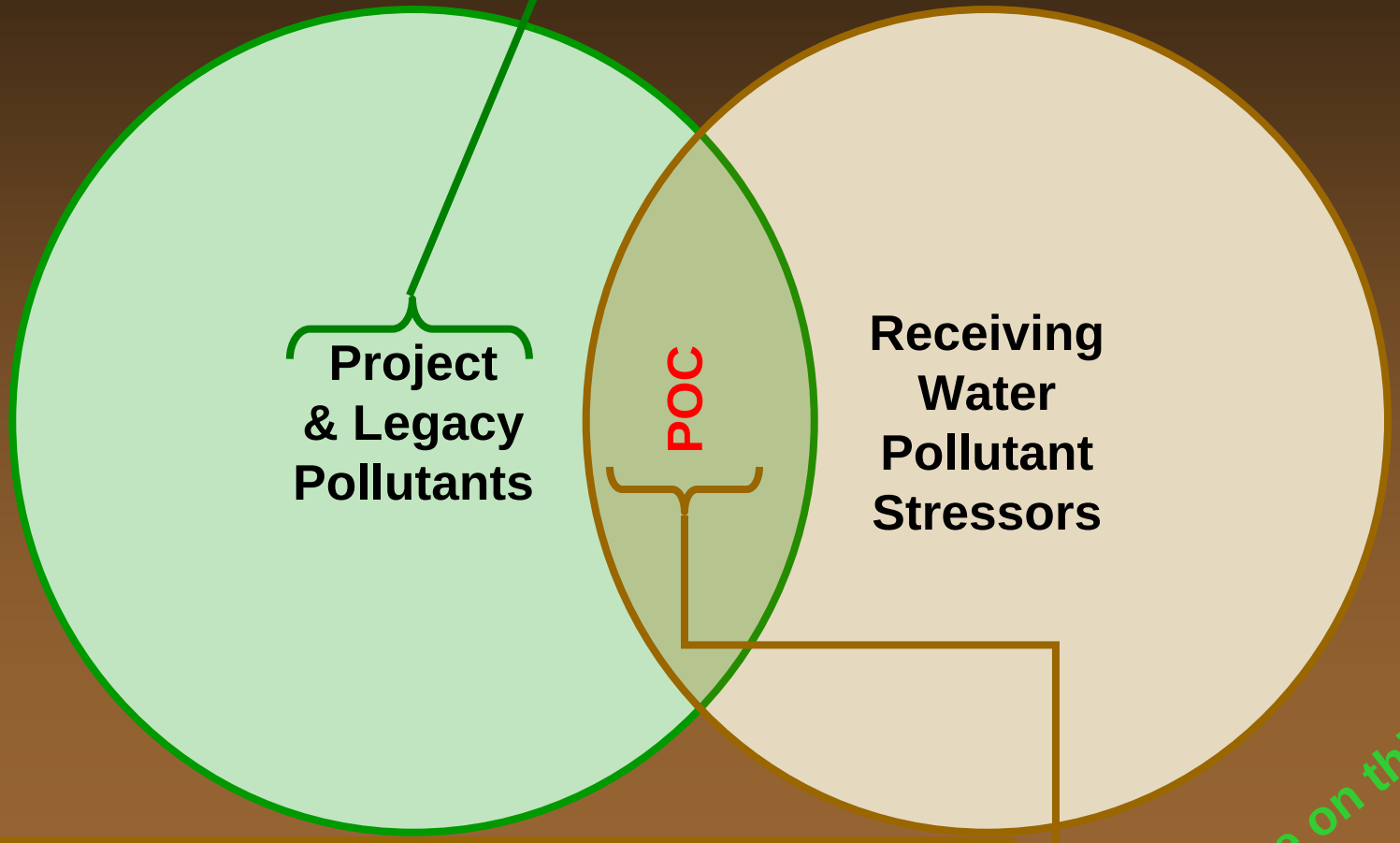
Hands-on Exercise
Pollutants of Concern

Address these pollutants using BMPs



More on this later!

Address these pollutants using BMPS with a High or Medium effectiveness

Hands-on Exercise
WQMP Contents

- Section I – Project Description
- Section II – Site Characterization
- Section III – Pollutants of Concern
- Section IV – Hydrologic Conditions of Concern
- Section V – BMPs
- Section VI – Operation and Maintenance for TBMP
- Section VII – Funding
- Tables
- Appendices

Hands-on Exercise
Section IV - What is HCOC?

- Hydraulic Condition of Concern
  - A change to the hydraulic pattern of a project site that can permanently impact downstream channels and habitat integrity

- Is the Project required to retain urban runoff onsite?
  - Yes – Do NOT need to complete this section
  - No – Complete selection and provide supporting calculations

Whitewater River Region WQMP
Project Title

IV. Hydrologic Conditions of Concern

Local Jurisdiction Requires On-Site Retention of Urban Runoff:

Yes ☐ The project will be required to retain urban runoff onsite in conformance with local ordinance (See Table 6, Permittees Requiring Onsite Retention of Stormwater, of the Whitewater River Region WQMP). This section does not need to be completed.

No ☑ This section must be completed.

Hands-on Exercise
Section IV - HCOC Conditions

- The Project-Specific WQMP must address HCOCs unless it meets one of the following:
  - Condition A
  - Condition B
  - Condition C
    - Requires supporting calculations and reports in Appendix C

This Project meets the following condition:

☑ **Condition A**: Runoff from the Project is discharged directly to a publicly-owned, operated and maintained MS4; the discharge is in full compliance with Permittee requirements for connections and discharges to the MS4 (including both quality and quantity requirements); the discharge would not significantly impact stream habitat in proximate Receiving Waters; and the discharge is authorized by the Permittee.

☐ **Condition B**: The project disturbs less than 1 acre and is not part of a larger common plan of development that exceeds 1 acre of disturbance. The disturbed area calculation must include all disturbances associated with larger plans of development.

☐ **Condition C**: The project's runoff flow rate, volume, velocity and duration for the post-development condition do not exceed the pre-development condition for the 2-year, 24-hour and 10-year 24-hour rainfall events. This condition can be achieved by minimizing impervious area on a site and incorporating other site-design concepts that mimic pre-development conditions. This condition must be substantiated by hydrologic modeling methods acceptable to the Permittee.

☐ **None**

Refer to Section 3.4 of the Whitewater River Region WQMP for additional requirements.

Hands-on Exercise
WQMP Contents

- Section I – Project Description
- Section II – Site Characterization
- Section III – Pollutants of Concern
- Section IV – Hydrologic Conditions of Concern
- Section V – BMPs
- Section VI – Operation and Maintenance for TBMP
- Section VII – Funding
- Tables
- Appendices

Hands-on Exercise
Section V - Best Management Practices

- Site Design and Treatment Control BMPs
  - Is the Project required to retain urban runoff onsite?
    - Yes – Do NOT need to complete this section
    - No – Complete selection and provide supporting calculations

V.1 SITE DESIGN AND TREATMENT CONTROL BMPS

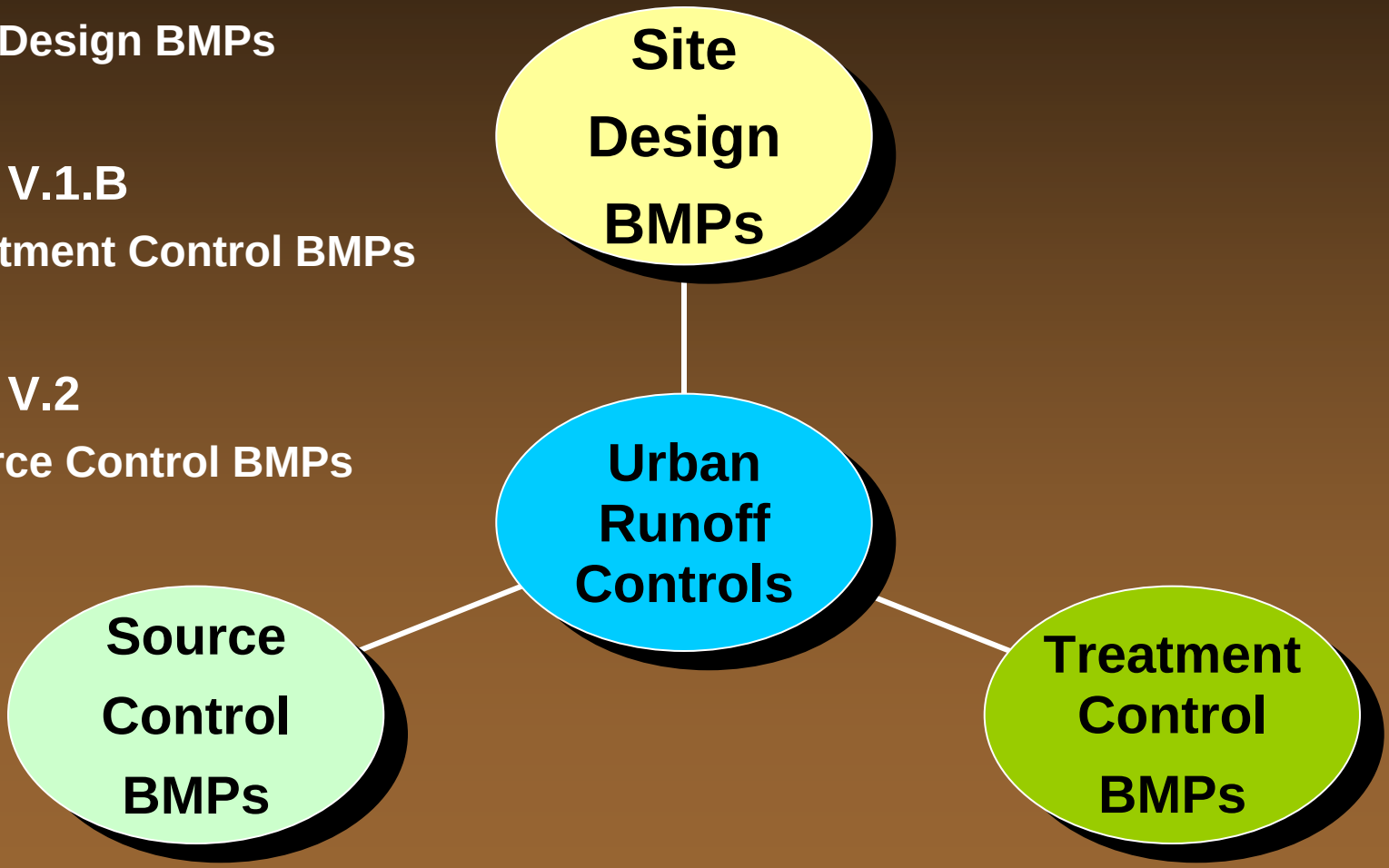
Local Jurisdiction Requires On-Site Retention of Urban Runoff:

Yes ☐ The project will be required to retain urban runoff onsite in conformance with local ordinance (See Table 6, Permittees Requiring Onsite Retention of Stormwater, of the Whitewater River Region WQMP). This section does not need to be completed.

No ☑ This section must be completed.

Hands-on Exercise
Section V - BMP

- Section V.1.A
  - Site Design BMPs
- Section V.1.B
  - Treatment Control BMPs
- Section V.2
  - Source Control BMPs



Hands-on Exercise
Section V.1.A - Site Design BMPs

- Priority Projects must implement the following to the Maximum Extent Practicable:
  - Site design that minimizes volume of runoff
  - Site design that promotes infiltration of precipitation and runoff
  - Site design that provides retention and storage for reuse
  - Site design that utilizes vegetation or engineered soils for evapotranspiration and bioretention.

Measurable Goal

Hands-on Exercise
Section V.1.A – Meeting Measurable Goal

- Cities which have on-site retention ordinances that are equivalent to volumetric or flow based water quality requirements:
  - Are considered to have met this "Measurable Goal"
  - Verify your local ordinances with your NPDES Coordinator

Hands-on Exercise
Section V.1.A - Site Design BMP - Example

Hands-on Exercise
Section V.1.A - Site Design BMP - Example

Hands-on Exercise
Section V.1.A - Site Design BMP - Example

Hands-on Exercise
Section V.1.A – Site Design BMP Summary

- **Strategy**
  - To the extent feasible, do what you can where you can
  - Integrate BMPs throughout the site. Every surface presents an opportunity!
    - Landscaping
    - Hardscaping
  - Use drainage as an organizing element

Hands-on Exercise
Section V.1.A-Measurable Goal Summary

- Site Design BMPs implementation must be detailed
- Strive for Measurable Goal criteria

- If not achieving Measurable Goal – Document should describe the reasons why!

Table 3. Site Design BMPs Measurable Goal Summary

Site Design BMP	Site Design BMP Sizing (if applicable)	Drainage Subarea ID or No.	Site Design BMP Tributary Area (nearest 0.1 acre)
Vegetated Swale	Q = 0.12 ft³/s	A	0.8 Ac.
Infiltration Basin	V = 1,634 ft³	B	2.3 Ac.
Total of Site Design BMP Tributary Areas (nearest 0.1 acre)			2.3 Ac.
Total Project Site Area (nearest 0.1 acre)			2.3 Ac.

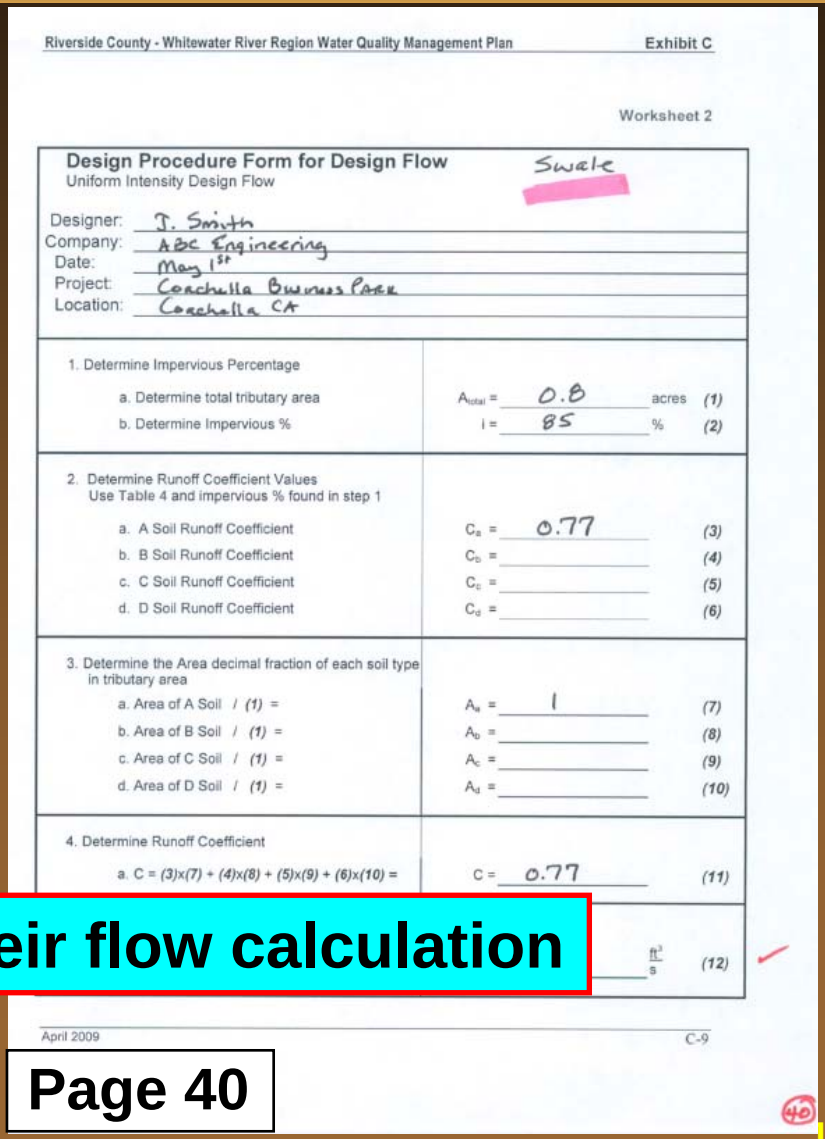
How are these calculated?

Let's look at Appendix F, Page 40

Page 19

Hands-on Exercise
Section V.1.A - Measurable Goal Design Sizing

- Appendix F should contain:
  - Calculation worksheets
  - All design sizing calculations
- Worksheet 2, Design Flow Calculation for the proposed swale



Riverside County - Whitewater River Region Water Quality Management Plan — Exhibit C

Worksheet 2

Design Procedure Form for Design Flow — Swale
Uniform Intensity Design Flow

Designer: J. Smith
Company: ABC Engineering
Date: May 1st
Project: Coachella Business Park
Location: Coachella CA

1. Determine Impervious Percentage		
a. Determine total tributary area	A_{total} = 0.8 acres	(1)
b. Determine Impervious %	I = 85 %	(2)
2. Determine Runoff Coefficient Values Use Table 4 and impervious % found in step 1		
a. A Soil Runoff Coefficient	C_a = 0.77	(3)
b. B Soil Runoff Coefficient	C_b =	(4)
c. C Soil Runoff Coefficient	C_c =	(5)
d. D Soil Runoff Coefficient	C_d =	(6)
3. Determine the Area decimal fraction of each soil type in tributary area		
a. Area of A Soil / (1) =	A_a = 1	(7)
b. Area of B Soil / (1) =	A_b =	(8)
c. Area of C Soil / (1) =	A_c =	(9)
d. Area of D Soil / (1) =	A_d =	(10)
4. Determine Runoff Coefficient		
a. C = (3)x(7) + (4)x(8) + (5)x(9) + (6)x(10) =	C = 0.77	(11)
	ft^3/s	(12)

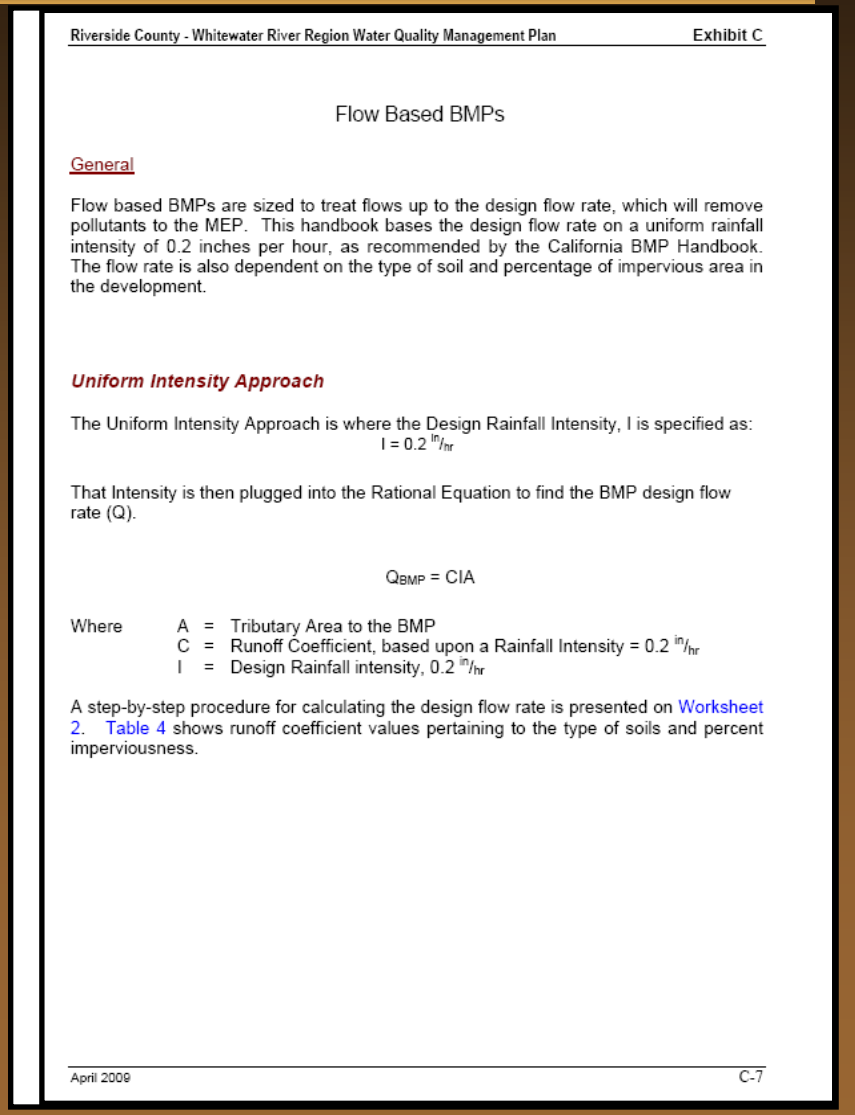
April 2009 C-9

Let's go ahead and check their flow calculation

Page 40

Hands-on Exercise
Section V.1.A - Measurable Goal Design Sizing

- **Exhibit C of the Guidance Document** (located after last green separator page)
  - Stormwater Quality Best Management Practice - Design Handbook
  - Flow Based BMPs - Page C-7
    - Describes the Uniform Intensity Approach



Riverside County - Whitewater River Region Water Quality Management Plan — Exhibit C

Flow Based BMPs

General

Flow based BMPs are sized to treat flows up to the design flow rate, which will remove pollutants to the MEP. This handbook bases the design flow rate on a uniform rainfall intensity of 0.2 inches per hour, as recommended by the California BMP Handbook. The flow rate is also dependent on the type of soil and percentage of impervious area in the development.

Uniform Intensity Approach

The Uniform Intensity Approach is where the Design Rainfall Intensity, I is specified as:

$I = 0.2\ ^{in}/_{hr}$

That Intensity is then plugged into the Rational Equation to find the BMP design flow rate (Q).

$$Q_{BMP} = CIA$$

Where
A = Tributary Area to the BMP
C = Runoff Coefficient, based upon a Rainfall Intensity = $0.2\ ^{in}/_{hr}$
I = Design Rainfall intensity, $0.2\ ^{in}/_{hr}$

A step-by-step procedure for calculating the design flow rate is presented on Worksheet 2. Table 4 shows runoff coefficient values pertaining to the type of soils and percent imperviousness.

April 2009 — C-7

Hands-on Exercise
Section V.1.A –Site Design Q_{BMP}

- Uniform Intensity Approach
  - Use Rational Equation to find Q:
    - QBMP = CIA
    - A – Tributary Area to BMP
    - I = .2 in/hr
    - C – Runoff Coefficient, based on Rainfall intensity of 0.2 in/hr

Page 39A or C-8

Riverside County - Whitewater River Region Water Quality Management Plan — Exhibit C

Table 4. Runoff Coefficients for an Intensity = 0.2 $^{in}/_{hr}$ for Urban Soil Types*

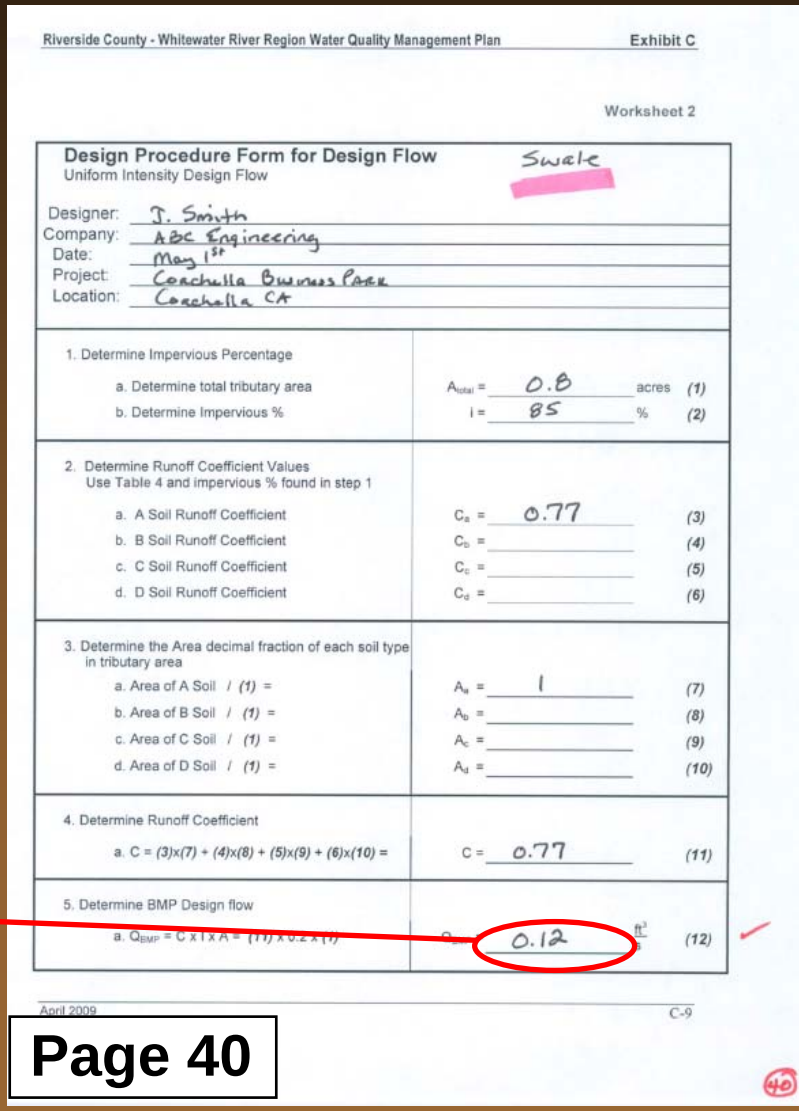
Impervious %	A Soil RI =32	B Soil RI =56	C Soil RI =69	D Soil RI =75
0 (Natural)	0.06	0.14	0.23	0.28
5	0.10	0.18	0.26	0.31
10	0.14	0.22	0.29	0.34
15	0.19	0.26	0.33	0.37
20 (1-Acre)	0.23	0.30	0.36	0.40
25	0.27	0.33	0.39	0.43
30	0.31	0.37	0.43	0.47
35	0.35	0.41	0.46	0.50
40 (1/2-Acre)	0.40	0.45	0.50	0.53
45	0.44	0.48	0.53	0.56
50 (1/4-Acre)	0.48	0.52	0.56	0.59
55	0.52	0.56	0.60	0.62
60	0.56	0.60	0.63	0.65
65 (Condominiums)	0.61	0.64	0.66	0.68
70	0.65	0.67	0.70	0.71
75 (Mobilehomes)	0.69	0.71	0.73	0.74
80 (Apartments)	0.73	0.75	0.77	0.78
85	0.77	0.79	0.80	0.81
90 (Commercial)	0.82	0.82	0.83	0.84
95	0.86	0.86	0.87	0.87
100	0.90	0.90	0.90	0.90

*Complete District's standards can be found in the Riverside County Flood Control Hydrology Manual

85	0.77	0.79	0.80	0.81

Hands-on Exercise
Section V.1.A – Flow Based Q_{BMP}

- Worksheet 2
  - A = 0.8 Ac (area tributary to the swale only)
  - Impervious area = 85%
  - C = 0.77 for 85% impervious
  - Area of A soil = 0.8/0.8 ac = 1
  - I = .2 in/hr
- Q_{BMP} = CIA
- Q_{BMP} = (0.77) (0.2 in/hr) (0.8 Ac)
  = 0.12 Ft^3/s



Riverside County - Whitewater River Region Water Quality Management Plan — Exhibit C

Worksheet 2

Design Procedure Form for Design Flow — Swale
Uniform Intensity Design Flow

Designer: J. Smith
Company: ABC Engineering
Date: May 1st
Project: Coachella Business Park
Location: Coachella CA

1. Determine Impervious Percentage		
a. Determine total tributary area	A_{total} = 0.8 acres	(1)
b. Determine Impervious %	i = 85 %	(2)
2. Determine Runoff Coefficient Values Use Table 4 and impervious % found in step 1		
a. A Soil Runoff Coefficient	C_a = 0.77	(3)
b. B Soil Runoff Coefficient	C_b =	(4)
c. C Soil Runoff Coefficient	C_c =	(5)
d. D Soil Runoff Coefficient	C_d =	(6)
3. Determine the Area decimal fraction of each soil type in tributary area		
a. Area of A Soil / (1) =	A_a = 1	(7)
b. Area of B Soil / (1) =	A_b =	(8)
c. Area of C Soil / (1) =	A_c =	(9)
d. Area of D Soil / (1) =	A_d =	(10)
4. Determine Runoff Coefficient		
a. C = (3)x(7) + (4)x(8) + (5)x(9) + (6)x(10) =	C = 0.77	(11)
5. Determine BMP Design flow		
a. Q_{BMP} = C x I x A = (11) x 0.2 x (1)	Q_{BMP} = 0.12 ft^3	(12)

April 2009 — C-9

Page 40

Hands-on Exercise
Section V.1.A-Measurable Goal Summary

- Swales are utilizing site design techniques to handle Q_{BMP} from 35% of site
- Does this eliminate treatment control use?
  - NO!
    - Infiltration Basin is the project Treatment BMP

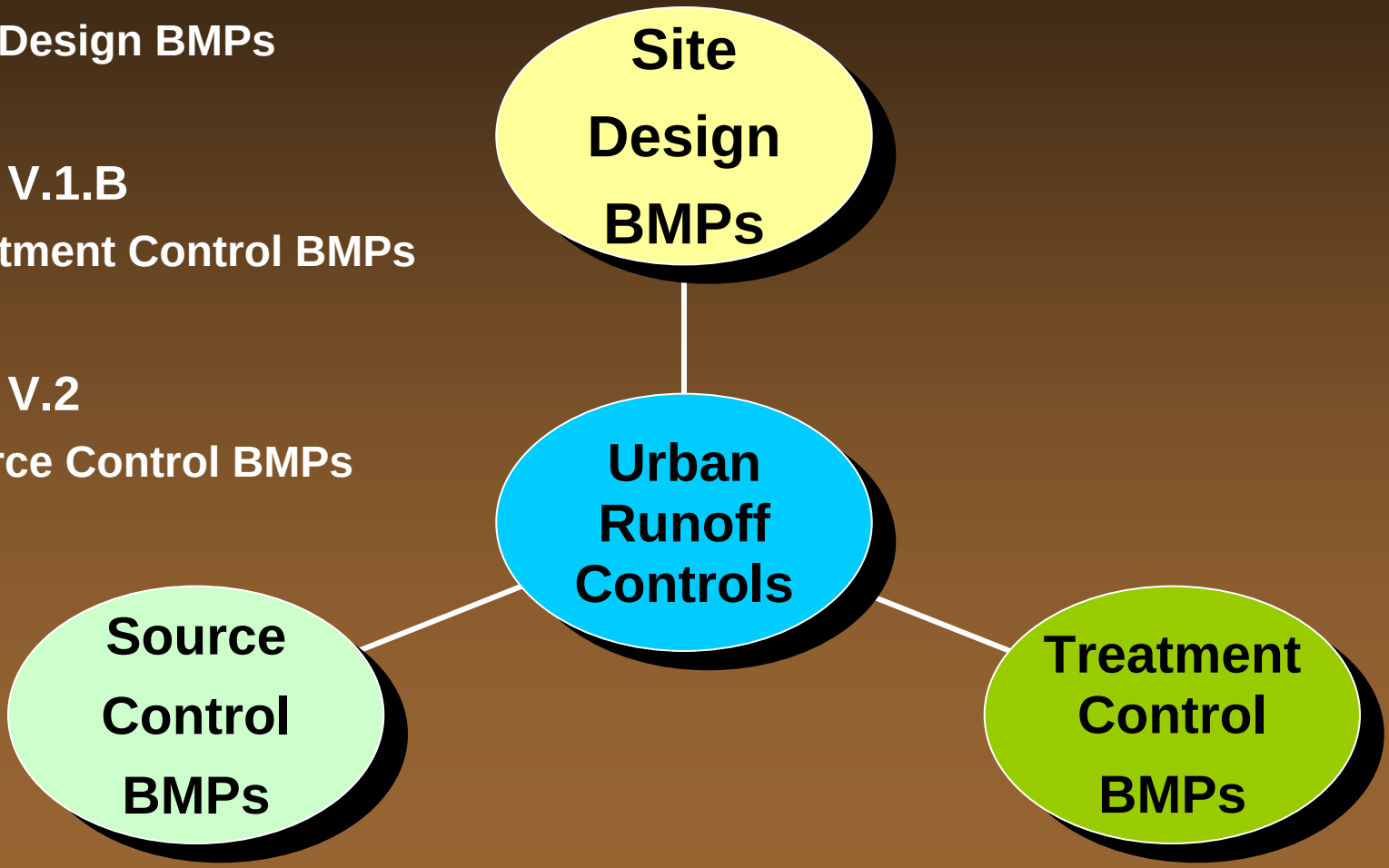
Table 3. Site Design BMPs Measurable Goal Summary

Site Design BMP	Site Design BMP Sizing (	D…	Site Design BMP Tributary Area (nearest 0.1 acre)
Vegetated Swale	Q = …		0.8 Ac.
Infiltration Basin			2.3 Ac.
Total of Site Design BMP Tributary Areas (nearest 0.1 acre)			2.3 Ac.
Total Project Site Area (nearest 0.1 acre)			2.3 Ac.

Basin sizing will be checked later in Appendix F

Hands-on Exercise
Section V – BMPs

- Section V.1.A
  - Site Design BMPs
- Section V.1.B
  - Treatment Control BMPs
- Section V.2
  - Source Control BMPs



Hands-on Exercise
Section V.1.B – Treatment Control BMPs

- Engineered systems designed and constructed to treat the adverse impacts of urban runoff
- BMPs that remove pollutants by…
  - Filtration
  - Media absorption
  - Other physical, biological, or chemical processes

Hands-on Exercise
Treatment Control BMPs - Example

Hands-on Exercise
Treatment Control BMPs - Example

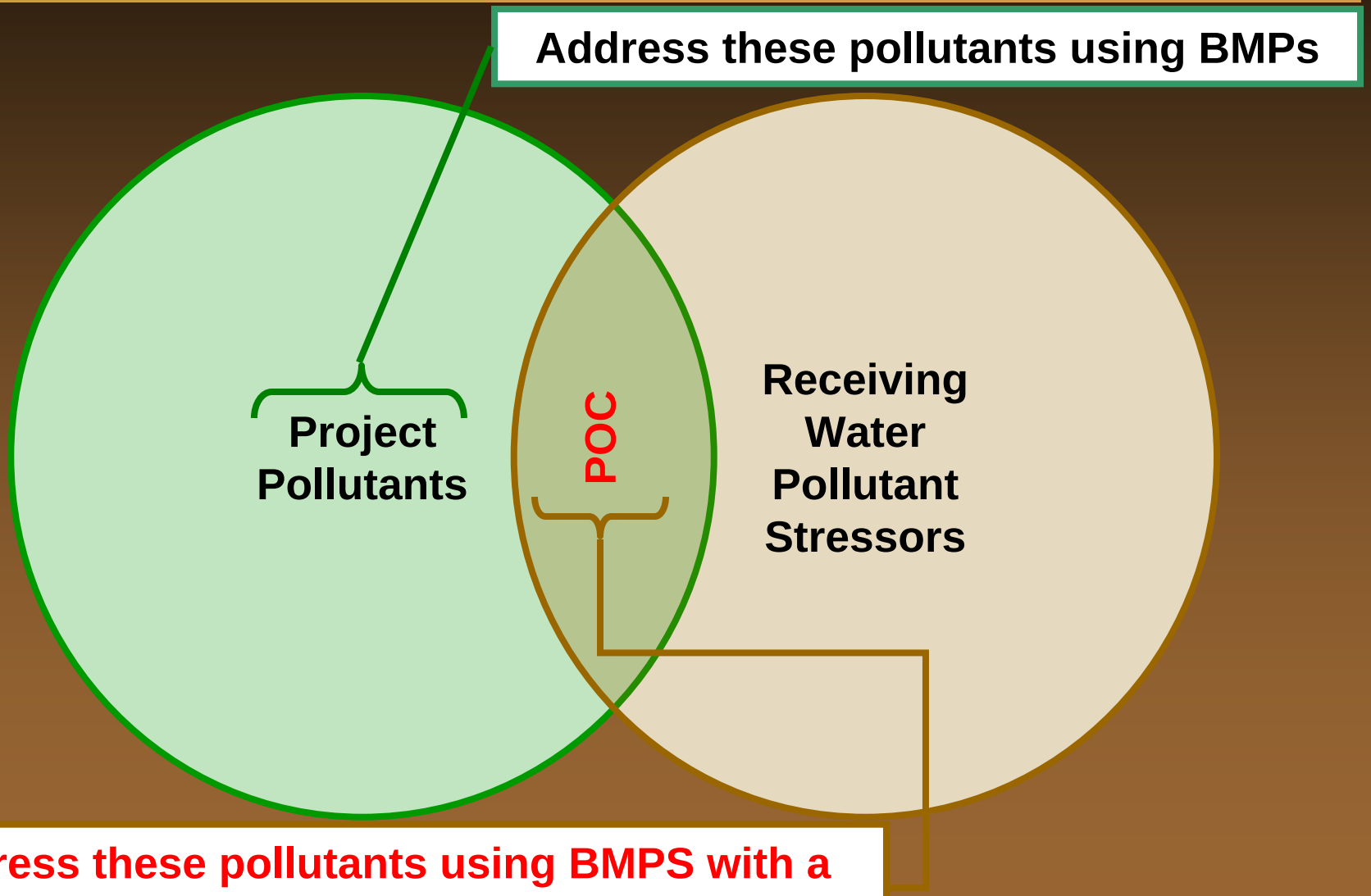
Hands-on Exercise
Treatment Control BMPs - Example

Hands-on Exercise
Section V.1.B – Treatment Control BMPs

- Select treatment controls based on Project Pollutants
- When Project Pollutants include Pollutant Stressors in impaired Receiving Waters, Treatment Control BMPs of Medium or High effectiveness must be used.
- WQMP Guidance Document Table 5, Page 18 identifies Treatment Control BMP Selection Matrix

Pollutant of Concern	Biofilters [2]	Detention Basins [3]	Infiltration BMPs [4]	Wet Ponds or Wetlands [5]	Filtration Systems [6]	Water Quality Inlets	Hydrodynamic Separator Systems [7]	Manufactured or Proprietary Devices [8]
Sediment/Turbidity	H/M	M	H/M	H/M	H/M	L	H/M (L for Turbidity)	U
Nutrients	L	M	H/M	H/M	L/M	L	L	U
Organic Compounds	U	U	U	U	H/M	L	L	U
Trash & Debris	L	M	U	U	H/M	M	H/M	U
Oxygen Demanding Substances	L	M	H/M	H/M	H/M	L	L	U
Bacteria & Viruses	U	U	H/M	U	H/M	L	L	U
Oil & Grease	H/M	M	U	U	H/M	M	L/M	U
Pesticides (non-soil bound)	U	U	U	U	U	L	L	U
Metals	H/M	M	H	H	H	L	L	U

Hands-on Exercise
Section V.1.B – Treatment Control BMPs



Address these pollutants using BMPS with a High or Medium effectiveness

Hands-on Exercise
Section V.1.B – Treatment Control BMPs

Pollutant of Concern	Biofilters [2]	Detention Basins [3]	Infiltration BMPs [4]	Wet Ponds or Wetlands [5]	Filtration Systems [6]	Water Quality Inlets	Hydrodynamic Separator Systems [7]	Manufactured or Proprietary Devices [8]
Sediment/Turbidity	H/M	M	H/M	H/M	H/M	L	H/M (L for Turbidity)	U
Nutrients	L	M	H/M	H/M	L/M	L	L	U
Organic Compounds	U	U	U	U	H/M	L	L	U
Trash & Debris	L	M	U	U	H/M	M	H/M	U
Oxygen Demanding Substances	L	M	H/M	H/M	H/M	L	L	U
Bacteria & Viruses	U	U	H/M	U	H/M	L	L	U
Oil & Grease	H/M	M	U	U	H/M	M	L/M	U
Pesticides (non-soil bound)	U	U	U	U	U	L	L	U
Metals	H/M	M	H	H	H	L	L	U

Project is proposing an Infiltration Basin

- **Sizing of the TBMP will be checked later in Appendix F!**

Hands-on Exercise
Side Bar – Treatment Control BMPs

- **Treatment trains – Find a Medium or Highly effective TC BMP for Pathogens and that also treats for Oils and Grease**

Pollutant of Concern	Biofilters (2)	Detention Basins (3)	Infiltration BMPs (4)	Wet Ponds or Wetlands (5)	Filtration Systems (6)	Water Quality Inlets	Hydrodynamic Separator Systems (7)	Manufactured or Proprietary Devices (8)
Sediment/Turbidity	H/M	M	H/M	H/M	H/M	L	H/M (L for Turbidity)	U
Nutrients	L	M	H/M	H/M	L/M	L	L	U
Organic Compounds	U	U	U	U	H/M	L	L	U
Trash & Debris	L	M	U	U	H/M	M	H/M	U
Oxygen Demanding Substances	L	M	H/M	H/M	H/M	L	L	U
Bacteria & Viruses	U	U	H/M	U	H/M	L	L	U
Oil & Grease	H/M	M	U	U	H/M	M	L/M	U
Pesticides (non-soil bound)	U	U	U	U	U	L	L	U
Metals	H/M	M	H	H	H	L	L	U

Filtration BMP will meet the treatment goals

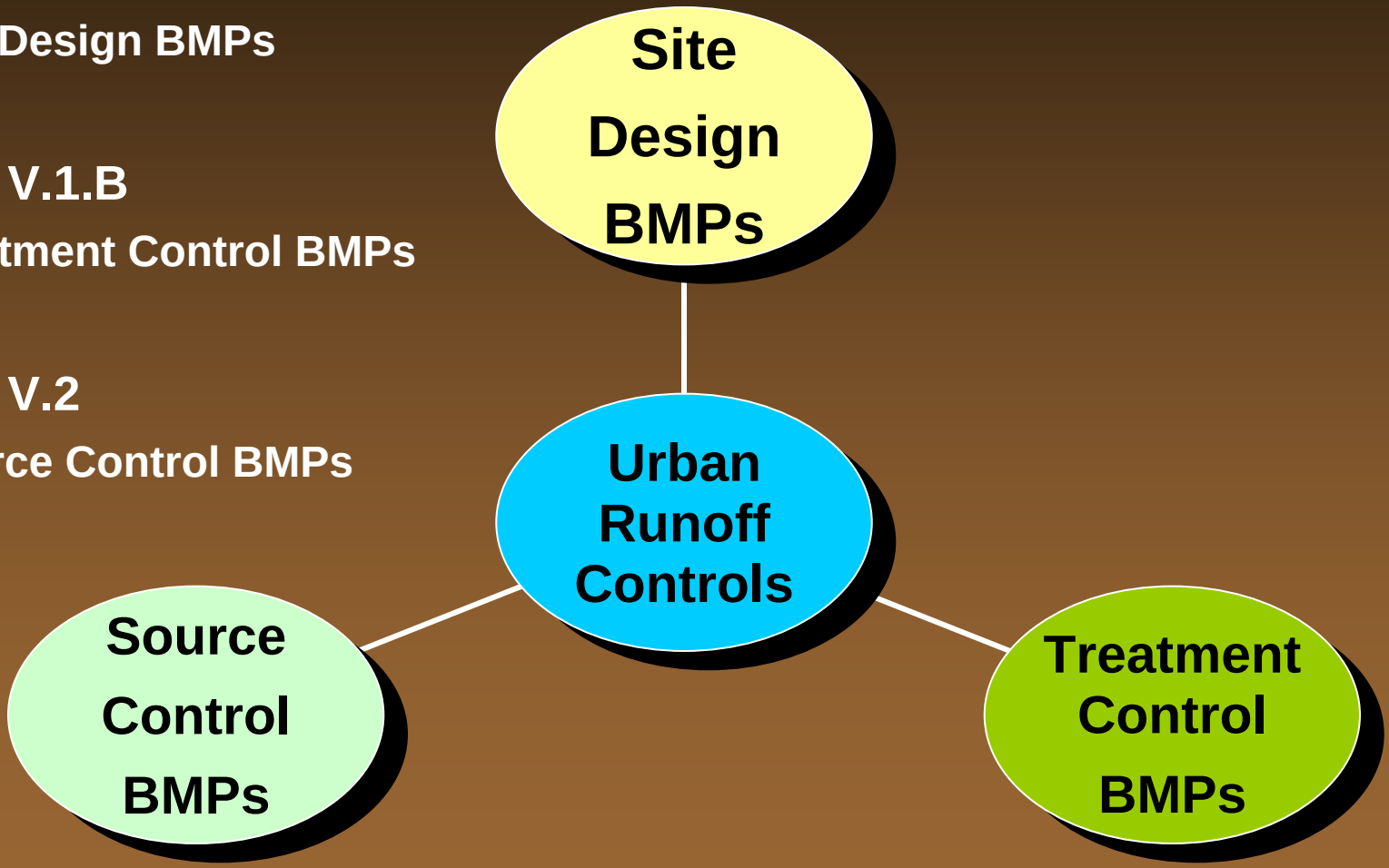
Biofilter BMP + Infiltration BMP will meet the treatment goals

Hands-on Exercise
Section V.1.B – Treatment Control BMPs

- **Strategy**
  - Stick with the BMPs recommended in Table 3 for various pollutants
  - If you deviate, document your reasons in the project file…you may be called on later to explain the change
  - Pay particular attention to the "Notes" at the bottom of the table
  - BMP Treatment Trains (two or more BMPs in series) can provide for a wide range of pollutant removal
- **Latest Information on BMPs**
  - Caltrans Treatment BMP Technology Report
  - April 2008
    - Report CTSW-RT-08-167.02.02

Hands-on Exercise
Section V - BMP

- Section V.1.A
  - Site Design BMPs
- Section V.1.B
  - Treatment Control BMPs
- Section V.2
  - Source Control BMPs



Hands-on Exercise
Section V.2 - Source Control BMPs

- Strategy
  - Reduce potential for rainfall, runoff, and pollutants to contact each other
  - Integrate pollution prevention behaviors into daily routines
    - Educate kids, tenants, owners, employees
    - Mandate thorough activity restrictions and prohibitions

- Must provide detailed description of Source Control implementation

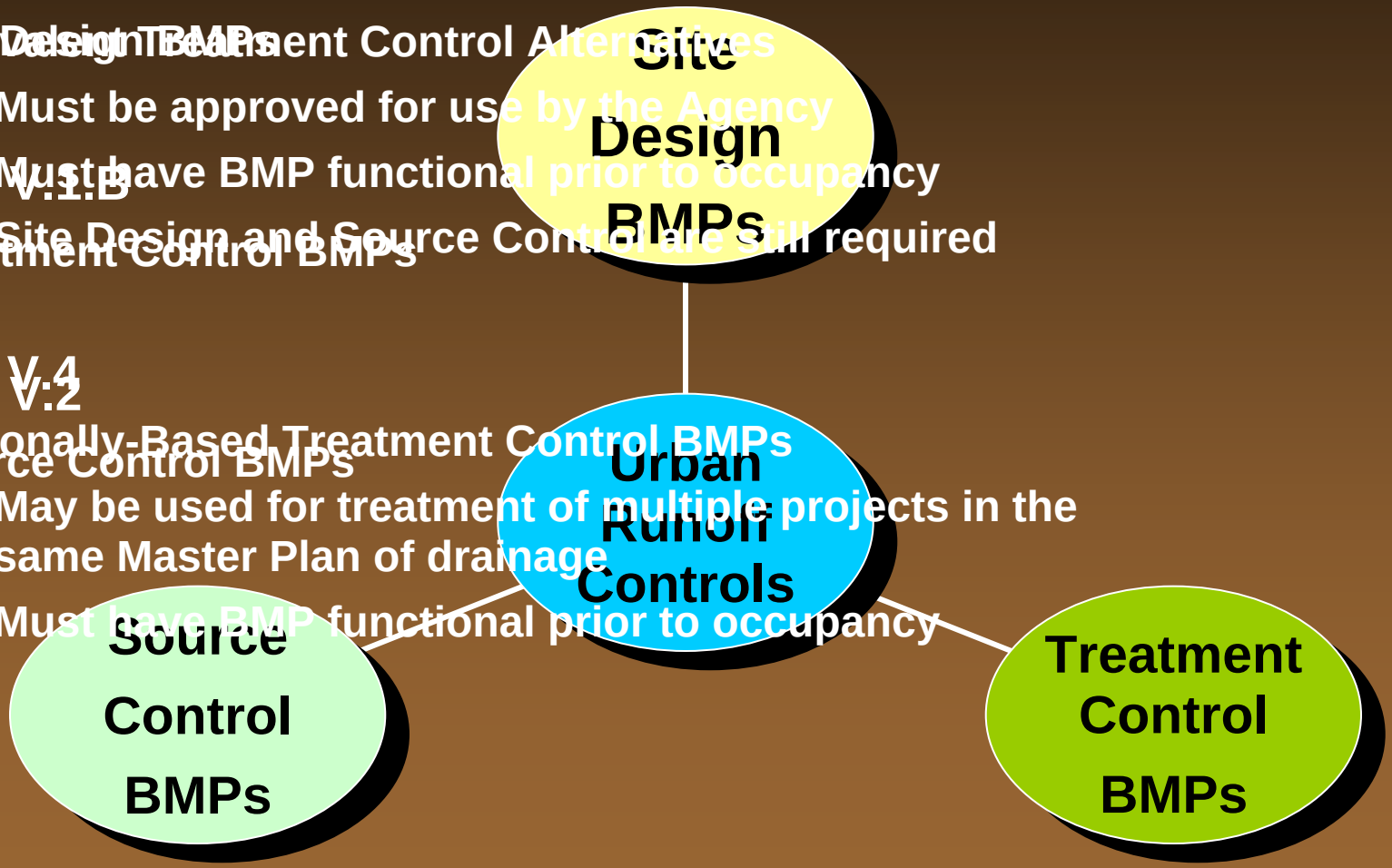
Hands-on Exercise
Section V.2 - Source Control BMP- Example

Hands-on Exercise
Section V.2 – Project Source Control BMPs

- Project implements the following Source Control BMPs:
  - Non-Structural
    - Education/Training
    - Activity Restrictions
    - Irrigation System and Landscape Maintenance
    - Common Area Litter control
    - Parking lot sweeping
  - Structural:
    - Trash storage areas
    - Protecting slopes and channels
    - Landscape irrigation system and design

Section V - BMP

- **Section V.1.A**
  - Site Design BMPs
    - Must be approved for use by the Agency
    - Must have BMP functional prior to occupancy
    - Site Design and Source Control are still required
- **Section V.1.B**
  - Treatment Control BMPs
- **Section V.2**
  - Source Control BMPs
    - May be used for treatment of multiple projects in the same Master Plan of drainage
    - Must have BMP functional prior to occupancy
- **Section V.4**
  - Regionally-Based Treatment Control BMPs
  - Equivalent Treatment Control Alternatives

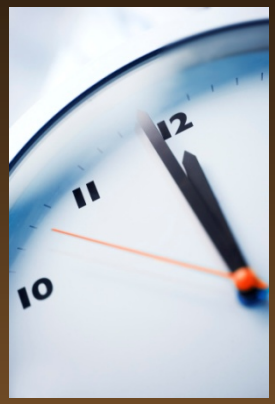


WQMP Contents

- Section I – Project Description
- Section II – Site Characterization
- Section III – Pollutants of Concern
- Section IV – Hydrologic Conditions of Concern
- Section V – BMPs
- Section VI – Operation and Maintenance for TBMP
- Section VII – Funding
- Tables
- Appendices

Hands-on Exercise
Section VI – Operation & Maintenance

- Maintenance mechanisms for BMPs requiring long-term maintenance
  - Includes structural and non-structural BMPs
  - Start-up dates
  - Frequency
- Should identify:
  - All BMPs requiring maintenance
  - Maintenance activities and handling/placement of wastes
  - BMP start up dates
  - Schedule of frequency of O&M activities
  - Responsible party
  - Inspection requirements
  - Record keeping requirements



Hands-on Exercise
Section VI – Swale O & M

- Let's look at the Swale O&M:
  - Vegetated Swales
    - Twice per month:
      - landscape maintenance
      - Inspection
    - Owner is responsible party
    - Inspection/maintenance to occur after a storm event
- What is missing?
  - Start-up date
  - Placement of wastes

Page 26

Hands-on Exercise
Section VI – Swale O & M Source

- California Stormwater Quality BMP Handbook
- Great Source for O&M basic requirements
  - TC-30 Vegetated Swale
    - Mowing frequency
    - Grass height
    - Inspection
    - Trash removal
    - Sediment removal
    - Standing water

TC-30 **Vegetated Swale**

establishment. Where runoff diversion is not possible, cover graded and seeded areas with suitable erosion control materials.

Maintenance

The useful life of a vegetated swale system is directly proportional to its maintenance frequency. If properly designed and regularly maintained, vegetated swales can last indefinitely. The maintenance objectives for vegetated swale systems include keeping up the hydraulic and removal efficiency of the channel and maintaining a dense, healthy grass cover.

Maintenance activities should include periodic mowing (with grass never cut shorter than the design flow depth), weed control, watering during drought conditions, reseeding of bare areas, and clearing of debris and blockages. Cuttings should be removed from the channel and disposed in a local composting facility. Accumulated sediment should also be removed manually to avoid concentrated flows in the swale. The application of fertilizers and pesticides should be minimal.

Another aspect of a good maintenance plan is repairing damaged areas within a channel. For example, if the channel develops ruts or holes, it should be repaired utilizing a suitable soil that is properly tamped and seeded. The grass cover should be thick; if it is not, reseed as necessary. Any standing water removed during the maintenance operation must be disposed to a sanitary sewer at an approved discharge location. Residuals (e.g., silt, grass cuttings) must be disposed in accordance with local or State requirements. Maintenance of grassed swales mostly involves maintenance of the grass or wetland plant cover. Typical maintenance activities are summarized below:

- Inspect swales at least twice annually for erosion, damage to vegetation, and sediment and debris accumulation preferably at the end of the wet season to schedule summer maintenance and before major fall runoff to be sure the swale is ready for winter. However, additional inspection after periods of heavy runoff is desirable. The swale should be checked for debris and litter, and areas of sediment accumulation.
- Grass height and mowing frequency may not have a large impact on pollutant removal. Consequently, mowing may only be necessary once or twice a year for safety or aesthetics or to suppress weeds and woody vegetation.
- Trash tends to accumulate in swale areas, particularly along highways. The need for litter removal is determined through periodic inspection, but litter should always be removed prior to mowing.
- Sediment accumulating near culverts and in channels should be removed when it builds up to 75 mm (3 in.) at any spot, or covers vegetation.
- Regularly inspect swales for pools of standing water. Swales can become a nuisance due to mosquito breeding in standing water if obstructions develop (e.g. debris accumulation, invasive vegetation) and/or if proper drainage slopes are not implemented and maintained.

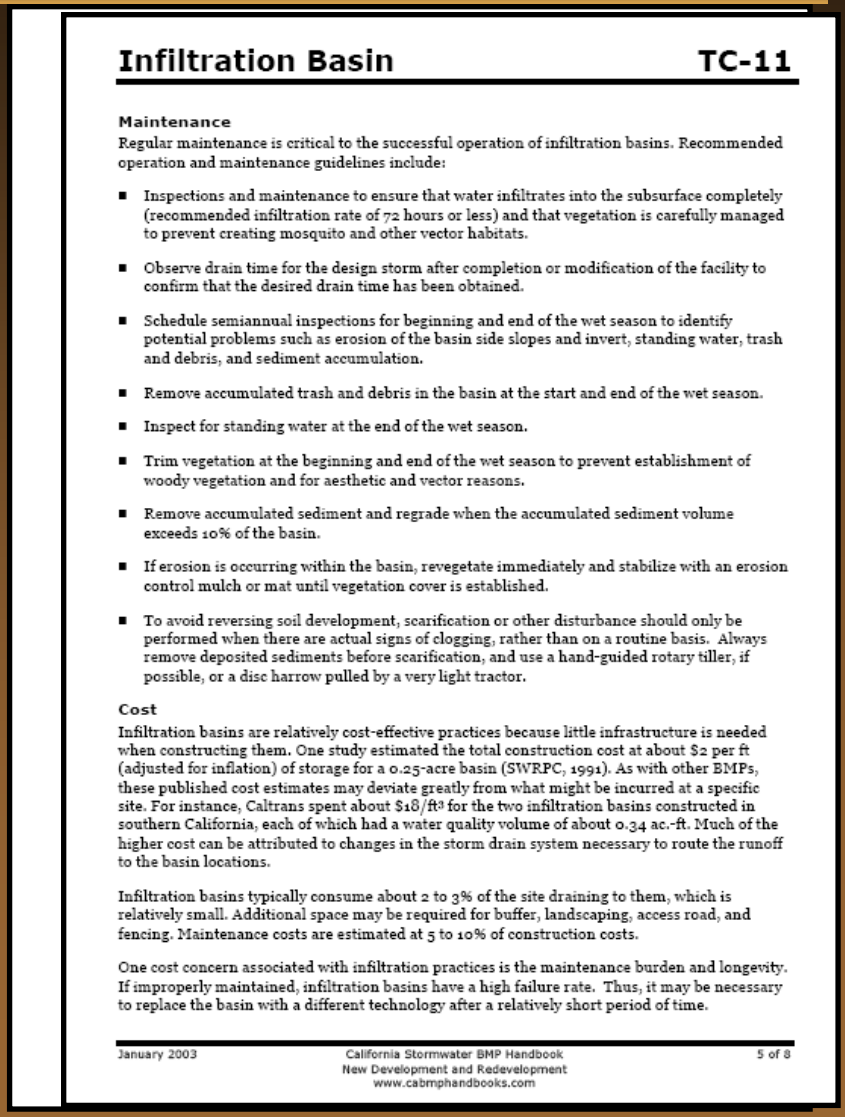
Hands-on Exercise
Section VI – Swale O & M

- Let's look at the Basin O&M:
  - Not covered under O&M in our plancheck document
- What is missing?
  - Landscape Maintenance
    - Schedule and frequency
  - Inspection
    - Schedule and frequency
  - Start-up date
  - Placement of wastes
  - Responsible party
  - What to do if water is still in basin after 48 hours

Page 27

Hands-on Exercise
Section VI – Basin O & M - Source

- California Stormwater Quality BMP Handbook
  - TC-11 Infiltration Basin
    - Vegetation trimming
    - Inspection
    - Trash removal
    - Sediment removal
    - Erosion
    - Standing water
    - Vector issues



Infiltration Basin TC-11

Maintenance

Regular maintenance is critical to the successful operation of infiltration basins. Recommended operation and maintenance guidelines include:

- Inspections and maintenance to ensure that water infiltrates into the subsurface completely (recommended infiltration rate of 72 hours or less) and that vegetation is carefully managed to prevent creating mosquito and other vector habitats.
- Observe drain time for the design storm after completion or modification of the facility to confirm that the desired drain time has been obtained.
- Schedule semiannual inspections for beginning and end of the wet season to identify potential problems such as erosion of the basin side slopes and invert, standing water, trash and debris, and sediment accumulation.
- Remove accumulated trash and debris in the basin at the start and end of the wet season.
- Inspect for standing water at the end of the wet season.
- Trim vegetation at the beginning and end of the wet season to prevent establishment of woody vegetation and for aesthetic and vector reasons.
- Remove accumulated sediment and regrade when the accumulated sediment volume exceeds 10% of the basin.
- If erosion is occurring within the basin, revegetate immediately and stabilize with an erosion control mulch or mat until vegetation cover is established.
- To avoid reversing soil development, scarification or other disturbance should only be performed when there are actual signs of clogging, rather than on a routine basis. Always remove deposited sediments before scarification, and use a hand-guided rotary tiller, if possible, or a disc harrow pulled by a very light tractor.

Cost

Infiltration basins are relatively cost-effective practices because little infrastructure is needed when constructing them. One study estimated the total construction cost at about $2 per ft (adjusted for inflation) of storage for a 0.25-acre basin (SWRPC, 1991). As with other BMPs, these published cost estimates may deviate greatly from what might be incurred at a specific site. For instance, Caltrans spent about $18/ft³ for the two infiltration basins constructed in southern California, each of which had a water quality volume of about 0.34 ac.-ft. Much of the higher cost can be attributed to changes in the storm drain system necessary to route the runoff to the basin locations.

Infiltration basins typically consume about 2 to 3% of the site draining to them, which is relatively small. Additional space may be required for buffer, landscaping, access road, and fencing. Maintenance costs are estimated at 5 to 10% of construction costs.

One cost concern associated with infiltration practices is the maintenance burden and longevity. If improperly maintained, infiltration basins have a high failure rate. Thus, it may be necessary to replace the basin with a different technology after a relatively short period of time.

WQMP Contents

- Section I – Project Description
- Section II – Site Characterization
- Section III – Pollutants of Concern
- Section IV – Hydrologic Conditions of Concern
- Section V – BMPs
- Section VI – Operation and Maintenance for TBMP
- Section VII – Funding
- Tables
- Appendices

HANDS-ON EXERCISE
Section VII - Funding

- Funding should list the name and contact info for the responsible person/party for all BMP maintenance

Today's Agenda

- Welcome and Training Process
- Whitewater River Region
  - NPDES Program Overview
- Project-Specific WQMPs
  - Project Categories
- Water Quality Management Plans - Hands-On Exercise
  - Sections I – VII
  - Appendices A - E
- Water Quality Management Plans - Hands-On Exercise
  - Appendix F - H
- WQMP Implementation
- Resources
- Roundtable Discussion

- Session Breaks
- Lunch - Provided

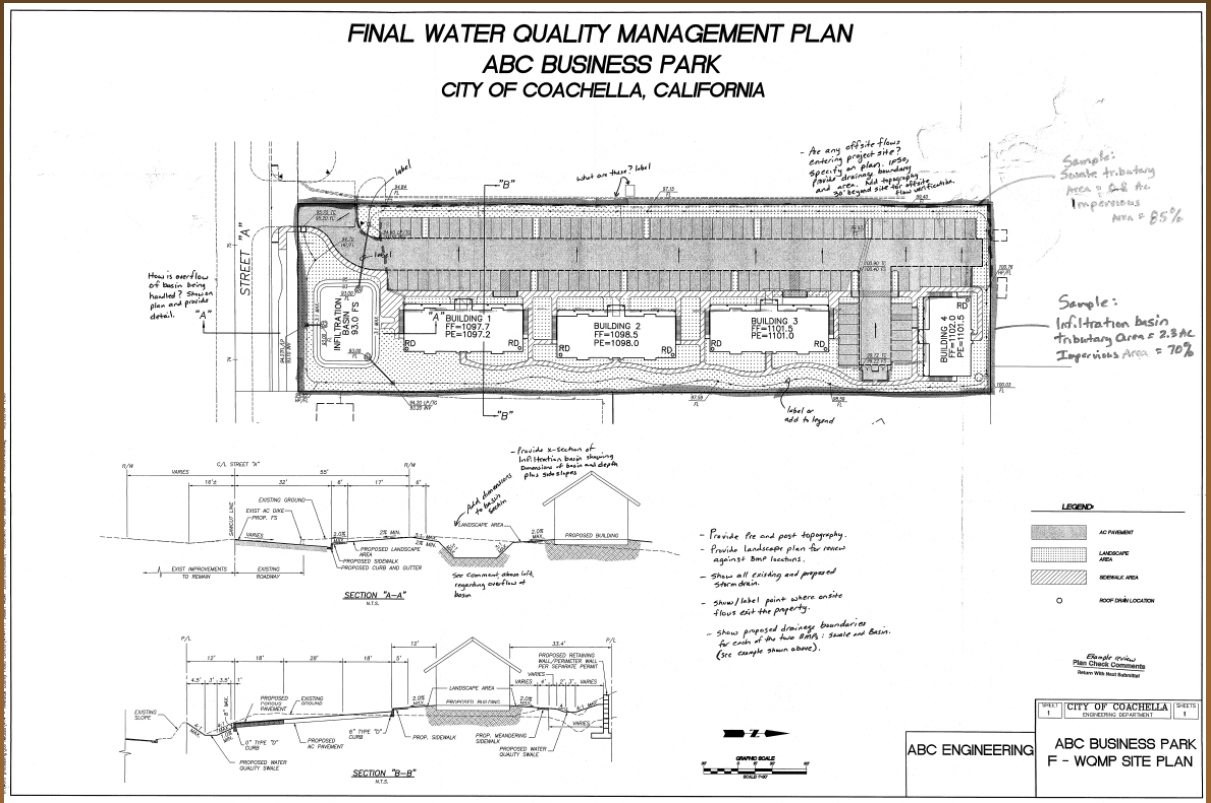
Hands-on Exercise
Appendix A – Conditions of Approval

- Should list the Planning Commission Resolution ID/Number and date

- Should highlight Water Quality applicable condition to verify compliance

Hands-on Exercise
Appendix B – Maps and Site Plan

- Appendix B shall contain the following:
  - Vicinity Map
  - Receiving Waters Map
  - WQMP Site plan



Hands-on Exercise
Appendix C – HCOC Support

- Appendix C should detail the project's selection of Condition A, B or C in Section IV
  - This project has selected Condition A and should describe the following:
    - Runoff is discharged directly to a Publicly-owned MS4
    - Discharge is in full compliance with Permittee requirements for connections and discharges to the MS4
      - Includes both quality and quantity
    - Discharge would not significantly impact stream habitat in proximate receiving waters
    - Discharge is authorized by the Permittee

Hands-on Exercise
Appendix D – Educational Materials

- Project related Educational Material shall be included in this Appendix
  - Refer developers to the County Flood Control Public Education Staff for standard materials

Hands-on Exercise
Appendix E – Soils Report

Soils Report Data is Required for all Infiltration type BMPs and shall include:

- **Geotechnical Investigation Report**
  - **Identify soil types**
  - **Infiltration capacity of local soils**
  - **Depth to groundwater**
- **Soil Boring Logs**
  - **Shall be provided to identify the soil profile of the project site**
  - **Location of borings shall be relevant to the proposed location of the treatment control BMP**

Appendix F
BMP Calculations

Whitewater River Region
Water Quality Management Plans
For Urban Runoff

AEI CASC CONSULTING

Today's Agenda

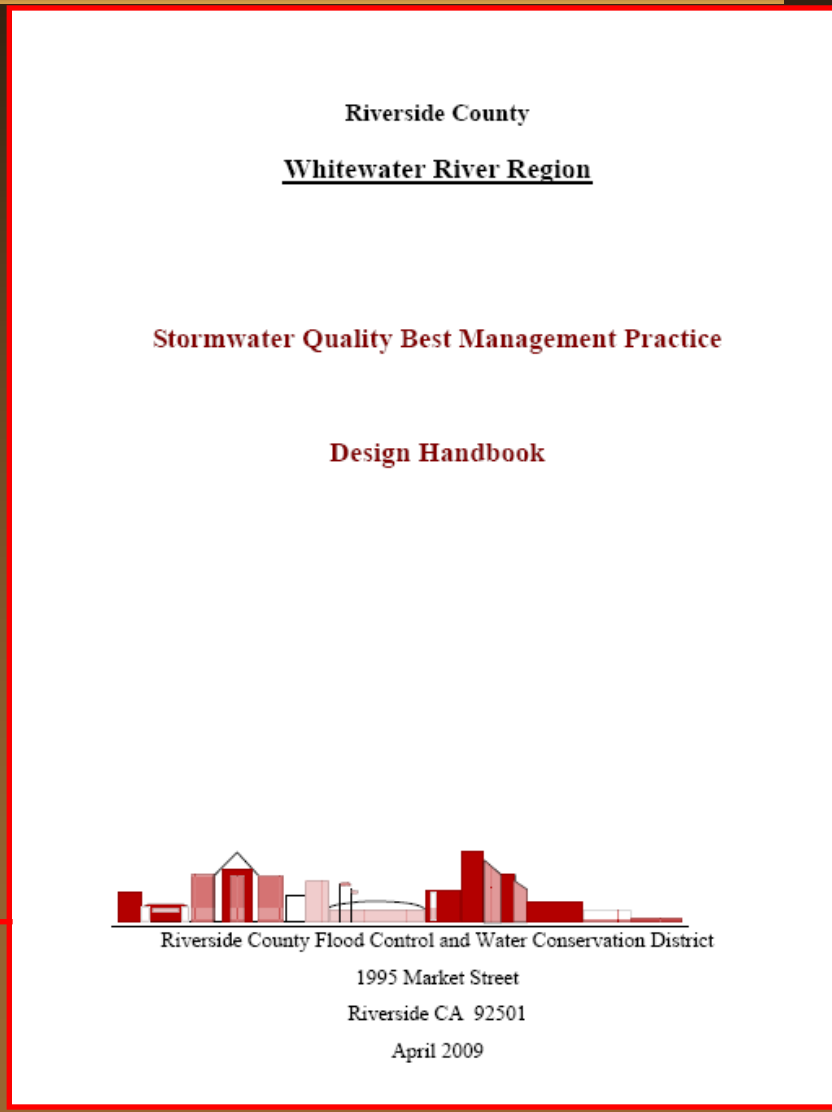
- Welcome and Training Process
- Whitewater River Region
  - NPDES Program Overview
- Project-Specific WQMPs
  - Project Categories
- Water Quality Management Plans - Hands-On Exercise
  - Sections I – VII
  - Appendices A - E
- Water Quality Management Plans - Hands-On Exercise
  - Appendix F - H
- WQMP Implementation
- Resources
- Roundtable Discussion

- Session Breaks
- Lunch - Provided

Hands-on Exercise
Appendix F - Calculation Worksheets

- Worksheet 1
  - Volume Calculation
- Worksheet 2
  - Design Flow Calculation
- Worksheet 4
  - Design procedure form for Infiltration Basin

- Worksheets and instructions are located in Exhibit C:
  - Stormwater Quality BMP Design Handbook


Riverside County

Whitewater River Region

Stormwater Quality Best Management Practice

Design Handbook

Riverside County Flood Control and Water Conservation District

1995 Market Street

Riverside CA 92501

April 2009

Hands-on Exercise
Worksheet 1 – Design Volume (V_{BMP})

- Page C-4, Volume based BMPs:
  - Determine BMP Tributary Area (A_{trib})
  - Determine the impervious ratio (i)
  - Calculate the Composite Runoff Coefficient (C)
    - $C=0.858*i^3-0.78*i^2+0.774*i+0.04$
  - Determine the Unit Storage Volume (V_u)
    - $Vu=0.4 \times C$
  - Calculate required capture volume of BMP (V_{BMP})
    - $V_{BMP} = Vu * A_{trib}$

Volume Based BMPs

General

The largest concentrations of pollutants are found in runoff from small volume storms and from the first flush of larger storms. Therefore, volume based BMPs should be sized to capture and treat the initial and more frequent runoff surges that convey the greatest concentration of pollutants. To maximize treatment and avoid health hazards, volume-based BMPs must retain and release the runoff between a 24 and 72 hour period. This handbook typically recommends a draw down time of 48 hours, as recommended by the California BMP Handbook. The drawdown time refers to the minimum amount of time the design volume must be retained.

In order to meet RWQCB requirements, Volume-based Treatment Control BMPs in the Whitewater River Region of Riverside County shall be designed to infiltrate or treat the volume of runoff, V_{BMP} calculated using the following procedure, developed using the CASQA Methodology referenced in Section F.1.b.4.a.ii of the Permit.

BMP Design Volume Calculations

Following is a step-by-step procedure for determining design volume for BMPs using Worksheet 1.

1. **Determine the BMP Tributary Area (A_{trib})** that drains to the proposed BMP. This includes all areas that will contribute runoff to the proposed BMP, including both pervious and impervious areas, and runoff from off-site areas that commingle with site runoff, whether or not they are directly or indirectly connected to the BMP. Measure this area in acres.
2. **Determine the impervious area ratio (i)** within the tributary area defined above.

   $i=A_{imp}/A_{trib}$, where

   A_{imp} = the impervious area within A_{trib}, measured in acres.
3. **Calculate the composite Runoff Coefficient (C)** for the BMP Tributary Area using Figure 1 below or the following equation based on the WEF/ASCE Method:

   $C = 0.858i^3 - 0.78i^2 + 0.774i + 0.04$, where

   i = the impervious area ratio defined above.
4. **Determine the Unit Storage Volume (V_u)** using the following equation derived from the Palm Springs Thermal Airport gauge data in Appendix D of the CASQA BMP Handbook:

   $V_u = 0.40 \times C$, where

   V_u = the unit storage volume (acre-in/acre), and C is the composite runoff coefficient calculated in the previous step.

Hands-on Exercise
Worksheet 1 – Design Volume (V_{BMP})

- Worksheet 1–Basin Volume:
- Area = 2.3 Ac
- Area Impervious = 1.61 Ac
- i = 1.61/2.3 = 0.70
- Runoff coefficient:
  - $C=0.858i^3- 0.78i^2+ 0.774i +0.04$
  - C= 0.49
- Unit Storage Volume:
  - V_U= 0.40 x C
  - V_U = 0.40 x 0.66 = 0.196
- Determine VBMP:
  - $V_{BMP} = V_U$ x $Area_{Tributary}$
  - V_{BMP} = {(0.196 x 2.3)/12} x 43,560
  - V_{BMP} = 1,636 Ft^3

Worksheet 1

Design Procedure for BMP Design Volume

Designer: J. Smith
Company: ABC Engineering
Date: May 1st
Project: Coachella Business Park
Location: Coachella, CA

1. Determine the Tributary Area to the BMP (A_{trib})	A_{trib}= 2.3 acres (1)
2. Determine the impervious area ratio (*i*) a. Determine impervious area within (A_{trib}) b. Calculate *i* = (2) / (1)	A_{imp} = 1.61 acres (2) *i* = 0.70 acres/acre (3)
3. Determine Runoff Coefficient (C) $C = 0.858 \cdot i^3 - 0.78 \cdot i^2 + 0.774 \cdot i + 0.04$ $C = 0.858 \cdot (3)^3 - 0.78 \cdot (3)^2 + 0.774 \cdot (3) + 0.04$	C = 0.49 (4)
4. Determine Unit Storage Volume (V_u) $V_u = 0.40 \cdot C$ $V_u = 0.40 \cdot (4)$	V_u = 0.196 acre-in/acre (5)
5. Determine Design Storage Volume a. V_{BMP} = (5) x (1) [acre-in] b. V_{BMP} = (6) / 12 [acre-ft] c. V_{BMP} = (7) x 43560 [ft^3]	V_{BMP} = 0.45 acre-in (6) V_{BMP} = 0.038 acre-ft (7) V_{BMP} = 1,636 ft^3 (8) ✓

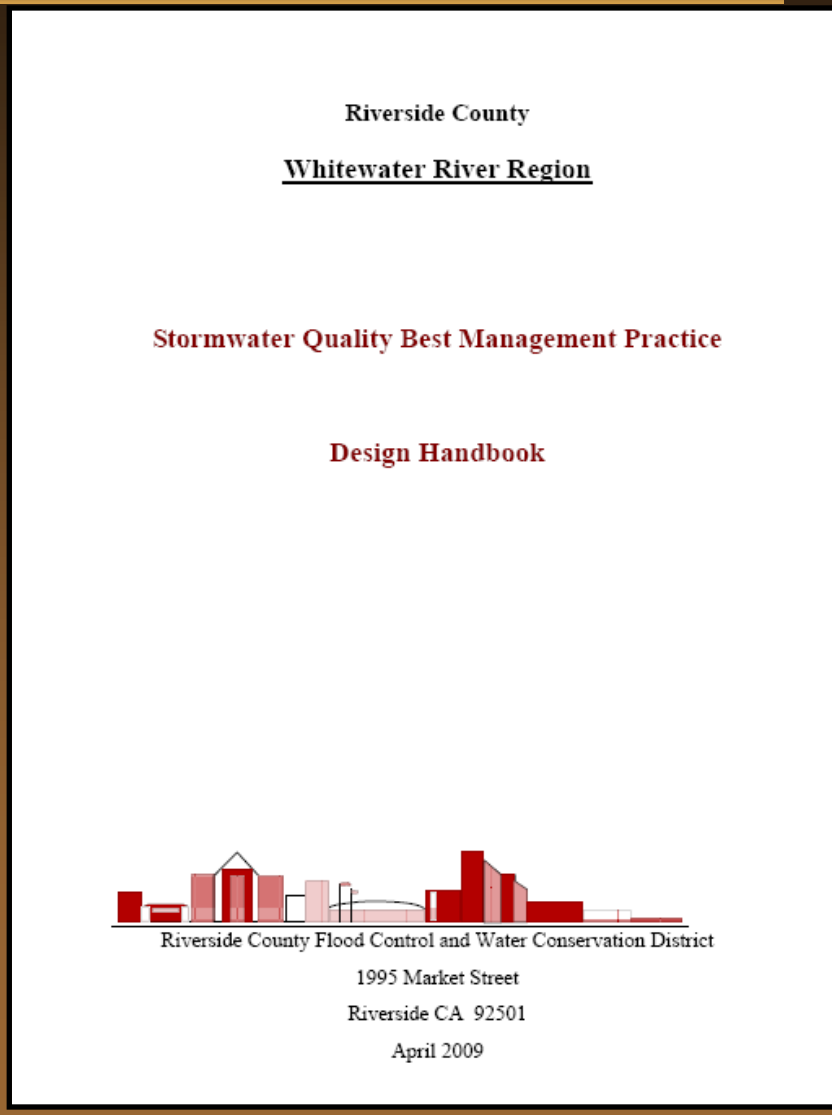
Notes: See attached basin volume Calculation Worksheet 4

Page 42

Hands-on Exercise
Project Calculation Worksheets

- Worksheet 1
  - Volume Calculation
- Worksheet 2
  - Design Flow Calculation
- Worksheet 4
  - Design procedure form for Infiltration Basin

- Worksheets and instructions are located in Exhibit C:
  - Stormwater Quality BMP Design Handbook


Riverside County

Whitewater River Region

Stormwater Quality Best Management Practice

Design Handbook

Riverside County Flood Control and Water Conservation District

1995 Market Street

Riverside CA 92501

April 2009

Hands-on Exercise Worksheet 2 - Design Flow (Q_{BMP})

- Page C-7, Flow based BMPs:
  - Uniform Intensity Approach: I = 0.2 in/hr
  - Use Rational Equation to find Q:
    - Q_{BMP} = CIA
    - A – Tributary Area to BMP
    - C – Runoff Coefficient, based on Rainfall intensity of 0.2 in/hr
    - I – Design Rainfall Intensity, 0.2 in/hr

Flow Based BMPs

General

Flow based BMPs are sized to treat flows up to the design flow rate, which will remove pollutants to the MEP. This handbook bases the design flow rate on a uniform rainfall intensity of 0.2 inches per hour, as recommended by the California BMP Handbook. The flow rate is also dependent on the type of soil and percentage of impervious area in the development.

Uniform Intensity Approach

The Uniform Intensity Approach is where the Design Rainfall Intensity, I is specified as:

$I = 0.2\ ^{in}/_{hr}$

That Intensity is then plugged into the Rational Equation to find the BMP design flow rate (Q).

$$Q_{BMP} = CIA$$

Where A = Tributary Area to the BMP
C = Runoff Coefficient, based upon a Rainfall Intensity = $0.2\ ^{in}/_{hr}$
I = Design Rainfall intensity, $0.2\ ^{in}/_{hr}$

A step-by-step procedure for calculating the design flow rate is presented on Worksheet 2. Table 4 shows runoff coefficient values pertaining to the type of soils and percent imperviousness.

Hands-on Exercise
Worksheet 2- Runoff Coefficients

- Runoff coefficients using Table 4, Page 39A:

Table 4. Runoff Coefficients for an Intensity = 0.2 $^{in}/_{hr}$ for Urban Soil Types*

Impervious %	A Soil RI =32	B Soil RI =56	C Soil RI =69	D Soil RI =75
0 (Natural)	0.06	0.14	0.23	0.28
5	0.10	0.18	0.26	0.31
10	0.14	0.22	0.29	0.34
15	0.19	0.26	0.33	0.37
20 (1-Acre)	0.23	0.30	0.36	0.40
25	0.27	0.33	0.39	0.43
30	0.31	0.37	0.43	0.47
35	0.35	0.41	0.46	0.50
40 (1/2-Acre)	0.40	0.45	0.50	0.53
45	0.44	0.48	0.53	0.56
50 (1/4-Acre)	0.48	0.52	0.56	0.59
55	0.52	0.56	0.60	0.62
60	0.56	0.60	0.63	0.65
65 (Condominiums)	0.61	0.64	0.66	0.68
70	0.65	0.67	0.70	0.71
75 (Mobilehomes)	0.69	0.71	0.73	0.74
80 (Apartments)	0.73	0.75	0.77	0.78
85	0.77	0.79	0.80	0.81
90 (Commercial)	0.82	0.82	0.83	0.84
95	0.86	0.86	0.87	0.87
100	0.90	0.90	0.90	0.90

*Complete District's standards can be found in the Riverside County Flood Control Hydrology Manual

Hands-on Exercise
Worksheet 2 - Design Flow (Q_{BMP})

Worksheet 2 - Basin:

- Area = 2.3 Ac
- Impervious % = 70%
- Soil Type is A for entire site
  - Soil Type fraction is 1
  - Soil A runoff coefficient = 0.65
- Q=CIA
  - (0.65)(0.2)(2.3)=0.30 Ft^3/s

Worksheet 2

Design Procedure Form for Design Flow
Uniform Intensity Design Flow

Basin

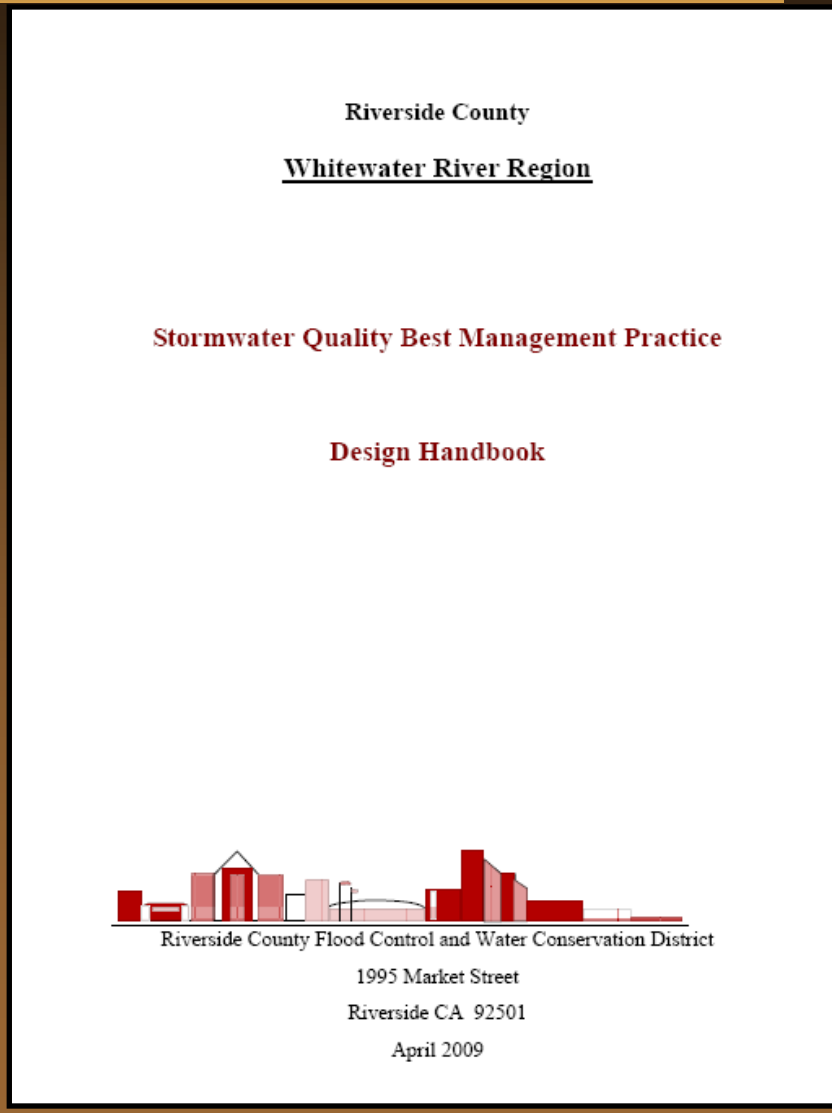
Designer: J. Smith
Company: ABC Engineering
Date: May 1st
Project: Coachella Business Park
Location: Coachella, CA

1. Determine Impervious Percentage		
a. Determine total tributary area	A_{total} = 2.3 acres	(1)
b. Determine Impervious %	i = 70 %	(2)
2. Determine Runoff Coefficient Values Use Table 4 and impervious % found in step 1		
a. A Soil Runoff Coefficient	C_a = 0.65	(3)
b. B Soil Runoff Coefficient	C_b =	(4)
c. C Soil Runoff Coefficient	C_c =	(5)
d. D Soil Runoff Coefficient	C_d =	(6)
3. Determine the Area decimal fraction of each soil type in tributary area		
a. Area of A Soil / (1) =	A_a = 1	(7)
b. Area of B Soil / (1) =	A_b =	(8)
c. Area of C Soil / (1) =	A_c =	(9)
d. Area of D Soil / (1) =	A_d =	(10)
4. Determine Runoff Coefficient		
a. C = (3)x(7) + (4)x(8) + (5)x(9) + (6)x(10) =	C = 0.65	(11)
5. Determine BMP Design flow		
a. Q_{BMP} = C x I x A = (11) x 0.2 x (1)	Q_{BMP} = 0.30 ft^3/s	(12)

C-9

Hands-on Exercise
Project Calculation Worksheets

- Worksheet 1
  - Volume Calculation
- Worksheet 2
  - Design Flow Calculation
- Worksheet 4
  - Design procedure form for Infiltration Basin
- Worksheets and instructions are located in Exhibit C:
  - Stormwater Quality BMP Design Handbook



Hands-on Exercise
Worksheet 4 – Design Infiltration Basin

- Area tributary = 2.3 Ac
- VBMP = 1,636 Ft^3
- Determine D_M:
  - $D_M = (t)(I)/12(S)$
    - t = 48 hour drawdown
    - I = site infiltration rate
    - S = Safety Factor
  - $D_M = (48)(2.8)/12(3) = 3.73'$
- Determine Basin Area:
  - $A_M = V_{BMP} / D_M$
  - $A_M = 1,636 / 3.73 = 439$ SF
- Proposed basin is 2' Deep so…
  - $A_M = 1,636 / 2 = 818$ SF required

Worksheet 4

Design Procedure Form for Infiltration Basin

Designer: J. Smith
Company: ABC Engineering
Date: May 1st
Project: Coachella Business Park
Location: Coachella, CA

1. Determine Design Storage Volume (Use Worksheet 1) a. Total Tributary Area (maximum 50) b. Design Storage Volume, V_{BMP}	A_{total} = 2.3 acres V_{BMP} = 1,636 ft^3
2. Maximum Allowable Depth (D_m) a. Site infiltration rate (I) b. Minimum drawdown time (48 hrs) c. Safety factor (s) d. D_m = [(t) x (I)]/[12s]	I = 2.8 in/hr t = 48 hrs s = 3 D_m = 3.73 ft
3. Basin Surface Area $A_m = V_{BMP} / D_m$ 1,636 ÷ 3.73' =	A_m = 439 ft^2 ✔
4. Vegetation (check type used or describe "other")	___ Native Grasses X Irrigated Turf Grass ___ Other

Notes: See Provided Infiltration basin Calculation on next page for proof of proper basin sizing.

Hands-on Exercise
Worksheet 4 – Design Infiltration Basin

Preparer indicates…..

- Area of basin is:
  - 3,445 SF
- At 2’ Depth area required:
  - A_M = 818 SF
- Provided Volume is:
  - V = 3,445 SF x 2’ = 6,890 Ft^3
  - Volume is > V_{BMP} of 1,636 Ft^3

Drawdown Time:

- Design Basin D_M provided = 2’
- Does Design D_M exceed calculated D_M? No, < 3.7 D_M
- Drains in less than maximum 48 hours

Volume Calculation for Proposed Infiltration Basin:

Area at Elev 93: 2,501 SF
Area at Elev 95: 4,389 SF
Area Average: 6,890 SF / 2 = 3,445 SF Average

Basin Depth = 2’

Proposed Basin Area: 3,445 SF x 2’ Depth = **6,890 Ft^3** of Volume in Basin ✓

Basin Volume of 6,890 Ft^3 > than required 1,636 FT^3 of V_{BMP} ✓

Therefore Basin is adequately sized.

Drawdown of basin:

Depth of Basin is 2’ < calculated D_M = 3.73’, thefore basin will drain under 48 hours.

$$DM = \frac{(Time)(infiltration\ rate)}{12(3\ safety\ factor)}$$

► Time = [(DM)(12)(3)] / infiltration rate = $\frac{(2')(12)(3)}{2.8}$ = **25.7 Hours to drain WQ volume** ✓

Page 43A

Hands-on Exercise
Appendix F - BMP Design Summary

- **Basin's Design is acceptable**
  - **Proposed infiltration basin does meet V_{BMP}**
  - **Basin depth does not exceed D_M**

- **Are there other considerations to accepting the BMP?**
  - **Safety Issue?**
  - **Nuisance?**

Hands-on Exercise
Appendix G and H

- Appendix G – Mechanism for ensuring ongoing O&M
  - CC&R
  - Maintenance Agreement
  - Transfer of requirements

- Appendix H – Phase 1 Environmental Site Assessment
  - Summary of Site remediation conducted
  - Any site use restrictions

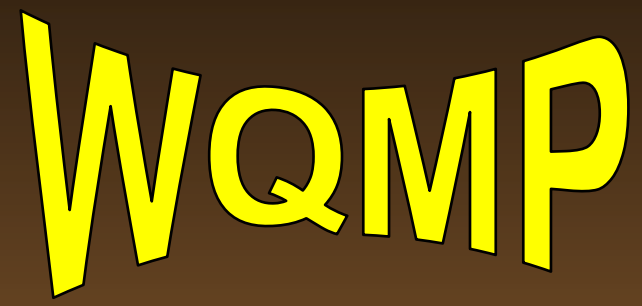
WQMP Program Implementation

Whitewater River Region Water Quality Management Plans For Urban Runoff

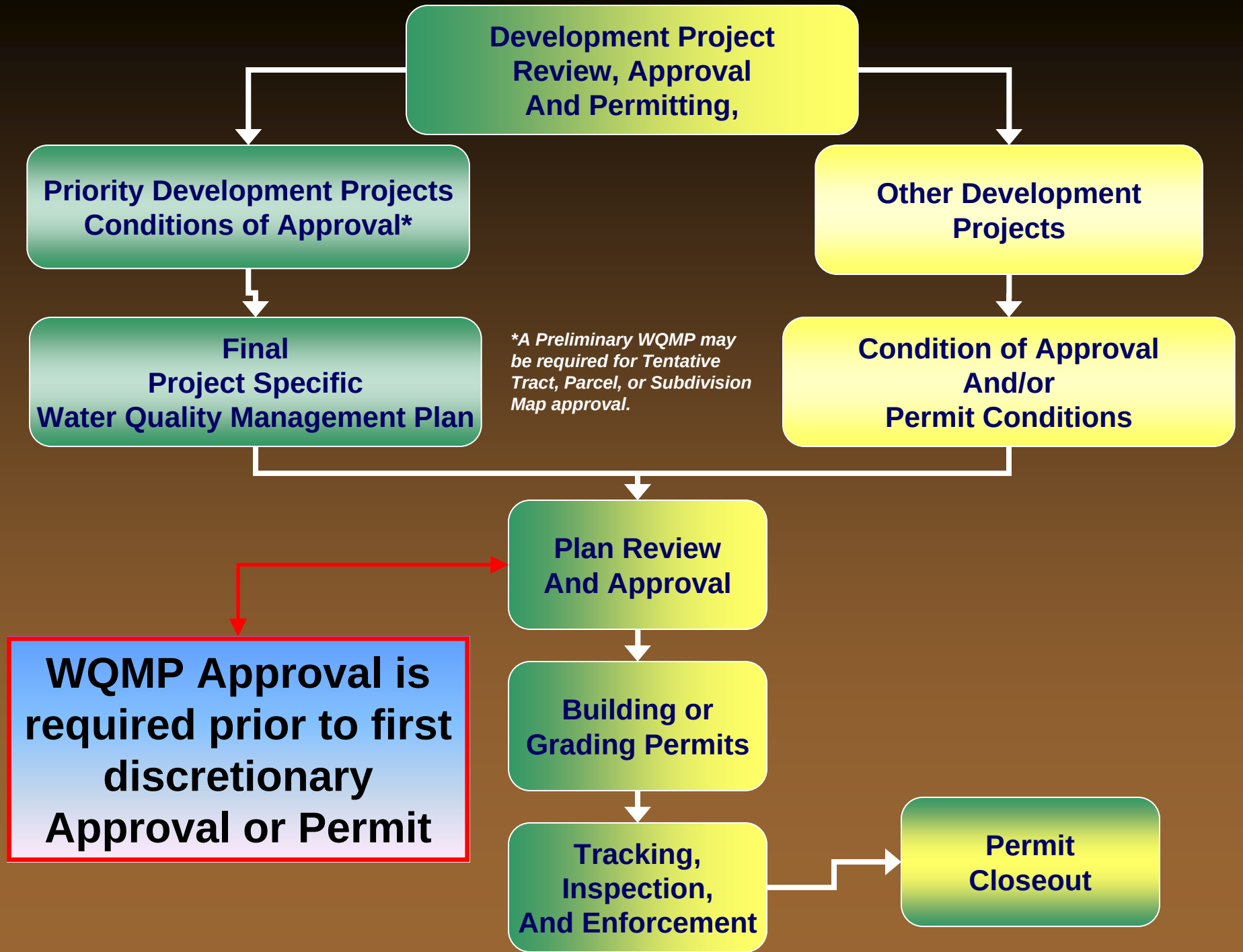
AEI CASC CONSULTING

First Things First!
What Is A WQMP?

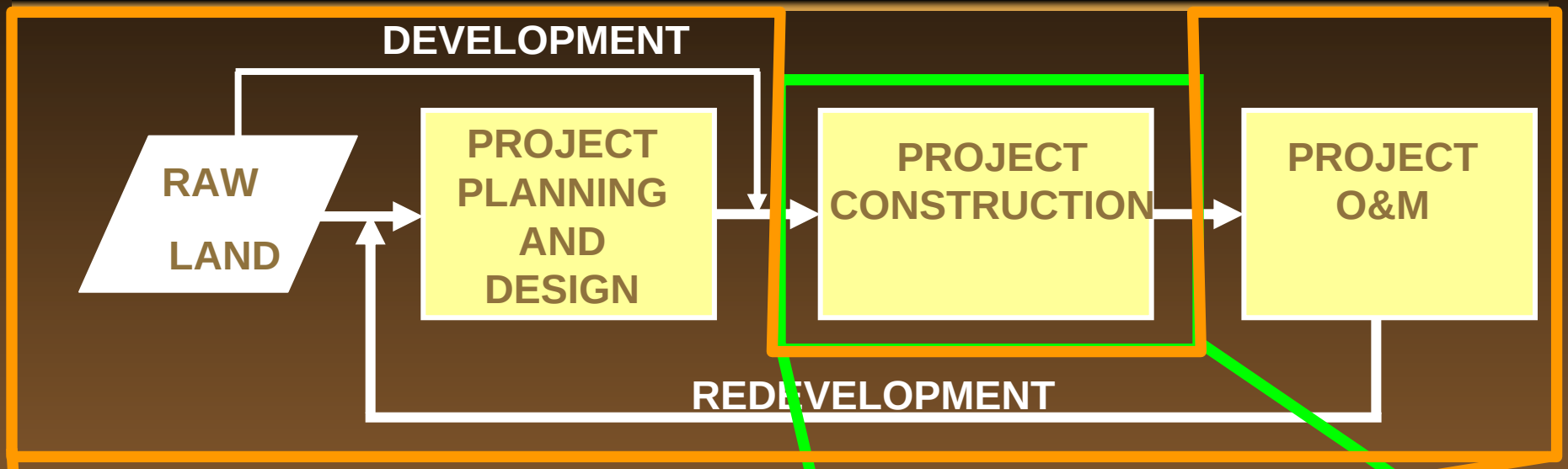
- **W**ater
- **Q**uality
- **M**anagement
- **P**lan



- The **WQMP** is a project-specific plan of Best Management Practices (BMPs), including site design, source controls, and treatment controls, to address post-construction urban runoff quality and quantity to protect receiving waters.
- A project-specific **WQMP** must be submitted and approved prior to the first discretionary project approval or permit for all Significant Redevelopment and New Development projects.


Development Project Review, Approval And Permitting,
Priority Development Projects Conditions of Approval*
Other Development Projects
Final Project Specific Water Quality Management Plan
*A Preliminary WQMP may be required for Tentative Tract, Parcel, or Subdivision Map approval.
Condition of Approval And/or Permit Conditions
Plan Review And Approval
WQMP Approval is required prior to first discretionary Approval or Permit
Building or Grading Permits
Tracking, Inspection, And Enforcement
Permit Closeout

Project Lifecycle and WQMPs



Pollution Prevention Is Now Part Of Every Project Stage!

This is the domain of the Water Quality Management Plan
The WQMP

This is the domain of the Storm Water Pollution Prevention Plan
The SWPPP

Preliminary Project-Specific WQMP

- A Preliminary Project-Specific WQMP may be required
  - When a project is subject to discretionary approval during the planning and entitlement process (tentative tract map, parcel map, or subdivision map) and
  - Will be subject to ministerial approvals for subsequent grading or building permits
- Submit WQMP with project application

Preliminary Project-Specific WQMP

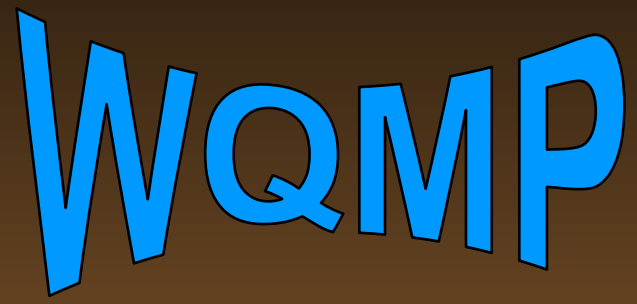
- Level of detail in a Preliminary Project-Specific WQMP will depend on the overall project design at the time project approval is sought.
  - Key point – The Preliminary WQMP needs to be specific enough to identify the land required for BMP implementation!

Many cities have adopted City-specific requirements to guide the Preliminary WQMP process

- A Final Project-Specific WQMP that is in substantial conformance with the Preliminary Project-Specific WQMP (and in full conformance with the WQMP Guidance) will be required prior to issuance of any building or grading permit.

Final Project-Specific WQMP

- **W**ater
- **Q**uality
- **M**anagement
- **P**lan

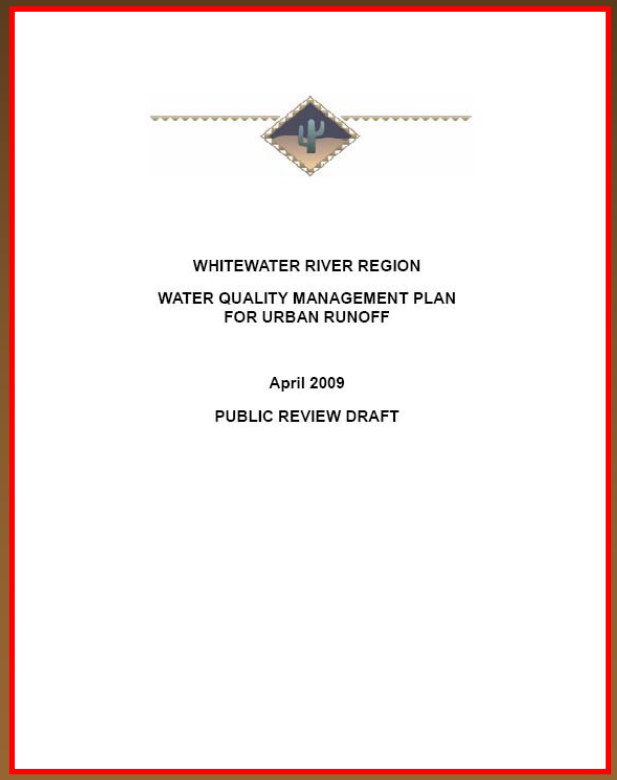


- The Final Project-Specific WQMP…
  - Is a planning level document
  - Is not expected to contain final BMP design drawings and details
  - Is expected to identify and show the location of structural BMPs
  - Is expected to provide design parameters and final design concepts of treatment BMPs
  - Must be approved prior to issuance of building or grading permits

Final Project-Specific WQMP

- The Final Project-Specific WQMP will contain
  - Site Design BMPs
  - Source Control BMPs
  - Treatment Control BMPs
  - BMP maintenance descriptions
  - BMP funding description
  - BMP operation responsibilities
- Must conform to the Guidance!

Many cities supplement the Guidance with City-specific requirements.


WHITEWATER RIVER REGION

WATER QUALITY MANAGEMENT PLAN
FOR URBAN RUNOFF

April 2009

PUBLIC REVIEW DRAFT

Grading and Building Permits Are Issued After

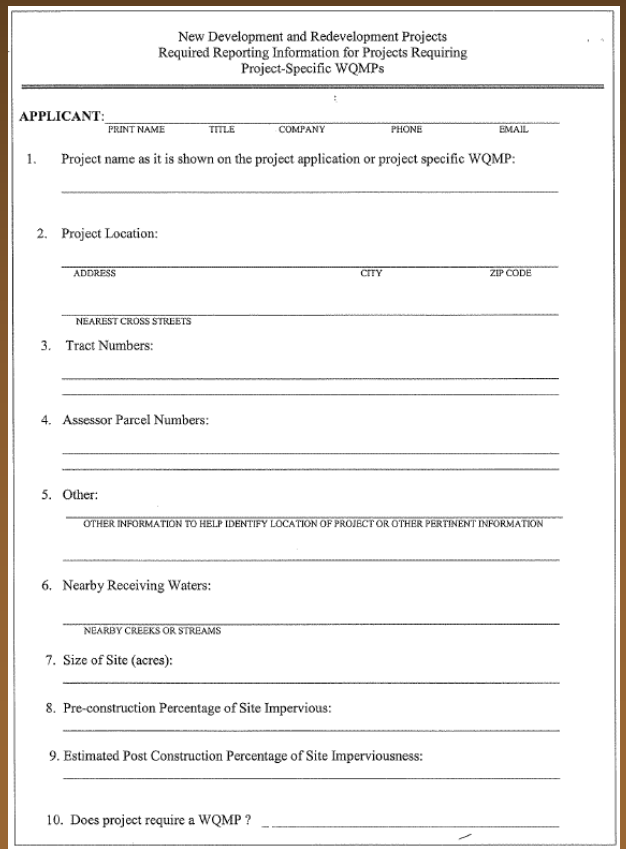
- Redevelopment and New Development Projects
  - Final Project-Specific WQMP is approved
  - Plan Check verifies that
    - BMPs from WQMP are incorporated into plans
    - Standard Notes have been placed on plans
    - Conditions of Approval have been met
- Other Projects
  - Construction plans incorporate site design and source control BMPs
    - Standard Notes have been placed on plans
    - Condition of Approval have been met

Permit Closeout, Certificates of Use and Occupancy

- Applicants will be required to demonstrate that:
  - All structural BMPs have been constructed and installed in conformance with approved plans and specifications.
  - A mechanism or agreement acceptable to the Co-Permittee has been executed for the long-term funding and implementation, operation, maintenance, repair, and/or replacement of BMPs.

Tracking and Inspection

- Anytime a Project crosses the counter – LOG IT IN!
- Require reporting forms be filled out by Public when submitting WQMPs for review



New Development and Redevelopment Projects
Required Reporting Information for Projects Requiring
Project-Specific WQMPs

APPLICANT: _____
PRINT NAME TITLE COMPANY PHONE EMAIL

1. Project name as it is shown on the project application or project specific WQMP:

2. Project Location:

ADDRESS CITY ZIP CODE

NEAREST CROSS STREETS

3. Tract Numbers:

4. Assessor Parcel Numbers:

5. Other:

OTHER INFORMATION TO HELP IDENTIFY LOCATION OF PROJECT OR OTHER PERTINENT INFORMATION

6. Nearby Receiving Waters:

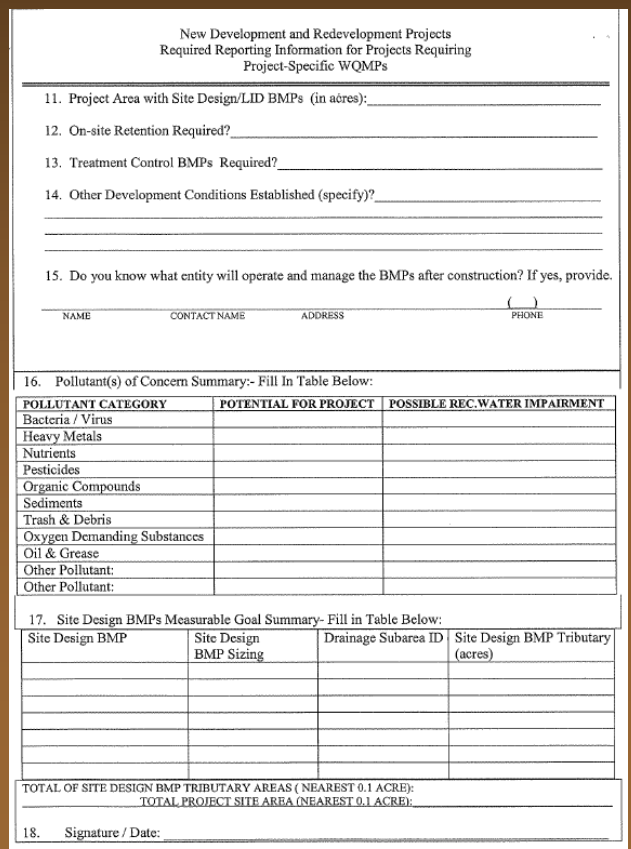
NEARBY CREEKS OR STREAMS

7. Size of Site (acres):

8. Pre-construction Percentage of Site Impervious:

9. Estimated Post Construction Percentage of Site Imperviousness:

10. Does project require a WQMP ? _____



New Development and Redevelopment Projects
Required Reporting Information for Projects Requiring
Project-Specific WQMPs

11. Project Area with Site Design/LID BMPs (in acres):_____

12. On-site Retention Required?_____

13. Treatment Control BMPs Required?_____

14. Other Development Conditions Established (specify)?_____

15. Do you know what entity will operate and manage the BMPs after construction? If yes, provide.

NAME CONTACT NAME ADDRESS (___) PHONE

16. Pollutant(s) of Concern Summary:- Fill In Table Below:

POLLUTANT CATEGORY	POTENTIAL FOR PROJECT	POSSIBLE REC.WATER IMPAIRMENT
Bacteria / Virus		
Heavy Metals		
Nutrients		
Pesticides		
Organic Compounds		
Sediments		
Trash & Debris		
Oxygen Demanding Substances		
Oil & Grease		
Other Pollutant:		
Other Pollutant:		

17. Site Design BMPs Measurable Goal Summary- Fill in Table Below:

Site Design BMP	Site Design BMP Sizing	Drainage Subarea ID	Site Design BMP Tributary (acres)

TOTAL OF SITE DESIGN BMP TRIBUTARY AREAS (NEAREST 0.1 ACRE):
TOTAL PROJECT SITE AREA (NEAREST 0.1 ACRE):

18. Signature / Date:

Tracking and Inspection

- **Use County established Spreadsheet to maintain your Agency's database!**
  - **Use for required Annual reporting for New Development and Redevelopment Projects**

DATABASE FORMAT AND ANNUAL REPORTING FOR NEW DEVELOPMENT AND REDEVELOPMENT PROJECTS REQUIRING PROJECT-SPECIFIC WQMPs

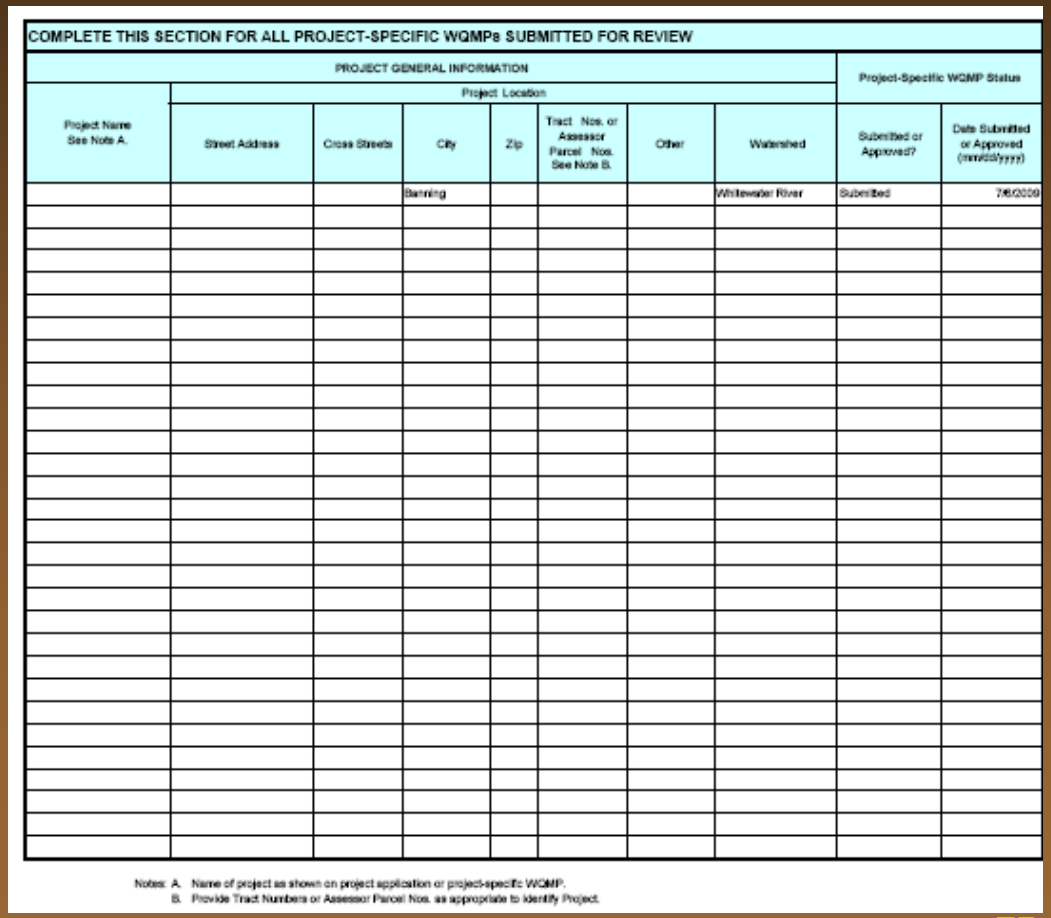
COMPLETE THIS SECTION FOR ALL PROJECT-SPECIFIC WQMPs SUBMITTED FOR REVIEW										COMPLETE THIS SECTION ONLY FOR APPROVED PROJECT-SPECIFIC WQMPs											
PROJECT GENERAL INFORMATION								Project-Specific WQMP Status								ENTITY RESPONSIBLE FOR BMP OPERATION & MAINTENANCE (WQMP Section VI)					
Project Name See Note A.	Project Location									Project Area (to 0.1 acre)	Pre-Project % Impervious Area	Project % Impervious Area	Project Area Managed with Site Design/Low Impact Development BMPs (to 0.1 acre)	Onsite Retention Required (Yes/No)	Treatment Control BMPs Required (Yes/No)	Other Development BMP Conditions Established (Yes/No)	Name	Contact Name	Mailing Address			Phone Number
	Street Address	Cross Streets	City	Zip	Tract Nos. or Assessor Parcel Nos. See Note B.	Other	Watershed	Submitted or Approved?	Date Submitted or Approved (mm/dd/yyyy)												
			Banning				Whitewater River	Submitted	7/6/2009												

Notes: A. Name of project as shown on project application or project-specific WQMP.
B. Provide Tract Numbers or Assessor Parcel Nos. as appropriate to identify Project.

Tracking and Inspection

- Left side of spreadsheet is for logging in and tracking of WQMP submittals

- Includes:
  - Project Name
  - Location
  - APN/Tract No
  - Watershed
  - Submittal or Approval Date



COMPLETE THIS SECTION FOR ALL PROJECT-SPECIFIC WQMPs SUBMITTED FOR REVIEW

PROJECT GENERAL INFORMATION								Project-Specific WQMP Status	
	Project Location								
Project Name See Note A.	Street Address	Cross Streets	City	Zip	Tract Nos. or Assessor Parcel Nos. See Note B.	Other	Watershed	Submitted or Approved?	Date Submitted or Approved (mm/dd/yyyy)
			Banning				Whitewater River	Submitted	7/6/2009

Notes: A. Name of project as shown on project application or project-specific WQMP.
B. Provide Tract Numbers or Assessor Parcel Nos. as appropriate to identify Project.

Tracking and Inspection

- Right side of spreadsheet is for tracking Project information

COMPLETE THIS SECTION ONLY FOR APPROVED PROJECT-SPECIFIC WQMPs												
							ENTITY RESPONSIBLE FOR BMP OPERATION & MAINTENANCE (WQMP Section VI)					
									Mailing Address			
Project Area (to 0.1 acre)	Pre-Project % Impervious Area	Project % Impervious Area	Project Area Managed with Site Design/Low Impact Development BMPs (to 0.1 acre)	Onsite Retention Required (Yes/No)	Treatment Control BMPs Required (Yes/No)	Other Development BMP Conditions Established (Yes/No)	Name	Contact Name	Street Address	City	Zip	Phone Number

- Includes:
  - Project Area
  - Pre/Post Impervious %
  - On-site retention
  - BMP Conditions
  - O&M responsibilities

- Tracking your Agency information is very important!

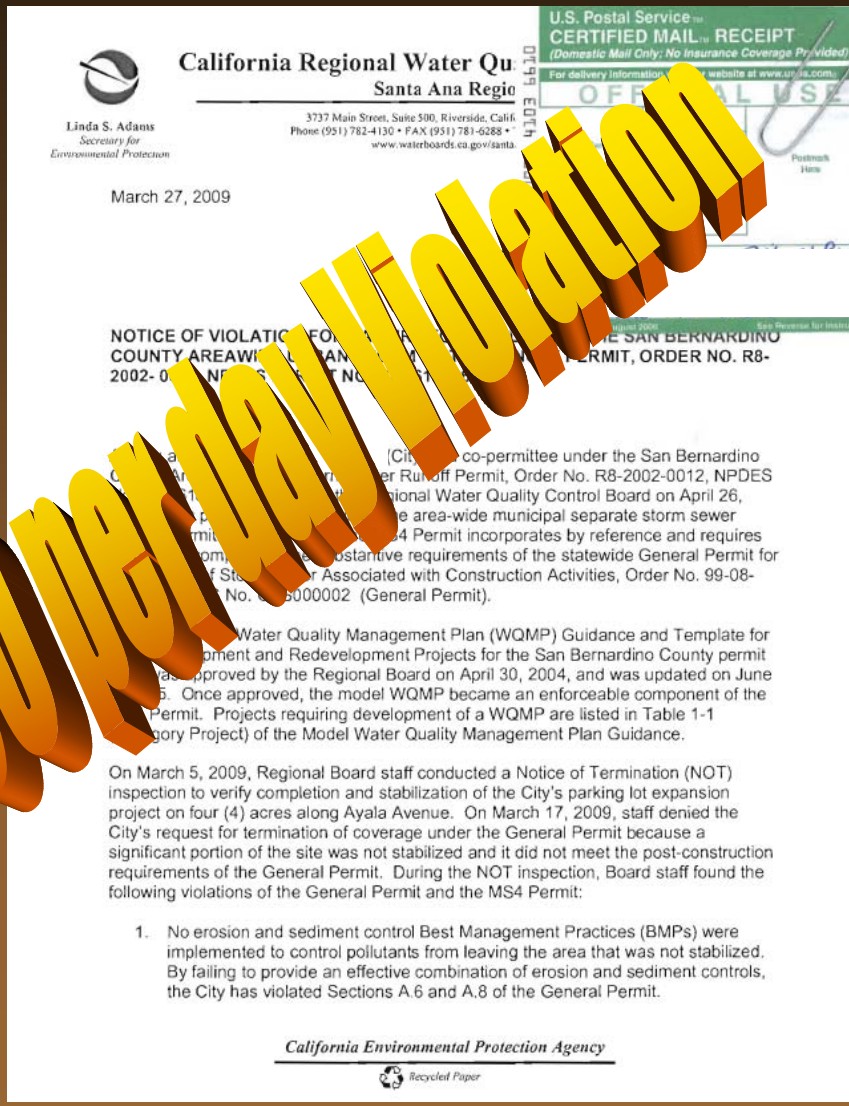
Summary of Requirements

- Post-construction water pollution control is a requirement that is now being more rigorously enforced!
  - A WQMP is required for all but the smallest of projects
  - Final Project-Specific WQMP is required before issuance of grading/building permits
  - Preliminary Project-Specific WQMP may be required during project entitlement phase

- BMPs should be installed and functional prior to occupancy!

Example of Non-Compliance

- Agency received original NOV in early 2008
- In Early 2009 Agency applied for NOT of Parking Lot expansion project and was inspected by the Regional Board – Termination was denied - NO WQMP!
- 30 Days to provide a
  projects permitted si
  OR ….



California Regional Water Qu
Santa Ana Regio

Linda S. Adams
Secretary for
Environmental Protection

3737 Main Street, Suite 500, Riverside, Calif
Phone (951) 782-4130 • FAX (951) 781-6288 •
www.waterboards.ca.gov/santa

U.S. Postal Service
CERTIFIED MAIL™ RECEIPT
(Domestic Mail Only; No Insurance Coverage Provided)

March 27, 2009

NOTICE OF VIOLATIO
COUNTY AREAWI
2002-0
ERMIT, ORDER NO. R8-

co-permittee under the San Bernardino
er Runoff Permit, Order No. R8-2002-0012, NPDES
ional Water Quality Control Board on April 26,
e area-wide municipal separate storm sewer
4 Permit incorporates by reference and requires
ubstantive requirements of the statewide General Permit for
r Associated with Construction Activities, Order No. 99-08-
No. 6000002 (General Permit).

Water Quality Management Plan (WQMP) Guidance and Template for
ment and Redevelopment Projects for the San Bernardino County permit
pproved by the Regional Board on April 30, 2004, and was updated on June
5. Once approved, the model WQMP became an enforceable component of the
Permit. Projects requiring development of a WQMP are listed in Table 1-1
gory Project) of the Model Water Quality Management Plan Guidance.

On March 5, 2009, Regional Board staff conducted a Notice of Termination (NOT) inspection to verify completion and stabilization of the City's parking lot expansion project on four (4) acres along Ayala Avenue. On March 17, 2009, staff denied the City's request for termination of coverage under the General Permit because a significant portion of the site was not stabilized and it did not meet the post-construction requirements of the General Permit. During the NOT inspection, Board staff found the following violations of the General Permit and the MS4 Permit:

1. No erosion and sediment control Best Management Practices (BMPs) were implemented to control pollutants from leaving the area that was not stabilized. By failing to provide an effective combination of erosion and sediment controls, the City has violated Sections A.6 and A.8 of the General Permit.

California Environmental Protection Agency
Recycled Paper

$10,000 per day Violation

Resources

Whitewater River Region Water Quality Management Plans For Urban Runoff

AEI CASC CONSULTING

Resources

- County website for Resources:
  - http://www.rcflood.org
- Your Agency NPDES Coordinator

WQMP Basic Training
Questions or Comments

Whitewater River Region
Water Quality Management Plans
For Urban Runoff

AEI CASC CONSULTING

Questions or comments?

- Best Management Practices
  - Questions
  - Comments
- Water Quality Management Plans
  - Questions
  - Comments
- Any experience to share that may be helpful to other Cities here?

We're all done!

Congratulations!

Whitewater River Region Water Quality Management Plans For Urban Runoff

Presented by

Jeffrey D. Endicott, P.E., DEE
Melanie E. Sotelo
AEI-CASC Consulting
937 S. Via Lata, Suite 500, Colton, CA 92324
Ph: 909.783.0101 Fax: 783-0108
jendicott@aei-casc.com
msotelo@aei-casc.com

AEI CASC CONSULTING