

**FOR OFFICE USE ONLY:**

Does this project require permanent storm water BMP's?

Y N

Date Submitted: \_\_\_\_\_



File No:	Quadrant
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## 2017 Storm Water LID Determination Worksheet

**PURPOSE AND APPLICABILITY:** This determination worksheet is intended to satisfy the specific requirements of "ORDER NO. R1-2015-0030, NPDES NO. CA0025054 NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT AND WASTE DISCHARGE REQUIREMENTS FOR DISCHARGES FROM THE MUNICIPAL SEPARATE STORM SEWER SYSTEMS." Additional design requirements imposed by Governing Agencies, such as local grading ordinances, CAL Green, CEQA, 401 permitting, and hydraulic design for flood control still apply as appropriate. Additionally, coverage under another regulation may trigger the requirement to design in accordance with the Storm Water LID Technical Design Manual.

### Part 1: Project Information

Project Name Applicant (owner or developer) Name

Project Site Address Applicant Mailing Address

Project City/State/Zip Applicant City/State/Zip

Permit Number(s) - (if applicable) Applicant Phone/Email/Fax

Designer Name Designer Mailing Address

Designer City/State/Zip Designer Phone/Email

### **Type of Application/Project:**

Subdivison      Grading Permit      Building Permit      Hillside Development  
 DesignReview      Use Permit      Encroachment      Time Extensions      Other : \_\_\_\_\_

### PART 2: Project Exemptions

1. Is this a project that creates or replaces *less than* 10,000 square feet of impervious surface<sup>1</sup>, including all project phases and off-site improvements?

Yes No

<sup>1</sup> Impervious surface replacement, such as the reconstruction of parking lots or excavation to roadway subgrades, is not a routine maintenance activity. Reconstruction is defined as work that replaces surfaces down to the subgrade. Overlays, resurfacing, trenching and patching are defined as maintenance activities per section VI.D.2.b.

## 2017 Storm Water LID Determination Worksheet

2. Is this project a routine maintenance activity<sup>2</sup> that is being conducted to maintain original line and grade, hydraulic capacity, and original purpose of facility such as resurfacing existing roads and parking lots?

Yes                  No

3. Is this project a stand alone pedestrian pathway, trail or off-street bike lane?

Yes                  No

4. **Did you answer "YES" to any of the questions in Part 2?**

**YES:** This project will *not* need to incorporate permanent Storm Water BMP's as required by the NPDES MS4 Permit. **Please complete the "Exemption Signature Section" on Page 4.**

**NO:** Please complete the remainder of this worksheet.

### **Part 3: Project Triggers**

#### **Projects that Trigger Requirements:**

Please answer the following questions to determine whether this project requires permanent Storm Water BMP's and the submittal of a SW LIDs as required by the NPDES MS4 Permit order No. R1-2015-0030.

1. Does this project create or replace a combined total of 10,000 square feet or more of impervious surface<sup>1</sup> including all project phases and off-site improvements?

Yes                  No

2. Does this project create or replace a combined total or 10,000 square feet or more of impervious streets, roads, highways, or freeway construction or reconstruction<sup>3</sup>?                  Yes                  No

3. Does this project create or replace a combined total of 1.0 acre or more of impervious surface<sup>1</sup> including all project phases and off-site improvements?                  Yes                  No

4. **Did you answer "YES" to any of the above questions in Part 3?**

**YES:** This project will need to incorporate permanent Storm Water BMP's as required by the NPDES MS4 Permit. **Please complete remainder of worksheet and sign the "Acknowledgement Signature Section" on Page 4.**

**NO:** This project will *not* need to incorporate permanent Storm Water BMP's as required by the NPDES MS4 permit. **Please complete the "Exemption Signature Section" on Page 4.**

<sup>1</sup> Impervious surface replacement, such as the reconstruction of parking lots or excavation to roadway subgrades, is not a routine maintenance activity. Reconstruction is defined as work that replaces surfaces down to the subgrade. Overlays, resurfacing, trenching and patching are defined as maintenance activities per section VI.D.2.b.

<sup>2</sup> "Routine Maintenance Activity" includes activities such as overlays and/or resurfacing of existing roads or parking lots as well as trenching and patching activities and reroofing activities per section VI.D.2.b.

<sup>3</sup> "Reconstruction" is defined as work that extends into the subgrade of a pavement per section VI.D.2.b.

1. Total Project area: \_\_\_\_\_ square feet  
\_\_\_\_\_ acres

Commercial      Industrial      Residential      Public      Other

3. Existing impervious surface area: \_\_\_\_\_ square feet  
\_\_\_\_\_ acres

Commercial      Industrial      Residential      Public      Other

5. Existing impervious surface area: square feet  
acres

2017 Storm Water LID Determination Worksheet

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**Acknowledgment Signature Section:**

As the property owner or developer, I understand that this project is required to implement permanent Storm Water Best Management Practices and provide a Storm Water Low Impact Development Submittal (SW LIDS) as required by the City's National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer Systems (MS4) Permit Order No. R1-2015-0030. \*Any unknown responses must be resolved to determine if the project is subject to these requirements.

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Applicant Signature

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Date**Exemption Signature Section:**

As the property owner or developer, I understand that this project as currently designed does not require permanent Storm Water BMP's nor the submittal of a Storm Water Low Impact Development Submittal (SW LIDS) as required by the City's National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer Systems (MS4) Permit\*. I understand that redesign may require submittal of a new Determination Worksheet and may require permanent Storm Water BMP's.

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Applicant Signature

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Date

\* This determination worksheet is intended to satisfy the specific requirements of "ORDER NO. R1-2015-0030, NPDES NO. CA0025054 NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT AND WASTE DISCHARGE REQUIREMENTS FOR DISCHARGES FROM THE MUNICIPAL SEPARATE STORM SEWER SYSTEMS." Additional design requirements imposed by Governing Agencies, such as local grading ordinances, CAL Green, CEQA, 401 permitting, and hydraulic design for flood control still apply as appropriate. Additionally, coverage under another regulation may trigger the requirement to design in accordance with the Storm Water LID Technical Design Manual.

**Implementation Requirements:** All calculations shall be completed using the "Storm Water Calculator" available at: [www.srcity.org/stormwaterLID](http://www.srcity.org/stormwaterLID)

**Hydromodification Control/100% Volume Capture:** Capture (infiltration and/or reuse) of 100% of the volume of runoff generated by a 1.0" 24-hour storm event, as calculated using the "Urban Hydrology for Small Watersheds" TR-55 Manual method. This is a retention requirement.

**Treatment Requirement:** Treatment of 100% of the flow calculated using the modified Rational Method and a known intensity of 0.20 inches per hour.

**Delta Volume Capture Requirement:** Capture (infiltration and/or reuse) of the increase in volume of storm water due to development generated by a 1.0" 24-hour storm event, as calculated using the "Urban Hydrology for Small Watersheds" TR-55 Manual method. This is a retention requirement.

## Hydromodification Control Requirement

Project: Santa Rosa Apartments  
Address/Location: 2905 Santa Rosa Ave.  
Designer: Walsh Engineering  
Date: December 9, 2019

BMP ID: Stormtech01

### Hydromodification Control Results

$V_{HYDROMOD} = 871.42 \text{ ft}^3$

**Description:** This Hydromodification Control Requirement 100% Volume Capture is the ideal condition and if achieved satisfies all requirements so that no additional treatment is required.

To Navigate back to Input BMP Data worksheet, Please use the "Return to Input BMP Data Worksheet" button.

<<< Return to "Input BMP Data" Worksheet

### Constants from Summary Page:

Reduced Physical Tributary Area that drains to Inlet/BMP: 68,887  $\text{ft}^2$   
Seasonal Precipitation Factor: K = 1.00

**Hydromodification Control Requirement: 100% Volume Capture;**  $V_{HYDROMOD}$   
Capture (infiltration and/or reuse) of 100% of the volume of runoff generated by the 85th percentile 24 hour storm event.  
Required for "Hydromodification Control Requirement" if the project creates or replaces 1 acre or more of impervious surface.

#### Formulas:

$$S = \frac{1000}{CN} - 10$$

$$Q = \frac{[(P \times K) - (0.2 \times S)]^2}{[(P \times K) + (0.8 \times S)]} \times \frac{1 \text{ ft}}{12 \text{ in}}$$

$$V = (Q)(A_r)$$

Where:

S = Potential maximum retention after runoff (in)<sup>[5]</sup>  
CN = Curve Number<sup>[5]</sup>

Where:

Q = Runoff depth (ft)<sup>[6]</sup>  
P = Precipitation (in) = 1.00  
K = Seasonal Precipitation Factor<sup>[7]</sup>

Where:

V = Volume of Storm Water to be Retained (ft<sup>3</sup>)  
 $A_r$  = Reduced Tributary Area including credit for Pollution Prevention Measures (ft<sup>2</sup>)

$A_r = 68,887 \text{ ft}^2$   
 $K = 1.00$

**Input:** (Pick data from drop down lists or enter calculated values)

Drop down Lists

Select post development hydrologic soil type within tributary area<sup>[8]</sup> = A: greater than 0.30 in/hr infiltration (transmission) rate

Select post development ground cover description<sup>[9]</sup> = Brush: weed-grass mixture with brush major element - Poor (<50% ground cover)

$CN_{POST} =$

OR: Composite post development CN<sup>[9]</sup> = 84.0

**NOTE:**

Entering a calculated composite CN will override selections made from the pull down menus above. Calculation worksheet should be used for all composite calculations and included with submittal.

#### Solution:

##### Volume of storm water - Post Development

$S_{POST} = 1.90 \text{ in}$

$S_{POST} = \frac{1000}{84.000} - 10$

Where:

$S_{POST}$  = Post development potential maximum retention after runoff (in).

$Q_{POST} = 0.01265 \text{ ft}$

$Q_{POST} = \frac{[(1.00 \times 1.00) - (0.2 \times 1.905)]^2}{[(1.00 \times 1.00) + (0.8 \times 1.905)]} \times \frac{1 \text{ ft}}{12 \text{ in}}$

$Q_{POST}$  = Q in feet of depth as defined by the "Urban Hydrology For Small Watersheds" TR-55 Manual.

$V_{HYDROMOD} = 871.42 \text{ ft}^3$

$V_{HYDROMOD} = (0.01265)(68,887)$

$V_{HYDROMOD}$  = Post Development Volume of Storm Water to be Retained (ft<sup>3</sup>)

[5] Per the "Urban Hydrology For Small Watersheds" TR-55 manual.

Click for the PDF of the Runoff curve numbers for urban areas. Check the bottom tool bar for open PDF.

[6] Q in feet of depth as defined by the "Urban Hydrology For Small Watersheds" TR-55 Manual.

[7] From Sonoma County Water Agency Flood Control Design Criteria.

Click for PDF of Sonoma County Mean Seasonal Precipitation Map and Graph. Check the bottom tool bar for open PDF.

[8] Hydrologic soil type based on infiltration rate of native soil as defined by "Urban Hydrology For Small Watersheds" TR-55 Manual.

Click for PDF of TR-55 Appendix A Hydrologic Soil Groups. Check for open PDF file on bottom tool bar.

[9] Composite CN calculated per "Worksheet 2 Part 1 of the Urban Hydrology For Small Watersheds" TR-55 manual.

Click for PDF of "Worksheet 2: Runoff curve number and runoff". Check for open PDF file on bottom tool bar.

## Hydromodification Control Requirement

Project: Santa Rosa Apartments  
Address/Location: 2905 Santa Rosa Ave.  
Designer: Walsh Engineering  
Date: December 9, 2019

BMP ID: Stormtech02

### Hydromodification Control Results

$V_{HYDROMOD} = 913.18 \text{ ft}^3$

**Description:** This Hydromodification Control Requirement 100% Volume Capture is the ideal condition and if achieved satisfies all requirements so that no additional treatment is required.

To Navigate back to Input BMP Data worksheet, Please use the "Return to Input BMP Data Worksheet" button.

<<< Return to "Input BMP Data" Worksheet

### Constants from Summary Page:

Reduced Physical Tributary Area that drains to Inlet/BMP: 72,188  $\text{ft}^2$   
Seasonal Precipitation Factor: K = 1.00

**Hydromodification Control Requirement: 100% Volume Capture;**  $V_{hydromod}$   
Capture (infiltration and/or reuse) of 100% of the volume of runoff generated by the 85th percentile 24 hour storm event.  
Required for "Hydromodification Control Requirement" if the project creates or replaces 1 acre or more of impervious surface.

#### Formulas:

$$S = \frac{1000}{CN} - 10$$

$$Q = \frac{[(P \times K) - (0.2 \times S)]^2}{[(P \times K) + (0.8 \times S)]} \times \frac{1 \text{ ft}}{12 \text{ in}}$$

$$V = (Q)(A_r)$$

Where:

S = Potential maximum retention after runoff (in)<sup>[5]</sup>  
CN = Curve Number<sup>[5]</sup>

Where:

Q = Runoff depth (ft)<sup>[6]</sup>  
P = Precipitation (in) = 1.00  
K = Seasonal Precipitation Factor<sup>[7]</sup>

Where:

V = Volume of Storm Water to be Retained (ft<sup>3</sup>)  
 $A_r$  = Reduced Tributary Area including credit for Pollution Prevention Measures (ft<sup>2</sup>)

$A_r = 72,188 \text{ ft}^2$   
 $K = 1.00$

**Input:** (Pick data from drop down lists or enter calculated values)

Drop down Lists

Select post development hydrologic soil type within tributary area<sup>[8]</sup> = A: greater than 0.30 in/hr infiltration (transmission) rate

Select post development ground cover description<sup>[9]</sup> = Brush: weed-grass mixture with brush major element - Poor (<50% ground cover)

$CN_{POST} =$

OR: Composite post development CN<sup>[9]</sup> = 84.0

**NOTE:**

Entering a calculated composite CN will override selections made from the pull down menus above. Calculation worksheet should be used for all composite calculations and included with submittal.

#### Solution:

##### Volume of storm water - Post Development

$S_{POST} = 1.90 \text{ in}$

$S_{POST} = \frac{1000}{84.000} - 10$

Where:

$S_{POST}$  = Post development potential maximum retention after runoff (in).

$Q_{POST} = 0.01265 \text{ ft}$

$Q_{POST} = \frac{[(1.00 \times 1.00) - (0.2 \times 1.905)]^2}{[(1.00 \times 1.00) + (0.8 \times 1.905)]} \times \frac{1 \text{ ft}}{12 \text{ in}}$

$Q_{POST}$  = Q in feet of depth as defined by the "Urban Hydrology For Small Watersheds" TR-55 Manual.

$V_{HYDROMOD} = 913.18 \text{ ft}^3$

$V_{HYDROMOD} = (0.01265)(72,188)$

$V_{HYDROMOD}$  = Post Development Volume of Storm Water to be Retained (ft<sup>3</sup>)

[5] Per the "Urban Hydrology For Small Watersheds" TR-55 manual.

Click for the PDF of the Runoff curve numbers for urban areas. Check the bottom tool bar for open PDF.

[6] Q in feet of depth as defined by the "Urban Hydrology For Small Watersheds" TR-55 Manual.

[7] From Sonoma County Water Agency Flood Control Design Criteria.

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[9] Composite CN calculated per "Worksheet 2 Part 1 of the Urban Hydrology For Small Watersheds" TR-55 manual.

Click for PDF of "Worksheet 2: Runoff curve number and runoff". Check for open PDF file on bottom tool bar.



## User Inputs

<b>Chamber Model:</b>	MC-3500
<b>Outlet Control Structure:</b>	Yes
<b>Project Name:</b>	Santa Rosa Apartments
<b>Engineer:</b>	N/A
<b>Project Location:</b>	California
<b>Measurement Type:</b>	Imperial
<b>Required Storage Volume:</b>	871 cubic ft.
<b>Stone Porosity:</b>	40%
<b>Stone Foundation Depth:</b>	12 in.
<b>Stone Above Chambers:</b>	12 in.
<b>Average Cover Over Chambers:</b>	18 in.
<b>Design Constraint Dimensions:</b>	(20 ft. x 100 ft.)

## Results

### System Volume and Bed Size

<b>Installed Storage Volume:</b>	947.89 cubic ft. <b>x2</b>
<b>Storage Volume Per Chamber:</b>	109.90 cubic ft.
<b>Number Of Chambers Required:</b>	4
<b>Number Of End Caps Required:</b>	2
<b>Chamber Rows:</b>	1
<b>Maximum Length:</b>	34.42 ft.
<b>Maximum Width:</b>	8.42 ft.
<b>Approx. Bed Size Required:</b>	289.67 square ft.

### System Components

<b>Amount Of Stone Required:</b>	44.30 cubic yards
<b>Volume Of Excavation (Not Including Fill):</b>	61.69 cubic yards

