

BETHEL ENGINEERING
2624 Airpark Drive
Santa Maria, California 93455
(805) 934-5767 FAX (805) 934-3448

JOB **Richard's Ranch (2142)**
PAGE **1 of 18**
CALCULATED BY **AMP** DATE **01/07/25**
CHECKED BY **RJG** DATE **01/07/25**

FLOOD CONTROL: DRAINAGE STUDY

for

Richard's Ranch
UNION VALLEY PARKWAY @ HIGHWAY 135
A.P.N. 107-250-019, 020, 021 AND 022
SANTA MARIA, CA.



PROJECT DESCRIPTION

The proposal is a mixed-use project on four vacant legal lots (APNs 107-250-019, 107-250-020, 107-250-021, and 107-250-022) located at the intersection of Union Valley Parkway and Orcutt Road in unincorporated Santa Barbara County. The project proposes a variety of commercial uses including car washes, a gas station, convenience store space, and self-storage. These uses will occur on the northwest, southwest and northeast parcels. The project also proposes 750 residential units (20% lower income affordable) and associated amenities such as a clubhouse, parks and open spaces, and parking throughout. The project will be accessed via both Union Valley Parkway and Orcutt Road.

The completed project proposes 4 separate detention basins. The tributary areas to each basin are described as follows:

Basin 1 – 114,594 S.F. (see Appendix A)

| | |
|----------------------------------|---------------------------------|
| proposed structures: | 295,260 S.F. (6.78 AC.) |
| proposed hardscape: | 340,388 S.F. (7.81 AC.) |
| <u>proposed landscaping:</u> | <u>472,130 S.F. (10.84 AC.)</u> |
| Total area tributary to Basin 1: | 1,107,778 S.F. (25.43 AC.) |

Basin 2 – 17,026 s.f. (see Appendix A)

| | |
|----------------------------------|--------------------------------|
| proposed structures: | 120,611 S.F. (2.77 AC.) |
| proposed hardscape: | 216,542 S.F. (4.97 AC.) |
| <u>proposed landscaping:</u> | <u>202,724 S.F. (4.65 AC.)</u> |
| Total area tributary to Basin 2: | 539,877 S.F. (12.39 AC.) |

Basin 3 – 4,263 s.f. (see Appendix A)

| | |
|----------------------------------|-------------------------------|
| proposed structures: | 8,600 S.F. (0.20 AC.) |
| proposed hardscape: | 32,706 S.F. (0.75 AC.) |
| <u>proposed landscaping:</u> | <u>39,520 S.F. (0.91 AC.)</u> |
| Total area tributary to Basin 3: | 80,826 S.F. (1.86 AC.) |

Basin 4 – 6,089 s.f. (see Appendix A)

| | |
|----------------------------------|-------------------------------|
| proposed structures: | 7,692 S.F. (0.18 AC.) |
| proposed hardscape: | 49,473 S.F. (1.13 AC.) |
| <u>proposed landscaping:</u> | <u>43,637 S.F. (1.00 AC.)</u> |
| Total area tributary to Basin 4: | 100,802 S.F. (2.31 AC.) |

The project is designed to be in conformance with the Flood Control Standard Conditions allowing a maximum outflow of 0.07 cfs per acre of development for a 25-year storm event and a storage volume \geq .10 acre-ft per acre of development.

EXISTING SITE

The site is currently undeveloped and consists of 4 parcels split by Union Valley Parkway (East-West) and Orcutt Road (North-South). The site slopes to the northwest utilizing culverts to drain under roadways. The site ultimately discharges at the northwest corner into a channel then piped under Highway 135.

PROPOSED SITE

Tributary Areas

The developed on-site tributary areas are separated into Drainage Management Areas (DMA's) for each basin (see Appendix A). Each DMA is typically collected in a catch basin, flows through underground pipes, and discharges into the detention basins through various outlet structures. DMA's are separated and defined as follows: Structures, Hardscape areas (drive-aisles, parking, sidewalks, etc.) and Landscaped areas. The purpose of subdividing the project area into these areas is to calculate the total amount of runoff to the basin and to properly design an adequate outlet of the prescribed outflow set by the Santa Barbara County Flood Control Requirements.

DMA #1 is tributary to Basin #1. DMA #1 Consists of 295,260 s.f. of structures.

DMA #2 is tributary to Basin #1. DMA #2 Consists of 340,388 s.f. of hardscaped areas.

DMA #3 is tributary to Basin #1. DMA #3 consists of 472,130 s.f. of landscaped areas.

DMA #4 is tributary to Basin #2. DMA #4 consists of 120,611 s.f. of structures.

DMA #5 is tributary to Basin #2. DMA #5 consists of 216,542 s.f. of hardscaped areas.

DMA #6 is tributary to Basin #2. DMA #6 consists of 202,724 s.f. of landscaped areas.

DMA#7 is tributary to Basin #3. DMA #7 consists of 8,600 s.f. of structures.

DMA #8 is tributary to Basin #3. DMA #8 consists of 32,706 s.f. of hardscaped areas.

DMA #9 is tributary to Basin #3. DMA #9 consists of 39,520 s.f. of landscaped areas.

DMA #10 is tributary to Basin #4. DMA #10 consists of 7,692 s.f. of structures.

DMA #11 is tributary to Basin #4. DMA #11 consists of 49,473 s.f. of hardscaped areas.

DMA #12 is tributary to Basin #4. DMA #12 consists of 43,637 s.f. of landscaped areas.

BASIN DESIGN:

The goal of the proposed site basin designs are twofold. First, they are designed to provide the required storage and outflow requirements as set forth by the "Santa Barbara County Flood Control and Water Conservation District" as well as meeting the post-construction stormwater requirements set forth by the "Central Coast Regional Water Quality Control Board" These designs minimize the impacts of daily operations throughout the rest of the site. The proposed development is designed to convey all site-generated storm water to the onsite basins at various locations within the proposed development. The bottom of the basins are designed to retain and infiltrate a 1.4" design storm (see separate Storm Water Control Plan). For the purposes of this report, the top of the terminal portion of the basins will be referred to as the basin bottoms. The basins are designed to accommodate a 25-year storm while allowing the proposed development runoff to match historical drainage patterns. The outflow discharge rates do not exceed 0.07 cfs per acre of development for 25-year storm events and the volume of available storage exceeds 0.1 acre-ft per acre of development. The basins were designed using HydroCAD software.

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(805) 934-5767 FAX (805) 934-3448JOB **Richard's Ranch (2142)**PAGE **5 of 18**CALCULATED BY **AMP** DATE **01/07/25**CHECKED BY **RJG** DATE **01/07/25****Basin 1:**

The basin receives flows from DMA's 1 thru 3. Flows enter a series of catch basins which discharge directly into the basin. The basin has a 1" bleeder orifice at 338.00 and discharges through a series of pipes into the existing drainage ditch at the northwest of the development along Highway 135.

| | <u>Elevation</u> | <u>Area</u> | <u>Perimeter</u> |
|--------------|------------------|--------------|------------------|
| Basin Bottom | 338.00' | 70,122 S.F. | 1,176.47 L.F. |
| Depth 0.75' | 338.75' | 75,752 S.F. | 1,200.26 L.F. |
| Depth 1.75' | 339.75' | 81,832 S.F. | 1,231.81 L.F. |
| Depth 2.75' | 340.75' | 88,070 S.F. | 1,263.29 L.F. |
| Depth 3.75' | 341.75' | 94,465 S.F. | 1,294.76 L.F. |
| Depth 4.75' | 342.75' | 101,018 S.F. | 1,326.20 L.F. |
| Depth 5.75' | 343.75' | 107,727 S.F. | 1,357.65 L.F. |
| Depth 6.75' | 344.75' | 114,594 S.F. | 1,389.08 L.F. |

Acres tributary to basin: 25.43 acres
 Storage Volume Required: 2.54 acre-ft
 Storage Volume Provided: 14.30 acre-ft

Maximum Outflow from a 25-year storm event = 0.03 cfs

Events for Pond P1: SCM1

| Event | Inflow (cfs) | Outflow (cfs) | Primary (cfs) | Secondary (cfs) | Elevation (feet) | Storage (cubic-feet) |
|---------|-----------------|------------------|------------------|--------------------|---------------------|-------------------------|
| 25 YEAR | 17.84 | 0.03 | 0.03 | 0.00 | 339.73 | 131,950 |

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Inflow Area = 25.431 ac, 57.38% Impervious, Inflow Depth = 1.45" for 25 YEAR event
 Inflow = 17.84 cfs @ 10.00 hrs, Volume= 3.065 af
 Outflow = 0.03 cfs @ 24.69 hrs, Volume= 0.067 af, Atten= 100%, Lag= 880.9 min
 Primary = 0.03 cfs @ 24.69 hrs, Volume= 0.067 af
 Secondary= 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.060000000 hrs / 2

Peak Elev= 339.73' @ 24.69 hrs Surf.Area= 151,839 sf Storage= 131,950 cf

Plug-Flow detention time= 925.2 min calculated for 0.067 af (2% of inflow)

Center-of-Mass det. time= 585.6 min (1,427.4 - 841.8)

| Volume | Invert | Avail.Storage | Storage Description |
|--------|---------|---------------|---|
| #1 | 337.75' | 0 cf | Sump (Prismatic) Listed below (Recalc) 17,494 cf Overall x 0.0% Voids |
| #2 | 338.00' | 622,988 cf | Active (Prismatic) Listed below (Recalc) |
| | | 622,988 cf | Total Available Storage |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 337.75 | 69,830 | 0 | 0 |
| 338.00 | 70,122 | 17,494 | 17,494 |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 338.00 | 70,122 | 0 | 0 |
| 338.75 | 75,752 | 54,703 | 54,703 |
| 339.75 | 81,832 | 78,792 | 133,495 |
| 340.75 | 88,070 | 84,951 | 218,446 |
| 341.75 | 94,465 | 91,268 | 309,713 |
| 342.75 | 101,018 | 97,742 | 407,455 |
| 343.75 | 107,727 | 104,373 | 511,827 |
| 344.75 | 114,594 | 111,161 | 622,988 |

| Device | Routing | Invert | Outlet Devices |
|--------|-----------|---------|---|
| #1 | Primary | 338.00' | 1.0" Vert. Orifice/Grate C= 0.600 |
| #2 | Secondary | 343.25' | 12.0" x 12.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads |

Primary OutFlow Max=0.03 cfs @ 24.69 hrs HW=339.73' (Free Discharge)↑**1=Orifice/Grate** (Orifice Controls 0.03 cfs @ 6.26 fps)**Secondary OutFlow** Max=0.00 cfs @ 0.00 hrs HW=337.75' (Free Discharge)↑**2=Orifice/Grate** (Controls 0.00 cfs)

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The basin receives flows from DMA's 4 thru 6. Flows enter a series of catch basins which discharge directly into the basin. The basin has a 1.5" bleeder orifice at 344.75' and a second 3.3" orifice at 346.60'. Basin 2 discharges through a series of pipes into the existing drainage ditch at the northwest of the development along Highway 135.

| | <u>Elevation</u> | <u>Area</u> | <u>Perimeter</u> |
|--------------|------------------|-------------|------------------|
| Basin Bottom | 344.75' | 7,629 S.F. | 381.56 L.F. |
| Depth 0.25' | 345.00' | 8,013 S.F. | 387.85 L.F. |
| Depth 1.25' | 346.00' | 9,615 S.F. | 412.98 L.F. |
| Depth 2.25' | 347.00' | 11,317 S.F. | 438.12 L.F. |
| Depth 3.25' | 348.00' | 13,119 S.F. | 463.25 L.F. |
| Depth 4.25' | 349.00' | 15,022 S.F. | 488.39 L.F. |
| Depth 5.25' | 350.00' | 17,026 S.F. | 513.52 L.F. |

Acres tributary to basin: 12.39 acres
 Storage Volume Required: 1.24 acre-ft
 Storage Volume Provided: 1.46 acre-ft

Maximum Outflow from a 25-year storm event = 0.55 cfs

Events for Pond P2: SCM2

| Event | Inflow (cfs) | Outflow (cfs) | Primary (cfs) | Tertiary (cfs) | Elevation (feet) | Storage (cubic-feet) |
|---------|-----------------|------------------|------------------|-------------------|---------------------|-------------------------|
| 25 YEAR | 9.80 | 0.55 | 0.55 | 0.00 | 348.99 | 47,343 |

Summary for Pond P2: SCM2

Inflow Area = 12.394 ac, 62.45% Impervious, Inflow Depth = 1.60" for 25 YEAR event
 Inflow = 9.80 cfs @ 10.00 hrs, Volume= 1.652 af
 Outflow = 0.55 cfs @ 22.94 hrs, Volume= 1.014 af, Atten= 94%, Lag= 776.3 min
 Primary = 0.55 cfs @ 22.94 hrs, Volume= 1.014 af
 Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.060000000 hrs / 2
 Peak Elev= 348.99' @ 22.94 hrs Surf.Area= 14,999 sf Storage= 47,343 cf

Plug-Flow detention time= 717.7 min calculated for 1.014 af (61% of inflow)
 Center-of-Mass det. time= 541.6 min (1,378.8 - 837.2)

| Volume | Invert | Avail.Storage | Storage Description |
|--------|---------|---------------|---|
| #1 | 344.75' | 63,548 cf | Active (Prismatic) Listed below (Recalc) |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 344.75 | 7,629 | 0 | 0 |
| 345.00 | 8,013 | 1,955 | 1,955 |
| 346.00 | 9,615 | 8,814 | 10,769 |
| 347.00 | 11,317 | 10,466 | 21,235 |
| 348.00 | 13,119 | 12,218 | 33,453 |
| 349.00 | 15,022 | 14,071 | 47,524 |
| 350.00 | 17,026 | 16,024 | 63,548 |

| Device | Routing | Invert | Outlet Devices |
|--------|----------|---------|---|
| #1 | Primary | 344.75' | 1.5" Vert. Orifice/Grate C= 0.600 |
| #2 | Primary | 346.60' | 3.3" Vert. Orifice/Grate C= 0.600 |
| #3 | Tertiary | 349.00' | 12.0" x 12.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads |

Primary OutFlow Max=0.55 cfs @ 22.94 hrs HW=348.99' (Free Discharge)
 ↑ **1=Orifice/Grate** (Orifice Controls 0.12 cfs @ 9.84 fps)
 ↓ **2=Orifice/Grate** (Orifice Controls 0.43 cfs @ 7.22 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=344.75' (Free Discharge)
 ↑ **3=Orifice/Grate** (Controls 0.00 cfs)

Basin 3:

The basin receives flows from DMA's 7 thru 9. Flows enter a series of catch basins which discharge directly into the basin. The basin has a 1.4" bleeder orifice at 335.00' and a second 1.6" orifice at 336.27'. Basin 3 discharges through a series of pipes into the existing drainage ditch at the northwest of the development along Highway 135.

| | <u>Elevation</u> | <u>Area</u> | <u>Perimeter</u> |
|--------------|------------------|-------------|------------------|
| Basin Bottom | 335.00' | 504 S.F. | 107.41 L.F. |
| Depth 1.00' | 336.00' | 1,195 S.F. | 168.78 L.F. |
| Depth 2.00' | 337.00' | 2,192 S.F. | 230.15 L.F. |
| Depth 3.00' | 338.00' | 3,496 S.F. | 291.52 L.F. |
| Depth 3.50' | 338.50' | 4,263 S.F. | 322.22 L.F. |

Acres tributary to basin: 1.80 acres
 Storage Volume Required: 0.18 acre-ft
 Storage Volume Provided: 0.18 acre-ft

Maximum Outflow from a 25-year storm event = 0.13 cfs

Events for Pond P3: SCM3

| Event | Inflow (cfs) | Outflow (cfs) | Primary (cfs) | Secondary (cfs) | Tertiary (cfs) | Elevation (feet) | Storage (cubic-feet) |
|---------|-----------------|------------------|------------------|--------------------|-------------------|---------------------|-------------------------|
| 25 YEAR | 0.90 | 0.13 | 0.07 | 0.05 | 0.00 | 337.00 | 2,536 |

Summary for Pond P3: SCM3

Inflow Area = 1.856 ac, 51.10% Impervious, Inflow Depth = 1.14" for 25 YEAR event
 Inflow = 0.90 cfs @ 10.01 hrs, Volume= 0.177 af
 Outflow = 0.13 cfs @ 14.21 hrs, Volume= 0.176 af, Atten= 86%, Lag= 251.8 min
 Primary = 0.07 cfs @ 14.21 hrs, Volume= 0.118 af
 Secondary= 0.05 cfs @ 14.21 hrs, Volume= 0.058 af
 Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.060000000 hrs / 2
 Peak Elev= 337.00' @ 14.21 hrs Surf.Area= 2,693 sf Storage= 2,536 cf

Plug-Flow detention time= 302.0 min calculated for 0.176 af (100% of inflow)
 Center-of-Mass det. time= 300.1 min (1,174.1 - 874.1)

| Volume | Invert | Avail.Storage | Storage Description |
|--------|---------|---------------|--|
| #1 | 334.50' | 0 cf | Sump (Prismatic) Listed below (Recalc) 195 cf Overall x 0.0% Voids |
| #2 | 335.00' | 7,327 cf | Active (Prismatic) Listed below (Recalc) |
| | | 7,327 cf | Total Available Storage |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 334.50 | 274 | 0 | 0 |
| 335.00 | 504 | 195 | 195 |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 335.00 | 504 | 0 | 0 |
| 336.00 | 1,195 | 850 | 850 |
| 337.00 | 2,192 | 1,694 | 2,543 |
| 338.00 | 3,496 | 2,844 | 5,387 |
| 338.50 | 4,263 | 1,940 | 7,327 |

| Device | Routing | Invert | Outlet Devices |
|--------|-----------|---------|---|
| #1 | Primary | 335.00' | 1.4" Vert. Orifice/Grate C= 0.600 |
| #2 | Secondary | 336.27' | 1.6" Vert. Orifice/Grate C= 0.600 |
| #3 | Tertiary | 337.00' | 12.0" x 12.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads |

Primary OutFlow Max=0.07 cfs @ 14.21 hrs HW=337.00' (Free Discharge)
 ↑**1=Orifice/Grate** (Orifice Controls 0.07 cfs @ 6.70 fps)

Secondary OutFlow Max=0.05 cfs @ 14.21 hrs HW=337.00' (Free Discharge)
 ↑**2=Orifice/Grate** (Orifice Controls 0.05 cfs @ 3.91 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=334.50' (Free Discharge)
 ↑**3=Orifice/Grate** (Controls 0.00 cfs)

Basin 4:

The basin receives flows from DMA's 10 thru 12. Flows enter a series of catch basins which discharge directly into the basin. The basin has a 1" bleeder orifice at 340.30' and a second 1.2" orifice at 342.17'. Basin 4 discharges through a series of pipes into the existing drainage ditch at the northwest of the development along Highway 135.

| | <u>Elevation</u> | <u>Area</u> | <u>Perimeter</u> |
|--------------|------------------|-------------|------------------|
| Basin Bottom | 340.30' | 808 S.F. | 162.34 L.F. |
| Depth 1.30' | 341.00' | 1,406 S.F. | 197.06 L.F. |
| Depth 2.30' | 342.00' | 2,295 S.F. | 248.10 L.F. |
| Depth 3.30' | 343.00' | 3,392 S.F. | 300.20 L.F. |
| Depth 4.30' | 344.00' | 4,683 S.F. | 338.81 L.F. |
| Depth 5.30' | 345.00' | 6,089 S.F. | 363.91 L.F. |

Acres tributary to basin: 2.33 acres
 Storage Volume Required: 0.23 acre-ft
 Storage Volume Provided: 0.34 acre-ft

Maximum Outflow from a 25-year storm event = 0.09 cfs

Events for Pond P4: SCM4

| Event | Inflow (cfs) | Outflow (cfs) | Primary (cfs) | Secondary (cfs) | Tertiary (cfs) | Elevation (feet) | Storage (cubic-feet) |
|---------|-----------------|------------------|------------------|--------------------|-------------------|---------------------|-------------------------|
| 25 YEAR | 1.41 | 0.09 | 0.05 | 0.04 | 0.00 | 343.46 | 7,161 |

Summary for Pond P4: SCM4

Inflow Area = 2.314 ac, 56.71% Impervious, Inflow Depth = 1.33" for 25 YEAR event
 Inflow = 1.41 cfs @ 10.01 hrs, Volume= 0.256 af
 Outflow = 0.09 cfs @ 23.42 hrs, Volume= 0.165 af, Atten= 94%, Lag= 804.5 min
 Primary = 0.05 cfs @ 23.42 hrs, Volume= 0.094 af
 Secondary= 0.04 cfs @ 23.42 hrs, Volume= 0.072 af
 Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.060000000 hrs / 2
 Peak Elev= 343.46' @ 23.42 hrs Surf.Area= 4,792 sf Storage= 7,161 cf

Plug-Flow detention time= 687.1 min calculated for 0.165 af (64% of inflow)
 Center-of-Mass det. time= 522.3 min (1,381.3 - 859.1)

| Volume | Invert | Avail.Storage | Storage Description |
|--------|---------|---------------|--|
| #1 | 340.00' | 0 cf | Sump (Prismatic) Listed below (Recalc) 229 cf Overall x 0.0% Voids |
| #2 | 340.30' | 14,892 cf | Active (Prismatic) Listed below (Recalc) |
| | | 14,892 cf | Total Available Storage |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 340.00 | 717 | 0 | 0 |
| 340.30 | 808 | 229 | 229 |

| Elevation (feet) | Surf.Area (sq-ft) | Inc.Store (cubic-feet) | Cum.Store (cubic-feet) |
|---------------------|----------------------|---------------------------|---------------------------|
| 340.30 | 808 | 0 | 0 |
| 341.00 | 1,406 | 775 | 775 |
| 342.00 | 2,295 | 1,851 | 2,625 |
| 343.00 | 3,392 | 2,844 | 5,469 |
| 344.00 | 4,683 | 4,038 | 9,506 |
| 345.00 | 6,089 | 5,386 | 14,892 |

| Device | Routing | Invert | Outlet Devices |
|--------|-----------|---------|---|
| #1 | Primary | 340.30' | 1.0" Vert. Orifice/Grate C= 0.600 |
| #2 | Secondary | 342.17' | 1.2" Vert. Orifice/Grate C= 0.600 |
| #3 | Tertiary | 343.50' | 12.0" x 12.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads |

Primary OutFlow Max=0.05 cfs @ 23.42 hrs HW=343.46' (Free Discharge)
 ↑1=Orifice/Grate (Orifice Controls 0.05 cfs @ 8.50 fps)

Secondary OutFlow Max=0.04 cfs @ 23.42 hrs HW=343.46' (Free Discharge)
 ↑2=Orifice/Grate (Orifice Controls 0.04 cfs @ 5.36 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=340.00' (Free Discharge)
 ↑3=Orifice/Grate (Controls 0.00 cfs)

CONCLUSION

In conclusion we have come up with 4 basin designs that individually, as well as combined, meet the detention and outflow requirements set forth by the Santa Barbara County Flood Control District.

Basins shall be designed with:

- 1. Not less than 0.07 acre feet per acre for residential developments or 0.10 acre feet per acre for commercial/industrial developments*

Total Project = 43.76 acres

43.76 acres x 0.10 = **4.38 acre-feet required**

Basin 1 = 14.30 acre-feet provided

Basin 2 = 1.46 acre-feet provided

Basin 3 = 0.18 acre-feet provided

Basin 4 = 0.34 acre-feet provided

Total volume provided = 16.28 acre-feet

OK

- 2. A gravity bleeder line that reduces storm water runoff (maximum outflow discharge) from a 25-year 24-hour storm event developed condition to 0.07 cubic feet per second per acre.*

Total Project = 43.76 acres

43.76 acres x 0.07 = **3.06 cfs** (max allowable outflow in a 25-year storm event)

Basin 1 = 0.03 cfs

Basin 2 = 0.55 cfs

Basin 3 = 0.13 cfs

Basin 4 = 0.09 cfs

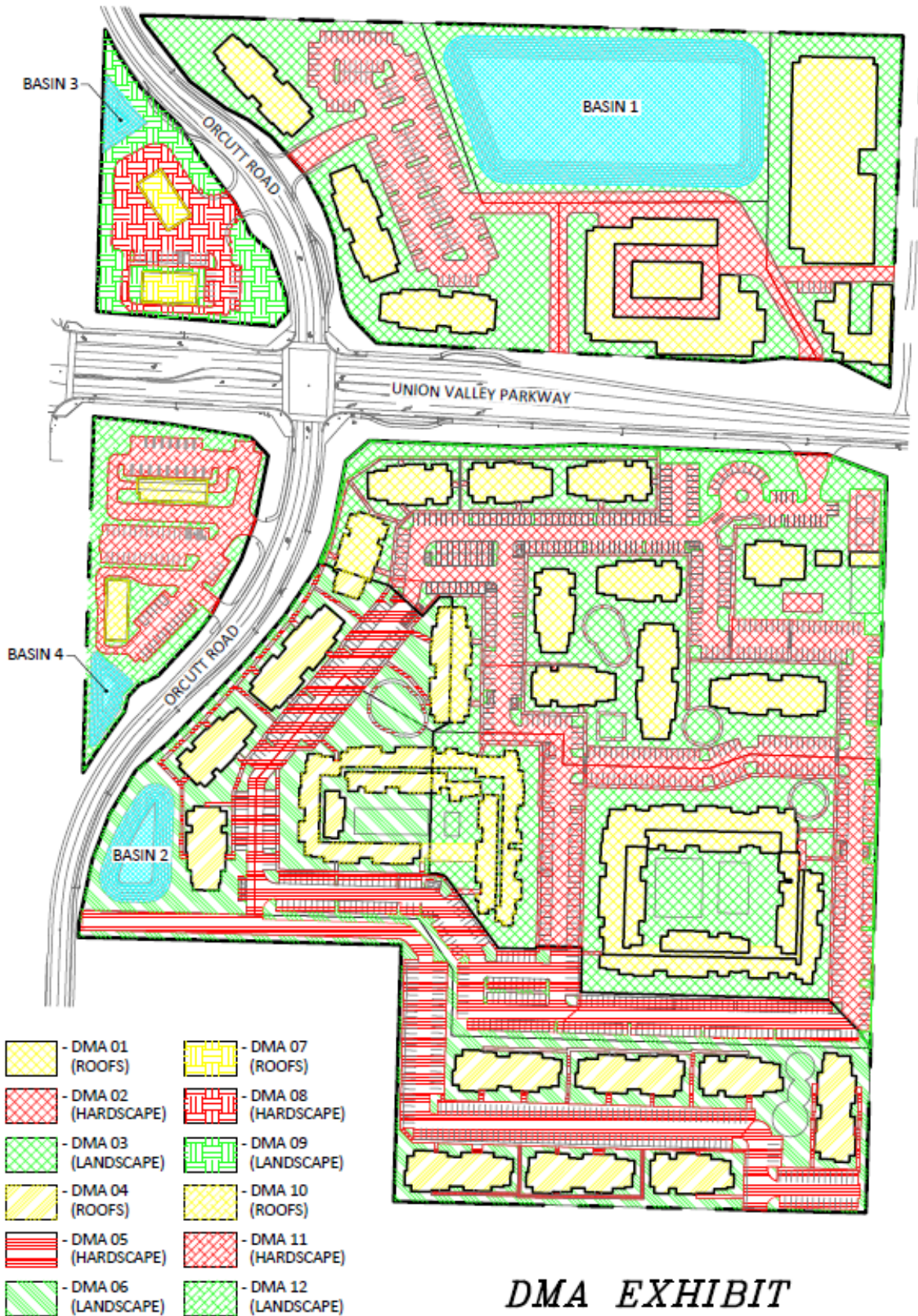
Total = 0.80 cfs

OK

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PAGE **14 of 18**
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Appendix A: DMA Exhibit



DMA EXHIBIT

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PAGE **16 of 18**

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Appendix B: Soil Map



Hydrologic Soil Group

| Map unit symbol | Map unit name | Rating | Acres in AOI | Percent of AOI |
|-----------------------------|--|--------|--------------|----------------|
| BmA | Betteravia loamy sand, 0 to 2 percent slopes | A | 11.1 | 21.1% |
| MaA | Marina sand, 0 to 2 percent slopes | B | 5.8 | 11.0% |
| OcD3 | Oceano sand, 2 to 15 percent slopes, severely eroded | A | 35.7 | 68.0% |
| Totals for Area of Interest | | | 52.6 | 100.0% |

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.