-1**	
1	Area draining to the BMP	16412	sq. ft.
2	Adjusted runoff factor for drainage area (Refer to Appendix B.1 and B.2)	0.68	
3	85th percentile 24-hour rainfall depth	0.51	inches
4	Design capture volume [Line 1 x Line 2 x (Line 3/12)]	474	cu. ft.
BMP Parameters			
5	Surface ponding [6 inch minimum, 12 inch maximum]	12	inches
6	Media thickness [18 inches minimum], also add mulch layer and washed ASTM 33 fine aggregate sand thickness to this line for sizing calculations	18	inches
7	Aggregate storage (also add ASTM No 8 stone) above underdrain invert (12 inches typical) – use 0 inches if the aggregate is not over the entire bottom surface area	12	inches
8	Aggregate storage below underdrain invert (3 inches minimum) – use 0 inches if the aggregate is not over the entire bottom surface area	3	inches
9	Freely drained pore storage of the media	0.2	in/in
10	Porosity of aggregate storage	0.4	in/in
11	Media filtration rate to be used for sizing (maximum filtration rate of 5 in/hr. with no outlet control; if the filtration rate is controlled by the outlet use the outlet controlled rate (includes infiltration into the soil and flow rate through the outlet structure) which will be less than 5 in/hr.)	5	in/hr.
Baseline Calculations			
12	Allowable routing time for sizing	6	hours
13	Depth filtered during storm [Line 11 x Line 12]	30	inches
14	Depth of Detention Storage [Line 5 + (Line 6 x Line 9) + (Line 7 x Line 10) + (Line 8 x Line 10)]	21.6	inches
15	Total Depth Treated [Line 13 + Line 14]	51.6	inches
Option 1 – Biofilter 1.5 times the DCV			
16	Required biofiltered volume [1.5 x Line 4]	711	cu. ft.
17	Required Footprint [Line 16/ Line 15] x 12	165	sq. ft.
Option 2 - Store 0.75 of remaining DCV in pores and ponding			
18	Required Storage (surface + pores) Volume [0.75 x Line 4]	356	cu. ft.
19	Required Footprint [Line 18/ Line 14] x 12	198	sq. ft.
Footprint of the BMP			
20	BMP Footprint Sizing Factor (Default 0.03 or an alternative minimum footprint sizing factor from Line 11 in Worksheet B.5-4)	0.03	
21	Minimum BMP Footprint [Line 1 x Line 2 x Line 20]	335	sq. ft.
22	Footprint of the BMP = Maximum(Minimum(Line 17, Line 19), Line 21)	335	sq. ft.
23	Provided BMP Footprint	775	sq. ft.
24	Is Line 23 ≥ Line 22?	**Yes, Performance Standard is Met**	

The City of SAN DIEGO	Project Name	Wakeland Housing - 4th Corner	
	BMP ID	BMP 2	
Sizing Method for Volume Retention Criteria		**Worksheet B.5-2**	
1	Area draining to the BMP	16412	sq. ft.
2	Adjusted runoff factor for drainage area (Refer to Appendix B.1 and B.2)	0.68	
3	85th percentile 24-hour rainfall depth	0.51	inches
4	Design capture volume [Line 1 x Line 2 x (Line 3/12)]	474	cu. ft.
Volume Retention Requirement			
5	Measured infiltration rate in the DMA Note: When mapped hydrologic soil groups are used enter 0.10 for NRCS Type D soils and for NRCS Type C soils enter 0.30 When in no infiltration condition and the actual measured infiltration rate is unknown enter 0.0 if there are geotechnical and/or groundwater hazards identified in Appendix C or enter 0.05	0	in/hr.
6	Factor of safety	2	
7	Reliable infiltration rate, for biofiltration BMP sizing [Line 5 / Line 6]	0	in/hr.
8	Average annual volume reduction target (Figure B.5-2) When Line 7 > 0.01 in/hr. = Minimum (40, 166.9 x Line 7 +6.62) When Line 7 ≤ 0.01 in/hr. = 3.5%	3.5	%
9	Fraction of DCV to be retained (Figure B.5-3) When Line 8 > 8% = 0.0000013 x Line 8^3 - 0.000057 x Line 8^2 + 0.0086 x Line 8 - 0.014 When Line 8 ≤ 8% = 0.023	0.023	
10	Target volume retention [Line 9 x Line 4]	11	cu. ft.

The City of SAN DIEGO	Project Name	Wakeland Hosuing - 4th Corner	
	BMP ID	BMP 2	

Volume Retention for No Infiltration Condition			Worksheet B.5-6
1	Area draining to the biofiltration BMP	16412	sq. ft.
2	Adjusted runoff factor for drainage area (Refer to Appendix B.1 and B.2)	0.68	
3	Effective impervious area draining to the BMP [Line 1 x Line 2]	11160	sq. ft.
4	Required area for Evapotranspiration [Line 3 x 0.03]	335	sq. ft.
5	Biofiltration BMP Footprint	775	sq. ft.

Landscape Area (must be identified on DS-3247)

	Identification	1	2	3	4	5
6	Landscape area that meet the requirements in SD-B and SD-F Fact Sheet (sq. ft.)					
7	Impervious area draining to the landscape area (sq. ft.)					
8	Impervious to Pervious Area ratio [Line 7/Line 6]	0.00	0.00	0.00	0.00	0.00
9	Effective Credit Area If (Line 8 >1.5, Line 6, Line 7/1.5]	0	0	0	0	0

10	Sum of Landscape area [sum of Line 9 Id's 1 to 5]	0	sq. ft.
11	Provided footprint for evapotranspiration [Line 5 + Line 10]	775	sq. ft.

Volume Retention Performance Standard

12	Is Line 11 ≥ Line 4?	Volume Retention Performance Standard is Met	
13	Fraction of the performance standard met through the BMP footprint and/or landscaping [Line 11/Line 4]	2.31	
14	Target Volume Retention [Line 10 from Worksheet B.5.2]	11	cu. ft.
15	Volume retention required from other site design BMPs [(1-Line 13) x Line 14]	-14.41	cu. ft.

Site Design BMP

	Identification	Site Design Type	Credit	
16	1			cu. ft.
	2			cu. ft.
	3			cu. ft.
	4			cu. ft.
	5			cu. ft.
	Sum of volume retention benefits from other site design BMPs (e.g. trees; rain barrels etc.). [sum of Line 16 Credits for Id's 1 to 5] Provide documentation of how the site design credit is calculated in the PDP SWQMP.		0	cu. ft.
17	Is Line 16 ≥ Line 15?	Volume Retention Performance Standard is Met		

The City of SAN DIEGO	Project Name	Wakeland Housing - 4th Corner	
	BMP ID	BMP 3	
Sizing Method for Pollutant Removal Criteria		**Worksheet B.5-1**	
1	Area draining to the BMP	11654	sq. ft.
2	Adjusted runoff factor for drainage area (Refer to Appendix B.1 and B.2)	0.84	
3	85th percentile 24-hour rainfall depth	0.51	inches
4	Design capture volume [Line 1 x Line 2 x (Line 3/12)]	416	cu. ft.
BMP Parameters			
5	Surface ponding [6 inch minimum, 12 inch maximum]	12	inches
6	Media thickness [18 inches minimum], also add mulch layer and washed ASTM 33 fine aggregate sand thickness to this line for sizing calculations	18	inches
7	Aggregate storage (also add ASTM No 8 stone) above underdrain invert (12 inches typical) – use 0 inches if the aggregate is not over the entire bottom surface area	12	inches
8	Aggregate storage below underdrain invert (3 inches minimum) – use 0 inches if the aggregate is not over the entire bottom surface area	3	inches
9	Freely drained pore storage of the media	0.2	in/in
10	Porosity of aggregate storage	0.4	in/in
11	Media filtration rate to be used for sizing (maximum filtration rate of 5 in/hr. with no outlet control; if the filtration rate is controlled by the outlet use the outlet controlled rate (includes infiltration into the soil and flow rate through the outlet structure) which will be less than 5 in/hr.)	5	in/hr.
Baseline Calculations			
12	Allowable routing time for sizing	6	hours
13	Depth filtered during storm [Line 11 x Line 12]	30	inches
14	Depth of Detention Storage [Line 5 + (Line 6 x Line 9) + (Line 7 x Line 10) + (Line 8 x Line 10)]	21.6	inches
15	Total Depth Treated [Line 13 + Line 14]	51.6	inches
Option 1 – Biofilter 1.5 times the DCV			
16	Required biofiltered volume [1.5 x Line 4]	624	cu. ft.
17	Required Footprint [Line 16/ Line 15] x 12	145	sq. ft.
Option 2 - Store 0.75 of remaining DCV in pores and ponding			
18	Required Storage (surface + pores) Volume [0.75 x Line 4]	312	cu. ft.
19	Required Footprint [Line 18/ Line 14] x 12	173	sq. ft.
Footprint of the BMP			
20	BMP Footprint Sizing Factor (Default 0.03 or an alternative minimum footprint sizing factor from Line 11 in Worksheet B.5-4)	0.03	
21	Minimum BMP Footprint [Line 1 x Line 2 x Line 20]	294	sq. ft.
22	Footprint of the BMP = Maximum(Minimum(Line 17, Line 19), Line 21)	294	sq. ft.
23	Provided BMP Footprint	624	sq. ft.
24	Is Line 23 ≥ Line 22?	**Yes, Performance Standard is Met**	

The City of SAN DIEGO	Project Name	Wakeland Housing - 4th Corner	
	BMP ID	BMP 3	
Sizing Method for Volume Retention Criteria		**Worksheet B.5-2**	
1	Area draining to the BMP	11654	sq. ft.
2	Adjusted runoff factor for drainage area (Refer to Appendix B.1 and B.2)	0.84	
3	85th percentile 24-hour rainfall depth	0.51	inches
4	Design capture volume [Line 1 x Line 2 x (Line 3/12)]	416	cu. ft.
Volume Retention Requirement			
5	Measured infiltration rate in the DMA Note: When mapped hydrologic soil groups are used enter 0.10 for NRCS Type D soils and for NRCS Type C soils enter 0.30 When in no infiltration condition and the actual measured infiltration rate is unknown enter 0.0 if there are geotechnical and/or groundwater hazards identified in Appendix C or enter 0.05	0	in/hr.
6	Factor of safety	2	
7	Reliable infiltration rate, for biofiltration BMP sizing [Line 5 / Line 6]	0	in/hr.
8	Average annual volume reduction target (Figure B.5-2) When Line 7 > 0.01 in/hr. = Minimum (40, 166.9 x Line 7 +6.62) When Line 7 ≤ 0.01 in/hr. = 3.5%	3.5	%
9	Fraction of DCV to be retained (Figure B.5-3) When Line 8 > 8% = 0.0000013 x Line 8^3 - 0.000057 x Line 8^2 + 0.0086 x Line 8 - 0.014 When Line 8 ≤ 8% = 0.023	0.023	
10	Target volume retention [Line 9 x Line 4]	10	cu. ft.

The City of SAN DIEGO	Project Name	Wakeland Housing - 4th Corner	
	BMP ID	BMP 3	

Volume Retention for No Infiltration Condition			Worksheet B.5-6
1	Area draining to the biofiltration BMP	11654	sq. ft.
2	Adjusted runoff factor for drainage area (Refer to Appendix B.1 and B.2)	0.84	
3	Effective impervious area draining to the BMP [Line 1 x Line 2]	9789	sq. ft.
4	Required area for Evapotranspiration [Line 3 x 0.03]	294	sq. ft.
5	Biofiltration BMP Footprint	624	sq. ft.

Landscape Area (must be identified on DS-3247)

	Identification	1	2	3	4	5
6	Landscape area that meet the requirements in SD-B and SD-F Fact Sheet (sq. ft.)					
7	Impervious area draining to the landscape area (sq. ft.)					
8	Impervious to Pervious Area ratio [Line 7/Line 6]	0.00	0.00	0.00	0.00	0.00
9	Effective Credit Area If (Line 8 >1.5, Line 6, Line 7/1.5]	0	0	0	0	0

10	Sum of Landscape area [sum of Line 9 Id's 1 to 5]	0	sq. ft.
11	Provided footprint for evapotranspiration [Line 5 + Line 10]	624	sq. ft.

Volume Retention Performance Standard

12	Is Line 11 ≥ Line 4?	Volume Retention Performance Standard is Met	
13	Fraction of the performance standard met through the BMP footprint and/or landscaping [Line 11/Line 4]	2.12	
14	Target Volume Retention [Line 10 from Worksheet B.5.2]	10	cu. ft.
15	Volume retention required from other site design BMPs [(1-Line 13) x Line 14]	-11.2	cu. ft.

Site Design BMP

	Identification	Site Design Type	Credit	
16	1			cu. ft.
	2			cu. ft.
	3			cu. ft.
	4			cu. ft.
	5			cu. ft.
	Sum of volume retention benefits from other site design BMPs (e.g. trees; rain barrels etc.). [sum of Line 16 Credits for Id's 1 to 5] Provide documentation of how the site design credit is calculated in the PDP SWQMP.		0	cu. ft.
17	Is Line 16 ≥ Line 15?	Volume Retention Performance Standard is Met		

BMP Sizing Spreadsheet V3.0

Project Name:	4th Corner
Project Applicant:	Wakeland Housing
Jurisdiction:	City of San Diego
Parcel (APN):	Multiple
Hydrologic Unit:	
Rain Gauge:	Lindbergh
Total Project Area (sf):	40,183
Channel Susceptibility:	Low

BMP Sizing Spreadsheet V3.0			
Project Name:	4th Corner	Hydrologic Unit:	0
Project Applicant:	Wakeland Housing	Rain Gauge:	Lindbergh
Jurisdiction:	City of San Diego	Total Project Area:	40,183
Parcel (APN):	Multiple	Low Flow Threshold:	0.1Q2
BMP Name:	BMP 1	BMP Type:	Biofiltration
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors	Minimum BMP Size
DMA Name	Area (sf)	Pre Project Soil Type	Pre-Project Slope	Post Project Surface Type	Area Weighted Runoff Factor (Table G.2-1)[1]	Surface Area	Surface Area (SF)
Impervious	9,029	D	Flat	Roofs	1.0	0.05	451
Pervious	823	D	Flat	Landscape	0.1	0.05	4
						0	0
Impervious	1,087	D	Flat	Concrete	1.0	0.05	54
Pervious	726	D	Flat	Landscape	0.1	0.05	4
						0	0
Impervious	71	D	Flat	Concrete	1.0	0.05	4
Pervious	153	D	Flat	Landscape	0.1	0.05	1
						0	0
						0	0
						0	0
						0	0
						0	0
						0	0
						0	0
BMP Tributary Area	11,889					Minimum BMP Size	518
						Proposed BMP Size*	533

* Assumes standard configuration

Surface Ponding Depth	12.00	in
Bioretention Soil Media Depth	18.00	in
Filter Coarse	6.00	in
Gravel Storage Layer Depth	12	in
Underdrain Offset	3.0	in

Notes:

1. Runoff factors which are used for hydromodification management flow control (Table G.2-1) are different from the runoff factors used for pollutant control BMP sizing (Table B.1-1). Table references are taken from the San Diego Region Model BMP Design Manual,

Describe the BMP's in sufficient detail in your PDP SWQMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

BMP's must be adapted and applied to the conditions specific to the development project such as unstable slopes or the lack of available head.
Designated Staff have final review and approval authority over the project design.

This BMP Sizing Spreadsheet has been updated in conformance with the San Diego Region Model BMP Design Manual, April 2018. For questions or concerns please contact the jurisdiction in which your project is located.

BMP Sizing Spreadsheet V3.0			
Project Name:	4th Corner	Hydrologic Unit:	0
Project Applicant:	Wakeland Housing	Rain Gauge:	Lindbergh
Jurisdiction:	City of San Diego	Total Project Area:	40,183
Parcel (APN):	Multiple	Low Flow Threshold:	0.1Q2
BMP Name	BMP 1	BMP Type:	Biofiltration

DMA Name	Rain Gauge	Pre-developed Condition		Unit Runoff Ratio (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	Orifice Area (in^2)
		Soil Type	Slope				
Impervious	Lindbergh	D	Flat	0.429	0.207	0.044	**0.63**
Pervious	Lindbergh	D	Flat	0.429	0.019	0.004	**0.06**
Impervious	Lindbergh	D	Flat	0.429	0.025	0.005	**0.08**
Pervious	Lindbergh	D	Flat	0.429	0.017	0.004	**0.05**
Impervious	Lindbergh	D	Flat	0.429	0.002	0.000	**0.00**
Pervious	Lindbergh	D	Flat	0.429	0.004	0.001	**0.01**

3.75	**0.059**	**0.83**	**1.03**
Max Orifice Head (feet)	**Max Tot. Allowable Orifice Flow (cfs)**	**Max Tot. Allowable Orifice Area (in^2)**	**Max Orifice Diameter (in)**

0.054	**0.058**	**0.83**	**1.030**
Average outflow during surface drawdown (cfs)	Max Orifice Outflow (cfs)	Actual Orifice Area (in^2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	2.7

BMP Sizing Spreadsheet V3.0

Project Name:	4th Corner
Project Applicant:	Wakeland Housing
Jurisdiction:	City of San Diego
Parcel (APN):	Multiple
Hydrologic Unit:	
Rain Gauge:	Lindbergh
Total Project Area (sf):	40,183
Channel Susceptibility:	Low

BMP Sizing Spreadsheet V3.0			
Project Name:	4th Corner	Hydrologic Unit:	0
Project Applicant:	Wakeland Housing	Rain Gauge:	Lindbergh
Jurisdiction:	City of San Diego	Total Project Area:	40,183
Parcel (APN):	Multiple	Low Flow Threshold:	0.1Q2
BMP Name:	BMP 2	BMP Type:	Biofiltration
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors	Minimum BMP Size
DMA Name	Area (sf)	Pre Project Soil Type	Pre-Project Slope	Post Project Surface Type	Area Weighted Runoff Factor (Table G.2-1)[1]	Surface Area	Surface Area (SF)
Impervious	10,614	D	Flat	Roofs	1.0	0.05	531
Pervious	3,893	D	Flat	Landscape	0.1	0.05	19
						0	0
Impervious	1,323	D	Flat	Roofs	1.0	0.05	66
Pervious	582	D	Flat	Landscape	0.1	0.05	3
						0	0
						0	0
						0	0
						0	0
						0	0
						0	0
						0	0
						0	0
						0	0
BMP Tributary Area	16,412					Minimum BMP Size	619
						Proposed BMP Size*	775

* Assumes standard configuration

Surface Ponding Depth	12.00	in
Bioretention Soil Media Depth	18.00	in
Filter Coarse	6.00	in
Gravel Storage Layer Depth	12	in
Underdrain Offset	3.0	in

Notes:

1. Runoff factors which are used for hydromodification management flow control (Table G.2-1) are different from the runoff factors used for pollutant control BMP sizing (Table B.1-1). Table references are taken from the San Diego Region Model BMP Design Manual,

Describe the BMP's in sufficient detail in your PDP SWQMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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BMP Sizing Spreadsheet V3.0			
Project Name:	4th Corner	Hydrologic Unit:	0
Project Applicant:	Wakeland Housing	Rain Gauge:	Lindbergh
Jurisdiction:	City of San Diego	Total Project Area:	40,183
Parcel (APN):	Multiple	Low Flow Threshold:	0.1Q2
BMP Name	BMP 2	BMP Type:	Biofiltration

DMA Name	Rain Gauge	Pre-developed Condition		Unit Runoff Ratio (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	Orifice Area (in^2)
		Soil Type	Slope				
Impervious	Lindbergh	D	Flat	0.429	0.244	0.052	**0.75**
Pervious	Lindbergh	D	Flat	0.429	0.089	0.019	**0.27**
Impervious	Lindbergh	D	Flat	0.429	0.030	0.007	**0.09**
Pervious	Lindbergh	D	Flat	0.429	0.013	0.003	**0.04**

3.75	**0.081**	**1.15**	**1.21**
Max Orifice Head (feet)	**Max Tot. Allowable Orifice Flow (cfs)**	**Max Tot. Allowable Orifice Area (in^2)**	**Max Orifice Diameter (in)**

0.075	**0.081**	**1.15**	**1.210**
Average outflow during surface drawdown (cfs)	Max Orifice Outflow (cfs)	Actual Orifice Area (in^2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	2.9

BMP Sizing Spreadsheet V3.0

Project Name:	4th Corner
Project Applicant:	Wakeland Housing
Jurisdiction:	City of San Diego
Parcel (APN):	Multiple
Hydrologic Unit:	
Rain Gauge:	Lindbergh
Total Project Area (sf):	40,183
Channel Susceptibility:	Low

BMP Sizing Spreadsheet V3.0			
Project Name:	4th Corner	Hydrologic Unit:	0
Project Applicant:	Wakeland Housing	Rain Gauge:	Lindbergh
Jurisdiction:	City of San Diego	Total Project Area:	40,183
Parcel (APN):	Multiple	Low Flow Threshold:	0.1Q2
BMP Name:	BMP 3	BMP Type:	Biofiltration
BMP Native Soil Type:	N/A - Impervious Liner	BMP Infiltration Rate (in/hr):	N/A

Areas Draining to BMP						HMP Sizing Factors	Minimum BMP Size
DMA Name	Area (sf)	Pre Project Soil Type	Pre-Project Slope	Post Project Surface Type	Area Weighted Runoff Factor (Table G.2-1)[1]	Surface Area	Surface Area (SF)
Impervious	9,722	D	Flat	Roofs	1.0	0.05	486
Pervious	778	D	Flat	Landscape	0.1	0.05	4
						0	0
Impervious	911	D	Flat	Concrete	1.0	0.05	46
Pervious	139	D	Flat	Landscape	0.1	0.05	1
						0	0
Impervious	104	D	Flat	Concrete	1.0	0.05	5
Pervious	0	D	Flat	Landscape	0.1	0.05	0
						0	0
						0	0
						0	0
						0	0
						0	0
						0	0
						0	0
BMP Tributary Area	11,654					Minimum BMP Size	541
						Proposed BMP Size*	624

* Assumes standard configuration

Surface Ponding Depth	12.00	in
Bioretention Soil Media Depth	18.00	in
Filter Coarse	6.00	in
Gravel Storage Layer Depth	12	in
Underdrain Offset	3.0	in

Notes:

1. Runoff factors which are used for hydromodification management flow control (Table G.2-1) are different from the runoff factors used for pollutant control BMP sizing (Table B.1-1). Table references are taken from the San Diego Region Model BMP Design Manual,

Describe the BMP's in sufficient detail in your PDP SWQMP to demonstrate the area, volume, and other criteria can be met within the constraints of the site.

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This BMP Sizing Spreadsheet has been updated in conformance with the San Diego Region Model BMP Design Manual, April 2018. For questions or concerns please contact the jurisdiction in which your project is located.

BMP Sizing Spreadsheet V3.0			
Project Name:	4th Corner	Hydrologic Unit:	0
Project Applicant:	Wakeland Housing	Rain Gauge:	Lindbergh
Jurisdiction:	City of San Diego	Total Project Area:	40,183
Parcel (APN):	Multiple	Low Flow Threshold:	0.1Q2
BMP Name	BMP 3	BMP Type:	Biofiltration

DMA Name	Rain Gauge	Pre-developed Condition		Unit Runoff Ratio (cfs/ac)	DMA Area (ac)	Orifice Flow - $\%Q_2$ (cfs)	Orifice Area (in^2)
		Soil Type	Slope				
Impervious	Lindbergh	D	Flat	0.429	0.223	0.048	**0.68**
Pervious	Lindbergh	D	Flat	0.429	0.018	0.004	**0.05**
Impervious	Lindbergh	D	Flat	0.429	0.021	0.004	**0.06**
Pervious	Lindbergh	D	Flat	0.429	0.003	0.001	**0.01**
Impervious	Lindbergh	D	Flat	0.429	0.002	0.001	**0.01**
Pervious	Lindbergh	D	Flat	0.429	0.000	0.000	**0.00**

3.75	**0.057**	**0.82**	**1.02**
Max Orifice Head (feet)	**Max Tot. Allowable Orifice Flow (cfs)**	**Max Tot. Allowable Orifice Area (in^2)**	**Max Orifice Diameter (in)**

0.053	**0.057**	**0.82**	**1.020**
Average outflow during surface drawdown (cfs)	Max Orifice Outflow (cfs)	Actual Orifice Area (in^2)	Selected Orifice Diameter (in)

Drawdown (Hrs)	3.2

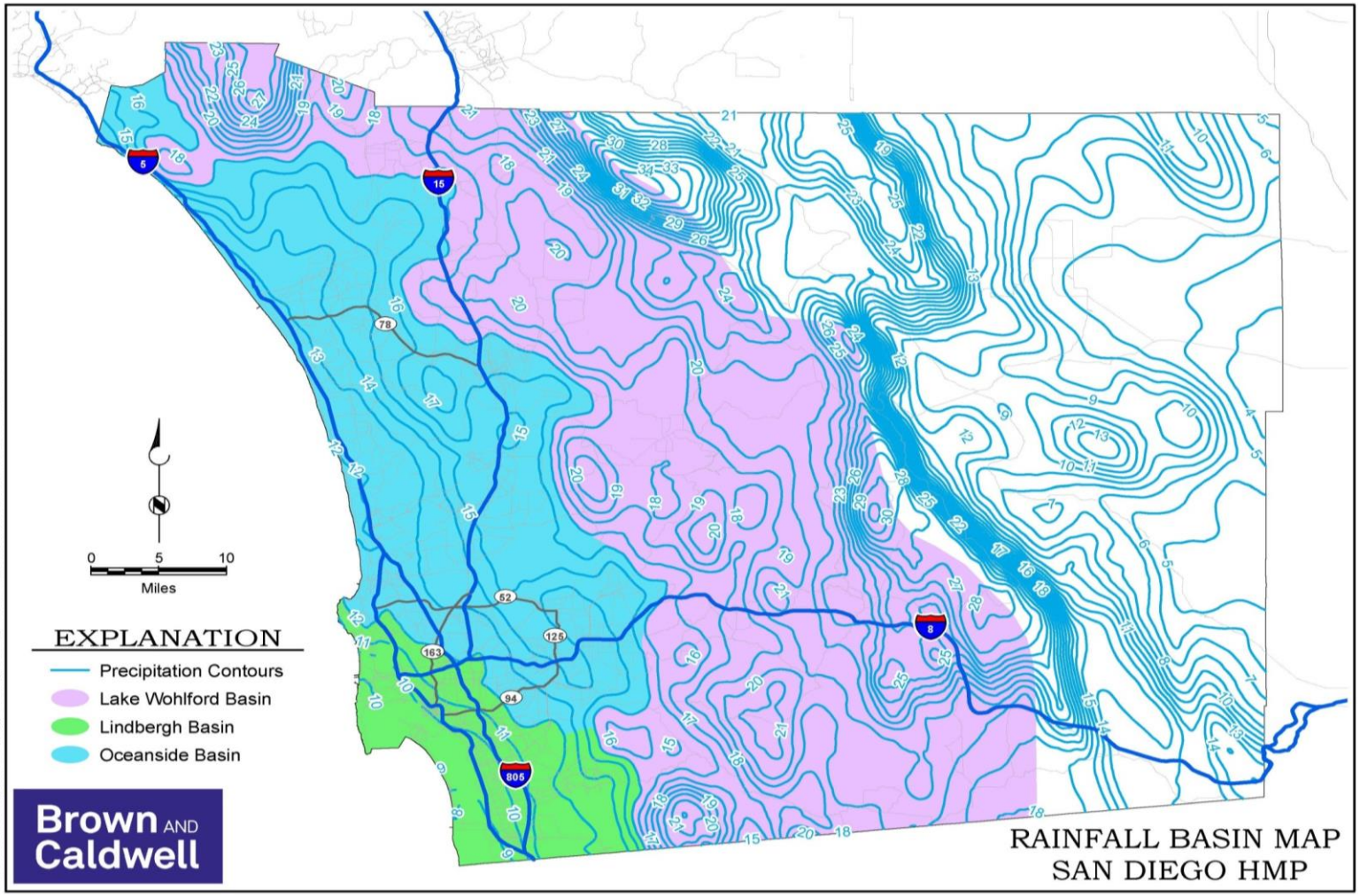

0 5 10
Miles
EXPLANATION
Precipitation Contours
Lake Wohlford Basin
Lindbergh Basin
Oceanside Basin
Brown AND Caldwell
RAINFALL BASIN MAP
SAN DIEGO HMP
File Name: P:\Projects\San Diego County\139942 - HMP Implementation Assistance\GIS\HMF GIS\Basins.mxd

Table G.2-3: Sizing Factors for Hydromodification Flow Control Infiltration BMPs Designed Using Sizing Factor Method				
Lower Flow Threshold	Soil Group	Slope	Rain Gauge	A
0.1Q2	A	Flat	Lindbergh	0.055
0.1Q2	A	Moderate	Lindbergh	0.055
0.1Q2	A	Steep	Lindbergh	0.055
0.1Q2	B	Flat	Lindbergh	0.045
0.1Q2	B	Moderate	Lindbergh	0.045
0.1Q2	B	Steep	Lindbergh	0.045
0.1Q2	C	Flat	Lindbergh	0.035
0.1Q2	C	Moderate	Lindbergh	0.035
0.1Q2	C	Steep	Lindbergh	0.035
0.1Q2	D	Flat	Lindbergh	0.03
0.1Q2	D	Moderate	Lindbergh	0.03
0.1Q2	D	Steep	Lindbergh	0.03
0.1Q2	A	Flat	Oceanside	0.06
0.1Q2	A	Moderate	Oceanside	0.06
0.1Q2	A	Steep	Oceanside	0.06
0.1Q2	B	Flat	Oceanside	0.05
0.1Q2	B	Moderate	Oceanside	0.05
0.1Q2	B	Steep	Oceanside	0.05
0.1Q2	C	Flat	Oceanside	0.05
0.1Q2	C	Moderate	Oceanside	0.05
0.1Q2	C	Steep	Oceanside	0.045
0.1Q2	D	Flat	Oceanside	0.035
0.1Q2	D	Moderate	Oceanside	0.035
0.1Q2	D	Steep	Oceanside	0.035
0.1Q2	A	Flat	Lake Wohlford	0.085
0.1Q2	A	Moderate	Lake Wohlford	0.085
0.1Q2	A	Steep	Lake Wohlford	0.085
0.1Q2	B	Flat	Lake Wohlford	0.07

0.1Q2	B	Moderate	Lake Wohlford	0.07
0.1Q2	B	Steep	Lake Wohlford	0.07
0.1Q2	C	Flat	Lake Wohlford	0.055
0.1Q2	C	Moderate	Lake Wohlford	0.055
0.1Q2	C	Steep	Lake Wohlford	0.055
0.1Q2	D	Flat	Lake Wohlford	0.04
0.1Q2	D	Moderate	Lake Wohlford	0.04
0.1Q2	D	Steep	Lake Wohlford	0.04

Table G.2-4: Sizing Factors for Hydromodification Flow Control Biofiltration with Partial Retention Designed Using Sizing Factor Method

Lower Flow Threshold	Soil Group	Slope	below low orifice inv	Rain Gauge	A
0.1Q_2	A	Flat	18	Lindbergh	0.08
0.1Q_2	A	Moderate	18	Lindbergh	0.08
0.1Q_2	A	Steep	18	Lindbergh	0.08
0.1Q_2	B	Flat	18	Lindbergh	0.065
0.1Q_2	B	Moderate	18	Lindbergh	0.065
0.1Q_2	B	Steep	18	Lindbergh	0.06
0.1Q_2	C	Flat	6	Lindbergh	0.05
0.1Q_2	C	Moderate	6	Lindbergh	0.05
0.1Q_2	C	Steep	6	Lindbergh	0.05
0.1Q_2	D	Flat	3	Lindbergh	0.05
0.1Q_2	D	Moderate	3	Lindbergh	0.05
0.1Q_2	D	Steep	3	Lindbergh	0.05
0.1Q_2	A	Flat	18	Oceanside	0.08
0.1Q_2	A	Moderate	18	Oceanside	0.075
0.1Q_2	A	Steep	18	Oceanside	0.075
0.1Q_2	B	Flat	18	Oceanside	0.07
0.1Q_2	B	Moderate	18	Oceanside	0.07
0.1Q_2	B	Steep	18	Oceanside	0.07
0.1Q_2	C	Flat	6	Oceanside	0.07
0.1Q_2	C	Moderate	6	Oceanside	0.07

0.1Q2	C	Steep	6	Oceanside	0.07
0.1Q2	D	Flat	3	Oceanside	0.07
0.1Q2	D	Moderate	3	Oceanside	0.07
0.1Q2	D	Steep	3	Oceanside	0.07
0.1Q2	A	Flat	18	Lake Wohlford	0.11
0.1Q2	A	Moderate	18	Lake Wohlford	0.11
0.1Q2	A	Steep	18	Lake Wohlford	0.105
0.1Q2	B	Flat	18	Lake Wohlford	0.09
0.1Q2	B	Moderate	18	Lake Wohlford	0.085
0.1Q2	B	Steep	18	Lake Wohlford	0.085
0.1Q2	C	Flat	6	Lake Wohlford	0.065
0.1Q2	C	Moderate	6	Lake Wohlford	0.065
0.1Q2	C	Steep	6	Lake Wohlford	0.065
0.1Q2	D	Flat	3	Lake Wohlford	0.06
0.1Q2	D	Moderate	3	Lake Wohlford	0.06
0.1Q2	D	Steep	3	Lake Wohlford	0.06

Table G.2-5: Sizing Factors for Hydromodification Flow Control Biofiltration BMPs Designed Using Sizing Factor Method

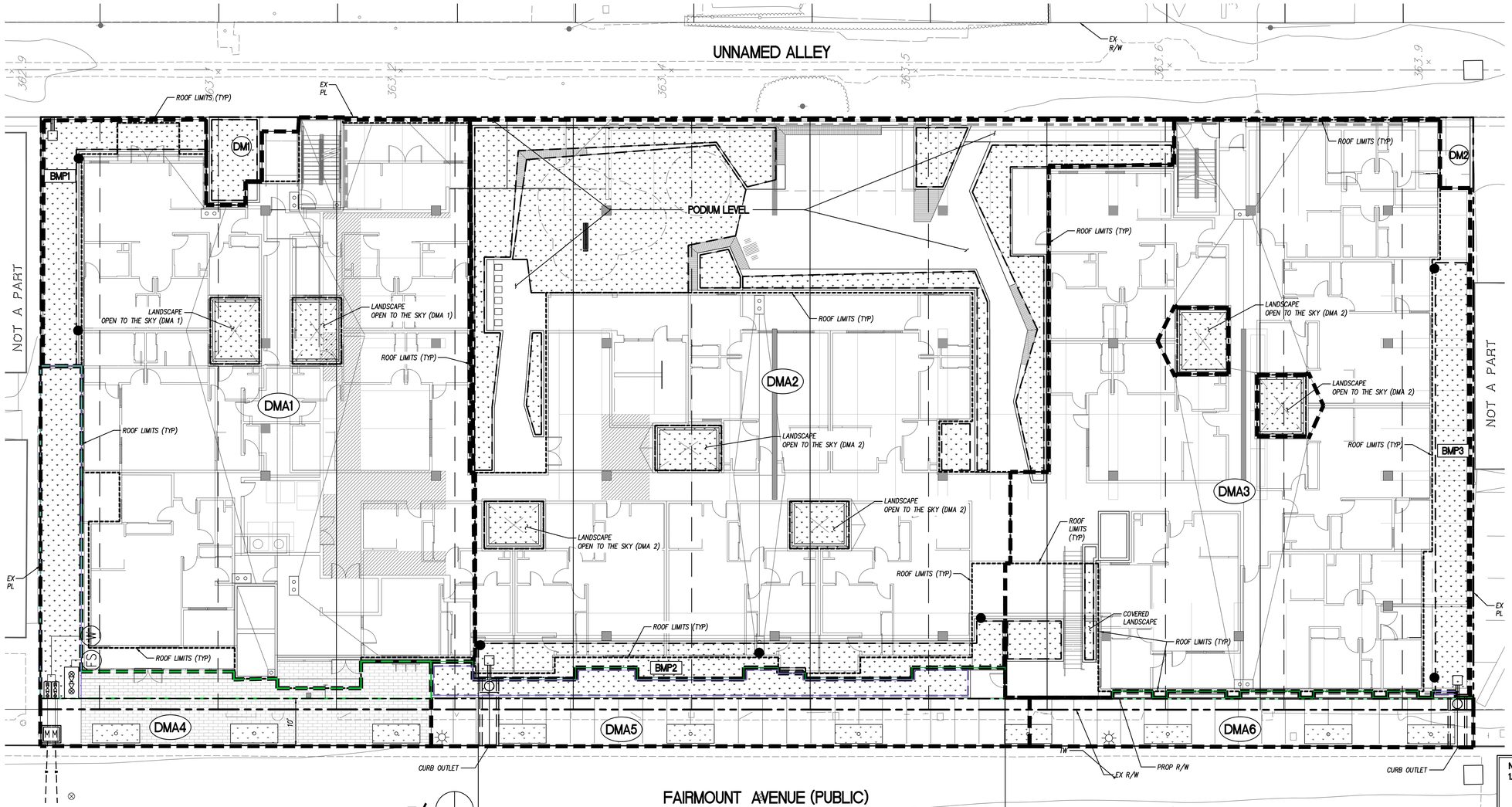
Lower Flow Threshold	Soil Group	Slope	Rain Gauge	A
0.1Q2	A	Flat	Lindbergh	0.32
0.1Q2	A	Moderate	Lindbergh	0.3
0.1Q2	A	Steep	Lindbergh	0.285
0.1Q2	B	Flat	Lindbergh	0.105
0.1Q2	B	Moderate	Lindbergh	0.1
0.1Q2	B	Steep	Lindbergh	0.095
0.1Q2	C	Flat	Lindbergh	0.055
0.1Q2	C	Moderate	Lindbergh	0.05
0.1Q2	C	Steep	Lindbergh	0.05
0.1Q2	D	Flat	Lindbergh	0.05
0.1Q2	D	Moderate	Lindbergh	0.05
0.1Q2	D	Steep	Lindbergh	0.05
0.1Q2	A	Flat	Oceanside	0.15
0.1Q2	A	Moderate	Oceanside	0.14
0.1Q2	A	Steep	Oceanside	0.135

0.1Q2	B	Flat	Oceanside	0.085
0.1Q2	B	Moderate	Oceanside	0.085
0.1Q2	B	Steep	Oceanside	0.085
0.1Q2	C	Flat	Oceanside	0.075
0.1Q2	C	Moderate	Oceanside	0.075
0.1Q2	C	Steep	Oceanside	0.075
0.1Q2	D	Flat	Oceanside	0.07
0.1Q2	D	Moderate	Oceanside	0.07
0.1Q2	D	Steep	Oceanside	0.07
0.1Q2	A	Flat	Lake Wohlford	0.285
0.1Q2	A	Moderate	Lake Wohlford	0.275
0.1Q2	A	Steep	Lake Wohlford	0.27
0.1Q2	B	Flat	Lake Wohlford	0.15
0.1Q2	B	Moderate	Lake Wohlford	0.145
0.1Q2	B	Steep	Lake Wohlford	0.145
0.1Q2	C	Flat	Lake Wohlford	0.07
0.1Q2	C	Moderate	Lake Wohlford	0.07
0.1Q2	C	Steep	Lake Wohlford	0.07
0.1Q2	D	Flat	Lake Wohlford	0.06
0.1Q2	D	Moderate	Lake Wohlford	0.06
0.1Q2	D	Steep	Lake Wohlford	0.06

Table G.2-6: Sizing Factors for Hydromodification Flow Control Cistern Facilities Designed Using Sizing Factor Method

Lower Flow Threshold	Soil Group	Slope	Rain Gauge	V
0.1Q2	A	Flat	Lindbergh	0.54
0.1Q2	A	Moderate	Lindbergh	0.51
0.1Q2	A	Steep	Lindbergh	0.49
0.1Q2	B	Flat	Lindbergh	0.19
0.1Q2	B	Moderate	Lindbergh	0.18
0.1Q2	B	Steep	Lindbergh	0.18
0.1Q2	C	Flat	Lindbergh	0.11
0.1Q2	C	Moderate	Lindbergh	0.11
0.1Q2	C	Steep	Lindbergh	0.11
0.1Q2	D	Flat	Lindbergh	0.09

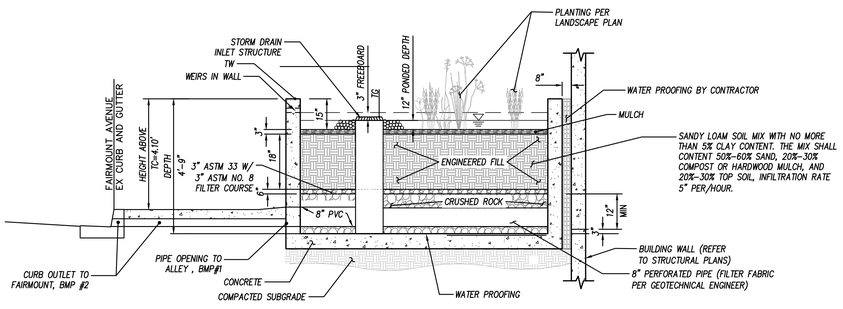
0.1Q2	D	Moderate	Lindbergh	0.09
0.1Q2	D	Steep	Lindbergh	0.09
0.1Q2	A	Flat	Oceanside	0.26
0.1Q2	A	Moderate	Oceanside	0.25
0.1Q2	A	Steep	Oceanside	0.25
0.1Q2	B	Flat	Oceanside	0.16
0.1Q2	B	Moderate	Oceanside	0.16
0.1Q2	B	Steep	Oceanside	0.16
0.1Q2	C	Flat	Oceanside	0.14
0.1Q2	C	Moderate	Oceanside	0.14
0.1Q2	C	Steep	Oceanside	0.14
0.1Q2	D	Flat	Oceanside	0.12
0.1Q2	D	Moderate	Oceanside	0.12
0.1Q2	D	Steep	Oceanside	0.12
0.1Q2	A	Flat	Lake Wohlford	0.53
0.1Q2	A	Moderate	Lake Wohlford	0.49
0.1Q2	A	Steep	Lake Wohlford	0.49
0.1Q2	B	Flat	Lake Wohlford	0.28
0.1Q2	B	Moderate	Lake Wohlford	0.28
0.1Q2	B	Steep	Lake Wohlford	0.28
0.1Q2	C	Flat	Lake Wohlford	0.14
0.1Q2	C	Moderate	Lake Wohlford	0.14
0.1Q2	C	Steep	Lake Wohlford	0.14
0.1Q2	D	Flat	Lake Wohlford	0.12
0.1Q2	D	Moderate	Lake Wohlford	0.12
0.1Q2	D	Steep	Lake Wohlford	0.12



DRAINAGE MANAGEMENT AREA PLAN

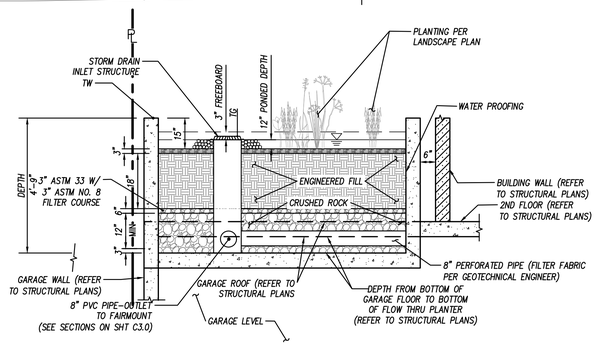
SCALE: 1" = 10'

0' 5' 10' 20'



FLOW THRU PLANTER BOX DETAIL (BIO FILTRATION) - BMP #1 AND BMP #2

NOT TO SCALE



FLOW THRU PLANTER BOX DETAIL (BIO FILTRATION) - BMP #3

NOT TO SCALE

NOTE:

BMP #3 IS A FLOW-THRU PLANTER BOX ELEVATED ABOVE GRADE AS PART OF THE BUILDING/STRUCTURE (I.E. LOCATED ON THE PODIUM LEVEL) REFER TO ARCHITECTURAL/STRUCTURAL PLANS. THE GEOMETRY (CROSS SECTION) WILL BE CONSISTENT WITH THE DIMENSIONS ABOVE TO COMPLY WITH THE STORMWATER PERMIT REQUIREMENTS.

FLOW THROUGH PLANTER NOTES

PLANTER DETAIL SHOWN HEREON FOR INFORMATIONAL PURPOSES ONLY. DETAILED DESIGN/DIMENSIONS TO BE INCLUDED IN THE FINAL STORM WATER QUALITY MANAGEMENT PLAN AND SHOWN ON THE FINAL BUILDING PERMIT PLANS AND STORM WATER MAINTENANCE DISCHARGE CONTROL AGREEMENT.

LEGEND

- PROPERTY LINE
- DRAINAGE PATTERN/FLOW DIRECTION
- DRAINAGE MANAGEMENT AREA (DMA)
- LIMITS OF ROOF
- BMP1 — BEST MANAGEMENT PRACTICE
- DMA1 — DRAINAGE MANAGEMENT AREA
- DM1 — DE MINIMUS AREA
- PERVIOUS AREA
- FLOW THROUGH PLANTER (SEE DETAIL SHEET C3.0)
- SELF MITIGATING AREA (DMA'S 4-6) (NON-CONTIGUOUS SIDEWALK)
- ROOF DRAIN POC AT BMP

WATER QUALITY AND HYDROMODIFICATION NOTES:

1. *THE PROPOSED PROJECT SHALL RESULT IN NO INCREASE IN PEAK STORM RUNOFF. REFER TO THE PROJECT'S PRELIMINARY DRAINAGE STUDY.*
2. *THE PROJECT IS NOT EXEMPT FROM THE STATE'S HYDROMODIFICATION REQUIREMENTS AS THE SITE IS NOT HARD-LINED DIRECTLY TO SAN DIEGO BAY.*
3. *THE PROPOSED FINISH GRADING AND DRAINAGE DESIGN INCLUDES DIRECTING RUNOFF ON TO FLOW THRU PLANTERS WHERE IT WILL BE TREATED BEFORE DISCHARGING OFFSITE IN TO THE ADJACENT ALLEY OR GUTTER IN FAIRMOUNT AVENUE.*
4. *THE FINAL DESIGN OF THE BMPS WILL OCCUR DURING THE FORMAL BUILDING PERMIT PHASE.*
5. *PRIOR TO THE ISSUANCE OF ANY CONSTRUCTION PERMIT, THE OWNER SHALL ENTER INTO A MAINTENANCE AGREEMENT FOR THE ONGOING PERMANENT BMP MAINTENANCE.*
6. *PRIOR TO THE ISSUANCE OF ANY CONSTRUCTION PERMIT, THE OWNER SHALL INCORPORATE ANY CONSTRUCTION BEST MANAGEMENT PRACTICE NECESSARY TO COMPLY WITH CHAPTER 14, ARTICLE 2, DIVISION 1 (GRADING REGULATIONS) OF THE SAN DIEGO MUNICIPAL CODE, INTO THE CONSTRUCTION PLANS AND/OR SPECIFICATIONS.*

STORM WATER PROTECTION NOTES

1. THIS PROJECT IS SUBJECT TO MUNICIPAL STORM WATER PERMIT ORDER NO. R9-2013-0001 & RISK LEVEL/TYPE;

- ☐ SWPPP
- ☐ CGP RISK LEVEL 1 ☐ CGP LUP TYPE 1
- ☐ CGP RISK LEVEL 2 ☐ CGP LUP TYPE 2
- ☐ CGP RISK LEVEL 3 ☐ CGP LUP TYPE 3

2. WDID NO.: N/A

3. CHECK ONE

- ☐ *THIS PROJECT WILL EXCEED THE MAXIMUM DISTURBED AREA LIMIT, THEREFORE A WEATHER TRIGGERED ACTION PLAN (WTAP) IS REQUIRED.*
- ☐ *THIS PROJECT WILL FOLLOW PHASED GRADING NOT TO EXCEED FIVE (5) ACRES PER PHASE.*
- ■ *NOT APPLICABLE*

4. THE CONTRACTOR SHALL COMPLY WITH THE REQUIREMENTS OF THE WPCP AS APPLICABLE.

5. WATERSHED: SAN DIEGO BAY

6. HYDRAULIC SUB AREA NAME: CHOLLAS

7. HYDRAULIC SUB AREA NUMBER: 908.22

NOTES:

1. **GROUND FLOOR SHOWN HEREON TO DEPICT LIMITS OF BUILDING AND SITE IMPROVEMENTS. HOWEVER, THIS WILL BE COVERED PARKING AND LIMITS OF DMA'S SHOWN/DEFINED HEREON ARE BASED ON THE PROJECTED BUILDING ROOF PLAN.**
2. **ALL FLOW THRU PLANTERS SHOWN HEREON WILL OUTLET/DISCHARGE TO EITHER THE ALLEY OR THE CURB-FACE ON FAIRMOUNT AVENUE.**

SUMMARY OF WATER QUALITY AND HYDROMODIFICATION PRELIMINARY DESIGN CRITERIA:

1. *HARVEST AND REUSE NOT APPLICABLE TO THIS PROJECT.*
2. *FULL AND PARTIAL INFILTRATION NOT FEASIBLE PROVIDED BY THE GEOTECHNICAL ENGINEER (LEIGHTON AND ASSOCIATES)).*
3. *BIO-FILTRATION SELECTED (I.E. FLOW-THRU PLANTERS - SEE DETAIL HEREON)*
4. *PROJECT IS NOT HYDROMODIFICATION EXEMPT (I.E. IS NOT HARD-LINED DIRECTLY TO THE SAN DIEGO BAY).*
5. *WATER QUALITY AND HYDROMODIFICATION CALCULATIONS SHOWN HEREON INCLUDE:*
   - *BMP NATIVE SOIL TYPE: D*
   - *RAIN GAUGE: LINDBERGH*
   - *BMP TYPE: FLOW-THROUGH PLANTER*
   - *PROJECT SLOPE: FLAT*
   - *LOW FLOW THRESHOLD 0.102*
6. *BMP 1, 2 AND 3 SIZED TO TREAT AND MITIGATE THE HYDRO-MOD VOLUMES FOR DMA'S 4-6 AS FOLLOWS:*
   - *BMP 1 DMA'S 1 AND 4 AND DM 1*
   - *BMP 2 DMA'S 2 AND 5*
   - *BMP 3 DMA'S 3 AND 6 AND DM 2*
7. *BMP SIZING:*
   BMP #1 - 518 SF REQUIRED, 533 SF PROVIDED
   BMP #2 - 619 SF REQUIRED, 729 SF PROVIDED
   BMP #3 - 541 SF REQUIRED, 624 SF PROVIDED
8. *DEMINIMUS AREAS:*
   DM1 - LANDSCAPE AND HARDSCAPE (224 SF)
   DM2 - HARDSCAPE (104 SF)
9. *THE PROPOSED PROJECT WILL COMPLY WITH ALL THE REQUIREMENTS OF THE CURRENT CITY OF SAN DIEGO STORM WATER STANDARDS MANUAL BEFORE GRADING OR BUILDING PERMIT IS ISSUED. IT IS THE RESPONSIBILITY OF THE OWNER/DESIGNER/APPLICANT TO ENSURE THAT THE CURRENT STORM WATER PERMANENT BMP DESIGN STANDARDS ARE INCORPORATED INTO THE PROJECT.*

******OUTLET NOTE******

ALL FLOW THRU PLANTERS SHOWN HEREON SHALL GRAVITY OUTLET VIA A CURB OUTLET(S) OR SIDEWALK UNDERDRAIN(S) ALONG FAIRMOUNT OR DIRECTLY ONTO THE SURFACE ALONG THE ALLEY. SIZE AND LOCATION OF OUTLET AND OVERFLOW WEIR NOTCH TO BE DETERMINED DURING FINAL ENGINEERING AND SUBJECT TO FINAL CITY ENGINEER APPROVAL. (SEE FLOW THRU PLANTER DETAIL THIS SHEET).

4TH CORNER DMA SUMMARY TABLE

DMA NO.	PERVIOUS AREA (SF)	IMPERVIUS AREA (SF)	TOTAL AREA (SF)	BMP No.
1	823	9,029	9,852	1
2	3,893	10,614	14,507	2
3	778	9,722	10,500	3
4	726	1,087	1,813	1
5	582	1,323	1,905	2
6	139	911	1,050	3

DESS ARCHITECTURE
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REGISTERED PROFESSIONAL ENGINEER
STEVEN C. KETTLER
No. C48358
Exp. 6-30-2022
CIVIL
STATE OF CALIFORNIA

4th Corner Apartmetns
4021, 4035, 4037, and 4061 Fairmount Ave
San Diego, CA 92105

DEVELOPER:
Wakeland Housing & Development
1230 Columbia Street
San Diego CA 92101
phone: (619) 677-3200
contact: Peter Armstrong

Completeness check	3.17.20
First City Submittal	4.16.20
Second City Submittal	6.22.20
Third City Submittal	7.23.20

SHEET SIZE: 24" x 36"
DO NOT SCALE DRAWINGS

SHEET TITLE:
DRAINAGE MANAGEMENT AREA PLAN

DATE: 06-15-2020
SCALE: AS NOTED
SHEET: C4.0