

Appendix E

Stormwater Compliance Study (MS4)

STORMWATER COMPLIANCE STUDY (MS4)

for

**Arrive Ventura
Olivas Park Dr & Victoria Ave
Ventura, CA 93003**

Prepared For:

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STORMWATER COMPLIANCE STUDY (MS4)

for

**Arrive Ventura
Olivas Park Dr & Victoria Ave
Ventura, CA 93003**

Date: September 26, 2024
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RCE No. 69614
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CCE Job Number: C21.0522

Prepared By:

Randy Chapman, P.E.
CCE Design Associates, Inc

Date

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2. Introduction

PURPOSE

The purpose of this report is to provide entitlement level analysis to determine compliance with the County of Ventura MS4 Permit as outlined in the most recent Technical Guidance Manual (TGM). The project will involve the construction of a 285-unit residential apartment complex and 12 live work units, with associated parking lots, hardscape, and recreational areas. There is a special agreement in place with Southern California Electric (SCE) to allow for the construction of a parking lot in the adjacent parcel. The main development (consisting of the site being developed with residential units) and the SCE site (parking lot only) will be analyzed separately to determine the required stormwater requirements for each site, and properly size an acceptable mitigation system.

SITE LOCATION & DESCRIPTION

The project is located at the intersection of Olivas Park Dr and Victoria Ave in the city of Ventura, California. The project is bounded to the west by Victoria Ave, to the east by Seaborg Ave, to the north by a commercial development (Phase I), and to the south by the Olivas Park Dr. The project contains the following addresses and APNs:

| Address | APNs |
|-------------------------------------|---|
| Olivas Park Drive & Victoria Avenue | 138-0-280-195 / 138-0-280-075 / 138-0-280-055 / |
| | 138-0-280-085 / 138-0-280-095 / 138-0-280-165 / |
| | 138-0-280-155 / 138-0-280-145 / 138-0-280-135 / |
| | 138-0-280-125 / 138-0-280-015 / 138-0-280-105 |

The site is currently undeveloped and occupied by barren land with minimal vegetation. The existing site largely drains from north to south.

As previously mentioned, the improvements consist of the construction of multi-family units (main site) and construction of a parking lot within the SCE site.

3. References

- “Technical Guidance Manual,” County of Ventura, July 13, 2011, rev 2018
- “Infiltration Test,” Leighton Group, August 2022.

4. Methodology

In accordance with the TGM, as the project proposes to add more than 10,000 square feet of impervious surface area and disturb 1 acre or more, it is required to implement post-construction stormwater management control measures.

5. Stormwater Treatment

PROJECT BACKGROUND

This project proposes the construction of multi-family and commercial units, with associated parking lots, hardscape, and recreational areas.

PROJECT DESIGNATION

As the project consists of the addition of more than 10,000 square feet of impervious area and disturbs at least 1 acre, the project is designated to be a ‘new development project’ per the TGM.

SITE ASSESSMENT

The table below summarizes the site assessment for each parce

| | Main Site (multi-family & commercial development) | SCE Site (Parking Lot) |
|----------------------------|---|--------------------------------|
| Total Project Area = | 8.67-ac | 5.08-ac |
| Existing Impervious Area = | 0.1-ac | 0.05-ac |
| Existing %Impervious= | 1.1% | 1% |
| | | |
| Proposed Impervious Area= | 7.8-ac | 2.95-ac |
| Proposed %Impervious= | 90% | 58% |
| 5%EIA= | 0.43-ac | 0.25-ac |
| SQDV= | 19,053-cf | 6,973-cf |
| Treatment Device= | Underground detention/infiltration system (INF-3) | Bio-filtration Systems (INF-6) |
| Pre-treatment Devices= | Hydrodynamic Separator | Catch basin filter inserts |

The following are site assessment conditions that are common for both developments:

- Activities expected onsite: Residential and Commercial
- Topography: Minimally slopes toward Olivas Park Drive. The lot is a vacant land with minimal vegetation.
- Soil Type: Soil type 5 per Ventura County maps.

SITE DESIGN PRINCIPLES AND TECHNIQUES

Site design principles and techniques have been applied to this project to reduce the hydrologic and water quality impacts typically associated with new development. The following is a list of site design features incorporated into this project and a brief explanation of how they are implemented:

- Site planning - The site has been laid out in a manner to minimize disturbing natural areas on-site.
- Minimize land disturbance - To be implemented during construction activities.
- Apply Low Impact Development best management practices (LID BMPs).

SOURCE CONTROL MEASURES

The following source control measures have been applied to this project to prevent pollutants from contacting stormwater runoff:

- (INF-3) Bioretention - Sized to treat SQDV.
- (INF-6) Proprietary Infiltration - Sized to treat SQDV

CALCULATE STORMWATER QUALITY DESIGN VOLUME (SQDV)

Post Construction Management Plans (PCSMP) were developed for each site to determine the minimum required Stormwater Quality Design Volume (SQDV) for each site. This analysis is included in Attachment A of this report. Table 1 in the previous page summarizes the results of these PCSMPs.

6. Summary and Conclusions

The proposed project located at the intersection of Olivas Park Dr and Victoria Ave in Ventura intends to construct multifamily and commercial units, with associated parking lots, hardscape, and recreational areas. Proposed drainage improvements for the main site will include new catch basin inlets, a new underground storm drain system designed to collect onsite runoff and direct it to an underground detention and infiltration basin. Overflow from the proposed underground infiltration/detention system will connect to an existing 30" storm drain line located within Olivas Park Drive.

Improvements within the SCE site consist of construction of a parking lot directing runoff to a series of bio-filtration basins. Overflow from these basins will connect to an existing 24" storm drain line located within Olivas Park Drive.

Both systems will be designed to accommodate the SQDV for each site complying with the County of Ventura stormwater treatment and mitigation requirements as outlined in the latest TGM.

7. Attachments

| | |
|--------------|----------------|
| Attachment A | PCSMP |
| Attachment B | TGM Worksheets |



Attachment A
PCSMP

**VENTURA COUNTYWIDE STORMWATER QUALITY PROGRAM
POST-CONSTRUCTION STORMWATER MANAGEMENT PLAN (PCSMP)
FOR
Arrive Ventura (Area A1 - Main Site)
PARCEL #: [REDACTED]**

Project Name: Arrive Ventura (Area A1 - Main Site)

Preparation/Revision Date: 9/26/2024

Prepared for:

Name of Owner/Developer: Arrive Ventura

Stress Address: 2082 Michelson Dr, 4th Floor

City, State, Zip Code: Irvine, CA 92612

Telephone: 415-149-6194

Prepared by:

Name and Title of Preparer: Randy Chapman, P.E.

Company Name: CCE Design Associates

Stress Address: 711 E Daily Dr, Suite 120

City, State, Zip Code: Camarillo, CA 93010

Telephone: 805-738-5434

I hereby certify that the information provided in this Application is correct.

Application Prepared by: _____
Print Name and Firm

Signed _____
Signature of Project Engineer in the Firm Named Above

Title _____
Affix Professional registration stamp of the person named above with signature and expiration date

Project Name: Arrive Ventura (Area A1 - Main Site)

STEP 1: DETERMINE PROJECT APPLICABILITY

Instructions:

For new development projects, answer yes, no, or NA to questions (1) - (10) below.

For redevelopment projects, answer yes, no, or NA to questions (11) - (13) below.

| NEW DEVELOPMENT PROJECTS | |
|--|---------------|
| <i>Does the new development project fall within categories (1) - (10) below?</i> | |
| Project Type and/or Characteristics | Y/N/NA |
| 1) Development projects equal to 1 acre or greater of disturbed area that adds more than 10,000 square feet of impervious surface area → go to Step 2 | Y |
| 2) Industrial parks with 10,000 square feet or more of total altered surface area → go to Step 2 | N/A |
| 3) Commercial strip malls with 10,000 square feet or more of impervious surface area → go to Step 2 | N/A |
| 4) Retail gasoline outlets with 5,000 square feet or more of total altered surface area → go to Step 2 | N/A |
| 5) Restaurants (Standard Industrial Classification (SIC) of 5812) with 5,000 square feet or more of total altered surface area → go to Step 2 | N/A |
| 6) Parking lots with 5,000 square feet or more of impervious surface area, or with 25 or more parking spaces → go to Step 2 | Y |
| 7) Streets, roads, highways, and freeway construction of 10,000 square feet or more of impervious surface area → go to Roadway Projects | N/A |
| 8) Automotive service facilities (Standard Industrial Classification (SIC) of 5013, 5014, 5511, 5541, 7532-7534 and 7536-7539) of 5,000 square feet or more of total altered surface area → go to Step 2 | N/A |
| 9) Projects located in or directly adjacent to, or discharging directly to an Environmentally Sensitive Area (ESA), where the development will: a. Discharge stormwater runoff that is likely to impact a sensitive biological species or habitat; and b. Create 2,500 square feet or more of impervious surface area → go to Step 2 | N/A |
| 10) Single-family hillside homes (see Section 2 of the TGM for specific requirements) → go to SF Hillside | N/A |

Project Name: Arrive Ventura (Area A1 - Main Site)

PROJECT APPLICABILITY, CONT.

| REDEVELOPMENT PROJECTS | |
|---|---------------|
| <i>For redevelopment projects that fall within categories (1) through (9) above, and that conduct land-disturbing activities that result in the creation, or addition, or replacement of 5,000 square feet or more of impervious surface area on an already developed site, answer questions 11-13 below. Existing single-family dwelling and accessory structures are exempt from redevelopment projects unless such projects create, add, or replace 10,000 square feet of impervious surface area.</i> | |
| Project Type and/or Characteristics | Y/N/NA |
| 11) Projects where redevelopment results in an alteration to more than fifty percent of impervious surfaces of a previously existing development, and the existing development <u>was not</u> subject to the post development stormwater quality control requirements of Board Order 00-108, these projects must mitigate the entire redevelopment project area → go to Step 2 | N/A |
| 12) Projects where redevelopment results in an alteration to more than fifty percent of impervious surfaces of a previously existing development, and the existing development <u>was</u> subject to the post development stormwater quality control requirements of Board Order 00-108, the project must mitigate only the altered portion of the redevelopment project area and not the entire project area → go to Step 2 | N/A |
| 13) Projects where redevelopment results in an alteration of less than fifty percent of impervious surfaces of a previously existing development these projects must mitigate only the altered portion of the redevelopment project area and not the entire project area → go to Step 2 | N/A |

Project Name:Arrive Ventura (Area A1 - Main Site)**STEP 2: ASSESS SITE CONDITIONS***Provide an assessment of the project site using the following tables***New Development Project General Characteristics**

| General Project Characteristics | Area (acres) |
|--|--------------|
| Total Project Site Area | 8.67 |
| Total Disturbed Area | 8.67 |
| Total Existing (Pre-Project) Impervious Area | 0.10 |
| Post-Project Impervious Area [1] | 7.80 |
| Area of Green Roof (ET-1) [1] | 0.00 |
| Area Draining to Hydrologic Source Controls (ET-2) [1] | |
| Revised Post-Project Impervious Area | 7.80 |
| Project Imperviousness (%) | 89.97% |

Redevelopment Project General Characteristics

| General Project Characteristics | Area (acres) |
|---|--------------|
| Total Project Site Area | |
| Total Altered Area [6] | |
| Total Existing (Pre-Project) Impervious Area | |
| Was existing (pre-project) impervious area subject to post-development stormwater quality control requirements? [2] | |
| Amount of Existing Impervious Area Altered [3] | |
| Amount of Impervious Area Added | |
| % Alteration of Existing Impervious Area [4] | N/A |
| Post-Project Impervious Area (Impervious Area to be Mitigated) [1], [4] | 0.00 |
| Area of Green Roof (ET-1) [1] | |
| Area Draining to Hydrologic Source Controls (ET-2) [1] | |
| Revised Post-Project Impervious Area | 0.00 |
| Project Imperviousness (%) [5] | |

Project Name:

Arrive Ventura (Area A1 - Main Site)

Project Description

Briefly describe project:

The project will involve the construction of a 285-unit residential apartment complex and 12 live work units, with associated parking lots, hardscape, and recreational areas.

Describe current and proposed zoning and land use designation:

The project site is zoned MXD - Mixed-Use Development Zone. The land use is GP Industrial.

Describe topography of project area. Identify low and high points and the location of steep slopes (provide a range of grades):

The site currently consists of an open vacant lot. The site currently drains from north to south.

Describe the site's soil types (A, B, C, D) and geological conditions

The site is currently composed of soil type D. The site is underlain by alluvial fan deposits of the latest Hocene age. Undocumented fill was previously mapped and is associated with past agricultural buildings/structures. Following the undocumented fill, compacted artificial fill was located. The Alluvial fan deposits are interbedded very loose to medium dense silty sands and soft to stiff clay and sandy clay to a maximum depth of 51.5 feet.

Attach soil type information

Project Name:

Arrive Ventura (Area A1 - Main Site)

Project Description, cont'd

Describe the site's groundwater conditions (e.g. depth to seasonal high groundwater):

Groundwater was not encountered at the maximum depth 51.5 feet. However, perched groundwater was observed at 15 feet below ground surface. A seismic hazard report indicates that historic groundwater beneath the site has been about 15 feet in depth.

Is there offsite drainage on the site? If so, identify the location(s) and source(s) of offsite drainage and the volume of water running onto the site:

N/A

Describe any existing utilities within the project area that would limit the possible locations of certain BMPs:

Due to Phase I of the project, there are wet and dry utilities on site.

Describe any environmentally sensitive areas (e.g. riparian areas, wetlands) within the project area:

The subject site does not have any environmentally sensitive areas.

Geotechnical considerations:

Does the site contain any of the following characteristics:

Y/N/NA

Collapsible Soil

N

Expansion Soil

Y

Potential for seismically-induced soil liquefaction

Y

Additional considerations:

N/A

Attach relevant geotechnical information

Project Name:

Arrive Ventura (Area A1 - Main Site)

STEP 2: POLLUTANTS OF CONCERN

Pollutants of Concern (See Section 3.3 of TGM)

| Activity / Potential Land Uses | Potential Pollutant* | | | | | | | | |
|--------------------------------|----------------------|-----------|--------|------------|-----------------------------|----------------|--------------|----------|------------------|
| | Sediment | Nutrients | Metals | Pesticides | Oxygen Demanding Substances | Toxic Organics | Oil & Grease | Bacteria | Trash and Debris |
| Parking Lots | X | | X | | X | X | | | X |
| Street, road, or highway | X | | X | | X | X | | | X |
| Parking Lots | X | | X | | X | X | | | X |
| Other [fill in if necessary] | | | | | | | | | |
| Other [fill in if necessary] | | | | | | | | | |

*Denote potential pollutant with "x"

Receiving Waterbody Listings (see Section 3.3. of TGM)

| Receiving Waterbody (watershed indicated in parentheses) | Constituent Group [7] | Distance to Project (ft) |
|---|--------------------------------------|--------------------------|
| Santa Clara River (Santa Clara) | Salts, Bacteria, Nutrients, Toxicity | 5000.00 |
| | | |
| Other [fill in if necessary] | | |

[1] Applicant should enter post-project impervious cover prior to accounting for green roof and hydrologic source control (HSC) credits. Volume reduction provided by green roofs and HSCs are accounted for implicitly in the sizing calculations for BMPs by assuming the roof area covered by a green roof or the area draining to a HSC is pervious rather than impervious when calculating the runoff coefficient for the site. Green roofs and HSCs are not required to be considered for all project locations and types. In order to obtain credit, Green Roofs and HSCs must be designed as specified in the TGM. Additional detail on Green Roofs (ET-1) and HSCs (ET-2) can be found in Section 6 of the TGM.

[2] Land-disturbing activity that results in the creation or addition or replacement of less than 5,000 square feet of impervious surface area on an already developed site, or that results in a decrease in impervious area which was subject to the post development stormwater quality control requirements of Board Order 00-108, is not subject to mitigation unless so directed by the local permitting agency

[3] Redevelopment does not include routine maintenance activities that are conducted to maintain the original line and grade, hydraulic capacity, or original purpose of the facility or emergency redevelopment activity required to protect public health and safety. Impervious surface replacement, such as the reconstruction of parking lots and roadways, that does not disturb additional area and maintains the original grade and alignment, is considered a routine maintenance activity. Agencies' flood control, drainage, and wet utilities projects that maintain original line and grade or hydraulic capacity are considered routine maintenance. Redevelopment also does not include the repaving of existing roads to maintain original line and grade.

[4] "% Alteration of Existing Impervious Area" determines the 50% threshold which is key in determining portion of site that must comply with post-construction requirements - see Step 1 redevelopment categories for more detail. The amount of "Post Project Impervious Area" that must adhere to post-construction requirements is dependant on 50% threshold

[5] "Project Imperviousness" is calculated using the "Total Project Area" except when redevelopment projects that must mitigate only the altered portion of the redevelopment project area. In this case, the "Total Disturbed Area" is used to calculate "Project Imperviousness"

[6] For the purposes of this calculation, Total Altered Area shall mean any area that is altered as a result of land disturbance, such as clearing, grading, grubbing, and excavation. This excludes areas used exclusively for temporary stockpiling.

[7] If a waterbody is listed for "toxicity" and the cause and/or contribution to toxicity is known, then the constituent group known to contribute to toxicity are listed here (in lieu of listing "toxicity")

Project Name: Arrive Ventura (Area A1 - Main Site)

STEP 3: APPLY SITE DESIGN PRINCIPLES AND TECHNIQUES

Provide a brief description of site design principles and techniques included within the proposed project site.

| Site Design Measures [1] | Included? Y/N/NA | Brief Description of the Site Design Measure |
|--|-----------------------------|--|
| Site Planning | Y | The site design has been laid out in a manner to disconnect impervious surface and proposed underground treatment (through infiltration with pre-treatment) will be used to treat per 5% EIA |
| Protect and Restore Natural Areas | N/A | N/A |
| Minimize Land Disturbance | Y | Minimizing land disturbance to occur during construction phase. |
| Minimize Impervious Cover | Y | Landscape areas were included through the site where practical. |
| Apply LID at Various Scales | Y | Implemented throughout the site at varying degrees. |
| Implement Integrated Water Resource Management Practices | Y | Installation Contech CMP Infiltration System on site to augment the recharge of groundwater. |

[1] Refer to Section 4.2 - 4.7 of the TGM for applicable Design Criteria.

Project Name: Arrive Ventura (Area A1 - Main Site)

STEP 4: APPLY SOURCE CONTROL MEASURES

Provide a brief description of the source control measures included in the proposed project site.

| Site-Specific Source Control Measures[1] | Included? Y/N/NA | Brief Description of the Source Control Measure |
|--|-----------------------------|--|
| S-1: Storm Drain Message and Signage | Y | Signage will be included on each catch basin inlet. |
| S-2: Outdoor Material Storage Area Design | N | No outdoor material storage areas anticipated onsite. |
| S-3: Outdoor Trash Storage and Waste Handling Area Design | Y | Trash areas will be constructed with impervious surface. Screen wall will be provided and no storm drain located within immediate vicinity. Signs will be provided on all dumpsters. |
| S-4: Outdoor Loading/Unloading Dock Area Design | N | No loading/unloading dock anticipated onsite. |
| S-5: Outdoor Repair/Maintenance Bay Design | N | No outdoor repair/maintenance bays anticipated onsite. |
| S-6: Outdoor Vehicle /Equipment/ Accessory Washing Area Design | N | No outdoor vehicle/equipment wash areas anticipated onsite. |
| S-7: Fueling Area Design | N | No fueling areas onsite. |
| S-8: Proof of Control Measure Maintenance | Y | Accomplished through Approved Maintenance Agreement an Maintenance Plan. |

[1] Refer to Fact Sheets in Section 5 of the TGM for detailed information and design criteria

Project Name: Arrive Ventura (Area A1 - Main Site)

STEP 5: APPLY BMPS TO REDUCE EIA TO <=5%

New development and redevelopment projects (Categories 1-6, 8, and 9) must reduce EIA to <=5%

Step 5a: Calculate Allowable EIA

EIA is defined as impervious area that is hydrologically connected via sheet flow over a hardened conveyance or impervious surface without any intervening medium to mitigate flow volume.

The allowable "EIA" for a project is calculated as:

$$EIA_{\text{allowable}} = (A_{\text{project}}) * (\%_{\text{allowable}}) \quad \text{Equation 2-1}$$

Where:

$EIA_{\text{allowable}}$ = The maximum impervious area from which runoff can be treated and discharged offsite (and not retained onsite) [acres]

A_{project} = The total project area [acres] [1]

$\%_{\text{allowable}}$ = 5 percent

| Input: | | Units |
|--------------------------|-------------|---------|
| A_{project} [1] | 8.67 | Acres |
| $\%_{\text{allowable}}$ | 5.00% | Percent |
| $EIA_{\text{allowable}}$ | 0.43 | Acres |

Step 5b: Calculate Impervious Area to be Retained

The impervious area from which runoff must be retained onsite is the total impervious area minus the EIA allowable, which should be calculated as follows:

$$A_{\text{retain}} = TIA - EIA_{\text{allowable}} = (IMP * A_{\text{project}}) - EIA_{\text{allowable}} \quad \text{Equation 2-2}$$

Where:

A_{retain} = the drainage area from which runoff must be retained [acres]

TIA = total impervious area [acres]

IMP = imperviousness of project area (%)

| Input: | | Units |
|--------------------------|-------------|-------|
| Imperviousness | 89.97% | |
| A_{project} [1] | 8.67 | Acres |
| $EIA_{\text{allowable}}$ | 0.43 | Acres |
| A_{retain} | 7.37 | Acres |

Project Name: Arrive Ventura (Area A1 - Main Site)

BMPS TO REDUCE EIA TO <=5%, CONT.

Step 5c: Calculate the Volume to be Retained (SQDV)

The runoff volume that is to be retained onsite should be calculated using Equation 2-3 below:

$$V_{\text{retain}} = C * (0.75/12) * A_{\text{retain}} \quad \text{Equation 2-3}$$

Where:

V_{retain} = The stormwater quality design volume (SQDV) that must be retained onsite [ac-ft]

C = runoff coefficient (equals 0.95 for impervious surfaces)

| Input: | | Units |
|---------------------|-----------|--------------|
| C | 0.95 | |
| A_{retain} | 7.37 | Acres |
| V_{retain} | 0.437 | ac-ft |
| | 142,523.7 | gallons |
| | 19,052.5 | cu.ft. |

Continue to Step 5d

Project Name: Arrive Ventura (Area A1 - Main Site)

STEP 5d: SELECT RETENTION BMPs

Select and size Retention BMPs to meet the 5% EIA Requirement. Retention BMPs include INF1-6, RWH-1, and ET 1 and 2. See TGM, Section 6 for more information.

| Retention BMPs | Included? | Drainage Area Retained (acres) [2] | Drainage Area Runoff Coefficient | Volume Retained (SQDV) (ac-ft) [1],[2] | If not applicable, state brief reason | | |
|---|-----------|------------------------------------|----------------------------------|--|---------------------------------------|--|--|
| | Y/N | | | | | | |
| <i>Infiltration BMPs</i> | | | | | | | |
| INF-1: Infiltration Basin | | | 0.95 | | | | |
| INF-2: Infiltration Trench | | | 0.95 | | | | |
| INF-3: Bioretention | | | 0.95 | | | | |
| INF-4: Drywell | | | 0.95 | | | | |
| INF-5: Permeable Pavement | | | 0.95 | | | | |
| INF-6: Proprietary Infiltration | Y | 5.08 | 0.95 | 0.302 | | | |
| INF-7: Bioinfiltration | | | 0.95 | | | | |
| <i>Rainwater Harvesting BMPs</i> | | | | | | | |
| RWH-1: Rainwater Harvesting | | | 2 | | | | |
| TOTAL Volume Retained | | | | 0.302 | ac-ft | | |
| | | | | 98,285.5 | gallons | | |
| | | | | 13,138.8 | cu.ft. | | |
| REMAINING Volume to meet 5% EIA requirement | | | | 0.1 | ac-ft | | |
| | | | | 44,238 | gallons | | |
| | | | | 5,914 | cu.ft. | | |

[1] SQDV Methodology #3 used here.

[2] If a Retention BMP is used more than once on a site (i.e., 2 Infiltration Trenches implemented on one site) then drainage area and volume retained shown here should be additive. A separate BMP sizing worksheet (see Appendix E of the TGM) should be submitted for each BMP.

ADDITIONAL INSTRUCTIONS: Retention BMPs must be used onsite to the maximum extent practicable. If the remaining volume to meet 5% EIA cannot be met, then project applicants must demonstrate technical infeasibility. Consult Section 3.2 of the 2011 TGM for infeasibility criteria. A technical infeasibility site-specific analysis must be submitted. Projects that cannot prove technical infeasibility must reduce EIA to <=5% using Retention BMPs.

If onsite Retention BMPs cannot feasibly be used to meet the 5% EIA Requirement, move onto Step 5e; if 5%EIA Requirement is met go to Step 7

| | |
|--|--------|
| | Y/N/NA |
|--|--------|

| | |
|---|---|
| A completed copy of the applicable "BMP Sizing Worksheet(s)" for the project's Retention BMPs from Appendix E of the TGM is included as an attachment. BMPs must be sized to meet the SQDV or SQDF (See Section 2 Step 7 of the TGM). | Y |
|---|---|

Project Name: Arrive Ventura (Area A1 - Main Site)

STEP 5e: SELECT AND SIZE BIOFILTRATION BMPs TO REDUCE EIA TO <=5%

New development and redevelopment projects that demonstrate technical infeasibility (see Section 3.2 of TGM) for reducing EIA to <= 5% using Retention BMPs are eligible to use Biofiltration BMPs to achieve the 5% EIA Requirement.

| | |
|---|------------|
| | Y/N |
| Is it technically infeasible for Retention BMPs to meet the 5% EIA Requirement? | N |
| If yes, volume-based biofiltration BMPs shall be sized to treat 1.5 times the volume not retained using Retention BMPs. | |

The onsite biofiltered volume ($V_{\text{biofilter}}$), should be calculated as follows:

$$V_{\text{biofilter}} = (V_{\text{retain}} - V_{\text{achieved}}) * 1.5 \quad \text{Equation 2-4}$$

Where:

- $V_{\text{biofilter}}$ = the volume that must be captured and treated in a Biofiltration BMP [ac-ft]
- V_{retain} = the stormwater quality design volume (SQDV) that must be retained [ac-ft]
- V_{achieved} = the volume retained onsite using Retention BMPs [ac-ft]

| Input | | Units |
|------------------------|---------------|---------|
| V_{achieved} | 0.302 | ac-ft |
| V_{retain} | 0.437 | ac-ft |
| $V_{\text{biofilter}}$ | 0.20 | ac-ft |
| | 66,357 | gallons |
| | 8,871 | cu.ft. |

BIOFILTRATION BMPs, CONT.

| Biofiltration BMPs | Included? Y/N | Drainage Area Biofiltered (acres) [3] | Drainage Area Runoff Coefficient | Volume Biofiltered (1.5xSQDV) (ac-ft) [2],[3] | If not applicable, state brief reason |
|--|------------------|---|--|--|--|
| BIO-1: Bioretention with Underdrain | | | 0.95 | | |
| BIO-2: Planter Box | | | 0.95 | | |
| BIO-3: Vegetated Swale [1] | | | 0.95 | | |
| BIO-4: Vegetated Filter Strip [1] | | | 0.95 | | |
| BIO-5: Proprietary Biotreatment [1] | | | 0.95 | | |
| TOTAL Volume Biofiltered | | | | 0.00 | ac-ft |
| | | | | 0.0 | gallons |
| | | | | 0.0 | cu.ft |
| REMAINING Volume to be addressed by Alternative Compliance | | | | 0.20 | ac-ft |
| | | | | 66,357.2 | gallons |
| | | | | 8,870.6 | cu.ft |

[1] BIO-3 and BIO-4 are flow-based and should be calculated using SQDF for sizing (see Table 2-1 of the TGM for the applicable design criteria for sizing). The SQDV is shown here for 5% EIA Requirement compliance purposes only.

[2] SQDV Methodology #3 used here.

[3] If a Biofiltration BMP is used more than once on a site (e.g., 2 Planter Boxes implemented on one site) then drainage area and volume biofiltered shown here be additive. A separate BMP sizing worksheet (see Appendix E of the TGM) should be submitted for each BMP.

ADDITIONAL INSTRUCTIONS: Certain new development and redevelopment project types are eligible for alternative compliance measures if onsite Retention and/or Biofiltration BMPs cannot feasibly be used to meet the 5% EIA requirement. Infeasibility is described in Section 3.2 of the TGM. A technical feasibility site-specific analysis must be submitted. Projects that cannot prove infeasibility must reduce EIA to <=5%.

If onsite Retention BMPs and/or Biofiltration BMPs cannot feasibly be used to meet the 5% EIA standard, move onto Step 6, otherwise, skip Step 6.

| | |
|---|--------|
| | Y/N/NA |
| A completed a copy of the applicable "BMP Sizing Worksheet(s)" for the project's Biofiltration BMPs from Appendix E of the TGM is included as an attachment.. BMPs must be sized to meet the 1.5 times SQDV or SQDF (see Section 2, Step 7 of the TGM) requirement. Guidance on flow based design for 150% sizing provided in Table 2-1 of the TGM. | |

Project Name: Arrive Ventura (Area A1 - Main Site)

STEP 7: APPLY TREATMENT CONTRL MEASURES

- ▶ *Stormwater runoff from EIA and developed pervious surfaces must be mitigated using Retention BMPs, Biofiltration BMPs, or Treatment Control Measures (See Chapter 6 of TGM).*
- ▶ *Treatment Control Measures should be selected per the BMP selection process outlined in Section 3.3 of the TGM.*
- ▶ *BMPs must be sized to meet the SQDV or SQDF. See Section 2, Step 7 of the for guidance on calculating the SQDV and SQDF.*

| | Y/N |
|--|-----|
| Completed copy of the applicable “BMP Sizing Worksheet(s)” for the project’s stormwater BMP(s) from Appendix E of the Technical Guidance Manual is included. | Y |

**VENTURA COUNTYWIDE STORMWATER QUALITY PROGRAM
POST-CONSTRUCTION STORMWATER MANAGEMENT PLAN (PCSMP)**

FOR

Arrive Ventura (Area A2 - SCE)

PARCEL #: [REDACTED]

Project Name: Arrive Ventura (Area A2 - SCE)

Preparation/Revision Date: 9/26/2024

Prepared for:

Name of Owner/Developer: Arrive Ventura

Stress Address: 2082 Michelson Dr, 4th Floor

City, State, Zip Code: Irvine, CA 92612

Telephone: 415-149-6194

Prepared by:

Name and Title of Preparer: Randy Chapman, P.E.

Company Name: CCE Design Associates

Stress Address: 711 E Daily Dr, Suite 120

City, State, Zip Code: Camarillo, CA 93010

Telephone: 805-738-5434

I hereby certify that the information provided in this Application is correct.

Application Prepared by: _____
Print Name and Firm

Signed _____
Signature of Project Engineer in the Firm Named Above

Title _____
Affix Professional registration stamp of the person named above with signature and expiration date

Project Name: Arrive Ventura (Area A2 - SCE)

STEP 1: DETERMINE PROJECT APPLICABILITY

Instructions:

For new development projects, answer yes, no, or NA to questions (1) - (10) below.

For redevelopment projects, answer yes, no, or NA to questions (11) - (13) below.

| NEW DEVELOPMENT PROJECTS | |
|--|---------------|
| <i>Does the new development project fall within categories (1) - (10) below?</i> | |
| Project Type and/or Characteristics | Y/N/NA |
| 1) Development projects equal to 1 acre or greater of disturbed area that adds more than 10,000 square feet of impervious surface area →go to Step 2 | Y |
| 2) Industrial parks with 10,000 square feet or more of total altered surface area →go to Step 2 | N/A |
| 3) Commercial strip malls with 10,000 square feet or more of impervious surface area →go to Step 2 | N/A |
| 4) Retail gasoline outlets with 5,000 square feet or more of total altered surface area →go to Step 2 | N/A |
| 5) Restaurants (Standard Industrial Classification (SIC) of 5812) with 5,000 square feet or more of total altered surface area →go to Step 2 | N/A |
| 6) Parking lots with 5,000 square feet or more of impervious surface area, or with 25 or more parking spaces →go to Step 2 | Y |
| 7) Streets, roads, highways, and freeway construction of 10,000 square feet or more of impervious surface area → go to Roadway Projects | N/A |
| 8) Automotive service facilities (Standard Industrial Classification (SIC) of 5013, 5014, 5511, 5541, 7532-7534 and 7536-7539) of 5,000 square feet or more of total altered surface area →go to Step 2 | N/A |
| 9) Projects located in or directly adjacent to, or discharging directly to an Environmentally Sensitive Area (ESA), where the development will: a. Discharge stormwater runoff that is likely to impact a sensitive biological species or habitat; and b. Create 2,500 square feet or more of impervious surface area →go to Step 2 | N/A |
| 10) Single-family hillside homes (see Section 2 of the TGM for specific requirements) →go to SF Hillside | N/A |

Project Name: Arrive Ventura (Area A2 - SCE)

PROJECT APPLICABILITY, CONT.

| REDEVELOPMENT PROJECTS | |
|--|---------------|
| <p><i>For redevelopment projects that fall within categories (1) through (9) above, and that conduct land-disturbing activities that result in the creation, or addition, or replacement of 5,000 square feet or more of impervious surface area on an already developed site, answer questions 11-13 below. Existing single-family dwelling and accessory structures are exempt from redevelopment projects unless such projects create, add, or replace 10,000 square feet of impervious surface area.</i></p> | |
| Project Type and/or Characteristics | Y/N/NA |
| <p>11) Projects where redevelopment results in an alteration to more than fifty percent of impervious surfaces of a previously existing development, and the existing development <u>was not</u> subject to the post development stormwater quality control requirements of Board Order 00-108, these projects must mitigate the entire redevelopment project area →go to Step 2</p> | N/A |
| <p>12) Projects where redevelopment results in an alteration to more than fifty percent of impervious surfaces of a previously existing development, and the existing development <u>was</u> subject to the post development stormwater quality control requirements of Board Order 00-108, the project must mitigate only the altered portion of the redevelopment project area and not the entire project area →go to Step 2</p> | N/A |
| <p>13) Projects where redevelopment results in an alteration of less than fifty percent of impervious surfaces of a previously existing development these projects must mitigate only the altered portion of the redevelopment project area and not the entire project area →go to Step 2</p> | N/A |

Project Name:

Arrive Ventura (Area A2 - SCE)

STEP 2: ASSESS SITE CONDITIONS*Provide an assessment of the project site using the following tables***New Development Project General Characteristics**

| General Project Characteristics | Area (acres) |
|--|--------------|
| Total Project Site Area | 5.08 |
| Total Disturbed Area | 5.08 |
| Total Existing (Pre-Project) Impervious Area | 0.05 |
| Post-Project Impervious Area [1] | 2.95 |
| Area of Green Roof (ET-1) [1] | 0.00 |
| Area Draining to Hydrologic Source Controls (ET-2) [1] | |
| Revised Post-Project Impervious Area | 2.95 |
| Project Imperviousness (%) | 58.07% |

Redevelopment Project General Characteristics

| General Project Characteristics | Area (acres) |
|---|--------------|
| Total Project Site Area | |
| Total Altered Area [6] | |
| Total Existing (Pre-Project) Impervious Area | |
| Was existing (pre-project) impervious area subject to post-development stormwater quality control requirements? [2] | |
| Amount of Existing Impervious Area Altered [3] | |
| Amount of Impervious Area Added | |
| % Alteration of Existing Impervious Area [4] | N/A |
| Post-Project Impervious Area (Impervious Area to be Mitigated) [1], [4] | 0.00 |
| Area of Green Roof (ET-1) [1] | |
| Area Draining to Hydrologic Source Controls (ET-2) [1] | |
| Revised Post-Project Impervious Area | 0.00 |
| Project Imperviousness (%) [5] | |

Project Name:

Arrive Ventura (Area A2 - SCE)

Project Description

Briefly describe project:

The project will involve the construction of a 285-unit residential apartment complex and 12 live work units, with associated parking lots, hardscape, and recreational areas.

Describe current and proposed zoning and land use designation:

The project site is zoned MXD - Mixed-Use Development Zone. The land use is GP Industrial.

Describe topography of project area. Identify low and high points and the location of steep slopes (provide a range of grades):

The site currently consists of an open vacant lot. The site currently drains from north to south.

Describe the site's soil types (A, B, C, D) and geological conditions

The site is currently composed of soil type D. The site is underlain by alluvial fan deposits of the latest Hocene age. Undocumented fill was previously mapped and is associated with past agricultural buildings/structures. Following the undocumented fill, compacted artificial fill was located. The Alluvial fan deposits are interbedded very loose to medium dense silty sands and soft to stiff clay and sandy clay to a maximum depth of 51.5 feet.

Attach soil type information

Project Name:

Arrive Ventura (Area A2 - SCE)

Project Description, cont'd

Describe the site's groundwater conditions (e.g. depth to seasonal high groundwater):

Groundwater was not encountered at the maximum depth 51.5 feet. However, perched groundwater was observed at 15 feet below ground surface. A seismic hazard report indicates that historic groundwater beneath the site has been about 15 feet in depth.

Is there offsite drainage on the site? If so, identify the location(s) and source(s) of offsite drainage and the volume of water running onto the site:

N/A

Describe any existing utilities within the project area that would limit the possible locations of certain BMPs:

Due to Phase I of the project, there are wet and dry utilities on site.

Describe any environmentally sensitive areas (e.g. riparian areas, wetlands) within the project area:

The subject site does not have any environmentally sensitive areas.

Geotechnical considerations:

Does the site contain any of the following characteristics:

| | Y/N/NA |
|---|---------------|
| Collapsible Soil | N |
| Expansion Soil | Y |
| Potential for seismically-induced soil liquefaction | Y |

Additional considerations:

N/A

Attach relevant geotechnical information

Project Name:

Arrive Ventura (Area A2 - SCE)

STEP 2: POLLUTANTS OF CONCERN

Pollutants of Concern (See Section 3.3 of TGM)

| Activity / Potential Land Uses | Potential Pollutant* | | | | | | | | |
|--------------------------------|----------------------|-----------|--------|------------|-----------------------------|----------------|--------------|----------|------------------|
| | Sediment | Nutrients | Metals | Pesticides | Oxygen Demanding Substances | Toxic Organics | Oil & Grease | Bacteria | Trash and Debris |
| Parking Lots | X | | X | | X | X | | | X |
| Street, road, or highway | X | | X | | X | X | | | X |
| Parking Lots | X | | X | | X | X | | | X |
| Other [fill in if necessary] | | | | | | | | | |
| Other [fill in if necessary] | | | | | | | | | |

*Denote potential pollutant with "x"

Receiving Waterbody Listings (see Section 3.3. of TGM)

| Receiving Waterbody (watershed indicated in parentheses) | Constituent Group [7] | Distance to Project (ft) |
|---|--------------------------------------|-----------------------------|
| Santa Clara River (Santa Clara) | Salts, Bacteria, Nutrients, Toxicity | 5000.00 |
| | | |
| Other [fill in if necessary] | | |

[1] Applicant should enter post-project impervious cover prior to accounting for green roof and hydrologic source control (HSC) credits. Volume reduction provided by green roofs and HSCs are accounted for implicitly in the sizing calculations for BMPs by assuming the roof area covered by a green roof or the area draining to a HSC is pervious rather than impervious when calculating the runoff coefficient for the site. Green roofs and HSCs are not required to be considered for all project locations and types. In order to obtain credit, Green Roofs and HSCs must be designed as specified in the TGM. Additional detail on Green Roofs (ET-1) and HSCs (ET-2) can be found in Section 6 of the TGM.

[2] Land-disturbing activity that results in the creation or addition or replacement of less than 5,000 square feet of impervious surface area on an already developed site, or that results in a decrease in impervious area which was subject to the post development stormwater quality control requirements of Board Order 00-108, is not subject to mitigation unless so directed by the local permitting agency

[3] Redevelopment does not include routine maintenance activities that are conducted to maintain the original line and grade, hydraulic capacity, or original purpose of the facility or emergency redevelopment activity required to protect public health and safety. Impervious surface replacement, such as the reconstruction of parking lots and roadways, that does not disturb additional area and maintains the original grade and alignment, is considered a routine maintenance activity. Agencies' flood control, drainage, and wet utilities projects that maintain original line and grade or hydraulic capacity are considered routine maintenance. Redevelopment also does not include the repaving of existing roads to maintain original line and grade.

[4] "% Alteration of Existing Impervious Area" determines the 50% threshold which is key in determining portion of site that must comply with post-construction requirements - see Step 1 redevelopment categories for more detail. The amount of "Post Project Impervious Area" that must adhere to post-construction requirements is dependant on 50% threshold

[5] "Project Imperviousness" is calculated using the "Total Project Area" except when redevelopment projects that must mitigate only the altered portion of the redevelopment project area. In this case, the "Total Disturbed Area" is used to calculate "Project Imperviousness"

[6] For the purposes of this calculation, Total Altered Area shall mean any area that is altered as a result of land disturbance, such as clearing, grading, grubbing, and excavation. This excludes areas used exclusively for temporary stockpiling.

[7] If a waterbody is listed for "toxicity" and the cause and/or contribution to toxicity is known, then the constituent group known to contribute to toxicity are listed here (in lieu of listing "toxicity")

Project Name: Arrive Ventura (Area A2 - SCE)

STEP 3: APPLY SITE DESIGN PRINCIPLES AND TECHNIQUES

Provide a brief description of site design principles and techniques included within the proposed project site.

| Site Design Measures [1] | Included? Y/N/NA | Brief Description of the Site Design Measure |
|--|-----------------------------|--|
| Site Planning | Y | The site design has been laid out in a manner to disconnect impervious surface and proposed underground treatment (through infiltration with pre-treatment) will be used to treat per 5% EIA |
| Protect and Restore Natural Areas | N/A | N/A |
| Minimize Land Disturbance | Y | Minimizing land disturbance to occur during construction phase. |
| Minimize Impervious Cover | Y | Landscape areas were included through the site where practical. |
| Apply LID at Various Scales | Y | Implemented throughout the site at varying degrees. |
| Implement Integrated Water Resource Management Practices | Y | Installation Contech CMP Infiltration System on site to augment the recharge of groundwater. |

[1] Refer to Section 4.2 - 4.7 of the TGM for applicable Design Criteria.

Project Name: Arrive Ventura (Area A2 - SCE)

STEP 4: APPLY SOURCE CONTROL MEASURES

Provide a brief description of the source control measures included in the proposed project site.

| Site-Specific Source Control Measures[1] | Included? Y/N/NA | Brief Description of the Source Control Measure |
|--|-----------------------------|--|
| S-1: Storm Drain Message and Signage | Y | Signage will be included on each catch basin inlet. |
| S-2: Outdoor Material Storage Area Design | N | No outdoor material storage areas anticipated onsite. |
| S-3: Outdoor Trash Storage and Waste Handling Area Design | Y | Trash areas will be constructed with impervious surface. Screen wall will be provided and no storm drain located within immediate vicinity. Signs will be provided on all dumpsters. |
| S-4: Outdoor Loading/Unloading Dock Area Design | N | No loading/unloading dock anticipated onsite. |
| S-5: Outdoor Repair/Maintenance Bay Design | N | No outdoor repair/maintenance bays anticipated onsite. |
| S-6: Outdoor Vehicle /Equipment/ Accessory Washing Area Design | N | No outdoor vehicle/equipment wash areas anticipated onsite. |
| S-7: Fueling Area Design | N | No fueling areas onsite. |
| S-8: Proof of Control Measure Maintenance | Y | Accomplished through Approved Maintenance Agreement an Maintenance Plan. |

[1] Refer to Fact Sheets in Section 5 of the TGM for detailed information and design criteria

Project Name: Arrive Ventura (Area A2 - SCE)

STEP 5: APPLY BMPS TO REDUCE EIA TO <=5%

New development and redevelopment projects (Categories 1-6, 8, and 9) must reduce EIA to <=5%

Step 5a: Calculate Allowable EIA

EIA is defined as impervious area that is hydrologically connected via sheet flow over a hardened conveyance or impervious surface without any intervening medium to mitigate flow volume.

The allowable "EIA" for a project is calculated as:

$$EIA_{\text{allowable}} = (A_{\text{project}}) * (\%_{\text{allowable}}) \quad \text{Equation 2-1}$$

Where:

$EIA_{\text{allowable}}$ = The maximum impervious area from which runoff can be treated and discharged offsite (and not retained onsite) [acres]

A_{project} = The total project area [acres] [1]

$\%_{\text{allowable}}$ = 5 percent

| Input: | | Units |
|--------------------------|-------------|---------|
| A_{project} [1] | 5.08 | Acres |
| $\%_{\text{allowable}}$ | 5.00% | Percent |
| $EIA_{\text{allowable}}$ | 0.25 | Acres |

Step 5b: Calculate Impervious Area to be Retained

The impervious area from which runoff must be retained onsite is the total impervious area minus the EIA allowable, which should be calculated as follows:

$$A_{\text{retain}} = TIA - EIA_{\text{allowable}} = (IMP * A_{\text{project}}) - EIA_{\text{allowable}} \quad \text{Equation 2-2}$$

Where:

A_{retain} = the drainage area from which runoff must be retained [acres]

TIA = total impervious area [acres]

IMP = imperviousness of project area (%)

| Input: | | Units |
|--------------------------|-------------|-------|
| Imperviousness | 58.07% | |
| A_{project} [1] | 5.08 | Acres |
| $EIA_{\text{allowable}}$ | 0.25 | Acres |
| A_{retain} | 2.70 | Acres |

Project Name: Arrive Ventura (Area A2 - SCE)

BMPS TO REDUCE EIA TO <=5%, CONT.

Step 5c: Calculate the Volume to be Retained (SQDV)

The runoff volume that is to be retained onsite should be calculated using Equation 2-3 below:

$$V_{\text{retain}} = C * (0.75/12) * A_{\text{retain}} \quad \text{Equation 2-3}$$

Where:

V_{retain} = The stormwater quality design volume (SQDV) that must be retained onsite [ac-ft]

C = runoff coefficient (equals 0.95 for impervious surfaces)

| Input: | Units |
|---------------------|---|
| C | 0.95 |
| A_{retain} | 2.70 Acres |
| V_{retain} | 0.160 ac-ft 52,161.0 gallons 6,972.9 cu.ft. |

Continue to Step 5d

Project Name:

Arrive Ventura (Area A2 - SCE)

STEP 5d: SELECT RETENTION BMPs

Select and size Retention BMPs to meet the 5% EIA Requirement. Retention BMPs include INF1-6, RWH-1, and ET 1 and 2. See TGM, Section 6 for more information.

| Retention BMPs | Included? | Drainage Area Retained (acres) [2] | Drainage Area Runoff Coefficient | Volume Retained (SQDV) (ac-ft) [1],[2] | If not applicable, state brief reason | | |
|---|-----------|------------------------------------|----------------------------------|--|---------------------------------------|--|--|
| | Y/N | | | | | | |
| <i>Infiltration BMPs</i> | | | | | | | |
| INF-1: Infiltration Basin | | | 0.95 | | | | |
| INF-2: Infiltration Trench | | | 0.95 | | | | |
| INF-3: Bioretention | | | 0.95 | | | | |
| INF-4: Drywell | | | 0.95 | | | | |
| INF-5: Permeable Pavement | | | 0.95 | | | | |
| INF-6: Proprietary Infiltration | Y | 5.08 | 0.95 | 0.302 | | | |
| INF-7: Bioinfiltration | | | 0.95 | | | | |
| <i>Rainwater Harvesting BMPs</i> | | | | | | | |
| RWH-1: Rainwater Harvesting | | | 2 | | | | |
| TOTAL Volume Retained | | | | 0.302 | ac-ft | | |
| | | | | 98,285.5 | gallons | | |
| | | | | 13,138.8 | cu.ft. | | |
| REMAINING Volume to meet 5% EIA requirement | | | | -0.1 | ac-ft | | |
| | | | | -46,125 | gallons | | |
| | | | | -6,166 | cu.ft. | | |

[1] SQDV Methodology #3 used here.

[2] If a Retention BMP is used more than once on a site (i.e., 2 Infiltration Trenches implemented on one site) then drainage area and volume retained shown here should be additive. A separate BMP sizing worksheet (see Appendix E of the TGM) should be submitted for each BMP.

If onsite Retention BMPs cannot feasibly be used to meet the 5% EIA Requirement, move onto Step 5e; if 5%EIA Requirement is met go to Step 7

| | |
|--|--------|
| | Y/N/NA |
|--|--------|

| | |
|---|---|
| A completed copy of the applicable "BMP Sizing Worksheet(s)" for the project's Retention BMPs from Appendix E of the TGM is included as an attachment. BMPs must be sized to meet the SQDV or SQDF (See Section 2 Step 7 of the TGM). | Y |
|---|---|

Project Name: Arrive Ventura (Area A2 - SCE)

STEP 5e: SELECT AND SIZE BIOFILTRATION BMPs TO REDUCE EIA TO <=5%

New development and redevelopment projects that demonstrate technical infeasibility (see Section 3.2 of TGM) for reducing EIA to <= 5% using Retention BMPs are eligible to use Biofiltration BMPs to achieve the 5% EIA Requirement.

| | |
|---|------------|
| | Y/N |
| Is it technically infeasible for Retention BMPs to meet the 5% EIA Requirement? | N |
| If yes, volume-based biofiltration BMPs shall be sized to treat 1.5 times the volume not retained using Retention BMPs. | |

The onsite biofiltered volume ($V_{\text{biofilter}}$), should be calculated as follows:

$$V_{\text{biofilter}} = (V_{\text{retain}} - V_{\text{achieved}}) * 1.5 \quad \text{Equation 2-4}$$

Where:

- $V_{\text{biofilter}}$ = the volume that must be captured and treated in a Biofiltration BMP [ac-ft]
- V_{retain} = the stormwater quality design volume (SQDV) that must be retained [ac-ft]
- V_{achieved} = the volume retained onsite using Retention BMPs [ac-ft]

| Input | | Units |
|------------------------|-----------------|---------|
| V_{achieved} | 0.302 | ac-ft |
| V_{retain} | 0.160 | ac-ft |
| $V_{\text{biofilter}}$ | -0.21 | ac-ft |
| | (69,187) | gallons |
| | (9,249) | cu.ft. |

BIOFILTRATION BMPs, CONT.

| Biofiltration BMPs | Included? Y/N | Drainage Area Biofiltered (acres) [3] | Drainage Area Runoff Coefficient | Volume Biofiltered (1.5xSQDV) (ac-ft) [2],[3] | If not applicable, state brief reason |
|--|------------------|---|--|--|--|
| BIO-1: Bioretention with Underdrain | | | 0.95 | | |
| BIO-2: Planter Box | | | 0.95 | | |
| BIO-3: Vegetated Swale [1] | | | 0.95 | | |
| BIO-4: Vegetated Filter Strip [1] | | | 0.95 | | |
| BIO-5: Proprietary Biotreatment [1] | | | 0.95 | | |
| TOTAL Volume Biofiltered | | | | 0.00 | ac-ft |
| | | | | 0.0 | gallons |
| | | | | 0.0 | cu.ft |
| REMAINING Volume to be addressed by Alternative Compliance | | | | -0.21 | ac-ft |
| | | | | -69,186.8 | gallons |
| | | | | -9,248.9 | cu.ft |

[1] BIO-3 and BIO-4 are flow-based and should be calculated using SQDF for sizing (see Table 2-1 of the TGM for the applicable design criteria for sizing). The SQDV is shown here for 5% EIA Requirement compliance purposes only.

[2] SQDV Methodology #3 used here.

[3] If a Biofiltration BMP is used more than once on a site (e.g., 2 Planter Boxes implemented on one site) then drainage area and volume biofiltered shown here be additive. A separate BMP sizing worksheet (see Appendix E of the TGM) should be submitted for each BMP.

If onsite Retention BMPs and/or Biofiltration BMPs cannot feasibly be used to meet the 5% EIA standard, move onto Step 6, otherwise, skip Step 6.

| | |
|---|--------|
| | Y/N/NA |
| A completed a copy of the applicable "BMP Sizing Worksheet(s)" for the project's Biofiltration BMPs from Appendix E of the TGM is included as an attachment.. BMPs must be sized to meet the 1.5 times SQDV or SQDF (see Section 2, Step 7 of the TGM) requirement. Guidance on flow based design for 150% sizing provided in Table 2-1 of the TGM. | |

Project Name: Arrive Ventura (Area A2 - SCE)

STEP 7: APPLY TREATMENT CONTRL MEASURES

- ▶ *Stormwater runoff from EIA and developed pervious surfaces must be mitigated using Retention BMPs, Biofiltration BMPs, or Treatment Control Measures (See Chapter 6 of TGM).*
- ▶ *Treatment Control Measures should be selected per the BMP selection process outlined in Section 3.3 of the TGM.*
- ▶ *BMPs must be sized to meet the SQDV or SQDF. See Section 2, Step 7 of the for guidance on calculating the SQDV and SQDF.*

| | Y/N |
|--|-----|
| Completed copy of the applicable “BMP Sizing Worksheet(s)” for the project’s stormwater BMP(s) from Appendix E of the Technical Guidance Manual is included. | Y |



Attachment B
TGM Worksheets

BMP Sizing Worksheet

INF-1: Infiltration Basin

| | |
|---|------------------------|
| Designer: <u>CCE Design Associates</u> | Date: <u>9/26/2024</u> |
| Project Proponent: <u>Arrive Ventura</u> | |
| Project Name: <u>Arrive Ventura - New Development (Area A1)</u> | |
| Project Address: <u>Northeast corner of Victoria Avenue and Olivas Park Drive</u> | |

| | | | | | |
|---|-------------------------------------|----------------|--------------------------|----------------------|--------------------------|
| Type of Vegetation: (check type used or describe "other") | <input type="checkbox"/> | Native Grasses | <input type="checkbox"/> | Irrigated Turf Grass | <input type="checkbox"/> |
| | <input checked="" type="checkbox"/> | Other | | (gravel) | |

Outlet collection: Valley drain to parkway drain

Step 1: Determine water quality design volume

| | | | |
|--|---------------------|--------|-----------------|
| 1-1. Enter Project area (acres), $A_{project}$ | $A_{project} =$ | 8.67 | ac |
| 1-2. Enter the maximum allowable percent of the Project area that may be effective impervious area (refer to permit), ranges from 5-30%, $\%_{allowable}$ | $\%_{allowable} =$ | 5% | |
| 1-3. Determine the maximum allowed effective impervious area (ac), $EIA_{allowable} = (A_{project}) * (\%_{allowable})$ | $EIA_{allowable} =$ | 0.43 | ac |
| 1-4. Enter Project Impervious fraction, Imp (e.g. 60%=0.60) | Imp = | 0.90 | |
| 1-5. Determine the Project Total Impervious area (ac) $TIA = A_{project} * Imp$ | TIA = | 7.80 | ac |
| 1-6. Determine the total area from which runoff must be retained (ac), $A_{retain} = TIA - EIA_{Allowable}$ | $A_{retain} =$ | 7.37 | ac |
| 1-7. Determine pervious runoff coefficient using Table E-1, C_p Click here for soil type map --> https://maps.ventura.org/pwagisviewer/ | Soil No. = | 5 | |
| | $C_p =$ | 0.05 | |
| 1-8. Runoff coefficient, C (equals 0.95 for impervious surfaces) | C = | 0.95 | |
| 1-9. Enter design rainfall depth of the storm (in), P_i | $P_i =$ | 0.75 | in |
| 1-10. Calculate rainfall depth (ft), $P = P_i / 12$ | P = | 0.0625 | ft |
| 1-11. Calculate water quality design volume (ft ³) $SQDV = 43560 * C * P * A_{retain}$ | SQDV = | 19060 | ft ³ |

BMP Sizing Worksheet

| Step 2: Determine the design percolation rate | | | |
|---|-------------------------|-------------|-----------------|
| 2-1. Enter measured soil percolation rate (in/hr, 0.5 in/hr min.), P_{measured} | $P_{\text{measured}} =$ | 1.1 | in/hr |
| 2-2. Determine percolation rate correction factor, S_A based on suitability assessment (see Section 6 INF-1) | $S_A =$ | 1.25 | |
| 2-3. Determine percolation rate correction factor S_B based on design (see Section 6 INF-1) | $S_B =$ | 1.75 | |
| 2-4. Calculate combined safety factor, $S = S_A \times S_B$ | $S =$ | 2.1875 | |
| 2-5. Calculate the design percolation rate (in/hr), $P_{\text{design}} = P_{\text{measured}}/S$ | $P_{\text{design}} =$ | 0.50 | in/hr |
| Step 3: Calculate the surface area | | | |
| 3-1. Enter required drain time (hours, 72 hrs max.), t | $t =$ | 72 | hrs |
| 3-2. Calculate max. depth of runoff that can be infiltrated within the t (ft), $d_{\text{max}} = P_{\text{design}} t/12$ | $d_{\text{max}} =$ | 3.017142857 | ft |
| 3-3. For basins, select ponding depth (ft), d_p , such that $d_p \leq d_{\text{max}}$ | $d_p =$ | 2.5 | ft |
| 3-4. For trenches, enter trench fill aggregate porosity, n_t | $n_t =$ | 0.3 | |
| 3-5. For trenches, enter depth of trench fill (ft), d_t | $d_t =$ | N/A | ft |
| 3-5. For trenches, select ponding depth d_p such that $d_p \leq d_{\text{max}} - n_t d_t$ | $d_p =$ | N/A | ft |
| 3-6. Enter the time to fill infiltration basin or trench with water (Use 2 hours for most designs), T | $T =$ | 2.00 | hrs |
| 3-7. Calculate infiltrating surface area for infiltration basin (ft ²): $A_b = \text{SQDV}/((T P_{\text{design}}/12)+d_p)$ OR Calculate infiltrating surface area for infiltration trenches or aggregate-filled drywells (ft ²): $A_t = \text{SQDV}/((T P_{\text{design}}/12)+n_t d_t+d_p)$ | $A_b =$ | 7377 | ft ² |
| | $A_t =$ | N/A | ft ² |

BMP Sizing Worksheet

INF-7: Bioinfiltration

| | |
|---|------------------------|
| Designer: <u>CCE Design Associates</u> | Date: <u>9/26/2024</u> |
| Project Proponent: <u>Arrive Ventura</u> | |
| Project Name: <u>Arrive Ventura - SCE Site (Area A2)</u> | |
| Project Address: <u>Northwest corner of Olivas Park Drive &</u> | |



| | | | | | |
|---|-------------------------------------|----------------|--------------------------|----------------------|--------------------------|
| Type of Vegetation: (check type used or describe "other") | <input type="checkbox"/> | Native Grasses | <input type="checkbox"/> | Irrigated Turf Grass | <input type="checkbox"/> |
| | <input checked="" type="checkbox"/> | Other | | (gravel) | |

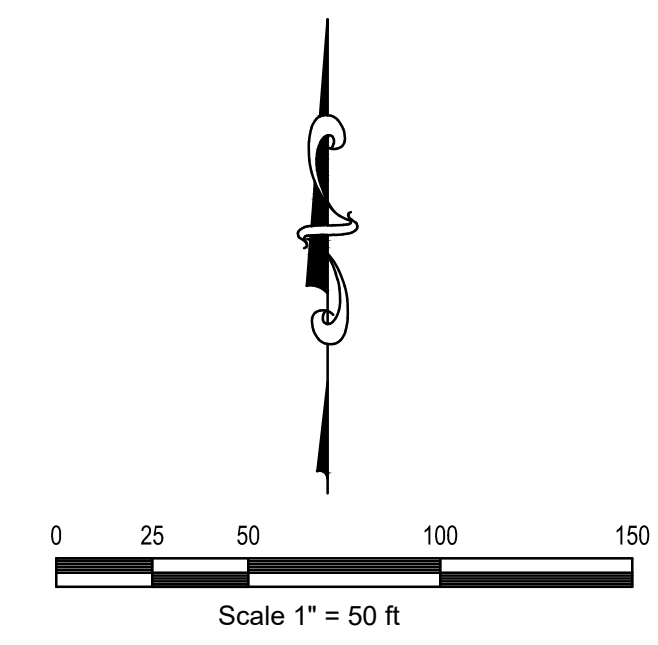
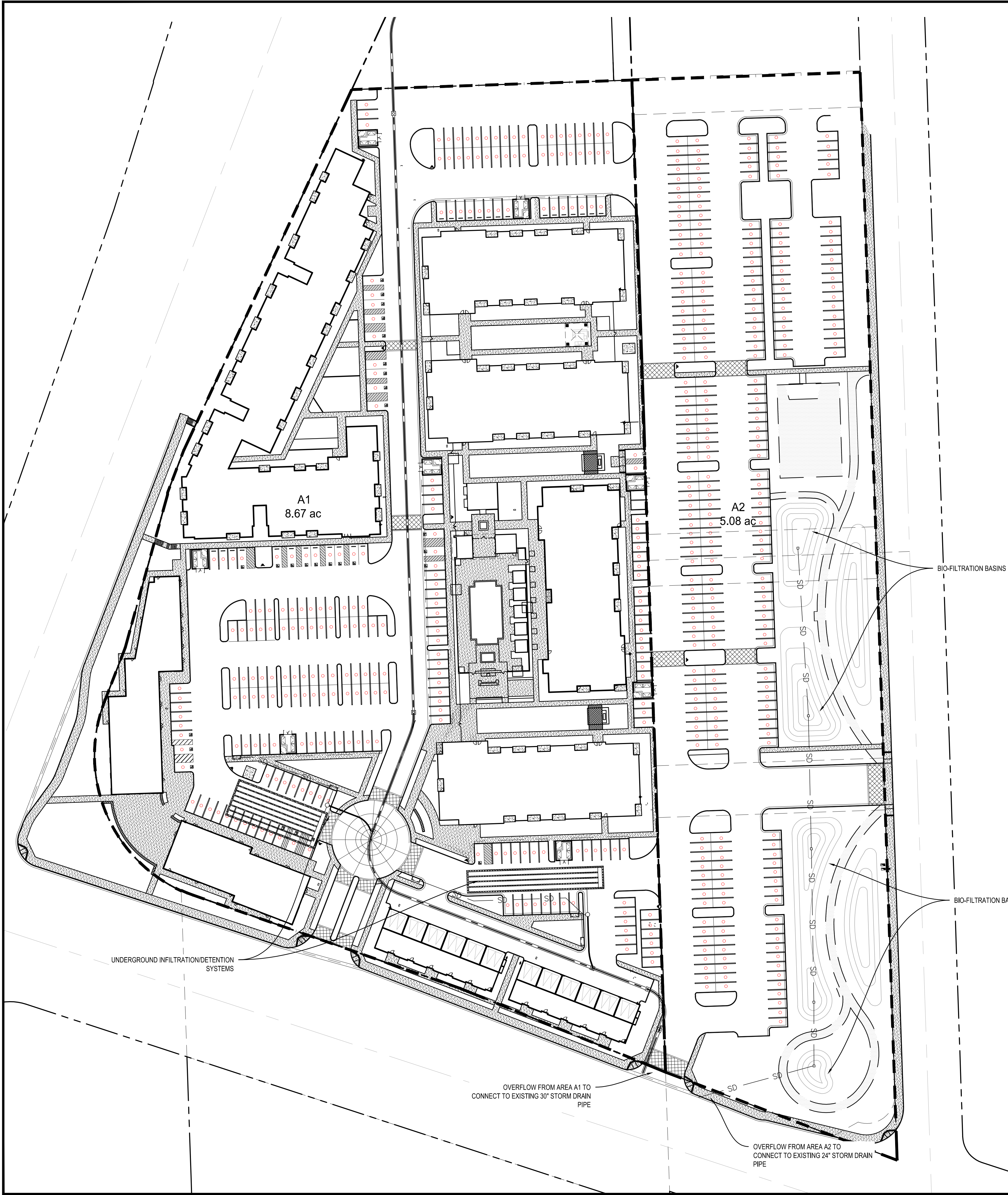
Outlet collection: Valley drain to parkway drain

Step 1: Determine water quality design volume

| | | | |
|---|---------------------|--------|-----------------|
| 1-1. Enter Project area (acres), $A_{project}$ | $A_{project} =$ | 5.08 | ac |
| 1-2. Enter the maximum allowable percent of the Project area that may be effective impervious area (refer to permit), ranges from 5-30%, $\%_{allowable}$ | $\%_{allowable} =$ | 5% | |
| 1-3. Determine the maximum allowed effective impervious area (ac), $EIA_{allowable} = (A_{project}) * (\%_{allowable})$ | $EIA_{allowable} =$ | 0.25 | ac |
| 1-4. Enter Project Impervious fraction, Imp (e.g. 60%=0.60) | Imp = | 0.58 | |
| 1-5. Determine the Project Total Impervious area (ac) $TIA = A_{project} * Imp$ | TIA = | 2.95 | ac |
| 1-6. Determine the total area from which runoff must be retained (ac), $A_{retain} = TIA - EIA_{Allowable}$ | $A_{retain} =$ | 2.69 | ac |
| 1-7. Determine pervious runoff coefficient using Table E-1, C_p | Soil No. = | 5 | |
| | $C_p =$ | 0.05 | |
| 1-8. Runoff coefficient, C (equals 0.95 for impervious surfaces) | C = | 0.95 | |
| 1-9. Enter design rainfall depth of the storm (in), P_i | $P_i =$ | 0.75 | in |
| 1-10. Calculate rainfall depth (ft), $P = P_i / 12$ | P = | 0.0625 | ft |
| 1-11. Calculate water quality design volume (ft ³) $SQDV = 43560 * C * P * A_{retain}$ | SQDV = | 6964 | ft ³ |

MS4 LEGEND

-  TRIBUTARY AREA BOUNDARY
-  STORM DRAIN LINE

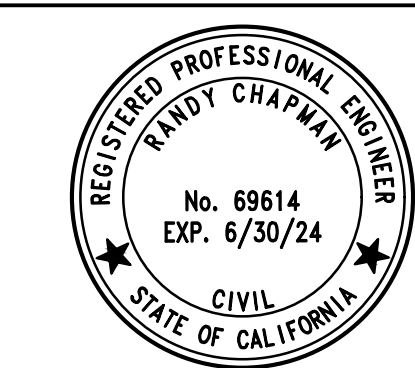


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RANDY CHAPMAN, P.E.



| REV. | DESCRIPTION | CK'D | APP | DATE |
|---|-------------|--------------------------|-----|------|
| | | | | |
| PUBLIC WORKS DEPARTMENT LAND DEVELOPMENT DIVISION | | CITY OF SAN BUENAVENTURA | | |
| OLIVAS PARK DR & VICTORIA AVE, VENTURA, CA 93003 | | | | |
| DRN. BY: RC | DES. BY: RC | CK'D BY: RC | | |
| LAND DEVELOPMENT ENGR | RCE NUMBER | DATE | | |
| CITY ENGINEER | RCE NUMBER | DATE | | |
| SID# 3570 | SHEET OF 7 | FILE NO. XXX-X-XXX | | |

BID SET - 1/11/2022

BMP Sizing Worksheet

| Step 2: Determine the design percolation rate | | | |
|--|--------------------------|------|-----------------|
| 2-1. Required drain time of surface ponding | $t_{\text{ponding}} =$ | 48 | hrs |
| 2-2. Determine the design percolation rate of underlying soils. This needs to be the adjusted percolation rate of the underlying soils and not the percolation rate of the filter media bed. The measured short-term infiltration rate should be adjusted by a safety factor of 2. | $P_{\text{measured}} =$ | 1.1 | in/hr |
| | $S =$ | 2.19 | |
| | $P_{\text{design}} =$ | 0.50 | in/hr |
| Step 3: Calculate the surface area | | | |
| 3-1. Determine the maximum depth of surface ponding water: $d_{\text{max}} = (P_{\text{design}} * t_{\text{ponding}})/12$ | $d_{\text{max}} =$ | 2 | ft |
| 3-2. Choose surface ponding depth (d_p) such that: $d_p \leq d_{\text{max}}$ | $d_p =$ | 2 | ft |
| 3-3. Choose thickness of amended media. Available porosity of amended soil media (approximately 0.25 ft/ft) | $l_{\text{media}} =$ | 3 | ft |
| | $n_{\text{media}} =$ | 0.25 | ft/ft |
| 3-4. Choose thickness of aggregate layer Available porosity of gravel layer (approximately 0.4 ft/ft) | $l_{\text{gravel}} =$ | 1 | ft |
| | $n_{\text{gravel}} =$ | 0.30 | ft/ft |
| 3-5. Calculate total effective storage depth of biofiltration area. $d_{\text{effective}} = (d_p + n_{\text{media}} * l_{\text{media}} + n_{\text{gravel}} * l_{\text{gravel}})$ | $d_{\text{effective}} =$ | 3.05 | ft |
| 3-6. Check entire effective depth is less than 96 hours $t_{\text{total}} = (d_{\text{effective}}/P_{\text{design}}) * 12 \leq 96$ hrs | $t_{\text{total}} =$ | 73 | hrs |
| 3-7. Calculate required infiltration surface areas $A_{\text{req}} = SQDV/d_{\text{effective}}$ | $A_{\text{req}} =$ | 2283 | ft ² |

Step 4: Size the forebay (infiltration basins or trenches)