CITY OF MORGAN HILL

STORM WATER MANAGEMENT PLAN
ANNUAL REPORT
FY 2005-2006

SEPTEMBER 2006

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CITY OF MORGAN HILL STORM WATER MANAGEMENT PLAN

City of Morgan Hill

2005-2006 ANNUAL REPORT

General Permit for the Discharger of Storm Water from Small Municipal Separate Storm Sewer Systems (General Permit)

Permit Information:

Contact Person(s):	**Karl Bjarke, Deputy Director of Public Works** **Charlie Ha, Assistant Engineer**
Mailing Address:	**100 Edes Court**
City, State and Zip Code:	**Morgan Hill, CA 95037-6282**
Phone Number:	**408-776-7337**
Waste Discharge Identification (WDID) #:	**3-43MS03020**
Reporting Period:	**Coverage Commencement (March 23, 2005 to June 30, 2006 (Year 1)**

Executive Summary:

City of Morgan Hill submitted a Notice of Intent (NOI) for the Phase II Storm Water Permit requirements for small municipals separate storm sewer systems (MS4s) in April of 2004. On March 23, 2005, the Central Coast Regional Water Quality Control Board (RWQCB) accepted the final revision of Morgan Hill's Storm Water Management Plan (SWMP) and issued the NPDES Small MS4S General Permit, Order Number 2003-0005-DWQ, Waste Discharge Identification Number (WDID#) 3-43MS03020. The City's SWMP plan outlines a comprehensive 5 year plan to establish a number of Best Management Practices (BMPs) to help reduce the discharge of pollutants into waterways and to protect local water quality caused by storm water and urban run-off within the corporate limits of Morgan Hill. The City's SWMP will be fully implemented by the end of June 30th 2010.

The City's staff is pleased to report the first year of implementation has been a success and a learning experience that will lay the ground work for an effective SWMP. A summary of the activities undertaken to implement the six minimum control measures follows.

MCM#1-Public Education and Outreach:

The City participated with Santa Clara Valley Urban Runoff and Pollution Prevention Program in their Watershed Watch Program. 5000 Watershed Watch Brochures were produced and distributed at public events, and 11000 Watershed Watch billing inserts were sent out. Staff discussed with Morgan Hill Unified School District about a classroom education program to be implemented in Year 2. City curbside oil collection continued on a bi-weekly basis for single-family residences, and residents without curbside service could go to two certified oil collection center in Morgan Hill. The San Martin Transfer and Recycling center offered multiple days per year for residents and small businesses to dispose hazard wastes. Pubic Works is still developing the SWMP internet page, and control measure 1F-Teleworks Messages was not met due to the City's decision to abandon the Teleworks program as a viable communication system for citizens. It proposed that control measure 1F be replaced by control measure 1I-City Newsletter Article, which calls for utilizing the City newsletter to inform citizens about its SWMP.

MCM #2-Public Involvement and Participation:
A public meeting was held to offer the community an opportunity to hear about the SWMP. The Environmental Programs coordinated City Beatification Day to coincide with National River Clean Up. Composting workshops were held monthly. A public hot line to report illicit discharge was established.

MCM #3-Illicit Discharge Detection and Elimination:
Public Works developed a Storm Water Infrastructure Map showing the City's storm drain system, creeks/rivers, and outfall locations. Illicit discharge ordinances from other agencies were compiled and studied, from which the City will develop its own illicit discharge ordinance. Written procedures where develop to address illicit discharges. Public education of non-storm water pollution prevention was made available to the public. Control measure 3E-Notification of Targeted Industries was not implemented by Year 1; however, steps have been taken to implement control measure 3E in Year 2.

MCM #4-Construction Site Runoff Control:
Public Works developed a plan check process that required all sites grading more than 1 acre in total to provide an NPDES Construction General Permit and Storm Water Pollution Prevention Plan. City inspectors were trained on SWPPP and run-off control measures; sites under the General Permit were inspected for permit compliance.

MCM #5-Post Construction Site Runoff Control:
Public Works compiled a list of post construction BMP's that have been successfully used in other communities, from which a post construction BMP manual will be developed for use in Year 2.

MCM #6-Pollution Prevention/Good House Keeping:
Street sweeping of the City occurs on a bi-weekly basis. Additional street cleaning by Public Works maintenance is provided on an as needed basis. Inspection of curb inlets during the fall seasons for additional maintenance is performed and shall be further developed in Year 2. Control measure 6B-Training was not implemented by Year 1; however, steps have been taken to implement control measure 6B in Year 2.

We understand that it is a challenge for local agencies and the Regional Board as to meet the federally mandated requirements of the NPDES permitting process. The City's staff looks forward to working with the Central Coast Regional Boards as we move forward in the implementation process.

Certification:
"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Karl Bjarke, Deputy Director of Public Works Date

Minimum Control Measure #1 – Public Education and Outreach

Introduction

A Phase II storm water plan must incorporate a public education program that educates the public on the impacts of storm water discharges on water bodies and the steps that they can take to reduce pollutants in storm water runoff. The City's intent is to institute a public education and outreach program that generates greater support for the program. As the public gains a greater understanding of the reasons why it is necessary and important to comply with the program, they will become more aware of the personal responsibilities expected of them and others in the community. The goals of the plan are to 1) educate residents on the local water bodies and how to protect those water bodies; 2) change behaviors that negatively impact watersheds; 3) promote public involvement in watershed stewardship; and 4) reach bilingual audiences. The City will utilize current, on-going programs that address the requirements of this minimum control measure. Close coordination of our program with the current program of the Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP), which is already performing a similar function in the south Bay Area, will result in a more effective communication link with the public.

Best Management Practice (BMP)
Minimum Control Measure #1 – Public Education and Outreach
Summary Table

BMP	Description	Implementation
1A Mass Media	Participate with Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPP) in their Watershed Watch Program.	Year 1
1B Brochures and Fliers	Brochures, fliers, coloring books, and handouts promoting Storm Water Quality. Some handouts will be in Spanish.	Year 1
1C Public Events	Establish educational booth at two public events each year. Possible events include Hiru Matsuri Spring Taiko Festival in April, Public Works Week in May, the Morgan Hill Mushroom Mardi Gras in May, Taste of Morgan Hill in September, and the weekly Saturday Morgan Hill Farmer's Market.	Year 1
1D Classroom Education	Engage local school district officials about bringing storm water quality education into the class room.	Year 1
1E Web Site	Post stormwater related information on City website.	Year 1
1F Teleworks Messages	Utilize Teleworks system as a means to inform citizens about the City's stormwater program.	Year 1
1G Used Oil Disposal	Collect used oil biweekly as a component of our curbside recycling program. For residents not served by the curbside program, two local drop-off locations and additional opportunities are available for used oil recycling through the Countywide Household Hazardous Waste Management Program.	Year 1
1H – Household Hazardous Waste Collection	Offer locations in the County multiple days per year for residents and small business to bring hazardous waste.	Year 1

Minimum Control Measure #1 – Public Education and Outreach

1A – Mass Media (Proposed: FY 2005-2006)	
Description	Participate with Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP) in their Watershed Watch Program.
Justification	Radio and television advertisements reach a large and diverse audience.
Measurable Goal	Place storm water quality advertisement on local cable stations (channels 17 and 19) 10 times per year.
Implementation Schedule	Year 1: Television and radio media spots. Local cable public service message 10 times.
Progress Measurement	Report in Annual Report the financial contribution from Morgan Hill and the number of spots aired in which Morgan Hill was considered a participant.
Effective Measurement	Estimated number of viewers (gross impressions).

1A – Mass Media (Implementation: FY 2005-2006)

General Summary: SCVURPPP implemented a significant media program during the Fall of 2005. Attachment 1A.1 is the complete summary report from the program. In addition, the City placed a series of slides containing stormwater pollution prevention messages on the local cable channel over a 10-week period in the Spring.

Status of Measurable Goals: The first year's measurable goal was met. Storm water quality advertisements were placed on the local cable channel over 10 times. Attachment 1A.2 is a report on the City's effort that describes the placement schedule and includes copies of the slides.

Effectiveness: As Attachment 1A.1 indicates, the Watershed Watch campaign resulted in over 20 million gross impressions. The City does not estimate gross impressions for the government access channel.

Proposed Modifications: Channel 19 will not be used.

Minimum Control Measure #1 – Public Education and Outreach

Ongoing Implementation:

1A – Mass Media (Year 2: FY 2006-2007)	
Description	Participate with Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPP) in their Watershed Watch Program.
Justification	Radio and television advertisements reach a large and diverse audience.
Measurable Goal	Place storm water quality advertisement on local cable stations (channels 17 ~~and 19~~) 10 times per year.
Implementation Schedule	Year 2: Television and radio media spots. Local cable public service message 10 times.
Progress Measurement	Report in Annual Report the financial contribution from Morgan Hill and the number of spots aired in which Morgan Hill was considered a participant.
Effective Measurement	Estimated number of viewers (gross impressions).
*Modifications are noted by the underlined text.	

ATTACHMENT 1A.1

Date: **December 5, 2005**

To: **Jill Bicknell, Program Manager**
SCVURPPP

From: **Lois Humphreys and Kristine Roselius, TRG & Associates**

RE: **Final Campaign & Media Report - July 2005 - November 2005**

Included in this report are the following:

A. Campaign Summary
B. Work Plan Task Summary (includes summary of media advertising)
C. Other Measurements
   - Pledge Cards
   - Watershed Watch Kits Distributed
   - Hot Line Calls
   - Web Site Statistics

A. Campaign Summary

Watershed Watch launched the FY 05-06 campaign in September 2005 with a media and promotional campaign, distribution of Watershed Watch Kits, events, maintenance and additions to the web site and partner coordination. Campaign messages and strategies follow the recommendations of the 2003 Watershed Watch Campaign evaluation and the SCVURPPP Watershed Education and Outreach Strategy.

Watershed Watch kit distribution included 257 kits distributed at community events. The Watershed Watch kit and message was also brought to schools by ZunZun who provided 700 English and 700 Spanish kits for distribution to teachers during the first five months of the fiscal year.

Publicity for the Watershed Watch campaign was gained from a third-party promotion through an *enter to win* contest cross-promoted by SJ Mercury News and KRTY/KLIV radio stations. This contest encouraged the public to properly dispose of their used florescent bulbs at one of many convenient locations throughout Santa Clara County (participating hardware stores). Free sporting event tickets were offered as incentive and nearly 400 entries were received.

Watershed Watch web site traffic has again increased by 23 percent over the past five months. To further increase the effectiveness of this communication tool, TRG revamped and expanded the web site at the end of the last fiscal year and increased traffic followed.

This report summarizes completion of tasks, activities, and effectiveness of the campaign for the period of July 2005 - November 2005.

B. Work Plan Task Summary

Task 1 – Media Advertising Campaign

The Watershed Watch campaign consultants developed a media strategy that involved print, radio and transit advertising in one flight during FY 05-06: September – October 2005. The fall 2005 media campaign mirrored the successful spring 2005 advertising campaign but also included the Got Bugs ads in addition to the Got Bulbs ads.

The Got Bulbs advertising campaign was a joint effort with campaign partners HHW and the Green Business Program. The goal of the Got Bulbs campaign was to increase public awareness about the proper disposal of fluorescent bulbs, the effects of mercury on the environment and watershed, and to provide information about convenient disposal locations (local participating hardware stores).

The Got Bugs print and radio commercials ran during the same time period as the Got Bulbs campaign. The ads were utilized to increase awareness and eventually influence behavior change with the targeted audiences.

The consultants recommended continuing working with the same media partners to maximize value added resources. The campaign worked with the following media partners:

- San Jose Mercury News
- KRTY/KLIV radio
- Viacom Outdoor (transit)

The net advertising budget for media was $40,800.50. This report quantifies the gross impressions, value added resources and various other performance mechanisms that resulted from the media campaign during the fall flight.

Media Added Value and Promotions

The media partners provided a total added value package of benefits and resources of $70,415. The value added resources included discounted advertising rates, free spots,

and PSA's, and an *enter to win* contest cross-promoted by SJ Mercury News and KRTY/KLIV radio stations.

San Jose Mercury News and KRTY/KLIV

The San Jose Mercury News and KRTY/KLIV cross-promoted an *enter to win* contest featuring messages pertaining to the proper disposal of light bulbs containing mercury. The media support included five free ¼ page ads in the SJ Mercury News and 120 promotional announcements airing on KRTY and KLIV. During the four-week contest period nearly 400 entries were received for a chance to win a customized professional sporting package for two.

Viacom Outdoor

Viacom Outdoor continued to run the "Got Bulbs?" poster on bus backs for an additional four weeks, from 10/17 to 11/20 free of charge.

Watershed Watch Advertising Statistics: September – October 2005

Gross Impressions – Gross Impressions (the sum of the average audience for all advertisements within a given schedule; average persons multiplied by the number of total spots, equals gross impressions). For example, if KRTY/KLIV runs 10 spots in the morning where are 13,000 listeners in quarter hour slots, the gross impression is 130,000. The following shows the gross impressions during the September – October 2005 period:

• SJ Mercury News	Adults 18+	5,763,000
• Viacom – Transit	Adults 18+	12,702,000
• KRTY/KLIV	Adults 18+	1,955,100

Total Gross Impressions **20,420,100**

Net Advertising Budget – The following amounts were spent on advertising during the fall flight:

San Jose Mercury News	$18,270
Viacom Outdoor	$ 9,500
KRTY/KLIV	$13,030.50
Total	**$40,800.50**

The following shows the added value of bonus spots, PSA's and promotions for the various media partners:

San Jose Mercury News	5 promo ads	$31,000
Viacom Outdoor	75 buses, 4wk override	$11,500
KRTY/KLIV	contest, psa's, free spots	$27,915

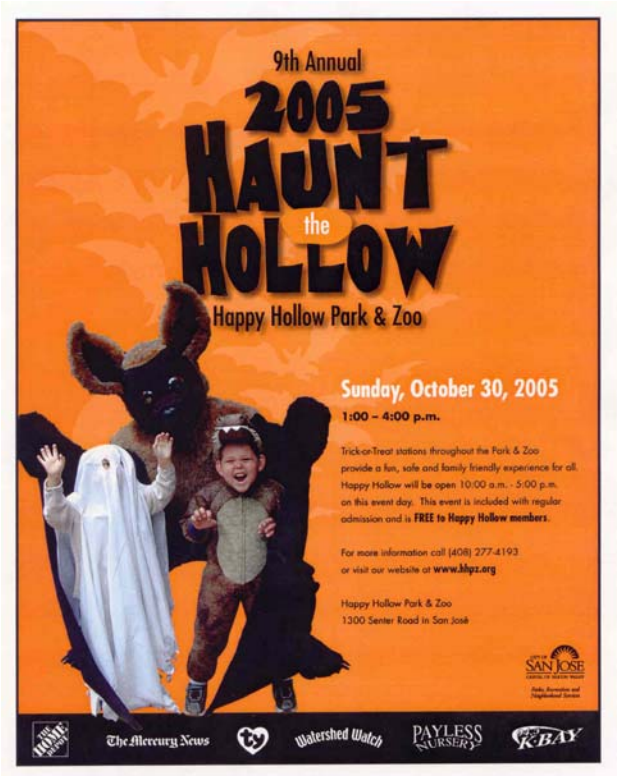
Total Added Value **$70,415**

Several of the no charge spots running on KRTY and KLIV aired during peak drive times. These upgrades totaled $5,140 vs. the original estimated value of $2,625.

Task 2 – Calendar / Event Coordination

During this period, TRG originally proposed that we would be able to staff only one event within the budget; however, we were able to staff a total of three due to the media campaign being less labor-intensive than anticipated.

Watershed Watch was given co-sponsor status of the Pumpkins in the Park and Happy Hollow Park & Zoo Halloween events by event sponsors and Watershed Watch campaign partners. As an event co-sponsor, the Watershed Watch logo was shown in all ads and promotional materials for the events. Some examples include:



TRG utilized the Watershed Watch booth and distributed the Watershed Watch kit and IPM materials at the following events:

Event	Audience	No. of brochures and promotional material distributed
Guadalupe River Park & Gardens Grand Opening Event – September 10, 2005	50,000	WW kits - 142 Others - 386
Pumpkins in the Park – October 8, 2005 (Watershed Watch co-sponsored)	10,000	WW kits- 56 Others- 363
Happy Hollow Park & Zoo Halloween Event – October 30, 2005 (Watershed Watch co-sponsored)	6,000	WW kits - 72 Others - 3000

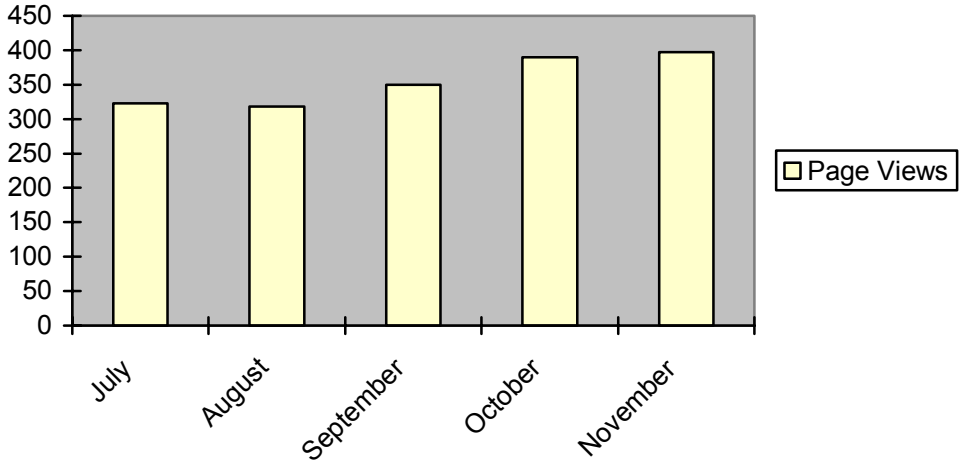
In addition to the Watershed Watch booth and IPM materials, the beanbag game was utilized at the three TRG-staffed events in September and October. New Watershed Watch temporary tattoos and other giveaway items were used as a prize for participants. The game attracted large crowds of children and their families to the booth, which allowed for interaction amongst the parents and Watershed Watch staff. The children enjoyed the game so much that there were many repeat visits to the booth and a high volume of traffic throughout the day at each event.

Event reports were submitted after each event. TRG estimated that the partnership value added from advertising, event participation and public exposure for the Watershed Watch campaign was value at $20,000.

Task 3 - Web Site Development

Web site page views have continued to increase over the past five months. The average number of page views has increased to 356 from July through November 2005; **this is a 3 percent increase from the average number of page views during this same period in FY 04/05.** The page views have continued to remain high as a result of links from partner web sites and from advertising.

Web site page views increased 23 percent from July to November 2005, following the Got Bulbs and Got Bugs ad campaign.



Below are the overall figures for web site page views July through November 2005:

- **The web site received a total of 54,275 page views in this period.**
- **The Watershed Watch Discount Card was downloaded 130 times from July – November 2005.**
- **Latinos are visiting the web site in consistently high numbers. On average, four of the top 10 pages viewed during July through November 2005 were Spanish pages.**
- **The IPM fact sheets continue to be viewed and downloaded: 2,652 pages have been downloaded between July and November 2005.**
- **The Spanish All About Watersheds page and the IPM Problems & Solutions page were the top two pages on the web site.**

Administration – Reports and Meetings

The consultant has submitted monthly reports, with information on events, partners, and web statistics along with invoices at the first part of each month. There have been two WE & O PI/P Ad Hoc Task Group meetings attended by the consultant and there has been ongoing communications with Program staff. TRG was able to over-deliver both media value added and the number of anticipated events within the $38,500 budget allocated for the Fall 2005 campaign.

C. Summary of Measurements in Response to Media, Web Site, Events, Partners, etc.

1) Pledge Cards Returned:
9

2) WW Kits Distributed Through Hotline, Events, Partners, ZunZun assemblies and Web Site:
959 English
725 Spanish

3) Hotline Calls:
42

4) Web Site Downloads of Discount Card:
130

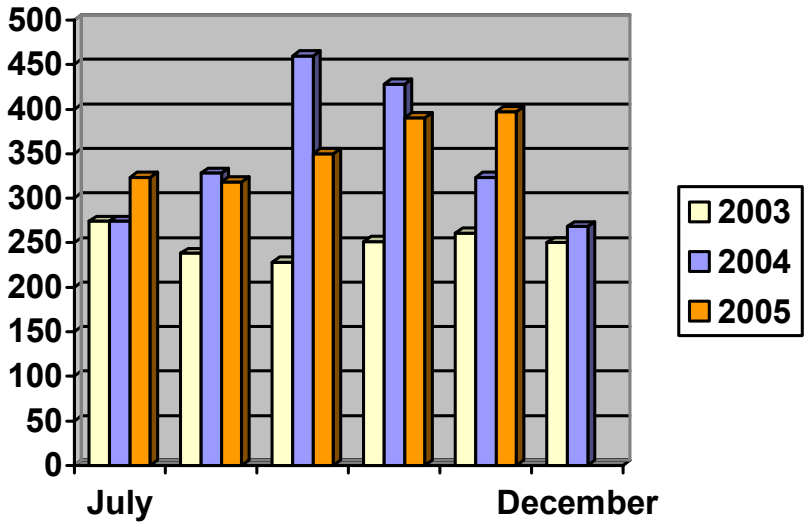
5) Web Site Downloads of IPM Fact Sheets:
2,652

6) Net Media Budget:
$40,800.50

7) Value Added Resources:
$90,415

8) Web Site Page Views:
54,275

Chart:



Web Site Page Views

Conclusion:

The fall campaign generated strong interest from the target audience, while producing high value added resources from the media and community partnerships.

ATTACHMENT 1A.2

CITY OF MORGAN HILL

ENVIRONMENTAL PROGRAMS DIVISION, PUBLIC WORKS DEPARTMENT

17555 Peak Avenue Morgan Hill CA 95037 (408) 779-7247 Fax (408) 779-7236

2006 STORMWATER CAMPAIGN
Channel 17 KCMH Run Schedule

SLIDE #	MESSAGE	RUN DATES
1	Watershed Watch Campaign	3/13/06-5/19/06
2	What is a Watershed?	3/13/06-5/19/06
3	The Importance of Our Watershed	3/13/06-5/19/06
4	Pollutants In Our Watershed	3/27/06-5/19/06
5	Where Do Pollutants Come From?	3/27/06-5/19/06
6	Runoff and the Sewer System	4/10/06-5/19/06
7	Preventing Watershed Pollution	4/10/06-5/19/06
8	You Can Prevent Storm Water Pollution (Part 1)	4/24/06-5/19/06
9	You Can Prevent Storm Water Pollution (Part 2)	4/24/06-5/19/06
10	How to Enjoy Our Creeks and Bay	5/8/06-5/19/06

Watershed Watch Campaign

The Watershed Watch Campaign is dedicated to educating and informing the public about the importance and value of local watersheds and why protection of watersheds is so important to you, your children, and future generations.

Call the Watershed Watch Hotline at 866-WATERSHED or visit www.watershedwatch.net for more information about less toxic methods of pest control in your home and garden, automobile care, and other pollution prevention ideas.

What Is A Watershed?

A watershed is a land area that drains into a creek, river, lake, wetland, bay or groundwater aquifer.

All water from rain and irrigation which flows over land surface (runoff) goes into storm drains, creeks and rivers that flow directly to Monterey Bay.

The runoff from Morgan Hill's homes, yards and neighborhoods eventually enters the Bay contaminated with pollutants that are picked up along the way.

The Importance of Our Watershed

Watersheds are more than just drainage areas in and around our communities. They support plant and animal habitat and provide drinking water for people and wildlife. They also provide opportunities for recreation and enjoyment of nature.

Protection of the watershed is essential for maintaining the health and well being of all living things. By protecting the watershed from pollutants, you are protecting the environment for your children and for future generations.

Pollutants In Our Watershed

Pollutants enter our creeks and rivers through storm drains that collect and convey runoff from most streets in our communities. The storm drains on your street may be stenciled with “No Dumping - Flows to Bay” or a similar message. Water flowing through these storm drains is untreated and carries pollutants to our creeks and streams, which eventually go to Monterey Bay. Pollution in our watersheds degrades the environment, harms wildlife habitat, impacts the economy and jobs, causes higher taxes and fees and ultimately affects the health of humans.

Where Do Pollutants Come From?

People can cause pollutants to enter storm drains and creeks without realizing that they are causing harm to the environment. Rain and over-watered lawns can wash pollutants such as pesticides, paint, fertilizers, pet waste, litter, oil and other automotive fluids, eroded soil, fertilizers, and pesticides into neighborhood gutters and storm drains that flow to the Bay. Identifying sources of storm water pollution and keeping this pollution away from storm drains and ditches is the best and most economical way to keep storm water clean.

Runoff and the Sewer System

Our sanitary sewer system carries wastewater to local wastewater treatment plants where processes remove most wastes before the treated water is discharged to the Bay.

Storm drains do not connect to the sewer system. They carry rainwater and other runoff from roads, parking lots and roof down spouts directly into our creeks, rivers, lakes and eventually, the ocean without the treatment that wastewater receives. This runoff is the major source of pollutants, including pesticides, that are found in our creeks at levels high enough to be toxic to aquatic life.

Preventing Watershed Pollution

The federal Clean Water Act and the California Water Code mandate that all cities and counties, as well as businesses and industries, take steps to prevent watershed pollution. However, individuals also cause pollution and each of us can prevent it by making very simple changes at home, work, school and play. Preventing pollution is much easier and less expensive than cleaning it up.

You Can Prevent Storm Water Pollution

Do your part to keep our storm drains clean:

- Don't dump ANYTHING down storm drains
- Divert rainspout runoff away from paved surfaces
- Keep storm drains clear of debris, dirt, and trash
- Reduce or eliminate use of chemical pesticides and fertilizers
- Plant or pave areas that are prone to erosion
- Dispose of pet droppings and litter properly

You Can Prevent Storm Water Pollution

Do your part to keep our storm drains clean:

- Recycle used automotive oil and filters at the curb
- Take automotive fluids, paints, pesticides, and other unwanted household chemicals to a Household Hazardous Waste collection event (299-7300)
- Wash cars at a car wash rather than in the yard or street
- Prevent leaking, dripping and spilling automotive fluids

How To Enjoy Our Creeks and Bay

- Ride a bike or walk along a creek. Visit www.parkhere.org for trail information
- Take a walk along the wetlands with a naturalist. Call the Don Edwards San Francisco Bay National Wildlife Refuge at Alviso at 262-5513 for more details
- Find volunteer opportunities to help protect your watershed (be a watershed steward)

Call (866) WATERSHED or visit
www.watershedwatch.net
for more information

1B – Brochures and Fliers (Proposed: FY 2005-2006)	
Description	Brochures, fliers, coloring books, and handouts promoting Storm Water Quality. Some handouts will be in Spanish.
Justification	Education material provided to citizens of all ages will raise awareness of storm water quality.
Measurable Goal	Hand out some type of education handout to a minimum of 3% of City population in Yrs. 1 & 2. Current population = 34,785.
Implementation Schedule	Year 1: Produce 1,500 brochures, 500 coloring books, and 1,000 misc. handouts.
Progress Measurement	Number of brochures, coloring books, and miscellaneous handouts produced.
Effective Measurement	Number/percent of storm water materials distributed each year. Does it meet 3% of population?

1B – Brochures and Fliers (Implementation: FY 2005-2006)

General Summary: The City produced a large number of stormwater promotional materials during the year. Staff obtained electronic images of materials created by SCVURPPP's Watershed Watch campaign and adapted them for use in Morgan Hill. This insured that local messages were consistent between jurisdictions. 5,000 copies of the brochure were printed and were distributed at the Mushroom Mardi Gras and Independence Day Festival. Attachment 1B.1 is the brochure. In addition, a billing insert was distributed to over 11,000 utility customers in February. Attachment 1B.2 is the insert. A new original stormwater pollution prevention coloring book, Attachment 1B.3 was created for the community and 10,000 copies were produced.

Status of Measurable Goals: The first year's measurable goal was met. The insert was mailed to over 11,000 households representing nearly 100% of the City's population.

Effectiveness: Nearly 100% of the population was reached.

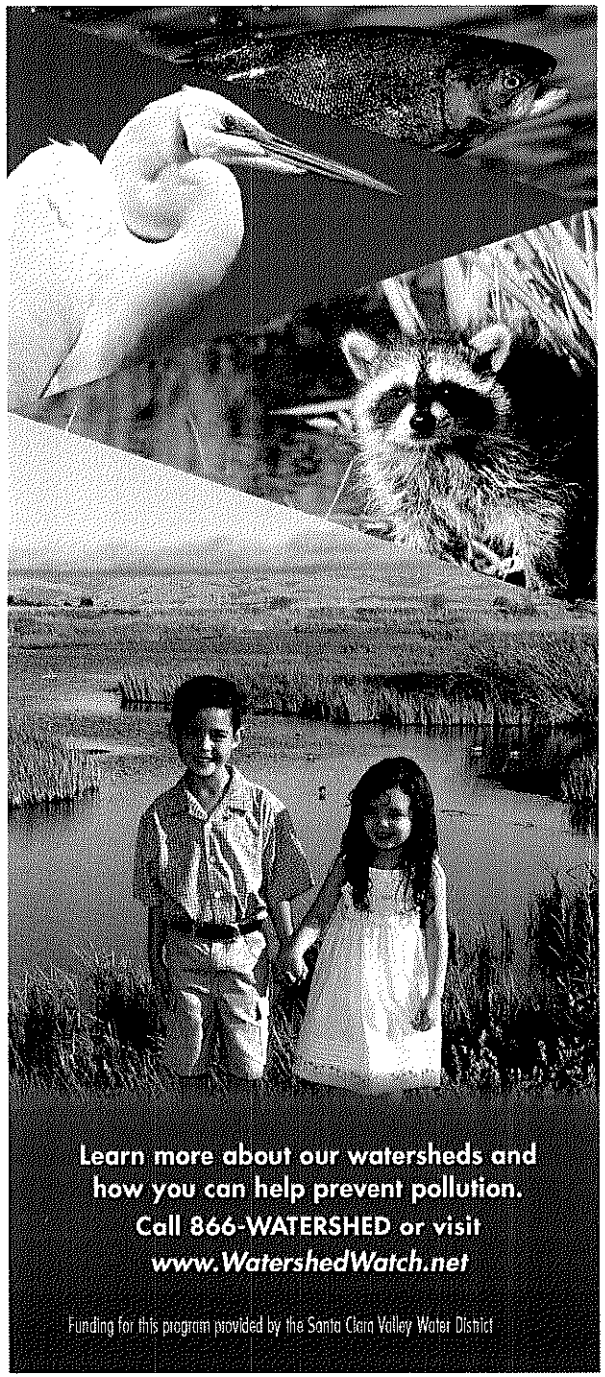
Proposed Modifications: Due to the large numbers of items produced in Year 1, the City has an adequate supply of public education materials currently and does not intend to produce more in Years 2 and 3. Staff will continue to distribute existing materials at public events throughout the year.

Minimum Control Measure #1 – Public Education and Outreach

Ongoing Implementation:

1B – Brochures and Fliers (Year 2: FY 2006-2007)	
Description	Brochures, fliers, coloring books, and handouts promoting Storm Water Quality. Some handouts will be in Spanish.
Justification	Education material provided to citizens of all ages will raise awareness of storm water quality.
Measurable Goal	Hand out some type of education handout to a minimum of 3% of City population in Yrs. 1 & 2.
Implementation Schedule	Year 2: Continue to distribute existing materials.
Progress Measurement	Number of brochures, coloring books, and miscellaneous handouts produced.
Effective Measurement	Number/percent of storm water materials distributed each year. Does it meet 3% of population?
*Modifications are noted by the underlined text.	

Billing Insert



Storm water from urban runoff is the major cause of pollution in our local creeks, rivers, and lakes. Many people think that everything that flows into storm drains gets treated in the sewer system. Actually, everything that flows into a storm drain goes untreated directly into our creeks, rivers, lakes, and eventually the ocean.

Storm water can become polluted by pesticides, paint, fertilizers, pet waste, litter, oil and other automotive fluids, eroded soil, and household chemicals. Even small amounts of pollutants that accumulate on roads, parking lots, and sidewalks can be transported into nearby streams and rivers during a rainstorm. Identifying sources of storm water pollution and keeping this pollution away from storm drains and ditches, is the best and most economical way to keep storm water clean.

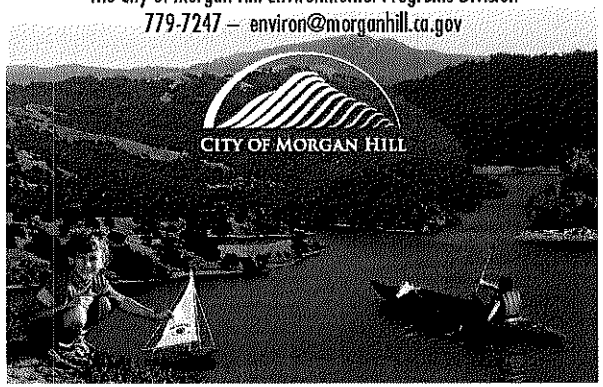
You can do your part to prevent and control storm water pollution. Here are some easy steps that can be taken to prevent storm water pollution:

- *Don't dump anything down storm drains.*
- *Chemicals such as paint, oil, and pesticides harm fish, wildlife, and people.*
- *Dispose of litter properly.*
- *Keep storm drains clear of debris, dirt, sand, silt, and wastes.*
- *Prevent dripping and spilling automotive fluids.*
- *Used oil and filters, antifreeze, and other automotive fluids can be safely recycled at a local used oil collection center.*
- *Wash cars at a car wash rather than in a yard or on the street.*
- *Reduce or eliminate use of chemical pesticides and fertilizers for landscaping and lawns.*
- *Plant or pave areas that are prone to erosion.*

For more information, call the hotline at 866-WATERSHED or visit www.WatershedWatch.net

Students are invited to enter the Clean Creeks Poster Contest for a chance to win $100!
www.earthdayart.com

The City of Morgan Hill Environmental Programs Division
779-7247 – environ@morganhill.ca.gov



ATTACHMENT 1B.1

ATTACHMENT 1B.2

important about watersheds?

just drainage areas in and around our commu-

for plants and animals, and

Want More Information About Watersheds and Pollution Prevention?

Call the Watershed Watch Hotline at (866) WATERSHED for more information about less toxic methods of pest control in your home and garden, automobile care, and other pollution prevention ideas.

The Watershed Watch Campaign is a public-private partnership with participants including:

Santa Clara Valley Urban Runoff Pollution Prevention Program
Santa Clara Basin Watershed Management Initiative
Don Edwards San Francisco Bay National Wildlife Refuge at Alviso

If you would like your business, nonprofit or group to join as a Watershed Watch partner, please call the Hotline at (866) WATERSHED.

Important Numbers:
County Household Hazardous Waste collection information (408) 299-7300
County Recycling Hotline for information on recycling (800) 533-8414
Report illegal discharges to creeks and reservoirs to the Pollution Hotline at 776-7337 ext. 5

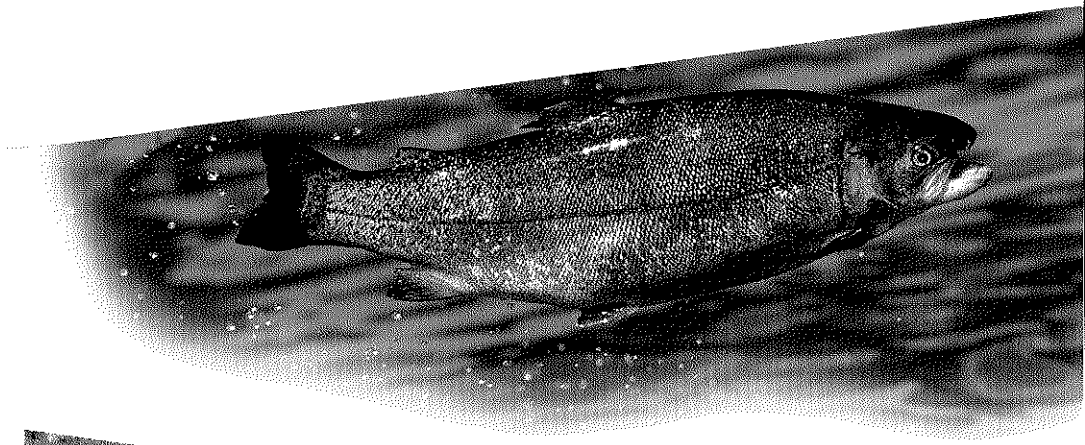
Watershed Watch
Protect Our Creeks And Bay

City of Morgan Hill

For More Information Call the Hotline at (866) WATERSHED
Visit the website at: www.WatershedWatch.net

Funding for this program provided by the Santa Clara Valley Water District Board of Directors.
This publication can be made available upon request in alternative formats.

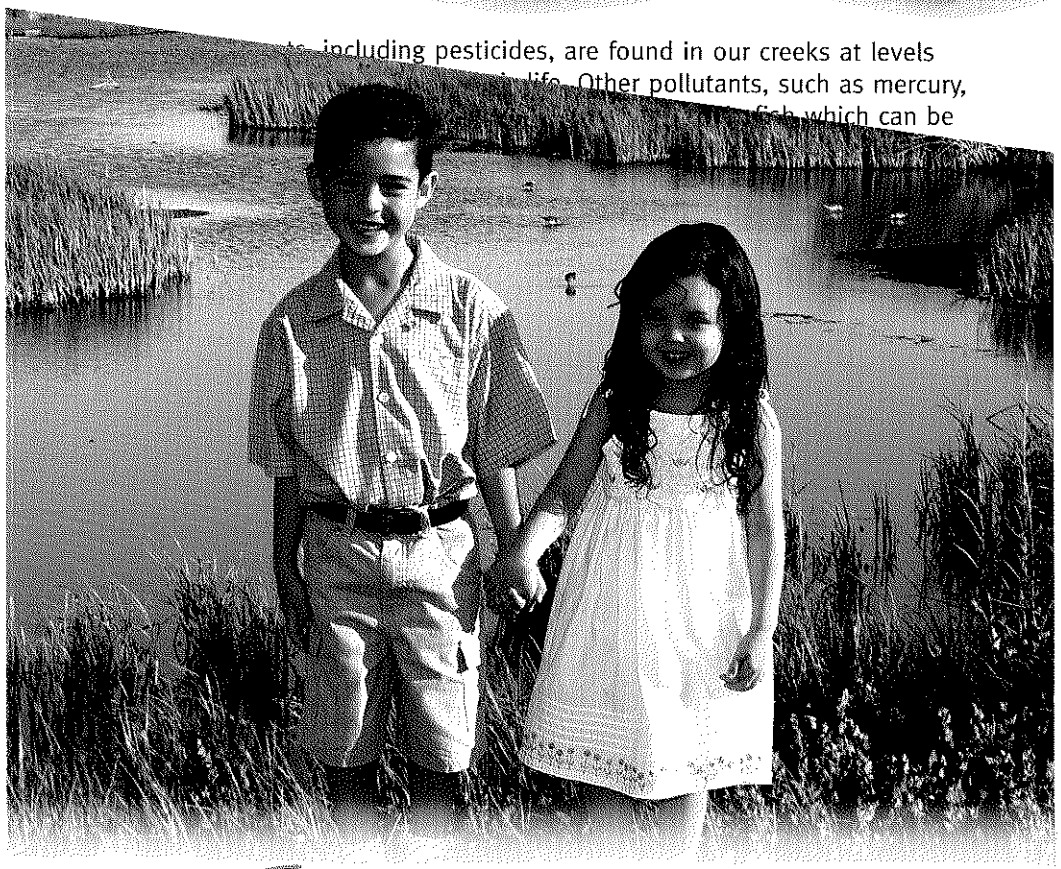
Printed on recycled content paper using soy based inks.



including pesticides, are found in our creeks at levels

life. Other pollutants, such as mercury,

fish which can be



These are worth protecting

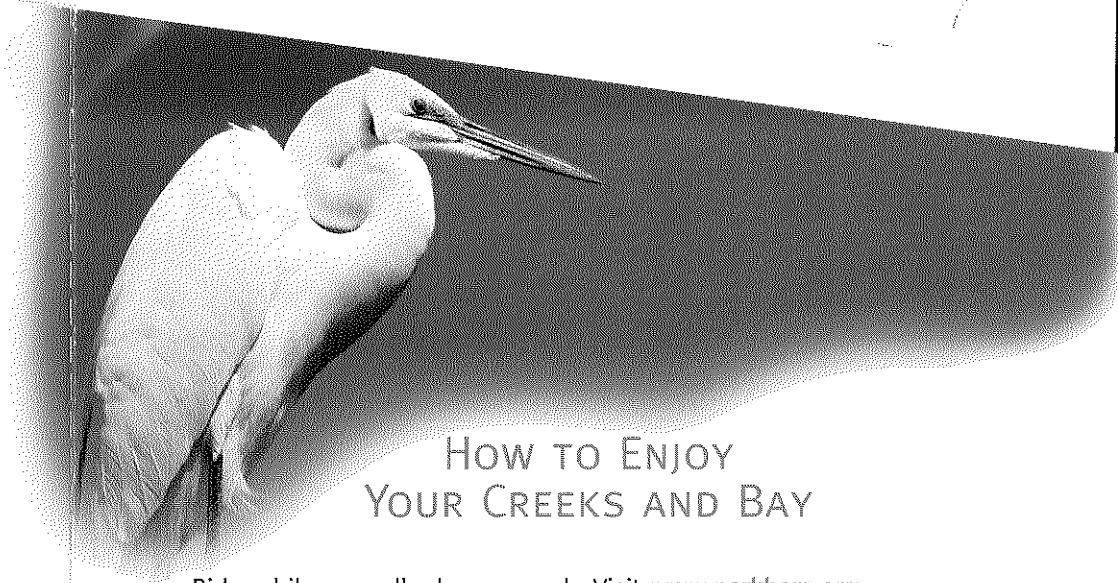
Watershed Watch
Protect Our Creeks And Bay

Pollution prevention keeps your local creeks and wetlands healthy for birds, fish and wildlife.

Easy Ways to Prevent Watershed Pollution

1. Find some alternative ways to control pests inside and outside your home, without toxic chemical pesticides. If you do use pesticides, use them sparingly and according to the directions specified on the container. Do not use outside if rain is forecast within 24 hours. Take unwanted pesticides to a Household Hazardous Waste Collection Event.
2. If you change your own oil, use our curbside recycling program, or take it to a Household Hazardous Waste Collection Event. Regularly maintain your car to avoid leaks of auto fluids. Never pour oil or other automotive fluids into a storm drain or onto the ground.
3. Clean up trash outside your home. Pick up leaves and yard clippings and recycle as green waste. If you see litter, pick it up and put it in a trash can.
4. Wash your car on an unpaved area or better yet, take it to a commercial car wash.
5. Pick up your pet droppings and dispose of them in the trash or in your toilet.
6. Use kitty litter or other absorbent materials – not your hose – to clean up spills and leaks on paved surfaces. Remember to clean up and properly dispose of the used absorbent.
7. Rinse latex paint brushes, pans and rollers in the sink. Filter and reuse oil-based paint thinner or brush cleaners. Take leftover latex and oil-based paints and solvents to a hazardous waste collection event. Never pour paint or solvents into a storm drain, sink or onto the ground.
8. Control erosion around your property to prevent dirt and debris from being carried into the storm drain.
9. Divert rainspouts and garden hoses away from paved surfaces to prevent water from carrying pollutants directly into storm drains. Provide landscaping next to sidewalks and driveways to collect runoff from paved surfaces.

CUT ALONG THIS LINE AND POST AS A REMINDER.



How to Enjoy Your Creeks and Bay

1. Ride a bike or walk along a creek. Visit www.parkhere.org for trail information.
2. Take a walk along the wetlands with a naturalist. Call the Don Edwards San Francisco Bay National Wildlife Refuge at Alviso at (408)262-5513 for more details.
3. Find volunteer opportunities to help protect your watershed (be a watershed steward).

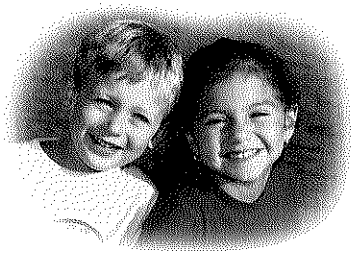
Call the Hotline at (866) WATERSHED or visit the website at www.WatershedWatch.net.

Protecting the watershed is essential for maintaining the health and well being of all living things — both now and in the future.

Pollution prevention keeps your local creeks and wetlands healthy for birds, fish and wildlife.

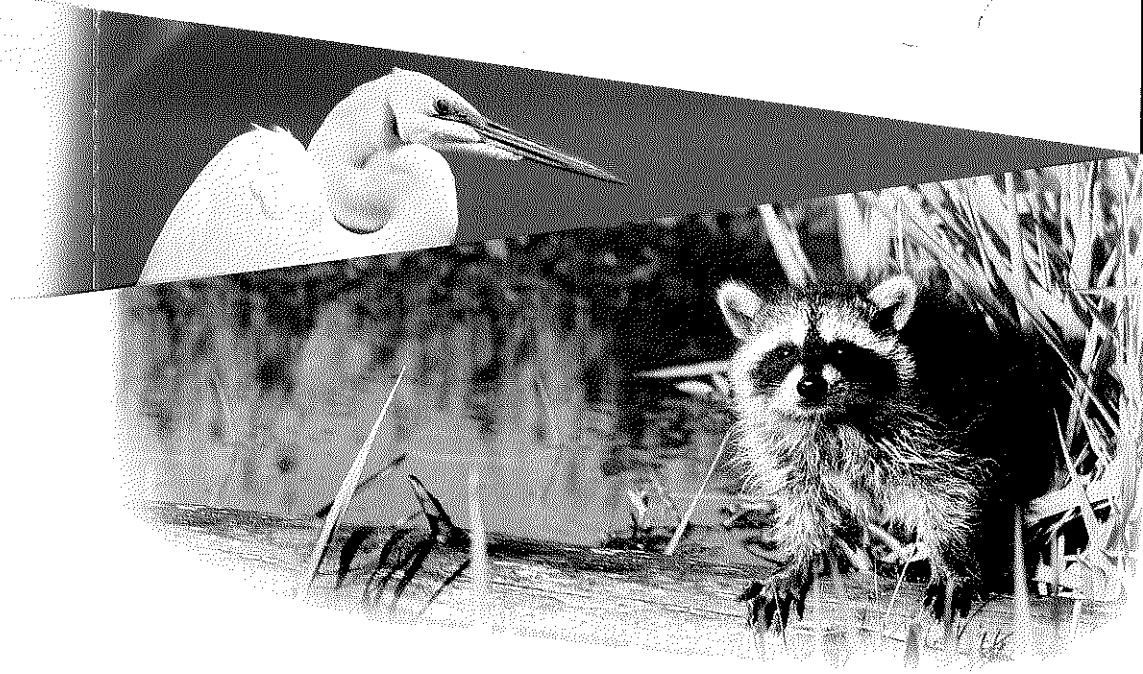
Easy Ways to Prevent Watershed P

1. Find some alte



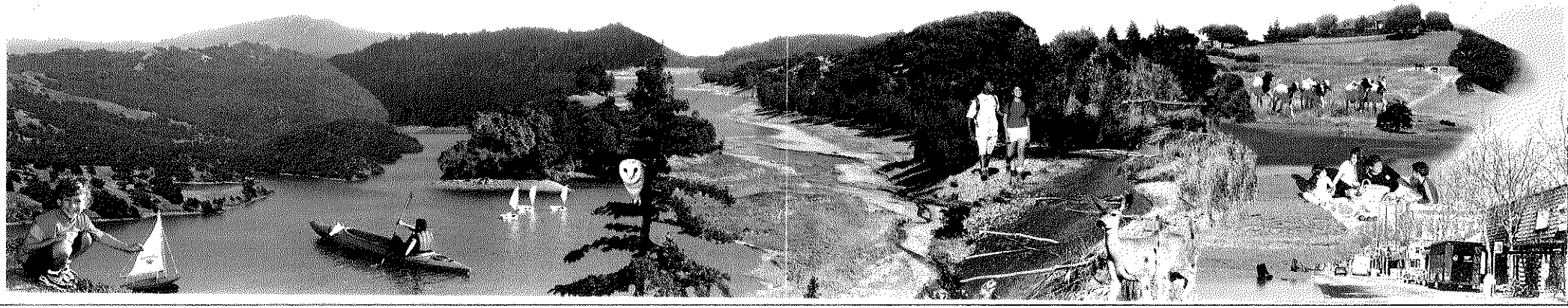
By protecting the watershed, creeks and the Bay, you are protecting the environment for your children and future generations.

The Watershed Watch Campaign is dedicated to educating and informing the public about the importance and value of local watersheds, and why protection of watersheds is so important to you, your children and future generations. This brochure provides information about watersheds and how you can help prevent pollution.



What is a watershed?

A watershed is a land area that drains into a creek, river, lake, wetland, bay, or groundwater aquifer. In South Santa Clara County, all the water from rain and irrigation which flows over the land surface (called runoff) goes into storm drains, creeks and rivers that flow to Montery Bay. You live in a watershed that flows to a local creek, and all of the runoff from your home, yard and neighborhood flows to that creek.

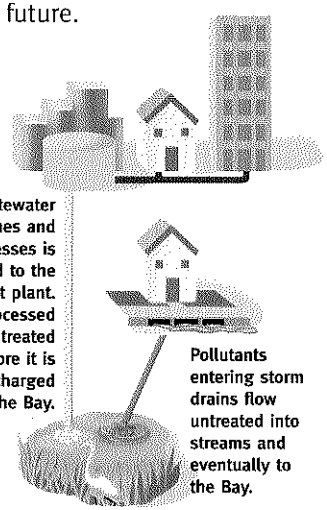


What's important about watersheds?

Watersheds are more than just drainage areas in and around our communities. They are necessary to support habitat for plants and animals, and they provide drinking water for people and wildlife. They also provide the opportunity for recreation and enjoyment of nature. Protection of the natural resources in our watershed is essential to maintain the health and well being of all living things – both now and in the future.

What's the problem?

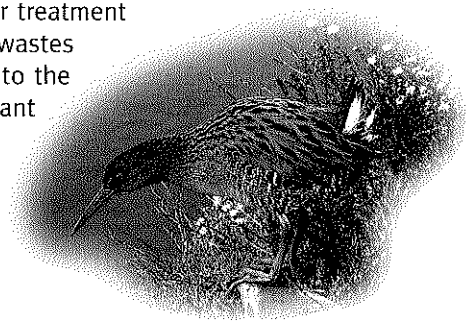
Pollutants enter our creeks and rivers through storm drains that collect and convey runoff from most streets in our communities. The storm drains on your street may be stenciled with "No Dumping – Flows to Bay" or a similar message. Water flowing through these storm drains is untreated and carries pollutants to our creeks and streams, which eventually go to Montery Bay. Pollution in our watersheds degrades the environment, harms wildlife habitat, impacts the economy and jobs, causes higher taxes and fees, and ultimately affects the health of humans as well. Pollutants such as motor oil, paint products, pet waste, litter, sediment, and chemicals such as fertilizers and pesticides are washed by rain and over-watered lawns into neighborhood gutters and storm drains. In day-to-day activities, people can cause some of these pollutants to enter storm drains and creeks without knowing that they are causing harm to the environment.



Some pollutants, including pesticides, are found in our creeks at levels high enough to be toxic to aquatic life. Other pollutants, such as mercury, even in relatively small quantities, contaminate certain fish which can be harmful when eaten by small children, pregnant women, or anyone who eats these fish frequently.

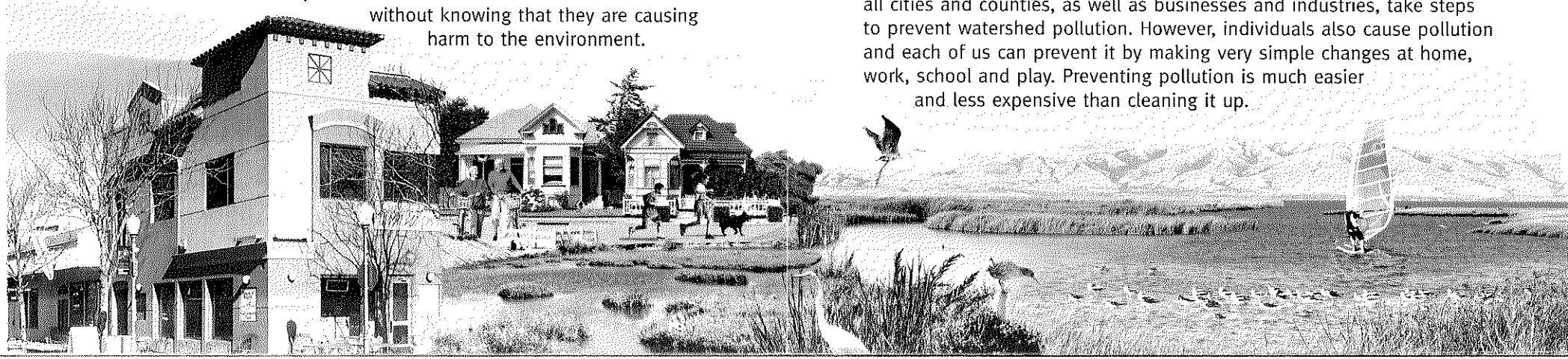
Doesn't polluted water get treated through the sewer system?

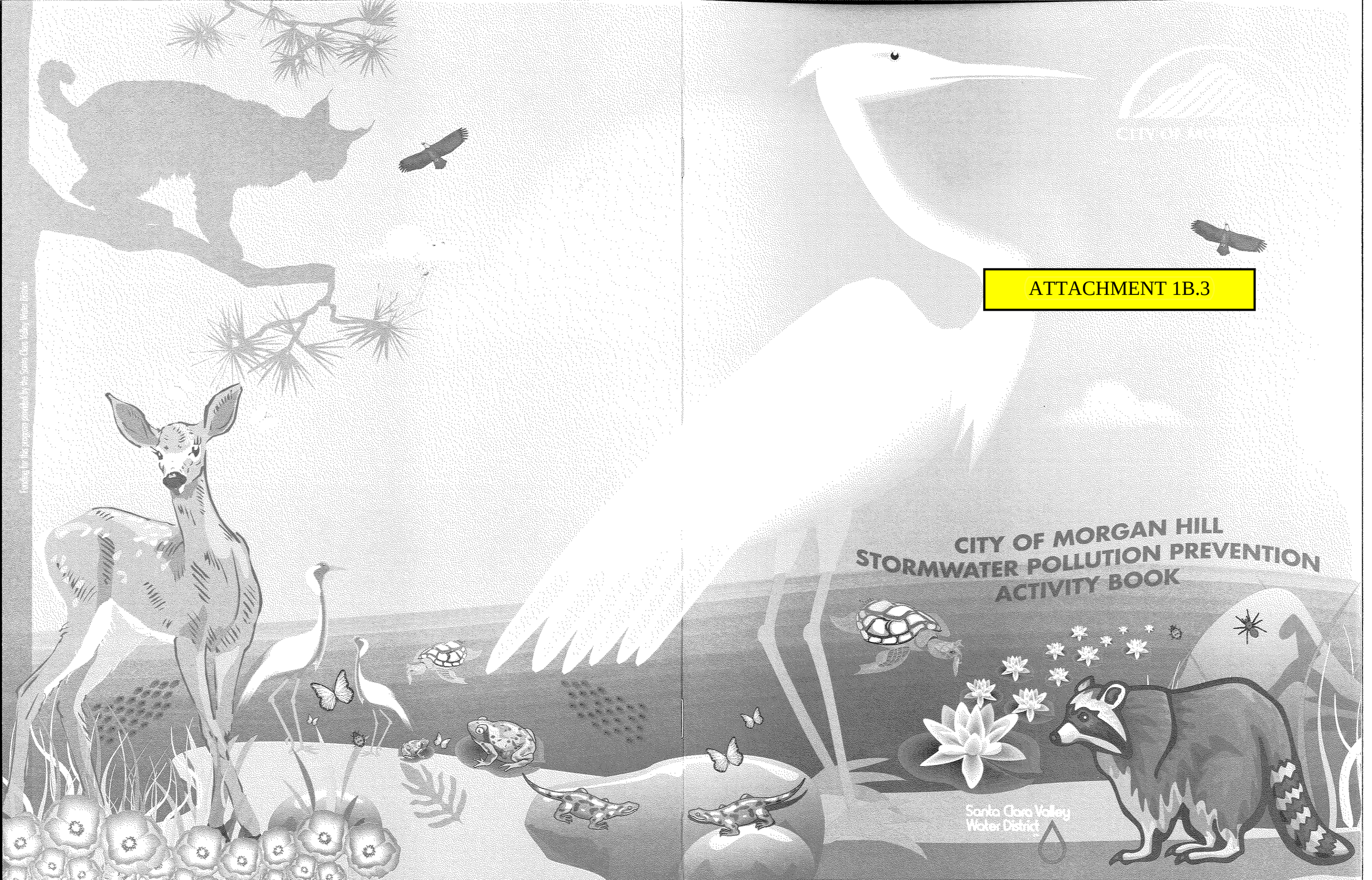
The sanitary sewer system carries wastewater from sinks, toilets and other indoor drains to local wastewater treatment plants, where processes remove most wastes before the treated water is discharged to the Bay. However, wastewater treatment plant processes cannot remove all solvents, metals, or chemicals from wastewater. The storm drain system carries rainwater and other runoff from roads, parking lots, and roof down spouts directly to local creeks and the Bay, with no treatment.



What is being done to prevent pollution?

The federal Clean Water Act and the California Water Code mandate that all cities and counties, as well as businesses and industries, take steps to prevent watershed pollution. However, individuals also cause pollution and each of us can prevent it by making very simple changes at home, work, school and play. Preventing pollution is much easier and less expensive than cleaning it up.




ATTACHMENT 1B.3
CITY OF MORGAN HILL
STORMWATER POLLUTION PREVENTION
ACTIVITY BOOK
Santa Clara Valley
Water District

CITY OF MORGAN HILL STORMWATER POLLUTION PREVENTION ACTIVITY BOOK

Activities for Morgan Hill students from grades K-12.

Learn more about our watersheds and how you can help prevent pollution.

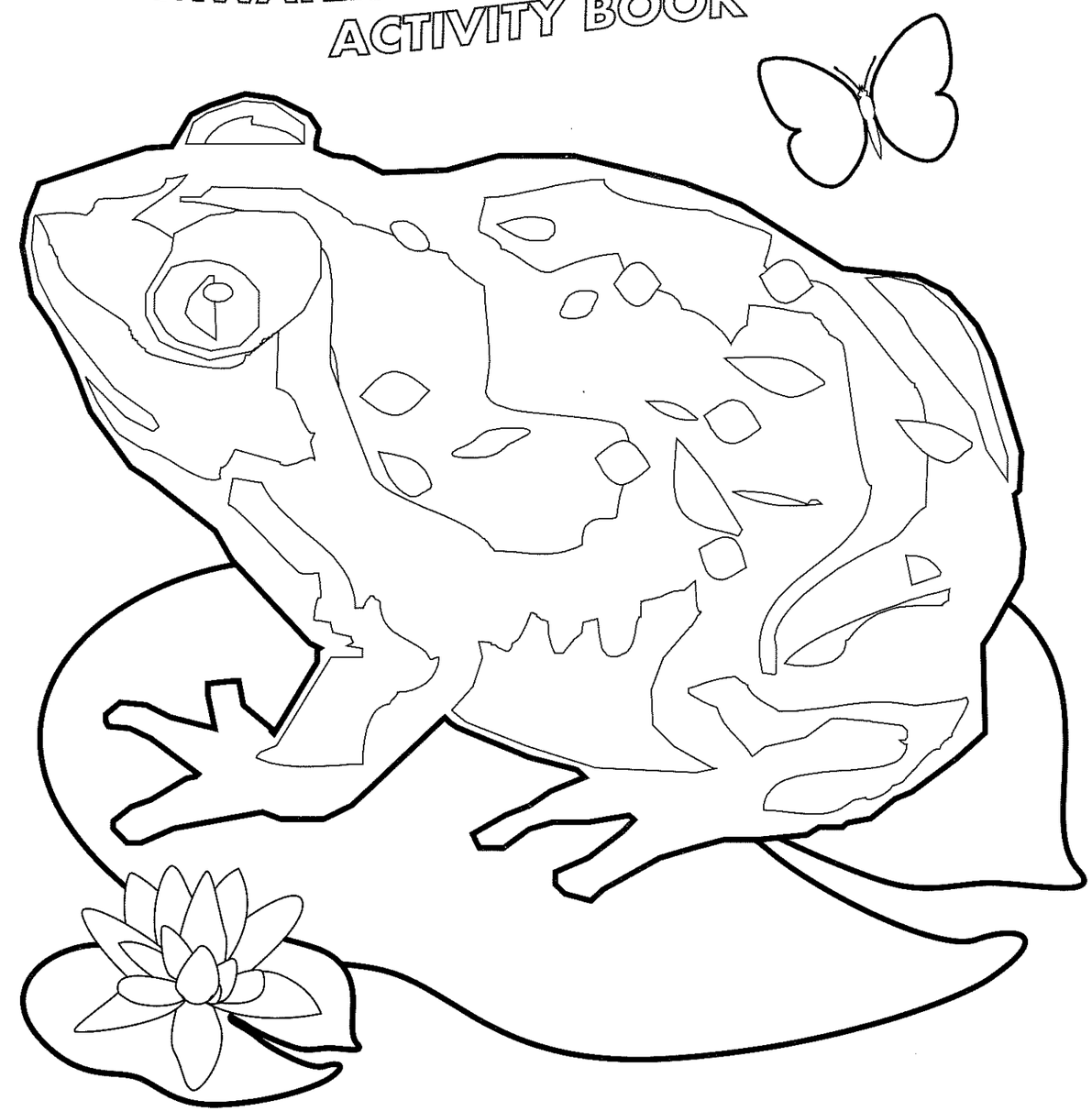
Funding for this program provided by the Santa Clara Valley Water District

CITY OF MORGAN HILL

The City of Morgan Hill Environmental Programs Division
779-7247 – environ@morganhill.ca.gov

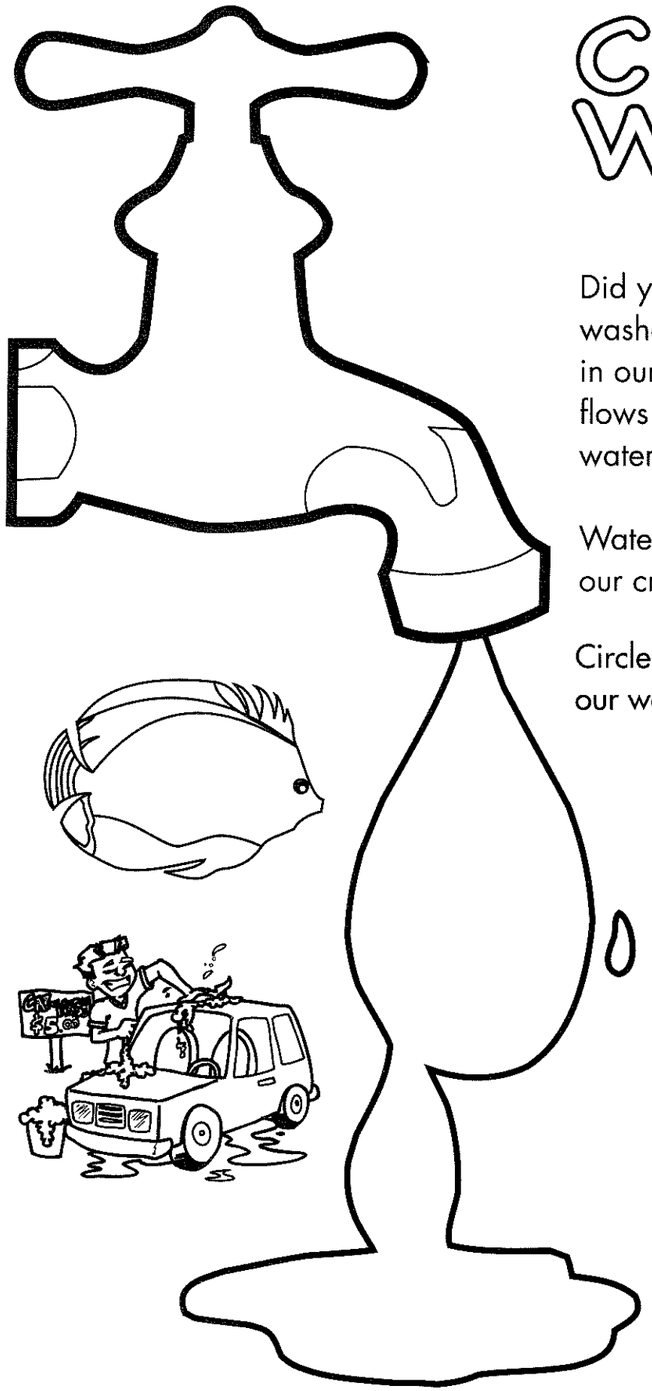
COLOR 1

CITY OF MORGAN HILL STORMWATER POLLUTION PREVENTION ACTIVITY BOOK



CITY OF MORGAN HILL STORMWATER ACTIVITY GUIDE FUNDED BY THE SANTA CLARA VALLEY WATER DISTRICT BOARD OF DIRECTORS.

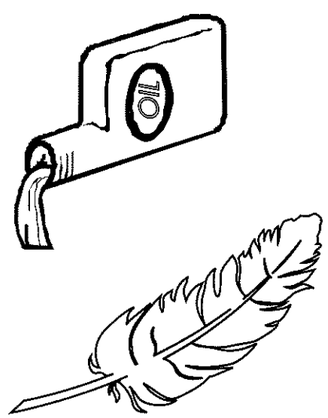
CLEAN WATER



Did you know? The pollution that washes down our street drains, ends up in our local creeks and streams, then flows into our oceans and back into our water supply.

Water that moves from our streets into our creeks is called runoff.

Circle what you think might harm or pollute our water supply:



Morgan Hill's most well known creek is Llagas Creek.

CITY OF MORGAN HILL STORMWATER ACTIVITY GUIDE FUNDED BY THE SANTA CLARA VALLEY WATER DISTRICT BOARD OF DIRECTORS.

STORMWATER WORDFINDER

See how many words can you make using the letters from the word: "STORMWATER" You can use each letter once per word.

1. matter
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____
16. _____
17. _____
18. _____
19. _____
20. _____
21. _____
22. _____
23. _____
24. _____
25. _____
26. _____
27. _____
28. _____
29. _____
30. _____

CITY OF MORGAN HILL STORMWATER ACTIVITY GUIDE FUNDED BY THE SANTA CLARA VALLEY WATER DISTRICT BOARD OF DIRECTORS.

How many animals that live in the watershed can you find?
Color in all of the plants and animals when you are done.

CITY OF MORGAN HILL STORMWATER ACTIVITY GUIDE FUNDED BY THE SANTA CLARA VALLEY WATER DISTRICT BOARD OF DIRECTORS.

Stormwater Pollution & Our Future

The generations that follow us have two possibilities for the kind of environment that we leave them. If we all pitch in and do our share to keep chemicals and trash out of our water system, the next generation of people, plants and animals will have clean healthy water to drink. If we keep carelessly damaging our water supply, the next generation will suffer because we didn't care enough to help now. Imagine what our world will look like 100 years from now if we do our part to protect it. Draw your vision below. Be sure to sign your name too!

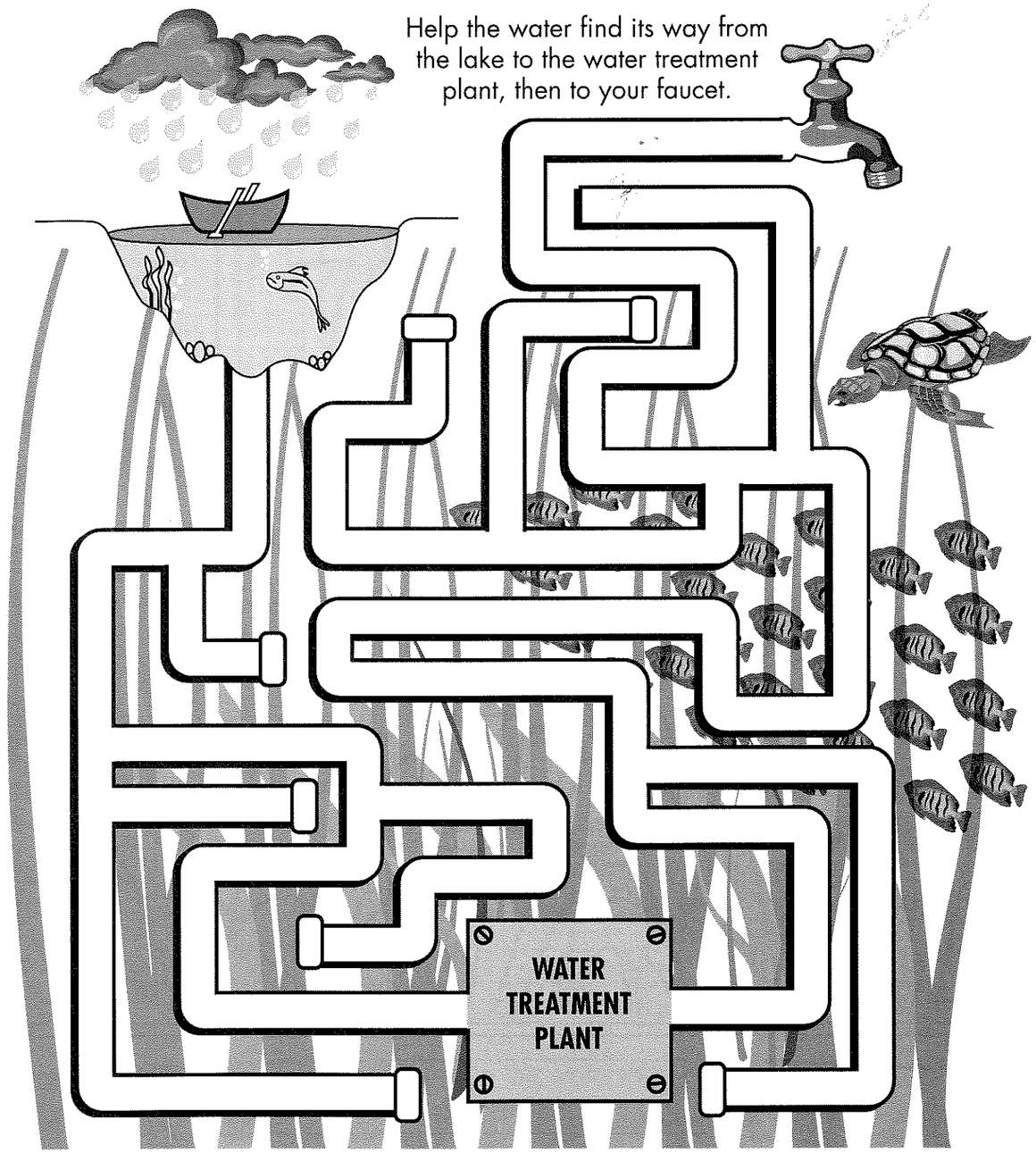
Artist Signature: _____

CITY OF MORGAN HILL STORMWATER ACTIVITY GUIDE FUNDED BY THE SANTA CLARA VALLEY WATER DISTRICT BOARD OF DIRECTORS.

PIPE MAZE 6

PIPE MAZE

Help the water find its way from the lake to the water treatment plant, then to your faucet.



WORD SEARCH 7

STORMWATER WORD SEARCH

Words can run in any direction, even backwards!

R E T A W M R O T S C R F
T N N A E E V E R N I C F
R V W A T E R I B Q L C O
R I O V R E S E R E P I N
E R T E W O W B A Y R T U
C O N T A M I N A T E A R
E N O I T U L L O P V U E
C M O F E D D R R E Q T
E E C E R R L U R S N A T
A N C W S D I U T A T T U
Q T A A H C F R E I I V G
A C R E E K E C B H O N T
S K C U D A O A O T N N A
E M T M N H R B T A S N

RESERVOIR
CREEK
BAY
OCEAN
GUTTER
DRAIN
AQUATIC

RUNOFF
POLLUTION
DUCKS
WATERSHED
CLEAN
ENVIRONMENT
CONTAMINATE
STORMWATER

OIL
STREAM
RACCOON
HABITAT
WATER
WILDLIFE
PREVENTION

COMPLETE 8

MISSINGLETTERS

There are lots of things that you can do to help keep our water free of pollution: put garbage where it belongs, be careful not to dump chemicals like cleaning products, nail polish, paint, medicine and motor oil down the drain. These chemicals will eventually end up in waterways that lead to the bay where they pollute our water. You can also ask your parents to call South Valley Disposal and Recycling at 842-3358 for a special curbside oil recycling container.

Can you fill in the missing letters and finish the sentence?

Y_u can h_lp ke_p o_r w_t_r _lean by p_c_ing u_ t_ash,

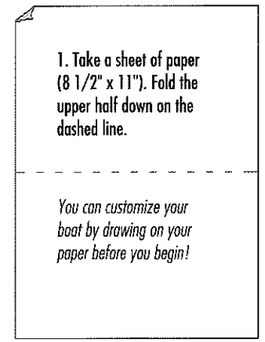
n_t d_mpin_ che_ica_s li_e soa__ i_ th_ gu_ters a_d

a_king y_ur p_ren_s to _e_ycle their oi_ at _he cur_.

CITY OF MORGAN HILL STORMWATER ACTIVITY GUIDE FUNDED BY THE SANTA CLARA VALLEY WATER DISTRICT BOARD OF DIRECTORS.

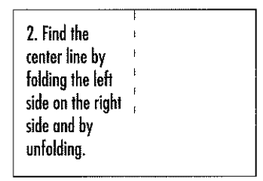
BUILD A BOAT 9

With a single sheet of paper you can create your own floating boat.

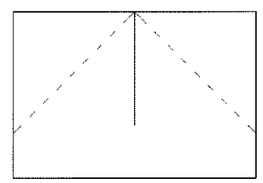


1. Take a sheet of paper (8 1/2" x 11"). Fold the upper half down on the dashed line.

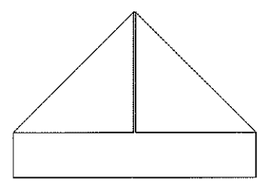
You can customize your boat by drawing on your paper before you begin!



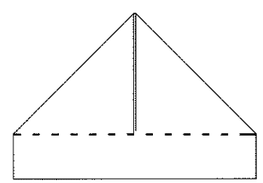
2. Find the center line by folding the left side on the right side and by unfolding.



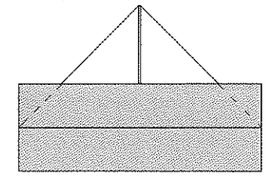
3. Fold downward both upper triangles on the dashed line.



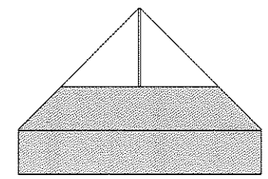
4. It must look like this.



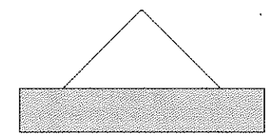
5. At the bottom fold the top strip upward on the dashed line.



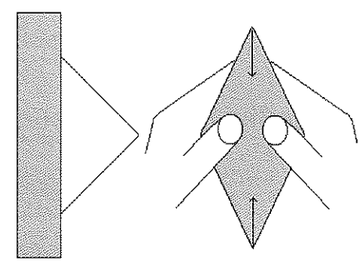
6. Fold the two small triangles on the left and on the right backwards to make them disappear.



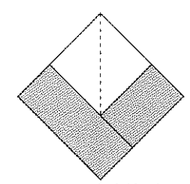
7. It must look like this.



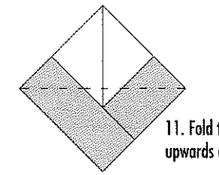
8. Turn the paper over and fold the other lower strip upwards. You have formed the well known hat.



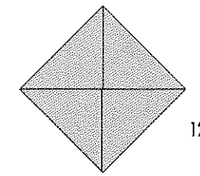
9. Turn the hat 90 degrees and open it. The thumbs must be inside.Lay the upper and the lower parts on each other.



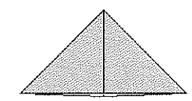
10. It must look like this.



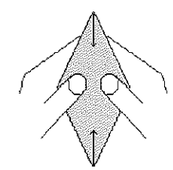
11. Fold the lower front triangle upwards on the dashed line.



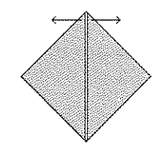
12. It must look like this.



13. Turn the paper over and fold up the other lower triangle. You get a hat without a brim.

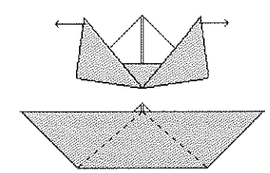


14. Open the hat again and put the upper part on the lower one.

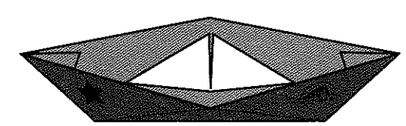


15. Pull the upper corners of the triangles in direction of the arrows...

... as much as possible. Form the boat.



16. The paper boat is finished.



17. Stretch the boat both to the right and left, and then separate it slightly from underneath so it can float.

CITY OF MORGAN HILL STORMWATER ACTIVITY GUIDE FUNDED BY THE SANTA CLARA VALLEY WATER DISTRICT BOARD OF DIRECTORS.

CROSSWORD 10

For word clues visit:
www.WatershedWatch.net

Watershed Watch
Protect Our Creeks And Bay

Use the clues below to fill in the crossword puzzle above.

Down

1. Contamination of water that harms wildlife
4. Web-footed birds that swim in our creeks and lakes
5. A land area that drains into a creek, lake, wetland or bay
6. The largest reservoir in Santa Clara County
8. A body of flowing water
11. Where the water from stormdrains eventually goes
13. A thick liquid that sometimes drips from cars into streets

Across

2. After a rain, water that runs into the gutters and drains
3. A creek and reservoir east of Morgan Hill
7. A small animal with a masked face and ringed tail
9. A creek that runs through Morgan Hill
10. A large storage area for water
12. A small wild dog, also the name of a local creek and reservoir

THINK 11

ADVANCED STUDENT ACTIVITY

READ

ANSWER

What Is A Watershed?
A watershed is a land area that drains water into a creek, river, lake, wetland, bay, or groundwater aquifer. In the Santa Clara Valley, all the water from rain and irrigation which flows over the land surface (called runoff) goes into storm drains, creeks and rivers that flow directly to our oceans.

You live in a watershed that flows to a local creek, and all of the runoff from your home, yard and neighborhood flows to that creek.

Where does our rainwater end up?

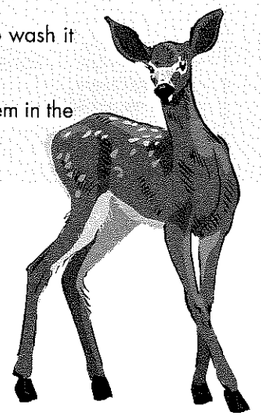
What's Important About The Watershed?
Watersheds are more than just drainage areas in and around our communities. They are necessary to support habitats for plants and animals, and they provide drinking water for people and wildlife. They also provide the opportunity for recreation and enjoyment of nature. Protection of the natural resources in our watershed is essential to maintain the health and well being of all living things, both now and in the future.

Why is a watershed important?

How To Protect Our Watershed

1. Clean up trash outside your home. Pick up leaves and yard clippings and recycle as green waste. If you see litter, pick it up and put it in a trash can.
2. If your parents change the oil in their cars, make sure to remind them to recycle the waste oil at the curb. Info about curbside recycling can be found at: www.southvalleydisposal.com/morganhill.htm
3. If you help wash your parent's car be sure to wash it on an unpaved area (like the lawn.)
4. Pick up your pet droppings and dispose of them in the trash or in your toilet.

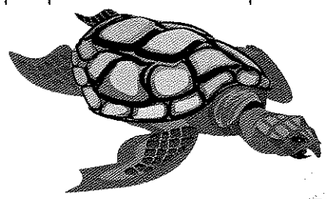
What can you do to help protect our watershed at home or school?



SCRAMBLE 12

UNSCRAMBLE

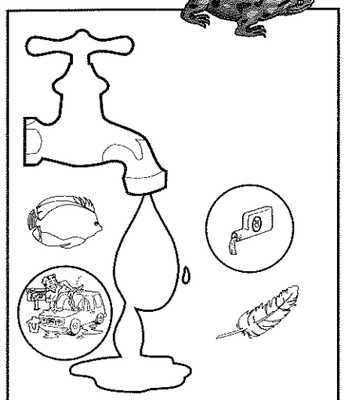
ADVANCED STUDENT ACTIVITY



RMOTS	1.	STORM
HSDERWAET	2.	
TENRIVMNOEN	3.	
TTIAABH	4.	
FOFRNU	5.	
AYB	6.	
NPOOILTLU	7.	
IILLWDEF	8.	
ELCAN	9.	
REAWT	10.	
CAAUTIQ	11.	
TTUGER	12.	
SNIRAD	13.	
EVNTIEONRP	14.	BONUS
TTAANNECOMI	15.	BONUS

CITY OF MORGAN HILL STORMWATER ACTIVITY GUIDE FUNDED BY THE SANTA CLARA VALLEY WATER DISTRICT BOARD OF DIRECTORS.

ANSWER KEY



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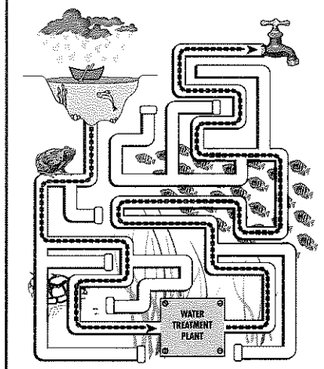
PAGE 4



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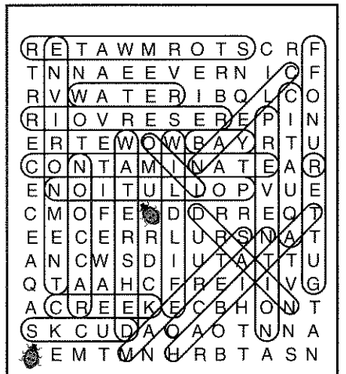


PAGE 7

You can help keep our water clean by picking up trash, not dumping chemicals like soap in the gutters and asking your parents to recycle their oil at the curb.

PAGE 8

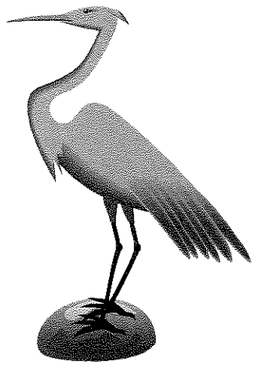
Down
1. Pollution
4. Ducks
5. Watershed
6. Anderson
8. Stream
11. Ocean
13. Oil

Across
2. Runoff
3. Uvas
7. Raccoon
9. Llagas
10. Reservoir
12. Coyote

PAGE 10

RMOTS	STORM
HSDERWAET	WATERSHED
TENRIVMNOEN	ENVIRONMENT
TTIAABH	HABITAT
FOFRNU	RUNOFF
AYB	BAY
NPOOILTLU	POLLUTION
IILWDEF	WILDLIFE
ELCAN	CLEAN
REAWT	WATER
CAAUTIQ	AQUATIC
TTUGER	GUTTER
SNIRAD	DRAINS
EVNTIEONRP	PREVENTION
TTAANNECOMI	CONTAMINATE

PAGE 12



CITY OF MORGAN HILL
STORMWATER POLLUTION PREVENTION
ACTIVITY BOOK

1C – Public Events (Proposed: FY 2005-2006)	
Description	Establish educational booth at two public events each year. Possible events include Hiru Matsuri Spring Taiko Festival in April, Public Works Week in May, the Morgan Hill Mushroom Mardi Gras in May, Taste of Morgan Hill in September, and the weekly Saturday Morgan Hill Farmer's Market.
Justification	Establishes visibility at public events and allows for distribution of educational materials.
Measurable Goal	An individual knowledgeable about the City's storm water quality program will be available at the booth.
Implementation Schedule	Year 1: Set up educational booth at two public events in Morgan Hill each year.
Progress Measurement	Number of public events where storm water booth was present.
Effective Measurement	Number of brochures, information packets handed out at each event.

1C – Public Events (Implementation: FY 2005-2006)

General Summary: The City created a public education display this year which is currently set up in the lobby of City Hall (see Attachment 1C.1). Staff handed out stormwater public education materials at the Taste of Morgan Hill in September 24th-25th 2005 and at the Mushroom Mardi Gras in May 26th-27th 2006.

Status of Measurable Goals: The first year's measurable goal was met. Trained individuals were present at the City's booths.

Effectiveness: Due to the dynamic nature of this year's public events and the need to get public information out quickly, the number of items handed out at public events was not tracked. Increased efforts to track the number of items distributed will be instituted in Year 2.

Proposed Modifications: The Hiru Matsuri Taiko Festival has been eliminated from possible outreach events because this event is no longer held.

Ongoing Implementation:

1C – Public Events (Year 2: FY 2006-2007)	
Description	Establish educational booth at two public events each year. Possible events include ~~Hiru Matsuri Spring Taiko Festival in April,~~ Public Works Week in May, the Morgan Hill Mushroom Mardi Gras in May, Taste of Morgan Hill in September, and the weekly Saturday Morgan Hill Farmer's Market.
Justification	Establishes visibility at public events and allows for distribution of educational materials.
Measurable Goal	An individual knowledgeable about the City's storm water quality program will be available at the booth.
Implementation Schedule	Year 2: Set up educational booth at two public events in Morgan Hill each year.
Progress Measurement	Number of public events where storm water booth was present.
Effective Measurement	Number of brochures, information packets handed out at each event.
*Modifications are noted by the underlined text.	

ATTACHMENT 1C.1

Figure 1C.1a Watershed Watch Oversized Display

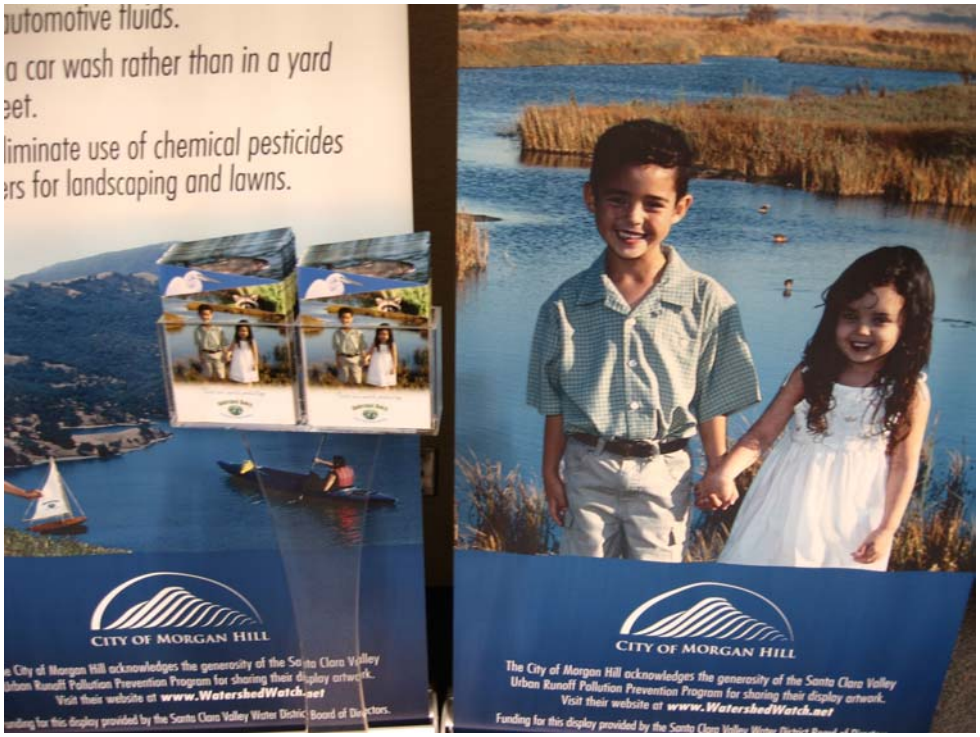


Figure 1C.1b Watershed Watch Brochures

1D – Classroom Education (Proposed: FY 2005-2006)	
Description	Engage local school district officials about bringing storm water quality education into the class room.
Justification	Educating students on storm water and water quality practices will help promote better awareness.
Measurable Goal	The local school district and private schools will be approached during Yr. 1 to craft a plan for educating grade students about water quality.
Implementation Schedule	Year 1: Meet with school district officials to determine if a mutually acceptable program can be assembled.
Progress Measurement	Meeting(s) held.
Effective Measurement	Education goals determined, format and time frame established, and a list of schools prepared.

1D – Classroom Education (Implementation: FY 2005-2006)

General Summary: Staff met with the District's Assistant Superintendent for Educational Services to discuss this concept and then participated in a meeting with the Superintendent and all school principals to present the idea. As a result, there is now a plan in place to develop a local lesson plan and test the lesson plan in Year 2. In addition, private school were included in all communications surrounding the City's Earth Day event and poster contest which featured stormwater pollution prevention information.

Status of Measurable Goals: The first year's measurable goal was met. Local schools were approached to discuss stormwater pollution prevention education.

Effectiveness: A group of 3 teachers is working in the Summer of 2006 to develop lesson plans that describe the education value, the format and time frame, and the resources needed to present the information in the 3rd or 4th grades in local schools.

Proposed Modifications: None at this time.

Ongoing Implementation:

1D – Classroom Education (Year 2: FY 2006-2007)	
Description	Bring an educational program to two local schools annually.
Justification	Educating students on storm water and water quality practices will help promote better awareness.
Measurable Goal	Present a storm water quality education program to two local schools in the Morgan Hill area. Program to be one hour minimum.
Implementation Schedule	Year 2: Bring educational program to two local schools.
Progress Measurement	Number of classrooms receiving education. Number of students receiving education.
Effective Measurement	Short, written survey of students and teachers to determine success of classroom education.
*Modifications are noted by the underlined text.	

1E – Web Site (Proposed: FY 2005-2006)	
Description	Post stormwater related information on City website.
Justification	Local updated information will raise awareness of the stormwater program.
Measurable Goal	Post and maintain a link about the City's storm water management plan on the City's web page. The link shall be present at all times and updated quarterly. Provide a minimum of 5 articles on storm water pollution prevention and update every quarter
Implementation Schedule	Year 1: Develop and post stormwater information on City's website. Update quarterly or more often if necessary.
Progress Measurement	Updated presence of storm water plan throughout year. Number of storm water pollution prevention articles posted.
Effective Measurement	Was web site established? Track number of hits to storm water site.

1E – Web Site (Implementation: FY 2005-2006)

General Summary: We are currently developing the Storm Water Management Plan internet pages.

Status of Measurable Goals: Internet page has not yet been established.

Effectiveness: None.

Proposed Modifications: None.

Ongoing Implementation:

1E – Web Site (Year 2: FY 2006-2007)	
Description	Post stormwater related information on City website.
Justification	Local updated information will raise awareness of the stormwater program.
Measurable Goal	Post and maintain a link about the City's storm water management plan on the City's web page. The link shall be present at all times and updated quarterly. Provide a minimum of 5 articles on storm water pollution prevention and update every quarter
Implementation Schedule	Yr. 2: Maintain stormwater information on City's website. Update quarterly or more often if necessary.
Progress Measurement	Updated presence of storm water plan throughout year. Number of storm water pollution prevention articles posted.
Effective Measurement	Track number of hits to storm water site. Survey residents about where they get their information about the City's storm water quality program.
*Modifications are noted by the <u>underlined text</u>.	

1F – Teleworks Messages (Proposed: FY 2005-2006)	
Description	Utilize Teleworks system as a means to inform citizens about the City's stormwater program.
Justification	Information accessible via the web will raise awareness of the stormwater program.
Measurable Goal	Install and maintain a Teleworks message about the City's storm water plan. The message should be present at all times.
Implementation Schedule	Yr. 1: Develop and record stormwater information on City's Teleworks system.
Progress Measurement	Teleworks message present, clear, and offers useful information.
Effective Measurement	Was Teleworks message system established?

1F – Teleworks Messages (Implementation: FY 2005-2006)

General Summary: Since the adoption of the City's Stormwater Management Plan, the City has abandoned Teleworks as a viable communications system for citizens.

Status of Measurable Goals: This goal was not met as originally envisioned.

Effectiveness: N/A

Proposed Modifications: As a replacement for the Teleworks messages, the City proposes to include a message annually in the City's newsletter about stormwater pollution prevention. These proposed activities have been included in the report as a new Section 1I.

Ongoing Implementation: None

1G – Used Oil Disposal (Proposed: FY 2005-2006)	
Description	Collect used oil biweekly as a component of our curbside recycling program. For residents not served by the curbside program, two local drop-off locations and additional opportunities are available for used oil recycling through the Countywide Household Hazardous Waste Management Program.
Justification	Collect used oil biweekly and offer two local drop-off locations to eliminate residential waste oil dumping.
Measurable Goal	Collection of used oil every other week for Morgan Hill residents.
Implementation Schedule	Year 1: Collect used oil biweekly and offer two local drop-off locations.
Progress Measurement	Number of times used oil is collected at curb side.
Effective Measurement	Track quantity of used oil pick-ups. Is number of pick-ups increasing? Decreasing?

1G – Used Oil Disposal (Implementation: FY 2005-2006)

General Summary: Curbside oil collection, by South Valley Disposal & Recycling (City contractor), continues on a biweekly basis throughout the community at single-family residences. To serve residents that do not have curbside recycling, two local locations accept used oil on a drop-off basis:

Speedee Oil Change* at 890 Tennant Station and
Kragen Auto Parts* at 16060 Monterey Road.
*(these locations are Certified Collections Centers approved by the State's Integrated Waste Management Broad, see Attachment 1G.1
http://www.ciwmb.ca.gov/UsedOil/Centers/Default.aspx)

The San Martin Transfer and Recycling center at 14070 Llagas Avenue also offers used oil collection.

Status of Measurable Goals: The first year's measurable goal was met. Collection of used oil occurred biweekly.

Effectiveness: 6,233 gallons of used oil were collected from July 2005 – June 2006 by South Valley Disposal. The number of households served is not tracked. This is slightly less than the 6,730 gallons collected in the previous year.

Proposed Modifications: South Valley Disposal only reports the total number gallons collected and not the number of household it collects from. Therefore, this control measure will only report the total number of gallons collected per year.

Ongoing Implementation

1G – Used Oil Disposal (Year 2: FY 2006-2007)	
Description	Collect used oil biweekly as a component of our curbside recycling program. For residents not served by the curbside program, two local drop-off locations and additional opportunities are available for used oil recycling through the Countywide Household Hazardous Waste Management Program.
Justification	Collect used oil biweekly and offer two local drop-off locations to eliminate residential waste oil dumping.
Measurable Goal	Collect used oil biweekly as a component of our curbside recycling program. For residents not served by the curbside program, two local drop-off locations and additional opportunities are available for used oil recycling through the Countywide Household Hazardous Waste Management Program.
Implementation Schedule	Year 2: Collect used oil biweekly and offer two local drop-off locations.
Progress Measurement	Number of times used oil is collected at curb side.
Effective Measurement	~~Track quantity of used oil pick-ups. Is number of pick-ups increasing? Decreasing?~~ Report the total number of gallons collect per fiscal year and compare to previous years.
*Modifications are noted by the underlined text.	

ATTACHMENT 1G.1

Used Oil Recycling Program

Find a Certified Used Oil Recycling Center Near You!

Your selection of the City of Morgan Hill returned 2 record(s).

Note: It is advisable to call before taking oil to any of the listed centers. The map links are provided as a conditional service.

New Search

City: Morgan Hill

Map all sites in the city of Morgan Hill

Kragen Auto Parts #4110
16060 Monterey Rd. Ste 100
Morgan Hill , CA 95037
(408) 776-7705
CIWMB#: 43-C-05730 Map

Speedee Oil Change
890 Tennant Station Ave
Morgan Hill , CA 95037
(408) 425-8335
CIWMB#: 43-C-07212 Map

New Search

Last updated: Data updated continuously.

http://www.ciwmb.ca.gov/UsedOil/
Wendy Roberson: wroberso@ciwmb.ca.gov (916) 341-6690
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Terms of Use/Privacy

1H – Household Hazardous Waste Collection (Proposed: FY 2005-2006)	
Description	Offer locations in the County multiple days per year for residents and small business to bring hazardous waste.
Justification	Dumping of hazardous waste will be eliminated by offering drop-off locations.
Measurable Goal	Offer household hazardous waste collection once per quarter (Four times per year).
Implementation Schedule	Year 1: Offer locations to drop-off household hazardous waste multiple times per year.
Progress Measurement	Number of times household hazardous waste drop-off is made available.
Effective Measurement	Track number of participants. Track volume/quantity of material dropped off. What percentage of households utilize household hazardous waste collection service?

1H – Household Hazardous Waste Collection (Implementation: FY 2005-2006)

General Summary: The City participates in a Countywide Household Hazardous Waste (HHW) management program; the HHW information can be found at http://www.sccgov.org/portal/site/deh/ (see Attachment 1H.1). In this program, residents are provided with multiple opportunities each month to bring HHW, with the San Martin Transfer and Recycling center at 14070 Llagas Avenue being the closest. Information regarding local HHW drop off is specifically listed on the City's internet page under the 'Environmental Programs' page at http://www.morgan-hill.ca.gov/html/citysvc/envir/hazard.asp. Attachment 1H.2 is the operations schedule of the program for the reporting period.

Status of Measurable Goals: The first year's measurable goal was met. HHW collection events were offered multiple times per month.

Effectiveness: The County's annual report for the reporting period will not be available until Fall 2006. Attachment 1H.3 is the County's statement from the previous year. In Fiscal Year 2005, nearly 6% of Morgan Hill residents participated in the program. The County does not track each City's individual tonnage. Preliminary indications are that the participation rate in Morgan Hill increased during Fiscal Year 2006.

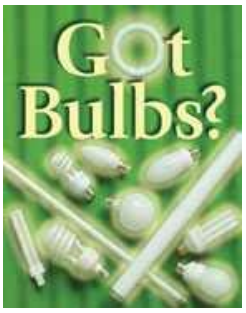
Proposed Modifications: None at this time.

Ongoing Implementation:

1H – Household Hazardous Waste Collection (Year 2: FY 2006-2007)	
Description	Offer locations in the County multiple days per year for residents and small business to bring hazardous waste.
Justification	Dumping of hazardous waste will be eliminated by offering drop-off locations.
Measurable Goal	Offer household hazardous waste collection once per quarter (Four times per year).
Implementation Schedule	Year 2: Offer locations to drop-off household hazardous waste multiple times per year.
Progress Measurement	Number of times household hazardous waste drop-off is made available.
Effective Measurement	Track number of participants. Track volume/quantity of material dropped off. What percentage of households utilize household hazardous waste collection service?

ATTACHMENT 1H.1

What is Household Hazardous Waste and How do I Dispose of it?



Chemicals accepted by the Household Hazardous Waste Program fall into one of four D.O.T. hazard categories:

Flammable

Corrosive

Toxic

Oxidizer

Flammables include paints, dry or wet, petroleum based products, and polishes.
Corrosives include acids, bases, batteries, and drain clog remover.
Toxics include poisons, pesticides, gardening chemicals, ammonia, and solvents.
Oxidizers include pool chemicals, hydrogen peroxide, iodine, and perchlorates.
Misc. include propane, helium, small oxygen tanks, smoke detectors.

Biohazardous

Residents can only dispose of the following medical waste; prescription drugs, used sharps, including syringes, need and lancets. The sharps must be placed in a commercial bio-hazardous container attainable at local pharmacies and online. Please click here for more information on disposal of sharps.

For a detailed list of household hazardous waste products we accept, please click here

The list also provides resources on how to dispose of items that we do not accept.

How to dispose of your hazardous waste
If you would like to schedule a drop-off at one of our facilities, please call the Santa Clara County HHW appointment at 408.299.7300, Monday thru Friday 8:30 a.m. to 4:30 p.m. Please bring materials in their original, labeled, and

sealed containers whenever possible and never mix chemicals together. Please box or bag ALL wastes for quicker removal from your vehicle and sort materials by the following categories: 1. Aerosols; 2. Paints, flammables and automotive fluids; and 3. Cleaners, and yard or garden products. Keep in mind that NO containers will be returned t you.

**Operating Schedule*: Please call 408.299.7300 for our normal operating hours, or click here to view our projected annual operating schedule.

Instructions for Residential Drop-off Participants

1. Please note that A MAXIMUM of 5 GALLONS or 50 POUNDS of hazardous waste per vehicle is permitted by state transportation laws and the HHW Program. If you have more than this amount of waste you may bring the additional hazardous waste in two or more cars or in two or more trips.

2. For your safety, transport the waste in your trunk or the back of a pick-up, away from the passenger area. The Program does NOT accept AMMUNITION, EXPLOSIVES, OR RADIOACTIVE MATERIALS.

3. Proof of residency, such as a driver's license or a utility bill with a current address, will be required at the check-in area. If you are unable to keep your appointment, please call the appointment line to cancel or reschedule, that way another resident can take your place. The drop-off will be held Rain or Shine. If you have any questions please call 408.299.7300 or visit our FAQ page.

4. Remember, due to the turning radius at the entrance of our facilities, vehicles with trailers are not allowed.

5. Also, to prevent delay and traffic congestion, we are not able to return any containers you bring your waste in; including any plastic recycling bins, boxes, trash cans, gas cans, or paint buckets.

6. In addition, please remove any valuables or non-waste products from your vehicle storage area. Our service moves quickly, and we do not want to cause confusion.

To learn about what happens to your waste after you drop it off, please click here.

Re-Use Program
To learn about how to pick-up free reusable products such as Cleaners, Chemicals, Automotive Fluids, Paints, and other items click here.

Alternative Means of disposing of other Hazardous Wastes
Disposal lists are updated every six months and disposal fees are subject to change, please call businesses for details, directions, and disposal information.

Alternative Means of disposing of Fluorescent Bulbs, Household Batteries, Thermometers and Thermostats
There are alternative means of disposal for fluorescent bulbs, household batteries, thermometers and thermostats besides our HHW drop-off locations. The fluorescent bulb, household batteries, thermometer and thermostat drop-off list are stores and locations that are accepting these items free of charge on our programs behalf. They will accept all different types of these items during their regular business hours.

Save The Day Champaign

Are you polluting the Bay?Pollution from our homes, cars, and neighborhoods is one of thegreatest threats to San Francisco Bay. Take Save The Bay's Keep It Clean! survey today to learn how you can keep the Bay healthy for future generations.

Resource List

Item(s)	Link
Free Motor Oil and Oil Filter Recycling	Santa Clara County Certified Centers

Fluorescent Light Drop-Off Sites	Free Fluorescent Bulb Drop-Off List
Thermostat Drop-Off Sites	Free Thermostat Drop-Off List
Thermometer Exchange Events & Permanent Drop-off Location	Free Thermometer Exchange Events & Permanent Dr Locations
Monitor/TV/CPU	CRT Disposal List -Click here to learn more about E-Waste Recycling
Home Electronics Recycling List	Click Here
Car Batteries, Antifreeze, and Tires	Click Here
Drum and Propane Tanks	Click Here
Hazardous Waste Pickup, Asbestos Testing, and other Enviromental Services	Enviromental Waste Haulers and Consultants
Railroad Tie Disposal Options	Landfills Accepting Railroad Ties
Curbside Pickup or/and Large Non-Hazardous Waste Item Pickup	Garbage Companies of Santa Clara County
Battery Disposal (Including Alkaline)	Free Battery Drop-Off List
Rubbish, Large Non-Hazardous Waste Item, or other Disposal Items	Santa Clara County Landfills
Other Household Hazardous Waste Programs in the Bay Area	Click Here
Cellular Phone Recyclers	Click Here

*Disclaimer: The Resource List is provided as a courtesy to residents of Santa Clara County as a reference guide. Th Household Hazardous Waste Program does not endorse or recommend any company listed.

Click on image to download the Adobe Reader for PDF files.

1I – City Newsletter Article (Year 2: FY 2006-2007)	
Description	Utilize City Newsletter as a means to inform citizens about the City's stormwater program.
Justification	Information in the City Newsletter will raise awareness of the stormwater program.
Measurable Goal	Write and place one article in the City Newsletter about the stormwater pollution prevention program.
Implementation Schedule	Year 2: Write one article.
Progress Measurement	Article published..
Effective Measurement	Did article get published in the City Newsletter?

Minimum Control Measure #2 – Public Involvement and Participation

Introduction

A Phase II storm water plan permittee shall encourage the public to be involved in the storm water program. The program must, at a minimum, comply with State and local public notification requirements. The public can provide valuable input and assistance to the storm water management program. Benefits include broader public support for the program and increased resources in the form of citizen volunteers. The City already has current, on-going programs that meet the requirements of this minimum control measure. The City will benefit from coordination of our program with the current program of the Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP), which is performing a similar function in the south Bay Area.

Best Management Practice (BMP) Minimum Control Measure #2 – Public Involvement and Participation Summary Table		
BMP	Description	Implementation
2A Public Meetings	Hold one public meeting each year coordinated with the annual reporting cycle.	Year 1
2B Storm Drain Stenciling	Conduct a storm drain stenciling participation event every other year. The event should include a minimum of two service organizations every other year.	Year 2
2C Community Clean-up	Coordinate one community clean up day per year. Event is recommended to coincide with regional or national events of similar nature. Coordination with the Santa Clara Valley Water District is important.	Year 1
2D Community Gardening/Composting	Offer community gardening/composting workshops at no charge to residents through the Home Composting Educational Program.	Year 1
2E Public Hotline	The City to have a hotline for the public to contact appropriate personnel if an illicit discharge is observed.	Year 1

Minimum Control Measure #2 – Public Involvement and Participation

2A – Public Meetings (Proposed: FY 2005-2006)	
Description	Hold one public meeting each year coordinated with the annual reporting cycle.
Justification	Public meetings offer the community an opportunity to hear about SWMP program and provide input.
Measurable Goal	Hold one public meeting each year coordinated with the annual reporting cycle.
Implementation Schedule	Year 1: Hold a public meeting in April or May. Proper public noticing is required.
Progress Measurement	Meeting held. Proper notices filed.
Effective Measurement	Track number of attendees. Document input.

2A – Public Meetings (Implementation: FY 2005-2006)

General Summary: A public meeting to receive input on the Storm Water Management Plan was held on May 31st, 2006, 7:00 pm at the City Hall Council Chambers. Notice of the public meeting was posted on the City internet home page on May 16th – 31st, 2006 and the Morgan Hills Times newspaper on May 20th and 23rd, 2006 (see Attachment 2A.1 for proof of publication and receipt). On the day of scheduled meeting, a presentation on the City's Storm Water Management Plan (SWMP) was given and televised on public access Channel 17. Unfortunately, the public meeting did not yield any attendance. However, to reach a larger audience beyond this date, the SWMP presentation was recorded and re-televised at 9 pm and 4 pm each day for two weeks on Channel 17 (see Attachment 2A.2 for the SWMP power point slide presentation).

Status of Measurable Goals: The first year's measurable goal was met. An annual public meeting was held.

Effectiveness:
We were not able achieve public involvement and participation due to lack of attendance. There was no additional feedback calls, resulting from the re-televised broadcasts of the SWMP presentation on channel 17, and it was not possible to determine the number viewers of the re-broadcast. However, we were contacted by Dr. Colette Marie McLaughlin, Director of Facilities for the Morgan Hill Unified School District. Dr. McLaughlin is in charge of implementing the School District's SWMP and was interested in the May 31st public meeting to learn about the components of a SWMP, but she could not attend. On June 8th, 2006, Public Works personnel, met with Dr. McLaughlin to discuss elements of the City's SWMP in order to aide with the development of the School District's SWMP.

Proposed Modifications:
In order to increase attendance for future public meetings, the public noticing of the scheduled meeting will be increased. Internet posting will listed on the City's home page at least 6 weeks prior to the schedule meeting, and noticing in the Morgan Hill Times will be increased to once a

week for four week prior the scheduled meeting. Noticing will also be posted at high schools to encourage students to attend for civics credits.

Ongoing Implementation:

2A – Public Meetings (Year 2: FY 2006-2007)	
Description	Hold one public meeting each year coordinated with the annual reporting cycle.
Justification	Public meetings offer the community an opportunity to hear about SWMP program and provide input.
Measurable Goal	Hold one public meeting each year coordinated with the annual reporting cycle.
Implementation Schedule	Year 1: Hold a public meeting in April or May. Post scheduled meeting on City internet home page and at high schools six weeks prior to meeting, publish meeting in the Morgan Hill Times once a week for four weeks prior to meeting. To reach a larger audience, the public meeting will be televised and recorded for re-broadcasting.
Progress Measurement	Meeting held. Proper notices filed.
Effective Measurement	Track number of attendees. Document input.
*Modifications are noted by the underlined text.	

PROOF OF PUBLICATION
(2015.S C.C.P.)

STATE OF CALIFORNIA
County of Santa Clara

I am a citizen of the United States and a resident of the County aforesaid. I am over the age of eighteen years, and not a party to or interested in the above entitled matter. I am the principal clerk of the printer of the Morgan Hill Times, printed and published Tuesday and Saturday in the city of Morgan Hill, County of Santa Clara, State of California, for which said newspaper has been adjudicated a newspaper of general circulation by the Superior Court of the County of Santa Clara, State of California, under the date of June 10, 1952, Action Number 83751; that the notice of which the annexed is a printed copy, has been published in each regular and entire issue of said newspaper and not in any supplement thereof on the following dates:

to wit: May 20, 23

all in the year 20 06.

I certify (or declare) under penalty of perjury that the foregoing is true and correct.
Dated at Morgan Hill, California this 23 day

of May, 20 06.

Mavieira

Signature

Morgan Hill Times

Phone: (408) 779-4106 • Fax: (408) 779-3886
Email: legals@svnewspapers.com

ATTACHMENT 2A.1

Proof of Publication of:

Public Notice

POLLUTION PREVENTION IN STORM WATER AND URBAN RUNOFF STORM WATER MANAGEMENT PLAN (SWMP)

The City of Morgan Hill seeks your input and assistance with its Storm Water Management Plan **(SWMP).** The SWMP is mandated by the Environmental Protection Agency **(EPA)** and is intended to protect the water quality and habitat of the streams and channels in and around our City. Residents of Morgan Hill are requested to attend a public meeting to learn about the SWMP and provide input and suggestions.

A public meeting for the community to learn more about the SWMP has been scheduled as follows:

Date: May 31st 2006
Time: 7:00 pm
Place: City Hall, Council Chambers
17555 Peak Avenue
Morgan Hill, CA 95037-4128

If you have any questions or comments regarding the **City's SWMP**, we encourage you to attend the scheduled public meeting or contact the Public Works Storm Water Coordinator at 408-776-7337.

PUBLISH: MAY 20, 23, 3006
M11511200

Mainstreet Media Group LLC

PO BOX 22365 Gilroy, CA 95021-2365

Gilroy Dispatch • The Pinnacle • Hollister Free Lance • Morgan Hill Times • South Valley Direct

GILROY/HOLLISTER - PH: (408) 842-6400 FAX: (408) 842-3817 PINNACLE - PH: (831) 637-6300 FAX: (831) 637-8174

Advertising Receipt

KAREN NELSON
MORGAN HILL, CITY OF
PUBLIC WORKS
100 EDES COURT
MORGAN HILL, CA 95037

PUBLICWORKS
JUN 0 5 2006
CITY OF MORGAN HILL

Cust#: 05104235-000
Ad#: 11511200
Phone: (408)776-7337
Date: 05/16/06

Ad taker: MV **Salesperson:** 010 **Classification:** 957

Description	Start	Stop	Ins.	Cost/Day	Surcharges	Total
38 MORGAN HILL TIMES	05/20/06	05/23/06	2	71.10		142.20

Payment Reference:

Total:	142.20
Tax:	0.00
Net:	142.20
Prepaid:	0.00
Total Due	142.20

OK TO PAY
CMH
6/27/06

POLLUTION PREVENTION IN STORM WATER AND URBAN RUNOFF STORM WATER MANAGEMENT PLAN (SWMP)

The City of Morgan Hill seeks your input and assistance with its Storm Water Management Plan (SWMP). The SWMP is mandated by the Environmental Protection Agency (EPA) and is intended to protect the water quality and habitat of the streams and channels in and around our City. Residents of Morgan Hill are requested to attend a public meeting to learn about the SWMP and provide input and suggestions.

A public meeting for the community to learn more about the SWMP has been scheduled as follows:

Date: May 31st 2006
Time: 7:00 pm
Place: City Hall, Council Chambers

COPY

Memo: South Valley Direct display ad image area is reduced to 95.6% of original

OKAY TO PAY
PO #
Close P.O.
Contract #
Account #
Proj. #
206.42250.5410 142.20

If this is NOT budgeted please attach a budget adjustment request.

ATTACHMENT 2A.2

CITY OF MORGAN HILL

STORM WATER MANAGEMENT PLAN (SWMP)

Pollution Prevention in Storm Water and Urban Runoff

Purpose of This Meeting

- The City of Morgan Hill seeks your input with its Storm Water Management Plan (SWMP).

What is the Storm Water Management Plan (SWMP)?

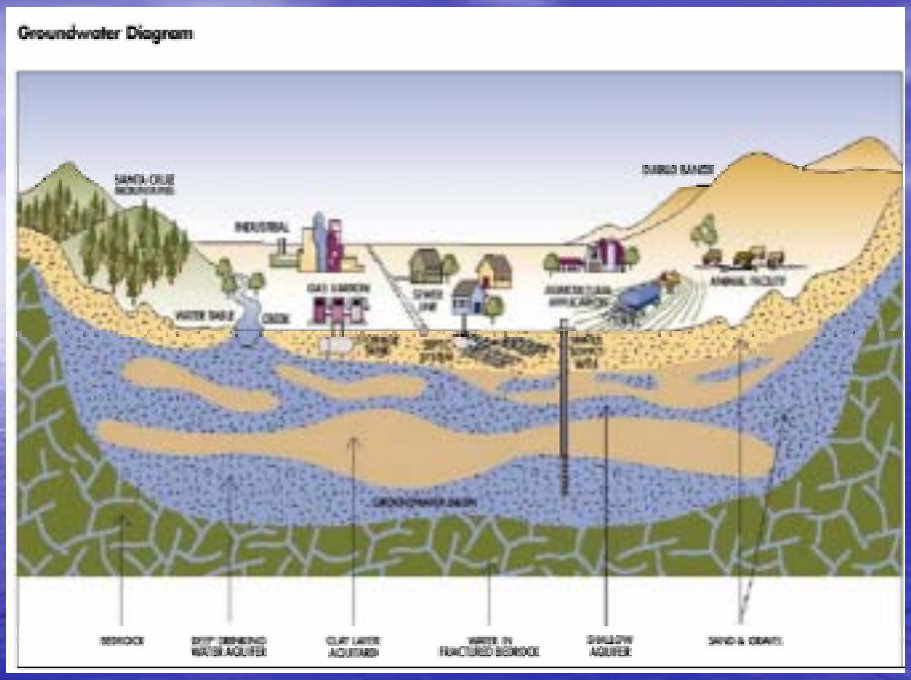
- The SWMP is a federal requirement mandated by the Environmental Protection Agency (EPA).
- The purpose of the SWMP is to protect the water quality and habitat of the streams and channels in and around our cities, through pollution prevention in storm water and urban runoff.

What is Storm Water and Urban Runoff?

- Storm Water Runoff: water which originates from rain events.
- Urban Runoff: water which originate from urban water use such as: irrigation (domestic and commercial), construction activities, car washing, etc.
- Surface Water runoff is collected and directed into street gutters and drain inlets which enter the City's underground storm drain pipe system.

Where does storm water and urban runoff go?

- Unlike sanitary sewer systems, which conveys sewage to a treatment plant; the underground storm drain system conveys (untreated) water to:
  - Streams, Creeks, Lakes
  - Bays
  - Oceans
- Groundwater
- Drinking Supply

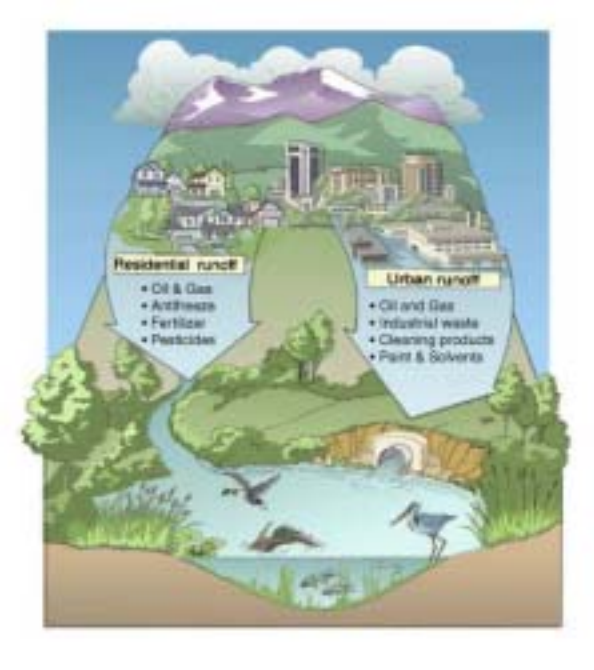


Sources of Water Pollution

- Construction
- Agriculture
- Transportation
- Sewage
- Improper Waste Disposal (Illicit Discharges)
- Urban activity
- Commercial activity
  - Manufacturing and Industrial
  - Automotive Facilities
  - Retail

Pollutants in Surface Water Runoff

- Street litter
- Soil/dirt
- Fertilizers
- Organic waste
- Metals
- Vehicle fluids
- Industrial and construction materials



Laws and Regulations

- Prior to 1972 dumping (discharges) pollutants in waters of the U.S. (creeks, streams, rivers, lakes, storm drain systems, etc) was not regulated.
- In 1972, the Environmental Protection Agency (EPA) amended the Clean Water Act (CWA) to prohibit and regulate discharges into waters of the U.S.
- ONLY RAIN DOWN A STORM DRAIN.

Clean Water Act (CWA)

- 1972 CWA amendment:
  - prohibit discharge of pollutants into waters of the U.S.
  - discharges are required to be authorized by a National Pollutant Discharge Elimination System (NPDES) permit.
- 1987 CWA amendment:
  - established framework for regulating storm water discharges.
- 1990 Phase I regulations for NPDES Storm Water permits:
  - Cities serving 100,000 people.
  - Industrial sites.
  - Construction site disturbing five acres or more.
- 1999 Phase II regulations for NPDES Storm Water permits:
  - Cities serving less than 100,000 people (MORGAN HILL).
  - Construction site disturbing one acre or more.

Storm Water Management Plan (SWMP)

- Under Phase II the City of Morgan Hill
  - On March 23, 2005 obtained an NPDES General Storm Water Permit for Storm Water discharges for small (cities) municipalities.
  - Developed and implemented the State approved 5-year Storm Water Management Plan.
  - Year one: March 23, 2005 through June 30, 2006.

Storm Water Management Plan (SWMP): Objective

- The objective of the SWMP is to establish a comprehensive effort by the City of Morgan Hill to help prevent the discharge of pollutants to surface water bodies by limiting the role storm water and urban runoff play as the vehicle for pollution through six minimum control measures.

Storm Water Management Plan (SWMP): Six (6) Minimum Control Measures

1. Public Education and Outreach
2. Public Involvement and Participation
3. Illicit Discharge (Dumping) Detection and Elimination
4. Construction Site Runoff Control
5. Post Construction Site Runoff Control
6. Pollution Prevention/Good Housekeeping

Minimum Control Measure #1
Public Education and Outreach

- Educate the public about the importance of the storm water pollution prevention through:
  - Mass Media (Channel 17)
  - Brochures and Fliers
  - Public Events (Taste of Morgan Hill, Mushroom Mardi Gras)
  - Classroom Education
  - Web Site (Environmental Programs, SWMP coming soon)
  - Used Oil Disposal
    - Biweekly curbside recycling.
    - Drop off locations (1-800-CLEANUP or visit www.1800cleanup.org)
  - Santa Clara House Hold Hazardous Waste Program
    - Monthly drop off locations within the county (408-299-7300)

Minimum Control Measure #2
Public Involvement and Participation

- Public Meetings
- Storm Drain Stenciling (Year 2)
- Community Clean-up
  - Costal Clean Up (September)
  - Community Clean Up (April)

  (for more information contact the Environmental Programs Division at 779-7247)
- Community Gardening/Composting
  - FREE workshops are held each month at the Mount Madonna YMCA, 17666 Crest Avenue.
  - Home Composting Hotline at 918-4640.
- Public Hotline
  - Illicit discharge/dumping contact Public Works at 408-776-7337.

Minimum Control Measure #3
Illicit Discharge Detection and Elimination

- Storm Water Infrastructure Map
- Ordinance
- Procedures
- Public Hotline (Public Works 408-776-7337)
- Notification (Outreach) of Targeted Industries
  - Car dealership, repair shop, restaurants, and other establishments that handle materials that should not be discharge into water ways.
- Used Oil Disposal
- Household Hazardous Waste Collection
- Non-Storm Water Discharges
  - Sidewalk washing
  - Car washing
  - Swimming pool draining
  - Lawn/landscape watering
  - Construction water

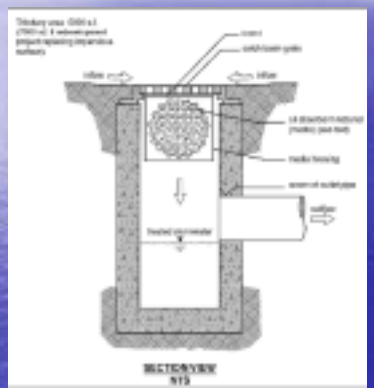
Minimum Control Measure #4
Construction Site Runoff Control

- Develop a program to control the discharge of pollutants from construction sites greater than one acre in size through
  - Ordinance (Year 2)
  - Site Plan Review and Plan Check
  - Site Inspection and Enforcement
  - Public Hotline

Minimum Control Measure #5
Post-Construction Runoff Control

- Develop a program to require long-term post-construction measures that protect water quality and control runoff flow for developments through:
  - Best Management Practices
  - Ordinances
  - Maintenance

Post Construction Best Management Practices (BMPs)



The typical design of a catch basin insert is a set of filters that are specifically chosen to address the pollutants expected at that site (Source: King County, Washington, 2008)

A porous pavement parking lot (Source: Invisible Structures, no date)

Post Construction Best Management Practices (BMPs)

Post Construction Best Management Practices (BMPs)

Developers can eliminate curbs and gutters to disconnect impervious surfaces and promote infiltration of storm water on vegetated areas (such as this grass-lined channel in a residential neighborhood)

Minimum Control Measure #6
Pollution Prevention/Good Housekeeping

- The City shall examine its own activities and develop a program to prevent the discharge of pollutants from these activities through:
  - Operations and Maintenance Programs
  - Training
  - Street Cleaning
  - Storm Water Pollution Prevention Plan for Corporation Yard and Street Operations
  - Program for Cleaning Storm Drain Facilities
  - Water Utility Discharge Pollution Prevention Plan

Discussion

- QUESTIONS?
- COMMENTS

2B – Storm Drain Stenciling (Year 1: FY 2006-2007 – none scheduled)	
2B – Storm Drain Stenciling (Year 2: FY 2006-2007)	
Description	Conduct a storm drain stenciling participation event every other year. The event should include a minimum of two service organizations every other year.
Justification	Stenciling storm water quality messages adjacent to storm drain inlets that are visible to the public will raise awareness about the impacts of pollutants entering the storm drain system.
Measurable Goal	Conduct a storm drain stenciling participation event every other year. The event should include a minimum of two service organizations every other year. Update master map with all new stenciling locations with a layer for stenciling.
Implementation Schedule	Year 2: Conduct a storm drain stenciling event which includes at least 2 service organizations participating. Update map to show new locations.
Progress Measurement	Storm drain stenciling event happens. Locations and participants documented.
Effective Measurement	Track number of storm drain inlets marked and compare to entire list of inlets. Track number and variety of service organization participants. Did two organizations participate?
*Modifications are noted by the <u>underlined text</u>.	

2C – Community Clean-up (Proposed: FY 2005-2006)	
Description	Coordinate one community clean up day per year. Event is recommended to coincide with regional or national events of similar nature. Coordination with the Santa Clara Valley Water District is important.
Justification	Having the public participate in a clean-up day helps promote storm water quality and allows for citizens to take "ownership" of the creeks and water bodies.
Measurable Goal	Hold one City sponsored community clean-up day per year. Enlist the participation of community groups and residents who want to help. Participate in one regional clean-up day per year.
Implementation Schedule	Year 1: Hold one City sponsored community clean-up event. Participate in one regional clean-up event.
Progress Measurement	Community clean-up event happens annually.
Effective Measurement	Track number and variety of participants. Track volume of waste picked up.

2C – Community Clean-up (Implementation: FY 2005-2006)

General Summary: Staff coordinated City Beautification Day on May 20th 2006. Groups from local churches, businesses, and civic groups participated at a variety of sites throughout the City. Portions of both the Butterfield Channel and West Little Llagas Creek were cleaned. Morgan Hill residents also participated in the National River Cleanup Day also held on May 20th at Chesbro Reservoir off of Oak Glen Avenue.

Status of Measurable Goals: The measurable goal was met. Community groups and residents were active in the City-sponsored cleanup event which was timed to coincide with the regional "Clean Creeks" day.

Effectiveness: Approximately 150 individuals participated in the event. Since the volume of waste comes from different sites, it is not counted. The Nation River Cleanup Day at Chesbro Reservoir yielded 240 pounds of trash and 90 pounds of recyclables per Attachment 2C.1.

Proposed Modifications: Track volume of waste picked up at National River Cleanup day only.

Minimum Control Measure #2 – Public Involvement and Participation

Ongoing Implementation:

2C – Community Clean-up (Year 2: FY 2006-2007)	
Description	Coordinate one community clean up day per year. Event is recommended to coincide with regional or national events of similar nature. Coordination with the Santa Clara Valley Water District is important.
Justification	Having the public participate in a clean-up day helps promote storm water quality and allows for citizens to take "ownership" of the creeks and water bodies.
Measurable Goal	Hold one City sponsored community clean-up day per year. Enlist the participation of community groups and residents who want to help. Participate in one regional clean-up day per year.
Implementation Schedule	Year 2: Hold one City sponsored community clean-up event. Participate in one regional clean-up event.
Progress Measurement	Community clean-up event happens annually.
Effective Measurement	Track number and variety of participants. Track volume of waste picked up for National River Cleanup site(s).
*Modifications are noted by the underlined text.	

ATTACHMENT 2C.1

CREEK CONNECTIONS ACTION GROUP WEBSITE

National River Cleanup Day
May 20, 2006

Santa Clara County Results

More than 650 volunteers removed more than 12,500 pounds of trash and recyclables from creeks!

Thanks to all the volunteers and site coordinators who and without their efforts made this event a success!

There were 27 sites countywide – here are results from the cleanup:

San Francisquito Creek
16 volunteers; approx. 625 lbs. of trash and 180 lbs. of recyclables.

Stevens Creek at La Avenida
12 volunteers; approx. 300 lbs. of trash and 30 lbs. of recyclables

Stevens Creek at El Camino/HWY 85 to South El Camino
4 volunteers; approx. 1,350 lbs. of trash and 0 lbs. of recyclables.

Sunnyvale West Channel
2 volunteers; approx. 50 lbs. of trash and 0 lbs. of recyclables

Calabazas Creek at Great America Parkway
12 volunteers; approx. 500 lbs. of trash and 0 lbs. of recyclables

Stevens Creek Reservoir at Stevens Creek County Park
50 volunteers; approx. 158 lbs. of trash and 55 lbs. of recyclables

Lake Cunningham Park
14 volunteers; approx. 300 lbs. of trash and 0 lbs. of recyclables.

Los Gatos Creek between Stokes and Hamilton Avenues
24 volunteers; approx. 750 lbs. of trash and 0 lbs. of recyclables

Guadalupe River from 880 HWY to Coleman Avenue
34 volunteers; approx. 400 lbs. of trash and 0 lbs. of recyclables

Los Gatos Creek from West San Fernando Street to Park

Avenue
6 volunteers; approx. 300 lbs. of trash and 0 lbs. of recylclables

Guadalupe River at Discovery Meadow
7 volunteers; approx. 491 lbs. of trash and 30 lbs. of recyclables

Coyote Creek at San Jose High Academy
34 volunteers; approx. 300 lbs. of trash, and 10 lbs. of recyclables

Coyote Creek from Santa Clara Street bridge to Julian Street bridge
60 volunteers; 2,000 lbs. of trash and 0 lbs. of recyclables.

Penitencia Creek from Mossdale to Capitol Avenues
6 volunteers; approx. 687 lbs. of trash and 0 lbs. of recyclables

Upper Penitencia Creek between Noble to Capitol Avenues
6 volunteers; approx. 50 lbs. of trash and 10 lbs. of recyclables

Lower Silver Creek from Capitol to Jackson Avenue
8 volunteers; approx. 150 lbs. of trash and 10 lbs. of recyclables

Evergreen Creek from Ruby Avenue to Falls Creek Drive
20 volunteers; approx. 150 lbs. and 45 lbs. of recyclables

Coyote Creek at Hellyer County Park
29 volunteers; approx. 1,000 lbs. of trash and 300 lbs. of recyclables

Almaden Lake Park
69 volunteers; approx. 240 lbs. of trash and 0 lbs. of recyclables

Guadalupe Reservoir off Hicks Road in Almaden Quicksilver Park
9 volunteers; approx. 240 lbs. of trash and 0 lbs. of recyclables
Calero Creek at the corner of Harry Road and Camden Avenue
14 volunteers; approx. 150 lbs. of trash and 25 lbs. of recyclables

Coyote Creek at RC Airfield
8 volunteers; approx. 40 lbs. of trash and 0 lbs. of recyclables

Chesbro Reservoir off Oak Glen Avenue
6 volunteers; approx. 240 lbs. of trash and 90 lbs. of recyclables

Uvas Creek at Christmas Hill Park
36 volunteers; 700 lbs. of trash and 0 lbs. of recyclables

Creek Connections Action Group
5750 Almaden Expressway - San José, CA 95118
(408)265-2607 ext.2238 - publicinfo@scvwd.dst.ca.us

2D – Community Gardening/Composting (Proposed: FY 2005-2006)	
Description	Offer community gardening/composting workshops at no charge to residents through the Home Composting Educational Program.
Justification	Fertilizers, pesticides, and herbicides harm useful insects, poison fish, and contaminate water. Offering alternative fertilizing techniques will help keep contaminants out of creeks.
Measurable Goal	Offer ten community gardening/composting workshops per year at no charge to residents through the Home Composting Educational Program.
Implementation Schedule	Year 1: Offer ten community gardening/composting workshops.
Progress Measurement	Number of community gardening/composting workshops held.
Effective Measurement	Monitor number of participants. Follow-up surveys of participants to see how well gardening/composting is going.

2D – Community Gardening/Composting (Implementation: FY 2005-2006)

General Summary: The City participates in the Countywide Home Composting Program. Composting workshops are offered monthly at a variety of locations throughout the County with a total of 54 offered during the reporting period. Workshops in Morgan Hill, in particular, were offered in each month at the Mount Madonna YMCA, 17666 Crest Avenue and Attachment 2D.1 list the participants.

Status of Measurable Goals: The measurable goal was met. 54 workshops were offered in total.

Effectiveness: The Morgan Hill composting workshops yielded 16 participants for the 2005-2006 FY. The County does not conduct follow-up surveys of participants.

Proposed Modifications: The City does not believe that encouraging small numbers of residents to compost is an effective tool in preventing stormwater pollution. The amounts of compost produced in a home composting system are typically very small and are not likely to be ultimately applied to a lawn that is the source of fertilizer runoff.

Instead, the City proposes to create a new measure, 2F – Water Conservation for Lawns, which will focus on reducing the irrigation of lawns that typically results in fertilizer runoff.

Ongoing Implementation: None

July 1, 2005 - May 31, 2006
Morgan Hill Compost Workshop Attendees

ATTACHMENT 2D.1

Morgan Hill Compost Workshop held on July 9, 2005

Jim	Brady	3165 Thomas Grade	Morgan Hill	95037	779-0363
Frank	Daley	PO Box 506	Morgan Hill	95136	782-0148
Lucas	Tan	10165 Dougherty Ave	Morgan Hill	95037	778-2417
Joe	Stewart	12130 Columbet Ave	San Martin		683-2741
Patricia	Possley	16910 John Telfer Dr	Morgan Hill	95037	

Morgan Hill Compost Workshop held on August 10, 2005

Angela	Moore	10400 Manfre Rd	Morgan Hill	95037	778-5818

Morgan Hill Compost Workshop held on September 10, 2005

Roy	Garcia	17785 Elm Rd	Morgan Hill	95037	779-1054
Maryanne	Kendall	17226 James Lex Ln	Morgan Hill	95037	778-5597
Jeannette	Langstaff	1631 Tiburon Dr.	Hollister	95023	831-636-1491
Irma & Elena	Silvas	17720 Florence Ct	Morgan Hill	95037	779-7912

Morgan Hill Compost Workshop held on November 12, 2005

Jeannette	Severson	570 W. Edmunson Ave	Morgan Hill	95037	778-7254
Jeannie	McGinnis	19091 Clayton Ave	Morgan Hill	95037	779-9004
Jane	Devine	1705 E. Main Ave	Morgan Hill	95037	778-0588

Morgan Hill Compost Workshop held on March 11, 2006

Kathy	O'Dell	1049 Violet Way	Gilroy	95020	842-3536
Theresa	Boles	6084 Monterey Highway	San Jose	95138	949 215-5948

Morgan Hill Compost Workshop held on April 12 & May 13, 2006, 2006

Cancelled

Morgan Hill Compost Workshop held on June 28, 2006

Kimberly	Lane	1167 Hogue Cout	San Martin	95046	686-1956

2E – Public Hotline (Proposed: FY 2005-2006)	
Description	The City to have a hotline for the public to contact appropriate personnel if an illicit discharge is observed.
Justification	A public hotline allows citizens to report illicit discharge observations. Helps City staff police community.
Measurable Goal	Set up and maintain a City hotline for the community to report illicit discharges. Publicize phone number.
Implementation Schedule	Year 1: City will establish hotline.
Progress Measurement	Hotline established.
Effective Measurement	Track number of calls. Track violations and enforcement actions.

2E – Public Hotline (Implementation: FY 2005-2006)

General Summary: The public was directed to report illicit discharges to Public Works in the Watershed Watch brochure per Attachment 1B.1, under important numbers.

Utilizing the internet, an 'Illegal Dumping (Illicit Discharge) Reporting' information page was established on the City's web page at the following address in the 'Environmental Programs' page at http://www.morgan-hill.ca.gov/html/citysvc/comm/envir.asp. The information page directs the public to report illicit discharges to Public Works at 408-776-7337 (see Attachment 2E.1).

Status of Measurable Goals:
This year's measurable goal was met; Public Works main phone number was designated as the illicit discharge hotline.

Effectiveness:
Since the illicit discharge procedure has been in place, Public Work has received one (3/2/06) report of illicit discharge resulting from a sanitary sewer overflow (see Attachment 3C.2 for report log).

Proposed Modifications:
None.

Ongoing Implementation:

2E – Public Hotline (Year 2: FY 2006-2007)	
Description	The City to have a hotline for the public to contact appropriate personnel if an illicit discharge is observed.
Justification	A public hotline allows citizens to report illicit discharge observations. Helps City staff police community.
Measurable Goal	To promote public input, the City will have a hotline for the public to contact appropriate personnel if an illicit discharge is observed
Implementation Schedule	Year 2: Phone employees will be trained in illicit discharge protocol. Advertise the hotline on public access cable channels once per month, City Visions twice per year, and the Morgan Hill Times newspaper twice per year.
Progress Measurement	Hotline is kept up-to-date and accessible 24 hours per day.
Effective Measurement	Track number of calls. Track violations and enforcement actions.
*Modifications are noted by the <u>underlined text</u>.	

City Services

Community Services

ATTACHMENT 2E.1

Environmental Programs

City staff have developed many informational resources to assist residents in their efforts to protect the environment.

If you don't find what you are looking for in the links below, please call staff from the Environmental Programs Division at 779-7247. Or, if you prefer, you can send an e-mail to: environ@morgan-hill.ca.gov

- Illegal Dumping (Illicit Discharge) Reporting
- Garbage & Recycling Service FAQ'S
- Waste Prevention & Recycling
- Batteries, Fluorescents & E-Waste
- Household Hazardous Waste Management
- Composting
- Yard Trimmings, Food Waste and Other Compostables
- Water Conservation
- Stormwater Pollution Prevention
- The Green Business Program
- Energy Efficiency
- Special Information for Teachers
- Design Water-Wise Landscaping
- Donating Reusable Goods

Illegal Dumping (Illicit Discharge) Reporting

You may have seen these markings near drain inlets around our City. It is important to remember that the storm drain system is design to convey clean water, which eventually flows to our local streams and creeks. By dumping any material (motor oil, soap water, trash, etc) other than clean water, you are polluting our local creeks and streams. Construction sites can also contribute to water pollution, by allowing contaminated construction water discharge into the storm drain or creeks. To protect water quality of our streams, creeks and public health, please report illegal dumping (illicit discharges) or construction site discharges to Public Works at 408-776-7337.

2F – Water Conservation for Lawns (Proposed: FY 2006-2007)	
Description	Encourage residents and nonresidential customers to reduce the amount of runoff that results from their irrigation of their lawns. Customers will be encouraged to request campaign materials and will be encouraged to sign up for a free home visit by an irrigation expert.
Justification	Fertilizers, pesticides, and herbicides harm useful insects, poison fish, and contaminate water. Reducing irrigation runoff will help keep contaminants out of creeks.
Measurable Goal	Run a web-based and cable tv-based campaign for 10 weeks in the Spring to encourage efficient irrigation techniques.
Implementation Schedule	Year 2: Implement a 10-week campaign.
Progress Measurement	Number of promotional items created for the campaign.
Effective Measurement	Monitor number of campaign materials requested and the number of home assistance appointments requested. .

Minimum Control Measure #3 – Illicit Discharge Detection and Elimination

Introduction

Illicit discharge is any discharge to a municipal separate storm sewer system that is not composed entirely of storm water. Examples of illicit discharges include raw sewage, car wash waste water, oil and vehicle fluids, laundry waste water, and household toxics. Illicit discharges enter the system through either direct connections (e.g. waste water piping either mistakenly or deliberately connected to the storm drain) or indirect connections (e.g., infiltration into the storm drain system from a cracked sewer line or spills that migrate into a storm drain inlet). Exceptions to illicit discharge are discharges from NPDES permitted industrial sources and discharges from fire-fighting activities. Illicit discharges are considered "illicit" because a municipal separate storm sewer system is not designed to accept, process, or discharge such non-storm water activities. Untreated discharges that contribute high levels of pollutants, including heavy metals, toxics, oil and grease, solvents, nutrients, viruses, and bacteria to receiving water bodies result from illicit discharge. Pollutant levels from these illicit discharges have been shown in EPA studies to be high enough to significantly degrade receiving water quality and threaten aquatic, wildlife, and human health.

The City's approach to the Illicit Discharge Minimum Control Measure will be to incorporate a combination of mapping and monitoring, regulatory controls, establishment of procedures for reporting, establishment of a public hotline, and training for City staff.

Best Management Practice (BMP)
Minimum Control Measure #3 – Illicit Discharge Detection and Elimination
Summary Table

BMP	Description	Implementation
3A Stormwater Infrastructure Map	City to have and maintain map of existing storm water facilities including outfalls to identified receiving waters.	Year 1
3B Ordinance	An ordinance addressing illicit discharge will establish regulatory control for the City.	Year 1
3C Procedures	Written and adopted procedures for addressing illicit discharge is an important staff tool.	Year 1
3D Public Hotline	To promote public input, the City will have a hotline.	Year 1
3E Notification of Targeted Industries	Outreach to applicable commercial and industrial establishments that potentially discharge to waterways.	Year 1
3F Used Oil Disposal	A program whereby citizens can dispose of used oil bi-weekly curbside and with two local drop-off locations will help eliminate residential waste oil dumping.	Year 1
3G Household Hazardous Waste Collection	Household Hazardous Waste Collection.	Year1
3H Public Education	Educate public on non-storm water pollution prevention.	Year 1

3A – Stormwater Infrastructure Map (Proposed: FY 2005-2006)	
Description	City to have and maintain map of existing storm water facilities including outfalls to identified receiving waters.
Justification	A comprehensive storm water infrastructure map will aid the City in targeting outfalls with dry weather flows and other suspicious discharges for more in-depth investigation. The map will help coordinate management activities to remove illicit connections and track storm drain system maintenance.
Measurable Goal	A storm water infrastructure map will be developed to show existing storm drain facilities, including pipes, culverts, inlets and outfalls. In addition, receiving waters shall be identified and located.
Implementation Schedule	Year 1: A storm water infrastructure map will be developed to show existing storm drain facilities, including pipes, culverts, inlets and outfalls.
Progress Measurement	Storm water infrastructure map completed.
Effective Measurement	Map is clear, comprehensive, and accessible to staff, the public, and other agencies. Map enables staff to track illicit discharge reports and to plan other storm water permit activities.

3A – Stormwater Infrastructure Map (Implementation: FY 2005-2006)

General Summary: Utilizing the City's existing Storm Drain Atlas Maps which already shows public storm drain pipes, pipe sizes, pipe flow, ditches, and channels, a comprehensive Storm Water Infrastructure Map (SWIM, see Attachment 3A.1) has been developed. Additionally, the SWIM identifies all outfall locations, with each outfall assigned a unique identification number, with receiving water bodies identified and labeled. The SWIM is further divided into several panels of maps for greater detail, with each panel identified by a panel number.

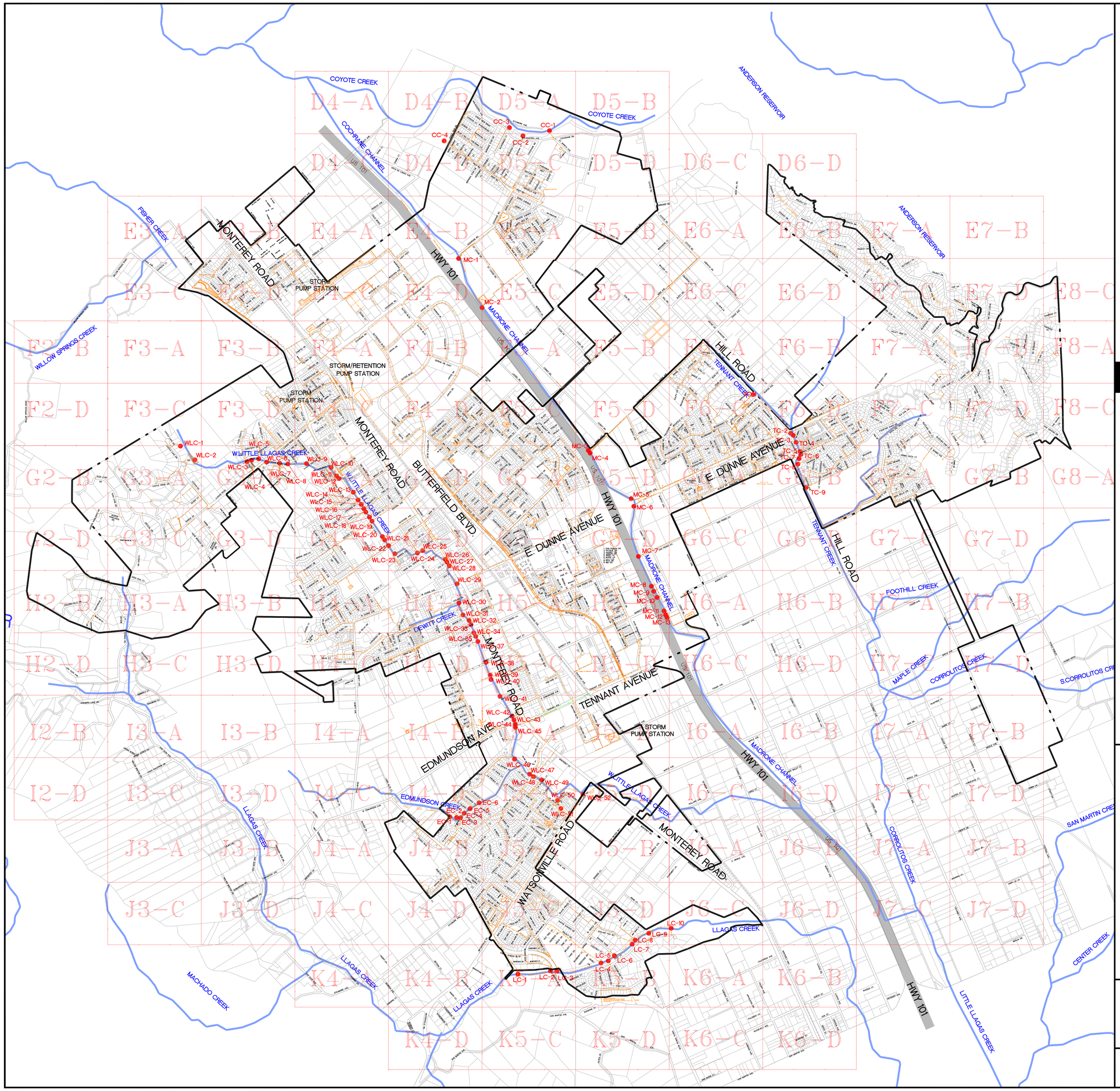
Status of Measurable Goals: The first year's measurable goal was met.

Effectiveness: By referring to the SWIM, outfall locations can be quickly identified and located by number. Greater detail of outfalls and the surrounding storm drain piping can be quickly looked up by the panel number which the outfall is located in. The map will be used to identify illicit discharge reports and will help City Staff locate potential no-point discharges most likely to reach streams and creeks.

Proposed Modifications: None

Ongoing Implementation:

3A – Stormwater Infrastructure Map (Year 2: FY 2006-2007)	
Description	City to have and maintain map of existing storm water facilities including outfalls to identified receiving waters.
Justification	A comprehensive storm water infrastructure map will aid the City in targeting outfalls with dry weather flows and other suspicious discharges for more in-depth investigation. The map will help coordinate management activities to remove illicit connections and track storm drain system maintenance.
Measurable Goal	The map will be continually updated in all subsequent years, to include new facilities and to prioritize sites for inspection.
Implementation Schedule	Year 2: Update map.
Progress Measurement	Storm water infrastructure map is updated as new infrastructure is added.
Effective Measurement	Map is clear, comprehensive, and accessible to staff, the public, and other agencies. Map enables staff to track illicit discharge reports and to plan other storm water permit activities.
*Modifications are noted by the <u>underlined text</u>.	



CITY OF MORGAN HILL

Storm Water Management Plan

Storm Water Infrastructure Map

Public Works

CREEK NAME	Rivers/Creeks
LC-X	Outfall Locations
	Storm Drain Lines
	City Limit/Boundary
	Hwy 101

CREEK/CHANNEL	ABBREVIATION
COYOTE CREEK	CC
EDMUNDSON CREEK	EC
MADRONE CREEK	MC
LLAGAS CREEK	LC
TENNANT CREEK	TC
WEST LITTLE LLAGAS CREEK	WLC

GRAPHIC SCALE

(IN FEET)
1 inch = 1000 ft.

Print date 8/25/06

17555 Peak Ave., City of Morgan Hill, CA 95037 (408) 779-7247
Drawn by: Mark Rauscher 8/11/05
Checked by: Charlie Ha 8/11/05
Mapping Services by: Department of Public Works

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3B – Ordinance (Proposed: FY 2005-2006)	
Description	An ordinance addressing illicit discharge will establish regulatory control for the City.
Justification	City should have regulatory authority to find illicit discharges illegal and to enforce disciplinary actions.
Measurable Goal	Review City Municipal Code for existing ordinances addressing illicit discharges. Research ordinances that have been successfully implemented in other local agencies (minimum of three).
Implementation Schedule	Year 1: Review and evaluate existing ordinances that address illicit discharges.
Progress Measurement	City has identified all in-house ordinances that address illicit discharge and has accumulated example ordinances from at least three other cities.
Effective Measurement	City has sufficient information to develop a comprehensive Illicit Discharge Ordinance.

3B – Ordinance (Implementation: FY 2005-2006)

General Summary: Upon review of the City's Municipal Code, it was determined that there was no specific ordinance addressing illicit discharges to waterways. Therefore, a comprehensive illicit discharge ordinance will need to be developed. Public Works has reviewed and evaluated several existing illicit discharge ordinances from the following municipalities and agency: City of Cupertino (Attachment 3B.1), City of Monterey (Attachment 3B.2), City of Salinas (Attachment 3B.3), City of Santa Cruz (Attachment 3B.4), and the California Coastal Commission (Attachment 3B.5).

Status of Measurable Goals: The first year's measurable goal was met. Public Works has determined a need for a comprehensive illicit discharge ordinance, and sufficient research has been obtained to develop an illicit discharge ordinance.

Effectiveness: City has located very good information that will become the basis for its ordinances addressing illicit discharge.

Proposed Modifications: None

Ongoing Implementation:

3B – Ordinance (Year 2: FY 2006-2007)	
Description	An ordinance addressing illicit discharge will establish regulatory control for the City.
Justification	City should have regulatory authority to find illicit discharges illegal and to enforce disciplinary actions.
Measurable Goal	Based on research in Year 1, establish necessary ordinance(s) for City Council adoption to properly address illicit discharges.
Implementation Schedule	Year 2: City adopts ordinance(s) designed to target the illegal discharging of illicit substances into the storm sewer system.
Progress Measurement	Ordinance adopted.
Effective Measurement	City has sufficient regulatory control to find and punish illicit discharge violators. Number of enforcement actions is tracked.
*Modifications are noted by the underlined text.	

9.18 Stormwater Pollution Prevention and Watershed Protection

9.18.010 Purpose of chapter.

9.18.020 Definitions.

9.18.030 Limitations on point of discharge.

9.18.040 Discharge into the storm drain prohibited.

9.18.050 Public nuisance.

9.18.060 Protection from accidental discharge.

9.18.070 Accidental discharge–Notification of discharge.

9.18.080 Discharge permitted pursuant to NPDES permit.

9.18.090 Stormwater pollution prevention plan.

9.18.100 Permanent storm water pollution prevention measures required.

9.18.110 Design and selection of best management practices.

9.18.120 Stormwater management plan required.

9.18.130 Stormwater management plan contents.

9.18.140 Preparation of stormwater management plan.

9.18.150 Stormwater BMP operation and maintenance responsibility.

9.18.160 Stormwater BMP operation and maintenance agreement.

9.18.170 Stormwater BMP inspection responsibility.

9.18.180 Records of maintenance and inspection activities.

9.18.190 Failure to maintain.

9.18.200 Inspection and maintenance easement.

9.18.210 Stormwater pollutant source control BMPs.

9.18.220 Violation.

9.18.230 Civil penalty for violation–Payment of funds to account.

9.18.240 Civil penalty for illicit discharges–Payment of funds to account.

9.18.250 Notice of violation.

9.18.260 Administrative penalties–Payment of funds to account.

9.18.270 Severability.

* Prior ordinance history: Ord. 1571.

9.18.010 Purpose of Chapter.

The U.S. Environmental Protection Agency has identified urban storm water runoff as the leading cause of water pollution in the United States. Furthermore, both federal and state agencies have identified storm water runoff as a major source of pollution adversely impacting the beneficial uses of the South San Francisco Bay. As a result, the California Regional Water Quality Control Board, San Francisco Bay Region, has issued the City of Cupertino a National Pollutant Discharge Elimination System ("NPDES") permit. The NPDES permit requires that the City of Cupertino implement a

Storm Water Management Program to control storm water runoff so that it does not cause or contribute to a violation of the water quality standards of South San Francisco Bay.

The purpose of this Chapter is, therefore, to protect health, life, resources and property by providing minimum requirements designed to control the discharge of pollutants into the City of Cupertino's storm drain system and to assure that discharges from the City of Cupertino storm drain system comply with applicable provisions of the Federal Clean Water Act and National Pollutant Discharge Elimination System Permit No. CA0029718. Enactment of this Chapter falls within the scope of the City of Cupertino police powers to protect the health, safety, and welfare of its residents. Nothing in this Chapter is intended to preclude more stringent federal or state regulation of any activity covered by this Chapter. (Ord. 1922, § 1 (part), 2003; Ord. 1598, § 1 (part), 1992)

9.18.020 Definitions.

For the purposes of this chapter, the following words and phrases shall have the meanings ascribed to them by this section, unless the context or the provision clearly requires otherwise.

1. “Applicant.” Any person, firm, or governmental agency who executes the necessary forms to procure official approval of a project or a permit to carry out construction of a project.

2. “Best management practice (BMP).” A structural device or nonstructural practice designed to temporarily store and/or treat stormwater runoff in order to reduce pollution, mitigate flooding and provide other amenities.

3. “City.” All the territory lying within the municipal boundaries of the City of Cupertino, as presently existing, plus all territory which may be added thereto during the effective term of the ordinance codified in this chapter.

4. “Commercial vehicle washing facility.” A commercial facility where vehicle washing is a primary business activity. Commercial vehicle washing facilities include, but are not limited to, mobile washing rigs.

5. “Cooling system.” The pipes, heat exchangers and other appurtenances used to convey cooling water in cooling towers, direct contact cooling systems and similar fixed cooling systems. Multiple units of a cooling water system serving a building or piece of equipment are considered as one system if the cooling water distribution system units are physically connected.

6. “Deemed complete.” The City reviews development applications within 30 days of submittal to determine whether all the required information has been provided and the application can be "deemed complete" and accepted. If the application submittal is incomplete, staff sends a letter to the applicant indicating that the application is "deemed incomplete" and lists the items needed to complete the application. If the Planning Division's written determination is not made within 30 days after receipt of the application, under State Law, it is deemed "complete" and staff proceeds with processing the application.

7. “Development.” A land development or land development project.

8. “Director of Public Works.” The Director of Public Works and his or her duly authorized agents and representatives.

9. “Director of Community Development.” The Director of Community Development and his or her duly authorized agents and representatives.

10. “Erosion and sedimentation control plan.” A plan designed to minimize the accelerated erosion and sediment runoff at a site during land disturbance activities.

11. “Existing conditions.” Refers to the conditions that exist on a site before the commencement of a land development project and at the time the City of Cupertino approves plans for the land development of a site. Where phased development or plan approval occurs (preliminary grading, roads and utilities, etc.), the existing conditions are considered those at the time before the first item being approved or permitted.

12. “Fleet washing facility.” A facility for washing vehicles at a location where a business maintains six or more vehicles.

13. “Food service facility.” Any nonresidential establishment that uses or generates grease when preparing food. “Food service facility” does not include any facility that prepares food for off-site cooking and consumption, or any facility that does not use, generate, or dispose of grease in cooking or preparing food.

14. “Grease.” Includes fats, oils, waxes, or other related constituents. Grease may be of vegetable or animal origin, including butter, lard, margarine, vegetable fats and oils, and fats in meats, cereals, seeds, nuts and certain fruits. Grease may also be of mineral origin, including kerosene, lubricating oil, and road oil.

15. “Grease removal device.” An interceptor, trap or other mechanical device designed, constructed and intended to remove, hold or otherwise prevent the passage of grease to the sanitary sewer.

16. “Hazardous material.” Any material so designated by Chapter 101 of this code.

17. “Illicit connection.” The unauthorized connection of a wastewater stream to storm sewers.

18. “Impervious surface.” A surface composed of any material that significantly impedes or prevents the natural infiltration of water into soil. Impervious surfaces include, but are not limited to, rooftops, buildings, streets and roads, and any concrete or asphalt surface.

19. “Easement.” A grant or reservation by the owner of land for the use of such land by others for a specific purpose or purposes, and which must be included in the conveyance of land affected by such easement.

20. “Land development activities.” Those actions or activities that comprise, facilitate or result in land development.

21. “Loading dock.” The area of a facility intended for the loading and unloading of trucks, plus an additional radius of ten feet.

22. “New development.” A land development activity on a previously undeveloped site.

23. “NPDES municipal stormwater discharge permit.” A National Pollution Discharge Elimination System permit issued to the City of Cupertino by the Regional Water Quality Control Board, San Francisco Bay Region.

24. “Numeric BMP sizing criteria.” Requirements for designing stormwater BMPs that are included in the City's NPDES Municipal Stormwater Discharge Permit and more specifically described in the Santa Clara Valley Urban Runoff Pollution Prevention Program's “Guidance for Implementing Stormwater Regulations for New and Redevelopment Projects.”

25. “Oil-water separator.” A receptacle designed and constructed to intercept, separate, and prevent the passage of oils and sediments into the sewer system.

26. “On-site storm water treatment facility.” A stormwater treatment facility located within the boundaries of the site.

27. “Operation and maintenance agreement.” A written agreement providing for the long-term operation and maintenance of stormwater management facilities and practices on a site or with respect to a land development project, which when properly recorded in the deed records constitutes a restriction on the title to a site or other land involved in a land development project.

28. “Owner.” The legal or beneficial owner of a site, including but not limited to, a mortgagee or vendee in possession, receiver, executor, trustee, lessee or other person, firm or corporation in control of the site.

29. “Permit.” The permit issued by the City of Cupertino to the applicant required for undertaking any land development activity.

30. “Person.” Any person, firm, association, organization, partnership, business trust, joint venture, corporation or company, and includes the United States, the State of California, the County of Santa Clara, special purpose districts, and any officer or agency thereof.

31. “Post-development.” Refers to the time period, or the conditions that may reasonably be expected or anticipated to exist, after completion of the land development activity on a site as the context may require.

32. “Redevelopment.” A land development project on a previously developed site, excluding ordinary maintenance activities, interior remodeling of existing buildings, resurfacing of paved areas, and exterior changes or improvements which do not materially increase or concentrate stormwater runoff, or cause additional stormwater runoff pollution.

33. “Runoff.” Stormwater runoff.

34. “Runon.” Stormwater flow entering a specific location from elsewhere on or off the site.

35. “Sanitary sewage” or “sewage.” Water-carried wastes from residences, business property, institutions and industrial property excluding ground water, surface water, and storm waters.

36. “Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP). The Santa Clara Valley Urban Runoff Pollution Prevention Program is an association of thirteen cities and towns in the Santa Clara Valley, together with Santa Clara County and the Santa Clara Valley Water District. Program participants, referred to as Co-permittees, share a common Municipal NPDES permit to discharge stormwater to South San Francisco Bay.

37. “Secondary containment.” The level of containment external to and separate from the primary containment.

38. “Sewer system” or “sanitary sewer system.” All sewers and other facilities for carrying, collecting, treating, and disposing of sanitary sewage.

39. “Site.” Any tract, lot or parcel of land or combination of tracts, lots, or parcels of land, which are in one ownership, or are contiguous and in diverse ownership where a development is to be performed as part of a unit, subdivision, or project.

40. “Storm drain.” Any pipe, conduit or sewer of the city designed or used for the disposal of storm and surface waters and drainage including unpolluted cooling water and unpolluted industrial process water, but excluding any community sanitary sewer system.

41. “Stormwater discharge.” Any discharge from land that results or probably will result in a discharge into watercourses. The discharges represent a process whereby pollutants, debris and chemicals generated from various land uses accumulate on streets, construction sites, parking lots and other exposed surfaces and are washed off and carried away by stormwater runoff into watercourses. The major pollutants of concern in these discharges are heavy metals, sediments, petroleum hydrocarbons, organochlorine, pesticides and toxics.

42. “Stormwater management.” The collection, conveyance, storage, treatment and disposal of stormwater runoff in a manner intended to prevent increased flood damage, streambank channel erosion, habitat degradation and water quality degradation, and to enhance and promote the public health, safety and general welfare.

43. “Stormwater management facility.” Any infrastructure that controls, treats or conveys stormwater runoff.

44. “Stormwater management plan.” A document describing how existing runoff characteristics will be affected by a land development project and containing measures for complying with the provisions of this ordinance.

45. “Stormwater pollutant source control BMPs.” Measures or practices used to control stormwater pollution by eliminating contact between rainfall and the potential source of contamination.

46. “Stormwater pollution prevention plan.” A document identifying potential stormwater pollutant sources at a construction site, the stormwater source control BMPs to be used to reduce these pollutants during and after construction and a description of required BMP monitoring. Generally applies to construction projects disturbing one or more acres.

47. “Stormwater runoff.” Water from rain, landscape irrigation, or other sources that flows over the land surface without entering the soil.

48. “Unpolluted water.” Water to which no constituent has been added, either intentionally or accidentally, that would render the water unacceptable for disposal to storm or natural drainages or directly to surface waters.

49. “Vehicle fluid.” A liquid used in or drained from a motor vehicle. Vehicle fluids include, but are not limited to, gasoline, diesel fuel, motor oil, brake fluid, radiator fluid, hydraulic fluid, transmission fluid, and coolant.

50. “Vehicle service facility.” A commercial or industrial facility that conducts one or more of the following operations with respect to vehicles or components of vehicles: vehicle repair, fuel dispensing, vehicle fluid replacement, engine and parts cleaning, body repair, vehicle salvage and wrecking, or vehicle washing.

51. “Waste.” Sewage and soil from erosion and any and all other waste substances, liquid, solid, gaseous or radioactive, associated with human habitation, or of human or animal origin, or from any producing, manufacturing or processing operation of whatever nature, including waste placed within containers of whatever nature prior to, and for purposes of, disposal.

52. “Watercourse.” Any natural or artificial stream, river, creek, ditch, channel, canal, conduit, culvert, drain, waterway, gully, ravine or wash, in and including any adjacent area that is subject to inundation from overflow or flood water.

53. “Water quality impact.” Any deleterious effect on waters or wetlands, including their quality, quantity, surface area, species composition, aesthetics or usefulness for human or natural uses that are or may potentially be harmful or injurious to human health, welfare, safety or property, to biological productivity, diversity, or stability or which unreasonably interfere with the enjoyment of life or property, including outdoor recreation. (Ord. 1922, § 1 (part), 2003; Ord. 1598, § 1 (part), 1992)

9.18.030 Limitations on Point of Discharge.

No person shall discharge any substance directly into a manhole or other opening in a City storm drain other than through a city approved storm drain connection. (Ord. 1922, § 1 (part), 2003; Ord. 1598, § 1 (part), 1992)

9.18.040 Discharge into the Storm Drain Prohibited.

A. It shall be unlawful to discharge, or cause, allow, or permit to be discharged into any storm drain or natural outlet or channel all waste, including but not restricted to, sewage, industrial wastes, petroleum products, coal tar or any refuse substance arising from the manufacture of gas from coal or petroleum, chemicals, detergents, solvents, paints, contaminated or chlorinated swimming pool water, pesticides, herbicides and fertilizers.

B. It is unlawful to cause hazardous materials, domestic waste or industrial waste to be deposited in such a manner or location as to constitute a threatened discharge into storm drains, gutters, creeks or San Francisco Bay. A “threatened discharge” is a condition creating a substantial probability of harm, when the probability and potential extent of harm make it reasonably necessary to take immediate action to prevent, reduce or mitigate damages to persons, property or natural resources. Domestic or industrial wastes that are no longer contained in a pipe, tank or other container are considered to be threatened discharges unless they are actively being cleaned up.

C. The Director of Public Works may require that unpolluted cooling water or other unpolluted water be discharged into a natural outlet. However, allowable discharges shall not cause any impairment in the beneficial uses or quality of water of the state as defined in the California Water Code or any special requirements of the Regional Water Quality Control Board, San Francisco Bay Region or to injure or interfere with the operation of the State’s watercourses. The City may, from time to time, by resolution of the City Council, adopt supplementary rules and regulations on discharge into any storm drain or natural outlet or channel which shall have the same force and effect as if set forth herein and for which the remedies herein for violation shall be applicable. (Ord. 1922, § 1 (part), 2003; Ord. 1598, § 1 (part), 1992)

9.18.050 Public Nuisance.

The discharge of unscreened garbage, fruit, vegetable, animal or other solid industrial wastes into any storm drain or natural outlet or channel, in violation of any provision of this chapter, is hereby declared to be a public nuisance and shall be handled in the same manner as provided in Chapter 1.09 of this code. (Ord. 1922, § 1 (part), 2003; Ord. 1598, § 1 (part), 1992)

9.18.060 Protection from Accidental Discharge.

Each person shall provide protection from accidental discharge of prohibited materials or other wastes regulated by this Chapter into any storm drain or natural outlet or channel. Facilities to prevent accidental discharge of prohibited materials shall be provided and maintained at the user’s expense. (Ord. 1922, § 1 (part), 2003; Ord. 1598, § 1 (part), 1992)

9.18.070 Accidental Discharge–Notification of Discharge.

A. All persons shall notify the Director of Public Works by telephone immediately upon accidentally discharging wastes to enable countermeasures to be taken by the City to minimize damage to storm drains and the receiving waters.

B. This notification shall be followed, within ten days of the date of occurrence, by a detailed written statement describing the causes of the accidental discharge and the measures being taken to prevent future occurrences. Such notification will not relieve persons of liability for violations of this chapter or for any fines imposed on the City on account thereof under Section 13350 of the California Water Code, or for violation of Section 5650 of the California Fish and Wildlife Code, or any other applicable provisions of State or Federal laws. (Ord. 1922, § 1 (part), 2003; Ord. 1598, § 1 (part), 1992)

9.18.080 Discharge Permitted Pursuant to NPDES Permit.

The provisions of this Chapter shall not prohibit any discharge in compliance with a valid NPDES permit issued to the discharger. (Ord. 1922, § 1 (part), 2003; Ord. 1598, § 1 (part), 1992)

9.18.090 Stormwater Pollution Prevention Plan.

Storm water pollution prevention plans (SWPPPs) shall be prepared and made available at construction sites for all projects disturbing a soil area of one or more acres. Preparation of the SWPPP shall be in accordance with the most recent versions of the "Guidelines for Construction Projects," published by the San Francisco Bay Region of the California Regional Water Quality Control Board and the City of Cupertino "Construction BMP Selection Matrix." (Ord. 1922, § 1 (part), 2003)

9.18.100 Permanent Storm Water Pollution Prevention Measures Required.

A. All development and redevelopment projects shall include permanent BMPs in order to reduce the water quality impacts of stormwater runoff from the entire site for the life of the project.

B. Significant Redevelopment projects that result in an increase of, or replacement of, more than fifty percent of the impervious surface of a previously existing development shall include permanent BMPs sufficient to reduce water quality impacts of stormwater runoff from the entire site for the life of the project.

C. Significant Redevelopment projects that result in an increase of, or replacement of fifty percent or less of the impervious surface of a previously existing development shall include permanent BMPs sufficient to reduce water quality impacts of stormwater runoff from the increased or replaced portion of the site for the life of the project.

D. No final building or occupancy permit shall be issued without the written certification of the Director of Public Works that the requirements of this chapter have been satisfied. (Ord. 1922, § 1 (part), 2003)

9.18.110 Design and Selection of Best Management Practices.

A. Stormwater quality best management practices shall be selected and designed to the satisfaction of the Director of Public Works in accordance with the requirements contained in the most recent versions of the following documents.

1. City of Cupertino BMP Selection Matrices (Construction and Post-Construction);

2. Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP) "Guidance for Implementing Stormwater Regulations for New and Redevelopment Projects;"

3. NPDES Municipal Stormwater Discharge Permit issued to the City of Cupertino by the California Regional Water Quality Control Board, San Francisco Bay Region;

4. California BMP Handbooks;

5. "Start at the Source" Design Guidance Manual;

6. Bay Area Stormwater Management Agencies Association "Using Site Design Standards to Meet Development Standards for Stormwater Quality - A Companion Document to *Start at the Source*"; and

7. City of Cupertino Planning Procedures Performance Standard.

B. Numeric sizing criteria used to design stormwater pollutant removal treatment systems shall be in accordance with the City's current NPDES Municipal Stormwater Discharge Permit.

1. Treatment systems depending on volume capacity, such as detention/retention units or infiltration structures, shall be designed to treat stormwater runoff equal to:

a. The maximized stormwater quality capture volume for the area, based on historical rainfall records, determined using the formula and volume capture coefficients set forth in *Urban Runoff Quality Management, WEF Manual of Practice No. 23/ASCE Manual of Practice No. 87*, (1998), pages 175-178 (e.g. approximately the 85th percentile 24-hour storm runoff event); or

b. The volume of annual runoff required to achieve 80 percent or more capture, determined in accordance with the methodology set forth in Appendix D of the *California Stormwater Best Management Practices Handbook for New Development and Redevelopment* (2003), using local rainfall data.

2. Treatment BMPs whose primary mode of action depends on flow capacity, such as swales, sand filters, or wetlands, shall be sized to treat:

a. 10% of the 50-year peak flow rate; or

b. The flow of runoff produced by rain equal to at least two times the 85th percentile hourly rainfall intensity for the applicable area, based on historical records of hourly rainfall; or

c. The flow of runoff resulting from rain equal to at least 0.2 inches per hour intensity. (Ord. 1922, § 1 (part), 2003)

9.18.120 Stormwater Management Plan Required.

A. Development Permit Application Requirements. Applications for land development projects meeting the criteria below must be accompanied by a Stormwater Management Plan, including stormwater quality best management practices (BMPs), as required by this ordinance. The Stormwater Management Plan shall detail how runoff and associated water quality impacts resulting from the activity will be controlled or managed.

1. New commercial, industrial, residential or institutional development creating one acre or more of impervious surface, collectively over the entire project site, including roof area, parking lots, streets and sidewalks;

2. Redevelopment of existing commercial, industrial, residential or institutional parcel or parcels creating, adding or replacing one acre or more of impervious surface, collectively over the entire project site, including roof area, parking lots, streets and sidewalks;

3. Public streets, roads and parking lots creating or replacing one acre or more of impervious surface, collectively over the entire project site.

4. Land development activities that are smaller than the minimum applicability criteria set forth in items 1 and 2 above, if such activities are part of a larger common plan of development, even though multiple, separate and distinct land development activities may take place at different times on different schedules.

B. Building Permit Requirements. No building, grading, or erosion and sediment control permit shall be issued until the Stormwater Management Plan has been reviewed and approved by the Director of Public Works. (Ord. 1922, § 1 (part), 2003)

9.18.130 Stormwater Management Plan Contents.

The development permit applicant is responsible for submitting a Stormwater Management Plan that meets the design requirements of this Ordinance. The plan shall include sufficient information to evaluate the environmental characteristics of affected areas, the potential impacts of the proposed development on water resources, and the effectiveness and acceptability of measures proposed for managing stormwater runoff. The minimum information submitted for support of a Stormwater Management Plan shall be as follows:

A. Common address, parcel number and legal description of the site;

B. Contact information for all persons having a legal interest in the property;

C. Vicinity map;

D. A brief narrative description of the project;

E. Geotechnicial investigations including soil maps, borings, site-specific recommendations, and any additional information necessary for the proposed stormwater management design;

F. Written or graphic inventory of natural resources existing at the site and in the surrounding area, including, but not limited to, watercourses, wetlands, and native vegetative areas;

G. Data for total site area, disturbed area, new and/or replaced impervious surface area, and total impervious surface area;

H. Topographic survey information showing existing and proposed contours, including all areas necessary for the post-development hydraulic analyses of proposed stormwater management facilities;

I. Erosion and sediment control plan, as required by City Code Section 16.08, Excavation, Grading and Retaining Walls;

J. A list of any other applicable environmental permits that will be required for the project and the responsible agencies (examples: Santa Clara Valley Water District, State Department of Fish and Game, Regional Water Quality Control Board);

K. Hydrologic computations, including drainage area maps depicting existing and post-development runoff flow paths and land use;

L. Hydraulic computations for existing and post-development conditions;

M. A list of all stormwater management facilities and practices to be employed at the site;

N. A list of any regular on-site cleaning activities to be used as stormwater pollutant source controls (example: pavement sweeping) and the schedules for these cleaning activities;

O. Numeric BMP sizing criteria computations according to the SCVURPPP "Guidance for Implementing Stormwater Regulations for New and Redevelopment Projects;"

P. Structural and construction details for all components of the proposed drainage system or systems and stormwater management facilities;

Q. Landscaping plan showing disposition of existing vegetation and any vegetative site stabilization and/or landscape-based storm water management measures;

R. Cost estimates for all proposed on-site stormwater treatment facilities for the purpose of calculating the amount of any required performance bonds;

S. BMP operation and maintenance procedures, including maintenance tasks, inspection and maintenance schedule, the parties responsible for BMP operation and maintenance, funding mechanisms for on-going operation and maintenance and access and safety issues;

T. Certification by the owner/developer that all stormwater management construction will be done according to this Stormwater Management Plan;

U. An as-built certification signature block to be executed by the responsible registered civil engineer after project completion; and

V. Any other information as may be required by the Director of Public Works. (Ord. 1922, § 1 (part), 2003)

9.18.140 Preparation of the Stormwater Management Plan.

A. The Stormwater Management Plan shall be prepared under the direction of a professional civil engineer registered in the State of California. The responsible professional civil engineer shall stamp and sign the approved Stormwater Management Plan.

B. The Director of Public Works may require a developer to provide a signed certification from the civil engineer responsible for preparing the Stormwater Management Plan that all stormwater best management practices have been designed to meet the requirements of this Ordinance. Each certifying civil engineer shall establish to the City's satisfaction that such person has been trained on the design of stormwater quality best management practices not more than three years prior to the certification signature date. Qualifying training shall be conducted by an organization with stormwater quality management expertise, such as a university, the Bay Area Stormwater Management Agencies Association, the American Society of Civil Engineers, the American Public Works Association, or the California Water Environment Association. (Ord. 1922, § 1 (part), 2003)

9.18.150 Stormwater BMP Operation and Maintenance Responsibility.

A. For the life of the project, all on-site stormwater management facilities shall be operated and maintained in good condition and promptly repaired by the property owner(s), an Owners' or Homeowners' Association or other legal entity approved by the City.

B. Any repairs or restoration and maintenance shall be in accordance with City- approved plans.

C. The property owner(s) shall develop a maintenance schedule for the life of any stormwater management facility and shall describe the maintenance to be completed, the time period for completion, and who shall perform the maintenance. This maintenance schedule shall be included with the approved Stormwater Management Plan. (Ord. 1922, § 1 (part), 2003)

9.18.160 Stormwater BMP Operation and Maintenance Agreement.

A. Prior to the issuance of any building permit requiring stormwater management BMPs, the owner(s) of the site shall enter into a formal written stormwater BMP operation and maintenance agreement with the City. The City shall record this agreement, against the property or properties involved, with the County of Santa Clara and it shall be binding on all subsequent owners of land served by the stormwater management treatment BMPs.

B. The stormwater BMP operation and maintenance agreement shall require that the BMPs not be modified and that BMP maintenance activities not alter the designed function of the facility from its original design unless approved by the City prior to the commencement of the proposed modification or maintenance activity.

C. The stormwater BMP operation and maintenance agreement shall provide that in the event that maintenance or repair is neglected, or the stormwater management facility becomes a danger to public health or safety, the City shall have the authority to perform maintenance and/or repair work and to recover the costs from the owner.

D. The owner shall provide the City with three signed copies of the recorded stormwater BMP operation and maintenance agreement. (Ord. 1922, § 1 (part), 2003)

9.18.170 Stormwater BMP Inspection Responsibility.

A. The property owner(s) shall be responsible for having all stormwater management facilities inspected for condition and function by a knowledgeable party.

B. Unless otherwise required by the Director of Public Works, stormwater facility inspections shall be done at least twice per year, once in fall, in preparation for the wet season, and once in winter. Written records shall be kept of all inspections and shall include, at minimum, the following information:

1. Site address;

2. Date and time of inspection;

3. Name of the person conducting the inspection;

4. List of stormwater facilities inspected;

5. Condition of each stormwater facility inspected;

6. Description of any needed maintenance or repairs; and

7. As applicable, the need for site reinspection. (Ord. 1922, § 1 (part), 2003)

9.18.180 Records of Maintenance and Inspection Activities.

On or before April 15th of each year, the party responsible for the operation and maintenance of on-site stormwater management facilities shall provide the Director of Public Works with records of all inspections, maintenance and repairs. (Ord. 1922, § 1 (part), 2003)

9.18.190 Failure to Maintain.

A. If the responsible party fails or refuses to meet the requirements of the stormwater BMP operation and maintenance agreement, the City, after thirty days written notice, may correct a violation of the design standards or maintenance requirements by performing the necessary work to place the facility or practice in proper working condition.

B. In the event the City determines that the violation constitutes an immediate danger to public health or public safety, 24 hours written notice from the City shall be sufficient.

C. The City may assess the owner(s) of the property for the cost of repair work and any penalties. This may be accomplished by placing a lien on the property, which may be placed on the tax bill for such property and collected in the ordinary manner for such taxes. (Ord. 1922, § 1 (part), 2003)

9.18.200 Inspection and Maintenance Easement.

A. The Director of Public Works shall have access to all on-site stormwater treatment facilities for the purpose of inspection and repair. This includes the right to enter a property when the City has a reasonable basis to believe that a violation of this ordinance is occurring or has occurred and to enter when necessary for abatement of a public nuisance or correction of a violation of this ordinance.

B. Prior to the issuance of a building permit for which stormwater management BMPs are required, the applicant/owner shall secure the necessary inspection and maintenance easement(s) on a permanent basis. The terms of the inspection and maintenance easement shall allow the City to enter the property at reasonable times and in a reasonable manner for the purpose of inspection and repair.

C. The inspection and maintenance easement will be recorded by the City with the stormwater BMP operation and maintenance agreement and will remain in effect even with transfer of title to the property.

D. The owner shall provide the City with three signed copies of the recorded inspection and maintenance easement. (Ord. 1922, § 1 (part), 2003)

9.18.210 Stormwater Pollutant Source Control BMPs.

A. Storm Drain Inlet Labeling. Storm drain inlets shall be clearly marked with the words "No Dumping - Flows to Bay," or equivalent.

B. Drains and Drain Lines.

1. Interior floor drains shall not be connected to the storm drain system.

2. Exterior drains within the following areas shall not be connected to the storm drain:

a. Equipment or vehicle washing areas;

b. Areas where chemicals, hazardous materials, or other uncontained materials are stored unless secondary containment is provided;

c. Equipment or vehicle fueling areas or fluid changing areas;

d. Loading docks where chemicals, hazardous materials, grease, oil, or waste products are handled.

3. Where feasible, roof drains shall not connect directly to the storm drain system. Roof runoff shall be directed to landscaped areas. Upon approval of the Director of Public Works, projects located in hillside areas may be exempt from these requirements.

4. Nonresidential facilities shall either: (a) provide secondary containment for all roof-mounted equipment, tanks, and piping containing liquids other than potable water; or (b) connect all roof drains and equipment discharge lines to the sanitary sewer.

5. Boiler drain lines shall be connected to the sewer system and may not be discharged to the storm drain system.

6. Cooling systems shall not be connected or allowed to drain to the storm drain system.

7. Condensate lines shall not be connected or allowed to drain to the storm drain system.

C. Pool and Spa Discharges.

1. It shall be unlawful to discharge water from pools and spas to the storm drain system.

2. When draining a pool, a hose or other temporary system shall be directed into a sewer (not storm drain system) clean out.

3. For swimming pools installed or remodeled after the adoption date of this ordinance, a sewer clean out shall be installed in a readily accessible area, within ten feet of the pool edge, if possible.

4. De-chlorinated spa discharges may be directed to landscaped areas, providing this does not generate runoff to the storm drain system.

D. Vehicle and Equipment Fueling Facilities. Vehicle or equipment fueling facilities installed or remodeled after the adoption date of this ordinance shall be designed to prevent the runon of stormwater and runoff of spills. This shall be accomplished by:

1. Paving the fueling area with concrete or other impervious surface;

2. Covering the fueling area and extending the cover a minimum of ten feet beyond the fuel pumps in the directions of vehicle or equipment access and egress; and

3. Grading the area (sloped inward) or installing a berm or curb around the perimeter of the fueling area. Storm drains shall be prohibited in these fueling areas.

E. Vehicle Service Facilities.

1. No person shall dispose of, nor permit the disposal, directly or indirectly, of vehicle fluids, hazardous materials, or rinsewater from parts cleaning operations into storm drains.

2. All owners and operators of vehicle service facilities shall ensure that any vehicle fluid, hazardous material, or rinsewater from parts cleaning operations that comes into contact with any floor, pavement or ground surface is cleaned up immediately from such surface.

3. No tanks, containers or sinks used for parts cleaning or rinsing shall be connected to the storm drain system.

4. No person shall perform vehicle fluid removal outside a building, nor on asphalt or ground surfaces, whether inside or outside a building, except in such a manner as to ensure that any spilled fluid will be in an area of secondary containment.

5. Leaking vehicle fluids shall be contained or drained immediately.

6. No person shall leave unattended drip parts or other open containers containing vehicle fluid, unless such containers are in use or in an area of secondary containment.

7. No person shall discharge wastewater from vehicle washing operations or wash racks to a storm drain, or onto the ground.

8. No person shall discharge water from vehicle washing operations into the storm drain, except that used for rinsing of vehicle exterior surfaces with water to remove only atmospheric dust deposited on a vehicle when not in use. This exception does not apply to commercial vehicle washing facilities or fleet washing.

9. Vehicle service facilities shall be cleaned using only those methods of cleaning that ensure that no materials are discharged to the storm drain.

10. All owners and operators of vehicle service facilities shall ensure that spill prevention and clean-up equipment and absorbent materials are kept in stock at all times and are readily available for use.

11. No acid-containing batteries shall be stored except within secondary containment.

12. All owners and operators of vehicle service facilities shall post or cause to be posted signs on all storm drains located on the property of the facility notifying persons that the discharge of waste into the storm drain is illegal.

F. Food Service Facilities.

1. Food service facilities shall have a sink or other area for cleaning floor mats, containers, and equipment, which is connected to a grease removal device and the sanitary sewer. The sink or cleaning area shall be large enough to clean the largest mat or piece of equipment to be cleaned.

2. New buildings constructed to house food service facilities shall include a covered area for a dumpster. The area shall be designed to prevent water runon to the area and runoff from the area.

3. Drains that are installed beneath dumpsters serving food service facilities shall be connected to a grease removal device.

G. Parking Garages.

1. If installed, parking garage floor drains on interior levels shall not be connected to the storm drain, but to an oil/water separator prior to discharging to the sanitary sewer system.

2. Parking garage oil/water separators shall have a minimum capacity of 100 gallons.

3. The parking garage oil/water separator shall be cleaned at a frequency of at least once every twelve months or more frequently if recommended by the manufacturer or as required by the City.

H. Root control chemicals. No person shall discharge, dispose or add to the storm drain system any substance to control roots.

I. Dumpsters.

1. New buildings, except for single-family and duplex residences, shall provide a covered-area for a dumpster.

2. The area shall be designed to prevent water runon to the area and runoff from the area.

3. Dumpsters serving food service facilities shall be designed in accordance with Section 9.18.200F, above.

J. Multi-Family Residential Vehicle Washing Facilities.

1. New residential buildings with 25 or more units shall provide a covered, bermed area for occupants to wash their vehicles.

2. The vehicle washing area shall be designed to prevent water runon to the area and runoff from the area.

3. A drain shall be installed to capture all vehicle washwaters and shall be connected to an oil/water separator prior to discharge to the sanitary sewer system.

4. Vehicle washing area oil/water separators shall have a minimum capacity of 100 gallons.

5. The oil/water separator shall be cleaned at a frequency of at least once every six months or more frequently if recommended by the manufacturer or the superintendent.

K. Copper roofing materials.

1. Copper metal roofing, copper granule-containing asphalt shingles and copper gutters shall not be permitted for use on any residential, commercial or industrial building for which a building permit is required.

2. Copper flashing for use under tiles or slates and small copper ornaments are exempt from this prohibition. (Ord. 1922, § 1 (part), 2003)

9.18.220 Violation.

Any person who violates any provision of this Chapter shall be guilty of a misdemeanor and upon conviction thereof shall be punished as provided in Chapter 1.12 of this code. (Ord. 1922, § 1 (part), 2003; Ord. 1598, § 1 (part), 1992)

9.18.230 Civil Penalty for Violation–Payment of Funds to Account.

Any person who violates any provision of this Chapter or any provision of any permit issued pursuant to this Chapter shall be civilly liable to the city in a sum not to exceed the amounts provided for in Government Code Sections 54740 and/or 54740.5. The City may petition the Superior Court pursuant to Government Code Section 54740 to impose, assess and recover such sums. The civil penalty provided in this section is cumulative and not exclusive, and shall be in addition to all other remedies available to the City under State and Federal law and local ordinances. Funds collected pursuant to this section shall be paid to City's Environmental Management Account. (Ord. 1922, § 1 (part), 2003; Ord. 1598, § 1 (part), 1992)

9.18.240 Civil Penalty for Illicit Discharges–Payment of Funds to Account.

Any person who discharges pollutants, in violation of this Chapter, by the use of illicit connections shall be civilly liable to the City in a sum not to exceed twenty-five thousand dollars per day per violation for each day in which such violation occurs. The City may petition the Superior Court pursuant to Government Code Section 54740 to impose, assess and recover such sums. The civil penalty provided in this section is cumulative and not exclusive, and shall be in addition to all other remedies available to the City under State and Federal law and local ordinances. Funds collected pursuant to this section shall be paid to City's Environmental Storm Management Account. (Ord. 1922, § 1 (part), 2003; Ord. 1598, § 1 (part), 1992)

9.18.250 Notice of Violation.

Unless the Director of Public Works finds that the severity of the violation warrants immediate action under Sections 9.18.220, 9.18.230 or 9.18.240 above, or permit revocation or suspension, he/she shall issue a notice of violation which:

A. Enumerates the violations found; and

B. Orders compliance by a certain date. (Ord. 1922, § 1 (part), 2003; Ord. 1598, § 1 (part), 1992)

9.18.260 Administrative Penalties–Payment of Funds to Account.

Whenever the City Manager or his/her designee finds that any person has violated any notice of violation requiring compliance with any provision of this Chapter, or has violated any provision of this Chapter, he may assess an administrative penalty in a sum not to exceed the amounts provided in Government Code Section 54740.5. The remedy provided in this section is cumulative and not exclusive, and shall be in addition to all other remedies available to the City under State and Federal law and local ordinances. Funds collected pursuant to this section shall be paid to the City’s Environmental Storm Management Account. (Ord. 1922, § 1 (part), 2003; Ord. 1598, § 1 (part), 1992)

9.18.270 Severability.

If any section, subsection, subdivision, sentence, clause, or phrase of this Chapter is for any reason held to be unconstitutional or otherwise void or invalid by any court of competent jurisdiction, the validity of the remaining portion of this Chapter shall not be affected thereby. (Ord. 1922, § 1 (part), 2003)

ARTICLE 2.
URBAN STORM WATER QUALITY MANAGEMENT AND DISCHARGE CONTROL.

ATTACHMENT 3B.2

Division I.
Title, Purpose and General Provisions.

Section 31.5-4. Title .

This Article shall be known as the "Urban Storm Water Quality Management and Discharge Control Ordinance" of the City of Monterey and may be so cited.

Section 31.5-5. Purpose and Intent .

The purpose and intent of this Article is to ensure the health, safety, and general welfare of citizens, and protect and enhance the water quality of watercourses and water bodies in a manner pursuant to and consistent with the Federal Clean Water Act (33 U.S.C. §1251 et seq.) by reducing pollutants in storm water discharges to the maximum extent practicable and by prohibiting non-storm water discharges to the storm drain system.

Section 31.5-6. Definitions .

The terms used in this Article shall have the following meanings:

(a) Best Management Practices . Activities, practices, and procedures to prevent or reduce the discharge of pollutants directly or indirectly to the municipal storm drain system and waters of the United States. Best Management Practices include but are not limited to: treatment facilities to remove pollutants from storm water; operating and maintenance procedures; facility management practices to control runoff, spillage or leaks of non-storm water, waste disposal, and drainage from materials storage; erosion and sediment control practices; and the prohibition of specific activities, practices, and procedures and such other provisions as the City determines appropriate for the control of pollutants. Please refer to the City of Monterey's *BMP Guidance Series* , as discussed further in Section 31.5-16(c) herein, for specific requirements.

(b) City . The City of Monterey.

(c) Clean Water Act . The federal Water Pollution Control Act (33 U.S.C. § 1251 et seq.), and any subsequent amendments thereto.

(d) Construction Activity . Activities subject to NPDES Construction Permits. These include construction projects resulting in land disturbance of 5 acres or more. Such activities include but are not limited to clearing and grubbing, grading, excavating, and demolition.

(e) Hazardous Materials . Any material, including any substance, waste, or combination thereof, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may cause, or significantly contribute to, a substantial present or potential hazard to human health, safety, property, or the environment when improperly treated, stored, transported, disposed of, or otherwise managed (California Health and Safety Code §25117).

(f) Illegal Discharge . Any direct or indirect non-storm water discharge to the storm drain system, except as exempted in Division II, Section 31.5-12 of this chapter.

(g) Illicit Connections . An illicit connection is defined as either of the following:

1. Any drain or conveyance, whether on the surface or subsurface, which allows an illegal discharge to enter the storm drain system including but not limited to any conveyances which allow any non-storm water discharge including sewage, process wastewater, and wash water to enter the storm drain system and any connections to the storm drain system from indoor drains and sinks, regardless of whether said drain or connection had been previously allowed, permitted, or approved by a government agency; or

2. Any drain or conveyance connected from a commercial or industrial land use to the storm drain system which has not been documented in plans, maps, or equivalent records and approved by the City.

(h) Industrial Activity . Activities subject to NPDES Industrial Permits as defined in 40 CFR, Section 122.26 (b)(14).

(i) National Pollutant Discharge Elimination System (NPDES) Storm Water Discharge Permits . General, group, and individual storm water discharge permits which regulate facilities defined in federal NPDES regulations pursuant to the Clean Water Act. The California Regional Water Quality Control Board, Central Coast Region (hereinafter, Regional Board) and the State Water Resources Control Board have adopted general storm water discharge permits, including but not limited to the General Construction Activity and General Industrial Activity permits.

(j) Non-Storm Water Discharge . Any discharge to the storm drain system that is not composed entirely of storm water.

(k) Pollutant . Anything which causes or contributes to pollution. Pollutants may include, but are not limited to: paints, varnishes, and solvents; oil and other automotive fluids; non-hazardous liquid and solid wastes and yard wastes; refuse, rubbish, garbage, litter, or other discarded or abandoned objects, articles, and accumulations, so that same may cause or contribute to pollution; floatables; pesticides, herbicides, and fertilizers; hazardous substances and wastes; sewage, fecal coliform and pathogens; dissolved and particulate metals; animal wastes; wastes and residues that result from constructing a building or structure (including but not limited to sediments, slurries, and concrete rinsates); and noxious or offensive matter of any kind.

(l) Pollution . The human-made or human-induced alteration of the quality of waters by waste to a degree which unreasonably affects, or has the potential to unreasonably affect, either the waters for beneficial uses or the facilities which serve these beneficial uses (California Water Code §13050).

(m) Porter-Cologne Act . The Porter-Cologne Water Quality Control Act and as amended (California Water Code §13000 et seq.).

(n) Premises . Any building, lot, parcel of land, or portion of land whether improved or unimproved including adjacent sidewalks and parking strips.

(o) Storm Drain System. Publicly-owned facilities operated by the City by which storm water is collected and/or conveyed, including but not limited to any roads with drainage systems, municipal streets, gutters, curbs, inlets, piped storm drains, pumping facilities, retention and detention basins, natural and human-made or altered drainage channels, reservoirs, and other drainage structures which are within the City and are not part of a publicly owned treatment works as defined at 40 CFR Section 122.2.

(p) Storm Water . Any surface flow, runoff, and drainage consisting entirely of water from rain storm events.

(q) Waters of the United States . Surface watercourses and water bodies as defined at 40 CFR § 122.2. including all natural waterways and definite channels and depressions in the earth that may carry water, even though such waterways may only carry water during rains and storms and may not carry storm

water at and during all times and seasons.

Section 31.5-7. Applicability .

This Article shall apply to all water entering the storm drain system generated on any developed and undeveloped lands lying within the City of Monterey including any amendments or revisions thereto.

Section 31.5-8. Responsibility for Administration .

The Public Works Director of the City shall administer, implement, and enforce the provisions of this Article. Any powers granted or duties imposed upon the Public Works Director may be delegated in writing by the Public Works Director to persons or entities acting in the beneficial interest of or in the employ of the City.

Section 31.5-9. Severability .

The provisions of this Article are hereby declared to be severable. If any provision, clause, sentence, or paragraph of this Article or the application thereof to any person, establishment, or circumstances shall be held invalid, such invalidity shall not affect the other provisions or application of this Article.

Section 31.5-10. Regulatory Consistency .

This Article shall be construed to assure consistency with the requirements of the Clean Water Act and Porter-Cologne Act and acts amendatory thereof or supplementary thereto, or any applicable implementing regulations.

Section 31.5-11. Ultimate Responsibility of Discharger .

The standards set forth herein and promulgated pursuant to this Article are minimum standards; therefore this Article does not intend nor imply that compliance by any person will ensure that there will be no contamination, pollution, nor unauthorized discharge of pollutants into waters of the U.S. caused by said person. This Article shall not create liability on the part of the City of Monterey, or any agent or employee thereof for any damages that result from any discharger's reliance on this Article or any administrative decision lawfully made thereunder.

Division II.
Discharge Prohibitions.

Section 31.5-12. Prohibition of Illegal Discharges .

No person shall discharge or cause to be discharged into the municipal storm drain system or watercourses any materials, including but not limited to pollutants or waters containing any pollutants that cause or contribute to a violation of applicable water quality standards, other than storm water.

The commencement, conduct or continuance of any illegal discharge to the storm drain system is prohibited except as described as follows:

(a) Discharges from the following activities will not be considered a source of pollutants to the storm drain system and to waters of the U.S. when properly managed to ensure that no potential pollutants are present, and therefore they shall not be considered illegal discharges unless determined to cause a violation of the provisions of the Porter-Cologne Act, Clean Water Act, or this ordinance: potable water line flushing; uncontaminated pumped groundwater and other discharges from potable water sources; landscape irrigation and lawn watering; diverted stream flows; rising groundwater; groundwater infiltration

to the storm drain system; uncontaminated foundation and footing drains; uncontaminated water from crawl space pumps; air conditioning condensation; uncontaminated non-industrial roof drains; springs; individual residential and occasional non-commercial car washing; flows from riparian habitats and wetlands; dechlorinated swimming pool discharges; street wash waters; and flows from fire fighting.

(b) The prohibition shall not apply to any non-storm water discharge permitted under an NPDES permit, waiver, or waste discharge order issued to the discharger and administered by the State of California under the authority of the Federal Environmental Protection Agency, provided that the discharger is in full compliance with all requirements of the permit, waiver, or order and other applicable laws and regulations, and provided that written approval has been granted by the City of Monterey for any discharge to the storm drain system.

(c) With written concurrence of the Regional Board, the City of Monterey may exempt in writing other non-storm water discharges which are not a source of pollutants to the storm drain system nor waters of the U.S.

Section 31.5-13. Prohibition of Illicit Connections .

(a) The construction, use, maintenance or continued existence of illicit connections to the storm drain system is prohibited.

(b) This prohibition expressly includes, without limitation, illicit connections made in the past, regardless of whether the connection was permissible under law or practices applicable or prevailing at the time of connection.

Section 31.5-14. Waste Disposal Prohibitions .

No person shall throw, deposit, leave, maintain, keep, or permit to be thrown, deposited, left, or maintained, in or upon any public or private property, driveway, parking area, street, alley, sidewalk, component of the storm drain system, or water of the U.S., any refuse, rubbish, garbage, litter, or other discarded or abandoned objects, articles, and accumulations, so that the same may cause or contribute to pollution. Wastes deposited in streets in proper waste receptacles for the purposes of collection are exempted from this prohibition.

Section 31.5-15. Discharges in Violation of Industrial or Construction Activity NPDES Storm Water Discharge Permit .

Any person subject to an industrial or construction activity NPDES storm water discharge permit shall comply with all provisions of such permit. Proof of compliance with said permit may be required in a form acceptable to the Public Works Director prior to or as a condition of a subdivision map, site plan, building permit, or development or improvement plan; upon inspection of the facility; during any enforcement proceeding or action; or for any other reasonable cause.

Division III.
Regulations and Requirements.

Section 31.5-16. Requirement to Prevent, Control, and Reduce Storm Water Pollutants .

(a) Authorization to Adopt and Impose Best Management Practices . The City will adopt requirements identifying Best Management Practices for any activity, operation, or facility which may cause or contribute to pollution or contamination of storm water, the storm drain system, or waters of the U.S. as a

separate *BMP Guidance Series* . Where Best Management Practices requirements are promulgated by the City or any federal, State of California, or regional agency for any activity, operation, or facility which would otherwise cause the discharge of pollutants to the storm drain system or water of the U.S., every person undertaking such activity or operation, or owning or operating such facility shall comply with such requirements.

The Public Works Director will report to the City Council annually on the status of implementation of BMP's, the pollutants of concern to be addressed the next year, and any new BMPs to be developed. BMP's developed under this program will be included in the City of Monterey's *BMP Guidance Series* .

(b) New Development and Redevelopment . The City may adopt requirements identifying appropriate Best Management Practices to control the volume, rate, and potential pollutant load of storm water runoff from new development and redevelopment projects as may be appropriate to minimize the generation, transport and discharge of pollutants. The City shall incorporate such requirements in any land use entitlement and construction or building-related permit to be issued relative to such development or redevelopment. The owner and developer shall comply with the terms, provisions, and conditions of such land use entitlements and building permits as required in this Article and the City Storm Water Utility Ordinance, Chapter 31.5, Article 1.

(c) Responsibility to Implement Best Management Practices . Notwithstanding the presence or absence of requirements promulgated pursuant to subsections (a) and (b), any person engaged in activities or operations, or owning facilities or property which will or may result in pollutants entering storm water, the storm drain system, or waters of the U.S. shall implement Best Management Practices to the extent they are technologically achievable to prevent and reduce such pollutants. The owner or operator of a commercial or industrial establishment shall provide reasonable protection from accidental discharge of prohibited materials or other wastes into the municipal storm drain system or watercourses. Facilities to prevent accidental discharge of prohibited materials or other wastes shall be provided and maintained at the owner or operator's expense.

Best Management Practices required by the City can be obtained from the Public Works Department by requesting the BMP manual appropriate to a commercial or industrial activity from the *BMP Guidance Series* . BMP's are broken into three categories: "high priority" which are required to be implemented, "medium priority" which are desirable to implement, and "low priority."

Section 31.5-17. Requirement to Eliminate Illegal Discharges .

Notwithstanding the requirements of Division IV, Section 31.5-23 herein, the Public Works Director may require by written notice that a person responsible for an illegal discharge immediately, or by a specified date, discontinue the discharge and, if necessary, take measures to eliminate the source of the discharge to prevent the occurrence of future illegal discharges.

Section 31.5-18. Requirement to Eliminate or Secure Approval for Illicit Connections .

(a) The Public Works Director may require by written notice that a person responsible for an illicit connection to the storm drain system comply with the requirements of this Article to eliminate or secure approval for the connection by a specified date, regardless of whether or not the connection or discharges to it had been established or approved prior to the effective date of this Article.

(b) If, subsequent to eliminating a connection found to be in violation of this Article, the responsible person can demonstrate that an illegal discharge will no longer occur, said person may request City approval to reconnect. The reconnection or reinstallation of the connection shall be at the responsible person's expense.

Section 31.5-19. Watercourse Protection.

Every person owning property through which a watercourse passes, or such person's lessee, shall keep and maintain that part of the watercourse within the property reasonably free of trash, debris, excessive vegetation, and other obstacles that would pollute, contaminate, or significantly retard the flow of water through the watercourse. In addition, the owner or lessee shall maintain existing privately owned structures within or adjacent to a watercourse, so that such structures will not become a hazard to the use, function, or physical integrity of the watercourse. The owner or lessee shall not remove healthy bank vegetation beyond that actually necessary for maintenance, nor remove said vegetation in such a manner as to increase the vulnerability of the watercourse to erosion. The property owner shall be responsible for maintaining and stabilizing that portion of the watercourse that is within their property lines in order to protect against erosion and degradation of the watercourse originating or contributed from their property.

Section 31.5-20. Requirement to Remediate .

Whenever the Public Works Director finds that a discharge of pollutants is taking place or has occurred which will result in or has resulted in pollution of storm water, the storm drain system, or water of the U.S., the Public Works Director may require by written notice to the owner of the property and/or the responsible person that the pollution be remediated and the affected property restored within a specified time pursuant to the provisions of sections 31.5-25 through 31.5-28 below.

Section 31.5-21. Requirement to Monitor and Analyze .

The Public Works Director may require by written notice of requirement that any person engaged in any activity and/or owning or operating any facility which may cause or contribute to storm water pollution, illegal discharges, and/or non-storm water discharges to the storm drain system or waters of the U.S., to undertake at said person's expense such monitoring and analyses and furnish such reports to the City of Monterey as deemed necessary to determine compliance with this Article.

Section 31.5-22. Notification of Spills .

Notwithstanding other requirements of law, as soon as any person responsible for a facility or operation, or responsible for emergency response for a facility or operation has information of any known or suspected release of materials which are resulting or may result in illegal discharges or pollutants discharging into storm water, the storm drain system, or water of the U.S. from said facility, said person shall take all necessary steps to ensure the discovery, containment, and cleanup of such release. In the event of such a release of a hazardous material said person shall immediately notify emergency response officials of the occurrence via emergency dispatch services (911). In the event of a release of non-hazardous materials, said person shall notify the City's Public Works Department in person or by phone or facsimile no later than 5:00 p.m. of the next business day. Notifications in person or by phone shall be confirmed by written notice addressed and mailed to the City's Public Works Department within three business days of the phone notice. If the discharge of prohibited materials emanates from a commercial or industrial establishment, the owner or operator of such establishment shall also retain an on-site written record of the discharge and the actions taken to prevent its recurrence. Such records shall be retained for at least three years.

Division IV.
Inspection and Monitoring.

Section 31.5-23. Authority to Inspect .

Whenever necessary to make an inspection to enforce any provision of this Article, or whenever the Public Works Director has cause to believe that there exists, or potentially exists, in or upon any premises any

condition which constitutes a violation of this Article, the Director may enter such premises at all reasonable times to inspect the same and to inspect and copy records related to storm water compliance. In the event the owner or occupant refuses entry after a request to enter and inspect has been made, the City is hereby empowered to seek assistance from any court of competent jurisdiction in obtaining such entry.

Section 31.5-24. Authority to Sample, Establish Sampling Devices, and Test .

During any inspection as provided herein, the Public Works Director may take any samples and perform any testing deemed necessary to aid in the pursuit of the inquiry or to record site activities.

Division V.
Enforcement.

Section 31.5-25. Notice of Violation .

Whenever the Public Works Director finds that a person has violated a prohibition or failed to meet a requirement of this Article, the Director may order compliance by written notice of violation to the responsible person. Such notice may require without limitation:

(a) The performance of monitoring, analyses, and reporting;

(b) The elimination of illicit connections or discharges;

(c) That violating discharges, practices, or operations shall cease and desist;

(d) The abatement or remediation of storm water pollution or contamination hazards and the restoration of any affected property; and

(e) Payment of a fine to cover administrative and remediation costs; and

(f) The implementation of source control or treatment BMPs.

If abatement of a violation and/or restoration of affected property is required, the notice shall set forth a deadline within which such remediation or restoration must be completed. Said notice shall further advise that, should the violator fail to remediate or restore within the established deadline, the work will be done by the City or a contractor designated by the Public Works Director and the expense thereof shall be charged to the violator pursuant to Section 31.5-27 below.

Section 31.5-26 Appeal .

Notwithstanding the provisions of Section 31.5-29 below, any person receiving a Notice of Violation under Section 31.5-25 above may appeal the determination of the Public Works Director to the City Manager. The notice of appeal must be received by the City Manager within 5 days from the date of the Notice of Violation. Hearing on the appeal before the City Manager or his/her designee shall take place within 15 days from the date of City's receipt of the notice of appeal. The decision of the City Manager or designee shall be final.

Section 31.5-27 Abatement by City .

If the violation has not been corrected pursuant to the requirements set forth in the Notice of Violation, or , in the event of an appeal under section 31.5-26, within 10 days of the decision of the City Manager upholding the decision of the Public Works Director, then the City or a contractor designated by the Public Works Director shall enter upon the subject private property and is authorized to take any and all measures

necessary to abate the violation and/or restore the property. It shall be unlawful for any person, owner, agent or person in possession of any premises to refuse to allow the City or designated contractor to enter upon the premises for the purposes set forth above.

Section 31.5-28 Charging Cost of Abatement/Liens .

Within 30 days after abatement of the nuisance by the City, the Public Works Director shall notify the property owner, as shown on the last equalized assessment roll, of the cost of abatement, which shall include all costs relating to the abatement and administrative costs incurred by City.

The owner may file a written protest objecting to the amount of the assessment with the City Clerk within 30 days of the date of the notification of costs. The City Clerk shall set the matter for a public hearing by the City Council. The decision of the Council shall be final. Failure to timely protest the amount of the abatement as provided herein shall constitute a failure to exhaust administrative remedies and no further appeal rights shall be granted.

If such costs are not paid within ninety days of the date of notification of the cost of abatement, or if the determination of the City Council as set forth above has not been successfully challenged by a timely writ of mandate, the obligation may constitute a lien or, in the alternative, a special assessment against the property on which the violation occurred.

The lien or special assessment shall be imposed as provided in Article 3 of Chapter 1 of the Monterey City Code, Sections 1-12 through 1-12.3 inclusive. (Ord 3365; 11/05))

Section 31.5-29 Urgency Abatement .

The Public Works Director is authorized to require immediate abatement of any violation of this Article that constitutes an immediate threat to the health, safety or well-being of the public. If any such violation is not abated immediately as directed by the Public Works Director, the City of Monterey is authorized to enter onto private property and to take any and all measures required to remediate the violation. Any expense related to such remediation undertaken by the City of Monterey shall be fully reimbursed by the property owner and/or responsible party. Any relief obtained under this section shall not prevent the City from seeking other and further relief authorized under this Article.

Section 31.5-30. Violations .

It shall be unlawful for any person to violate any provision or fail to comply with any of the requirements of this Article. A violation of or failure to comply with any of the requirements of this Article shall constitute a misdemeanor and shall be punished as set forth in City Code Section 1.7.

Section 31.5-31. Compensatory Action .

In lieu of enforcement proceedings, penalties, and remedies authorized by this Article, the Public Works Director may impose upon a violator alternative compensatory actions, such as storm drain stenciling, attendance at compliance workshops, creek cleanup, etc.

Section 31.5-32. Violations Deemed a Public Nuisance

In addition to the enforcement processes and penalties hereinbefore provided, any condition caused or permitted to exist in violation of any of the provisions of this Article is a threat to public health, safety, and welfare, and is declared and deemed a nuisance, and may be summarily abated or restored by the City at the violator's expense, and/or a civil action to abate, enjoin, or otherwise compel the cessation of such nuisance may be taken by the City.

Section 31.5-33. Acts Potentially Resulting in a Violation of the Federal Clean Water Act and/or California Porter-Cologne Act .

Any person who violates any provision of this Article or any provision of any requirement issued pursuant to this chapter, may also be in violation of the Clean Water Act and/or the Porter-Cologne Act and may be subject to the sanctions of those acts including civil and criminal penalties. Any enforcement action authorized under this Article shall also include written notice to the violator of such potential liability.

ATTACHMENT 3B.3

CITY OF SALINAS

CHAPTER 29.* STORMWATER MANAGEMENT AND DISCHARGE CONTROL

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Sec. 29-1. Title.

This ordinance shall be known as the "City of Salinas Stormwater Management and Discharge Control Ordinance" and may be so cited. (Ord. No. 2350 (NCS), § 1.)

Sec. 29-2. Purpose and intent.

The purpose and intent of this chapter is to ensure the health, safety and general welfare of citizens, and protect the water quality of watercourses and water bodies in a manner pursuant to and consistent with the Federal Clean Water Act (33 U.S.C. Section 1251 et seq.) by reducing pollutants in urban stormwater discharges to the maximum extent practicable and by effectively prohibiting nonstormwater discharges to the storm sewer drain system. (Ord. No. 2350 (NCS), § 1.)

Sec. 29-3. Definitions.

When used in this chapter, the following words shall have the meanings ascribed to them in this section:

(a) "Act" means the Federal Water Pollution Control Act, including the 1972 amendments, referred to as the Clean Water Act or CWA (33 U.S.C. Section 1251 et seq.).

(b) "Approval authority" means the state of California Central Coast Regional Water Quality Control Board.

(c) "Authorized enforcement officer" means the public works director and those individuals designated by the public works director to enforce the provisions of this chapter.

(d) Authorized Representative of Industrial Activity. An authorized representative of an industrial user may include, but is not limited to the following persons:

(1) A principal executive officer of at least the level of vice-president, if the industrial user is a corporation;

(2) A general partner or proprietor if the industrial user is a partnership or proprietorship, respectively; or

(3) A duly authorized representative of the individual designated above if such representative is responsible for the overall operation of the facility from which the discharge originates.

(e) "Best management practices (BMP)" means any program, schedule of activity, technology, process, siting criteria, operating method, measure, device, prohibition, practice (including, but not limited to, general housekeeping practices and pollution prevention practices), procedure or other management policy which controls, prevents, removes or reduces the discharge of pollutants, directly or indirectly to the municipal storm drain system and waters of the United States.

(f) "California general construction activities stormwater permit" means the general permit as adopted by the California State Water Resources Control Board for the permitting of stormwater discharges associated with construction activities.

(g) "California general industrial activities stormwater permit" means the general permit as adopted by the California State Resources Control Board for the permitting of stormwater discharges associated with given industrial activities.

(h) "Clean Water Act" means the federal Water Pollution Control Act (33 U.S.C. Section 1251 et seq.) and any subsequent amendments thereto and regulations adopted thereby.

(I) "CFR" means the code of Federal Regulations.

(j) "City" means the city of Salinas.

(k) "Public works director" means the director of the city of Salinas public works department.

(l) "City storm sewer drainage system" or "storm drainage system" means and includes, but is not limited to, those facilities owned and operated by the city through which stormwater may be collected and/or conveyed to the waters of the United States, including flood control channels, any roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels or storm drains which are not part of a publicly-owned treatment works (POTW) as defined at 40 Code of Federal Regulations Section 122.2 and all conduits, pumping plants, collection facilities and other appurtenances owned and operated by the city of Salinas for carrying, collecting, pumping and/or disposing of stormwater, surface water, groundwater, roof runoff or other unpolluted water.

(m) "Construction activity" means activities Subject to the California general construction activities permit.

(n) "Facility" means any nonresidential premises.

(o) "Hazardous materials" means any material, including any substance, waste or combination thereof, which because of its quantity, concentration or physical, chemical or infectious characteristics may cause, or significantly contribute to, a substantial present or potential hazard to human health, safety, property or the environment when improperly treated, stored, transported, disposed of or otherwise managed.

(p) "Illicit or illegal discharge" means any direct or indirect nonstormwater discharge to the storm drain system, except as exempted in Section 29-10 of this chapter.

(q) "Illicit Connections." An illicit connection is defined as either of the following:

(1) Any drain or conveyance, whether on the surface or subsurface, which allows an illegal discharge to enter the storm drain system including but not limited to any conveyances which allow any nonstormwater discharge including sewage, process wastewater and wash water to enter the storm drain system and any connections to the storm drain system from indoor drains and sinks, regardless of whether said drain or connection had been previously allowed, permitted or approved by a government agency; or

(2) Any drain or conveyance connected from a commercial or industrial land use to the storm drain system which has not been documented in plans, maps or equivalent records and approved by the city.

(r) "Industrial activity" means any activity that involves manufacturing, processing or raw materials storage areas. Further definition of activities covered is given in 40 Code of Federal Regulations Section 122.26 (b).

(s) "Inspector" means an authorized enforcement officer as defined in this section.

(t) "National Pollutant Discharge Elimination System (NPDES) permit" means a permit issued by the approval authority pursuant to the Clean Water Act, which authorizes a discharge to the waters of the state.

(u) "Nonstormwater discharge" means any discharge to the storm drain system that is not entirely composed of stormwater.

(v) "Notice of intent (NOI)" means the formal notification to the State Water Resources Control Board by the applicant that either a construction or industrial activity will occur in compliance with the conditions of

the general permit and thereby commits the applicant to prepare and implement a stormwater pollution prevention plan.

(w) "Outfall" means the point at which the city's storm drainage system discharges to the waters of the state.

(x) "Person" means any natural person, corporation, partnership, business trust, company, government agency, association or other entity.

(y) "Pollutant" means anything which causes or contributes to pollution including, but not limited to, the following: dredged soil, incinerator residue, sewage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal and agricultural waste discharge into water. Pollutants may also include: paints, varnishes and solvents; oil and other automotive fluids; nonhazardous liquid and solid wastes and yard wastes; refuse, rubbish, garbage, litter or other discarded or abandoned objects, articles and accumulations, so that same may cause or contribute to pollution; floatables; pesticides, herbicides and fertilizers; hazardous substances and wastes; animal wastes; wastes and residues that result from constructing a building or structure; and noxious or offensive matter of any kind.

(z) "Pollution" means human-caused or human-induced alteration of the quality of waters by waste to a degree which unreasonably affects, or has the potential to unreasonably affect, either the waters for beneficial uses or the facilities which serve these beneficial uses.

(aa) "Porter-Cologne Act" means the Porter-Cologne Water Quality Control Act (California Water Code Section 13000 et seq.) and any subsequent amendments thereto and regulations adopted thereby.

(bb) "Premises" means any building, lot parcel, real estate or land or portion of land, whether improved or unimproved, including adjacent sidewalks and parking strips or other surface area which is capable of contributing runoff to the city's storm drain system.

(cc) "State" means the state of California.

(dd) "Stormwater" means stormwater runoff, snowmelt runoff, and surface runoff and drainage.

(ee) "Stormwater management program" means a comprehensive planning process to reduce discharge of pollutants to the maximum extent practicable using best management practices.

(ff) "Stormwater pollution prevention plan (SWPPP)" means the report required to be prepared by industrial or construction site storm-water dischargers, which sets forth the site map, identifies the activities that have the potential to pollute stormwater and describes the proposed BMPs to be implemented by the discharger.

(gg) "User" means any person who contributes, causes or permits the contribution of stormwater to the city's storm drainage system.

(hh) "Unpolluted water" means water to which no pollutant has been intentionally or accidentally introduced so as to render such water unacceptable to the city for disposal to storm or natural drainages or directly to surface waters.

(ii) "Waters of the state" means surface watercourses, and water bodies as defined at 40 CFR Section 122.2 and any subsequent amendment. (Ord. No. 2350 (NCS), § 1.)

Sec. 29-4. Responsibility for administration.

This part shall be administered by the publc works director for the city of Salinas. (Ord. No. 2350 (NCS), § 1.)

Sec. 29-5. Construction and application.

The rules and regulations set forth in this chapter shall be construed in a manner consistent with and shall in no way be construed in such a manner so as to diminish the authority of the requirements of the federal Water Pollution Control Act and the 1972 amendments thereto, referred to as the Clean Water Act, and any amendments or supplements thereto and its applicable implementing regulations; the city of Salinas NPDES permit and any amendment, revision or reissuance thereof; and all other provisions contained in the Salinas Municipal Code. (Ord. No. 2350 (NCS), § 1.)

Sec. 29-6. Severability and application.

If any portion of this chapter is declared invalid, the remaining portions of this chapter are to be considered severable and valid. (Ord. No. 2350 (NCS), § 1.)

Sec. 29-7. Taking.

The provisions of this chapter shall not operate to deprive any landowner of substantially all of the market value of his or her property or otherwise constitute an unconstitutional taking without compensation. If application of this chapter to a specific project would create a taking then pursuant to the chapter the city council may allow additional land uses, but only to the extent necessary to avoid a taking. Such uses shall be consistent with and carry out the purposes of this chapter as stated in Section 29-2. (Ord. No. 2350 (NCS), § 1.)

Sec. 29-8. Effective date.

This ordinance codified in this chapter will take effect thirty days from the date of passage, and shall be published following passage as required by Government Code. (Ord. No. 2350 (NCS), § 1.)

Sec. 29-9. General discharge prohibition--Illegal discharges.

Nonstormwater discharges to the city storm drain system are prohibited. No person shall contribute or cause to be contributed, directly or indirectly, to the city's storm drainage system any pollutant, wastewater or any substance or material which will interfere with the operation or performance of the storm drainage system, violate the city's NPDES permit or violate other applicable law or regulations. (Ord. No. 2350 (NCS), § 1.)

Sec. 29-10. Discharges exempt from the general prohibition.

(a) The general discharge prohibition shall not apply to any discharge regulated under a NPDES permit, waiver or waste discharge order issued to the discharger and administered by the state of California under the authority of the United States Environmental Protection Agency, provided that the discharger is in full compliance with all requirements of the permit, waiver or order and other applicable laws or regulations.

(b) Discharges from the following activities shall not be considered a source of pollutants to waters of the United States when properly managed to ensure that no potential pollutants are present, and therefore they shall not be considered illegal discharges unless determined to cause a violation of the provisions of the Porter-Cologne Act, Clean Water Act, or this chapter:

(1) Potable water line flushing and other discharges from potable water sources;

(2) Landscape irrigation and lawn watering;

(3) Irrigation water, diverted stream flows or rising groundwaters;

(4) Groundwater infiltration to storm drain system;

(5) Uncontaminated pumped groundwater;

(6) Uncontaminated water from foundation and footing drains, and from crawl space pumps;

(7) Air conditioning condensation;

(8) Uncontaminated nonindustrial roof drains;

(9) Spring water or flows from riparian habitats and wetlands;

(10) Individual residential and occasional non-commercial car washing;

(11) Dechlorinated swimming pool discharges;

(12) Street wash waters; and

(13) Flows from firefighting. (Ord. No. 2350 (NCS), § 1.)

Sec. 29-11. Discharge in violation of permit.

Any discharge not managed in accordance with the city's stormwater management program as referenced in the city's NPDES permit or any amendment, revision or reissuance thereof, either separately considered or when combined with other discharges, is prohibited. Liability for any such discharge shall be the responsibility of the person(s) causing or responsible for the discharge, and such person(s) shall defend, indemnify, hold harmless the city against any litigation, administrative proceeding, claim, expense, liability, fine, penalty or payment for injury or damage to any person or property resulting from such discharges. (Ord. No. 2350 (NCS), § 1.)

Sec. 29-12. Requirement to eliminate illegal discharges.

The authorized enforcement officer may require by written notice that a person responsible for an illegal discharge immediately, or by a specified date, discontinue the discharge and, if necessary, take measures to eliminate the source of the discharge to prevent the occurrence of future illegal discharges. (Ord. No. 2350 (NCS), § 1.)

Sec. 29-13. Illicit connections.

It is unlawful for any person to establish, use, maintain or continue illicit discharges or illicit drainage connections to the city storm drainage system. This prohibition shall apply to connections in existence at the time of the adoption of the ordinance codified in this chapter, irrespective of whether such connection was made under a permit or other authorization or whether permissible under the law or practices applicable or prevailing at the time the connection was made. (Ord. No. 2350 (NCS), § 1.)

Sec. 29-14. Requirement to eliminate or secure approval for illicit connections.

The authorized enforcement officer may require by written notice that a person responsible for an illicit connection to the storm drain system comply with the requirements of this article to eliminate or secure approval for the connection by a specified date, regardless of whether or not the connection or discharges to it had been established or approved prior to the effective date of this article.

If, subsequent to eliminating a connection found to be in violation of this article, the responsible person can demonstrate that an illegal discharge will no longer occur, such person may request city approval to reconnect. The reconnection or reinstallation of the connection shall be at the responsible person's expense. (Ord. No. 2350 (NCS), § 1.)

Sec. 29-15. Reduction of pollutants in stormwater.

Any person engaged in activities, which will, or may result in pollutants entering the city storm drainage system shall undertake all practicable measures to reduce the introduction of such pollutants. Where best management practices requirements are promulgated by the city or any federal, state or regional agency for any activity, operation or facility which would otherwise cause the discharge of pollutants to the storm drain system or waters of the United States, every person undertaking such activity or operation, or owning or operating such facility shall comply with such requirements.

The city's stormwater management program shall establish minimum requirements that apply to pollutant generating activities within the city. With regard to such activities, the following minimum requirements shall apply.

(a) Littering. No person shall throw, deposit, leave, maintain, keep or permit to be thrown, deposited, placed or left, any refuse, rubbish, garbage or other discarded or abandoned objects, articles and accumulations, in or upon any street, alley, sidewalk, storm drain, inlet, catch basin, conduit or any other drainage structures, business place or upon any public or private plot of land in the city, so that the same might be or become a pollutant. No person shall throw or deposit litter in any fountain, pond, lake, stream or any other body of water in a park or elsewhere in the city. This section shall not apply to the storing of such potential pollutants in containers or in lawfully established waste disposal facilities.

(b) Owners of Abutting Property. The occupants, tenants, owners, lessees and/or proprietors of any real property in the city of Salinas in front of which there is a paved sidewalk shall be responsible for maintaining such sidewalk and keeping the same free of dirt and litter to the maximum extent practicable. Sweepings from such sidewalk shall not be swept or otherwise made or allowed to go into the gutter or roadway, but shall be disposed of in receptacles maintained on such real property as required for the disposal of garbage.

(c) Owners and Operators of Parking Lots and Similar Structures. Persons owning or operating a paved parking lot, gas station pavement, paved private street or road, or similar structure, shall clean those structures in a manner that does not result in discharge of pollutants to the city storm drain system.

(d) Best Management Practices for Construction Sites. All construction shall comply with Resolution No. 10836 (NCS), Standards to Control Excavations, Cuts, Fills, Clearing, Grading, Erosion and Sediments (or any ordinance that revises, supplements, or replaces said ordinance). Any construction contractor performing work in the city shall keep debris and dirt out of the city's storm drain system. The authorized enforcement officer may require any construction contractor performing work in the city to submit a stormwater pollution prevention plan prior to final map approval by city or prior to issuance of a building permit by city, whichever first occurs.

(e) Best Management Practices for New Development and Redevelopment. The authorized enforcement officer may adopt regulations establishing controls on the volume and rate of stormwater runoff for new development and redevelopment within the city as may be appropriate to minimize the discharge and transport of pollutants.

(f) Notification of Intent and Compliance with General Permits. Each industrial discharger, discharger associated with construction activity, or other discharger, described in any general stormwater permit addressing such discharges, as may be adopted by the United States Environmental Protection Agency, the State Water Resources Control Board, or the California Regional Water Quality Control Board, Central Coast Region, shall provide notice of intent, comply with, and undertake all other activities required by any general stormwater permit applicable to such discharges. Furthermore, each discharger identified in an individual NPDES permit relating to stormwater discharges shall comply with and undertake all activities required by such permit.

(g) Compliance with Best Management Practices. Where best management practices guidelines or requirements have been defined in the city's stormwater management program or adopted by any federal, state, regional, county and/or city agency, for any activity, operation or facility which may cause or contribute to stormwater pollution or contamination, and/or discharges of nonstormwater to the stormwater system or waters of the United States, every person undertaking such activity or operation, or owning or operating such facility, shall comply with such guidelines or requirements. Any person engaged in activities or operations, or owning facilities or property which will or may result in pollutants entering stormwater, the storm drain system or waters of the U.S. shall implement best management practices to the extent they are technologically achievable to prevent and reduce such pollutants. The owner or operator of a commercial or industrial establishment shall provide reasonable protection from accidental discharge of prohibited materials or other wastes into the municipal storm drain system or watercourses. Facilities to prevent accidental discharge of prohibited materials or other wastes shall be provided and maintained at the owner or operator's expense.

(h) Watercourse Protection. Every person owning property through which a watercourse passes, or such person's lessee, shall keep and maintain that part of the watercourse within the property reasonably free of trash, debris, excessive vegetation and other obstacles that would pollute, contaminate or significantly retard the flow of water through the watercourse. In addition, the owner or lessee shall maintain existing privately owned structures within or adjacent to a watercourse, so that such structures will not become a hazard to the use, function or physical integrity of the watercourse. The owner or lessee shall not remove healthy bank vegetation beyond that actually necessary for maintenance, nor remove such vegetation in such a manner as to increase the vulnerability of the watercourse to erosion. The property owner shall be responsible for maintaining and stabilizing that portion of the watercourse that is within their property lines in order to protect against erosion and degradation of the watercourse originating or contributed from their property. (Ord. No. 2350 (NCS), § 1.)

Sec. 29-16. Spill prevention plan.

Each facility shall provide protection from spills of hazardous or prohibited materials or other substances regulated by this chapter. The methods, procedures, mechanisms and facilities established and utilized for the purpose of preventing accidental discharges or spills of materials with pollution potential shall be provided and maintained at the owner's own cost and expense.

Facilities required to file a NOI for coverage under the California general industrial activities stormwater permit shall submit to the city a copy of the stormwater pollution prevention plan (SWPPP) prepared for the general permit. The SWPPP shall outline the user's spill prevention and response procedure, describe the nature and location of any chemicals stored on the user's premises and shall contain procedures for immediately notifying the city and preventing adverse impacts of any discharge of such chemicals, substances or materials. (Ord. No. 2350 (NCS), § 1.)

Sec. 29-17. Notification of spills.

All persons in charge of a facility or responsible for emergency response for a facility have a personal responsibility to train facility personnel and maintain notification procedures to assure immediate notification is provided to the city of any suspected, confirmed or unconfirmed release of material, pollutants or waste creating a risk of discharge into the city storm drain system.

As soon as any person in charge of a facility or responsible for emergency response for a facility has knowledge of any suspected, confirmed or unconfirmed release of materials, pollutants or waste which may result in pollutants or nonstormwater discharge entering the city storm drain system, such person shall take all necessary steps to ensure the discovery, containment and clean up of such release and notify the city of the occurrence.

In the event of a release of hazardous materials, such person shall telephone 911 to report the release immediately. In the event of a release of nonhazardous materials, see Section 29-3(o), such person shall notify the city of Salinas, public works department in person or by phone or facsimile no later than 5:00 p.m. of the next business day. Notifications in person and by phone shall be confirmed by written notice addressed and mailed, within three business days, to Public Works Director, City of Salinas, 200 Lincoln Avenue, Salinas CA 93901, Attention: Spill Notification.

Notification shall identify the location of the discharge, the type, concentration and volume of waste, and corrective actions taken and/or anticipated. Such notification shall not relieve the user of any expense, loss, damage or other liability which may be incurred as a result of damage to the city, fish kills, or any other damage to person or property; nor shall such notification relieve the user of any fines, civil penalties or other liabilities which may be imposed by this part or other applicable law.

A notice advising employees whom to call in the event of an accidental discharge or spill shall be posted on the user's bulletin board or other prominent place. Employers shall provide spill prevention and response training for all employees who may cause an accidental discharge or spill to occur. (Ord. No. 2350 (NCS), § 1.)

Sec. 29-18. Authority to inspect.

Whenever necessary to make an inspection to enforce any of the provisions of this chapter, or whenever an authorized enforcement officer has reasonable cause to believe that there exists in any building or upon any premises any condition which constitutes a violation of the provisions of this chapter, the officer may enter such building or premises at all reasonable times to inspect the same or perform any duty imposed upon the officer by this chapter, provided that (i) if such building or premises be occupied, he or she shall first present proper credentials and request entry; and (ii) if such building or premises be unoccupied, he or she shall first make a reasonable effort to locate the owner or other persons having charge or control of the building or premises and request entry.

Any such request for entry shall state that the property owner or occupant has the right to refuse entry and that in the event such entry is refused, inspection may be made only upon issuance of a search warrant by a duly authorized court.

Routine or area inspections shall be based upon such reasonable selection processes as may be deemed necessary to carry out the objectives of this chapter, including but not limited to random sampling and/or sampling in areas with evidence of stormwater contamination, illicit discharges, discharge of nonstorm-water to the stormwater system, or similar factors.

(a) Authority to Sample and Establish Sampling Devices. With the consent of the owner or occupant or pursuant to a search warrant, any authorized enforcement officer may establish on any property such

devices as are necessary to conduct sampling or metering operations. During all inspections as provided herein, the officer may take any samples deemed necessary to aid in the pursuit of the inquiry or in the recordation of the activities on-site.

(b) Requirement to Test or Monitor. Any authorized enforcement officer may require that any person engaged in any activity and/or owning or operating any facility which may cause or contribute to stormwater pollution or contamination, illicit discharges and/or discharges of non-stormwater to the stormwater system, undertake such monitoring activities and/or analyses and furnish such reports as the officer may specify. The burden, including costs, of these activities, analyses and reports shall bear a reasonable relationship to the need for the monitoring, analyses and reports and the benefits to be obtained. The recipient of such request shall undertake and provide the monitoring, analyses and reports required.

In the event the owner or operator of a facility subject to a monitoring and/or analyses order fails to conduct required monitoring and/or analyses and furnish the required reports in the form required, the authorized enforcement officer may in addition to the other penalties noted in this chapter, cause such monitoring and/or analyses and the cost therefor, including the reasonable additional administrative costs incurred by the city to be borne by the owner of the property and the cost thereof shall be invoiced to the owner of the property. (Ord. No. 2350 (NCS), § 1.)

Sec. 29-19. Violations constituting misdemeanors.

Unless otherwise specified by ordinance, the violation of any provision of this chapter, or failure to comply with any of the mandatory requirements of this chapter shall constitute a misdemeanor; except that notwithstanding any other provisions of this chapter, any such violation constituting a misdemeanor under this chapter may, at the discretion of the authorized enforcement officer be charged and prosecuted as an infraction. (Ord. No. 2350 (NCS), § 1.)

Sec. 29-20. Penalty for violation.

Upon conviction of a misdemeanor, a person shall be subject of payment of a fine, or imprisonment, or both, not to exceed the limits set forth in California Government Code Section 36901.

Upon conviction of an infraction, a person shall be subject to payment of a fine; not to exceed the limits set forth in California Government Code Section 36900. After a third conviction for a violation of the same provision subsequent violations within a twelve-month period may be charged as a misdemeanor. (Ord. No. 2350 (NCS), § 1.)

Sec. 29-21. Continuing violation.

Unless otherwise provided, a person, firm, corporation or organization shall be deemed guilty of a separate offense for each and every day during any portion of which a violation of this chapter is committed, continued or permitted by the person, firm, corporation or organization and shall be punishable accordingly as herein provided. (Ord. No. 2350 (NCS), § 1.)

Sec. 29-22. Concealment.

Causing, permitting, aiding, abetting or concealing a violation of any provision of this chapter shall constitute a violation of such provision. (Ord. No. 2350 (NCS), § 1.)

Sec. 29-23. Acts potentially resulting in violation of federal Clean Water Act and/or Porter-Cologne Act.

Any person who violates any provision of this chapter, any provision of any permit issued pursuant to this chapter, or who discharges waste or wastewater which causes pollution, or who violates any cease and desist order, prohibition, or effluent limitation, may also be in violation of the federal Clean Water Act and/or Porter-Cologne Act and may be subject to the sanctions of those acts including civil and criminal penalty. Any enforcement action authorized under this article should also include notice to the violator of such potential liability. (Ord. No. 2350 (NCS), § 1.)

Sec. 29-24. Violations deemed a public nuisance.

In addition to the penalties hereinbefore provided, any condition caused or permitted to exist in violation of any of the provisions of this chapter is deemed a threat to the public health, safety and welfare, and is declared and deemed to be a public nuisance, and may be summarily abated and/or restored by the authorized enforcement officer, and/or civil action to abate, enjoin or otherwise compel the cessation of such nuisance may be taken by the city attorney.

The cost of such abatement and restoration shall be borne by the owner of the property and the cost thereof shall be invoiced to the owner of the property.

If any violation of this chapter constitutes a seasonal and recurrent nuisance, the public works director shall so declare. Thereafter such seasonal and recurrent nuisance shall be abated every year without the necessity of further learning. If the city prevails in any administrative or civil proceedings initiated under this chapter, the city shall be entitled to seek reimbursement for all costs incurred in connection with such proceeding. Such reimbursable costs may include, but are not limited to, the costs of investigation, administrative overhead, out-of-pocket expenses, costs of administrative hearings, costs of suit, and reasonable attorney fees. (Ord. No. 2350 (NCS), § 1.)

Sec. 29-25. Civil actions.

In addition to any other remedies provided in this section, any violation of this section may be enforced by civil action brought by the city. In any such action, the city may seek, and the court may grant, as appropriate, any or all of the following remedies:

(a) A temporary and/or permanent injunction;

(b) Assessment against the violator for the costs of any investigation, inspection, or monitoring survey, which led to the discovery of the violation, and for the reasonable costs incurred in preparing and prosecuting legal action as a result of violations of this Chapter.

(c) Costs incurred in removing, correcting, or terminating the adverse effects resulting from the violation.

(d) Compensatory damages for loss or destruction to water quality, wildlife, fish and aquatic life.

(e) Such other relief as the court may authorize. Assessments under this subsection shall be paid to the City to be used exclusively for costs associated with monitoring and establishing storm water discharge pollution control systems and/or implementing or enforcing the provisions of this ordinance. (Ord. No. 2350 (NCS), § 1.)

Sec. 29-26. Administrative enforcement powers.

In addition to the other enforcement powers and remedies established by this chapter, the authorized enforcement officer has the authority to utilize the following administrative remedies.

(a) Cease and Desist Orders. When the authorized enforcement officer finds that a discharge has taken place or is likely to take place in violation of this chapter, the officer may issue an order to cease and desist such discharge, or practice, or operation likely to cause such discharge and direct that those persons not complying shall: (a) comply with the requirement, (b) comply with a time schedule for compliance, and/or (c) take appropriate remedial or preventive action to prevent the violation from recurring.

(b) Notice to Clean. Whenever the authorized enforcement officer finds any oil, earth, dirt, grass, weeds, dead trees, tin cans, rubbish, refuse, waste or any other material of any kind, in or upon the sidewalk abutting or adjoining any parcel of land, or upon any parcel of land or grounds, which may result in an increase in pollutants entering the city storm drain system or a nonstormwater discharge to the city storm drain system, he or she may give notice to remove such oil, earth, dirt, grass, weeds, dead trees, tin cans, rubbish, refuse, waste or other material in any manner that he or she may reasonably provide. The authorized enforcement officer shall specify in site notice the time allotted for compliance and the recipient of such notice shall undertake the activities necessary to abate such condition within the period of time specified. In the event the owner or operator of a facility fails to conduct the required activities as described in the notice, the authorized enforcement officer may cause such required activities as described in the notice and the cost thereof shall be invoiced to the owner of the property. (Ord. No. 2350 (NCS), § 1.)

Sec. 29-27. Authority to arrest or issue citations.

Duly authorized peace officers for the city shall have and are vested with the authority to arrest or cite and release any person who violates the provisions of this chapter, in the manner provided by California Penal Code Section 849.

It is the intent of the city council that the immunities prescribed in Section 836.5 of the Penal Code which apply to public officers or employees in the discharge of their duties within the course and scope of their employment shall apply to all actions taken by such peace officers or other city employees in discharging their duties in accordance with this part. (Ord. No. 2350 (NCS), § 1.)

Sec. 29-28. Appeal.

Any person, firm, corporation or organization required to perform monitoring, analyses, reporting, and/or corrective activities by the authorized enforcement officer who is aggrieved by the decision of the authorized enforcement officer may appeal such decision to the city manager within fifteen days following the effective date of the decision by furnishing written request for an appeal to the public works director. Upon receipt of such request, the public works director shall request a report and recommendation from the authorized enforcement officer and shall set the matter for hearing at the earliest practical date. At such hearing, the public works director may hear additional evidence, and may reject, affirm or modify the authorized enforcement officer's decision. Such decision shall be final. (Ord. No. 2350 (NCS), § 1.)

Sec. 29-29. Judicial review.

The provisions of Section 1094.6 of the California Code of Civil Procedure are applicable to judicial review of city decisions pursuant to this chapter. (Ord. No. 2350 (NCS), § 1.)

Sec. 29-30. Remedies not exclusive.

Remedies under this article are in addition to and do not supersede or limit any and all other remedies, civil or criminal. The remedies provided for herein shall be cumulative and not exclusive. (Ord. No. 2350 (NCS), § 1.)

Sec. 29-31. Disclaimer of liability.

The degree of protection required by this chapter is considered reasonable for regulatory purposes and is based on scientific, engineering and other relevant technical considerations. The standards set forth herein are minimum standards and this division does not imply that compliance will ensure that there will be no unauthorized discharge of pollutants into the waters of the United States. This chapter shall not create liability on the part of the city or any officer or employee thereof for any damages that result from reliance on this chapter or any administrative decision lawfully made thereunder. (Ord. No. 2350 (NCS), § 1.)

Sec. 29-32. Coordination with hazardous materials inventory and response program.

The first revision of the business plan for any facility subject to the city's hazardous materials inventory and response program shall include a program for compliance with this chapter, including the prohibitions on nonstormwater discharges and illicit discharges, and the requirement to reduce stormwater pollutants to the maximum extent practicable. (Ord. No. 2350 (NCS), § 1.)

Sec. 29-33. Confidential information.

Information and data on a user obtained from reports, questionnaires, permit applications, permits and monitoring programs, and from inspections shall be made available to the EPA, state agencies and other local governmental agencies without restrictions. Such information and data shall also be made available to the public or other nongovernmental agencies without restriction unless the user specifically requests and is able to demonstrate to the satisfaction of the city that the release of such information would divulge information, processes or methods of production entitled to protection as trade secrets of the user. However, in no event shall stormwater constituents and characteristics be recognized as confidential information.

Information accepted by the city as confidential shall not be transmitted to any nongovernmental agency or to the general public by the city until or unless the request is received in writing and until ten days after notification of the request has been given to the user by the city. Furthermore, when requested by the person furnishing a report for uses related to this part, the National Pollutant Discharge Elimination System (NPDES) permit, state general industrial stormwater permit and/or state general construction activity water permit, the portions of a report which might disclose trade secrets or secret processes shall not be made available when requested by the public or nongovernmental agencies. However, such portions of such reports shall be made available, without reservation, to the EPA, state agencies or local governmental agencies upon the written request of such agency. (Ord. No. 2350 (NCS), § 1.)

Sec. 29-34. Special agreements.

Special agreements and arrangements between the council of the city and any persons or agencies may be established when, in the opinion of the city, unusual or extraordinary circumstances compel special terms and conditions. However, in no event shall any such agreement be interpreted so as to authorize the violation or waiver of applicable standards or requirements as delineated in the city's NPDES permit. (Ord. No. 2350 (NCS), § 1.)

ATTACHMENT 3B.4

Chapter 16.19
STORM WATER AND URBAN RUNOFF POLLUTION CONTROL

View Chapter Archive

Sections:

16.19.010 Purpose and intent.
16.19.020 Definitions.
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16.19.080 Damage to the storm drain system.
16.19.090 Littering -- Discharge of polluting or damaging substances prohibited.
16.19.100 Prohibited discharges from industrial or commercial activity.
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16.19.130 Mandatory best management practices.
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16.19.010 PURPOSE AND INTENT.

The purpose of this chapter is to protect the health and safety of the residents of the city by protecting the water quality, beneficial uses, marine habitats, and ecosystems of the receiving waters of the city, including the San Lorenzo River and Monterey Bay, from pollutants carried by urban runoff.

(Ord. 2003-21 § 2 (part), 2003).

16.19.020 DEFINITIONS.

The following words, phrases and terms as used in this chapter shall have the meanings ascribed to them in this chapter.

(a) "Basin plan" shall mean a water quality control plan for a specific watershed area or areas adopted by a regional board.

(b) "Beneficial uses" shall mean existing or potential uses of receiving waters as defined in a basin plan.

(c) "Best management practices" (BMPs) shall mean pollution control practices designed to reduce the pollutants contained in discharges.

(d) "Building drain" means that part of the lowest horizontal piping of a wastewater drainage system which receives the discharge from soil and waste pipes inside the walls of the building and conveys it to the building sewer, beginning two feet outside the inner face of the building wall.

(e) "City" shall mean the City of Santa Cruz.

(f) "Clean Water Act" shall mean the Federal Water Pollution Control Act, which was enacted in 1972 to prohibit the discharge of pollutants to receiving waters of the United States and, later amended in 1987, to establish a framework for regulating municipal, industrial and construction storm water discharges under the NPDES Program.

(g) "Commercial activity" means any public or private activity not defined as an industrial activity in 40 CFR 122.26(b)(14), involved in the storage, transportation, distribution, exchange or sale of goods and/or commodities or providing professional and/or non-professional services.

(h) "Construction activity" means any clearing, grading, or excavation that results in soil disturbance. Construction activity also includes, but is not limited to, construction, repairs, dewatering, remodeling, building, and emergency construction activities required to immediately protect public health and safety.

(i) "Director" means the director of public works for the City of Santa Cruz or his/her authorized agent, representative or inspector.

(j) "Discharge" means any release, spill, leak, pump, flow, escape, dumping, or disposal of any liquid, semi-solid, or solid substance.

(k) "Hazardous substance" means any hazardous substance as defined in Section 6.50.040 of this code.

(l) "Illicit connection" means any human-made conveyance that is connected to the storm drain system and allows for an illicit discharge.

(m) "Illicit discharge" means any discharge to the storm drain system that is prohibited under local, state, or federal statutes, ordinances, codes, or regulations. Illicit discharge includes all non-storm water discharges except discharges pursuant to a NPDES permit or conditionally exempted by this chapter.

(n) "Illicit disposal" means any disposal, either intentional or unintentional, of material(s), substance(s), or waste(s) that has the potential to pollute runoff unless otherwise allowed by law.

(o) "Industrial Activity" means any public or private activity which is associated with any of the 11 categories of activities defined in 40 CFR 122.26(b)(14) and required to obtain a NPDES permit.

(p) "Industrial/commercial facility" means any public or private facility involved and/or used in the production, manufacture, storage, transportation, distribution, exchange or sale of goods and/or commodities, or any facility involved and/or used in providing professional and non-professional services. This category of facility includes, but is not limited to, any facility defined by a Standard Industrial Classification (SIC).

(q) "Maximum extent practicable" means a standard for implementation of storm water management programs to reduce pollutants in storm water. It is the maximum extent possible taking into account equitable consideration and competing facts, including, but not limited to: the seriousness of the problem, public health risk, environmental benefits, pollutant removal effectiveness, regulatory compliance, ability to implement, cost and technical feasibility.

(r) "NPDES" means the National Pollutant Discharge Elimination System and is implemented and enforced by a permit issued by the U.S. Environmental Protection Agency, State Water Resources Control Board, or the California Regional Water Quality Control Board pursuant to the Clean Water Act that authorizes discharges to waters of the United States and requires the reduction of pollutants in the discharge.

(s) "Non-storm water runoff " means any discharge to the storm drain system that is not composed entirely of storm water.

(t) "Nuisance" means a "public nuisance" as defined in this section.

(u) "Pollutant" means the same as defined in Section 502(6) of the Clean Water Act or as incorporated into the California Water Code, subsection 13373. Pollutants include, but are not limited to the following:

1. Materials (including but not limited to fuels, solvents, chemicals, detergents, plastic pellets, hazardous substances, radioactive wastes, fertilizers, pesticides, paints, soot, slag, ash, sludge);

2. Metals and non-metals both soluble and insoluble (including but not limited to cadmium, lead, zinc, copper, silver, nickel, chromium, chlorine, phosphorous, formaldehyde, glutaraldehyde and arsenic);

3. Petroleum hydrocarbons (including but not limited to fuels, oils, lubricants, surfactants, waste oils, solvents, coolants, and grease);

4. Eroded soils, sediment, saw cut slurry and particulate materials in amounts which may adversely affect the beneficial use of the receiving waters, flora, or fauna of the state;

5. Animal wastes (including but not limited to discharge from confinement facilities, kennels, pens, recreational facilities, and stables);

6. Substances having acidic or corrosive characteristics, unusual coloration or turbidity;

7. Any domestic or industrial wastewater;

8. Any hazardous substances.

The term "pollutant" shall not include uncontaminated storm water, potable water, groundwater or reclaimed water generated by a lawfully permitted water treatment facility.

(v) "Private storm water conveyance system" shall mean a storm water conveyance system that is not owned or maintained by the city including any instrumentality that drains or conveys storm water from a building or from/through one or more properties to the environment or the city's storm water system.

(x) "Public nuisance" means any discharge in violation of the provisions of this chapter, a wastewater discharge permit, or an order of the city council.

(y) "Receiving waters" means all surface water bodies.

(z) "Regional Board" means a California Regional Water Quality Control Board.

(aa) "Runoff" means any storm water or non-storm water discharges from a drainage area that reaches the storm drain system. The term "runoff" is interchangeable with the term "urban runoff."

(bb) "Standard Industrial Classification" or "SIC" means a classification pursuant to the current edition of the *Standard Industrial Classification Manual* issued by the Executive Office of the President of the United States, Office of Management and Budget.

(cc) "State Board" means the State Water Resources Control Board.

(dd) "Storm drain system" means collectively any street, gutter, conduit, natural or artificial drain, channel and watercourse, or other facility that is owned, operated, maintained, or controlled by the city and used for the purpose of collecting, storing, transporting, or disposing of runoff.

(ee) "Storm water" means any water that originates from atmospheric moisture (rainfall or snowmelt) and falls onto land, water, or other surfaces.

(ff) "Storm water pollution prevention plan" or "SWPPP" means a plan required by the State of California General Permit for Storm Water Discharges associated with either industrial or construction activities. The purpose of the plan is to help identify the sources of pollution that affect the quality of storm water discharges from a site and to

describe and ensure the implementation of practices to reduce pollutants in storm water discharges.

(gg) "Storm water runoff" means that part of precipitation (rainfall or snowmelt) which travels via flow across any surface to the storm drain system.

(hh) "Street washing" means the practice of washing of streets and/or sidewalks using water.

(ii) "Urban runoff" means any storm water and non-storm water runoff.

(jj) "U.S. EPA" means the United States Environmental Protection Agency.

(Ord. 2003-21 § 2 (part), 2003).

16.19.030 ILLICIT DISCHARGES PROHIBITED.

(a) No person shall cause the discharge of non-storm water runoff to enter the storm drain system unless the discharge is one of the following:

1. Authorized by a NPDES permit issued by the U.S. EPA, the State Board, or a Regional Board.

2. Caused by or resulting from one of the following:

a. Fire fighting activities.

b. Landscape irrigation.

c. Water line breaks and releases from potable water systems.

d. Foundation/footing drains.

e. Individual residential car washing.

f. Unpolluted groundwater.

g. Hydrant flushing.

h. Authorized by the city.

All exempt discharges, as listed above, must be in conformance with all other provisions of this code.

(Ord. 2003-21 § 2 (part), 2003).

16.19.040 INSTALLATION OR USE OF ILLICIT CONNECTIONS PROHIBITED.

No person shall install, maintain or use any connection to the storm drain system which is used to discharge to the storm drain system in violation of this code. All connections to the storm drain system that provide for a discharge from inside any building are prohibited.

(Ord. 2003-21 § 2 (part), 2003).

16.19.050 REMOVAL OF ILLICIT CONNECTION.

If any person fails to disconnect an illicit connection upon notification by the director, the director may direct that such connection be disconnected from the storm drain system. The city may pursue the recovery of costs for such disconnection.

(Ord. 2003-21 § 2 (part), 2003).

16.19.060 PRIVATE STORM WATER CONVEYANCE SYSTEMS.

The owner of a property where a private storm water conveyance system is located shall be responsible for the maintenance, repair, and proper operation of the private storm water conveyance system, regardless of whether the

private storm water conveyance system is completely located on the private property or partially within the public right-of way. The city shall have no responsibility or obligation for the maintenance, repair, or proper operation of a private storm water conveyance system.

If the director determines that a private storm water conveyance system is not operating properly and causes the improper discharge of storm water to the street, sidewalk or storm drain system, the director may declare this condition to constitute a public nuisance and proceed to abate that nuisance in accordance with Section 16.19.180.

(Ord. 2003-21 § 2 (part), 2003).

16.19.070 DISCHARGE OF SEWAGE PROHIBITED.

No person shall cause the discharge of sewage to the storm drain system. In addition, if the director determines that a building drain or building sewer is not operating properly and causes the discharge of sewage to the street, sidewalk, or storm drain system, the director may declare this condition to constitute a public nuisance and proceed to abate that nuisance in accordance with Section 16.19.180.

(Ord. 2003-21 § 2 (part), 2003).

16.19.080 DAMAGE TO THE STORM DRAIN SYSTEM.

It is unlawful for any person to maliciously, willfully or negligently break, damage, destroy, uncover, deface or tamper with any structure, appurtenance or equipment which is part of the municipal storm drain system.

(Ord. 2003-21 § 2 (part), 2003).

16.19.090 LITTERING -- DISCHARGE OF POLLUTING OR DAMAGING SUBSTANCES PROHIBITED.

No person shall throw, deposit, place, leave, maintain, litter, keep, or permit to be thrown, deposited, placed, left, maintained, or kept, any pollutant, refuse, rubbish, food waste, garbage, or any other discarded or abandoned objects, in or upon any portion of the storm drain system or place of business, or upon any public or private plot of land in the city, except when placed in facilities protected from urban runoff such as containers, bags or recycling bins. Such prohibited activities shall include littering within the confines of receiving waters such as the San Lorenzo River, Branciforte Creek, Carbonera Creek, Neary Lagoon and Pogonip Creek.

(Ord. 2003-21 § 2 (part), 2003).

16.19.100 PROHIBITED DISCHARGES FROM INDUSTRIAL OR COMMERCIAL ACTIVITY

(a) The following list of discharges from industrial/commercial activities shall be considered prohibited unless permitted under a separate NPDES permit or as allowed by BMPs published or approved by the city public works department. This list is based on Section 16.19.030 but is not an exhaustive list of prohibited discharges to the storm drain system:

(1) Water from the cleaning of gas stations, vehicle service garages, or other types of vehicle service facilities;

(2) Water, cleansers, or solvents from the cleaning of vehicles, machinery or equipment, and other such commercial and industrial operations;

(3) Water from the washing or rinsing of vehicles containing soap, detergents, solvents, or other cleaners;

(4) Water from the washing or rinsing of vehicles, with or without soap, from auto body repair shops;

(5) Water from the cleaning or rinsing of vehicle engine, undercarriage, or auto parts cleaning;

(6) Vehicle fluids;

(7) Mat wash water from food service facilities;

(8) Food and kitchen cleaning water from food service facilities;

(9) Leakage from dumpsters or trash containers;

(10) Water from the cleaning or rinsing of garbage dumpster areas and areas where garbage is stored or contained;

(11) Water from pressure washing, steam cleaning, and hand scrubbing of sidewalks, gutters, plazas, alleyways, outdoor eating areas, steps, building exteriors, walls, driveways, and other outdoor surfaces;

(12) Wastewater or cleaning fluids from carpet cleaning;

(13) Swimming pool and spa water;

(14) Wash out from concrete trucks;

(15) Runoff from areas where hazardous substances, including diesel fuel, gasoline and motor oil are stored, except as allowed by Chapter 6.50 of this code;

(16) Super-chlorinated water normally associated with the disinfection of potable water systems.

(Ord. 2003-21 § 2 (part), 2003).

16.19.110 INDUSTRIAL/COMMERCIAL SOURCES REQUIRED TO OBTAIN AN NPDES PERMIT.

(a) Any industrial/commercial facility that is required to have a NPDES permit shall retain the following documents on-site and make them immediately available to the director:

(1) A copy of a permit or notice of intent to comply with a general permit to discharge storm water associated with industrial activity as submitted to the State Board or report of waste discharge as submitted to a Regional Board of jurisdiction.

(2) A waste discharge identification number issued by the State Board or copy of the NPDES permit issued by a Regional Board.

(3) A SWPPP monitoring program plan or group monitoring plan.

(4) Storm water quality data.

(5) Evidence of facility self-inspection as required by the NPDES permit.

(Ord. 2003-21 § 2 (part), 2003).

16.19.120 NOTIFICATION OF PROHIBITED DISCHARGE REQUIRED.

In the event or discovery of a discharge to the storm drain system that is prohibited by this code, the discharger or permittee shall immediately notify the director of the incident by telephone at the city public works department. The notification shall include the discharge location, type of materials discharged, estimated concentration and volume of the discharge, and corrective actions taken to contain or minimize the effects of the discharge.

Within 10 calendar days from the first discovery of the discharge, the discharger or permittee shall submit to the director a detailed written report describing the cause of the discharge, corrective action taken and measures to be taken to prevent future occurrences, and measures taken to remediate the effects of the discharge. Such notification shall not relieve the discharger or permittee of liability or fines incurred as a result of the prohibited discharge.

(Ord. 2003-21 § 2 (part), 2003).

16.19.130 MANDATORY BEST MANAGEMENT PRACTICES.

Any owner, occupant, or user of any property, or any person conducting activities within the city shall comply

with any mandatory BMPs listed in the latest BMP manual published by the public works department and the following mandatory BMPs:

(a) If water is used to remove paint or graffiti for building exteriors, walls, steps, signs, and other surfaces, the wastewater and paint particles may not be discharged to the street or storm drain system. If blasting or sanding is used to remove paint or graffiti, the paint particles, blasting material, sand, or dust may not be allowed to reach the storm drain system.

(b) Paintbrushes, paint spray guns, paint trays or containers, and paint cans may not be cleaned or rinsed into the street or storm drain system.

(c) Objects including, but not limited to, motor vehicles, motor vehicle parts, machinery, and equipment that contain grease, oil, or hazardous substances shall be placed in a confined area in order to contain leakage, spillage and discharges, or stored in such condition so that grease, oil or hazardous substances do not contact urban runoff.

(d) Areas susceptible to runoff shall have debris removed by sweeping or another equally effective measure on a regular basis.

(e) Waste not contained in receptacles shall be covered and located so as to prevent contact with urban runoff.

(Ord. 2003-21 § 2 (part), 2003).

16.19.140 BEST MANAGEMENT PRACTICES FOR CONSTRUCTION ACTIVITY.

Any construction project, including those undertaken under any permit or approval granted pursuant to Titles 15, 18, and 24 of this code, shall implement best management practices (BMPs) including the city's mandatory BMPs as detailed in the latest BMP manual published by the city's public works department. BMPs shall be maintained in full force and effect during the duration of the project.

(Ord. 2003-21 § 2 (part), 2003).

ATTACHMENT 3B.5

3B Model Urban Runoff Ordinance

MODEL ORDINANCE

ORDINANCE NO. _____ C.S.
ORDINANCE ADDING NEW ARTICLE 2 TO CHAPTER 31.5
OF THE [Municipality] CITY CODE REGARDING
URBAN STORM WATER QUALITY MANAGEMENT AND DISCHARGE CONTROL

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THE COUNCIL OF THE CITY OF **[Municipality]** DOES ORDAIN AS FOLLOWS:

SECTION 1. A new Article 2 is hereby added to Chapter 31.5 of the **[Municipality]** City Code regarding Urban Storm Water Quality Management and Discharge Control, which shall read in its entirety as follows:

"ARTICLE 2.

URBAN STORM WATER QUALITY MANAGEMENT AND DISCHARGE CONTROL.

Division I.

Title, Purpose and General Provisions.

Section 31.5-4. Title.

This Article shall be known as the "Urban Storm Water Quality Management and Discharge Control Ordinance" of the City of **[Municipality]** and may be so cited.

Section 31.5-5. Purpose and Intent.

The purpose and intent of this Article is to ensure the health, safety, and general welfare of citizens, and protect and enhance the water quality of watercourses and water bodies in a manner pursuant to and consistent with the Federal Clean Water Act (33 U.S.C. §1251 et seq.) by reducing pollutants in storm water discharges to the maximum extent practicable and by prohibiting non-storm water discharges to the storm drain system.

Section 31.5-6. Definitions.

The terms used in this Article shall have the following meanings:

(a) Best Management Practices. Activities, practices, and procedures to prevent or reduce the discharge of pollutants directly or indirectly to the municipal storm drain system and

waters of the United States. Best Management Practices include but are not limited to: treatment facilities to remove pollutants from storm water; operating and maintenance procedures; facility management practices to control runoff, spillage or leaks of non-storm water, waste disposal, and drainage from materials storage; erosion and sediment control practices; and the prohibition of specific activities, practices, and procedures and such other provisions as the City determines appropriate for the control of pollutants. Please refer to the City of **[Municipality]** *BMP Guidance Series*, as discussed further in Section 31.5-16(c) herein, for specific requirements.

(b) City. The City of **[Municipality]**.

(c) Clean Water Act. The federal Water Pollution Control Act (33 U.S.C. § 1251 et seq.), and any subsequent amendments thereto.

(d) Construction Activity. Activities subject to NPDES Construction Permits. These include construction projects resulting in land disturbance of 5 acres or more. Such activities include but are not limited to clearing and grubbing, grading, excavating, and demolition.

(e) Hazardous Materials. Any material, including any substance, waste, or combination thereof, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may cause, or significantly contribute to, a substantial present or potential hazard to human health, safety, property, or the environment when improperly treated, stored, transported, disposed of, or otherwise managed (California Health and Safety Code §25117).

(f) Illegal Discharge. Any direct or indirect non-storm water discharge to the storm drain system, except as exempted in Division II, Section 31.5-12 of this chapter.

(g) Illicit Connections. An illicit connection is defined as either of the following:

1. Any drain or conveyance, whether on the surface or subsurface, which allows an illegal discharge to enter the storm drain system including but not limited to any conveyances which allow any non-storm water discharge including sewage, process wastewater, and wash water to enter the storm drain system and any connections to the storm drain system from indoor drains and sinks, regardless of whether said drain or connection had been previously allowed, permitted, or approved by a government agency; or

2. Any drain or conveyance connected from a commercial or industrial land use to the storm drain system which has not been documented in plans, maps, or equivalent records and approved by the City.

(h) Industrial Activity. Activities subject to NPDES Industrial Permits as defined in 40 CFR, Section 122.26 (b)(14).

(i) National Pollutant Discharge Elimination System (NPDES) Storm Water Discharge Permits. General, group, and individual storm water discharge permits which regulate facilities defined in federal NPDES regulations pursuant to the Clean Water Act. The California Regional

Water Quality Control Board, Central Coast Region (hereinafter, Regional Board) and the State Water Resources Control Board have adopted general storm water discharge permits, including but not limited to the General Construction Activity and General Industrial Activity permits.

(j) Non-Storm Water Discharge. Any discharge to the storm drain system that is not composed entirely of storm water.

(k) Pollutant. Anything which causes or contributes to pollution. Pollutants may include, but are not limited to: paints, varnishes, and solvents; oil and other automotive fluids; non-hazardous liquid and solid wastes and yard wastes; refuse, rubbish, garbage, litter, or other discarded or abandoned objects, articles, and accumulations, so that same may cause or contribute to pollution; floatables; pesticides, herbicides, and fertilizers; hazardous substances and wastes; sewage, fecal coliform and pathogens; dissolved and particulate metals; animal wastes; wastes and residues that result from constructing a building or structure (including but not limited to sediments, slurries, and concrete rinsates); and noxious or offensive matter of any kind.

(l) Pollution. The human-made or human-induced alteration of the quality of waters by waste to a degree which unreasonably affects, or has the potential to unreasonably affect, either the waters for beneficial uses or the facilities which serve these beneficial uses (California Water Code §13050).

(m) Porter-Cologne Act. The Porter-Cologne Water Quality Control Act and as amended (California Water Code §13000 et seq.).

(n) Premises. Any building, lot, parcel of land, or portion of land whether improved or unimproved including adjacent sidewalks and parking strips.

(o) Storm Drain System. Publicly-owned facilities operated by the City by which storm water is collected and/or conveyed, including but not limited to any roads with drainage systems, municipal streets, gutters, curbs, inlets, piped storm drains, pumping facilities, retention and detention basins, natural and human-made or altered drainage channels, reservoirs, and other drainage structures which are within the City and are not part of a publicly owned treatment works as defined at 40 CFR Section 122.2.

(p) Storm Water. Any surface flow, runoff, and drainage consisting entirely of water from rain storm events.

(q) Waters of the United States. Surface watercourses and water bodies as defined at 40 CFR § 122.2. including all natural waterways and definite channels and depressions in the earth that may carry water, even though such waterways may only carry water during rains and storms and may not carry storm water at and during all times and seasons.

Section 31.5-7. Applicability.

This Article shall apply to all water entering the storm drain system generated on any developed and undeveloped lands lying within the City of [**Municipality**] including any amendments or revisions thereto.

Section 31.5-8. Responsibility for Administration.

The Public Works Director of the City shall administer, implement, and enforce the provisions of this Article. Any powers granted or duties imposed upon the Public Works Director may be delegated in writing by the Public Works Director to persons or entities acting in the beneficial interest of or in the employ of the City.

Section 31.5-9. Severability.

The provisions of this Article are hereby declared to be severable. If any provision, clause, sentence, or paragraph of this Article or the application thereof to any person, establishment, or circumstances shall be held invalid, such invalidity shall not affect the other provisions or application of this Article.

Section 31.5-10. Regulatory Consistency.

This Article shall be construed to assure consistency with the requirements of the Clean Water Act and Porter-Cologne Act and acts amendatory thereof or supplementary thereto, or any applicable implementing regulations.

Section 31.5-11. Ultimate Responsibility of Discharger.

The standards set forth herein and promulgated pursuant to this Article are minimum standards; therefore this Article does not intend nor imply that compliance by any person will ensure that there will be no contamination, pollution, nor unauthorized discharge of pollutants into waters of the U.S. caused by said person. This Article shall not create liability on the part of the City of [**Municipality**], or any agent or employee thereof for any damages that result from any discharger's reliance on this Article or any administrative decision lawfully made thereunder.

Division II.

Discharge Prohibitions.

Section 31.5-12. Prohibition of Illegal Discharges.

No person shall discharge or cause to be discharged into the municipal storm drain system or watercourses any materials, including but not limited to pollutants or waters containing any pollutants that cause or contribute to a violation of applicable water quality standards, other than storm water.

The commencement, conduct or continuance of any illegal discharge to the storm drain system is prohibited except as described as follows:

(a) Discharges from the following activities will not be considered a source of pollutants to the storm drain system and to waters of the U.S. when properly managed to ensure that no potential pollutants are present, and therefore they shall not be considered illegal discharges unless determined to cause a violation of the provisions of the Porter-Cologne Act, Clean Water Act, or this ordinance: potable water line flushing; uncontaminated pumped groundwater and other discharges from potable water sources; landscape irrigation and lawn watering; diverted stream flows; rising groundwater; groundwater infiltration to the storm drain system; uncontaminated foundation and footing drains; uncontaminated water from crawl space pumps; air conditioning condensation; uncontaminated non-industrial roof drains; springs; individual residential and occasional non-commercial car washing; flows from riparian habitats and wetlands; dechlorinated swimming pool discharges; street wash waters; and flows from fire fighting.

(b) The prohibition shall not apply to any non-storm water discharge permitted under an NPDES permit, waiver, or waste discharge order issued to the discharger and administered by the State of California under the authority of the Federal Environmental Protection Agency, provided that the discharger is in full compliance with all requirements of the permit, waiver, or order and other applicable laws and regulations, and provided that written approval has been granted by the City of **[Municipality]** for any discharge to the storm drain system.

(c) With written concurrence of the Regional Board, the City of **[Municipality]** may exempt in writing other non-storm water discharges which are not a source of pollutants to the storm drain system nor waters of the U.S.

Section 31.5-13. Prohibition of Illicit Connections.

(a) The construction, use, maintenance or continued existence of illicit connections to the storm drain system is prohibited.

(b) This prohibition expressly includes, without limitation, illicit connections made in the past, regardless of whether the connection was permissible under law or practices applicable or prevailing at the time of connection.

Section 31.5-14. Waste Disposal Prohibitions.

No person shall throw, deposit, leave, maintain, keep, or permit to be thrown, deposited, left, or maintained, in or upon any public or private property, driveway, parking area, street, alley, sidewalk, component of the storm drain system, or water of the U.S., any refuse, rubbish, garbage, litter, or other discarded or abandoned objects, articles, and accumulations, so that the same may cause or contribute to pollution. Wastes deposited in streets in proper waste receptacles for the purposes of collection are exempted from this prohibition.

Section 31.5-15. Discharges in Violation of Industrial or Construction Activity NPDES Storm Water Discharge Permit.

Any person subject to an industrial or construction activity NPDES storm water discharge permit shall comply with all provisions of such permit. Proof of compliance with said permit may be required in a form acceptable to the Public Works Director prior to or as a condition of a subdivision map, site plan, building permit, or development or improvement plan; upon inspection of the facility; during any enforcement proceeding or action; or for any other reasonable cause.

Division III.

Regulations and Requirements.

Section 31.5-16. Requirement to Prevent, Control, and Reduce Storm Water Pollutants.

(a) Authorization to Adopt and Impose Best Management Practices. The City will adopt requirements identifying Best Management Practices for any activity, operation, or facility which may cause or contribute to pollution or contamination of storm water, the storm drain system, or waters of the U.S. as a separate *BMP Guidance Series*. Where Best Management Practices requirements are promulgated by the City or any federal, State of California, or regional agency for any activity, operation, or facility which would otherwise cause the discharge of pollutants to the storm drain system or water of the U.S., every person undertaking such activity or operation, or owning or operating such facility shall comply with such requirements.

The Public Works Director will report to the City Council annually on the status of implementation of BMP's, the pollutants of concern to be addressed the next year, and any new BMPs to be developed. BMP's developed under this program will be included in the City of **[Municipality]** *BMP Guidance Series*.

(b) New Development and Redevelopment. The City may adopt requirements identifying appropriate Best Management Practices to control the volume, rate, and potential pollutant load of storm water runoff from new development and redevelopment projects as may be appropriate to minimize the generation, transport and discharge of pollutants. The City shall incorporate such requirements in any land use entitlement and construction or building-related permit to be issued relative to such development or redevelopment. The owner and developer shall comply with the terms, provisions, and conditions of such land use entitlements and building permits as required in this Article and the City Storm Water Utility Ordinance, Chapter 31.5, Article 1.

(c) Responsibility to Implement Best Management Practices. Notwithstanding the presence or absence of requirements promulgated pursuant to subsections (a) and (b), any person engaged in activities or operations, or owning facilities or property which will or may result in pollutants entering storm water, the storm drain system, or waters of the U.S. shall implement Best Management Practices to the extent they are technologically achievable to prevent and

reduce such pollutants. The owner or operator of a commercial or industrial establishment shall provide reasonable protection from accidental discharge of prohibited materials or other wastes into the municipal storm drain system or watercourses. Facilities to prevent accidental discharge of prohibited materials or other wastes shall be provided and maintained at the owner or operator's expense.

Best Management Practices required by the City can be obtained from the Public Works Department by requesting the BMP manual appropriate to a commercial or industrial activity from the *BMP Guidance Series*. BMP's are broken into three categories: "high priority" which are required to be implemented, "medium priority" which are desirable to implement, and "low priority."

Section 31.5-17. Requirement to Eliminate Illegal Discharges.

Notwithstanding the requirements of Division IV, Section 31.5-23 herein, the Public Works Director may require by written notice that a person responsible for an illegal discharge immediately, or by a specified date, discontinue the discharge and, if necessary, take measures to eliminate the source of the discharge to prevent the occurrence of future illegal discharges.

Section 31.5-18. Requirement to Eliminate or Secure Approval for Illicit Connections.

(a) The Public Works Director may require by written notice that a person responsible for an illicit connection to the storm drain system comply with the requirements of this Article to eliminate or secure approval for the connection by a specified date, regardless of whether or not the connection or discharges to it had been established or approved prior to the effective date of this Article.

(b) If, subsequent to eliminating a connection found to be in violation of this Article, the responsible person can demonstrate that an illegal discharge will no longer occur, said person may request City approval to reconnect. The reconnection or reinstallation of the connection shall be at the responsible person's expense.

Section 31.5-19. Watercourse Protection.

Every person owning property through which a watercourse passes, or such person's lessee, shall keep and maintain that part of the watercourse within the property reasonably free of trash, debris, excessive vegetation, and other obstacles that would pollute, contaminate, or significantly retard the flow of water through the watercourse. In addition, the owner or lessee shall maintain existing privately owned structures within or adjacent to a watercourse, so that such structures will not become a hazard to the use, function, or physical integrity of the watercourse. The owner or lessee shall not remove healthy bank vegetation beyond that actually necessary for maintenance, nor remove said vegetation in such a manner as to increase the vulnerability of the watercourse to erosion. The property owner shall be responsible for maintaining and stabilizing that portion of the watercourse that is within their property lines in

order to protect against erosion and degradation of the watercourse originating or contributed from their property.

Section 31.5-20. Requirement to Remediate.

Whenever the Public Works Director finds that a discharge of pollutants is taking place or has occurred which will result in or has resulted in pollution of storm water, the storm drain system, or water of the U.S., the Public Works Director may require by written notice to the owner of the property and/or the responsible person that the pollution be remediated and the affected property restored within a specified time pursuant to the provisions of sections 31.5-25 through 31.5-28 below.

Section 31.5-21. Requirement to Monitor and Analyze.

The Public Works Director may require by written notice of requirement that any person engaged in any activity and/or owning or operating any facility which may cause or contribute to storm water pollution, illegal discharges, and/or non-storm water discharges to the storm drain system or waters of the U.S., to undertake at said person's expense such monitoring and analyses and furnish such reports to the City of [**Municipality**] as deemed necessary to determine compliance with this Article.

Section 31.5-22. Notification of Spills.

Notwithstanding other requirements of law, as soon as any person responsible for a facility or operation, or responsible for emergency response for a facility or operation has information of any known or suspected release of materials which are resulting or may result in illegal discharges or pollutants discharging into storm water, the storm drain system, or water of the U.S. from said facility, said person shall take all necessary steps to ensure the discovery, containment, and cleanup of such release. In the event of such a release of a hazardous material said person shall immediately notify emergency response officials of the occurrence via emergency dispatch services (911). In the event of a release of non-hazardous materials, said person shall notify the City's Public Works Department in person or by phone or facsimile no later than 5:00 p.m. of the next business day. Notifications in person or by phone shall be confirmed by written notice addressed and mailed to the City's Public Works Department within three business days of the phone notice. If the discharge of prohibited materials emanates from a commercial or industrial establishment, the owner or operator of such establishment shall also retain an on-site written record of the discharge and the actions taken to prevent its recurrence. Such records shall be retained for at least three years.

Division IV.

Inspection and Monitoring.

Section 31.5-23. Authority to Inspect.

Section 31.5-26 Appeal.

Notwithstanding the provisions of Section 31.5-29 below, any person receiving a Notice of Violation under Section 31.5-25 above may appeal the determination of the Public Works Director to the City Manager. The notice of appeal must be received by the City Manager within 5 days from the date of the Notice of Violation. Hearing on the appeal before the City Manager or his/her designee shall take place within 15 days from the date of City's receipt of the notice of appeal. The decision of the City Manager or designee shall be final.

Section 31.5-27 Abatement by City.

If the violation has not been corrected pursuant to the requirements set forth in the Notice of Violation, or , in the event of an appeal under section 31.5-26, within 10 days of the decision of the City Manager upholding the decision of the Public Works Director, then the City or a contractor designated by the Public Works Director shall enter upon the subject private property and is authorized to take any and all measures necessary to abate the violation and/or restore the property. It shall be unlawful for any person, owner, agent or person in possession of any premises to refuse to allow the City or designated contractor to enter upon the premises for the purposes set forth above.

Section 31.5-28 Charging Cost of Abatement/Liens.

Within 30 days after abatement of the nuisance by City, the Public Works Director shall notify the property owner of the property of the cost of abatement, including administrative costs. The property owner may file a written protest objecting to the amount of the assessment with the City Clerk within 15 days. The City Clerk shall set the matter for public hearing by the City Council. The decision of the City Council shall be set forth by resolution and shall be final.

If the amount due is not paid within 10 days of the decision of the City Council or the expiration of the time in which to file an appeal under this Section, the charges shall become a special assessment against the property and shall constitute a lien on the property for the amount of the assessment. A copy of the resolution shall be turned over to the County Auditor so that the auditor may enter the amounts of the assessment against the parcel as it appears on the current assessment roll, and the tax collector shall include the amount of the assessment on the bill for taxes levied against the parcel of land.

Section 31.5-29 Urgency Abatement.

The Public Works Director is authorized to require immediate abatement of any violation of this Article that constitutes an immediate threat to the health, safety or well-being of the public. If any such violation is not abated immediately as directed by the Public Works Director, the City of [**Municipality**] is authorized to enter onto private property and to take any and all measures required to remediate the violation. Any expense related to such remediation undertaken by the City of **[Municipality]** shall be fully reimbursed by the property owner and/or

Whenever necessary to make an inspection to enforce any provision of this Article, or whenever the Public Works Director has cause to believe that there exists, or potentially exists, in or upon any premises any condition which constitutes a violation of this Article, the Director may enter such premises at all reasonable times to inspect the same and to inspect and copy records related to storm water compliance. In the event the owner or occupant refuses entry after a request to enter and inspect has been made, the City is hereby empowered to seek assistance from any court of competent jurisdiction in obtaining such entry.

Section 31.5-24. Authority to Sample, Establish Sampling Devices, and Test.

During any inspection as provided herein, the Public Works Director may take any samples and perform any testing deemed necessary to aid in the pursuit of the inquiry or to record site activities.

Division V.

Enforcement.

Section 31.5-25. Notice of Violation.

Whenever the Public Works Director finds that a person has violated a prohibition or failed to meet a requirement of this Article, the Director may order compliance by written notice of violation to the responsible person. Such notice may require without limitation:

(a) The performance of monitoring, analyses, and reporting;

(b) The elimination of illicit connections or discharges;

(c) That violating discharges, practices, or operations shall cease and desist;

(d) The abatement or remediation of storm water pollution or contamination hazards and the restoration of any affected property; and

(e) Payment of a fine to cover administrative and remediation costs; and

(f) The implementation or maintenance of source control or treatment BMPs.

If abatement of a violation and/or restoration of affected property is required, the notice shall set forth a deadline within which such remediation or restoration must be completed. Said notice shall further advise that, should the violator fail to remediate or restore within the established deadline, the work will be done by the City or a contractor designated by the Public Works Director and the expense thereof shall be charged to the violator pursuant to Section 31.5-27 below.

responsible party. Any relief obtained under this section shall not prevent City from seeking other and further relief authorized under this Article.

Section 31.5-30. Violations.

It shall be unlawful for any person to violate any provision or fail to comply with any of the requirements of this Article. A violation of or failure to comply with any of the requirements of this Article shall constitute a misdemeanor and shall be punished as set forth in City Code Section 1.7.

Section 31.5-31. Compensatory Action.

In lieu of enforcement proceedings, penalties, and remedies authorized by this Article, the Public Works Director may impose upon a violator alternative compensatory actions, such as storm drain stenciling, attendance at compliance workshops, creek cleanup, etc.

Section 31.5-32. Violations Deemed a Public Nuisance

In addition to the enforcement processes and penalties hereinbefore provided, any condition caused or permitted to exist in violation of any of the provisions of this Article is a threat to public health, safety, and welfare, and is declared and deemed a nuisance, and may be summarily abated or restored by the City at the violator's expense, and/or a civil action to abate, enjoin, or otherwise compel the cessation of such nuisance may be taken by the City.

Section 31.5-33. Acts Potentially Resulting in a Violation of the Federal Clean Water Act and/or California Porter-Cologne Act.

Any person who violates any provision of this Article or any provision of any requirement issued pursuant to this chapter, may also be in violation of the Clean Water Act and/or the Porter-Cologne Act and may be subject to the sanctions of those acts including civil and criminal penalties. Any enforcement action authorized under this Article shall also include written notice to the violator of such potential liability."

SECTION 2. All ordinances and parts of ordinances in conflict herewith are hereby repealed.

SECTION 3. This ordinance shall be in full force and effect 30 days after its final passage and adoption.

PASSED AND ADOPTED BY THE COUNCIL OF THE CITY OF [**Municipality**] this ____ day of _____, 19__, by the following vote:

AYES: COUNCILMEMBERS:

NOES: COUNCILMEMBERS:

ABSENT: COUNCILMEMBERS:

- - - - -

APPROVED:

/s/ _____
Mayor of said City

ATTEST:

/s/ _____
City Clerk thereof

Date of Publication:

3C – Procedures (Proposed: FY 2005-2006)	
Description	Written and adopted procedures for addressing illicit discharge is an important staff tool.
Justification	Having a set of written procedures for City staff to follow in the event that an illicit discharge is discovered will help ensure that enforcement is followed through consistently.
Measurable Goal	Establish a set of procedures for City staff to follow to address illicit discharge. Procedures to include step by step approach and applicable phone numbers. All Public Works employees and Building Department employees to get one hour of training.
Implementation Schedule	Year 1: Written procedures established and adopted. All PW staff and Building Dept. staff trained in procedures (1 hour).
Progress Measurement	Procedures established and adopted. Training documented.
Effective Measurement	Procedures are in place to properly address illicit discharges. All PW and Bldg. staff are able to effectively respond to illicit discharge reports.

3C – Procedures (Implementation: FY 2005-2006)

General Summary: On January 24th 2006, Public Works established a procedure to address illicit discharge to the storm drain system or water bodies. The procedures require that reports of illicit discharges are to be logged and brought to the attention of the SWMP Coordinator or designee. The SWMP Coordinator or designee is to oversee that the illicit discharge is addressed to conclusion. Attachment 3C.1 outlines in detail procedures for addressing illicit discharge.

Status of Measurable Goals: The first year's measurable goal was met. A set of procedures to address illicit discharge was developed. The Public Works administrative staff, SWMP coordinator, and key maintenance staff were trained to respond to illicit discharge.

Effectiveness: Since the illicit discharge procedure has been in place, Public Works has received one (3/2/06) report of illicit discharge resulting from a sanitary sewer overflow. Following the illicit discharge procedure Public Works was able to address the problem to conclusion; Attachment 3C.2 is a copy of the illicit discharge log and report.

Proposed Modifications: Through control measure 2E-Public Hotline, the public has been directed to report all illicit discharges to Public Works at 408-776-7337 (main line). By funneling all illicit discharges through Public Works, this eliminates the need to train the Building Department staff on addressing the illicit discharge.

Ongoing Implementation:

3C – Procedures (Year 2: FY 2006-2007)	
Description	Written and adopted procedures for addressing illicit discharge is an important staff tool.
Justification	Having a set of written procedures for City staff to follow in the event that an illicit discharge is discovered will help ensure that enforcement is followed through consistently.
Measurable Goal	Train applicable Public Works ~~and Bldg.~~ employees about illicit discharge (twice per year, ½ hour per session). Update procedures if necessary.
Implementation Schedule	Year 2: All PW and Bldg. staff receive ½ hour of training two times on procedures.
Progress Measurement	All PW ~~and Bldg.~~ staff receives two sessions of training. Training is documented.
Effective Measurement	All PW ~~and Bldg.~~ staff understand how to respond to illicit discharge reports. Reports handled consistently.
*Modifications are noted by the underlined text.	

ATTACHMENT 3C.1

CITY OF MORGAN HILL

PUBLIC WORKS DEPARTMENT
100 EDES COURT
MORGAN HILL, CA 95037-5301
ENGINEERING: 408-776-7337
MAINTENANCE: 408-776-7333
FAX: 408-779-6282
WWW.MORGAN-HILL.CA.GOV

PUBLIC WORKS DEPARTMENT
ENGINEERING AND MAINTANCE DIVISION
POLICY MEMORANDUM #_____

DATE: **JANUARY 24, 2006**
TO: **PUBLIC WORKS STAFF**
FROM: **STORM WATER MANAGEMENT PLAN COORDINATOR**

SUBJECT: **ILLICIT DISCHARGE/DUMPING INTO STORM DRAINS, STREAMS, CREEKS, RIVERS, AND CHANNELS**

As part of the City's Storm Water Management Plan (SWMP), the City is required to provide a Phone Hot Line for the public to report sightings of illicit discharges/dumping into storm drains, streams, creeks, rivers, and channels. All reports shall be logged and addressed immediately.

Illicit discharges are essentially anything other than storm water runoff that infiltrates the City's storm drain system or creeks and channels through either direct connections (e.g., wastewater piping either mistakenly or deliberately connected to the storm drains) or indirect connections (e.g., infiltration into the municipal storm drain system from cracked sanitary systems, spills collected by drain outlets, or paint or used oil dumped directly into a drain). The result is untreated discharges that contribute high levels of pollutants, including heavy metals, toxics, oil and grease, solvents, nutrients, viruses, and bacteria to receiving water bodies. Pollutant levels from these illicit discharges have been shown in Environmental Protection Agency (EPA) studies to be high enough to significantly degrade receiving water quality and threaten aquatic, wildlife, and human health.

The public will be encouraged to use the Phone Hot Line to report illicit discharges.

PROCEDURES

I. LOGGING ILLICIT DISCHARGE/DUMPING FOR REGULAR BUSINESS HOURS: For Monday thru Friday (8:00 AM to 5:00 PM), the public will be directed to report illicit discharge/dumping to Public Works at 408-776-7337. The administrative staff shall log illicit discharge/dumping calls in the following manner:

A. Request and log the following information (see attached log form):
   1. Caller's full name.
   2. Caller's contact phone number.
   3. When did the discharge or dumping occur (time and date if discharge/dumping occurred a different day)?
   4. Where is the location (address if possible) of the illicit discharge/dumping?
      a. Public storm drain
      b. Private storm drain
      c. Stream, Creek, River, or channel
   5. Who is the discharger? If available, provide discharger's vehicle license plate number.
      a. Construction activity

b. Industrial activity
c. Private residence
d. Commercial
e. Other

6. What type of illicit discharge?
    a. Oil products
    b. Debris
    c. Soaps
    d. Trash
    e. Hazardous materials
    f. Unknown
    g. Other

II. RESPONSE TO ILLICIT DISCHARGE IN PUBLIC RIGHT OF WAY: Addressing Illicit Discharge/Dumping into the Public Storm Drain System and City Channels.

A. Notify the Storm Water Management Plan (SWMP) Coordinator or designee.
    1. SWMP Coordinator shall oversee that the illicit discharge is addressed to conclusion and prepare a report for the SWMP. The Director of Public Works shall be given a copy of the report.

B. SWMP coordinator or designee shall ascertain ownership of facility contaminated. If it is a City owned/maintained facility the Maintenance Supervisor shall be contacted. Maintenance shall:
    1. Secure the illicit discharge and contact the Santa Clara County Fire Department at 408-299-2503. If it is not in the means of Maintenance to secure the illicit discharge await County fire for assistance.
        a. County Fire Department and Maintenance shall determine the proper clean up disposal of the illicit discharge, by in-house clean up or by a City contracted remediation service. When remediation is required contact:
        Phillips Services Corporation/Environmental Division (formerly Allwaste)
        P.O. Box 150 (12475 Llagas Avenue)
        San Martin, CA 95046
        1-800-321-1030 OR 683-2395 (dial "0" after beep for after-hours)
    2. Notify Santa Clara Valley Water District (SCVWD), if illicit discharge has entered into a SCVWD facility/jurisdiction, at 1-888-510-5151.

III. RESPONSE TO ILLICIT DISCHARGE ON PRIVATE PROERTY: Addressing Illicit Discharge into Private Storm Drain System.

A. Notify the Storm Water Management Plan (SWMP) Coordinator or designee.
    1. SWMP Coordinator shall oversee that the illicit discharge is addressed to conclusion and prepare a report for the SWMP. The Director of Public Works shall be given a copy of the report.

B. SWMP coordinator or designee shall ascertain ownership of facility contaminated. If it is a privately owned/maintained facility the owner shall be contacted.
    1. The owner shall be notified of the situation and required to immediately address remediation of illicit discharge.

2. The owner shall be informed if subsequent down stream remediation is required within the public right-of-way; cost borne by the City to remediate shall be the responsibility of the owner.

C. SWMP coordinator or designee shall notify the Maintenance Supervisor of possible illicit discharge within the public right-of-way due to up stream flow from a private facility. Maintenance shall:
   1. Determine if down stream condition within the public right-of-way needs to be addressed.
   2. If discharge reached public right of way, maintenance personnel shall address illicit discharge/dumping per section II above, as required by Maintenance.

IV. RESPONSE TO ILLICIT DISCHARGE IN JURISDICTION OF SANTA CLARA VALLEY WATER DISTRICT: Addressing Illicit Discharge into Streams, Creeks, Rivers, and Channels under Santa Clara Valley Water District's (SCVWD) Jurisdiction.

A. Notify the Storm Water Management Plan (SWMP) Coordinator or designee.
   1. SWMP Coordinator shall oversee that the illicit discharge is addressed to conclusion and prepare a report for the SWMP. The Director of Public Works shall be given a copy of the report.

B. SWMP coordinator or designee shall ascertain ownership of facility. If it is a SCVWD owned/maintained facility the Maintenance Supervisor shall be contacted. Maintenance shall:
   1. Field verify SCVWD is contaminated and contact SCVWD at 1-888-510-5151.
   2. Determine if up-stream condition within the public right-of-way needs to be addressed.
   3. If discharge originates in the public right-of-way, maintenance personnel shall address illicit discharge/dumping per section II above, as required by Maintenance.

V. LOGGING ILLICIT DISCHARGE/DUMPING FOR NON-BUSINESS HOURS: For non-business hours, weekends and holidays the public will be directed to leave a detailed voicemail reporting illicit discharges to Public Works at 408-776-7337 Extension 5.

A. The main phone message shall direct the caller to Extension 5 to leave a message regarding the observed illicit discharge/dumping.

B. Extension 5 shall have the following instructions:
   1. "Hello. You have reached the City of Morgan Hill hotline to report illegal dumping of materials into storm drains, creeks, channels, or other bodies of water."
   2. "Please leave your name and phone number, where you can be reached, and a detailed message."

C. Extension 5 shall be checked daily immediately in the morning for messages regarding illicit discharge/dumping. The administrative staff shall:
   1. Log illicit discharge/dumping message per procedure I and verify message with a 'call back'.
   2. Notify SWMP Coordinator of the illicit discharge/dumping.
      a. SWMP Coordinator shall oversee that the illicit discharge is addressed to conclusion per procedure II, III, or IV.

CITY OF MORGAN HILL

PUBLIC WORKS DEPARTMENT
100 EDES COURT
MORGAN HILL, CA 95037-5301
ENGINEERING: 408-776-7337
MAINTENANCE: 408-776-7333
FAX: 408-779-6282
WWW.MORGAN-HILL.CA.GOV

STORM WATER MANAGEMENT PLAN (SWMP)

ILLICIT DISCHARGE/ILLEGAL DUMPING INCIDENT FORM

DATE: _____

PUBLIC WORKS STAFF: _____

CALLER INFORMATION		
Name:	_____ First	_____ Last
Phone Number:	_____ Home	_____ Work

ILLICIT DISCHARE/DUMPING INFORMATION

1. When did the discharge or dumping occur? _____ Time _____ Date

2. Where is the location of the illicit discharge/dumping?
   Street/Address: _____
   Closest Intersection(s): _____
   Discharge/Dumping into: Public Storm Drain☐ Private Storm Drain☐ Stream/Creek/River☐

3. Who is the discharger? _____
   Activity linked to the discharge: Construction☐ Industrial☐ Commercial☐ Private☐ Other☐ _____
   Vehicle linked to the discharge: (if applicable) _____ License Plate _____ Make and Model

4. What type of illicit discharge? Oils☐ Soaps☐ Trash☐ Debris☐ Paints☐ Sewage☐ Hazardous Materials☐ Other☐ _____

Note: If this template form is used on the computer to log illicit discharge(s), save in the network drive: N:\PROJECTS\STORM WATER-NPDES\ILLICIT DISHCHARGE-DUMPING LOGS.
File shall be named in the following format: YEAR-MONTH-DAY-Illicit Discharge-Dumping Log.doc.

Once log is complete notify Storm Water Management Plan Coordinator to address illicit discharge.

3D – Public Hotline (Proposed: FY 2005-2006)	
Description	To promote public input, the City will have a hotline.
Justification	A public hotline will allow the public to report illicit discharges. The public's help will enable the City to better monitor illicit discharges.
Measurable Goal	Establish a public hotline for the public to utilize 24 hours per day. Train reception staff on how to retrieve hotline calls.
Implementation Schedule	Year 1: City will establish hotline. Reception staff will be trained on hotline.
Progress Measurement	Hotline established. Persons retrieving hotline calls will be trained.
Effective Measurement	Track number of calls received and number of calls received that result in enforcement action. Track number of actual illicit discharges detected through hotline.

3D – Public Hotline (Implementation: FY 2005-2006)

General Summary: Per control measure 2E, the Public Works main phone line, 408-776-7337, is the designated illicit discharge hotline. The administrative staff has been trained to log illicit phone calls (per Attachment 3D.1) and relay information to the SWMP Coordinator to address the illicit discharge per control measure 3C.

Status of Measurable Goals: This year's measurable goal was met; Public Works main phone number was designated as the illicit discharge hotline.

Effectiveness: Since the illicit discharge procedure has been in place, Public Work has received one 'Hotline' (3/2/06) report of illicit discharge resulting from a sanitary sewer overflow.

Proposed Modifications: The City will promote the existence of the hotline on the City's internet page, community bulletins, and at City facilities.

Ongoing Implementation:

3D – Public Hotline (Year 2: FY 2006-2007)	
Description	To promote public input, the City will have a hotline.
Justification	A public hotline will allow the public to report illicit discharges. The public's help will enable the City to better monitor illicit discharges.
Measurable Goal	Keep and maintain a public hotline for the public to utilize 24 hours per day.
Implementation Schedule	Year 2: All City employees will receive instructions for illicit discharge protocol.
Progress Measurement	Hotline established. Persons retrieving hotline calls will be trained.
Effective Measurement	Track number of calls received and number of calls received that result in enforcement action. Track number of actual illicit discharges detected through hotline.
*Modifications are noted by the <u>underlined text</u>.	

ATTACHMENT 3D.1

CITY OF MORGAN HILL

PUBLIC WORKS DEPARTMENT
100 EDES COURT
MORGAN HILL, CA 95037-5301
ENGINEERING: 408-776-7337
MAINTENANCE: 408-776-7333
FAX: 408-779-6282
WWW.MORGAN-HILL.CA.GOV

STORM WATER MANAGEMENT PLAN (SWMP)

ILLICIT DISCHARGE/ILLEGAL DUMPING INCIDENT FORM

DATE: _____

PUBLIC WORKS STAFF: _____

CALLER INFORMATION

Name: _____ First _____ Last

Phone Number: _____ Home _____ Work

ILLICIT DISCHARE/DUMPING INFORMATION

1. When did the discharge or dumping occur? _____ Time _____ Date

2. Where is the location of the illicit discharge/dumping?
   Street/Address: _____
   Closest Intersection(s): _____
   Discharge/Dumping into: Public Storm Drain☐ Private Storm Drain☐ Stream/Creek/River☐

3. Who is the discharger? _____
   Activity linked to the discharge: Construction☐ Industrial☐ Commercial☐ Private☐ Other☐ _____
   Vehicle linked to the discharge: (if applicable) _____ License Plate _____ Make and Model

4. What type of illicit discharge? Oils☐ Soaps☐ Trash☐ Debris☐ Paints☐ Sewage☐ Hazardous Materials☐ Other☐ _____

Note: If this template form is used on the computer to log illicit discharge(s), save in the network drive: N:\PROJECTS\STORM WATER-NPDES\ILLICIT DISHCHARGE-DUMPING LOGS.
File shall be named in the following format: YEAR-MONTH-DAY-Illicit Discharge-Dumping Log.doc.

Once log is complete notify Storm Water Management Plan Coordinator to address illicit discharge.

3E – Notification of Targeted Industries (Proposed: FY 2005-2006)	
Description	Outreach to applicable commercial and industrial establishments that potentially discharge to waterways.
Justification	Reaching out to applicable commercial and industrial establishments that can potentially discharge to waterways will raise awareness and reduce illicit discharges.
Measurable Goal	The City will provide informational brochures to motor vehicle dealerships, repair shops, restaurants, and other commercial and industrial establishments that handle materials that should not be discharged into water ways.
Implementation Schedule	Year 1: City will distribute brochures.
Progress Measurement	Brochures distributed.
Effective Measurement	Track illicit discharge reports from commercial and industrial entities that have received brochures.

3E – Notification of Targeted Industries (Implementation: FY 2005-2006)

General Summary: The control measure was not implemented.

Status of Measurable Goals: This year's measurable goal was not met; staff was not available to dedicate time to this control measure.

Effectiveness: Not applicable.

Proposed Modifications: To better address this measure the City will identify commercial and industrial establishments that geographically pose the largest threats for discharging directly into creeks and streams. Public Works is working with the Santa Clara Valley Water District (SCVWD) under their Safe Creeks Grant program to pay for a consultant to implement this control measure. Attachment 3E.1 is the request for proposal from SCVWD and the City's proposal for various funding of SWMP's control measures, with item 5 being the funding request for this control measure. The City will supplement this program with its own resources to help with implementation.

Ongoing Implementation:

3E – Notification of Targeted Industries (Year 2: FY 2006-2007)	
Description	Outreach to applicable commercial and industrial establishments that potentially discharge to waterways.
Justification	Reaching out to applicable commercial and industrial establishments that can potentially discharge to waterways will raise awareness and reduce illicit discharges.
Measurable Goal	The City will provide informational brochures to motor vehicle dealerships, repair shops, restaurants, and other commercial and industrial establishments that handle materials that should not be discharged into water ways.
Implementation Schedule	Year 2: City will distribute brochures.
Progress Measurement	Brochures distributed.
Effective Measurement	Track illicit discharge reports from commercial and industrial entities that have received brochures.
*Modifications are noted by the underlined text.	

Santa Clara Valley Water District

ATTACHMENT 3E.1

5750 ALMADEN EXPWY
SAN JOSE, CA 95118-3686
TELEPHONE (408) 265-2600
FACSIMILE (408) 266-0271
www.valleywater.org
AN EQUAL OPPORTUNITY EMPLOYER

August 3, 2006

AUG 04 2006
CITY OF MORGAN HILL

Mr. Jay Baksa
City Administrator
City of Gilroy
7351 Rosanna Street
Gilroy, CA 95020-6197

Mr. Karl Bjarke
Deputy Director of Public Works/Engineering
City of Morgan Hill
100 Edes Court
Morgan Hill, CA 95037-5301

Subject: Clean, Safe Creeks Outcome 2.1: South Santa Clara County Urban Runoff Pollutant Reduction

Dear Mr. Baksa and Mr. Bjarke:

The Santa Clara Valley Water District's (District) Clean, Safe Creeks and Natural Flood Protection Program includes an urban runoff pollutant reduction effort for cities in south Santa Clara County. The key performance indicator for this effort is to "reduce urban runoff pollutants in South County cities." In order to achieve that objective the District seeks to collaborate with south county municipalities by offering limited funding in support of projects that include but are not limited to: direct pollutant reduction measures; direct or indirect monitoring; staff training; and public outreach. The District is seeking applicant projects for fiscal year (FY) ending June 30, 2007. Applications for FY 2007 funding should be submitted as soon as possible.

The District is able to award up to $30,000 in total for FY 2007 to qualifying municipal projects. While the District is under no constraints to do so, it is the District's desire to award those funds equally between south county cities. Project applications should be brief but include the following elements:

1. Project Name
2. Project Description
3. Qualitative and/or Quantitative Measures of Runoff Pollutant Reductions
4. Project Milestones with Associated Schedules
5. Amount of District funding Requested

Projects that are awarded District funding will be required to submit brief quarterly reports that describe progress toward milestones and qualitative and/or quantitative achievement of runoff pollutant reductions.

If you have any questions or require more information, please contact Dale Jacques at (408) 265-2607, extension 2637, or at djacques@valleywater.org.

Sincerely,

Ann Draper
Assistant Operating Officer
Office of Watershed Planning

cc: Mr. Jim Ashcraft
Director of Public Works/Engineering
City of Morgan Hill
100 Edes Court
Morgan Hill, CA 95037-5301

Mr. Tony Eulo
Environmental Programs Coordinator
City of Morgan Hill
17555 Peak Avenue
Morgan Hill, CA 95037-5301

Ms. Lisa Jensema
Environmental Programs Coordinator
City of Gilroy
7351 Rosanna Street
Gilroy, CA 95020-6197

Mr. Rick Smelser
City Engineer
7351 Rosanna Street
Gilroy, CA 95020-6197

J. Fiedler, A. Draper, M. Klemencic, R. Narsim, D. Jacques

ad:mf
0802c-l.doc

CITY OF MORGAN HILL

PUBLIC WORKS DEPARTMENT
100 EDES COURT
MORGAN HILL, CA 95037-5301
ENGINEERING: 408-776-7337
MAINTENANCE: 408-776-7333
FAX: 408-779-6282
WWW.MORGAN-HILL.CA.GOV

August 18, 2006

Mr. Dale Jacques
Santa Clara Valley Water District
5750 Almaden Expressway
San Jose, CA 95118

Re: Clean Safe Creeks Outcome 2.1:
South Santa Clara County Urban Runoff Pollution Reduction
FY 2006 Request for Funding

Dear Mr. Jacques:

This is the City of Morgan Hill's request for FY 2006 funding as called for in your August 3rd 2006 letter. Attached is the 'Urban Runoff Pollution Reduction Funding Table', showing 8 proposed projects seeking the District's available funding. The proposed projects parallel the City's NPDES Storm Water Management Plan's various Minimum Control Measures. The funding table prioritizes the projects in order from 1 to 8, with 1 having the highest priority and 8 the lowest.

Thank you for the opportunity to participate with the Santa Clara Valley Water District in this program. Should you have any questions or require any additional information, please do not hesitate to contact me or Charlie Ha at 408-776-7337.

Sincerely,

Karl Bjarke
Deputy Public Works Director

cc: Jim Ashcraft, Director of Public Works
Anthony Eulo, Program Administrator
Saeed Vaziry, City of Gilroy

Urban Runoff Pollution Reduction Funding Table

PROJECT NAME	PROJECT DESCRIPTION	PROJECT EFFECTIVENESS	PROJECT TASKS & SCHEDULE	PROJECT EXPENDITURES	BUDGET
1 Ordinance: Storm Water and Urban Runoff Pollution Control	Develop an ordinance to protect the health and safety of the residents of the city by protecting the water quality, beneficial uses, marine habitats, and ecosystems of the receiving waters of the city, from pollutant carried by urban runoff.	Ordinance will address illicit discharges; establish regulatory control of construction site and urban run-off among other things. The Ordinance will give the City authority to levy fines against violations to this Ordinance.	Research and develop a Stormwater Quality Ordinance based on the SWRCB model ordinance and neighboring municipalities' ordinances. 10/1/06-12/31/06 Staff to review and comment 1/1/07-03/31/07 Adopt Ordinance 04/01/07-06/31/07	1) Consultant to develop Stormwater Quality Ordinance (16 hours x $150/hours = $2,400).	$2,400
2 City Corporation Yard SWPPP	Develop and implement a Storm Water Pollution Prevention Plan for the City's corporation yard.	Permanent standards (SWPPP) of Best Management Practices to help maintain proper water quality discharges.	Develop Corporation Yard SWPPP: 10/1/06 – 12/31/06. Training and implementation of SWPPP: 01/01/07-03/31/07.	1) Consultant to develop SWPPP ($4,000). 2) Consultant presentation prep/ presentation training (6 hours x $150/hours = $900).	$4,900
3 Staff Training	Implement a training program for field personnel about storm water quality and how their actions can have a direct impact on water quality.	Pubic Work maintenance staff will be trained to perform field work in a manner not to negatively affect storm water quality.	Consultant to develop training presentation: 01/0/07-03/31/07. Training of various maintenance crews (Park, Sanitary, Storm, etc): 4/01/07-6/31/07	1) Consultant to develop training presentation for Park, Storm, and Sewer crew (12 hours x $150/hours = $1,800) 2) Consultant presentation prep/ presentation training (6 hours x $150/hours = $900).	$2,700
4 Stormdrain Stenciling	The City has historically had a poorly-organized and somewhat haphazard stormdrain stenciling effort. This project will formalize the effort with the development and use of an official City stencil.	"No Dumping, Drains to Creeks" and similar stenciled messages directly on drain inlets will help educate to curb illicit discharge into the storm drain system. Tracking of stenciled curb inlets will be mapped on the City's Storm Drain.	Research Available Stencils: 7/1/06 – 8/31/06 Adopt Stencil: 9/1/06 – 9/30/06 Hold Two Separate Stenciling Efforts: 10/1/06 – 11/30/06	1) Purchase Stencils. 2) Paying community group to organize stenciling effort. 3) Event materials (paint, refreshments, etc.)	$5,000

Urban Runoff Pollution Reduction Funding Table

PROJECT NAME	PROJECT DESCRIPTION	PROJECT EFFECTIVENESS	PROJECT TASKS & SCHEDULE	PROJECT EXPENDITURES	BUDGET
5 Public Outreach to Businesses	Outreach to applicable commercial and industrial establishments that can potentially discharge to waterways, to raise awareness and reduces possible illicit discharge into the public and private storm drain systems.	Education on the benefits and importance pollution prevention in the storm drain system directly with the commercial and industrial businesses via verbal dialogue and information brochures and packets.	Obtain brochures for Best Management Practices to address illicit discharge for motor dealerships, repair shops, services stations, and other commercial/industrial establishments that handle materials that should not be discharge into water ways: 10/1/06 –12/31/06 Contact targeted industries and distribute brochures: 01/1/07 – 03/31/07	1) Consultant time to contact targeted industries and distribute brochures. Target 60 businesses. (2 visits per hour, 30 hours x $150/hour = $4,500).	$4,500
6 Upper Grades Environmental Education Program	The City currently has a stormwater education program in progress for children in grades K-6. This project would initiate a second effort for grades 7-12. A contractor would be used to offer stormwater presentations, equipment, and curriculum to the six local public and private upper grade schools. The contractor will provide follow-up assistance and guidance as needed to the interested educators.	Education on the benefits and importance pollution prevention in the storm drain system directly with large young target audience in an academic setting.	Contact Schools: 8/1/06 – 9/30/06 Set up Individual School Meetings: 8/1/06 – 9/30/06 Provide In-Depth Follow Up Assistance and Materials: 9/1/06 – 6/15/07 Chronicle Accomplishments: 10/1/06 – 6/30/07	1) Consultant time for public outreach. 2) Education materials for students.	$15,000
7 Participation in Public Events	There are three annual outdoor festivals in Morgan Hill with thousands of attendees. This project will identify and train a local organization to set up and staff a booth at each of these events. The booth will offer information on pollutant reduction strategies to the public. The events are the 4th of July Family Fun Fest, the Taste of Morgan Hill, and the Mushroom Mardi Grass	Education on the benefits and importance pollution prevention in the storm drain system directly with the public via verbal dialogue and information brochures and packets.	Identify and Train Local Group: (Pretask completed before project) Obtain Booth Space: 7/1/06 – 4/15/07 Collect and Prepare Existing Booth Materials: 7/1/06 – 5/15/07 Monitor and Assist Organizations in Staffing Booth During Events: 7/1/06 – 5/31/07	1) Paying community group to staff booth and training. 2) Booth entry fees and materials/giveaways.	$5,000

Urban Runoff Pollution Reduction Funding Table

PROJECT NAME	PROJECT DESCRIPTION	PROJECT EFFECTIVENESS	PROJECT TASKS & SCHEDULE	PROJECT EXPENDITURES	BUDGET
8 Earth Day Art and Science Fair	For three years, the City has sponsored an Earth Day Art and Science Fair with funding from the State's beverage container recycling program. The focus of the event will be broadened to include urban runoff pollution prevention.	Education on the benefits and importance pollution prevention in the storm drain system directly with the public via verbal dialogue and information brochures and packets.	Solicit Entries: 8/1/06 – 3/21/07 Set up Fair: 4/20/07 – 4/22/07 Judge Entries: 4/22/07 Award Winners: 4/22/07 – 5/15/07	1) Money to be added to event contract for event administration.	$5,000

3F – Used Oil Disposal (Proposed: FY 2005-2006)	
Description	City-wide used oil collection program.
Justification	A program whereby citizens can dispose of used oil bi-weekly curbside and with two local drop-off locations will help eliminate residential waste oil dumping.
Measurable Goal	Collect used oil bi-weekly as a component of City curbside recycling program. For residents not served by the curbside program, two local drop-off locations and additional opportunities for used oil recycling through the Countywide Household Hazardous Waste Management Program.
Implementation Schedule	Year 1: Collect used oil bi-weekly and offer two local drop-off locations.
Progress Measurement	Curbside program in place. Two drop-off locations established.
Effective Measurement	Track volume of used oil recycled. Track number of visits to drop-off locations. Are reported used oil illicit discharges increasing? Decreasing?

3F – Used Oil Disposal (Implementation: FY 2005-2006)

General Summary (per MCM 1G): Curbside oil collection, by South Valley Disposal & Recycling, continues on a biweekly basis throughout the community at single-family residences. To serve residents that do not have curbside recycling, two local locations accept used oil on a drop-off basis:

Speedee Oil Change* at 890 Tennant Station and
Kragen Auto Parts* at 16060 Monterey Road.
*(these locations are Certified Collections Centers approved by the State's Integrated Waste Management Broad)

Status of Measurable Goals: The first year's measurable goal was met. Collection of used oil occurred biweekly.

Effectiveness: 6,233 gallons of used oil were collected from July 2005 – June 2006 by South Valley Disposal & Recycling. The number of households served is not tracked. This is slightly less than the 6,730 gallons collected in the previous year.

317 gallons of used oil were collected from April 2005 – March 2006 by Speedy Oil Change. 3,862 gallons of used oil were collected from April 2005 – March 2006 by Kragen Auto Parts. Attachment 3F.1 is a summary of used oil collection as tabulated by the County of Santa Clara Department of Environmental Health, Household Hazardous Waste Program. Totals were based on the 'Do It Yourself' (DIY) oil change quarterly totals. 2006 second quarter totals were not available that the time of this report.

There were no reports of illicit discharge of oil into the local storm drains or creeks.

Proposed Modifications: The number of visits to drop-offs locations is not tracked by the county.

Ongoing Implementation:

3F – Used Oil Disposal (Year 2: FY 2006-2007)	
Description	City-wide used oil collection program.
Justification	A program whereby citizens can dispose of used oil bi-weekly curbside and with two local drop-off locations will help eliminate residential waste oil dumping.
Measurable Goal	Collect used oil bi-weekly as a component of City curbside recycling program. For residents not served by the curbside program, two local drop-off locations and additional opportunities for used oil recycling through the Countywide Household Hazardous Waste Management Program.
Implementation Schedule	Year 2: Collect used oil bi-weekly and offer two local drop-off locations.
Progress Measurement	Curbside program in place. Two drop-off locations established.
Effective Measurement	Track volume of used oil recycled. ~~Track number of visits to drop-off locations.~~ Are reported used oil illicit discharges increasing? Decreasing?
*Modifications are noted by the underlined text.	

County	CIWMB Grant Manager	Lead Grantee	City of CC	CIWMB ID	Start Date	Expiration Date	Site	Address	Zip	Year & Qtr	All Gallons Claimed	Est. DIY Gallons	All Filters	DIY Filters
Santa Clara	Ashraf	Santa Clara County	Morgan Hill	43-C-05730	12-Jun-01	29-Dec-07	Kragen Auto Parts #4110	16060 Monterey Rd. Ste 100, Morgan Hill, CA 95037	95037	2005/2	1,500	1,500	0	0
Santa Clara	Ashraf	Santa Clara County	Morgan Hill	43-C-05730	12-Jun-01	29-Dec-07	Kragen Auto Parts #4110	16060 Monterey Rd. Ste 100, Morgan Hill, CA 95037	95037	2005/3	1,175	1,175	0	0
Santa Clara	Ashraf	Santa Clara County	Morgan Hill	43-C-05730	12-Jun-01	29-Dec-07	Kragen Auto Parts #4110	16060 Monterey Rd. Ste 100, Morgan Hill, CA 95037	95037	2005/4	845	845	0	0
Santa Clara	Ashraf	Santa Clara County	Morgan Hill	43-C-05730	12-Jun-01	29-Dec-07	Kragen Auto Parts #4110	16060 Monterey Rd. Ste 100, Morgan Hill, CA 95037	95037	2006/1	1173	1,173	0	0
Santa Clara	Ashraf	Santa Clara County	Morgan Hill	43-C-06318	24-Jun-03	24-Jun-05	Speedee Oil Change	890 Tennant Station Ave, Morgan Hill, CA 95037	95037	2005/2	3,550	71	2250	0
Santa Clara	Ashraf	Santa Clara County	Morgan Hill	43-C-07212	19-Jan-06	18-Jan-08	Speedee Oil Change	890 Tennant Station Ave, Morgan Hill, CA 95037	95037	2005/2	same CCC as above			
Santa Clara	Ashraf	Santa Clara County	Morgan Hill	43-C-06318	24-Jun-03	24-Jun-05	Speedee Oil Change	890 Tennant Station Ave, Morgan Hill, CA 95037	95037	2005/3	3,550	71	2250	0
Santa Clara	Ashraf	Santa Clara County	Morgan Hill	43-C-07212	19-Jan-06	18-Jan-08	Speedee Oil Change	890 Tennant Station Ave, Morgan Hill, CA 95037	95037	2005/3	same CCC as above			
Santa Clara	Ashraf	Santa Clara County	Morgan Hill	43-C-06318	24-Jun-03	24-Jun-05	Speedee Oil Change	890 Tennant Station Ave, Morgan Hill, CA 95037	95037	2005/4	3,550	71	2250	0
Santa Clara	Ashraf	Santa Clara County	Morgan Hill	43-C-07212	19-Jan-06	18-Jan-08	Speedee Oil Change	890 Tennant Station Ave, Morgan Hill, CA 95037	95037	2005/4	same CCC as above			
Santa Clara	Ashraf	Santa Clara County	Morgan Hill	43-C-06318	24-Jun-03	24-Jun-05	Speedee Oil Change	890 Tennant Station Ave, Morgan Hill, CA 95037	95037	2006/1	5195	104	2250	0
Santa Clara	Ashraf	Santa Clara County	Morgan Hill	43-C-07212	19-Jan-06	18-Jan-08	Speedee Oil Change	890 Tennant Station Ave, Morgan Hill, CA 95037	95037	2006/1	same CCC as above			
									Total		**20,538**	**5,010**	**9,000**	**0**

ATTACHMENT 3F.1

3G – Household Hazardous Waste Collection (Proposed: FY 2005-2006)	
Description	Household Hazardous Waste Collection.
Justification	Dumping of hazardous waste will be reduced by offering drop-off locations at least once per month.
Measurable Goal	Offer location(s) in the County at least once per month for residents and small business to drop off household hazardous waste.
Implementation Schedule	Year 1: Establish and offer a program for dropping off household hazardous waste.
Progress Measurement	Location(s) and dates to drop-off household hazardous waste established.
Effective Measurement	Track participation in household hazardous waste drop-off program.

3G – Household Hazardous Waste Collection (Implementation: FY 2005-2006)

General Summary (per MCM H1): The City participates in a Countywide Household Hazardous Waste (HHW) management program; the HHW information can be found at http://www.sccgov.org/portal/site/deh/ (see Attachment 1H.1). In this program, residents are provided with multiple opportunities each month to bring HHW, with the San Martin Transfer and Recycling center at 14070 Llagas Avenue being the closest. Information regarding local HHW drop off is specifically listed on the City's internet page under the 'Environmental Programs' page at http://www.morgan-hill.ca.gov/html/citysvc/envir/hazard.asp. Attachment 1H.2 is the operations schedule of the program for the reporting period.

Status of Measurable Goals: The first year's measurable goal was met. HHW collection events were offered multiple times per month.

Effectiveness: The County's annual report for the reporting period will not be available until Fall 2006. Attachment 1H.3 is the County's statement from the previous year. In Fiscal Year 2005, nearly 6% of Morgan Hill residents participated in the program. The County does not track each City's individual tonnage. Preliminary indications are that the participation rate in Morgan Hill increased during Fiscal Year 2006.

Proposed Modifications: None at this time.

Ongoing Implementation:

3G – Household Hazardous Waste Collection (Year 2: FY 2006-2007)	
Description	Household Hazardous Waste Collection.
Justification	Dumping of hazardous waste will be reduced by offering drop-off locations at least once per month.
Measurable Goal	Offer location(s) in the County at least once per month for residents and small business to drop off household hazardous waste.
Implementation Schedule	Year 2: Establish and offer a program for dropping off household hazardous waste.
Progress Measurement	Location(s) and dates to drop-off household hazardous waste established.
Effective Measurement	Track participation in household hazardous waste drop-off program.
*Modifications are noted by the underlined text.	

3H – Public Education (Proposed: FY 2005-2006)	
Description	Educate public on non-storm water pollution prevention.
Justification	Educating the public on non-storm water pollution prevention will help control possible polluting activities that happen in residential neighborhoods.
Measurable Goal	Offer information to the public about the following activities. Washing sidewalks and driveways, washing cars at home, draining swimming pools and spas, and landscape irrigation. Flyers to be made available at public locations and community events. Information posted on City's web page. Information provided on public Channel 17.
Implementation Schedule	Yrs. 1-5: Provide flyers at City Hall public counters. Flyers distributed at public events. Yrs. 1-5: Post information on City's web page and maintain at all times. Yrs. 1-5: Provide information on public television Channel 17 twice per year.
Progress Measurement	Flyers produced and made available. Information posted on web page and maintained at all times. Message placed on Channel 17 twice per year.
Effective Measurement	Track number of flyers distributed. Track number of hits to web page. Survey residents to test knowledge of non-storm water pollution.

3H – Public Education (Implementation: FY 2005-2006)

General Summary: City has various flyers addressing non-storm water pollution prevention available at the City's kiosk and information stand. These include (see Attachments 3H.1):

The Bay Begins at Your Front Door! (SCVURPPP)
Home Maintenance Tips for a Cleaner Bay (BASMAA)
Keeping it all in Tune (BASMAA)
Pets Bugging You? (SCVURPPP)
Santa Clara County House Hold Hazardous Waste Program (Santa Clara County)
Rules of Thumb for Water-Wise Gardening (SCVWD)
Water-Wise Gardening for California (Sunset)
How to Water Your Garden (Sunset)

Information regarding non-storm water pollution prevention available on the City's internet page under 'Environmental Programs' at http://www.morgan-hill.ca.gov/html/citysvc/comm/envir.asp.

Status of Measurable Goals: The first year's measurable goal was met. Information on non-storm water pollution was made available to the public at information counters, on the city's web site and cable channel, and at public events.

Effectiveness: Due to the dynamic nature of this year's public events and the need to get public information out quickly, the number of items handed out at public events was not tracked. Increased efforts to track the number of items distributed will be instituted in Year 2. The City does not currently have the ability to track hits on its web page. No survey of residents was completed this year as staff was not available to complete this task.

Proposed Modifications: None at this time.

ATTACHMENT 3H.1
IS NOT AVAIABLE IN PDF FORMAT

Minimum Control Measure #4 – Construction Site Run-Off Control

Introduction

Construction sites, with their proportionally large areas of disturbed native soil, can contribute significant amounts of polluted storm runoff to the City's drainage system. Sediment is the primary pollutant with runoff rates at construction sites being 10 to 20 times greater than those of agricultural lands, and 1,000 to 2,000 times greater than those of forest lands. During a short period of time, construction sites can contribute more sediment to streams than can be deposited naturally during several decades. The resulting siltation, and the contribution of other pollutants from construction sites, can cause physical, chemical, and biological harm to out nation's waters.

Best Management Practice (BMP) Minimum Control Measure #4 – Construction Site Run-Off Control Summary Table		
BMP	Description	Implementation
4A Ordinance	Ordinance establishing regulatory control of construction site run-off.	Year 2
4B Site Plan Review and Plan Check	Address construction run-off before construction begins.	Year 2
4C Site Inspection and Enforcement	Ensure site inspection at all construction sites.	Year 1
4D Public Hotline	Allow public to report on construction site run-off violations.	Year 1

4A – Ordinance (Year 1: FY 2005-2006 – not scheduled)	
4A – Ordinance (Year 2: FY 2006-2007)	
Description	Ordinance establishing regulatory control of construction site run-off.
Justification	Sedimentation and siltation from construction sites can cause physical, chemical, and biological harm to local waterways if not contained properly. The City requires regulatory enforcement powers to help control these pollutants.
Measurable Goal	Evaluate existing ordinance for erosion and sediment control at construction sites. Create and have City Council adopt ordinance addressing construction site run-off and ensuring compliance with NPDES permit.
Implementation Schedule	Year. 2: City Council adoption of ordinance for erosion and sediment control for all developers of construction sites greater than one acre.
Progress Measurement	Ordinance established and adopted.
Effective Measurement	City staff has sufficient enforcement authority to quickly address construction site run-off issues.

4B – Site Plan Review and Plan Check (Year 1: FY 2005-2006 – not scheduled but implemented in Year 1)

4B – Site Plan Review and Plan Check (Implementation: FY 2005-2006)

General Summary: Public Works has developed and implemented a site plan review and plan check process that ensures approved plans contain applicable measures conforming to the State Water Resources Control Board (SWRCB) Order No.99-08-DWQ NPDES General Permit No. CAS000002 for discharges of storm water runoff associated with construction activity.

Projects which disturbs more than 1 acre or projects part of a larger common plan of development in total disturbs more than 1 acre are required to comply with the NPDES General Permit. As part of the plan approval process, projects are required to:

1. File a Notice of Intent (NOI) with the SWRCB.
2. Provide a NOI Receipt Letter or a Waste Discharge Identification (WDID) number, which can be verified on the SWRCB Stormwater internet web page.
3. Provide a site specific Storm Water Pollution Prevention Plan (SWPPP) manual.
4. Provide as part of the improvement plans Water Pollution Control Drawings for Erosion and Sediment Control.

A grading permit will not be issued until all the above items are satisfied.

Public Works has adopted the California Storm Quality Association (CASQA) standards for Stormwater Best Management Practices (BMPs) and the Storm Water Pollution Prevention Plan (SWPPP) template. Improvement plans must meet or incorporate CASQA BMP standards. Project SWPPP manual submittals must have the same content as the CASQA SWPPP template and conform to the NPDES General Permit requirements. Based on a slightly modified CASQA SWPPP, Attachment 4B.2 is a copy of the City's SWPPP template for developers to use as a form or a model for developing their project SWPPPs.

On October 25, 2005, the Public Works Engineering staff received in house training on the components of a SWMP and SWPPP. Attachment 4B.1 is the attendance log and presentation outline.

Status of Measurable Goals:
The City is ahead of schedule for 4B's control measure. In Year 1 the following Year 2 and 5 implementations have been established:

1. By adopting CASQA BMP standards and SWPPP template, an established construction run-off plan requirement has been met (Year 2).
2. The Public Works Engineering staff received training on the contents of a SWPPP and the proper submittals of a SWPPP (Year 2).
3. Using the CASQA SWPPP template, developers have a detailed guide to aid in the development of an approved SWPPP (Year 5).

Effectiveness: All new developments have submitted or are submitting SWPPPs either based on or model after the CASQA template; new SWPPP's are consistent and complete.

Minimum Control Measure #4 – Construction Site Run-Off Control

Proposed Modifications: None

Ongoing Implementation:

4B – Site Plan Review and Plan Check (Year 2: FY 2006-2007)	
Description	Address construction run-off before construction begins.
Justification	Requiring construction site run-off prevention measures on plans helps reduce problems early on and reduces costly field enforcement.
Measurable Goal	Establish construction plan site run-off prevention requirements. Incorporate requirements in City Design Standards. Train City plan checkers.
Implementation Schedule	Year 2: Establish construction run-off plan requirements. Incorporate into Design Standards. Train plan checkers. Year 2: All Public Works plan check staff to receive training on the contents of a SWPPP and the proper submittals of a SWPPP.
Progress Measurement	Requirements established. Requirements incorporated into Design Standards. Plan Checkers trained. Training provided and documented.
Effective Measurement	Track number of approved plans that have new standards incorporated after program is established. Are all plans getting checked? Plan check review of SWPPP's is consistent. All development in City has proper SWPPP.
*Modifications are noted by the <u>underlined text</u>.	

CALIFORNIA STORM WATER AND URBAN RUNOFF REGULATIONS:

Storm Water Management Plan (SWMP)

Strom Water Pollution Prevention Plan (SWPPP)

ATTACHMENT 4B.1

I. Why regulate storm water and urban run off?

- The State Water Resources Control Board (SWRCB) and EPA finds that:
  - Storm water/urban runoff is a leading cause of pollution throughout California.
  - Pollutants in storm water/urban runoff (some): sediment, vehicle fluids, fertilizers, animal waste, pathogens, pesticides, heavy metals, site construction materials.
  - Urban development creates an increase in impervious surfaces which leads to increases in runoff and pollution loading.
  - Pollution in storm water can have damaging effects such as:
    - Human illness associated with recreational activities in proximity to urban storm drains discharges (beach closures).
    - Impact aquatic ecosystem (fish advisories – mercury content).

I. Why regulate storm water and urban run off?

- Storm Water Regulation: Clean Water Act (CWA) was amended in 1972 to provide that:
  - Discharge of pollutants to waters of the U.S. is unlawful, unless the discharge is in compliance with a National Pollutant Discharge Elimination System (NPDES) permit.
  - 1987 the CWA was further amended with provisions to regulate Municipal and Industrial discharges.

I. Why regulate storm water and urban run off?

- Regulatory Authority:
  - California is authorized by Environmental Protection Agency (EPA) to administer the CWA/NPDES permits.
  - NPDES permits are issued by the State Water Resources Control Board (SWRCB) which oversees nine Regional Water Quality Control Boards (RWQCB) delineated by watershed. Regional boards enforce permits.

II. Regulation development: Phase I and Phase II

- Phase I (November 1990, 1992) required NPDES permits for:
  - Medium and Large Municipal Separate Storm Sewer System (MS4s) serving over 100,000 in population;
  - Industrial activities; and
  - **Construction activities disturbing 5 acres or more of land (Construction General Permit - CGP).**
  - Permits stress development of and executing Best Management Practices (BMPs).

II. Regulation development: Phase I and Phase II

- Phase II (December 1999) required NPDES permits for:
  - **Small MS4s serving populations less than 100,000 (Small MS4 General Permit - SMGP);**
  - **Construction Activities disturbing between 1 and 5 acres of land (CGP – reissued).**
  - Permits stress development of and executing Best Management Practices (BMPs).

III. Permit Overview: SMGP and CGP

- General Permits
  - Scope: General permits apply to multiple permit holders in a category of activities or facilities (Municipal, Industrial, Construction, etc.).
  - Application process: Permit coverage under a general permit is initiated with a submission of a Notice of Intent to comply with a particular general permit to the State Water Resource Control Board (SWRCB). Permits are enforced by the governing Regional Water Quality Control Board (RWQCB).
  - Permit: All permit holders are issued a Waste Discharge Identification Number (WDID#), which is proof of permit coverage.

III. Permit Overview: SMGP and CGP

- Phase II Small MS4s General Permit (SMGP): SWRCB Water Quality Order No.2003-0005-DWQ NPDES General Permit No. CA000004 (adopted April 30, 2003)
  - Small municipalities in urban areas are automatically subject to the SMGP. (City of Morgan Hill).
  - Small MS4 General Permit requires a development of a Storm Water Management Plan (SWMP). The SWMP must establish 6 Minimum Control Measures (MCM), which need to be fully implemented in 5 years.
    - MCM 1: Public Education and Outreach on Storm Water Impacts
    - MCM 2: Public Involvement and Participation
    - MCM 3: Illicit Discharge Detection and Elimination
    - **MCM 4: Construction Site Storm Water Runoff Control**
    - MCM 5: Post-Construction Storm Water Management in New Development and Redevelopment
    - MCM 6: Pollution Prevention and Good Housekeeping for Municipal Operations

III. Permit Overview: SMGP and CGP

- Construction General Permit (CGP): SWRCB Water Quality Order No. 99-08-DWQ, NPDES General Permit No. CA000002 (1992, 1999, amended 2002)
  - What is subject to Construction General Permit?
    - Construction activities disturbing 1 or more acres of land (2002).
    - Construction activities disturbing land which is part of a common plan of development greater than 1 acre.
  - Construction General Permit Requirements:
    - Property owner required to obtain permit, and ultimately liable for contractor's failure to comply.
    - Storm Water Pollution Prevention Plan (SWPPP) must be in place before construction begins.
    - Eliminate or reduce discharge of pollutants in storm water through the use of BMPs.
    - Eliminate non-storm water discharges.
    - Monitoring required, including BMP inspections before, during, and after storm events, and sampling when BMPs malfunction, for sediment, and for invisible pollutants otherwise.
    - Termination of permit once site is stabilized.
    - Retain SWPPP records for 3 years.

IV. Impact of SWMP to PW-Engineering

- SWMP: The immediate MCM which impacts the City is MCM 4: Construction Site Storm Water Runoff Control.
  - Sites greater than 1 acre or sites part of a common plan of development greater than 1 acre are required to obtain the NPDES CGP.
  - Sites are required to submit SWPPP to Public Works for review and approval.
  - Sites are to be inspected for General Permit compliance of SWPPP. City inspections need to be logged and documented.

V. SWPPP Requirements

- SWPPP Objective (cover the CGP requirements):
  - Identify all pollutant sources of sediment and construction activities/materials that may affect the quality of storm water discharges during construction;
  - Identify non-storm water discharges;
  - Identify, construct, implement, and maintain BMPs to reduce or eliminate pollutants in storm water discharges;
  - Develop a maintenance schedule for BMPs installed during construction designed to reduce or eliminate pollutants after construction is complete (post-construction BMPs).
  - Identify a sampling and analysis strategy and sampling schedule for discharges from construction activity which discharge directly into water bodies listed per Clean Water Act Section 303d. (NOTE: only sites which discharge directly to Llagas Creek will require this, most site are exempt)
  - For all construction activity, identify a sampling and analysis strategy and sampling schedule for discharges that have been discovered through visual monitoring to be potentially contaminated by pollutants no visually detectable in the runoff.

V. SWPPP Requirements

- Implementation Schedule
- Availability/Public Access to SWPPP (SWRCB, RWQCB, CMH)
- Required Changes (amendments)
- Source Identification
  - Project Information
    - Maps
    - Water Pollution Control Drawings (WPCDs)
      - » Existing Grades
      - » Proposed Grades
      - » Erosion and Sediment controls
  - Pollutant source identification with itemization of BMPs to control listed pollutants

V. SWPPP Requirements

- Erosion Control
- Sediment Control
- Tracking Control
- Wind Erosion Control
- Non-Storm Water Management
- Waste Management Control

V. SWPPP Requirements

- Post-Construction Storm Water Management
- Maintenance, Inspection, and Repair
- Training
- List of Contractors/Subcontractors
- Certification
- Non compliance Reporting
- Monitoring Program for sedimentation/siltation
- Monitoring Program for pollutants not visually detectable in storm water.
- NOI receipt letter / WDID

VI. SWPPP BMPs

- Erosion Control
  - Preservation of existing vegetation
  - Straw mulch
  - Geotextiles and mats
- Sediment Control
  - Silt fence
  - Fiber rolls (straw wattles)
  - Street Sweeping and Vacuuming
  - Sandbag barrier
  - Storm drain inlet protection

VI. SWPPP BMPs

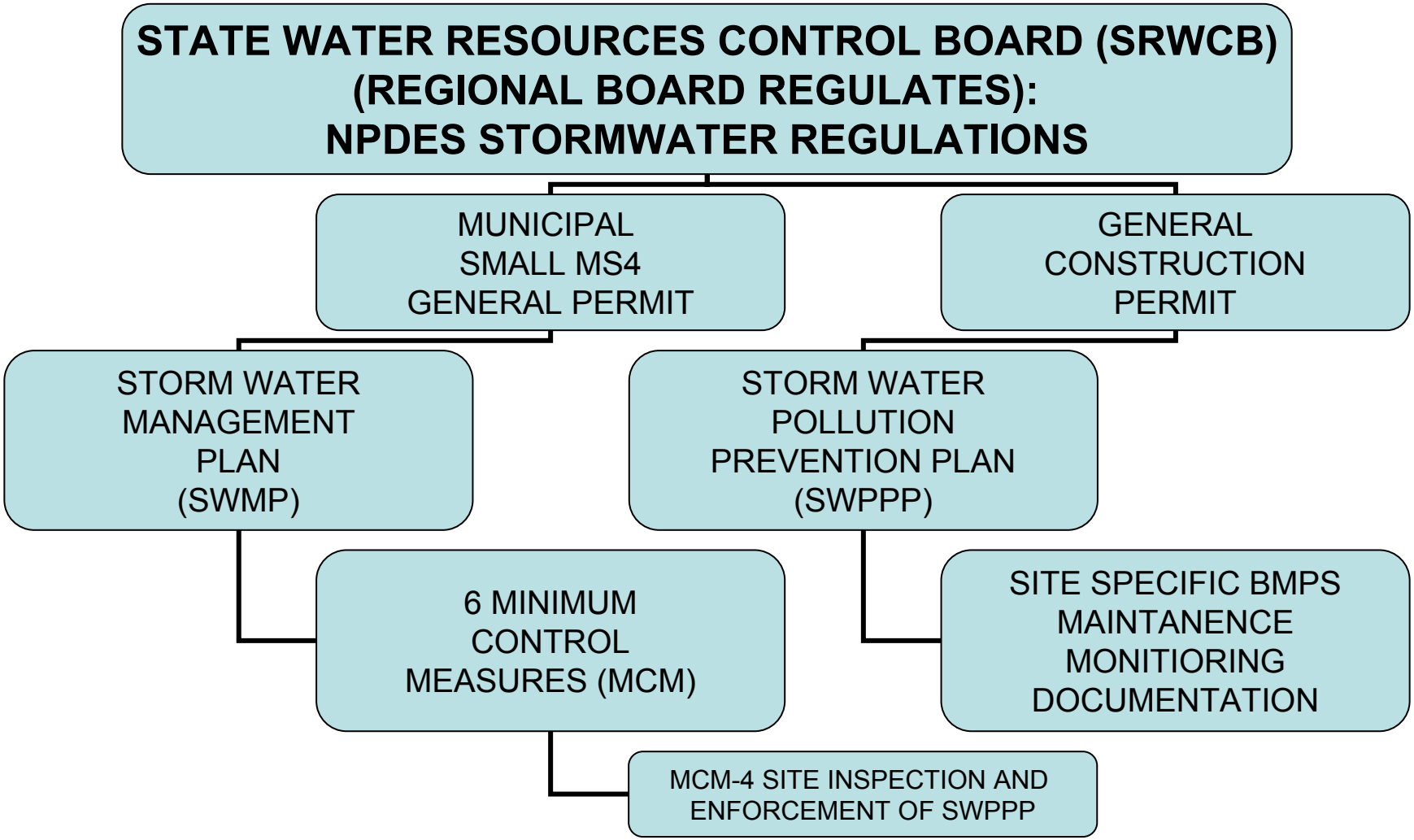
- Tracking Control
  - Stabilized construction entrance/exit
  - Entrance/outlet tire wash
- Wind Erosion Control

VI. SWPPP BMPs

- Non-Storm Water Control
  - Water conservation practices
  - Paving and grinding operations
  - Vehicle and equipment cleaning
  - Vehicle and equipment fueling
  - Vehicle and equipment maintenance
  - Concrete Curing
  - Materials and equipment use over water
  - Concrete finishing
  - Structure demolition/removal
  - Concrete waste management

VI. SWPPP BMPs

- Waste Management and Materials Pollution Control
  - Material delivery and storage
  - Material use
  - Stockpile Management
  - Hazardous waste Management
  - Sanitary/Septic Waste Management


STATE WATER RESOURCES CONTROL BOARD (SRWCB)
(REGIONAL BOARD REGULATES):
NPDES STORMWATER REGULATIONS
MUNICIPAL
SMALL MS4
GENERAL PERMIT
GENERAL
CONSTRUCTION
PERMIT
STORM WATER
MANAGEMENT
PLAN
(SWMP)
STORM WATER
POLLUTION
PREVENTION PLAN
(SWPPP)
6 MINIMUM
CONTROL
MEASURES (MCM)
SITE SPECIFIC BMPS
MAINTANENCE
MONITIORING
DOCUMENTATION
MCM-4 SITE INSPECTION AND
ENFORCEMENT OF SWPPP

ATTACHMENT 4B.2

CALIFORNIA STORMWATER BMP HANDBOOK

CONSTRUCTION

STORM WATER

POLLUTION

PREVENTION

PLAN

TEMPLATE

CALIFORNIA STORMWATER BEST MANAGEMENT PRACTICES HANDBOOK
CONSTRUCTION

REQUIREMENTS FOR A
STORM WATER POLLUTION PREVENTION PLAN

A Storm Water Pollution Prevention Plan (SWPPP) must be developed and implemented for construction projects that disturb one (1) acre or more, in accordance with the following:

(1) *State Water Resources Control Board (SWRCB) Order No. 99-08-DWQ, National Pollutant Discharge Elimination System (NPDES) Permit No. CAS000002, Waste Discharge Requirements (WDRs) for Discharges of Storm Water Runoff Associated with Construction Activity (General Permit)*;

(2) *State Water Resources Control Board Resolution No. 2001- 046, Modification of Water Quality Order 99-08-DWQ State Water Resources Control Board (SWRCB) National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction Activity (General Permit)*; and

(3) *State Water Resources Control Board Resolution No. 2001-155, Modification of Water Quality Order 99-08-DWQ State Water Resources Control Board (SWRCB) National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction Activity (General Permit) to include Small Construction Activity (One to Five Acres)*

The purpose of the SWPPP is to identify potential pollutant sources that may affect the quality of discharges associated with construction activity, to identify non-storm water discharges, and to design the use and placement of Best Management Practices (BMPs) to effectively prohibit the entry of pollutants from the construction site into the storm drain system during construction. Erosion and sediment source control BMPs must be considered for both active and inactive (previously disturbed) construction areas. BMPs for wind erosion and dust control are also included. The SWPPP will likely require modification as the project progresses and as conditions warrant.

The template herein is provided for information purposes to assist Developers/Contractors in preparing a SWPPP. Other SWPPP templates developed by individual agencies may also be used.

Prior to the issuance of any construction/grading permit for private projects subject to the General Permit, the Developer/Contractor must provide proof of submittal of a Notice of Intent (NOI) to the Regional Water Quality Control Board (RWQCB) to comply with the General Permit.

Prior to the commencement of any clearing, grading or excavation of any public works project subject to the General Permit, a SWPPP will be prepared and implemented. The template herein can be used for preparing the SWPPP.

The Owner/Developer/Contractor is responsible for ensuring that all project Contractors and subcontractors implement all applicable BMPs.

The Storm Water Pollution Prevention Plan and BMPs (EC, SE, WM, etc.) referenced are from the following sources:

> California Stormwater BMP Handbook - Construction, 2003 Edition. The Handbooks may be downloaded from the California Stormwater BMP Handbook web site at www.cabmphandbooks.com.

INSTRUCTIONS

- The title page shall have the following information:
  - ❑ Title: "Storm Water Pollution Prevention Plan"
  - ❑ Project Name
  - ❑ Project Grading Permit Number, Building Permit Number, Tract Number, CUP, SUP, and/or APN
  - ❑ Project Owner/Developer/Contractor
  - ❑ Owner/Developer/Contractor's Name, Address, Telephone Number and Authorized Representative
  - ❑ Job Site Location/Address and Telephone Number, if Any
  - ❑ Identification and address of Lead Agency (City or County Agency)
  - ❑ Name of Contractor's Storm Water Pollution Prevention Manager (SWPPM). This person shall be responsible for SWPPP implementation, inspection and repairs.
  - ❑ Name of the Consulting Engineering company that prepared the SWPPP (if it was prepared by an outside consultant), including name and title of preparer
  - ❑ SWPPP Preparation Date
  - ❑ Estimated dates for start and end of construction
  - ❑ WDID Number

- A template title page is provided below.

REQUIRED TEXT:

Storm Water Pollution Prevention Plan

For:

Start Here…Triple Click here to insert Project Name-then TAB to next field

INSERT GRADING PERMIT NO., BUILDING PERMIT NO., TRACT NUMBER, CUP, SUP AND/OR APN -THEN TAB TO NEXT FIELD.

Prepared for:
City of Morgan Hill
Building Department, 17555 Peak Avenue
Public Works Department, 100 Edes Court
Morgan Hill, CA 95037-5301
408-776-7337

Owner/Developer/Contractor:
Insert Owner/Developer/Contractor's Company Name-then TAB.
Insert Address 1 then press ENTER to insert Address 2 or TAB to next field.
Insert City, State, ZIP-then TAB.
Insert Telephone-then TAB.
Insert Owner/Developer/Contractor's Representative's Name-then TAB.

Project Site Location/Address:
Insert project site address if any. Press the DELETE key if not and TAB to next field.
Insert job site telephone number, if any. Press the DELETE key if not and TAB to next field.

Contractor's Storm Water Pollution Prevention Manager
Insert SWPPM's Name-then TAB.
Insert Telephone Number(s)-then TAB.

SWPPP Prepared by:
Insert Company Name-then TAB.
Insert Address-then TAB.
Insert City, State, ZIP-then TAB.
Insert Telephone-then TAB
Insert Name and Title of Preparer-then TAB.

SWPPP Preparation Date:
Insert Date

Estimated Project Dates:
Start of Construction: Insert Date **Completion of Construction: Insert Date**

WDID No.: Insert Waste Discharge Identification Number

INSTRUCTIONS

- ❑ Include the numbers and names for each section of the SWPPP, from Section 100 to Section 600. List the first page number of each subsection.
- ❑ Include a Tab for each major section of the SWPPP and for each of the attachments.

REQUIRED TEXT:

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SWPPP Attachments

Attachment A ..... Vicinity Map
Attachment B ..... Water Pollution Control Drawings
Attachment C ..... BMP Consideration Checklist
Attachment D ..... Computation Sheet for Determining Runoff Coefficients
Attachment E ..... Computation Sheet for Determining Run-on Discharges
Attachment F ..... Notice of Intent (NOI)
Attachment G ..... Program for Maintenance, Inspection, and Repair of Construction Site BMPs
Attachment H ..... Storm Water Quality Construction Site Inspection Checklist
Attachment I ..... Trained Contractor Personnel Log
Attachment J ..... Subcontractor Notification Letter and Log
Attachment K ..... Notice of Non-Compliance
Attachment L ..... SWPPP and Monitoring Program Checklist
Attachment M ..... Annual Certification of Compliance Form
Attachment N ..... Other Plans/Permits
Attachment O ..... Water Pollution Control Cost Breakdown
Attachment P ..... Notice of Termination (NOT)
Attachment Q ..... BMPs Selected for the Project
Attachment R ..... Sampling Activity Log
Attachment S ..... Construction Material and Pollutant Testing Guidance Table – Non-Visible Pollutants
Attachment T ..... Discharge Reporting Log

Section 100
SWPPP Certifications and Approval

100.1 Initial SWPPP Certification by Contractor

INSTRUCTIONS:

- ❑ Include a Separator and Tab for Section 100 for ready reference.

- The SWPPP shall be signed and certified by the Contractor or authorized qualified designee, in conformance with Section C, Provision 9 of the General Construction Permit (CAS000002, Order No. 99-08-DWQ).

- ❑ Fill in the project name and the grading permit number, building permit number, tract number, CUP, SUP or APN at the top of the form.
- ❑ Certification shall be signed and dated by the person responsible for overall management of the site, such as a corporate officer or person assigned the responsibility by a corporate officer, according to corporate procedures.
- ❑ Fill in the name, title and telephone number of the person signing the certification.
- ❑ The SWPPP and Monitoring Program Checklist in Attachment L shall be completed and submitted.
- ❑ The Notice of Intent (NOI) is to be attached in Attachment F. The completed form must be provided by the Owner/Developer.

REQUIRED TEXT: To be completed by Contractor

Project Name:	**Start Here…Triple Click here to insert Project Name-then TAB to next field**
Project Number:	**Insert Grading Permit No., Building Permit No., Tract Number, CUP, SUP and/or APN -then TAB to next field.**

"I certify under a penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, to the best of my knowledge and belief, the information submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Contractor's Signature	Date
Contractor's Name and Title	Telephone Number

100.2 Owner/Developer Approval and Certification of SWPPP

INSTRUCTIONS:

- The SWPPP shall be signed and certified by the Owner/Developer/Contractor in conformance with Section C, Item 9 of the General Construction Permit (CAS000002, Order No. 99-08-DWQ).
- This certification shall be signed by a responsible corporate officer, principal executive officer, general partner or proprietor, or by a duly authorized representative. A person is a duly authorized representative only if:
  1. The authorization is made in writing by a person described above and retained as part of the SWPPP.
  2. The authorization specifies either an individual or a position having responsibility for the overall operation of the construction activity, such as the position of manager, operator, superintendent, or position of equivalent responsibility or an individual or position having overall responsibility for environmental matters of the company or agency.
  3. If an authorization is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization must be reported to the Regional Board and attached to the SWPPP prior to submittal of any reports, certifications, or information signed by the authorized representative.
- In the case of Public Works projects, the [City] Engineer is the authorized representative of the agency for approving, signing, and certifying the SWPPP, in conformance with Section C, Item 9 of the General Construction Permit (CAS000002, Order No. 99-09-DWQ).

- ❑ Fill in the project name and the grading permit number, building permit number, tract number, CUP, SUP or APN at the top of the form.
- ❑ Certification shall be signed and dated by the Owner/Developer staff; specifically, the person responsible for preparation of the SWPPP and/or person responsible for overall management of the site, such as a corporate officer or person assigned the responsibility by a corporate officer, according to corporate procedures.
- ❑ Fill in the name(s), title(s) and telephone number(s) of the person(s) signing the certification.

REQUIRED TEXT:

Owner/Developer
Approval and Certification of the
Storm Water Pollution Prevention Plan

Project Name: **Start Here…Triple Click here to insert Project Name-then TAB to next field**

Project Number: **Insert Grading Permit No., Building Permit No., Tract Number, CUP, SUP and/or APN -then TAB to next field.**

"I certify under a penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, to the best of my knowledge and belief, the information submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Owner/Developer Signature	Date
Owner/Developer Name	Telephone Number

100.3 Annual Compliance Certification

INSTRUCTIONS:

- Owner/Developer/Contractor's qualified assigned/authorized personnel listed by name and contact telephone number in the SWPPP shall certify annually that construction activities comply with the requirements of the Permit and the SWPPP. This Certification is based upon the site inspections required in Section 600.
- The Owner/Developer/Contractor is responsible for completing and submitting a Letter of Certification and Annual Fee to the RWQCB prior to July 1 of each year.
- A blank copy of the Annual Certification of Compliance shall be included in the SWPPP as Attachment M.
- Completed and signed Annual Compliance Certifications and [City] Engineer Approvals shall be included in this section of the SWPPP following the required text, below.
- Do not complete the Annual Certification during the initial SWPPP approval. Annual certifications are completed by July 1 each year. For those projects that start construction on or after July 1, an Annual Certification will not be required until the following July 1.

REQUIRED TEXT:

By July 1 of each year, the Contractor shall submit an Annual Certification of Compliance to the Central Coast Regional Water Quality Control Board (RWQCB), stating compliance with the terms and conditions of the Permit and the SWPPP. The Annual Certification of Compliance Form is included in Attachment M. Completed Annual Certifications of Compliance and Approvals can be found in the following pages.

Annual Certification shall be sent to:

Central Coast Regional Water Quality Control Board
Stormwater/401 Division
895 Aerovista Place , Suite 101
San Luis Obispo, CA 93401
(805) 549-3147

Section 200
SWPPP Amendments

200.1 SWPPP Amendment Certification and Approval

INSTRUCTIONS:

- ❑ Include a Separator and Tab for Section 200 for ready reference.

- When changes to the approved SWPPP are required, the Contractor shall prepare and certify an amendment. The Owner/Developer shall review and approve all amendments.
- The SWPPP shall be amended:
  - Whenever there is a change in construction or operations which may affect the discharge of pollutants to surface waters, groundwater(s), or a municipal separate storm sewer system (MS4);

    or
  - If any condition of the Permit is violated or the general objective of reducing or eliminating pollutants in storm water discharges has not been achieved. If the RWQCB determines that a Permit violation has occurred, the SWPPP shall be amended and implemented within 14-calendar days after notification by the RWQCB;

    and
  - Annually, prior to the defined rainy season.
- All SWPPP amendments shall be transmitted in letter format and shall include revised drawings as appropriate.
- All amendments shall be recorded in the SWPPP Amendment Log that is located in Section 200.2 of the SWPPP.
- Amendments will be inserted into the Owner/Developer/Contractor's on-site SWPPP. Owner/Developer/Contractor Certifications for all amendments shall be inserted into this section.
- The following items shall be included in each amendment:
  - Discuss who requested the amendment.
  - Describe the location of proposed change.
  - Describe reason for change.

- Describe the original BMP proposed, if any.
- Describe the new BMP proposed.
- Describe any existing implemented BMP(s)

❑ This SWPPP certification and approval form shall be used as a cover sheet for each amendment.

❑ Fill-in the Project name and number.

❑ The Owner/Developer/Contractor shall sign and date the certification form.

❑ The [City] Engineer shall sign and date the certification approval form.

❑ Print the names and telephone numbers.

EXAMPLE:

The Regional Water Quality Board has requested the following Amendment:

The concrete washout is to be relocated away from the drainage inlet at Miller Ave. It is now located on the northeast section of the construction site, see revised map. This change will prevent concrete washout water from entering the drainage inlet.

REQUIRED TEXT:

This SWPPP shall be amended:

- Whenever there is a change in construction or operations which may affect the discharge of pollutants to surface waters, groundwater(s), or a municipal separate storm sewer system (MS4); or
- If any condition of the Permits is violated or the general objective of reducing or eliminating pollutants in storm water discharges has not been achieved. If the RWQCB determines that a Permit violation has occurred, the SWPPP shall be amended and implemented within 14-calendar days after notification by the RWQCB;
- Annually, prior to the defined rainy season; and
- When deemed necessary by the Owner/Developer/Contractor.

All SWPPP amendments shall be transmitted in letter format and shall include revised drawings as appropriate.

All amendments shall be recorded in the SWPPP Amendment Log that is located in Section 200.2 of the SWPPP.

Amendments will be inserted into the Owner/Developer/Contractor's on-site SWPPP. Owner/Developer/Contractor Certifications for all amendments shall be inserted into this section.

The following items will be included in each amendment:

- Who requested the amendment.
- The location of proposed change.
- The reason for change.
- The original BMP proposed, if any.
- The new BMP proposed.
- The following SWPPP certification and approval form shall be used as a cover sheet for each amendment.

INSERT ADDITIONAL RESPONSIBILITIES AND/OR NAMES HERE OR DELETE THIS LINE (Use the "FORMAT OPTIONS" button to insert subtitles and/or paragraphs)

SWPPP Amendment No.

Project Name:	**Start Here…Triple Click here to insert Project Name-then TAB to next field**
Project Number:	**Insert Grading Permit No., Building Permit No., Tract Number, CUP, SUP and/or APN -then TAB to next field.**

Contractor Certification of the Storm Water Pollution Prevention Plan Amendment

"I certify under a penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, to the best of my knowledge and belief, the information submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Contractor's Signature	Date
Contractor's Name and Title	Telephone Number

Owner/Developer Approval of the Storm Water Pollution Prevention Plan Amendment

"I certify under a penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, to the best of my knowledge and belief, the information submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Owner/Developer Signature	Date
Owner/Developer Name and Title	Telephone Number

200.2 Amendment Log

INSTRUCTIONS:

- SWPPP amendment(s) prepared and approved as discussed in Section 200.1 shall be documented in the Amendment Log, which shall be kept in Section 200 of the SWPPP, immediately following the Certification and Approval forms.
- All amendments shall be dated, directly attached to the SWPPP, and listed in the Amendment Log.
  - ❑ Enter the project name and number(s) at the top of the form.
  - ❑ Enter the Amendment number, Date, Brief Description, and Name of Person Who Prepared the Amendment in the table.

EXAMPLE:

Amendment No.	Date	Brief Description of Amendment	Prepared By
001	Dec 10, 2000	Grading schedule changed to begin on Feb 10, 2001, and will include additional 2 acres. Amended plans attached to SWPPP.	John Doe, Superintendent

REQUIRED TEXT:

Project Name: **Start Here…Triple Click here to insert Project Name-then TAB to next field**

Project Number: **Insert Grading Permit No., Building Permit No., Tract Number, CUP, SUP and/or APN -then TAB to next field.**

Amendment No.	Date	Brief Description of Amendment	Prepared By

Amendment No.	Date	Brief Description of Amendment	Prepared By

Section 300
Introduction and Project Description

300.1 Introduction and Project Description

INSTRUCTIONS:

- ❑ Include a Separator and Tab for Section 300 for ready reference.
- ❑ Provide the project's legal description, (County, City and address). Describe proximity to receiving waters to which the project will discharge, including surface waters, drainage channels, and drainage systems (identify who owns the drainage system; i.e., municipality or agency.)

EXAMPLE:

The construction project is located in Orange County, in Any city. The project is a land development that will ultimately include 600 single-family homes, a planned senior community and commercial properties. The project will be constructed in four stages. The main project features include mass grading, construction of water, storm drain and sewer lines, underground telephone, electric and cable TV lines, roadways and buildings.

REQUIRED TEXT:

CLICK AND TYPE PROJECT DESCRIPTION HERE

300.2 Unique Site Features

INSTRUCTIONS:

- ❑ Provide a brief description of any unique site features (water bodies, wetlands, environmentally sensitive areas, endangered or protected species, etc.) and significant or high-risk construction activities that may impact storm water quality. Include any unique features or activities within or adjacent to water bodies (such as dredging, dewatering, re-use of aerially deposited lead material, large excavations, or work within a water body).

EXAMPLE:

Conejo Creek traverses the project in a southwesterly direction. Conejo Creek is located east of the project site adjacent to the project limits. Conejo Creek is a dry creek that only flows during storm events.

REQUIRED TEXT:

CLICK AND TYPE PROJECT FEATURES HERE

300.3 Construction Site Estimates

INSTRUCTIONS:

- Provide an estimate of the following site features (Refer also to Attachments D and E):
  - ❑ Construction site area (acres)
  - ❑ Runoff coefficient before and after construction
  - ❑ Percentage impervious area before and after construction
  - ❑ Anticipated storm water run-on to the construction site (Show calculations and include as Attachment E).

EXAMPLE:

The following are estimates of the construction site:

Construction site area:	530 Acres
Percentage impervious area before construction:	0 %
Runoff coefficient before construction (1):	0.43
Percentage impervious area after construction	40%
Runoff coefficient after construction (1)	0.60
Anticipated storm water flow on to the construction site (2)	35.1 cfs

(1) Calculations are shown in Attachment D
(2) Calculations are shown in Attachment E

REQUIRED TEXT:

The following are estimates of the construction site:

Construction site area	_____	acres
Percentage impervious area before construction	_____	%
Runoff coefficient before construction (1)	_____	
Percentage impervious area after construction	_____	%
Runoff coefficient after construction (1)	_____	
Anticipated storm water flow on to the construction site (2)	_____	cfs

(1) Calculations are shown in Attachment D
(2) Calculations are shown in Attachment E

300.4 Project Schedule/Water Pollution Control Schedule

INSTRUCTIONS:

- ❑ Provide a written and graphical project schedule. The schedule shall clearly show how the rainy season relates to soil-disturbing and re-stabilization activities. The schedule shall contain an adequate level of detail to show major activities sequenced with implementation of construction site BMPs, including:
  - ❑ Project start and finish dates
  - ❑ Rainy season dates
  - ❑ Annual certifications
  - ❑ Mobilization dates
  - ❑ Mass clearing and grubbing/roadside clearing dates
  - ❑ Major grading/excavation dates
  - ❑ Special dates named in other permits such as Fish and Game and Army Corps of Engineers Permits
  - ❑ Dates for submittal of SWPPP Amendments required by the contract documents
  - ❑ Annual submittal of rainy season implementation schedule if required by the Permittee

- ❑ Dates for implementation of pre-rainy season temporary soil stabilization and temporary sediment control BMPs, if required by the contract documents
- ❑ Rainy season implementation schedule
  - ❑ Deployment of temporary soil stabilization BMPs
  - ❑ Deployment of temporary sediment control BMPs
  - ❑ Deployment of wind erosion control BMPs
  - ❑ Deployment of tracking control BMPs
  - ❑ Deployment of non-storm water BMPs
  - ❑ Deployment of waste management and materials pollution control BMPs
- ❑ Non-rainy season implementation schedule
  - ❑ Deployment of temporary soil stabilization BMPs
  - ❑ Deployment of temporary sediment control BMPs
  - ❑ Deployment of wind erosion control BMPs
  - ❑ Deployment of tracking control BMPs
  - ❑ Deployment of non-storm water BMPs
  - ❑ Deployment of waste management and materials pollution control BMPs
- ❑ Paving, saw-cutting, and any other pavement related operations
- ❑ Major planned stockpiling operations
- ❑ Dates for other significant long-term operations or activities that may plan non-storm water discharges such as dewatering, grinding, etc.
- ❑ Final stabilization activities staged over time for each area of the project

EXAMPLE: Written Schedule

Estimate Construction Start: 05/01/2000

Estimate Construction Finish: 04/15/2002

Mobilization of equipment and materials to begin on 05/01/2000

Store temporary soil stabilization and temporary sediment control products beginning on 05/01/2000.

Install stabilized construction entrance on 05/01/2000

Site preparation: Clearing and grubbing (Phase I) will occur from 05/25/2000-06/30/2000

Begin construction of residential units 5/30/2000-6/30/2001

Submit annual rainy season implementation schedule 9/25/00

Prepare soil stabilization and sediment control implementation plan prior to the rainy season, submit to the Owner/Developer by 09/25/2000

Start implementation of temporary soil stabilization and sediment control BMPs on 09/28/00 (before rainy season starts). Continue to implement and maintain temporary BMPs throughout rainy season.

Complete installation of temporary soil stabilization and sediment control BMPs on 10/05/2000

Rainy season begins 10/15/2000

Excavation to begin on 06/30/2000 and continue through 02/20/2001

Installation of utilities (power lines, phone lines, storm drain and sewer lines) 3/2001-9/2001

Grading work 07/15/2000 – 02/20/2001.

Clearing and grading for commercial property lots 7/30/2000 – 12/31/2000

Schedule soil stabilization subcontractors for application of temporary soil stabilization on disturbed areas and permanent erosion control on areas substantially complete: 09/01/2000

Rainy season ends 04/15/2001

Clearing and grubbing (Phase II) from 05/01/2001 through 07/30/2001

SWPPP Annual Certification due on 07/01/2001

Begin trenching, backfilling and compaction on 07/15/2001

Implement final erosion control of substantially completed areas 8/1/2001

Install temporary concrete washout 09/10/2001

Submit annual rainy season implementation schedule 09/25/2001

Start implementation of temporary soil stabilization and sediment control BMPs on 09/28/2001 (before rainy season starts). Continue to implement and maintain temporary BMPs throughout rainy season.

Complete installation of temporary soil stabilization and sediment control BMPs on 10/05/2001

Rainy season starts 10/15/2001

End residential units construction on or before 01/25/2002

Begin final paving/construction on 02/01/2002. Continue to apply soil stabilization and sediment controls as needed during construction

Remove concrete washout and restore area to original grade

Schedule subcontractors for application of permanent erosion control 03/01/2002

Start final stabilization, revegetation and landscape by 03/15/2002

Project complete 04/15/2002

REQUIRED TEXT:

CLICK AND TYPE EITHER NARRATIVE PROJECT SCHEDULE OR ATTACH SCHEDULE IN THIS SECTION. IF THE SCHEDULE IS NOT AVAILABLE, NOTE AS SUCH AND PROVIDE PRIOR TO GRADING ACTIVITIES/PRE-CONSTRUCTION MEETING.

300.5 Contact Information/List of Responsible Parties

INSTRUCTIONS:

- Owner/Developer/Contractor is required to show the Name, Address and Telephone number(s) of the person(s) responsible for SWPPP management/implementation, water pollution control and Permit compliance during construction. This person shall be called the Storm Water Pollution Prevention Manager (SWPPM).
- Duties of the SWPPM include but are not limited to:
  - Ensuring full compliance with the SWPPP and the Permit
  - Implementing all elements of the SWPPP and contract documents, including but not limited to:
    - Implementation of prompt and effective erosion and sediment control measures
    - Implementing all non-storm water management, and materials and waste management activities such as: monitoring discharges (dewatering, diversion devices); general site clean-up; vehicle and equipment cleaning, fueling and maintenance; spill control; ensuring that no materials other than storm water are discharged in quantities which will have an adverse effect on receiving waters or storm drain systems; etc.
  - Pre-storm inspections
  - Storm event inspections
  - Post-storm inspections

- Routine inspections as specified in the project's specifications or described in the SWPPP
- Updates/Amendments to the SWPPP, as needed
- Preparing annual compliance certification
- Ensuring elimination of all unauthorized discharges
- The SWPPM shall be assigned authority by the Owner/Developer/Contractor to mobilize crews in order to make immediate repairs to the control measures
- Coordinate with the Owner/Developer/Contractor to assure all of the necessary corrections/repairs are made immediately, and that the project complies with the SWPPP, the Permit and approved plans at all times.
- Submitting Notices of Discharge and reports of Illicit Connections or Illegal Discharges

■ If anyone else other than the SWPPM is responsible for any of these duties, enter Name, address, telephone number(s) of the person(s) and the duty or duties for which they are responsible and edit the template below as needed.

❑ Name and Telephone Number(s) of the Contractor's SWPPM. The Contractor's SWPPM shall have primary responsibility and significant authority for the implementation, maintenance, inspection and amendments to the approved SWPPP.

REQUIRED TEXT:

The Storm Water Pollution Prevention Manager (SWPPM) assigned to this project is:

Insert SWPPM's Name-then **TAB.**

Insert Telephone Number(s)-then **TAB.**

Insert Owner/Developer/Contractor's Company Name-then **TAB.**

Insert Address 1 then press **ENTER to insert Address 2 or TAB to next field.**

Insert City, State, ZIP-then **TAB.**

The SWPPM shall have primary responsibility and significant authority for the implementation, maintenance, inspection and amendments to the approved SWPPP. The SWPPM will be available at all times throughout the duration of the project. Duties of the Owner/Developer/Contractor's SWPPM include but are not limited to:

■ Ensuring full compliance with the SWPPP and the Permit

- Implementing all elements of the SWPPP, including but not limited to:
  - Implementation of prompt and effective erosion and sediment control measures
  - Implementing all non-storm water management, and materials and waste management activities such as: monitoring discharges (dewatering, diversion devices); general site clean-up; vehicle and equipment cleaning, fueling and maintenance; spill control; ensuring that no materials other than storm water are discharged in quantities which will have an adverse effect on receiving waters or storm drain systems; etc.
- Pre-storm inspections
- Storm event inspections
- Post-storm inspections
- Routine inspections as specified in the project's specifications or described in the SWPPP
- Updates/Amendments to the SWPPP, as needed
- Preparing annual compliance certification
- Ensuring elimination of all unauthorized discharges
- The SWPPM shall be assigned authority by the Owner/Developer/Contractor to mobilize crews in order to make immediate repairs to the control measures
- Coordinate with the Owner/Developer/Contractor to assure all of the necessary corrections/repairs are made immediately, and that the project complies with the SWPPP, the Permit and approved plans at all times
- Submitting Notices of Discharge and reports of Illicit Connections or Illegal Discharges

INSERT ADDITIONAL RESPONSIBILITIES AND/OR NAMES HERE OR DELETE THIS LINE (Use the "FORMAT OPTIONS" button to insert subtitles and/or paragraphs)

Section 400
References

INSTRUCTIONS:

- ❑ Include a Separator and Tab for Section 400 for ready reference.
- ❑ Identify and prepare a list of the documents referenced in the SWPPP. Project Plans & Specifications, reports, design, and storm water management related documents used to prepare the SWPPP must also be included in the references.

- Documents that shall be referenced are:
  - ❑ All permits that apply to the project (Federal, state and local), such as Fish and Game, U.S. Army Corps of Engineers, DTSC Aerially Deposited Lead Reuse Variance, local RWQCB Permits or specific requirements, etc.

- Referenced materials may also include:
  - ❑ On-site project information such as the project plans and specifications, Geotechnical Report, Hydrology/Hydraulic Report, other reports provided by the Owner/Developer/Contractor, regulatory guidance from federal or state agencies, and published technical specifications

- The reference for each document shall include:
  - ❑ Complete name of the referenced document
  - ❑ Number of the document (if applicable)
  - ❑ Author
  - ❑ Date Published
  - ❑ Document date/revision that applies
- Referenced documents shall be kept on-site and be readily available for review.

EXAMPLE:

The following documents are made a part of this SWPPP by reference:

- Project plans and specifications No. xx-xxxx
- State Water Resources Control Board (SWRCB) Order No. 99-08-DWQ, National Pollutant Discharge Elimination System (NPDES) General Permit No. CAS000002, Waste Discharge Requirements (WDRs) for Discharges of Storm Water Runoff Associated with Construction Activity. August 19, 1999, ("Permit").
- State Water Resources Control Board (SWRCB) Resolution No. 2001- 046, Modification of Water Quality Order 99-08-DWQ State Water Resources Control Board (SWRCB) National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated With Construction Activity (General Permit), adopted by the SWRCB on April 26, 2001.
- Modification of Water Quality Order 99-08-DWQ State Water Resources Control Board (SWRCB) National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated With Construction Activity (General Permit) to Include Small Construction Activity (One to Five Acres), adopted by the SWRCB on December 2, 2002.
- California Regional Water Quality Control Board, Los Angeles Region, Waiver of Clean Water Act Section 401 Water Quality Certification, dated xx/xx/xx.
- US Army Corps of Engineers, Nationwide Permit 26-authorization letter, dated xx/xx/xx.
- California Stormwater BMP Handbook – Construction, January 2003
- Storm Water Management for Construction Activities – Developing Pollution Prevention Plans and Best Management Practices, USEPA 832-R-92-005, October 1992.

REQUIRED TEXT:

The following documents are made a part of this SWPPP by reference:

- Project plans and specifications No. INSERT NUMBER, dated INSERT DATE, perpared by ENTITY PREPARING THE PLANS, SPECIFICATIONS AND ESTIMATE.
- State Water Resources Control Board (SWRCB) Order No. 99-08-DWQ, National Pollutant Discharge Elimination System (NPDES) General Permit No. CAS000002, Waste Discharge Requirements (WDRs) for Discharges of Storm Water Runoff Associated with Construction Activity.
- California Stormwater BMP Handbook – Construction, January 2003, the BMP Handbook can be viewed/downloaded at the following internet address: http://www.cabmphandbooks.com/Documents/Construction/Construction.pdf

- CLICK AND TYPE FOR ADDITIONAL TEXT, PRESS RETURN FOR NEW LINE ITEM. TO CLEAR LINE USE DELETE LINE BUTTON.

Referenced documents shall be kept on-site and be readily available for review.

Section 500
Body of SWPPP

500.1 Objectives

INSTRUCTIONS:

- ❑ Include a Separator and Tab for Section 500 for ready reference.
- The six primary SWPPP objectives are described in the General Permit and are shown below in the "required text" section. Pollutant source identification and BMP selections shall be developed in the body of the SWPPP to support the six SWPPP objectives.

REQUIRED TEXT:

This Storm Water Pollution Prevention Plan (SWPPP) has six main objectives:

- Identify all pollutant sources, including sources of sediment that may affect the quality of storm water discharges associated with construction activity (storm water discharges) from the construction site, and
- Identify non-storm water discharges, and
- Identify, construct, implement in accordance with a time schedule, and maintain Best Management Practices (BMPs) to reduce or eliminate pollutants in storm water discharges and authorized non-storm water discharges from the construction site during construction, and
- Develop a maintenance schedule for BMPs installed during construction designed to reduce or eliminate pollutants after construction is completed (post-construction BMPs).
- Identify a sampling and analysis strategy and sampling schedule for discharges from construction activity which discharge directly into water bodies listed on Attachment 3 of the General Permit (Clean Water Act Section 303(d) [303(d)] Water Bodies listed for Sedimentation).

- For all construction activity, identify a sampling and analysis strategy and sampling schedule for discharges that have been discovered through visual monitoring to be potentially contaminated by pollutants not visually detectable in the runoff.

This SWPPP conforms with the required elements of the General Permit No. CAS000002 issued by the State of California, State Water Resources Control Board (SWRCB). This SWPPP will be modified and amended to reflect any amendments to the Permit or any changes in construction or operations that may affect the discharge of pollutants from the construction site to surface waters, groundwaters, or the municipal separate storm sewer system (MS4). The SWPPP will also be amended if it is in violation of any condition of the Permit or has not achieved the general objective of reducing pollutants in storm water discharges. The SWPPP shall be readily available on-site for the duration of the project.

500.2 Vicinity Map

INSTRUCTIONS:

- The General Permit requires that both a vicinity and site map be included in the SWPPP.
  - ❑ The Vicinity Map shall be a 8-1/2" x 11" color copy of a USGS map or equal and shall extend approximately 400 meters (one-quarter mile) beyond the property boundaries of the construction site (an 11" x 17" may be used if needed). Insert the vicinity map as Attachment A and place a reference in Section 500.2. To meet the site map requirement, insert a reduced copy (8-1/2" x 11" or 11" x 17") of the project's Title Sheet in Attachment A and make reference to it in Section 500.2.
  - ❑ Provide a brief narrative description of the vicinity to support the map in Attachment A. Describe important features, drainage areas, or receiving waters that could not be shown on the map.

- The vicinity map shall show:
  - ❑ Outline of the site's perimeter;
  - ❑ Easily identifiable major roadways;
  - ❑ Geographic features or landmarks;
  - ❑ Water bodies within or adjacent to the construction limits;
  - ❑ Construction site perimeter;
  - ❑ Known wells;
  - ❑ Outline of the offsite drainage area(s) that discharge into the construction site;

- ❑ Identification of anticipated discharge location(s) where the construction site's storm water discharges to a municipal storm sewer system or other water body;
- ❑ Other geographic features surrounding the site; and
- ❑ General topography.

REQUIRED TEXT

The construction project vicinity map showing the project location, surface water boundaries, geographic features, construction site perimeter, and general topography, is located in Attachment A.

500.3 Pollutant Source Identification and BMP Selection

500.3.1 Inventory of Materials and Activities that May Pollute Storm Water

INSTRUCTIONS:

- ❑ List all construction materials that will have the potential to contribute to the discharge of pollutants to storm water.
- ❑ List all construction activities that have the potential to contribute sediment to storm water discharges.
- ❑ Insert as many bullets as necessary to complete the inventory.

EXAMPLE:

Control practices for each activity are identified in Sections 500.3.4 through 500.3.9

The following is a list of construction materials that will be used and activities that will be performed that will have the potential to contribute pollutants, other than sediment, to storm water runoff. Control practices for each activity are identified in the Sections 500.3.4 through 500.3.9:

- Vehicle fluids, including oil, grease, petroleum, and coolants
- Asphaltic emulsions associated with asphalt-concrete paving operations

- Cement materials associated with PCC concrete paving operations, drainage structures, median barriers, and bridge construction
- Base and subbase material
- Joint and curing compounds
- Concrete curing compounds
- Paints
- Solvents, thinners, acids
- Sandblasting materials
- Mortar mix
- Raw landscaping materials and wastes (topsoil, plant materials, herbicides, fertilizers, mulch, pesticides)
- BMP materials (sandbags, liquid copolymer)
- Treated lumber (materials and waste)
- PCC rubble
- Masonry block rubble
- General litter

Construction activities that have the potential to contribute sediment to storm water discharges include:

- Clear and grub operations
- Grading operations
- Soil import operations
- Utility excavation operations
- Sandblasting operations
- Landscaping operations

REQUIRED TEXT:

The following is a list of construction materials that will be used and activities that will be performed that will have the potential to contribute pollutants, other than sediment, to storm water runoff (control practices for each activity are identified in the Water Pollution Control Drawings (WPCDs) and/or in Sections 500.3.4 through 500.3.9:

- Vehicle fluids, including oil, grease, petroleum, and coolants

- Vehicle and equipment cleaning, fueling and maintenance operations
- Vehicle and equipment wash water, including concrete washout water
- Asphaltic emulsions associated with asphalt-concrete paving operations
- Cement materials associated with PCC concrete paving operations, drainage structures, median barriers, and bridge construction
- Base and subbase material
- Joint and curing compounds
- Concrete curing compounds
- Paints
- Solvents, thinners, acids, detergents
- Mortar mix
- Raw landscaping materials and wastes (topsoil, plant materials, herbicides, fertilizers, mulch, pesticides)
- BMP materials (sandbags, liquid copolymer)
- Treated lumber (materials and waste)
- PCC rubble
- Masonry block rubble
- Slurries from concrete cutting and coring operations, PCC grinding or AC grinding operations
- Slurries from concrete or mortar mixing operations
- Slurries from drilling or boring operations
- Blast residue from high-pressure washing of structures or surfaces
- Wash water from cleaning painting equipment
- Sanitary and septic wastes

- Chemical leaks and/or spills of any kind including but not limited to petroleum, paints, cure compounds, etc.
- General litter
- CLICK AND TYPE FOR ADDITIONAL TEXT, PRESS RETURN FOR NEW LINE ITEM. TO CLEAR LINE USE DELETE LINE BUTTON.

Construction activities that have the potential to contribute sediment to storm water discharges include:

- Clear and grub operations
- Grading operations
- Soil import operations
- Utility excavation operations
- Sandblasting operations
- Landscaping operations
- Runoff from dust control applications of water or dust palliatives
- CLICK AND TYPE FOR ADDITIONAL TEXT, PRESS RETURN FOR NEW LINE ITEM. TO CLEAR LINE USE DELETE LINE BUTTON.

INSERT ADDITIONAL NARRATIVE TEXT HERE OR DELETE THIS LINE (Use the "FORMAT OPTIONS" button to insert subtitles and/or paragraphs)

Attachment C lists all Best Management Practices (BMPs) that have been selected for implementation in this project. Implementation and location of BMPs are shown on the WPCDs in Attachment B. Narrative descriptions of BMPs to be used during the project are listed by category in each of the following SWPPP sections. Attachment C and Q includes a list and copies of the fact sheets of all the BMPs selected for this project.

500.3.2 Existing (pre-construction) Control Measures

INSTRUCTIONS:

- ❑ Identify the existing control measures in place prior to construction. Pre-construction control measures may include any measures used to reduce erosion, sediment or other

pollutants in storm water discharges. Pre-construction control measures may include but not be limited to: Detention basins, infiltration basins, sediment basins, oil water separators, rock slope protection, existing erosion control, existing landscaping, lined ditches, energy dissipators etc.

EXAMPLE:

The following are existing (pre-construction) control measures encountered within the project site:

- Detention basin located at the southeast end of the project. This basin was designed as a combination flood control and permanent treatment control measure. It is anticipated that the basin will be used as a temporary sediment basin during construction, and will be restored to original condition prior to project completion.

REQUIRED TEXT:

The following are existing (pre-construction) control measures encountered within the project site:

- CLICK AND TYPE FOR ADDITIONAL TEXT, PRESS RETURN FOR NEW LINE ITEM. TO CLEAR LINE USE DELETE LINE BUTTON.

INSERT ADDITIONAL NARRATIVE TEXT HERE OR DELETE THIS LINE (Use the "FORMAT OPTIONS" button to insert subtitles and/or paragraphs)

500.3.3 Nature of Fill Material and Existing Data Describing the Soil

INSTRUCTIONS:

- ❑ Describe the conditions of the fill material and the soils at the construction site (i.e. types of soils, groundwater location and conditions, dewatering operations that may be necessary, etc.) and the source and conditions of the fill material at the construction site. A general description can usually be found in the geotechnical report or other environmental documents.
- ❑ Show and/or describe existing site features that, as a result of known past usage, may contribute pollutants to storm water, (e.g., toxic materials that are known to have been treated, stored, disposed, spilled, or leaked onto the construction site). Review the contract documents and associated environmental documents to determine the known site contaminants and list them in this section.

EXAMPLE:

Existing site features that, as a result of known past usage, may contribute pollutants to storm water, (e.g., toxic materials that are known to have been treated, stored, disposed, spilled, or leaked onto the construction site) include:

- Several old farms are within the project property. Extensive use of farming related chemicals may have left detectable amounts of toxic materials in the soil.
- This site includes aerially deposited lead located at the northeast corner of the site.

REQUIRED TEXT:

DESCRIBE CONDITIONS OF FILL MATERIALS AND EXISTING SOILS AT THE PROJECT SITE

Existing site features that, as a result of past usage, may contribute pollutants to storm water (e.g., toxic materials that are known to have been treated, stored, disposed, spilled, or leaked onto the construction site) include: (Delete if N/A)

- CLICK AND TYPE FOR ADDITIONAL TEXT, PRESS RETURN FOR NEW LINE ITEM. TO CLEAR LINE USE DELETE LINE BUTTON.

INSERT ADDITIONAL NARRATIVE TEXT HERE OR DELETE THIS LINE (Use the "FORMAT OPTIONS" button to insert subtitles and/or paragraphs)

INSTRUCTIONS:

BMP SELECTION PROCESS

BMP selection is an iterative process that first identifies potential pollutant sources and then identifies the BMPs necessary to reduce or eliminate pollutant discharges from the construction site.

- ❑ Identify all BMPs selected for implementation (indicated in Attachment C, and any other BMPs required by the contract documents).
- ❑ Select BMPs to eliminate or reduce the pollutants identified in the inventory list (Section 500.3.1). See Section 3 of the *California Stormwater BMP Handbook – Construction*, for instructions for selecting and implementing construction site BMPs and fact sheets for

construction site BMPs. Refer to the BMP Consideration Checklist in Attachment C to select BMPs in each of the following sections:

500.3.4 Erosion Control (Soil Stabilization)

500.3.5 Sediment Control

500.3.6 Tracking Control

500.3.7 Wind Erosion Control

500.3.8 Non-Storm Water Control

500.3.9 Waste Management and Materials Pollution Control

- ❑ Show the selected BMPs on the WPCDs. Use the instructions in Section 500.4 and the SWPPP and Monitoring Program Checklist (Attachment L) to confirm that all WPCD requirements are included. Provide a narrative description of the BMPs selected in the appropriate section.

500.3.4 Erosion Control

INSTRUCTIONS:

- The General Permit requires that, at a minimum, the Owner/Developer/Contractor implements an effective combination of erosion control (soil stabilization) and sediment controls on all disturbed areas during the rainy season.
  - ❑ Select temporary erosion control BMPs to be used and complete the Erosion Control section of the BMP Consideration Checklist in Attachment C. See Section 3 of the *California Stormwater BMP Handbook – Construction*, for instructions for selecting and implementing construction site BMPs and working details for construction site BMPs.
  - ❑ Provide introductory paragraphs that define erosion control and give a general approach on how temporary erosion control BMPs will be implemented on the project.
  - ❑ List all the temporary erosion control BMPs to be used in the project.
  - ❑ Show selected temporary erosion control BMPs on the WPCDs. Provide a narrative description of temporary erosion control BMPs that cannot be adequately identified on the WPCDs.
  - ❑ Discuss the on-site availability of temporary erosion control materials (materials kept for temporary erosion control BMPs) and proposed mobilization and implementation of temporary erosion control BMPs in the event of a predicted storm. (Explain how and

when BMPs will be implemented when rain is forecasted). Sufficient material(s) needed to install temporary soil stabilization BMPs necessary to completely protect the exposed portions (disturbed soil area) of the site from erosion and to prevent sediment discharges must be stored on site. Areas that have already been protected from erosion using temporary or permanent physical stabilization or established vegetation stabilization BMPs are not considered to be "exposed disturbed soil areas" for purposes of this requirement.

EXAMPLE:

Erosion Control, also referred to as soil stabilization, is a source control measure that is designed to prevent soil particles from detaching and becoming suspended in the storm water runoff. Erosion control BMPs protect the soil surface by covering and/or binding the soil particles. This project will incorporate erosion control measures required by the contract documents, and other measures selected by the Contractor. This construction project will implement the following practices to assure effective temporary and final erosion control during construction:

1) Preserve existing vegetation where required and when feasible.
2) Apply temporary erosion control to remaining active and non-active areas as required by the California Stormwater BMP Handbook – Construction, and the contract documents. Reapply as necessary to maintain effectiveness.
3) Implement temporary erosion control measures at regular intervals throughout the defined rainy season to achieve and maintain the contract's disturbed soil area requirements. When the project's specifications require it, temporary erosion control BMPs will be implemented 20 days prior to the defined rainy season.
4) Stabilize non-active areas as soon as feasible after the cessation of construction activities.
5) Control erosion in concentrated flow paths by applying erosion control blankets, check dams, erosion control seeding, and lining swales as required in the contract documents.
6) Apply seed to areas deemed substantially complete by the [City] Engineer during the defined rainy season.
7) At completion of construction, apply permanent erosion control to all remaining disturbed soil areas.

Sufficient erosion control materials will be maintained on-site to allow implementation in conformance with Permit requirements and described in this SWPPP. This includes implementation requirements for active areas and non-active areas that require deployment before the onset of rain.

Implementation and locations of erosion control BMPs are shown on the Water Pollution Control Drawings (WPCDs) in Attachment B and/or described in this section. The BMP Consideration

Checklist in Attachment C indicates the BMPs that will be implemented to control erosion on the construction site; these are:

- EC-2, Preservation of Existing Vegetation
- EC-6, Straw Mulch
- EC-7, Geotextiles and Mats
- EC-9, Earth Dikes and Drainage Swales

Implementation of Erosion Control BMPs

- BMPs will be deployed in a sequence to follow the progress of grading and construction. As the locations of soil disturbance change, erosion and sedimentation controls will be adjusted accordingly to control storm water runoff at the downgrade perimeter and drain inlets. BMPs will be mobilized as follows:

Year-round:

- The Storm Water Pollution Prevention Manager (SWPPM) will monitor weather using National Weather Service reports to track conditions and alert crews to the onset of rainfall events.
- Disturbed soil areas will be stabilized with temporary erosion control or with permanent erosion control as soon as possible after grading or construction is complete.

During the rainy season:

- Disturbed areas will be stabilized with temporary or permanent erosion control before rain events.

- Disturbed areas that are substantially complete will be stabilized with permanent erosion control (soil stabilization) and vegetation (if within seeding window for seed establishment).

- Prior to forecast storm events, temporary erosion control BMPs will be deployed and inspected.

During the non-rainy season:

- The project schedule will sequence construction activities with the installation of both erosion control and sediment control measures. The construction schedule will be arranged as much as practicable to leave existing vegetation undisturbed until immediately prior to grading.

Straw Mulch

- Straw mulch will be primarily used throughout the disturbed areas adjacent to excavations and on shallow slopes surrounding the site. See the WPCDs in Attachment B of this SWPPP for locations where straw mulch will be used.

Geotextiles, Plastic Covers and Erosion Control Blankets/Mats

- Geotextile blankets will be used to provide temporary and long-term stabilization for the flow line of the vegetated swale on the western boundary of the project.
- Polyethylene covers will be used to cover exposed soil and sand stockpiled material areas. Covers will be placed over stockpiles prior to forecast storm events, and anchored to prevent damage by wind.

REQUIRED TEXT:

Erosion control, also referred to as soil stabilization, consists of source control measures that are designed to prevent soil particles from detaching and becoming transported in storm water runoff. Erosion control BMPs protect the soil surface by covering and/or binding soil particles. This project will incorporate erosion control measures required by the contract documents, and other measures selected by the Contractor. This project will implement the following practices for effective temporary and final erosion control during construction:

1) Preserve existing vegetation where required and when feasible.
2) Apply temporary erosion control to remaining active and non-active areas as required by the California Stormwater BMPs Handbook – Construction, and the contract documents. Reapply as necessary to maintain effectiveness.
3) Implement temporary erosion control measures at regular intervals throughout the defined rainy season to achieve and maintain the contract's disturbed soil area requirements. Implement erosion control prior to the defined rainy season.
4) Stabilize non-active areas as soon as feasible after the cessation of construction activities.
5) Control erosion in concentrated flow paths by applying erosion control blankets, erosion control seeding, and lining swales as required in the contract documents.
6) Apply seed to areas deemed substantially complete by the Owner during the defined rainy season.
7) At completion of construction, apply permanent erosion control to all remaining disturbed soil areas.

Sufficient erosion control materials will be maintained on-site to allow implementation in conformance with Permit requirements and described in this SWPPP. This includes implementation requirements for active areas and non-active areas that require deployment before the onset of rain.

Implementation and locations of temporary erosion control BMPs are shown on the Water Pollution Control Drawings (WPCDs) in Attachment B and/or described in this section. The BMP Consideration Checklist in Attachment C indicates the BMPs that will be implemented to control erosion on the construction site; these are:

- EC-1, Scheduling
- EC-2, Preservation of Existing Vegetation
- EC-6, Straw Mulch
- EC-7, Geotextiles and Mats
- CLICK AND TYPE FOR ADDITIONAL TEXT, PRESS RETURN FOR NEW LINE ITEM. TO CLEAR LINE USE DELETE LINE BUTTON.

Complete narratives of the above BMPs are in Attachement Q.

Implementation of Erosion Control BMPs

BMPs will be deployed in a sequence to follow the progress of grading and construction. As the locations of soil disturbance change, erosion and sedimentation controls will be adjusted accordingly to control storm water runoff at the downgrade perimeter and drain inlets. BMPs will be mobilized as follows:

<u>Year-round:</u>

The Storm Water Pollution Prevention Manager (SWPPM) will monitor weather using National Weather Service reports to track conditions and alert crews to the onset of rainfall events.

Disturbed soil areas will be stabilized with temporary erosion control or with permanent erosion control as soon as possible after grading or construction is complete.

<u>During the rainy season:</u>

Disturbed areas will be stabilized with temporary or permanent erosion control before rain events.

Disturbed areas that are substantially complete will be stabilized with permanent erosion control (soil stabilization) and vegetation (if within seeding window for seed establishment).

Prior to forecast storm events, temporary erosion control BMPs will be deployed and inspected.

During the non-rainy season:

The project schedule will sequence construction activities with the installation of both erosion control and sediment control measures. The construction schedule will be arranged as much as practicable to leave existing vegetation undisturbed until immediately prior to grading.

Straw Mulch

Straw mulch will be primarily used throughout the disturbed areas adjacent to excavations and on shallow slopes surrounding the site.

Plastic Covers and Erosion Control Blankets/Mats

Polyethylene covers will be used to cover exposed soil and sand stockpiled material areas. Covers will be placed over stockpiles prior to forecast storm events, and anchored to prevent damage by wind.

INSERT ADDITIONAL NARRATIVE TEXT OF SOIL STABILIZATION HERE OR DELETE THIS LINE (Use the "FORMAT OPTIONS" button to insert subtitles and/or paragraphs)

500.3.5 Sediment Control

INSTRUCTIONS:

- ❑ Select sediment control BMPs to be used and complete the Sediment Control BMPs section of the BMP Consideration Checklist in Attachment C. See Section 3 of the *California Stormwater BMP Handbook – Construction*, for instructions for selecting and implementing construction site BMPs and working details for construction site BMPs.
- ❑ Provide introductory paragraphs that define what are sediment controls and give a general approach on how sediment control BMPs will be implemented at the draining perimeter of disturbed soil areas, at the toe of slopes, at inlets and outfall areas at all times.
- ❑ List all the temporary sediment control BMPs to be used in the project.

- ❑ Show selected temporary sediment control BMPs on the WPCDs. Provide a narrative description of temporary sediment control BMPs that cannot be adequately identified on the WPCDs.
- ❑ Show BMPs used to divert off-site drainage around and/or through the construction project.
- ❑ Discuss the on-site availability of temporary sediment control materials (materials kept for temporary sediment control BMPs) and proposed mobilization and implementation of temporary sediment control BMPs in the event of a predicted storm.

EXAMPLE:

Sediment controls are structural measures that are intended to complement and enhance the erosion control measures and reduce sediment discharges from construction areas. Sediment controls are designed to intercept and filter out soil particles that have been detached and transported by the force of water. This project will incorporate sediment control measures required by the contract documents, and other measures selected by the Owner/Developer/Contractor.

Sufficient quantities of temporary sediment control materials will be maintained on-site throughout the duration of the project, to allow implementation of temporary sediment controls in the event of predicted rain, and for rapid response to failures or emergencies, in conformance with other Permit requirements and as described in this SWPPP. This includes implementation requirements for active areas and non-active areas before the onset of rain.

Implementation and locations of temporary sediment control BMPs are shown on the Water Pollution Control Drawings (WPCDs) in Attachment B. The BMP Consideration Checklist in Attachment C indicates all the BMPs that will be implemented to control sediment on the construction site; these are:

- SE-1, Silt fence
- SE-4, Check dams
- SE-5, Fiber rolls
- SE-7, Street Sweeping and Vacuuming
- SE-8, Sandbag barrier
- SE-10, Storm Drain Inlet Protection

Implementation of Temporary Sediment Controls

- Temporary sediment control BMPs will be deployed according to the schedule shown in SWPPP Section 300.4.

- During the rainy season, temporary sediment controls will be implemented at the draining perimeter of disturbed soil areas, at the toe of slopes, at storm drain inlets and at outfall areas at all times.
- During the non-rainy season, temporary sediment controls will be implemented at the draining perimeter of disturbed soil areas and at storm drain downstream from disturbed areas before rain events.
- As shown on the WPCDs, silt fences will be deployed along the toe of exterior slopes to filter storm water runoff.
- Storm drain inlet protection will be used at all operational internal inlets to the storm drain system during the rainy season as shown on the WPCDs.
- During the non-rainy season, in the event of a predicted storm, the following temporary sediment control materials will be maintained on-site: silt fence materials, sandbags for linear barriers, fiber rolls

REQUIRED TEXT:

Sediment controls are structural measures that are intended to complement and enhance the selected erosion control measures and reduce sediment discharges from active construction areas. Sediment controls are designed to intercept and settle out soil particles that have been detached and transported by the force of water. This project will incorporate sediment control measures required by the contract documents, and other measures selected by the Owner/Developer/Contractor.

Sufficient quantities of temporary sediment control materials will be maintained on-site throughout the duration of the project, to allow implementation of temporary sediment controls in the event of predicted rain, and for rapid response to failures or emergencies, in conformance with other Permit requirements and as described in this SWPPP. This includes implementation requirements for active areas and non-active areas before the onset of rain.

Implementation and locations of temporary sediment control BMPs are shown on the Water Pollution Control Drawings (WPCDs) in Attachment B. The BMP Consideration Checklist in Attachment C indicates all the BMPs that will be implemented to control sediment on the construction site; these are:

- SE-1, Silt fence
- SE-5, Fiber rolls

- SE-7, Street Sweeping and Vacuuming
- SE-8, Sandbag barrier
- SE-10, Storm Drain Inlet Protection
- CLICK AND TYPE FOR ADDITIONAL TEXT, PRESS RETURN FOR NEW LINE ITEM. TO CLEAR LINE USE DELETE LINE BUTTON.

Complete narratives of the above BMPs are in Attachement Q.

Implementation of Temporary Sediment Controls

Temporary sediment control BMPs will be deployed according to the schedule shown in SWPPP Section 300.4.

Temporary sediment controls will be implemented at the draining perimeter of disturbed soil areas, at the toe of slopes, at storm drain inlets and at outfall areas at year round.

Silt fences will be deployed along the toe of exterior slopes to filter storm water runoff.

Storm drain inlet protection will be used at all operational internal inlets.

INSERT ADDITIONAL NARRATIVE TEXT OF SEDIMENT CONTROLS HERE OR DELETE THIS LINE (Use the "FORMAT OPTIONS" button to insert subtitles and/or paragraphs)

500.3.6 Tracking Control

INSTRUCTIONS:

- Tracking controls shall be considered and implemented year round and throughout the duration of the project, at all access (ingress/egress) points to the project site where vehicles and/or equipment may track sediment from the construction site onto public or private roadways.

  - ❑ Select BMPs and provide a narrative description of tracking control BMPs that will be used to reduce sediment tracking onto public or private roads.
  - ❑ Show on the WPCDs the location of all ingress/egress points to the project site where sediment tracking is likely.

- ❑ Describe measures to prevent sediment tracking in this section.
- ❑ Discuss road-cleaning BMPs.

EXAMPLE:

The following BMPs have been selected to reduce sediment tracking from the construction site onto private or public roads:

- SE-7, Street Sweeping and Vacuuming
- TC-1, Stabilized Construction Entrance/Exit
- TC-2, Stabilized Construction Roadway
- TC-3, Entrance/Outlet Tire Wash

BMPs to Reduce Sediment Tracking

Stabilized Construction Entrance/Exit

- A stabilized construction entrance/exit will be constructed and maintained at construction site entrances and exits, equipment yard, PCC batch plants and crushing plants, water filling area for water trucks, and project office location, as shown on the site map.

- The site entrance/exit will be stabilized to reduce tracking of sediment as a result of construction traffic. The entrance will be designated and graded to prevent runoff from leaving the site. Stabilization material will be 3 to 6-inch aggregate. The entrance will be flared where it meets the existing road to provide an adequate turning radius. During dirt-hauling activities that extend over a one-week time period, a site entrance/exit will be installed to reduce tracking of sediment.

Stabilized Construction Roadway

- The construction roadway through the site will also be designated and stabilized to prevent erosion and to control tracking of mud and soil material onto adjacent roads. The roadway will be clearly marked for limited speed to control dust. Refer to the WPCDs for entrance/exit and construction roadway locations. Stabilization material will be 3 to 6-inch aggregate. A regular maintenance program will be conducted to replace sediment-clogged stabilization material with new stabilization material.

Entrance/Outlet Tire Wash

- An entrance/outlet tire wash station will be used to ensure that sediment tracking to public streets is minimized.

Road Cleaning BMPs – Street Sweeping and Vacuuming

Road sweeping and vacuuming will occur during soil hauling and as necessary to keep street surfaces clear of soil and debris. Washing of sediment tracked onto streets into storm drains will not occur.

REQUIRED TEXT:

The following BMPs have been selected to reduce sediment tracking from the construction site onto private or public roads:

- SE-7, Street Sweeping and Vacuuming
- TC-1, Stabilized Construction Entrance/Exit
- TC-3, Entrance/Outlet Tire Wash
- CLICK AND TYPE FOR ADDITIONAL TEXT, PRESS RETURN FOR NEW LINE ITEM. TO CLEAR LINE USE DELETE LINE BUTTON.

Complete narratives of the above BMPs are in Attachement Q.

Stabilized Construction Entrance/Exit

The site entrance/exit will be stabilized to reduce tracking of sediment as a result of construction traffic. The entrance will be designated and graded to prevent runoff from leaving the site. Stabilization material will be 3 to 6-inch aggregate. The entrance will be flared where it meets the existing road to provide an adequate turning radius. During dirt-hauling activities that extend over a one-week time period, a site entrance/exit will be installed to reduce tracking of sediment.

Entrance/Outlet Tire Wash

An entrance/outlet tire wash station will be used to ensure that sediment tracking to public streets is minimized.

Road Cleaning BMPs – Street Sweeping and Vacuuming

Road sweeping and vacuuming will occur during soil hauling and as necessary to keep street surfaces clear of soil and debris. Washing of sediment tracked onto streets into storm drains will not occur.

INSERT ADDITIONAL NARRATIVE TEXT OF TRACKING CONTROL PRACTICES HERE OR DELETE THIS LINE (Use the "FORMAT OPTIONS" button to insert subtitles and/or paragraphs)

500.3.7 Wind Erosion Control

INSTRUCTIONS:

- Wind erosion control BMPs shall be considered and implemented year-round and throughout the duration of the project on all disturbed soils on the project site that are subject to wind erosion, and when significant wind and dry conditions are anticipated during project construction. The objective of wind controls is to prevent the transport of soil from soil-disturbed areas of the project site, offsite by wind.

  - ❑ Select BMPs and provide a narrative description of BMPs that will be used to control dust during construction operations, including stockpile operations.

EXAMPLE:

The following BMPs have been selected to control dust from the construction site:

- WE-1, Wind Erosion Control

Dust Control

- Potable water will be applied to disturbed soil areas of the project site to control dust and maintain optimum moisture levels for compaction. The water will be applied using water trucks. As shown on the project schedule, project soils will be disturbed and exposed from approximately May 1 through December 15. Water applications will be concentrated during the late summer and early fall months and especially during the embankment construction operations scheduled for July. The total water to be applied is expected to be between 110,000 and 180,000 ft^3.

- BMP WE-1, Wind Erosion Control, and BMP NS-1, Water Conservation Practices, will be implemented to provide dust control and prevent discharges from dust control activities and

water supply equipment. Water application rates will be minimized as necessary to prevent runoff and ponding and water equipment leaks will be repaired immediately.

- During windy conditions (forecast or actual wind conditions of approximately 25 mph or greater), dust control will be applied to disturbed areas, including haul roads, to adequately control wind erosion.

- BMP WM-3, Stockpile Management, using silt fences and plastic covers will be implemented to prevent wind dispersal of sediment from stockpiles.

REQUIRED TEXT:

The following BMPs have been selected to control dust from the construction site:

- WE-1, Wind Erosion Control

- CLICK AND TYPE FOR ADDITIONAL TEXT, PRESS RETURN FOR NEW LINE ITEM. TO CLEAR LINE USE DELETE LINE BUTTON.

Complete narratives of the above BMPs are in Attachement Q.

Dust Control

Potable water will be applied to disturbed soil areas of the project site to control dust and maintain optimum moisture levels for compaction. The water will be applied using water trucks. Water applications will be concentrated during the late summer and early fall months.

BMP WE-1, Wind Erosion Control, and BMP NS-1, Water Conservation Practices, will be implemented to provide dust control and prevent discharges from dust control activities and water supply equipment. Water application rates will be minimized as necessary to prevent runoff and ponding and water equipment leaks will be repaired immediately.

During windy conditions (forecast or actual wind conditions of approximately 25 mph or greater), dust control will be applied to disturbed areas, including haul roads, to adequately control wind erosion.

BMP WM-3, Stockpile Management, using silt fences and plastic covers will be implemented to prevent wind dispersal of sediment from stockpiles.

INSERT ADDITIONAL NARRATIVE TEXT OF WIND EROSION CONTROL PRACTICES HERE OR DELETE THIS LINE (Use the "FORMAT OPTIONS" button to insert subtitles and/or paragraphs)

500.3.8 Non-Storm Water Control

INSTRUCTIONS:

- Non-storm water discharges consist of all discharges from a municipal storm water conveyance, which do not originate from precipitation events (i.e., all discharges from a conveyance system other than storm water).
- ***PROHIBITED (ILLICIT) DISCHARGES***. Non-storm water discharges into storm drainage systems or waterways, which are not authorized under the Permit or authorized under a separate NPDES permit, are prohibited. Examples of prohibited discharges common to construction activities include:
  - Vehicle and equipment cleaning, fueling and maintenance operations
  - Vehicle and equipment wash water, including concrete washout water
  - Slurries from concrete cutting and coring operations, PCC grinding or AC grinding operations
  - Slurries from concrete or mortar mixing operations
  - Slurries from drilling or boring operations
  - Blast residue from high-pressure washing of structures or surfaces
  - Wash water from cleaning painting equipment
  - Runoff from dust control applications of water or dust palliatives
  - Sanitary and septic wastes
  - Chemical leaks and/or spills of any kind including but not limited to petroleum, paints, cure compounds, etc.
- Discharges of construction materials and wastes, such as fuel or paint, resulting from dumping, spills, or direct contact with rainwater or storm water runoff are also prohibited and shall be addressed in Section 500.3.9, Waste Management and Materials Pollution Control.
- Some specific non-storm water discharges may be allowed provided they are not relied upon to clean up failed or inadequate construction or post-construction BMPs designed to keep materials onsite. However, they must be identified as not being sources of pollutants to receiving waters and appropriate BMPs may be required to de developed and implemented to minimize adverse impacts from these sources/discharges. The RWQCB may require a

separate NPDES permit or specific monitoring and reporting requirements for some non-storm water discharges. All possible non-storm water discharges shall be listed, along with narrative description of BMPs designed to control potential pollutants in such discharges. Examples of non-storm water discharges that may be allowed include:

- Flows from riparian habitats or wetlands
- Diverted stream flows
- Springs, rising groundwater
- Landscape irrigation runoff for purpose of establishing erosion control
- De-chlorinated water line flushing
- Hydrant flushing
- Foundation and footing drains
- Uncontaminated groundwater infiltration

- Other discharges such as pumped groundwater, irrigation water and water line and hydrant flushing are not prohibited if they are identified as not being sources of pollutants to receiving waters or if appropriate control measures (BMPs) to minimize the adverse impacts of such sources are developed and implemented. Some RWQCBs may require a separate NPDES permit or specific monitoring and reporting requirements for the conditionally exempt discharges. Check with the local jurisdiction on what discharges may be conditionally exempt.

- Use the following process to identify, quantify, and select BMPs for non-storm water discharges. List each potential non-storm water discharge and provide the information addressed by each step. Complete the BMP Consideration Checklist in Attachment C to show selected BMPs.

  - ❑ Identify all potential non-storm water discharges within the project. Examine all project activities and determine what discharges will be generated or may be required in order to complete each activity, including mobile-type operations. Discuss how mobile operations, such as maintenance and fueling for large or stationary equipment, will be addressed. Examples of common construction activities that may result in non-storm water discharges on a project are:

    - Vehicle and equipment cleaning, fueling and maintenance
    - Surface water diversions,
    - Dewatering operations
    - Saw-cutting
    - Drilling
    - Boring

- AC and PCC grinding
- AC and PCC recycling
- Concrete mixing
- Crushing
- Bridge cleaning
- Blasting
- Painting
- Hydro-demolition
- Mortar mixing
- Air-blown mortar, etc.

- ❑ Describe each planned non-storm water discharge from the project into the storm drain system or waterway, including flow/quantity and expected pollutants. If a flow or quantity cannot be determined, then fully describe the nature and extent of the activity such that the quantity can be inferred. One-time discharges shall be monitored by the person responsible for SWPPP implementation during the time that such discharges are occurring.

- ❑ Describe each non-storm water source or activity that may generate a discharge; containment facilities and appurtenances that would be employed; and flow paths of discharge to downstream inlets, drainage facilities, and receiving waters. Where possible, depict BMP locations on the WPCDs.

- ❑ Indicate the time period and frequency of each activity that generates or may generate a discharge.

- ❑ Describe mandatory non-storm water control BMPs and practices required by the local jurisdiction, the RWQCB (such as WDR requirements for projects that reuse Aerially Deposited Lead soils), other permits, or other federal, state, or local agencies. Provide details and schedules as appropriate. Include maintenance, inspection, testing, and reporting requirements. Provide permit information for discharges covered by a separate NPDES permit.

- ❑ Describe Owner/Developer/Contractor-selected non-storm water control BMPs and practices to minimize, contain, and dispose prohibited discharges or to minimize adverse impacts of authorized discharges from the project into the storm drain system or waterway. BMPs within both the Non-Storm Water Management and the Materials Handling and Waste Management categories may be applicable to non-storm water discharges. Include maintenance, inspection, testing, and reporting procedures, if applicable. Also include sediment controls for landscape irrigation prior to establishment of vegetation.

- ❑ Indicate how illicit connections and illegal discharges will be handled.

- When an Owner/Developer/Contractor sells or leases individual lots or properties, there may be instances when the new Owner(s)/occupant(s) get involved in construction activities that may contribute to the discharge of pollutants into storm water. It is suggested that the Owner/Developer/Contractor develops a notification pamphlet or brochure that makes the new Owner(s)/occupant(s) aware of the potential for unauthorized discharges and practices to limit, reduce or eliminate the risks of discharging pollutants into storm water.

EXAMPLE:

An inventory of construction activities and potential non-storm water discharges is provided in Section 5.3.1. The BMP Consideration Checklist in Attachment C and the following list indicates the BMPs that have been selected to control non-storm water pollution on the construction site. Implementation and locations of some non-storm water control BMPs are shown on the Water Pollution Control Drawings (WPCDs) in Attachment B. A narrative description of each BMP follows.

- NS-1, Water Conservation Practices
- NS-3, Paving and Grinding Operations
- NS-6, Illicit Connection/Illegal Discharge Detection and Reporting
- NS-8, Vehicle and Equipment Cleaning
- NS-9, Vehicle and Equipment Fueling
- NS-10, Vehicle and Equipment Maintenance
- NS-11, Pile Driving Operations
- NS-12, Concrete Curing
- NS-13, Materials and Equipment Use over Water
- NS-14, Concrete Finishing
- NS-15, Structure Demolition/Removal
- WM-08, Concrete Waste Management

Illicit Connection/Illegal Discharge Detection and Reporting

- The Contractor will implement BMP NS-6, Illicit Connection/Illegal Discharge Detection and Reporting throughout the duration of the project.

Paving Operations

- The project will include placement of approximately 20 acres of AC pavement. Paving locations and adjacent storm drain inlets are shown on WPCDs 2, 3, and 5. Paving operations will

generally be conducted in August and September as shown on the project schedule in Section 300.4. BMP NS-3, Paving and Grinding Operations, will be implemented to prevent paving materials from being discharged off-site. Covers will be placed over each inlet adjacent to paving operations. The covers will consist of scrap carpeting placed over, and tucked under, each inlet grate. Following paving operations, the area will be swept, inlet covers will be removed, and the inlets will be inspected for paving materials.

Vehicle and Equipment Operations

- Several types of vehicles and equipment will be used on-site throughout the project, including graders, scrapers, excavators, loaders, paving equipment, rollers, trucks and trailers, backhoes, forklifts, generators, compressors, and traffic control equipment. BMPs NS-9, Vehicle and Equipment Fueling, and NS-10, Vehicle and Equipment Maintenance will be utilized to prevent discharges of fuel and other vehicle fluids. Except for concrete washout, which is addressed in Section 500.3.8, vehicle cleaning will not be performed on-site.

- A paved temporary fueling area will be constructed in the Contractor's yard as shown on WPCD-4. All self-propelled vehicles will be fueled off-site or at the temporary fueling area. Fuel trucks, each equipped with absorbent spill clean-up materials, will be used for all on-site fueling, whether at the temporary fueling area or for mobile fueling elsewhere on the site. Drip pans will be used for all mobile fueling. The fueling truck will be parked on the paved fueling area for overnight storage.

- Drip pans or absorbent pads will be used for all vehicle and equipment maintenance activities that involve grease, oil, solvents, or other vehicle fluids.

- All vehicle maintenance and mobile fueling operations will be conducted at least 50 feet away from operational inlets and drainage facilities and on a level graded area.

Concrete Saw-cutting

- The project will include approximately 600 ft of concrete saw-cutting. Saw-cutting locations and adjacent storm drain inlets are shown on WPCDs 2, 3, and 4. Estimated saw-cutting dates are shown on the schedule in Section 300.4. Saw-cutting operations will not be conducted during or immediately prior to rainfall events. Saw-cutting operations are expected to produce about 1.5 cy of waste slurry consisting of water and fine PCC grit.

- BMP WM-08, Concrete Waste Management, will be implemented to contain and dispose of saw-cutting slurries. The slurry will be vacuumed and discharged to the concrete washout facility described above. Dried and cured concrete wastes will be disposed off-site during concrete washout maintenance activities.

REQUIRED TEXT:

An inventory of construction activities and potential non-storm water discharges is provided in Section 500.3.1. The BMP Consideration Checklist in Attachment C and the following list indicates the BMPs that have been selected to control non-storm water pollution on the construction site. Implementation and locations of some non-storm water control BMPs are shown on the Water Pollution Control Drawings (WPCDs) in Attachment B.

- NS-1, Water Conservation Practices
- NS-3, Paving and Grinding Operations
- NS-6, Illicit Connection/Illegal Discharge Detection and Reporting
- NS-8, Vehicle and Equipment Cleaning
- NS-9, Vehicle and Equipment Fueling
- NS-10, Vehicle and Equipment Maintenance
- NS-11, Pile Driving Operations
- NS-12, Concrete Curing
- NS-13, Materials and Equipment Use over Water
- NS-14, Concrete Finishing
- NS-15, Structure Demolition/Removal
- WM-08, Concrete Waste Management
- CLICK AND TYPE FOR ADDITIONAL TEXT, PRESS RETURN FOR NEW LINE ITEM. TO CLEAR LINE USE DELETE LINE BUTTON.

Complete narratives of the above BMPs are in Attachement Q.

Illicit Connection/Illegal Discharge Detection and Reporting

The Contractor will implement BMP NS-6, Illicit Connection/Illegal Discharge Detection and Reporting throughout the duration of the project.

Paving Operations

BMP NS-3, Paving and Grinding Operations, will be implemented to prevent paving materials from being discharged off-site. Covers will be placed over each inlet adjacent to paving operations. The covers will consist of scrap carpeting placed over, and tucked under, each inlet grate. Following paving operations, the area will be swept, inlet covers will be removed, and the inlets will be inspected for paving materials for removal.

Vehicle and Equipment Operations

Several types of vehicles and equipment will/may be used on-site throughout the project, including graders, scrapers, excavators, loaders, paving equipment, rollers, trucks and trailers, backhoes, forklifts, generators, compressors, and traffic control equipment. BMPs NS-9, Vehicle and Equipment Fueling, and NS-10, Vehicle and Equipment Maintenance will be utilized to prevent discharges of fuel and other vehicle fluids. Except for concrete washout, which is addressed in Section 500.3.8, vehicle cleaning will not be performed on-site.

Drip pans or absorbent pads will be used for all vehicle and equipment maintenance activities that involve grease, oil, solvents, or other vehicle fluids.

All vehicle maintenance and mobile fueling operations will be conducted at least 50 feet away from operational inlets and drainage facilities and on a level graded area.

Concrete Saw-cutting

Saw-cutting operations will not be conducted during or immediately prior to rainfall events.

BMP WM-08, Concrete Waste Management, will be implemented to contain and dispose of saw-cutting slurries. The slurry will be vacuumed and discharged to the concrete washout facility described above. Dried and cured concrete wastes will be disposed off-site during concrete washout maintenance activities.

INSERT ADDITIONAL NARRATIVE TEXT OF NON-STORM WATER CONTROL PRACTICES HERE OR DELETE THIS LINE (Use the "FORMAT OPTIONS" button to insert subtitles and/or paragraphs)

500.3.9 Waste Management and Materials Pollution Control

INSTRUCTIONS:

- Waste management consists of implementing procedural and structural BMPs for collecting, handling, storing and disposing of wastes generated by a construction project to prevent the release of waste materials into storm water discharges. Wastes are going to be generated during construction; however, the methods in which the wastes are collected, stored, and removed will determine the success of the waste management activities. Construction site wastes can range from residues collected from non-storm water discharges (i.e. paint removal) to general site litter and debris (i.e. empty marker paint cans).
- Materials pollution control (materials handling) consist of implementing procedural and structural BMPs for handling, storing and using construction materials to prevent the release of those materials into storm water discharges. The amount and type of construction materials to be utilized at the site will be dependent upon the type of construction and the length of the construction period. The materials may be used continuously, such as fuel for vehicles and equipment, or the materials may be used for a discrete period, such as fertilizer for landscaping.
- Waste management and materials pollution control BMPs shall be implemented to minimize storm water contact with construction materials, wastes and service areas, and to prevent materials and wastes from being discharged off-site. The primary mechanisms for storm water contact that shall be addressed are:
  - Direct contact with precipitation
  - Contact with storm water run-on and runoff
  - Wind dispersion of loose materials
  - Direct discharge to the storm drain system through spills or dumping
- Extended contact with some materials and wastes, such as asphalt cold mix and treated wood products can also leach pollutants into storm water.

- Use the following process to identify and select BMPs for waste management and materials pollution control:
  - ❑ Review construction activities to identify and quantify likely construction materials and wastes. Identify materials and wastes with special handling or disposal requirements; such as lead contaminated soils, concrete saw-cutting liquids, waste chemicals and empty chemical containers. (See Section 500.3.1)
  - ❑ Substitute safer, less polluting products where possible.

- ❑ Use the BMP Consideration Checklist in Attachment C to identify BMPs selected to address project-specific activities.
- ❑ List the selected BMPs and describe proposed facilities for materials storage and waste management (including on-site storage and disposal of waste). Discuss how each storm water contact mechanism will be addressed. Include schedules, inspection, and maintenance requirements. Show facility locations and details on the WPCDs where possible.
- ❑ Describe proposed waste collection and removal schedules.

EXAMPLE:

An inventory of construction activities, materials, and wastes is provided in Section 5.3.1. The BMP Consideration Checklist in Attachment C and the following list indicate the BMPs that have been selected to control construction site wastes and materials. Implementation and locations of some materials handling and waste management BMPs are shown on the Water Pollution Control Drawings (WPCDs) in Attachment B. A narrative description of each BMP follows.

- WM-1, Material Delivery and Storage
- WM-2, Material Use
- WM-3, Stockpile Management
- WM-4, Spill Prevention and Control
- WM-5, Solid Waste Management
- WM-6, Hazardous Waste Management
- WM-8, Concrete Waste Management

Material Delivery, Storage, and Use

- In general, BMPs WM-1 and WM-2 will be implemented to help prevent discharges of construction materials during delivery, storage, and use. The general material storage area will be located in the Contractor's yard as shown on WPCD-4. A sandbag barrier (BMP SE-8) will be provided around the storage area to prevent run-on from adjacent areas. Two types of storage/containment facilities will be provided within the storage area to minimize storm water contact with construction materials:
    - Two watertight shipping containers will be used to store hand tools, small parts, and most construction materials that can be carried by hand, such as paint cans, solvents and grease.

- A separate covered storage/containment facility will be constructed adjacent to the shipping containers to provide storage for larger items such as drums and items shipped or stored on pallets. The containment facility will consist of a 10 ft by 20 ft raised concrete pad with 6 inch curbed sides. A wood frame and corrugated tin roof and sides will be constructed to protect the facility from sun and rain. The facility will provide about 530 gal of containment volume. The containment volume is adequate to store 9-55 gallon drums pursuant to BMP WM-1.

- Very large items, such as light standards, framing materials, and stockpiled lumber, will be stored in the open in the general storage area. Such materials will be elevated with wood blocks to minimize contact with run-on.

- Spill clean-up materials, material safety data sheets, a material inventory, and emergency contact numbers will be maintained and stored in the southern shipping container.

Stockpile Management

- BMPs WM-3, Stockpile Management, will be implemented to reduce or eliminate pollution of storm water from stockpiles of soil and paving materials such as portland cement concrete (PCC) rubble, asphalt concrete (AC), asphalt concrete rubble, aggregate base, aggregate subbase, pre-mixed aggregate, and asphalt minder (so called "cold mix" asphalt). Stockpiles will be surrounded with sediment controls (SE-5, Fiber Rolls or SE-8, Sandbag Barrier). Plastic covers (EC-7, Geotextiles & Mats), or EC-5, Soil Binders, will be used.

Spill Prevention and Control

- BMP WM-4, Spill Prevention and Control, will be implemented to contain and clean-up spills and prevent material discharges to the storm drain system. Spill prevention is also discussed above in Material Delivery, Storage, and below in the following waste management and equipment maintenance sections.

Waste Management

- BMP WM-5, Solid Waste Management, and BMP WM-6, Hazardous Waste Management will be implemented to minimize storm water contact with waste materials and prevent waste discharges. Solid wastes will be loaded directly into trucks for off-site disposal. When on-site storage is necessary, solid wastes will be stored in watertight dumpsters in the general storage area of the Contractors yard. Dumpster locations are shown on WPCD-4. AC and PCC rubble will be stockpiled in the general storage area and will be surrounded with sediment controls (SE-8, Sandbag Barrier) and covered when necessary. Solid waste, including rubble stockpiles, will be removed and disposed off-site at least weekly. ABC Waste Disposal (License CA9999999) will provide solid waste disposal services. Hazardous wastes will be stored in the shipping containers or covered containment area discussed above for materials storage. Hazardous wastes will be appropriate and clearly marked containers and segregated from other non-waste materials.

Contaminated Soil Management

- When contaminated soils are encountered, the City Engineer will be notified, the contaminated soils will be contained, covered if stockpiled, and disposed of per WM-7, Contaminated Soil Management, and the contract documents. Employees will be instructed to recognize evidence of contaminated soil, such as buried debris, discolored soil, and unusual odors.

Concrete Residuals and Washout Wastes

- This project includes placement of about 130 cubic yards of concrete. The estimated maximum washout volume is 3.5 cubic feet. Discharges will consist of rinse water and residual concrete (Portland cement, aggregates, admixture, and water). Estimated pour dates are shown on the project schedule in Section 300.4. Concrete pours will not be conducted during or immediately prior to rainfall events.

- BMP WM-8, Concrete Waste Management, will be implemented and a below grade concrete washout facility will be constructed and maintained at the Contractor's yard as shown on WPCD-4. All excess concrete and concrete washout slurries will be discharged to the washout facility for drying. The minimum-sized washout, at 10 ft x 10 ft x 3.3 ft deep, will provide more than sufficient volume to contain concrete washout wastes and waste collected from concrete saw-cutting operations, discussed below. BMP maintenance, waste disposal, and BMP removal will be conducted as described in WM-8. Dried-off concrete will be used as fill material if permitted by the City Engineer.

- Concrete waste solids/liquids will be removed and disposed of as required by WM-8.

Sanitary and Septic Wastes

- The Contractor will implement BMP WM-9, Sanitary and Septic Waste Management, and portable toilets will be located and maintained at the Contractor's yard for the duration of the project. Specific locations are shown on WPCD-4. Weekly maintenance will be provided each Wednesday by ABC Sanitation (license CA0Q45W) and wastes will be disposed off-site. The toilets will be located away from concentrated flow paths and traffic flow.

REQUIRED TEXT:

An inventory of construction activities, materials, and wastes is provided in Section 500.3.1. The BMP Consideration Checklist in Attachment C and the following list indicates the BMPs that have been selected to handle materials and control construction site wastes.

- WM-1, Material Delivery and Storage
- WM- 2, Material Use

- WM-3, Stockpile Management
- WM-4, Spill Prevention and Control
- WM-5, Solid Waste Management
- WM-6, Hazardous Waste Management
- WM-8, Concrete Waste Management
- WM-9, Sanitary/Septic Waste Management
- CLICK AND TYPE FOR ADDITIONAL TEXT, PRESS RETURN FOR NEW LINE ITEM. TO CLEAR LINE USE DELETE LINE BUTTON.

Complete narratives of the above BMPs are in Attachement Q.

Material Delivery, Storage, and Use

BMPs WM-1 and WM-2 will be implemented to help prevent discharges of construction materials during delivery, storage, and use.

Very large items, such as light standards, framing materials, and stockpiled lumber, will be stored in the open in a general storage area. Such materials will be elevated with wood blocks to minimize contact with run-on.

Spill clean-up materials, material safety data sheets, a material inventory, and emergency contact numbers will be maintained and stored in a clearly labeled accessible area.

Stockpile Management

BMPs WM-3, Stockpile Management, will be implemented to reduce or eliminate pollution of storm water from stockpiles of soil and paving materials such as portland cement concrete (PCC) rubble, asphalt concrete (AC), asphalt concrete rubble, aggregate base, aggregate subbase, pre-mixed aggregate, and asphalt minder (so called "cold mix" asphalt). Stockpiles will be surrounded with sediment controls (SE-5, Fiber Rolls or SE-8, Sandbag Barrier). Plastic covers (EC-7, Geotextiles & Mats), or EC-5, Soil Binders, will be used.

Spill Prevention and Control

BMP WM-4, Spill Prevention and Control, will be implemented to contain and clean-up spills and prevent material discharges to the storm drain system. Spill prevention is also discussed above in Material Delivery, Storage, and below in the following waste management and equipment maintenance sections.

Waste Management

BMP WM-5, Solid Waste Management, and BMP WM-6, Hazardous Waste Management will be implemented to minimize storm water contact with waste materials and prevent waste discharges. Solid wastes will be loaded directly into trucks for off-site disposal. When on-site storage is necessary, solid wastes will be stored in watertight dumpsters in the general storage area of the Contractors yard.

Contaminated Soil Management

When contaminated soils are encountered, the City Engineer will be notified, the contaminated soils will be contained, covered if stockpiled, and disposed of per WM-7, Contaminated Soil Management, and the contract documents. Employees will be instructed to recognize evidence of contaminated soil, such as buried debris, discolored soil, and unusual odors.

Concrete Residuals and Washout Wastes

BMP WM-8, Concrete Waste Management, will be implemented and a below grade concrete washout facility will be constructed and maintained at the Contractor's yard. All excess concrete and concrete washout slurries will be discharged to the washout facility for drying. BMP maintenance, waste disposal, and BMP removal will be conducted as described in WM-8.

Concrete waste solids/liquids will be removed and disposed of as required by WM-8.

Sanitary and Septic Wastes

The Contractor will implement BMP WM-9, Sanitary and Septic Waste Management, and portable toilets will be located and maintained at the Contractor's yard for the duration of the project. The toilets will be located away from concentrated flow paths and traffic flow.

INSERT ADDITIONAL NARRATIVE TEXT OF WASTE MANAGEMENT AND MATERIALS POLLUTION CONTROL PRACTICES HERE OR DELETE THIS LINE (Use the "FORMAT OPTIONS" button to insert subtitles and/or paragraphs)

500.3.10 Cost Breakdown for Water Pollution Control

EXAMPLE:

A cost breakdown itemizing the contract lump sum for water pollution control has been developed for this project and included in Attachment O. The cost breakdown reflects the items of work, quantities and costs for BMPs shown in the SWPPP, except for those construction site BMPs and permanent BMPs that are shown on the project plans and for which there is a contract item of work.

REQUIRED TEXT:

A cost breakdown itemizing the contract lump sum for water pollution control has been developed for this project and included in Attachment O. The cost breakdown reflects the items of work, quantities and costs for BMPs shown in the SWPPP, except for those construction site BMPs and permanent BMPs that are shown on the project plans and for which there is a contract item of work.

500.4 Water Pollution Control Drawings (WPCDs)

INSTRUCTIONS:

- Prepare water pollution control drawings (WPCDs) in conformance with these instructions and the requirements of the General Construction Permit requirements for a site map. Include the WPCDs as Attachment B to the SWPPP.
  - ❑ Include a cover sheet(s) listing the BMPs that will be used and any selected options shown on the fact sheets, along with construction notes and a legend.
  - ❑ The WPCDs shall show locations for the BMPs that will be used.
  - ❑ Include detailed sheets showing construction details for the BMPs that will be used. BMP Fact Sheets provided in the *California Stormwater BMP Handbook – Construction* may be used as appropriate and included in Attachment Q.

- ❑ Additional details may be necessary to describe site-specific BMP applications.
- ❑ Use grading sheets, drainage sheets or erosion control sheets as base sheets for the WPCDs. Use Section 500.3, "Pollutant Source Identification and BMP Selection" as a guide to pollutant sources and BMPs for construction activities. Select BMPs that are appropriate for the site and show their locations on the site map.

- The base sheets shall show the construction project in detail, including:
  - ❑ The construction site perimeter.
  - ❑ Geographic features within or immediately adjacent to the site. Include surface waters such as lakes, streams, springs, wetlands, estuaries, ponds, and the ocean.
  - ❑ Site topography before and after construction. Include roads, paved areas, buildings, slopes, drainage facilities, and areas of known or suspected contamination.
  - ❑ Permanent (post-construction) BMPs. These are usually shown on the project plans.

- Also delineate the following site information:
  - ❑ Discharge points from the project to off-site storm drain systems or receiving waters.
  - ❑ Tributary areas and drainage patterns across the project area (show using flow arrows) into each on-site storm water inlet or receiving water.
  - ❑ Tributary areas and drainage patterns to each on-site storm water inlet, receiving water or discharge point.
  - ❑ Off-site tributary drainage areas that generate run-on to the project. (Where off-site tributary drainage areas are too large to depict on the drawings, use map notes or inserts illustrating the upstream drainage areas).
  - ❑ Temporary on-site drainage(s) to carry concentrated flows.
  - ❑ Drainage patterns and slopes anticipated after major grading activities are completed.
  - ❑ Outline all areas of existing vegetation, soil cover, or native vegetation that will remain undisturbed during the project
  - ❑ Areas of cut and fill.
  - ❑ Outline all areas of soil disturbance (disturbed soil areas, DSAs). Indicate which areas will be disturbed during the rainy season and which areas will be left exposed during the rainy season.

- ❑ Identify location(s) or areas where it is known that toxic materials have been stored, disposed, spilled, or leaked onto the construction site.
- ❑ Identify location(s) of contaminated or hazardous soils.
- ❑ Locate potential non-storm water discharges and activities, such as dewatering operations, concrete saw-cutting or coring, pressure washing, waterline flushing, diversions, cofferdams, and vehicle and equipment cleaning. If operations can't be located, provide a narrative description.
- ❑ Identify location(s) or direct discharge from the construction site into a Section 303(d) list water body (discharges that do not flow into an accepted MS4 system).
- ❑ Identify locations designated for sampling the discharge(s) from areas of the construction site.

- Show proposed locations for all construction site BMPs. Include additional detail drawings if necessary to convey site-specific configurations.
  - ❑ Show temporary erosion control and temporary sediment control BMPs that will be used during construction. Including temporary on-site drainage(s) to carry concentrated flows, BMPs implemented to divert off-site drainage around or through the construction site, and BMPs that protect storm water inlets.
  - ❑ Locate site ingress and egress points and any proposed temporary construction roads.
  - ❑ Show BMPs to mitigate or eliminate non-storm water discharges.
  - ❑ Show BMPs for waste management and materials pollution control, including, but not limited to storage of soil or waste; construction material loading, unloading, storage and access areas; and areas designated for waste handling and disposal.
  - ❑ Show location(s) of temporary stockpiles and BMPs to protect those areas.
  - ❑ Show BMPs for vehicle and equipment storage, fueling, maintenance, and cleaning.
  - ❑ Show location of all post-construction BMPs.

- The SWPPP shall apply to all areas that are directly related to the construction activity, including but not limited to staging areas, storage yards, material borrow areas and storage areas, access roads, etc., whether or not they reside within the project site. Therefore:
  - ❑ If the Contractor's yard for the project is not within the project site, but is located in the vicinity of the project, the WPCDs shall show all BMPs to be used at Contractor's yard.

- The WPCDs shall reflect the Contractor's phasing and/or construction staging, and shall address the entire scope of the contract work. (The Owner/Developer/Contractor may address certain individual operations at a later date per the SWPPP amendment process established in Sections 200.1 and 200.2)

EXAMPLE:

The Water Pollution Control Drawings can be found in Attachment B of the SWPPP.

REQUIRED TEXT:

The Water Pollution Control Drawings can be found in Attachment B of the SWPPP.

500.5 Construction BMP Maintenance, Inspection, and Repair

INSTRUCTIONS:

- The purpose of storm water inspections is to evaluate BMP effectiveness and implement repairs or design changes as soon as feasible.
- Inspections shall be completed by the Contractor's SWPPM.
- Inspections are recommended on a regular basis during dry weather. The purpose of dry-weather inspections is to ensure proper implementation of BMPs that are not necessarily weather-related. Examples include non-storm water, waste management, and sediment tracking control BMPs.
- A sample maintenance, inspection, and repair program is shown in Attachment G.
- A checklist is required during each inspection. A Storm Water Quality Construction Site Inspection Checklist is included as Attachment H. This checklist shall be used for all inspections unless the project's contract documents require the Contractor to use a different checklist.
- Inspections are required:
    - Prior to a forecast storm
    - after a rain event that causes runoff from the construction site
    - at 24-hour intervals during extended rain events
    - at any other time(s) or intervals of time specified in the contract documents.

- Copies of the completed checklists shall be kept with the SWPPP.
- A tracking or follow-up procedure shall follow any inspection that identifies deficiencies in BMPs.

❑ Include a discussion of the program to inspect and maintain all BMPs as identified in the site plan or other narrative documents throughout the duration of the project. Insert the complete program as Attachment G.

EXAMPLE:

Inspections will be conducted as follows:

- Prior to a forecast storm
- after a rain event that causes runoff from the construction site
- at 24-hour intervals during extended rain events
- weekly during the rainy season
- every 2 weeks during the non-rainy season
- at any other time(s) or intervals of time specified in the contract documents

A program for Maintenance, Inspection and Repair of BMPs is shown in Attachment G.

REQUIRED TEXT

Inspections will be conducted as follows:

- Prior to a forecast storm
- after a rain event that causes runoff from the construction site
- at 24-hour intervals during extended rain events
- weekly during the rainy season
- every 2 weeks during the non-rainy season
- at any other time(s) or intervals of time specified in the contract documents

Completed inspection checklists will be submitted to the Public Works Department within 24 hours of inspection. Copies of the completed checklists will be kept with the SWPPP.

A tracking or follow-up procedure shall follow any inspection that identifies deficiencies in BMPs. A program for Maintenance, Inspection and Repair of BMPs is shown in Attachment G.

500.6 Post-Construction Storm Water Management

500.6.1 Post-Construction Control Practices

INSTRUCTIONS:

- Post-Construction BMPs are permanent measures installed during construction, designed to reduce or eliminate pollutant discharges from the site after construction is completed. The Owner/Developer and/or Permittee may provide listings, descriptions, and special operations and maintenance requirements for post-construction BMPs.
  - ❑ Provide descriptions of the BMPs employed after all construction phases have been completed at the site (Post-Construction BMPs). Examples of post-construction measures are:
    - Infiltration basins;
    - Detention/retention devices;
    - Vegetated strips and/or swales;
    - Biofilters;
    - Permanent erosion control, seeding and planting;
    - Outlet protection/velocity dissipation devices;
    - Earth dikes, drainage swales, and lined ditches;
    - Rock slope protection;
    - Mulching;
    - Other proprietary permanent structural BMPs; and
    - Verification that interior drains are not connected to a storm sewer system.
- When an Owner/Developer/Contractor sells or leases individual lots or properties, there may be instances when the new Owner(s)/occupant(s) get involved in construction activities that may contribute to the discharge of pollutants into storm water. It is suggested that the Owner/Developer/Contractor develops a notification pamphlet or brochure that makes the new Owner(s)/occupant(s) aware of the potential for unauthorized discharges and practices to limit, reduce or eliminate the risks of discharging pollutants into storm water.

EXAMPLE:

The following are the post-construction BMPs that are to be used at this construction site after all construction is complete:

- Outlet protection/velocity dissipation devices at all culvert outlets.
- All slopes will be seeded with, planted and protected with wood mulch.
- Numerous drainage strips and swales.
- An infiltration basin.

REQUIRED TEXT:

The following are the post-construction BMPs that are to be used at this construction site after all construction is complete:

- CLICK AND TYPE FOR ADDITIONAL TEXT, PRESS RETURN FOR NEW LINE ITEM. TO CLEAR LINE USE DELETE LINE BUTTON.

INSERT ADDITIONAL NARRATIVE TEXT HERE OR DELETE THIS LINE (Use the "FORMAT OPTIONS" button to insert subtitles and/or paragraphs)

500.6.2 Operation/Maintenance after Project Completion

INSTRUCTIONS:

- Describe the following information regarding post-construction BMPs. The Owner/Developer/Contractor may provide specific language for any operations and maintenance requirements of post-construction control practices. Any pertinent language provided by the Owner/Developer/Contractor shall be added to this section of the SWPPP.
  - ❑ List the parties responsible for long-term operation and maintenance of permanent BMPs. Examples of responsible parties are: a Home Owners Association (HOA); a local agency or municipality; or the Owner/Developer/Contractor.

EXAMPLE:

The post-construction BMPs that are described above will be funded and maintained by the Rancho del Cielo Home Owners Association (RCHOA).

REQUIRED TEXT:

The post-construction BMPs that are described above will be funded and maintained by ENTER RESPONSIBLE PARTY

INSERT ANY ADDITIONAL LANGUAGE PROVIDED BY OWNER/DEVELOPER/CONTRACTOR HERE. DELETE THIS LINE (Use the "FORMAT OPTIONS" button to insert subtitles and/or paragraphs)

500.7 Training

INSTRUCTIONS:

- Individuals responsible for SWPPP preparation, implementation, and permit compliance are required to be trained, and the SWPPP shall document all training. This includes those personnel responsible for installation, inspection, maintenance, and repair of BMPs. Describe the types of training that the Contractor's inspection, maintenance, and repair personnel have received or will receive that are directly related to storm water pollution prevention.
- Subcontractors and employees whose activities may generate non-storm water discharges shall be trained to minimize the potential for such discharges.
- Training may be both formal and informal
- Formal storm water pollution prevention or erosion and sediment control training sessions may include certification as a Certified Professional in Erosion Control and Sediment Control (CPESC); workshops offered by the SWRCB, RWQCB, Community College or University of California Extension, or other locally recognized agencies or professional organizations such as the International Erosion Control Association (IECA), Association of Bay Area Governments (ABAG), Association of General Contractors (AGC), etc. Owners/Developers/Contractors are encouraged to contact the RWQCB or the SWRCB to inquire about availability of training.
- A listing of training organizations, subject matter and classes are located at http://www.dot.ca.gov/hq/construc/stormwater.html
- The Storm Water Pollution Prevention Manager (SWPPM) should have a minimum of 24 hours (3 days) of formal storm water pollution prevention training.
- On-site storm water pollution prevention training shall be conducted on an on-going basis.

  - ❑ Document formal and informal storm water training using the sample Trained Contractor Personnel Log sheet provided as Attachment I.

- ❑ Formal storm water training may be documented by providing a list of classes and copies of class completion documents.

EXAMPLE:

Section 300.5 shows the name of the Owner/Developer/Contractor's Storm Water Pollution Prevention Manager (SWPPM). This person has received the following training:

- Two (2) day construction storm water management course given by the County of Los Angeles Storm Water Program in October of 1999.
- Attended 2001 IECA 3-day Conference.

On-going, formal training sessions will be selected from one of the following organizations:

- City of Los Angeles Storm Water Program
- County of Los Angeles Storm Water Program
- State of California Regional Water Quality Control Board
- IECA, ABAG and/or AGC sponsored training
- USEPA sponsored training
- Recognized municipal stakeholder organizations throughout California
- Professional organizations and societies in the building and construction field

Other Contractor personnel attending tailgate training will document attendance using the form in Attachment I. Informal training will include tailgate site briefings to be conducted bi-weekly and will address the following topics:

- Erosion Control BMPs
- Sediment Control BMPs
- Non-Storm Water BMPs
- Waste Management and Materials Pollution Control BMPs
- Emergency Procedures specific to the construction site storm water management

This SWPPP was prepared by ABC Engineering, under the direction of Mr. John Doe, a registered Professional Engineer in the State of California. Mr. Doe has over 5 years of experience in the preparation of Storm Water Pollution Prevention Plans (SWPPPs), and has the following previous experience:

- Has prepared over 15 project-specific SWPPPs
- Over 15 years of experience in storm drain design, hydrology, and hydraulics
- SWPPP Preparation training sponsored by Orange County Storm Water Program, June 2002
- Attended the 1999, 2000, 2001, and 2002 International Erosion Control Association (IECA) 3-day conferences

- Received certification as a Certified Professional in Erosion Control and Sediment Control (CPSEC) in July 2001
- Attended "NPDES Storm Water Permit Compliance" course in spring 2002, sponsored by the American Society of Civil Engineers (ASCE)

REQUIRED TEXT:

Individuals responsible for SWPPP preparation, implementation, and permit compliance are required to be trained, and the SWPPP shall document all training. This includes those personnel responsible for installation, inspection, maintenance, and repair of BMPs. Describe the types of training that the Contractor's inspection, maintenance, and repair personnel have received or will receive that are directly related to storm water pollution prevention.

Subcontractors and employees whose activities may generate non-storm water discharges shall be trained to minimize the potential for such discharges.

Training may be both formal and informal.

Formal storm water pollution prevention or erosion and sediment control training sessions may include certification as a Certified Professional in Erosion Control and Sediment Control (CPESC); workshops offered by the SWRCB, RWQCB, Community College or University of California Extension, or other locally recognized agencies or professional organizations such as the International Erosion Control Association (IECA), Association of Bay Area Governments (ABAG), Association of General Contractors (AGC), etc. Owners/Developers/Contractors are encouraged to contact the RWQCB or the SWRCB to inquire about availability of training.

A listing of current training workshops for the Central Coast RWQCB is located at http://www.waterboards.ca.gov/centralcoast/SWNEW/Workshops/index.htm

A listing of current training materials/workshops for the SWRCB is located at http://www.waterboards.ca.gov/stormwtr/training.html

The Storm Water Pollution Prevention Manager (SWPPM) should have a minimum of 24 hours (3 days) of formal storm water pollution prevention training.

On-site storm water pollution prevention training shall be conducted on an on-going basis.

Document formal and informal storm water training using the sample Trained Contractor Personnel Log sheet provided as Attachment I.

Formal storm water training may be documented by providing a list of classes and copies of class completion documents.

Section 300.5 shows the name of the Owner/Developer/Contractor's Storm Water Pollution Prevention Manager (SWPPM). This person has received the following training:

- CLICK AND TYPE FOR ADDITIONAL TEXT, PRESS RETURN FOR NEW LINE ITEM. TO CLEAR LINE USE DELETE LINE BUTTON.

The training log showing formal and informal training of various Contractor personnel is shown in Attachment I.

INSERT HERE ANY ADDITIONAL TEXT REGARDING TRAINING OF PERSONNEL.

This SWPPP was prepared by INSERT COMPANY, NAME AND PROFESSIONAL REGISTRATION OR OTHER QUALIFICATIONS OF THE PERSON THAT PREPARED THE SWPPP.

500.8 List of Subcontractors

INSTRUCTIONS:

- The SWPPP is required to include a list of names of all Contractors, (or subcontractors) and individuals responsible for implementation of the SWPPP. This list shall include telephone numbers and addresses. Specific areas of responsibility of each subcontractor (type of work to be performed) and emergency contact numbers shall also be included.
- A sample sub-contractor notification letter and log is provided as Attachment J. Discuss pertinent conditions in the contractual agreement and/or letter of approval that address subcontractor responsibility for General Permit compliance.

❑ Include a completed Attachment J in the SWPPP.

EXAMPLE:

All Contractors and subcontractors will be notified of the requirement for storm water management measures during the project. A list of contractors will be maintained and included in the SWPPP. If subcontractors change during the project, the list will be updated accordingly. The sub-contractor notification letter and log is included in the SWPPP as Attachment J.

REQUIRED TEXT:

All contractors and subcontractors will be notified of the requirement for storm water management measures during the project. A list of contractors will be maintained and included in the SWPPP. If subcontractors change during the project, the list will be updated accordingly. The subcontractor notification letter and log is included in the SWPPP as Attachment J.

500.9 Other Plans/Permits

INSTRUCTIONS:

- ❑ The SWPPP shall incorporate appropriate elements of other plans or permits required by local, State, or Federal agencies.
- ❑ Include a copy of the General Permit CAS000002.
- ❑ Provide a list of all of the other plans and permits in this section, and describe any special requirements for each permit. Insert additional bullets as needed. Delete bullets if not needed.
- ❑ Include a copy of all other plans/permits as Attachment N of the SWPPP.

EXAMPLE:

Following is a list of the plans and permits included in Attachment N of this SWPPP.

- State Water Resources Control Board (SWRCB) Resolution No. 99-08-DWQ, National Pollutant Discharge Elimination System (NPDES) General Permit No. CAS000002, Waste Discharge Requirements (WDRs) for Discharges of Storm Water Runoff Associated with Construction Activity, August 1999, and amendments.
- California Department of Fish and Game Code Section 1601 Streambed Alteration Agreement
- Clean Water Act Section 401 Water Quality Certification issued by the State of California as processed through the RWQCB
- U.S. Army Corps of Engineers Clean Water Act Section 404 Nationwide Permit

REQUIRED TEXT:

Attachment N includes copies of other local, state, and federal plans and permits. Following is a list of the plans and permits included in Attachment N:

- State Water Resources Control Board (SWRCB) Order No. 99-08-DWQ, National Pollutant Discharge Elimination System (NPDES) General Permit No. CAS000002, Waste Discharge Requirements (WDRs) for Discharges of Storm Water Runoff Associated with Construction Activity.
- CLICK AND TYPE FOR ADDITIONAL TEXT, PRESS RETURN FOR NEW LINE ITEM. TO CLEAR LINE USE DELETE LINE BUTTON.

Section 600
Monitoring Program and Reports

600.1 Site Inspections

INSTRUCTIONS:

- ❑ Include a Separator and Tab for Section 600 for ready reference.

- The site shall be inspected:
  - Prior to a forecast storm
  - after a rain event that causes runoff from the construction site
  - at 24-hour intervals during extended rain events
  - as specified in the contract documents

- BMPs shall be evaluated for adequacy, proper implementation, and whether additional BMPs are required in accordance with the terms of the Permits and the contract documents.
- Implementation of non-storm water discharge BMPs shall be verified and their effectiveness evaluated.
- One-time discharges of non-storm water shall be inspected when such discharges occur.
- The results of the inspections and assessments shall be recorded on the Storm Water Quality Construction Site Inspection Checklist included in Attachment H. This checklist shall be used for all inspections.
- A copy of each completed Storm Water Quality Construction Site Inspection Checklist shall be provided to the Owner/Developer/Contractor and a copy attached to the on-site SWPPP. A tracking or follow-up procedure shall follow any inspection that identifies deficiencies in BMPs.

REQUIRED TEXT:

The Owner/Developer/Contractor will inspect the site:
-Prior to a forecast storm,
-after a rain event that causes runoff from the construction site,
-at 24-hour intervals during extended rain events,
-and as specified in the contract documents.

BMPs shall be evaluated for adequacy, proper implementation, and whether additional BMPs are required in accordance with the terms of the Permits and the contract documents.

Implementation of non-storm water discharge BMPs shall be verified and their effectiveness evaluated.

A tracking or follow-up procedure shall follow any inspection that identifies deficiencies in BMPs.

The results of all inspections and assessments will be documented:

-a copy shall be provided to the Owner/Developer/Contractor within 24 hours of the inspection,
-copies of the completed inspection checklists will be maintained with the SWPPP,
-site inspections conducted for monitoring purposes will be performed using the inspection checklist shown in Attachment H.

The name(s) and contact number(s) of the assigned inspection personnel are listed below:

Assigned inspector: NAME OF INSPECTOR Contact phone: TELEPHONE NUMBER

600.2 Non-Compliance Reporting

INSTRUCTIONS:

- Discharges will be reported to the Owner/Developer/Contractor verbally upon discovery and in writing within 7 days of occurrence, or as specified in the contract documents. A sample Notice of Non-Compliance form is provided in Attachment K and a sample form for logging discharges is shown in Attachment T.
- Note: USEPA has issued regulations that define Reportable Quantity (RQ) levels for oil and hazardous substances. These regulations are found in the Code of Federal Regulations at 40 CFR Part 110, Part 117, or Part 302.
  - For example, an oily sheen in storm water runoff as a result of a spill or release is an exceedance of a RQ level. The RQ level for dieldrin, a pesticide, is 1 kilogram. A spill or release of one or more kg of dieldrin is an exceedance of the RQ threshold.

REQUIRED TEXT:

If a discharge occurs or if the project receives a written notice of non-compliance, the Contractor will immediately notify the Owner/Developer; will file a written report to the

Owner/Developer within 7 days of the discharge or notice; and will file a written report to the Regional Water Quality Control Board (RWQCB) within 30 days or identification of non-compliance. Corrective measures will be implemented immediately following the discharge, notice or order. A sample Notice of Non-Compliance (NONC) form is provided in Attachment K. All discharges will be documented on a Discharge Reporting Log using the example form in Attachment T.

The report to the Owner/Developer and to the RWQCB will contain the following items:

- The date, time, location, nature of operation, and type of unauthorized discharge, including the cause or nature of the notice or order,
- The control measures (BMPs) deployed before the discharge event, or prior to receiving notice or order,
- The date of deployment and type of control measures (BMPs) deployed after the discharge event, or after receiving the notice or order, including additional measures installed or planned to reduce or prevent re-occurrence, and
- An implementation and maintenance schedule for any affected BMPs

Note: USEPA has issued regulations that define Reportable Quantity (RQ) levels for oil and hazardous substances. These regulations are found in the Code of Federal Regulations at 40 CFR Part 110, Part 117, or Part 302.

-For example, an oily sheen in storm water runoff as a result of a spill or release is an exceedance of a RQ level. The RQ level for dieldrin, a pesticide, is 1 kilogram. A spill or release of one or more kg of dieldrin is an exceedance of the RQ threshold.

600.3 Record Keeping and Reports

REQUIRED TEXT:

Records shall be retained for a minimum of three years for the following items:

- Site inspections
- Compliance certifications
- Discharge reports
- Approved SWPPP document and amendments

600.4 Sampling and Analysis Plan for Sediment

INSTRUCTIONS:

- If the project has the potential to discharge directly into a water body listed as impaired due to Sedimentation/Siltation and/or Turbidity pursuant to Section 303(d) of the Clean Water Act, the SWPPP must include a Sampling and Analysis Plan (SAP) for Sediment. The purpose of a SAP for Sediment is to determine if BMPs implemented on the construction site are effective for preventing impacts to levels of sedimentation/siltation and/or turbidity in 303(d) listed water bodies impaired by those pollutants.
  - Refer to the SWRCB web site at http://www.swrcb.ca.gov/tmdl/docs/303d98.pdf for the list of 303(d) water bodies in California. Determine if the project will discharge directly into one of the 303(d) water bodies listed as impaired due to Sedimentation/Siltation and/or Turbidity.
  - ***Direct discharge*** is defined as a point source or conveyance that discharges directly to the 303(d) listed water body that does not first flow through a tributary river or stream (that itself is not listed as impaired) or combine with storm water from off-site in a municipal separate storm sewer system (MS4).
- Include the following required text to identify whether or not the project discharges directly to a 303(d) listed water body.
- **NOTE: Llagas Creek is the only 303(d) listed water body within the City of Morgan Hill. Therefore, unless water is discharged directly into Llagas Creek most construction sites in Morgan Hill DOES NOT have the potential to discharge directly to a water body listed as impaired per Section 303(d) of the CWA.**

REQUIRED TEXT (in the 'select field' below choose if the site 'does' or 'does not' and press tab to continue):

This project does have the potential to discharge directly to a water body listed as impaired due to Sedimentation/Siltation and/or Turbidity pursuant to Clean Water Act, Section 303(d).

INSTRUCTIONS:

- If the project does not discharge to a 303(d) listed water body, delete Sections 600.4.1 through 600.4.9 from the template and continue with Section 600.5.
- If the project does discharge to a 303(d) listed water body, complete Sections 600.4.1 through 600.4.9 by following the instructions provided at the beginning of each section.

600.4.1 Scope of Monitoring Activities

INSTRUCTIONS:

- ❑ Provide the name(s) of the 303(d) listed water bodies and identify the reason for impairment. (Sedimentation/Siltation and/or Turbidity)
- ❑ Describe the location(s) of direct discharge from the project site to each 303(d) listed water body and show the locations of direct discharge on the WPCDs.
- ❑ Include the appropriate required text to identify whether run-on to the project site may combine with storm water and directly discharge to the 303(d) water body. If the project does receive run-on, describe the locations of run-on and show the locations on the WPCDs.

REQUIRED TEXT:

This project discharges directly into [specify 303(d) water body], a water body listed as impaired due to [specify reason(s) for impairment: Sedimentation/Siltation and/or Turbidity] pursuant to Clean Water Act, Section 303(d). This Sampling and Analysis Plan (SAP) has been prepared pursuant to the requirements of the General Permit (including Resolution 2001-046). The SAP describes the sampling and analysis strategy and schedule for monitoring [specify impairment: Sedimentation/Siltation and/or Turbidity] in the 303(d) listed water body and potential increases in the [specify impairment: Sedimentation/Siltation and/or Turbidity] levels caused by storm water discharges from the project site.

The project has the potential for direct (concentrated) storm water discharges to [specify 303(d) water body] at the following locations, as shown on the WPCDs in Attachment B.

- CLICK AND TYPE FOR ADDITIONAL TEXT, PRESS RETURN FOR NEW LINE ITEM. TO CLEAR LINE USE DELETE LINE BUTTON.

REQUIRED TEXT for PROJECTs that do not RECEIVE RUN-ON:

The project does not receive run-on with the potential to combine with storm water that discharges directly to the 303(d) listed water body.

REQUIRED TEXT for PROJECTs that RECEIVE RUN-ON:

The project receives run-on with the potential to combine with storm water that discharges directly to the 303(d) listed water body at the following locations, as shown on the WPCDs in Attachment B:

- CLICK AND TYPE FOR ADDITIONAL TEXT, PRESS RETURN FOR NEW LINE ITEM. TO CLEAR LINE USE DELETE LINE BUTTON.

600.4.2 Monitoring Strategy

INSTRUCTIONS:

- ❑ Describe the sampling schedule for monitoring the impacts of direct storm water discharges to the 303(d) water body.
- ❑ Describe the sampling locations for monitoring the impacts of direct storm water discharges from the project to the 303(d) water body.
- ❑ Describe the rationale for the selection of sampling locations.
- ❑ Identify a location upstream of all direct discharge from the construction site that appears to represent the flow of the water body, to analyze the prevailing condition of the receiving water without any influence from the construction site. Describe exactly, either using GPS coordinates of post kilometer/post mile, where the sample will be collected. Note: Sampling too far upstream may not show prevailing conditions immediately upstream of the construction site.
- ❑ Identify a location immediately downstream from the last point of direct discharge from the construction site that appears to represent the nature of the flow to analyze potential pollutants to the 303(d) listed water body from the project. Describe exactly where the sample will be collected. Downstream samples should represent the receiving water mixed with flow from the construction site. Note: Sampling too far downstream may detect pollutants from other discharges.
- ❑ For projects that, in Section 600.4.1, identified locations of run-on to the project, include the required text to identify run-on sampling location(s) to determine potential impairments that originate off the project site. Describe exactly where the sample will be collected.
- ❑ Show all sampling locations on the WPCDs.

- Locate sampling locations in areas that are safe, out of the path of heavy traffic, and reasonably accessible.
  - ❑ Describe surrounding areas such as agricultural fields, or other sites that may contribute run-on sediment to the site.
  - ❑ Do not locate sampling points upstream or downstream of point sources or confluences to minimize backwater effects or poorly mixed flows.

- ❑ Do not locate sampling points directly downstream from a bridge, which may contaminate flows from the bridge structure or from road surface runoff.

REQUIRED TEXT:

Sampling Schedule

Upstream, downstream, discharge, and run-on samples, if applicable, shall be collected for [specify impairment: Sedimentation/Siltation and/or Turbidity] during the first two hours of discharge from rain events that result in a direct discharge from the project site to [enter 303(d) water body]. Samples shall be collected during daylight hours (sunrise to sunset) and shall be collected regardless of the time of the year, status of the construction site, or day of the week.

All storm events that occur during daylight hours will be sampled up to a maximum of four rain events within a 30-day period. In conformance with the U.S. Environmental Protection Agency definition, a minimum of 72 hours of dry weather will be used to distinguish between separate rain events.

Sampling Locations

Sampling locations are based on proximity to identified discharge or run-on location(s), accessibility for sampling, personnel safety, and other factors in accordance with the applicable requirements in the General Permit. Sampling locations are shown on the WPCDs and include:

- A sample location (designated number) is upstream of all direct discharge from the construction site for the collection of a control sample to be analyzed for the prevailing condition of the receiving water without any influence from the construction site. The control sample will be used to determine the background levels of [specify impairment: Sedimentation/Siltation and/or Turbidity] in the 303(d) listed water body upstream of the project, if any.
    - Sample location number is located .
- A sample location (designated number) is immediately downstream from the last point of direct discharge from the construction site for the collection of a sample to be analyzed for potential increases in [specify impairment: Sedimentation/Siltation and/or Turbidity] in the 303(d) listed water body caused by the storm water discharged from the project, if any.

- Sample location number is located .

REQUIRED TEXT only for PROJECTs that RECEIVE RUN-ON:

- [Enter number of locations] sampling location(s) (designated number(s) has been identified for the collection of samples of run-on to the project site with the potential to combine with discharges from the construction site in other than MS4 to the 303(d) water body. These samples will identify potential [specify impairment: Sedimentation/Siltation and/or Turbidity] that originates off the project site and contributes to direct storm water discharges from the construction site to the 303(d) listed water body.

If the following is not needed, place cursor in a field and use the "Delete Line" option on the toolbar.

- Sample location number is located .
- If needed Sample location number is located .
- If needed Sample location number is located .

600.4.3 Monitoring Preparation

INSTRUCTIONS:

- ❑ Identify whether samples will be collected by the Contractor's personnel (with appropriate training/knowledge for sampling), by a commercial laboratory, or by an environmental consultant.
- ❑ Identify training and experience of individuals responsible for collecting water samples.
- ❑ Identify Contractor's health and safety procedures for sampling personnel.
- ❑ Identify alternate sampling personnel in case of emergency, sick leave, and/or vacations during storm water monitoring. Identify training of alternate sampling personnel.
- ❑ Identify the state-certified laboratory(ies) that will analyze the samples. For a list of California state-certified laboratories, access the following web site: www.dhs.ca.gov/ps/ls/elap/html/lablist.htm

- ❑ Include the appropriate required text to describe the strategy for ensuring that adequate sample collection supplies are available to the project in preparation for a sampling event.
- ❑ Describe the strategy for ensuring that appropriate field-testing equipment is available to the project in preparation for a sampling event. If equipment is to be rented, contact a local environmental rental company, such as www.totalsafetyinc.com.

REQUIRED TEXT IF Contractor personnel will collect samples, if contractor is not to collect select 'not to be collected by' in the 'Select field' below:

Samples on the project site will Select one of the following Contractor sampling personnel:

Name/Telephone Number:	Name Phone Number
Name/Telephone Number:	Name Phone Number
Alternate(s)/Telephone Number:	Name Phone Number
Alternate(s)/Telephone Number:	Name Phone Number

Prior to the rainy season, all sampling personnel and alternates will review the SAP. Qualifications of designated Contractor personnel describing environmental sampling training and experience are provided in Attachment I.

An adequate stock of supplies and equipment for monitoring [specify impairment: Sedimentation/Siltation and/or Turbidity] will be available on the project site or provided by [specify laboratory] prior to a sampling event. Monitoring supplies and equipment will be stored in a cool-temperature environment that will not come into contact with rain or direct sunlight. Sampling personnel will be available to collect samples in accordance with the sampling schedule.

Supplies maintained at the project site will include, but will not be limited to, surgical gloves, sample collection equipment, coolers, appropriate number and volume of sample bottles, identification labels, re-sealable storage bags, paper towels, personal rain gear, ice, Sampling Activity Log forms, and Chain of Custody (COC) forms. The Contractor will obtain and maintain the field-testing instruments, as identified in Section 600.4.5, for analyzing samples in the field by Contractor sampling personnel. Safety practices for sample collection will be in accordance with the [enter title and publication date of contactor health and safety plan for the project].

REQUIRED TEXT only if consultant or laboratory will collect samples:

Samples on the project site will be collected by the following [specify laboratory or environmental consultant]:
(**Note: For a list of California state-certified laboratories, access the following web site:** www.dhs.ca.gov/ps/ls/elap/html/lablist.htm)

Company Name:

Address:

Telephone Number:

Point of Contact:

Qualifications of designated Contractor personnel describing environmental sampling training and experience are provided in Attachment I.

SWPPM will contact [specify name of laboratory or environmental consultant] [enter number of hours] hours prior to a predicted rain event to ensure that adequate sample collection personnel, supplies and field test equipment for monitoring [specify impairment: Sedimentation/Siltation and/or Turbidity] are available and will be mobilized to collect samples on the project site in accordance with the sampling schedule.

[Specify name of laboratory or environmental consultant] will obtain and maintain the field-testing instruments, as identified in Section 600.4.5, for analyzing samples in the field by their sampling personnel.

600.4.4 Sample Collection and Handling

INSTRUCTIONS:

- ❑ Describe sample collection procedures to be used on the project.
- Run-on samples could be collected using the following procedures:
  - Place several rows of sandbags in a half circle directly in the path of the run-on to pond water and wait for enough water to spill over. Then place a cleaned or decontaminated flexible hose along the top and cover with another sandbag so that ponded water will only

pour through the flexible hose and into sample bottles. Do not reuse the same sandbags in future sampling events as they may cross-contaminate future samples.

- Place a cleaned or decontaminated dustpan with open handle in the path of the run-on so that water will pour through the handle and into sample bottles.

- For laboratory analysis, all sampling, sample preservation, and analyses must be conducted according to test procedures under 40 CFR Part 136.
- For a list of California state-certified laboratories, access the following web site: www.dhs.ca.gov/ps/ls/elap/html/lablist_county.htm
  - ❑ Describe sample-handling procedures.
  - ❑ Describe decontamination waste disposal requirements (i.e., TSP soapy water shall not be discharged to the storm drainage system or receiving water).
  - ❑ Describe sample collection documentation procedures.
  - ❑ Describe procedures for recording and correcting sampling data.
- A Chain of Custody (COC) form is required to be submitted to the laboratory with the samples to trace the possession and handling of samples from collection through analysis.
- A Sampling Activity Log should be kept to document details of all sampling events and to record results for samples analyzed in the field.
- Each sample bottle is required to have a proper and complete identification label.

REQUIRED TEXT:

Sample Collection Procedures

Grab samples will be collected and preserved in accordance with the methods identified in Table 600-1, "Sample Collection, Preservation and Analysis for Monitoring Sedimentation/Siltation and/or Turbidity" provided in Section 600.4.5. Only personnel trained in proper water quality sampling will collect samples.

Upstream samples will be collected to represent the condition of the water body upgradient of the construction site. Downstream samples will be collected to represent the water body mixed with direct flow from the construction site. Samples will not be collected directly from ponded, sluggish, or stagnant water.

Upstream and downstream samples will be collected using one of the following methods:

- Placing a sample bottle directly into the stream flow in or near the main current upstream of sampling personnel, and allowing the sample bottle to fill completely;

  OR,

- Placing a decontaminated or 'sterile' bailer or other 'sterile' collection device in or near the main current to collect the sample, and then transferring the collected water to appropriate sample bottles, allowing the sample bottles to fill completely.

Run-on samples, if applicable, will be collected to identify potential sedimentation/siltation and/or turbidity that originates off the project site and contributes to direct discharges from the construction site to the 303(d) listed water body. Run-on samples will be collected downgradient and within close proximity of the point of run-on to the project by pooling or ponding water and allowing the ponded water to spill over into sample bottles directly in the stream of water.

To maintain sample integrity and prevent cross-contamination, sampling collection personnel will:

- Wear a clean pair of surgical gloves prior to the collection and handling of each sample at each location.
- Not contaminate the inside of the sample bottle by not allowing it to come into contact with any material other than the water sample.
- Discard sample bottles or sample lids that have been dropped onto the ground prior to sample collection.
- Not leave the cooler lid open for an extended period of time once samples are placed inside.
- Not touch the exposed end of a sampling tube, if applicable.
- Avoid allowing rainwater to drip from rain gear or other surfaces into sample bottles.
- Not eat, smoke, or drink during sample collection.
- Not sneeze or cough in the direction of an open sample bottle.
- Minimize the exposure of the samples to direct sunlight, as sunlight may cause biochemical transformation of the sample to take place.
- Decontaminate sampling equipment prior to sample collection using a TSP-soapy water wash, distilled water rinse, and final rinse with distilled water.

- Dispose of decontamination water/soaps appropriately; i.e., not discharge to the storm drain system or receiving water.

Sample Handling Procedures

REQUIRED TEXT only If laboratory will analyze ALL or SOME OF THE samples: Select Yes/No (after selecting press tab to continue)

Immediately following collection, sample bottles for laboratory analytical testing will be capped, labeled, documented on a Chain of Custody (COC) form provided by the analytical laboratory, sealed in a re-sealable plastic storage bag, placed in an ice-chilled cooler, at as near to 4 degrees Celsius as practicable, and delivered within 24 hours to the following California state-certified laboratory:

Laboratory Name:

Address:

Telephone Number:

Point of Contact:

REQUIRED TEXT only if Contractor will analyze ALL OR SOME OF THE samples:

Immediately following collection, samples for field analysis will be tested in accordance with the field instrument manufacturer's instructions and results recorded on the Sampling Activity Log.

REQUIRED TEXT:

Sample Documentation Procedures

All original data documented on sample bottle identification labels, Chain of Custody forms, Sampling Activity Logs, and Inspection Checklists will be recorded using waterproof ink. These will be considered accountable documents. If an error is made on an accountable document, the individual will make corrections by lining through the error and entering the correct information. The erroneous information will not be obliterated. All corrections will be initialed and dated. Copies of the Sampling Activity Log and Chain

of Custody form are provided in Attachment R. Sampling and field analysis activities will be documented using the following:

- Sample Bottle Identification Labels: Sampling personnel will attach an identification label to each sample bottle. At a minimum, the following information will be recorded on the label, as appropriate:
  - Project name
  - Project number
  - Unique sample identification number and location.
    [Project Number]-[Six digit sample collection date]-[Location]
    (*Example:* 0G5304-081801-Upstream).
    Quality assurance/quality control (QA/QC) samples shall be identified similarly using a unique sample number or designation
    (*Example:* 0G5304-081801-DUP1).
  - Collection date/time (No time applied to QA/QC samples)
  - Analysis constituent

- Sampling Activity Logs: A log of sampling events will identify:
  - Sampling date
  - Separate times for sample collection of upstream, downstream, run-on, and QA/QC samples recorded to the nearest minute
  - Unique sample identification number and location
  - Analysis constituent
  - Names of sampling personnel
  - Weather conditions (including precipitation amount)
  - Field analysis results
  - Other pertinent data

- Chain of Custody (COC) forms: All samples to be analyzed by a laboratory will be accompanied by a COC form provided by the laboratory. Only the sample collectors will sign the COC form over to the lab. COC procedures will be strictly adhered to for QA/QC purposes.
- Storm Water Quality Construction Inspection Checklists: When applicable, the Contractor's storm water inspector will document on the checklist that samples for sedimentation/siltation and/or turbidity were taken during a rain event.

600.4.5 Sample Analysis

INSTRUCTIONS:

- ❑ Identify the tests to be used on the project by completing Table 600-1, "Sample Collection, Preservation and Analysis for Monitoring Sedimentation/Siltation and/or Turbidity".
- ❑ For 303(d) listed water bodies impaired due to Sedimentation/Siltation, select YES for (b) and (c) OR YES for (b), and (c) and/or (a).
- ❑ For 303(d) listed water bodies impaired due to Turbidity, select YES for (d).
- ❑ For each test selected, fill in the blank fields in the table. Contact the selected laboratory for the specifications to obtain the necessary information.

REQUIRED TEXT:

Samples will be analyzed for the constituents indicated in Table 600-1, "Sample Collection, Preservation and Analysis for Monitoring Sedimentation/Siltation and/or Turbidity".

Table 600-1
Sample Collection, Preservation and Analysis for Monitoring Sedimentation/Siltation and/or Turbidity

Constituent [1]	Analytical Method	Test to be Used?	Sample Preservation	Minimum Sample Volume	Sample Bottle	Maximum Holding Time	Reporting Limit
(a) Suspended Sediment Concentration (SSC)	ASTM D3977-97	☐ YES ☐ NO	Store at 4˚ C (39.2˚ F)				
(b) Settleable Solids (SS)	EPA 160.5 Std Method 2540(f)	☐ YES ☐ NO	Store at 4˚ C (39.2˚ F)				mL/L/hr
(c) Total Suspended Solids (TSS)	EPA 160.2 Std Method 2540(d)	☐ YES ☐ NO	Store at 4˚ C (39.2˚ F)				mg/L
(d) Turbidity	EPA 180.1 Std Method 2130(b)	☐ YES ☐ NO	Store at 4˚ C (39.2˚ F)				NTU

Notes: [1] Samples shall be analyzed by using methods (b) and (c), or only method (a)

ASTM – American Society for Testing and Materials
°C – Degrees Celsius
°F – Degrees Fahrenheit
EPA – U.S. Environmental Protection Agency
L – Liter
mL/L/hr – Milliliters per liter per hour
mg/L – Milligrams per liter
mL – Milliliters
NTU – Nephelometric Turbidity Unit
Std Method – Per the *Standard Methods for the Examination of Water and Wastewater*, 20th Edition, American Water Works Association

REQUIRED TEXT only If samples will be analyzed in the field: Select Yes/No (after selecting press tab to continue)

For samples collected for field analysis, collection, analysis and equipment calibration will be in accordance with the field instrument manufacturer's specifications.

The following field instrument(s) will be used to analyze the following constituents:

Field Instrument	Constituent

- The instrument(s) will be maintained in accordance with manufacturer's instructions.
- The instrument(s) will be calibrated before each sampling and analysis event.
- Maintenance and calibration records will be maintained with the SWPPP.

600.4.6 Quality Assurance/Quality Control

REQUIRED TEXT:

For an initial verification of laboratory or field analysis, duplicate samples will be collected at a rate of 10 percent or 1 duplicate per sampling event. The duplicate sample will be collected, handled, and analyzed using the same protocols as primary samples, and will be collected where contaminants are likely, and not on the upstream sample. A duplicate sample will be collected immediately after the primary sample has been collected. Duplicate samples will not influence any evaluations or conclusions; however, they will be used as a check on laboratory quality assurance.

600.4.7 Data Management and Reporting

REQUIRED TEXT:

A copy of all water quality analytical results and QA/QC data will be submitted to the Owner/Developer within 5 days of sampling (for field analyses) and within 30 days of sampling (for laboratory analyses). Lab reports and COCs will be reviewed for consistency between lab methods, sample identifications, dates, and times for both primary samples and QA/QC samples. All data, including COC forms and Sampling Activity Logs, shall be kept with the SWPPP document.

600.4.8 Data Evaluation

INSTRUCTIONS:

- The General Permit requires that BMPs be implemented on the construction site to prevent a net increase of sediment load in storm water discharges relative to pre-construction levels. The upstream sample, while not representative of pre-construction levels, provides a basis for comparison with the sample collected downstream of the construction site.
- The downstream water quality sample analytical results will be evaluated to determine if the downstream sample(s) show elevated levels of the tested constituent relative to the levels found in the upstream (control) sample. The run-on sample analytical results will be used as an aid in evaluating potential offsite influences on water quality results. If elevated levels of pollutants are identified, additional BMPs must be implemented in an iterative manner to prevent a net increase in pollutants to receiving waters.

REQUIRED TEXT:

An evaluation of the water quality sample analytical results, including figures with sample locations, will be submitted to the Owner/Developer/Contractor with the water quality analytical results and the QA/QC data for every event that samples are collected. Should the downstream sample concentrations exceed the upstream sample concentrations, the Storm Water Pollution Prevention Manager or other personnel will evaluate the BMPs, site conditions, surrounding influences (including the run-on sample analysis), and other site factors to determine the probable cause for the increase.

As determined by the data and project evaluation, appropriate BMPs will be repaired or modified to mitigate increases in sediment concentrations in the water body. Any revisions to the BMPs will be recorded as an amendment to the SWPPP.

600.4.9 Change of Conditions

REQUIRED TEXT:

Whenever SWPPP monitoring, pursuant to Section B of the General Permit, indicates a change in site conditions that might affect the appropriateness of sampling locations, testing protocols will be revised accordingly. All such revisions will be recorded as amendments to the SWPPP.

600.5 Sampling and Analysis Plan for Non-Visible Pollutants

INSTRUCTIONS:

- The project SWPPP must include a Sampling and Analysis Plan (SAP) for pollutants not visually detectable in storm water. The purpose of a SAP for Non-Visible Pollutants is to determine if BMPs implemented on the construction site are effective in preventing pollutants not visually detectable in storm water, from leaving the construction site and potentially impacting water quality objectives.

REQUIRED TEXT:

This Sampling and Analysis Plan (SAP) for Non-Visible Pollutants describes the sampling and analysis strategy and schedule for monitoring non-visible pollutants in storm water discharges from the project site and off-site activities directly related to the project, in accordance with the requirements of Section B of the General Permit, including SWRCB Resolution 2001-046.

600.5.1 Scope of Monitoring Activities

INSTRUCTIONS:

- ❑ Identify the general sources and locations of potential non-visible pollutants on the project site in the following categories:
  - Materials or wastes as identified in Section 500.3.1, containing potential non-visible pollutants and that are not stored under watertight conditions.
  - Materials or wastes containing potential non-visible pollutants that are stored under watertight conditions, but (1) a breach, leakage, malfunction, or spill is observed; and (2) the leak or spill has not been cleaned up prior to the rain event; and (3) there is the potential for discharge of non-visible pollutants to surface waters or drainage system.
  - Construction activities such as application of fertilizers, pesticides, herbicides or non-pigmented curing compounds, that have occurred during a rain event or within 24 hours preceding a rain event, and there is the potential for discharge of pollutants to surface waters or drainage system.
  - Existing site features contaminated with non-visible pollutants as identified in Section 500.3.3.
  - Applications of soil amendments, including soil stabilization products, with the potential to alter pH levels or other properties of soil (such as chemical properties,

engineering properties, or erosion resistance), or contribute toxic pollutants to storm water runoff, and there is the potential for discharge of pollutants to surface waters or drainage system (unless independent test data are available that demonstrate acceptable concentration levels of non-visible pollutants in the soil amendment).

- Certain soil amendments, when sprayed on straw or mulch, are considered visible pollutants and are not subject to water quality monitoring requirements.

- Storm water runoff from an area contaminated by historical usage of the site is observed to combine with storm water, and there is the potential for discharge of pollutants to surface waters or drainage system.
- Storm water run-on to the project site with the potential to contribute non-visible pollutants to discharges from the project.
- Breaches, malfunctions, leakages, or spills from a BMP

EXAMPLE:

The following construction materials, wastes, or activities, as identified in Section 500.3.1, are potential sources of non-visible pollutants to storm water discharges from the project. Storage, use, and operational locations are shown on the WPCDs in Attachment B.

- Solvents, thinners
- Concrete curing
- Treated wood
- Soil stabilizers
- Lime treated subgrade
- Fertilizers, herbicides, and pesticides

The following existing site features, as identified in Section 500.3.3, are potential sources of non-visible pollutants to storm water discharges from the project. Locations of existing site features contaminated with non-visible pollutants are shown on the WPCDs in Attachment B.

- Southwest portion of the construction site was previously used as a municipal landfill until 1987 and may have volatile organics in the soil.
- North portion of the construction site was a storage area for a metal plating shop until 1960 and may have metals in the soil.

The following soil amendments have the potential to change the chemical properties, engineering properties, or erosion resistance of the soil and will be used on the project site. Locations of soil amendment application are shown on the WPCDs in Attachment B.

- None

The project has the potential to receive storm water run-on with the potential to contribute non-visible pollutants to storm water discharges from the project. Locations of such run-on to the project site are shown on the WPCDs in Attachment B.

- One location downgradient of the Millennium Chemical Company chemical plant and the Progress Industrial Park is identified as a run-on location to the construction site.
- Two locations are identified as run-on locations along the eastern edge of the construction site boundary.
- The northern boundary of the construction site has one location where run-on is likely.

REQUIRED TEXT:

The following construction materials, wastes or activities, as identified in Section 500.3.1, are potential sources of non-visible pollutants to storm water discharges from the project. Storage, use, and operational locations are shown on the WPCDs in Attachment B.

- LIST
-
-

The following existing site features, as identified in Section 500.3.3, are potential sources of non-visible pollutants to storm water discharges from the project.
Locations of existing site features contaminated with non-visible pollutants are shown on the WPCDs in Attachment B. (Delete if this portion does not apply)

- LIST
-
-

The following soil amendments have the potential to change the chemical properties, engineering properties, or erosion resistance of the soil and will be used on the project site. Locations of soil amendment application are shown on the WPCDs in Attachment B. (Delete if this portion does not apply)

- LIST
-
-

The project has the potential to receive storm water run-on with the potential to contribute non visible pollutants to storm water discharges from the project.
Locations of such run on to the project site are shown on the WPCDs in Attachment B.
(Delete if this portion does not apply)

- LIST
-
-

Sampling for non-visible pollutants will be conducted when (1) a breach, leakage, malfunction, or spill is observed; and (2) the leak or spill has not been cleaned up prior to the rain event; and (3) there is the potential for discharge of non-visible pollutants to surface waters or drainage system.

600.5.2 Monitoring Strategy

INSTRUCTIONS:

- ❑ Describe the sampling schedule for monitoring potential non-visible pollutants in storm water runoff. Note the specific conditions under which a sampling event for non-visible pollutants is triggered.
- ❑ Describe the sampling locations for monitoring non-visible pollutants.
- ❑ Describe the rationale for the selection of sampling locations.
- ❑ Identify a location for collecting samples of storm water runoff from each source location of non-visible pollutant identified in Section 600.5.1. Describe exactly where the sample will be collected.
- ❑ Identify a location for collecting an uncontaminated background sample of runoff that has not come into contact with the non-visible pollutants identified in Section 600.5.1 or disturbed soil areas of the project. Describe exactly where the sample will be collected.
- ❑ Identify a location for collecting samples of storm water run-on from each of the locations identified in Section 600.5.1 to identify possible sources of contamination that may originate from off the project site. Describe exactly where the sample will be collected.
- ❑ Identify sampling locations at off-site activities directly related to the project such as storage areas, Contractor's yard, PCC or asphalt batch plants, etc., whether or not it is located within the project site.
- ❑ Show all sampling locations on the WPCDs.

- ❑ Locate sampling locations in areas that are safe, out of the path of heavy traffic, and have attainable access.
- ❑ Describe or list surrounding areas, such as industrial sites, that may contribute run-on or airborne constituents to the site.
- ❑ If no inspections of the site are performed prior to or during a rain event, monitoring and sampling of all non-visible pollutants is required.

REQUIRED TEXT:

Sampling Schedule

Samples for the applicable non-visible pollutant(s) and a sufficiently large uncontaminated background sample shall be collected during the first two hours of discharge from rain events that result in a sufficient discharge for sample collection. Samples shall be collected during daylight hours (sunrise to sunset) and shall be collected regardless of the time of year, status of the construction site, or day of the week.

In conformance with the U.S. Environmental Protection Agency definition, a minimum of 72 hours of dry weather will be used to distinguish between separate rain events.

Collection of discharge samples for non-visible pollutant monitoring will be triggered when any of the following conditions are observed during the required inspections conducted before or during rain events:

- Materials or wastes containing potential non-visible pollutants are not stored under watertight conditions. Watertight conditions are defined as (1) storage in a watertight container, (2) storage under a watertight roof or within a building, or (3) protected by temporary cover and containment that prevents storm water contact and runoff from the storage area.
- Materials or wastes containing potential non-visible pollutants are stored under watertight conditions, but (1) a breach, malfunction, leakage, or spill is observed, (2) the leak or spill is not cleaned up prior to the rain event, and (3) there is the potential for discharge of non-visible pollutants to surface waters or a storm sewer system.
- An operational activity, including but not limited to those in Section 600.5.1, with the potential to contribute non-visible pollutants (1) was occurring during or within 24 hours prior to the rain event, (2) applicable BMPs were observed to be breached, malfunctioning, or improperly implemented, and (3) there is the potential for discharge of non-visible pollutants to surface waters or a storm sewer system.

- Soil amendments that have the potential to change the chemical properties, engineering properties, or erosion resistance of the soil have been applied, and there is the potential for discharge of non-visible pollutants to surface waters or a storm sewer system.
- Storm water runoff from an area contaminated by historical usage of the site has been observed to combine with storm water runoff from the site, and there is the potential for discharge of non-visible pollutants to surface waters or a storm sewer system.

Sampling Locations

Sampling locations are based on proximity to planned non-visible pollutant storage, occurrence or use; accessibility for sampling, personnel safety; and other factors in accordance with the applicable requirements in the Permit. Planned sampling locations are shown on the WPCDs in Attachment B and include the following:

If the following is not "applicable", place cursor in a field and use the "Delete Line" option on the toolbar.

- [Enter number of locations] sampling locations have been identified for the collection of samples of runoff that drain areas where soil amendments that have the potential to change the chemical properties, engineering properties, or erosion resistance of the soil will be applied.
- If applicable Sample location number(s) is located .
- [Enter number of locations] sampling locations have been identified for the collection of samples of runoff that drain areas contaminated by historical usage of the site.
- If applicable Sample location number(s) is located .
- [Enter number of locations] sampling locations have been identified for the collection of samples of run-on to the project site with the potential to combine with discharges being sampled for non-visible pollutants. These samples are intended to identify sources of potential non-visible pollutants that originate off the project site.
- If applicable Sample location number(s) is located .
- A location has been identified for the collection of an uncontaminated sample of runoff as a background sample for comparison with the samples being analyzed for non-visible pollutants. This location was selected such that the sample will not have come in contact with (1) operational or storage areas associated with the materials, wastes, and activities identified in Section 500.3.1; (2) potential non-visible pollutants due to historical use of the site as identified in Section 500.3.3; (3) areas in which soil amendments that have the

potential to change the chemical properties, engineering properties, or erosion resistance of the soil have been applied; or (4) disturbed soils areas.

- If applicable Sample location number(s) is located .

If an operational activity or storm water inspection conducted 24 hours prior to or during a rain event identifies the presence of a material storage, waste storage, or operations area with spills or the potential for the discharge of non-visible pollutants to surface waters or a storm sewer system that was an unplanned location and has not been identified on the WPCDs, sampling locations will be selected using the same rationale as that used to identify planned locations.

600.5.3 Monitoring Preparation

INSTRUCTIONS:

- ❑ Identify whether samples will be collected by the Contractor's personnel, by a commercial laboratory, or by an environmental consultant.
- ❑ Identify training and experience of individuals responsible for collecting water samples.
- ❑ Identify the Contractor's health and safety procedures for sampling personnel.
- ❑ Identify alternate sampling personnel in case of emergency, sick leave, and/or vacations during storm water monitoring. Identify training of alternate sampling personnel.
- ❑ Identify the state-certified laboratory(ies) that will analyze the samples. For a list of California state-certified laboratories, access the following website: http://www.dhs.ca.gov/ps/ls/elap/html/lablist_county.htm.
- ❑ Include the appropriate required text to describe the strategy for ensuring that adequate sample collection supplies are available to the project in preparation for a sampling event.
- ❑ Describe the strategy for ensuring that appropriate field-testing equipment is available to the project in preparation for a sampling event. If equipment is to be rented, contact a local environmental equipment rental company, such as www.totalsafetyinc.com.

REQUIRED TEXT if Contractor personnel will collect samples: Select Yes/No (after selecting press tab to continue)

Samples on the project site will be collected by the following Contractor sampling personnel:

Name/Telephone Number:

Name/Telephone Number:
Alternate(s)/Telephone Number:
Alternate(s)/Telephone Number:

Prior to the rainy season, all sampling personnel and alternates will review the SAP. Qualifications of designated Contractor personnel describing environmental sampling training and experience are provided in Attachment I.

An adequate stock of monitoring supplies and equipment for monitoring non-visible pollutants will be available on the project site prior to a sampling event. Monitoring supplies and equipment will be stored in a cool-temperature environment that will not come into contact with rain or direct sunlight. Sampling personnel will be available to collect samples in accordance with the sampling schedule.

Supplies maintained at the project site will include, but are not limited to, surgical gloves, sample collection equipment, coolers, appropriate number and volume of sample bottles, identification labels, re-sealable storage bags, paper towels, personal rain gear, ice, Sampling Activity Log forms, and Chain of Custody (COC) forms. The Contractor will obtain and maintain the field-testing instruments, as identified in Section 600.5.6, for analyzing samples in the field by Contractor sampling personnel.

Safety practices for sample collection will be in accordance with the [ENTER TITLE AND PUBLICATION DATE OF CONTRACTOR'S HEALTH AND SAFETY PLAN FOR THE PROJECT OR PROVIDE SPECIFIC REQUIREMENTS HEREIN].

REQUIRED TEXT if consultant or laboratory will collect samples:

Samples on the project site will be collected by the following [specify laboratory or environmental consultant]:
(Note: For a list of California state-certified laboratories, access the following web site: www.dhs.ca.gov/ps/ls/elap/html/lablist.htm)

Company Name:

Address:

Telephone Number:

Point of Contact:

Qualifications of designated Contractor personnel describing environmental sampling training and experience are provided in Attachment I.

SWPPM will contact [specify name of laboratory or environmental consultant] [enter number of hours] hours prior to a predicted rain event and if one of the triggering conditions is identified during an inspection before, during, or after a storm event to ensure that adequate sample collection personnel, supplies and field test equipment for monitoring non-visible pollutants are available and will be mobilized to collect samples on the project site in accordance with the sampling schedule.

[Specify name of laboratory or environmental consultant] will obtain and maintain the field-testing instruments, as identified in Section 600.5.6, for analyzing samples in the field by their sampling personnel.

600.5.4 Analytical Constituents

INSTRUCTIONS:

- ❑ Identify the specific non-visible pollutants on the project site by completing Table 600-2, "Potential Non-Visible Pollutants and Water Quality Indicator Constituents".
- ❑ List the non-visible pollutant source, non-visible pollutant name, and water quality indicator.
- ❑ Refer to the "Construction Material and Pollutant Testing Guidance Table - Non-Visible Pollutants" in Attachment S for a partial list of some of the common non-visible pollutants.
- ❑ Add lines to the table as needed.

- Do not include visible pollutants such as:
  - Petroleum products: gas, diesel, and lubricants
  - Colored paints
  - Sand, gravel or topsoil
  - Asphalt cold mix

- ❑ Fill in Table 600-3, Sample Collection, Preservation and Analysis for Monitoring Non-Visible Pollutants.

REQUIRED TEXT:

Identification of Non-Visible Pollutants

Table 600-2 lists the specific sources and types of potential non-visible pollutants on the project site and the applicable water quality indicator constituent(s) for that pollutant. Also, refer to the "Construction Material and Pollutant Testing Guidance Table - Non-Visible Pollutants" in Attachment S for an additional list/information of some of the common non-visible pollutants.

Table 600-2

Potential Non-Visible Pollutants and Water Quality Indicator Constituents

Pollutant Source	Pollutant	Water Quality Indicator Constituent
Vehicle batteries	Lead, Sulfate or pH	Lead, sulfate or pH
Line Flushing	Chlorine	Clorine
Portable Toilets	Bacteria, disinfectants	Total/fecal coliform
Painting	Resins	Semi-volatile organic compounds (SVOCs)
	Tinners	Phenols, VOCs
	Paint Srippers	VOCs
	Solvents	Phenols, VOCs
	Adhesives	Phenols, SVOCs
	Sealantants	SVOCs
Cleaning	Detergents	MBAS, phosphates
	Bleachers	Residual chlorine
	Solvents	VOCs
Landscaping	Pesticides/ Herbicides	Check Lab for specific herbicide or pesticide
	Fertilzers	$NO_3/NH_3/P$
	Lime and Gypsum	Acidity/alkalinity
	Aluminum sulfate, sulfur	TDS, alkalinity
Treat wood	Copper, arsenic, selenium	Metals
Soil amendments and dust control	Lime, gypsum	pH
	Plant gums	Biochemical oxygen demand (BOD)

Table 600-2

Potential Non-Visible Pollutants and Water Quality Indicator Constituents

Pollutant Source	Pollutant	Water Quality Indicator Constituent
	Magnesium chloride	Alkalinity, TDS
	Calcium chloride	Alkalinity, TDS
	Natural brines	Alkalinity, TDS
	Lignosulfonates	Alkalinity, TDS

600.5.5 Sample Collection and Handling

INSTRUCTIONS:

- For laboratory analysis, all sampling, sample preservation, and analyses must be conducted according to test procedures under 40 CFR Part 136.
- For a the list of California state-certified laboratories, access the following web site: www.dhs.ca.gov/ps/ls/elap/html/lablist_county.htm
- A Chain of Custody (COC) form is required to be submitted to the laboratory with the samples to trace the possession and handling of samples from collection through analysis.
- A Sampling Activity Log is required to document details of all sampling events and to record results for samples analyzed in the field.
- Each sample bottle is required to have a proper and complete identification label.
- Run-on samples could be collected using the following collection procedures:
    - Place several rows of sandbags in a half circle directly in the path of the run-on to pond water and wait for enough water to spill over. Then place a decontaminated or clean flexible hose along the top and cover with another sandbag so that ponded water will only pour through the flexible hose and into sample bottles. Do not reuse the same sandbags in future sampling events as they may cross-contaminate future samples.
    - Place a decontaminated or clean dustpan with open handle in the path of the run-on so that water will pour through the handle and into sample bottles.
    - If not using clean equipment, decontaminate by washing equipment in a TSP-soapy water wash, distilled water rinse, and final rinse with distilled water.

❑ Describe sample collection procedures to be used on the project site.

- ❑ Describe sample-handling procedures.
- ❑ Describe decontamination waste disposal requirements (i.e., TSP soapy water shall not be discharged to the storm drainage system or receiving water)
- ❑ Describe sample collection documentation procedures.
- ❑ Describe procedures for recording and correcting sampling data.
- ❑ Fill in Table 600-3, Sample Collection, Preservation and Analysis for Monitoring Non-Visible Pollutants, in Section 600.5.6.

REQUIRED TEXT:

Sample Collection Procedures

Samples of discharge will be collected at the designated sampling locations shown on the WPCDs for observed breaches, malfunctions, leakages, spills, operational areas, soil amendment application areas, and historical site usage areas that triggered the sampling event.

Grab samples will be collected and preserved in accordance with the methods identified in the Table 600-3, "Sample Collection, Preservation and Analysis for Monitoring Non-Visible Pollutants," provided in Section 600.5.6. Only personnel trained in proper water quality sampling will collect samples.

Samples will be collected by placing a separate lab-provided sample container directly into a stream of water downgradient and within close proximity to the potential non-visible pollutant discharge location. This separate lab-provided sample container will be used to collect water, which will be transferred to sample bottles for laboratory analysis. The upgradient and uncontaminated background samples shall be collected first prior to collecting the downgradient to minimize cross-contamination. The sampling personnel will collect the water upgradient of where they are standing. Once the separate lab-provided sample container is filled, the water sample will be poured directly into sample bottles provided by the laboratory for the analyte(s) being monitored.

To maintain sample integrity and prevent cross-contamination, sampling collection personnel will:

- Wear a clean pair of surgical gloves prior to the collection and handling of each sample at each location.
- Not contaminate the inside of the sample bottle by not allowing it to come into contact with any material other than the water sample.

- Discard sample bottles or sample lids that have been dropped onto the ground prior to sample collection.
- Not leave the cooler lid open for an extended period of time once samples are placed inside.
- Not sample near a running vehicle where exhaust fumes may impact the sample.
- Not touch the exposed end of a sampling tube, if applicable.
- Avoid allowing rainwater to drip from rain gear or other surfaces into sample bottles.
- Not eat, smoke, or drink during sample collection.
- Not sneeze or cough in the direction of an open sample bottle.
- Minimize the exposure of the samples to direct sunlight, as sunlight may cause biochemical transformation of the sample to take place.
- Decontaminate sampling equipment prior to sample collection using a TSP-soapy water wash, distilled water rinse, and final rinse with distilled water.
- Dispose of decontamination water/soaps appropriately; i.e., not discharge to the storm drain system or receiving water.

Sample Handling Procedures

REQUIRED TEXT only if a laboratory will analyze ALL OR SOME OF THE samples: Select Yes/No (if selecting NO press tab)

Immediately following collection, sample bottles for laboratory analytical testing will be capped, labeled, documented on a Chain of Custody form provided by the analytical laboratory, sealed in a re-sealable storage bag, placed in an ice-chilled cooler, at as near to 4 degrees Celsius as practicable, and delivered within 24 hours to the following California state-certified laboratory:

Laboratory Name:

Address:

Telephone Number:

Point of Contact:

REQUIRED TEXT only If Contractor will analyze ALL OR SOME samples:

Immediately following collection, samples for field analysis will be tested in accordance with the field instrument manufacturer's instructions and results recorded on the Sampling Activity Log.

REQUIRED TEXT:

Sample Documentation Procedures

All original data documented on sample bottle identification labels, Chain of Custody forms, Sampling Activity Logs, and Inspection Checklists will be recorded using waterproof ink. These will be considered accountable documents. If an error is made on an accountable document, the individual will make corrections by lining through the error and entering the correct information. The erroneous information will not be obliterated. All corrections will be initialed and dated. Copies of the Sampling Activity Log and Chain of Custody form are provided in Attachment R.

Sampling and field analysis activities will be documented using the following:

- Sample Bottle Identification Labels: Sampling personnel will attach an identification label to each sample bottle. At a minimum, the following information will be recorded on the label, as appropriate:

  - Project name
  - Project number
  - Unique sample identification number and location.
    [Project Number]-[Six digit sample collection date]-[Location]
    (*Example:* 0G5304-081801-Inlet472).
    Quality assurance/quality control (QA/QC) samples shall be identified similarly using a unique sample number or designation
    (*Example:* 0G5304-081801-DUP1).
    - Collection date/time (No time applied to QA/QC samples
    - Analysis constituent

- Sampling Activity Logs: A log of sampling events will identify:

  - Sampling date
  - Separate times for collected samples and QA/QC samples recorded to the nearest minute
  - Unique sample identification number and location

- Analysis constituent
- Names of sampling personnel
- Weather conditions (including precipitation amount)
- Field analysis results
- Other pertinent data

- Chain of Custody (COC) forms: All samples to be analyzed by a laboratory will be accompanied by a COC form provided by the laboratory. Only the sample collectors will sign the COC form over to the lab. COC procedures will be strictly adhered to for QA/QC purposes.

- Storm Water Quality Construction Inspection Checklists: When applicable, the Contractor's storm water inspector will document on the checklist that samples for non-visible pollutants were taken during a rain event.

600.5.6 Sample Analysis

INSTRUCTIONS:

- ❑ Identify the test method and specifications to be used to monitor the non-visible pollutants included in Table 600-2, "Potential Non-Visible Pollutants and Water Quality Indicator Constituents" in Section 600.5.4.
- ❑ Fill-in Table 600-3, "Sample Collection, Preservation and Analysis for Monitoring Non-Visible Pollutants".
- ❑ There should be a test method identified for each Water Quality Indicator Constituent listed in Table 600-2 in Section 600.5.4.
- ❑ Contact the selected laboratory for the appropriate test method(s)/specifications to be used for each constituent.
- ❑ Identify field test instruments to be used for analyzing samples in the field, if any.

REQUIRED TEXT:

Samples will be analyzed for the applicable constituents using the analytical methods identified in Table 600-3, "Sample Collection, Preservation and Analysis for Monitoring Non-Visible Pollutants" in this section.

Example:

Table 600-3 (Sample)
Sample Collection, Preservation and Analysis for Monitoring Non-Visible Pollutants

Constituent	Analytical Method	Minimum Sample Volume	Sample Bottle	Sample Preservation	Reporting Limit	Maximum Holding Time
VOCs-Solvents	EPA 8260B	3 x 40 mL	VOA-glass	Store at 4˚ C, HCl to pH<2	1 µg/L	14 days
SVOCs	EPA 8270C	1 x 1 L	Glass-Amber	Store at 4˚ C	10 µg/L	7 days
Pesticides/PCBs	EPA 8081A/8082	1 x 1 L	Glass-Amber	Store at 4˚ C	0.1 µg/L	7 days
Herbicides	EPA 8151A	1 x 1 L	Glass-Amber	Store at 4˚ C	Check Lab	7 days
BOD	EPA 405.1	1 x 500 mL	Polypropylene	Store at 4˚ C	1 mg/L	48 hours
COD	EPA 410.4	1 x 250 mL	Glass-Amber	Store at 4˚ C, H_2SO_4 to pH<2	5 mg/L	28 days
DO	SM 4500-O G	1 x 250 mL	Glass-Amber	Store at 4˚ C	Check Lab	8 hours
pH	EPA 150.1	1 x 100 mL	Polypropylene	None	Unitless	Immediate
Alkalinity	SM 2320B	1 x 250 mL	Polypropylene	Store at 4˚ C	1 mg/L	14 days
Metals (Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, Se, Na, Th, Va, Zn)	EPA 6010B/7470A	1 x 250 mL	Polypropylene	Store at 4˚ C, HNO_3 to pH<2	0.1 mg/L	6 months
Metals (Chromium VI)	EPA 7199	1 x 500 mL	Polypropylene	Store at 4˚ C	1 µg/L	24 hours

Notes:
- °C – Degrees Celsius
- BOD – Biological Oxygen Demand
- COD – Chemical Oxygen Demand
- DO – Dissolved Oxygen
- EPA – Environmental Protection Agency
- HCl – Hydrogen Chloride
- H_2SO_4 – Hydrogen Sulfide
- HNO_3 – Nitric Acid
- L – Liter
- mg/L – Milligrams per Liter
- µg/L – Micrograms per Liter
- mL – Milliliter
- PCB – Polychlorinated Biphenyl
- SVOC – Semi-Volatile Organic Compound
- SM – Standard Method
- TPH – Total Petroleum Hydrocarbons
- TRPH – Total Recoverable Petroleum Hydrocarbons
- VOA – Volatile Organic Analysis
- VOC – Volatile Organic Compound

REQUIRED TEXT:

Table 600-3
Sample Collection, Preservation and Analysis for Monitoring Non-Visible Pollutants

Constituent	Analytical Method	Minimum Sample Volume	Sample Bottle	Sample Preservation	Reporting Limit	Maximum Holding Time
VOCs-Solvents	EPA 8260B	3 x 40 mL	VOA-glass	Store at 4˚ C, HCl to pH<2	1 µg/L	14 days
SVOCs	EPA 8270C	1 x 1 L	Glass-Amber	Store at 4˚ C	10 µg/L	7 days
Phenols	EPA 420.1	1 x 500 mL	Glass-Amber	Store at 4˚ C, H_2SO_4 to pH<2	0.1 mg/L	28 days
Pesticides/PCBs	EPA 8081A/8082	1 x 1 L	Glass-Amber	Store at 4˚ C	0.1 µg/L	7 days
Herbicides	EPA 8151A	1 x 1 L	Glass-Amber	Store at 4˚ C	Check Lab	7 days
Residual chlorine	SM 4500	1 x 500 mL	Glass or PE	Do not expose to light	0.1 mg/L	Immediate
Cations (barium, potassium, iron, sodium, magnesium)	EPA 200.7	1 x 500 mL	Glass or PE	Store at 4˚ C	1 mg/L	6 months
Anions (chloride, sulfate)	EPA 300	1 x 500 mL	Polypropylene	Store at 4˚ C	1 mg/L	28 days
TDS	EPA 160.1	1 x 100 mL	Glass or PE	Store at 4˚ C	1 mg/L	7 days
BOD	EPA 405.1	1 x 500 mL	Polypropylene	Store at 4˚ C	1 mg/L	48 hours
COD	EPA 410.4	1 x 250 mL	Glass-Amber	Store at 4˚ C, H_2SO_4 to pH<2	5 mg/L	28 days
TOC/DOC	EPA 415.1	1 x 100 mL	Glass or PE	Store at 4˚ C, H_2SO_4 to pH<2	1 mg/L	28 days
TKN (organic nitrogen)	EPA 351.3	1 x 100 mL	Glass or PE	Store at 4˚ C, H_2SO_4 to pH<2	0.1 mg/L	28 days
NO_3-N (Nitrate-inorganic nitrogen)	EPA 300.0	1 x 100 mL	Glass or PE	Store at 4˚ C, H_2SO_4 to pH<2	0.1 mg/L	48 days
DO	SM 4500-O G	1 x 250 mL	Glass-Amber	Store at 4˚ C	Check Lab	8 hours
pH	EPA 150.1	1 x 100 mL	Polypropylene	None	Unitless	Immediate
Phosphate (inorganic phosphorus)	EPA 300	1 x 100 mL	Glass or PE	Store at 4˚ C	0.1 mg/L	48 hours
Alkalinity	SM 2320B	1 x 250 mL	Polypropylene	Store at 4˚ C	1 mg/L	14 days

Constituent	Analytical Method	Minimum Sample Volume	Sample Bottle	Sample Preservation	Reporting Limit	Maximum Holding Time
Metals (Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, Se, Na, Th, Va, Zn)	EPA 6010B/7470A	1 x 250 mL	Polypropylene	Store at 4˚ C, HNO_3 to pH<2	0.1 mg/L	6 months
Metals (Chromium VI)	EPA 7199	1 x 500 mL	Polypropylene	Store at 4˚ C	1 µg/L	24 hours
Coliform bacteria (total/fecal)	SM 9221B/9221E	1 x 200 mL	Sterile glass or plastic	Store at 4˚ C	1 MPN/ 100mL	6 hours

Notes:

°C	–	Degrees Celsius	µg/L	–	Micrograms per Liter
BOD	–	Biological Oxygen Demand	mL	–	Milliliter
COD	–	Chemical Oxygen Demand	PCB	–	Polychlorinated Biphenyl
DO	–	Dissolved Oxygen	SVOC	–	Semi-Volatile Organic Compound
EPA	–	Environmental Protection Agency	SM	–	Standard Method
HCl	–	Hydrogen Chloride	TPH	–	Total Petroleum Hydrocarbons
H_2SO_4	–	Hydrogen Sulfide	TRPH	–	Total Recoverable Petroleum Hydrocarbons
HNO_3	–	Nitric Acid	VOA	–	Volatile Organic Analysis
L	–	Liter	VOC	–	Volatile Organic Compound
mg/L	–	Milligrams per Liter			

REQUIRED TEXT only If samples will be analyzed in the field: Select Yes/No (after selecting press tab to continue)

For samples collected for field analysis, collection, analysis and equipment calibration will be in accordance with the field instrument manufacturer's specifications.

The following field instrument(s) will be used to analyze the following constituents:

Field Instrument	Constituent

- The instrument(s) will be maintained in accordance with manufacturer's instructions.
- The instrument(s) will be calibrated before each sampling and analysis event.
- Maintenance and calibration records will be maintained with the SWPPP.

600.5. 7 Quality Assurance/Quality Control

REQUIRED TEXT:

For an initial verification of laboratory or field analysis, duplicate samples will be collected at a rate of 10 percent or 1 duplicate per sampling event. The duplicate sample will be collected, handled, and analyzed using the same protocols as primary samples. A duplicate sample will be collected at each location immediately after the primary sample has been collected. Duplicates will be collected where contamination is likely, not on the background sample. Duplicate samples will not influence any evaluations or conclusions; however, they will be used as a check on laboratory quality assurance.

600.5.8 Data Management and Reporting

REQUIRED TEXT:

A copy of all water quality analytical results and QA/QC data will be submitted to the Owner/Developer within 5 days of sampling (for field analyses) and within 30 days (for laboratory analyses).

Lab reports and COCs will be reviewed for consistency between lab methods, sample identifications, dates, and times for both primary samples and QA/QC samples. All data, including COC forms and Sampling Activity Logs, shall be kept with the SWPPP.

600.5.9 Data Evaluation

INSTRUCTIONS:

- The General Permit requires that BMPs be implemented on the construction site to reduce non-visible pollutants in discharges of storm water from the construction site.
- The runoff/downgradient water quality sample analytical results will be evaluated to determine if the runoff/downgradient sample(s) show significantly elevated concentrations of the tested analyte relative to the concentrations found in the uncontaminated background sample.
- The water quality sample analytical results will be evaluated to determine if the runoff and run-on samples show significantly elevated levels of the tested constituent relative to the levels found in the background sample. The run-on sample analytical results will be used as an aid in evaluating potential offsite influences on water quality results.

REQUIRED TEXT:

An evaluation of the water quality sample analytical results, including figures with sample locations, will be submitted to the Owner/Developer with the water quality analytical results and the QA/QC data.

Should the runoff/downgradient sample show an increased level of the tested analyte relative to the background sample, the BMPs, site conditions, and surrounding influences will be assessed to determine the probable cause for the increase. As determined by the site and data evaluation, appropriate BMPs will be repaired or modified to mitigate discharges of non-visual pollutant concentrations. Any revisions to the BMPs will be recorded as an amendment to the SWPPP.

600.5.10 Change of Conditions

REQUIRED TEXT:

Whenever SWPPP monitoring, pursuant to Section B of the General Permit, indicates a change in site conditions that might affect the appropriateness of sampling locations or introduce additional non-visible pollutants of concern, testing protocols will be revised accordingly. All such revisions will be recorded as amendments to the SWPPP.

4C – Site Inspection and Enforcement (Proposed: FY 2005-2006)	
Description	Ensure site inspection at all construction sites.
Justification	Proper and consistent inspection of SWPPP measures will help prevent construction site run-off for sites larger than 1 acre.
Measurable Goal	Train City inspectors about SWPPP's and other run-off prevention measures. Provide written procedures, including checklists, reports, daily logs, and notification.
Implementation Schedule	Year 1: Train all City inspectors on the field requirements of SWPPP's and other required run-off prevention measures. Provide written procedures for inspectors to utilize.
Progress Measurement	City inspectors trained. Procedures completed and provided to inspectors.
Effective Measurement	All construction sites receive same scrutiny for preventing construction site run-off. Track number of violation notices.

4C – Site Inspection and Enforcement (Implementation: FY 2005-2006)

General Summary: In order to have consistency with the Building and Public Works inspectors, all inspectors were trained on the requirements of SWRCB NPDES General Permit. Harris & Associates, which has extensive knowledge in state NPDES regulations and inspections, was obtained to provide training. The training occurred in two sessions: a classroom presentation and field inspection training.

On March 8th 2006, a classroom presentation covering the NPDES General Permit requirements and steps to keep sites in compliance was held. The classroom training emphasized basic construction site BMPs to control construction site runoff. Inspectors were advised to look for the 'Five Deadly Sins':

1. Dirt in the street,
2. Blowing Trash,
3. Washout waters,
4. Leaks and spills, and
5. Improperly maintained BMPs,

which are common site violations of the General permit. Attachment 4C.1 is copy of the Power Point presentation which details the topics of the classroom training.

On May 3rd 2006, the field inspection training was held at the Mission Ranch residential subdivision. The active portion of the site was about 8 acres of relatively flat terrain with both public and private lot activity. Harris field inspectors walked the site noting violations as categorized in the 'Five Deadly Sins'. This gave the inspectors a model of what to look for in the field. Attachment 4C.2 is copy of the hand out material used and referenced in the field inspection training.

Harris also developed an inspection an Inspector's Field Guide (Attachment 4C.3) and a Field Inspection Checklist (Attachment 4C.4).

Minimum Control Measure #4 – Construction Site Run-Off Control

Status of Measurable Goals: The first year's measurable goals where met: City inspectors were trained, inspection procedures and checklist were developed.

Effectiveness: Although inspectors are now addressing site construction run-off issues with more scrutiny, it is difficult for inspectors to add regular SWPPP inspections into their work load. Also, the level of detail which the procedures and checklist require could not be achieved. During regular inspections, inspectors have addressed the most basic SWPPP violations based on the 'Five Deadly Sins'. The most common violations are: inadequate stabilized construction entrances resulting in soil tracked into the streets, unprotected/un-maintained inlet protection, uncovered stockpiles, dust control, improper installation of wattles and silt fencing. Attachments 4C.5 are example pictures of violations found and their corrections.

Proposed Modifications: Currently, a short check list has been developed to address the most common SWPPP violations based on the 'Five Deadly Sins' (see Attachment 4.C6). During the dry season, inspectors will note these SWPPP violations at regular Building and Public Works inspections; if the violations are not corrected upon the subsequent inspection, the inspections will be put on hold until the violation is corrected. During the rainy season, violations will need to be corrected 24 hours prior to any forecasted rain, or the subsequent inspection whichever occurs first. Attachment 4C.5 shall be used to track SWPPP violations.

For the FY 2005-2006, Public Works has acquired additional limited funding for stormwater run-off control. This funding will be used to obtain inspection services from Harris Associates. The Harris inspector will inspect high profile sites such as large residential subdivisions and commercial sites. The inspections will occur on a bi-weekly, pre and post storm event basis, checking site for full SWPPP compliance and tracked per Attachment 4C.4 (long checklist).

The Public Works department is looking to increase the inspection and engineering fee to provide a regular budget for inspection services. Also, Public Works will look at the possibility of staffing a full time NPDES SWPPP inspector.

Ongoing Implementation:

4C – Site Inspection and Enforcement (Year 2: FY 2006-2007)	
Description	Ensure site inspection at all construction sites.
Justification	Proper and consistent inspection of SWPPP measures will help prevent construction site run-off for sites larger than 1 acre.
Measurable Goal	In years 1-5 all construction sites to monitored for proper erosion control.
Implementation Schedule	Yr. 1-5: 100% of construction sites monitored for erosion control. Sites shall comply with regulatory requirements.
Progress Measurement	Track total number of sites. Track percentage of sites. Track percentage that are in compliance.
Effective Measurement	All construction sites receive same scrutiny for preventing construction site run-off. Track number of violation notices.
*Modifications are noted by the <u>underlined text</u>.	

STORM WATER MANAGEMENT
Construction Site Runoff Control Program

Classroom Training

ATTACHMENT 4C.1

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PRESENTATION TOPICS

- **What are the applicable laws?**
  - Federal: Clean Water Act history
  - State: Permit coverage
- **How are these laws enforced?**
  - Field inspections
  - Fines and lawsuits
- **How do you achieve compliance?**
  - Paperwork and documentation
  - Field inspections
  - Knowing pollutant sources
  - Knowing sediment and erosion control techniques
    - Selecting and implementing Best Management Practices (BMPs)

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FEDERAL LAW
The Clean Water Act

- **Administered by the U.S. Environmental Protection Agency (EPA)**
- **1972 Amendments**
  - Prohibits the discharge of any pollutant to waters of the U.S. unless the discharge is authorized by a National Pollutant Discharge Elimination System (NPDES) permit
- **1987 Amendments**
  - Established framework for regulating storm water discharges
- **1990 Phase I Requirements**
  - Required large and medium municipalities and construction sites >5 acres to obtain NPDES storm water permits
- **1999 Phase II Requirements**
  - Required small municipalities and construction sites 1 acre or greater to obtain NPDES storm water permits

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STATE LAW
Order 99-08-DWQ

- **Administered by the Regional Water Quality Control Board (RWQCB)**
- **One statewide NPDES General Storm Water Permit for Storm Water Discharges Associated with Construction Activities: General Permit No. CAS000002**
- **General Permit adopted in 2003**
  - City of Morgan Hill was required to file a Notice of Intent (NOI) with the RWQCB to obtain coverage under the statewide General Permit
  - The General Permit required the City to develop and implement a Storm Water Management Plan
    - The plan outlined the program development requirements for a Construction Site Runoff Control Program

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WHY WORRY?

******Fines, lawsuits, and bad press******

- **U.S. EPA FY2005 Enforcement Results**
  - **$10 billion** committed by violators to correct violations
  - **188 sentenced years** for willfully or knowingly breaking the law
  - **4,346 enforcement cases**
  - **$154 million** in administrative and judicial penalties

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CONSTRUCTION SITE COMMON POLLUTANTS

- Soil, dirt, and sediment
- Paints and solvents
- Pesticides and herbicides
- Fertilizers
- Detergents
- Plaster and related products
- Concrete washout
- Asphalt compounds
- Petroleum products (fuel, oil, and grease)
- Hazardous chemicals (acids, lime, glues, adhesives, and curing compounds)

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EROSION TYPES

- **Splash Erosion**
  - Each raindrop in a storm event strikes the ground at a speed of over 20 miles per hour, dislodging far greater than its own weight in soil
- **Sheet Erosion**
  - Accounts for 70-80% of sediment found in streams
  - Almost entirely caused by poorly managed construction sites

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WHAT IS A BMP?

******Best Management Practice******

- An action, program, or device which helps to reduce pollutants in construction site runoff
  - Good housekeeping
  - Inspection and maintenance
  - Pollution Prevention employee training
  - Erosion control: Keeping soil in its place (1st line of defense)
  - Sediment control: Keeping soil onsite and out of storm drains (2nd line of defense)

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WHEN ARE BMPs REQUIRED?

- Storm drain inlet protection and other sediment control BMPS are required *year-round*
- Erosion control BMPs (e.g., soil stabilization) are required in addition to sediment controls *in the wet season*
  - California wet season: October 1st – April 30th

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EROSION CONTROL BMPs

- Plastic tarps
- Hydroseeding
- Straw mulch
- Soil stabilizers
- Erosion control blankets

Plastic Tarp

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SEDIMENT CONTROL BMPs

- Silt fence
- Straw wattles/fiber rolls
- Gravel bags around drain inlets
- Straw bales

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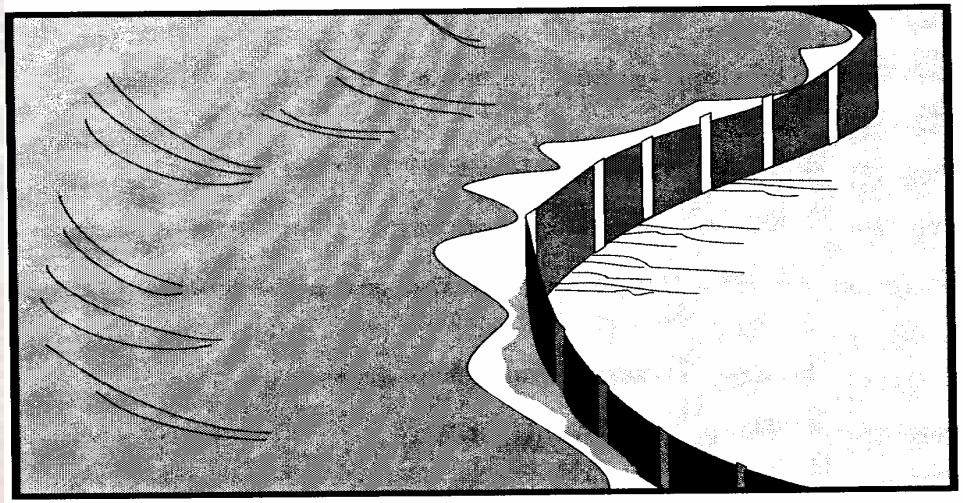
SILT FENCE



BMP Objectives

- ○ Soil Stabilization
- ● Sediment Control
- ○ Tracking Control
- ○ Wind Erosion Control
- ○ Non-Storm Water Management
- ○ Materials and Waste Management

- Slows runoff and facilitates settlement of suspended solids
- Silt fence fabric can be attached to wooden posts (stakes) in the factory or onsite
- Stakes are typically placed 6-10 feet apart
- Machine-trenched process is preferred

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WATTLES AND FIBER ROLLS

- Slows storm water, capture sediment, dissipates hydraulic energy
- No trenching; for use across swales, slopes, and around inlet structures

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SEDIMENT CONTROL BMPs

Inlet Protection

OTHER BMPs

- Wind erosion control
- Sediment tracking control
- Control of non-storm water leaks/spills
- Waste management
  - Housekeeping materials

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OTHER BMPs
Stabilized Construction Entranceway

- **Purpose**
  - Funnels traffic to one entrance/exit
  - Gravel surface reduces soil tracked offsite
- **Installation**
  - Geotextile placed beneath stone separates subgrade from expensive stone
  - Results in reduced site disturbance and increased roadway life

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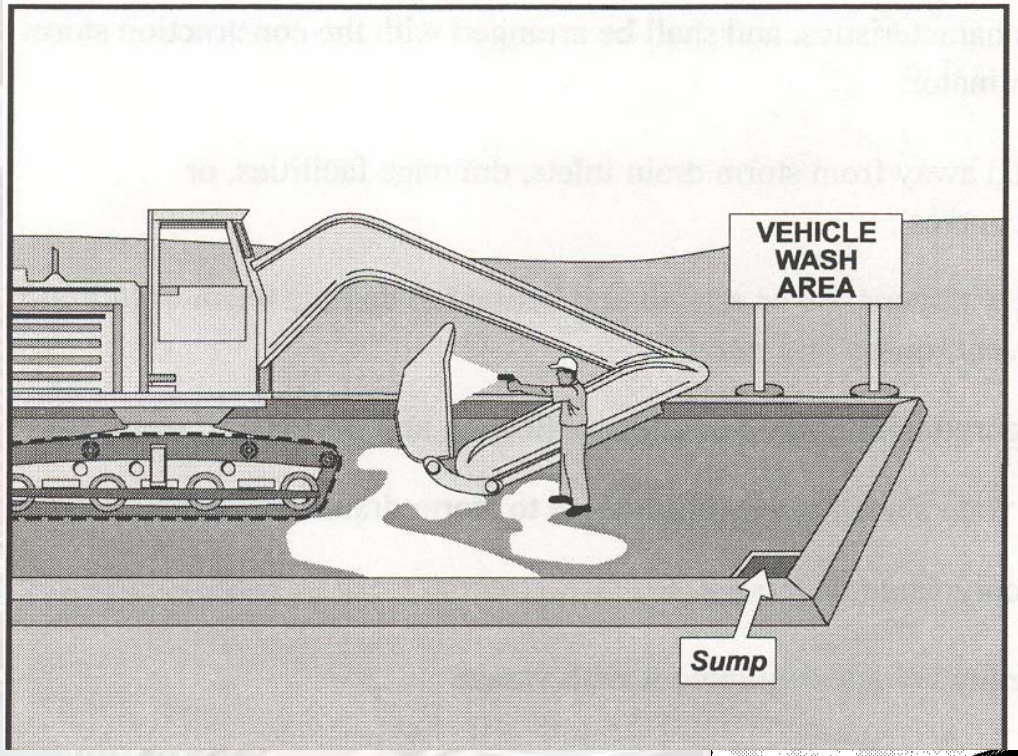
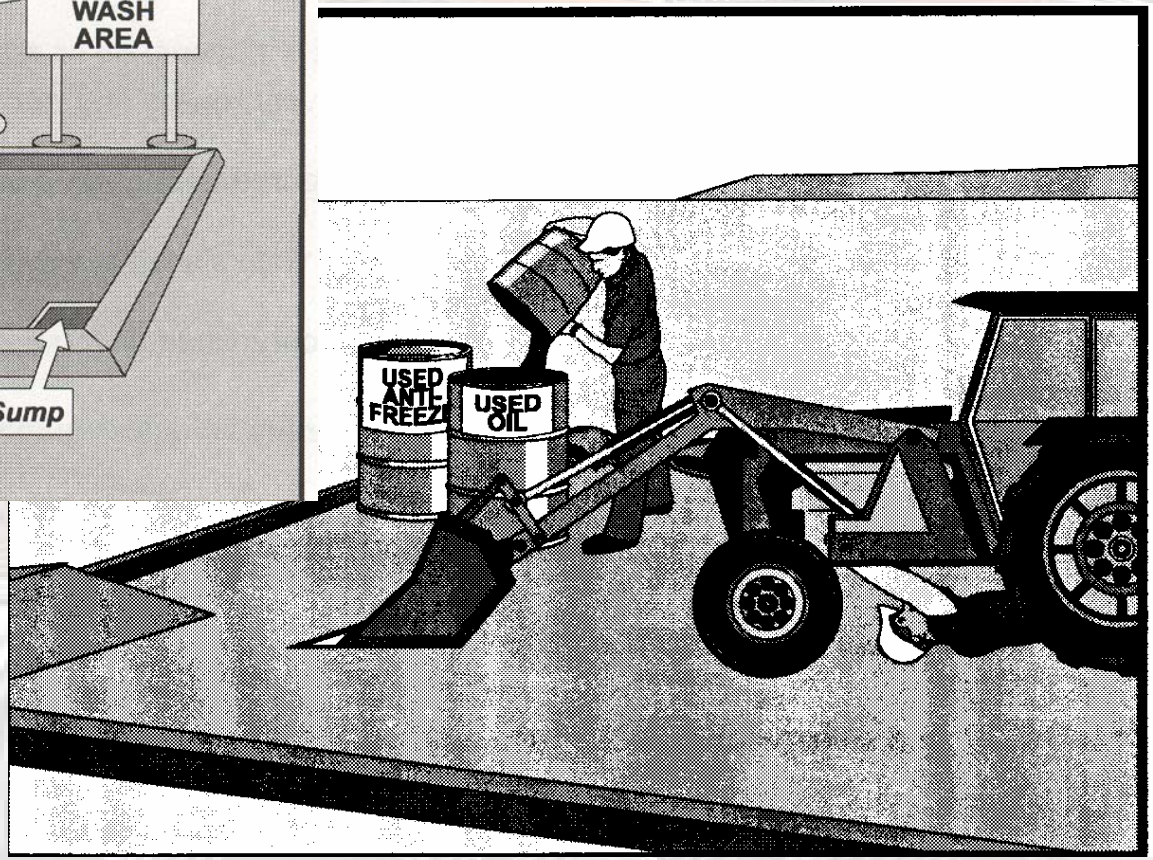
OTHER BMPs
Vehicle and Equipment Management





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OTHER BMPs
Good Housekeeping

- Designate areas for waste storage outside of gutters and away from drain inlets
- Contain, segregate, and recycle wastes
- Arrange for regular waste collection

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OTHER BMPs
Hazardous Materials

- **Concrete and Paving Operations**
  - Designate a concrete wash-out area at least 50 feet from drain inlets
  - Prevent saw cut slurry and concrete acid washes from entering storm drains
- **Painting**
  - Designate areas for mixing paints and cleaning paint equipment
  - Don’t hose; sweep

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OTHER BMPs
Hazardous Materials

- **Landscaping and Pest Control**
  - Cover stockpiled pesticides, herbicides, and fertilizers
  - Watch the weather! Do not schedule work before a predicted rain
- **Portable Toilets**
  - Place at least 50 feet away from nearest storm drain inlet
  - Place on flat, protected surfaces and anchor in windy areas

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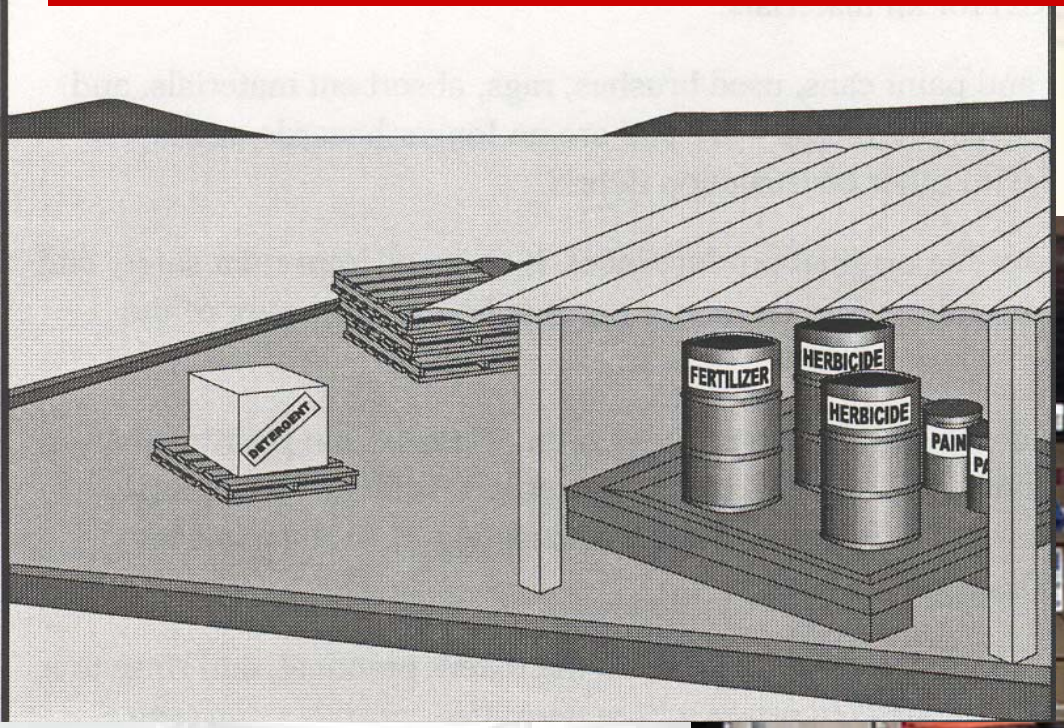
OTHER BMPs
Waste Management



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7 STEPS TO COMPLIANCE

1. Training
2. Storm Water Pollution Prevention Plans (SWPPPs)
3. Permits
4. BMP Implementation
5. Inspections and Record Keeping
6. Construction Site Housekeeping
7. Termination

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TRAINING

- Training at all levels of your organization
- Develop in-house expertise and credentials
- Qualified Field Inspectors
  - Understand SWPPP requirements
  - Understand the implementation and installation of BMPs
  - Be able to communicate (and educate) contractors and subcontractors

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WHAT IS A SWPPP?

- SWPPPs are required for all sites subject to the State's Construction General Permit
- All contractors working at the construction site must follow the SWPPP
- The SWPPP is a living document
  - Must be kept up to date and reflect changing site conditions
- The SWPPP must be available at all times for review by inspectors
  - Onsite: In trailer or in lock box

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WHAT DOES A SWPPP INCLUDE?

- Schedule of Activities
- Pollutant Sources
- Site Description
- Site Map/Location Map
- Pollution Prevention Techniques/BMPs
- Existing Site Conditions/Inspection Reports
- Plan Certifications/Delegation Letters
- Watershed/Polluted Waters
- Copy of Regulations

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PERMITS

- California Permit Requirements
  - **Where to File:** State Water Control Board/Division of Water Quality
  - **How to File:** Submit NOI 30 days prior
  - **When to Commence Construction:** When Water Discharge ID (WDID #) is received (generally 2 weeks)
  - **Who Files:** Owner/Operator
  - **Fee:** $200 + $20/acre/18.5% surcharge

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BMP IMPLEMENTATION

- BMPs onsite must match the BMPs listed in the site-specific SWPPP
- Keep an accurate site map
- Modify the SWPPP and BMPs when there is a change in design or construction activities that will affect discharge
- Modify the SWPPP and BMPs if there is a violation of the General Permit or if the General Permit's objectives are not being met

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INSPECTIONS AND RECORD KEEPING

- **Inspection Requirements**
  - Prior to anticipated storm events
  - During extended storm events
  - After actual storm events
  - Once each 24 hour period during extended storm events
  - Track BMP installation, maintenance, and removal dates
  - Show a pattern of finding and then correcting problems
- **Keep records for at least 3 years from the date generated**

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HOW TO HANDLE REGULATORY INSPECTIONS

- **Pre-Inspection**
  - Know what's going on in your community
  - Designate a knowledgeable individual to meet with inspectors
- **During Inspection**
  - Accompany inspector
  - Take notes and pictures (duplicate evidence)
  - Request copy of inspection report
- **Post Inspection**
  - Document event from notes
  - Follow-up with corrective action
  - Follow up with regulatory inspector

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CONSTRUCTION SITE HOUSEKEEPING

- **Watch for the "5 Deadly Sins"**
  1. **Dirt in the street**
  2. **Blowing trash**
  3. **Washout waters**
  4. **Leaks and spills**
  5. **Improperly maintained BMPs**

The "5 Deadly Sins" account for most of the complaints that lead to regulatory inspections

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DEADLY SIN #1
Dirt in the Street

- Sweep streets frequently
- Implement tracking control BMPs
  - Stabilized Construction Entranceway

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DEADLY SIN #2
Blowing Trash

- Ensure that trash is moved into containers at the end of each work day
- Pay special attention to blowing trash such as:
  - Foam board
  - Cardboard boxes
  - Plastic

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DEADLY SIN #3
Washout Waters

- Concrete and paint washout areas should be located away from storm drain inlets
  - Designated and contained areas
- Once washout waters have dried, the residue will be removed from the site as a solid waste

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DEADLY SIN #4
Leaks and Spills

- Prohibit crew from changing oil on the jobsite
- Remove hazardous material containers or store in secondary containment
- Clean up spills and leaks as soon as they are noticed

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DEADLY SIN #5
BMP Maintenance

- Ensure that sediment and erosion control BMPs are installed properly and are in good condition
- Take the responsibility of repair as soon as an issue is noticed

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TERMINATION

- Make sure site is stabilized with permanent vegetation
- If any area of the site has not met the definition of final stabilization, consider the site “inactive” and perform monthly inspections until the stabilization is complete
- File signed Notice of Termination (NOT) and retain copies for at least three years

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ATTACHMENT 4C.2
IS NOT AVAIABLE IN PDF FORMAT

ATTACHMENT 4C.3

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Construction Site Runoff Control Program

Inspector's Field Guide

FIELD GUIDE PURPOSE

This Field Guide describes how to conduct storm water inspections at construction sites and discusses inspector responsibilities, how to prepare for a site inspection, and actual field inspection procedures.

INSPECTION PROCEDURES

An on-site construction runoff inspection typically consists of the following components:

- ❒ Pre-Inspection Preparation
- ❒ Entry
- ❒ Records Review
- ❒ Site Inspection
- ❒ Exit Debrief

Pre-Inspection Preparation

Plan your inspections by targeting construction sites in priority areas such as sites near surface waters, areas undergoing rapid development, sites highly visible to the public, or sites with a history of compliance problems.

In preparing for your inspection, you should review available files such as permits, copies of Storm Water Pollution Prevention Plans (SWPPPs), past inspection reports, and any other correspondence applicable to the construction site you will be inspecting. Copy relevant information that may be useful in the field. This should include past inspection checklists in order to verify that problems have been corrected.

Be prepared for the inspection. Dress for the weather and take appropriate safety gear. Make sure you have the following: inspection credentials, digital camera or video recorder, copies of inspection checklists, a logbook for taking notes, clipboard, and personal protective equipment. Always take extra copies of materials such as inspection checklists.

Entry

Before entering the construction site, observe the surroundings and various stages of construction. Note areas for in-depth review and any deficiencies. This is also a good time to view construction site vehicle exit locations for tracking control as well as other perimeter Best Management Practices (BMPs) (e.g., silt fence). Indicate on the inspection checklist the date/time, weather conditions, and other general information.

When entering the site, review all posting and ask for the owner or Contractor's Site Superintendent. If these people are not available, ask to speak with someone who is familiar with the construction site's SWPPP. Note the names of the individuals with whom you meet. Present your credentials and explain the purpose of your inspection. Inform the individual of the typical sequence of events for the inspection (introductions, file review, site tour and checklist completion, and exit debrief). Ensure that the site representative participates during the records review and accompanies you during the inspection. Always ask if there are any site-specific safety issues or requirements for the site.

Records Review

Ask to see a copy of their SWPPP and application for coverage under the general storm water permit, including a copy of all the contractor's self-inspections.

Ask for a copy of the site map and the BMP list to determine if it is specific to the construction site you are inspecting. The site map and BMP list can be marked up during the actual inspection to indicate locations of potential non-compliance issues as a reminder to ensure BMPs are implemented.

Remember, the SWPPP must be onsite! This includes all changes to it, and all inspection and maintenance records. SWPPPs were intended to be dynamic documents, with amendments or changes made when:

- Changes in design, construction, operation, maintenance, weather, or seasonal conditions have a significant effect on storm water discharges.

- Inspection indicates that the SWPPP is not effective.

- The SWPPP is non-consistent with the terms of the Permit.

Discuss with the site contact whether any amendments have been made to the SWPPP.

SITE INSPECTION

A keen eye, an understanding of the construction sequencing process, and accurate documentation are necessary to perform an effective construction site runoff inspection. Use your inspection checklist and take notes. Use photographs or video to document concerns/deficiencies and indicate on a rough diagram where the photos were taken.

A recommended construction inspection sequence follows:

- *Plan your inspection*

  Review the site map and plan how you will conduct the inspection. Consider the direction of storm water flow at the site. If possible, begin your inspection at low points of the construction site so that you can observe discharge points as you walk up slope.

- *Inspect discharge points and downstream, off-site areas for signs of impact*

  Inspect down-slope municipal catch basin inlets and existing curbs and gutters if applicable.

- *Inspect perimeter controls*

  Note the type of perimeter controls installed and whether they are properly installed and maintained. Inspect construction exits for signs of sediment tracking.

- *Compare BMPs in the SWPPP with construction site conditions*

Are all BMPs required by the SWPPP in place? Are additional BMPs needed?

- *Inspect disturbed areas not currently being worked*

  How long have these areas been disturbed and not worked? When will active work commence? Should these areas be seeded with temporary vegetation?

- *Inspect areas with final stabilization*

  Has uniform vegetative cover been established? Is any erosion occurring?

Common Compliance Problems at Construction Sites

The following "5 Deadly Sins" account for most of the complaints that lead to regulatory inspections and penalties:

1. *Dirt on the Street*

   If BMPs are not adequately keeping sediment off the street, then the permit requires tracked sediments to be removed (street sweeping). Vehicle exits must use BMPs such as stabilized exits/entranceways to prevent tracking of sediment.

2. *Blowing Trash*

   Solid waste must be contained and disposed of properly.

3. *Washout Waters*

   A designated and marked concrete washout pit that will contain the washout water until hardened is required.

4. *Leaks and Spills*

   Hazardous materials (including oil and gasoline) must be properly stored (which includes secondary containment).

5. *Improperly Maintained BMPs*

   Are BMPs in proper working order and in good condition?

Taking Photographs

A digital camera is useful to document your findings and supplement the field inspection checklist. Take photographs of all potential deficiencies. Photograph model BMPs that could be useful to train other field inspectors or contractors.

On the site map, indicate approximate locations of where you took photos, and the direction of the photograph. Keep notes for each photograph you take.

Exit Debrief

Prior to conducting your exit debrief, break away from the group to gather your thoughts and prepare a list of preliminary findings. Review the inspection checklist and determine the severity of any identified deficiencies.

Debrief the person in charge. It is best to lead off your debrief with one or more positive comments regarding the site and then list your negative findings in order of severity.

BMP INSPECTION TIPS

The BMPs discussed within this section are commonly implemented on construction sites and are organized by the order an inspector will typically encounter them in the field.

Storm Drain Inlet Protection

Storm drain inlet protection prevents sediment from entering a storm drain by surrounding or covering the inlet with a filtering material. This allows sediment-laden runoff to pond and settle before entering the storm drain.

Several types of filters are commonly used for inlet protection: silt fence, sand bags, or block and gravel bags. The type of filter used will depend on the inlet type (e.g., curb, drop), slope, and amount

of flow. Some commercial inlet filters are placed in front of or on top of an inlet; others are placed inside the inlet under the grate.

Inspection Tips

- ✓ Inlet protection is a secondary BMP (i.e., your "last line of defense"). Make sure that erosion controls or additional sediment controls are also in-place.
- ✓ Inlet protection should not block the storm drain or cause flooding.
- ✓ Inlet protection should be in-place immediately after storm drains are installed (or before land disturbance activities begin in an area with existing storm drains).
- ✓ Sediment accumulation should be removed after each storm event if it impedes flow through the filter.
- ✓ Make sure that no "gaps" exist to allow unfiltered storm water to enter the inlet.

Stabilized Construction Entrance/Exit

A rock construction exit can reduce the amount of sediment transported onto paved roads by vehicles. The construction exit does this by knocking mud off the vehicle tires before the vehicle enters a public road.

Inspection Tips

- ✓ Is there evidence of sediment tracking from the site?
- ✓ Is there evidence that vehicles are leaving the site from other locations and not using the designated construction exit?
- ✓ Does the aggregate need to be replaced or replenished?
- ✓ Is the construction exit long enough to remove mud and sediment from the tires?
- ✓ Is the site graded away from the construction exit to prevent runoff from leaving the site?

Silt Fence (or Other Sediment Barrier)

A silt fence or sediment filter (such as a fiber roll or wattle) is a downgradient barrier intended to intercept sheet flow runoff and settle out sediment upslope while allowing runoff to filter through.

Inspection Tips

- ✓ Is the silt fence installed along the contour if applicable?
- ✓ Is the fence trenched in with stakes on the downhill side?
- ✓ Is the fence installed where concentrated flow is expected? (silt fence is not appropriate for concentrated flows)

Diversion Ditches/Berms

Diversion ditches or berms direct off-site runoff away from unprotected slopes or direct sediment laden runoff to a sediment trapping structure. A diversion ditch can be located at the upslope side of a construction site to prevent surface runoff from entering the disturbed area. Ditches or berms on steeper slopes may need to consider erosive velocities. Also, ensure that the diverted water is released through a stable outlet and does not cause downstream flooding.

Inspection Tips

- ✓ Does the diversion discharge to a stable outlet of channel?
- ✓ Have diversion ditches or berms been seeded?
- ✓ Is the diversion eroding?

Mats, Mulches, and Blankets

Mats, mulches, and blankets are used for temporary stabilization and establishing vegetation of disturbed soils. Mats and blankets are typically used on slopes or channels.

Mulches are effective in helping to protect the soil surface and foster growth of vegetation.

Inspection Tips

- ✓ The blanket or mat should come into complete contact with the soil.
- ✓ Check that the top of the blanket is trenched-in (there should be no evidence of water flowing under the blanket or mat).

- ✓ Mulch should not be placed in concentrated flow areas.
- ✓ Check to see if erosion is occurring in the mulched area (more mulch may need to be applied).
- ✓ Check blankets and mats to see if sections are overlapped by 4-6 inches and staples are at least 12 inches apart on tops and 24 inches apart down the sides and in the middle.

Temporary Sediment Trap or Pond

A temporary sediment trap or pond is a small, temporary ponding area formed by constructing an earthen embankment with an outlet across a swale. Temporary sediment traps are intended to detain sediment-laden runoff from small, disturbed areas long enough to allow the majority of the sediment to settle out.

Inspection Tips

- ✓ Check the location of the sediment trap. Failure of the trap should not pose a risk to life or property.
- ✓ Sediment in the trap should be removed after it reaches approximately one-third of the design capacity.
- ✓ The trap should not be installed in a main stream or near culvert outlets.
- ✓ Check the outlet for needed maintenance.

Vegetative Stabilization

Vegetative stabilization includes temporary or permanent seeding and sodding. Vegetative stabilization helps prevent erosion at construction sites by reestablishing vegetation on exposed soils.

Inspection Tips

- ✓ Check for signs of erosion in vegetated areas.
- ✓ Concentration flows should not be allowed across newly seeded slopes.
- ✓ Depending on the time of year, a slope may need to be mulched rather than seeded.

Solid Waste/Hazardous Materials Management

Pollution prevention measures should be implemented at construction sites. At a minimum, solid waste should be properly disposed (i.e., practice good housekeeping). Hazardous materials should be properly stored, often within secondary containment, to prevent spills, leaks, or other discharge.

Inspection Tips

- ✓ Does the construction site have dumpsters or other containers for debris and solid waste?
- ✓ Is there evidence of solid waste or debris in the storm drain system?
- ✓ Are gas, oil, and paint properly stored?
- ✓ Are solid waste and hazardous materials stored away from receiving waters, catch basins, or storm drains?
- ✓ Is there evidence of hazardous materials being disposed of improperly in solid waste dumpsters or rolloff bins?
- ✓ Is there evidence that solid waste or hazardous materials containers have leaked?
- ✓ Are vehicles or equipment fueled onsite? Is the area bermed or away from receiving waters, catch basins, or storm drains?
- ✓ Are hazardous materials containers properly labeled?
- ✓ Are concrete washouts installed properly away from receiving waters, catch basins, and storm drains?

ATTACHMENT 4C.4

CITY OF MORGAN HILL

Construction Site Runoff Field Inspection Checklist

GENERAL INFORMATION				
Project Name				
Project Location				
Owner Name and Contact Information	Name:		Phone #:	
Contractor(s)				
Total Project Area (acres)				
Field Estimate of Active Disturbed Soil Area (Acres)				
Date Construction Started				
Anticipated Construction End Date				
Inspector's Name				
Inspector's Title				
Date and Time of Inspection	Date:		Time:	
Inspection Type (Check Applicable)	❒ Prior to forecast rain ❒ 24-hr intervals during extended rain		❒ After a rain event ❒ Other _____	
Season (Check Applicable)	❒ Rainy (Oct. 1st through April 30th)		❒ Non-Rainy (May 1st through Sept. 30th)	
Storm Data	Storm Start Date & Time:		Storm Duration (hrs):	
	Time Elapsed Since Last Storm (Circle Applicable Units)	Min. Hr. Days	Approximate Rainfall Amount (Circle Applicable Units)	Inches mm

INSPECTION CHECKLIST				
Requirement	**Yes**	**No**	**N/A**	**Corrective Action**
SWPPP REVIEW				
Do the SWPPP and Project Schedule adequately reflect the current site conditions and contractor operations?				
Are all BMPs shown on the SWPPP installed in the proper location(s) and according to the details for the plan?				
IS SEDIMENT BEING DISCHARGED FROM THE SITE?				
Is the entrance stabilized to prevent tracking?				
Are points of ingress/egress to public/private roads inspected, swept, and vacuumed daily?				
Are all paved areas free of visible sediment tracking or other particulate matter?				
Are stabilized entrances inspected daily to ensure that they are properly maintained?				
IS TRASH CONTROLLED AT THE SITE?				
Is the site free of litter?				
Are trash receptacles provided in the yard, field trailer areas, and at locations where workers congregate for lunch and break periods?				
Is litter from work areas within the construction limits of the project site collected and placed in watertight dumpsters?				
Are waste management receptacles free of leaks?				
Are the contents of waste management receptacles properly protected from contact with storm water or from being dislodged by winds?				
Are waste management receptacles filled at or beyond capacity?				
ARE WASHOUT WATERS APPROPRIATELY CONTAINED AND MANAGED?				
Are washout areas protected from run-on and runoff, and located at least 15 m from concentrated flows and downstream drainage facilities?				
Are temporary concrete washout facilities designated and being used?				
Are temporary concrete washout facilities functional for receiving and containing concrete waste and are concrete residues prevented from entering the drainage system?				
Do temporary concrete washout facilities provide sufficient volume and freeboard for planned concrete operations?				
Are the temporary concrete washout facilities' PVC liners free from punctures and holes?				
Are concrete wastes, including residues from cutting and grinding, contained and disposed of off-site or in concrete washout facilities?				
ARE LEAKS AND SPILLS EVIDENT? ARE THEY BEING PREVENTED?				
Vehicle & Equipment Fueling, Cleaning, and Maintenance				
Are vehicle and equipment fueling, cleaning and maintenance areas reasonably clean and free of spills, leaks, or any other deleterious material?				

CITY OF MORGAN HILL

INSPECTION CHECKLIST				
Requirement	**Yes**	**No**	**N/A**	**Corrective Action**
Are vehicle and equipment fueling, cleaning and maintenance activities performed on an impermeable surface in dedicated areas?				
If no, are drip pans used?				
Are dedicated fueling, cleaning, and maintenance areas located at least 15 m away from downstream drainage facilities and watercourses, and protected from run-on and runoff?				
Is wash water contained for infiltration/ evaporation and disposed of outside the highway right of way?				
Is on-site cleaning limited to washing with water (no soap, soaps substitutes, solvents, or steam)?				
On each day of use, are vehicles and equipment inspected for leaks and if necessary, repaired?				
Waste Management & Materials Pollution Control				
Are material storage areas located at least 15 m away from downstream drainage facilities and watercourses, and protected from run-on and runoff?				
Are all material handling and storage areas clean; organized; free of spills, leaks, or any other deleterious material; and stocked with appropriate clean-up supplies?				
Are liquid materials, hazardous materials, and hazardous wastes stored in temporary containment facilities?				
Are bagged and boxed materials stored on pallets?				
Are hazardous materials and wastes stored in appropriate, labeled containers?				
Are proper storage, clean-up, and spill-reporting procedures for hazardous materials and wastes posted in open, conspicuous and accessible locations adjacent to storage areas?				
Are temporary containment facilities free of spills and rainwater?				
Are temporary containment facilities and bagged/boxed materials covered?				
ADDITIONAL BMPS				
Preservation of Existing Vegetation				
Is temporary fencing provided to preserve vegetation in areas where no construction activity is planned?				
Erosion Control				
Does the applied temporary erosion control provide 100% coverage for the required areas?				
Are there any non-vegetated areas that may require temporary soil stabilization?				
Is the area where temporary soil stabilization required free from visible erosion?				
Temporary Linear Sediment Barriers (Silt Fence, Fiber Rolls, Sandbag Barriers, etc.)				
Are temporary linear sediment barriers properly installed, functional, and maintained?				
Are temporary linear sediment barriers free of accumulated litter?				
Is the built-up sediment less than 1/3 the height of the barrier?				

INSPECTION CHECKLIST				
Requirement	**Yes**	**No**	**N/A**	**Corrective Action**
Are cross barriers installed where necessary and properly spaced?				
Storm Drain Inlet Protection				
Are storm drain inlets internal to the site properly protected?				
Are external storm drain inlets immediately downgradient of the site protected?				
Are storm drain inlet protection devices in working order and being properly maintained?				
Sediment Basins				
Are basins designed in accordance with the requirements of the General Permit?				
Are basins maintained to provide the required retention/detention?				
Are basin controls (inlets, outlets, diversions, weirs, spillways, and racks) in working order?				
Stockpiles				
Are all locations of temporary stockpiles, including soil, hazardous waste, and construction materials in approved areas?				
Are stockpiles protected from run-on, run-off from adjacent areas and from winds?				
Are stockpiles located at least 15 m away from concentrated flows, downstream drainage courses and storm drain inlets?				
Are required covers and/or perimeter controls in place?				
Concentrated Flows				
Are concentrated flow paths free of visible erosion?				
Wind Erosion Control				
Is dust control properly implemented?				
Dewatering Operations				
Are all one-time dewatering operations covered by the General Permit inspected before or as they occur and BMPs implemented as necessary during discharge?				
Is groundwater dewatering handling in accordance with a dewatering permit issued by the Water Board?				
Is required treatment provided for dewatering effluent?				
Temporary Water Body Crossing or Encroachment				
Are temporary water body crossings and encroachments constructed appropriately?				
Illicit Connection/Illegal Discharge Detection and Reporting				
Is there any evidence of illicit discharges or illegal dumping on the project site?				
If yes, has the Owner/Operator been notified?				

CITY OF MORGAN HILL

INSPECTION CHECKLIST				
Requirement	**Yes**	**No**	**N/A**	**Corrective Action**
Are discharge points and discharge flows free from visible pollutants?				
Are discharge points free of any significant sediment transport?				
General				
Are there any other potential water pollution control concerns at the site?				
Storm Water Monitoring				
Does the storm water discharge directly to a water body listed in the General Permit as impaired for sediment/sedimentation or turbidity?				
If yes, were samples for sediment/sedimentation or turbidity collected?				
Did the sampling results indicate that the discharges are causing or contributing to further impairment?				
If yes, were the erosion/sediment control BMPs improved or maintained to reduce the discharge of sediment to the water body?				
Were there any BMPs not properly implemented, or breaches, malfunctions, leakages or spills observed, which could result in the discharge of pollutants to surface waters that would not be visually detectable in storm water?				
If yes, were samples for non-visually detectable pollutants collected pursuant to the sampling and analysis plan during rain events?				
Were soil amendments (e.g., gypsum) used on the project?				
If yes, were samples for non-visually detectable pollutants collected pursuant to the sampling and analysis plan during rain events?				
If sampling indicated pollution of the storm water by the use of the soil amendments, is there a contingency plan for retention onsite of the polluted storm water?				
Did storm water contact stored materials or waste and resulted in a discharge from the construction site? (Materials not in watertight containers, etc.)				
If yes, were samples for non-visually detectable pollutants collected pursuant to the sampling and analysis plan during rain events?				

COMMENTS/RECOMMENDATIONS

INSPECTION SUMMARY		
Deficiencies Corrective Actions Recommendations	❒ Site NOT in compliance ❒ Corrective actions taken at time of inspection (attach rough field sketch showing deficiencies and corrective action taken)	❒ Corrective actions recommended (follow-up inspection required)(attach rough field sketch showing deficiencies) ❒ Photographs collected ❒ Videotaping performed
Inspector Signature:		Date:
Received by:		Date:

CITY OF MORGAN HILL

ATTACHMENT 4C.5

Figure 4C.5a – Morgan Hill Centennial Indoor Recreation Center
Deadly Sin #1: Dirt in the Street (2-7-06)

Figure 4C.5b – Morgan Hill Centennial Indoor Recreation Center
Tracking Control: Street Swept (2-13-06)

ATTACHMENT 4C.5

Figure 4C.5c – Morgan Hill Centennial Indoor Recreation Center
Deadly Sin #5: Improperly Maintained BMP (2-7-06)

Figure 4C.5d – Morgan Hill Centennial Indoor Recreation Center
Inlet Protection: Maintenance of Inlet Protection (2-13-06)

ATTACHMENT 4C.5

Figure 4C.5e – Morgan Hill Centennial Indoor Recreation Center
Deadly Sin #1: Dirt in the Street (2-7-06)

Figure 4C.5f – Morgan Hill Centennial Indoor Recreation Center
Tracking Control: Street Swept (2-13-06)

ATTACHMENT 4C.6

CITY OF MORGAN HILL

SWPPP Short Checklist

GENERAL INFORMATION				
Project Name				
Project Location				
Owner Name and Contact Information	Name:		Phone #:	
Contractor(s)				
Inspector's Name				
Inspector's Title				
Date and Time of Inspection	Date:		Time:	
Inspection Type (Check Applicable)	❒ Prior to forecast rain ❒ 24-hr intervals during extended rain		❒ After a rain event ❒ Other _____	
Season (Check Applicable)	❒ Rainy (Oct. 1st through April 30th)		❒ Non-Rainy (May 1st through Sept. 30th)	
Storm Data	Storm Start Date & Time:		Storm Duration (hrs):	
	Time Elapsed Since Last Storm (Circle Applicable Units)	Min. Hr. Days	Approximate Rainfall Amount (Circle Applicable Units)	Inches mm

INSPECTION CHECKLIST				
Requirement	**Yes**	**No**	**N/A**	**Corrective Action**
1. TRACKING CONTROL				
Is the entrance stabilized to prevent tracking?				
Is the stabilized entrance properly installed and maintained? (3 – 6" rock 12" thick, 50 feet long, 25 feet wide, over frabic)				
Are all paved areas free of visible sediment tracking or other particulate matter?				

INSPECTION CHECKLIST				
Requirement	**Yes**	**No**	**N/A**	**Corrective Action**
2. TRASH CONTROL				
Is the site free of litter?				
Are trash receptacles provided in the yard, field trailer areas, and at locations where workers congregate for lunch and break periods?				
Are waste management receptacles free of leaks?				
Are the contents of waste management receptacles properly protected from contact with storm water or from being dislodged by winds?				
Are waste management receptacles filled at or beyond capacity?				
3. WASHOUT WATER CONTROL (CONCRETE, STUCCO, PAINT)				
Are temporary (concrete/stucco/paint) washout facilities designated and being used?				
Are washout areas protected from run-on and runoff, and located at least 50 feet from concentrated flows and downstream drainage facilities?				
Are temporary washout facilities functional for receiving and containing waste and are residues prevented from entering the drainage system?				
Do temporary washout facilities provide sufficient volume (10'x10'x1') and freeboard for planned operations?				
Are the temporary washout facilities' liners free from punctures and holes?				
Are wastes, including residues from cutting and grinding, contained and disposed of off-site or in washout facilities?				
4. LEAKS AND SPILLS CONTROL				
Vehicle & Equipment Fueling, Cleaning, and Maintenance				
Are vehicle and equipment fueling, cleaning and maintenance areas reasonably clean and free of spills, leaks, or any other deleterious material?				
Are vehicle and equipment fueling, cleaning and maintenance activities performed on an impermeable surface in dedicated areas?				
If no, are drip pans used?				

INSPECTION CHECKLIST				
Requirement	**Yes**	**No**	**N/A**	**Corrective Action**
Are dedicated fueling, cleaning, and maintenance areas located at least 50 feet away from downstream drainage facilities and watercourses, and protected from run-on and runoff?				
Is on-site cleaning limited to washing with water (no soap, soaps substitutes, solvents, or steam)?				
Waste Management & Materials Pollution Control				
Are portable rest rooms material storage areas located at least 50 feet away from downstream drainage facilities and watercourses, and protected from run-on and runoff?				
Are all material handling and storage areas clean; organized; free of spills, leaks, or any other deleterious material; and stocked with appropriate clean-up supplies?				
Are liquid materials, hazardous materials, and hazardous wastes stored in temporary containment facilities, which are free of spills and rainwater?				
Are bagged and boxed materials stored on pallets?				
Are hazardous materials and wastes stored in appropriate, labeled containers?				
Are proper storage, clean-up, and spill-reporting procedures for hazardous materials and wastes posted in open, conspicuous and accessible locations adjacent to storage areas?				
5. BMPs MAINTENANCE				
Preservation of Existing Vegetation				
Is temporary fencing provided to preserve vegetation in areas where no construction activity is planned?				
Erosion Control (Straw Mulch, Hydroseeding, Soil Binders, Geo Mats, etc)				
Does the applied temporary erosion control provide 100% coverage for the required areas?				
Are there any non-vegetated areas that may require temporary soil stabilization?				
Is the area where temporary soil stabilization required free from visible erosion?				
Temporary Linear Sediment Barriers (Silt Fence, Fiber Rolls, Sandbag Barriers, etc.)				
Are temporary linear sediment barriers properly installed, functional, and maintained?				

INSPECTION CHECKLIST				
Requirement	**Yes**	**No**	**N/A**	**Corrective Action**
Are temporary linear sediment barriers free of accumulated litter?				
Is the built-up sediment less than 1/3 the height of the barrier?				
Are cross barriers installed where necessary and properly spaced?				
Storm Drain Inlet Protection				
Are storm drain inlets on-site properly protected?				
Are storm drain inlets off-site properly protected?				
Are external storm drain inlets immediately downgradient of the site protected?				
Are storm drain inlet protection devices in working order and being properly maintained?				
Stockpiles				
Are all locations of temporary stockpiles, including soil, hazardous waste, and construction materials in approved areas?				
Are stockpiles protected from run-on, run-off from adjacent areas and from winds?				
Are stockpiles located at least 50 feet away from concentrated flows, downstream drainage courses and storm drain inlets?				
Are required covers and/or perimeter controls in place?				
Wind Erosion Control				
Is dust control properly implemented?				

COMMENTS/RECOMMENDATIONS

INSPECTION SUMMARY		
Deficiencies Corrective Actions Recommendations	❐ Site NOT in compliance ❐ Corrective actions taken at time of inspection (attach rough field sketch showing deficiencies and corrective action taken)	❐ Corrective actions recommended (follow-up inspection required)(attach rough field sketch showing deficiencies) ❐ Photographs collected ❐ Videotaping performed
Inspector Signature:		Date:
Received by:		Date:

4D – Public Hotline (Proposed: FY 2005-2006)	
Description	Allow public to report on construction site run-off violations.
Justification	A hotline promotes public input and assists City with enforcement of construction site run-off.
Measurable Goal	City to establish hotline for the public to contact appropriate personnel if construction site runoff controls are not properly used.
Implementation Schedule	Year 1: City will establish hotline.
Progress Measurement	Hotline established.
Effective Measurement	Track number of calls from public reporting construction site run-off violations.

4D – Public Hotline (Implementation: FY 2005-2006)

General Summary: Per control measure 2E, the Public Works main phone line, 408-776-7337, is the designated illicit discharge hotline. The administrative staff has been trained to log illicit phone calls (per Attachment 3D.1) and relay information to the SWMP Coordinator to address the illicit discharge per control measure 3C.

Status of Measurable Goals: This year's measurable goal was met; Public Works main phone number was designated as the illicit discharge hotline.

Effectiveness: Since the illicit discharge procedure has been in place, Public Work has not received calls regarding construction site run-off.

Proposed Modifications: None.

Ongoing Implementation

4D – Public Hotline (Year 2: FY 2006-2007)	
Description	Allow public to report on construction site run-off violations.
Justification	A hotline promotes public input and assists City with enforcement of construction site run-off.
Measurable Goal	City to establish hotline for the public to contact appropriate personnel if construction site runoff controls are not properly used.
Implementation Schedule	Year 2: Maintain hotline. Train all PW phone reception staff on how to retrieve calls and implement investigation.
Progress Measurement	Hotline operational. PW phone reception staff trained.
Effective Measurement	Calls received get processed for investigation. Track number of calls from public reporting construction site run-off violations.
*Modifications are noted by the underlined text.	

Minimum Control Measure #5 – Post Construction Site Run-Off Control

Introduction

As specified in the current Municipal Code (Section 18.74.330) "Grading and drainage plans illustrating existing topography, proposed cuts and fills, sedimentation and erosion-control measures and structures, the direction of all site drainage, and all structural drainage facilities, shall be submitted as a part of architectural and site review. On-site storm water retention ponds shall be required where permanent storm-drainage facilities are not available. All storm water retention ponds shall be landscaped and fenced, where required by the City Engineer. Permanent storm water drainage facilities shall be used to transmit storm water whenever possible."

Post-construction storm water management in areas undergoing new development or redevelopment is necessary because runoff from these areas has been shown to significantly affect receiving water bodies. Prior planning and design for the minimization of pollutants in post-construction storm water discharges can be a cost-effective approach to storm water quality management.

There are generally two forms of substantial impacts of post-construction runoff. The first is caused by an increase in the type and quality of pollutants in storm water runoff. As runoff flows over areas altered by development, it picks up harmful sediment and chemicals such as oil and grease, pesticides, heavy metals, and nutrients (e.g. nitrogen and phosphorus). These pollutants often become suspended in runoff and are carried to receiving waters, such as lakes, reservoirs, ponds and streams. Once deposited, these pollutants can enter the food chain through small aquatic life, eventually entering the tissues of fish and humans.

The second kind of post-construction runoff impact occurs by increasing the quantity of water delivered to the water body during storms. Increased impervious surfaces interrupt the natural cycle of gradual percolation of water through vegetation and soil. Instead, water is collected from surfaces such as asphalt and concrete and routed to drainage systems where large volumes of runoff quickly flow to the nearest receiving water. The effects of this process include stream bank scouring and downstream flooding, which often lead to a loss of aquatic life and damage to property.

ATTACHMENT 5A.2

NONSTRUCTURAL POST CONSTRUCTION BMPs

Alternative Pavers

One type of alternative paver consists of a concrete lattice structure for support with grass growing in the void spaces (Source: Lo Gioco Landscaping, Inc., no date)

Description

Alternative pavers are permeable surfaces that can replace asphalt and concrete and can be used for driveways, parking lots, and walkways. From a storm water perspective, this is important because alternative pavers can replace impervious surfaces, creating less storm water runoff. The two broad categories of alternative pavers are paving blocks and other surfaces, including gravel, cobbles, wood, mulch, brick, and natural stone. While porous pavement is an alternative paver, as an engineered storm water management practice it is discussed in detail in the Porous Pavement fact sheet.

Paving Blocks

Paving blocks are concrete or plastic grids with gaps between them. Paving blocks make the surface more rigid and gravel or grass planted inside the holes allows for infiltration. Depending on the use and soil types, a gravel layer can be added underneath to prevent settling and allow further infiltration.

Other Alternative Surfaces

Gravel, cobbles, wood, and mulch also allow varying degrees of infiltration. Brick and natural stone arranged in a loose configuration allow for some infiltration through the gaps. Gravel and cobbles can be used as driveway material, and wood and mulch can be used to provide walking trails.

Applicability

Alternative pavers can replace conventional asphalt or concrete in parking lots, driveways, and walkways. At the same time, traffic volume and type can limit application. For this reason, alternative pavers for parking are recommended only for overflow areas. In residential areas, alternative surfaces can be used for driveways and walkways, but are not ideal for areas that require handicap accessibility.

Siting and Design Criteria

Accessibility, climate, soil type, traffic volume, and long-term performance should be considered, along with costs and storm water quality controls, when choosing paving materials. Use of alternative pavers in cold climates will require special consideration, as snow shovels are not practical for many of these surfaces. Sand is particularly troublesome if used with paving blocks, as the sand that ends up between the blocks cannot effectively wash away or be removed. In addition, salt used to de-ice can also infiltrate directly into the soil and cause potential ground water pollution.

Soil types will affect the infiltration rates and should be considered when using alternative pavers. Clayey soils (D soils) will limit the infiltration on a site. If ground water pollution is a concern, use of alternative pavers with porous soils should be carefully considered.

The durability and maintenance cost of alternative pavers also limits use to low-traffic-volume areas. At the same time, alternative pavers can abate storm water management costs. Used in combination with other better-site-design techniques, the cumulative effect on storm water can be dramatic.

Limitations
Alternative pavers are not recommended for high-traffic volumes for durability reasons. Access for wheelchairs is limited with alternative pavers. In addition, snow removal is difficult since plows cannot be used, sand can cause the system to clog, and salt can be a potential pollutant.

Maintenance Considerations
Alternative pavers require periodic maintenance, and costs increase when the permeable surface must be restored.

Effectiveness
The most obvious benefit of utilizing alternative pavers includes reduction or elimination of other storm water management techniques. Applied in combination with other techniques such as bioretention and green parking, pollutant removal and storm water management can be further improved.

Alternative pavers all provide better water quality improvement than conventional asphalt or concrete, and the range of improvement depends on the type of paver used. Table 1 provides a list of pavers and the range of water quality improvement achievable by different types of alternative pavers.

Table 1. Water quality improvement of various pavers (Source: BASMAA, 1997)

Material	Water Quality Effectiveness
Conventional Asphalt/ Concrete	Low
Brick (in a loose configuration)	Medium
Natural Stone	Medium
Gravel	High
Wood Mulch	High
Cobbles	Medium

Cost Considerations
The range of installation and maintenance costs of various pavers is provided in Table 2. Depending on the material used, installation costs can be higher or lower for alternative pavers than for conventional asphalt or concrete, but maintenance costs are almost always higher.
Table 2. Installation and maintenance costs for various pavers (Source: BASMAA, 1997)

Material	Installation Cost	Maintenance Cost
Conventional Asphalt/Concrete	Medium	Low
Brick (in a loose configuration)	High	Medium
Natural Stone	High	Medium
Gravel	Low	Medium
Wood Mulch	Low	Medium
Cobbles	Low	Medium

Alternative Turnarounds

Rather than having a fully paved cul-de-sac bulb, site designers can incorporate pervious circles with vegetation that reduce the site's overall impervious area

Description
Alternative turnarounds are designs for end-of-street vehicle turnaround that replace cul-de-sacs and reduce the amount of impervious cover created in residential neighborhoods. Cul-de-sacs are local access streets with a closed circular end that allows for vehicle turnarounds. Many of these cul-de-sacs can have a radius of more than 40 feet. From a storm water perspective, cul-de-sacs create a huge bulb of impervious cover, increasing the amount of storm water runoff. For this reason, reducing the size of cul-de-sacs through the use of alternative turnarounds or eliminating them altogether can reduce the amount of impervious cover created at a site.

Numerous alternatives create less impervious cover than the traditional 40-foot cul-de-sac. These alternatives include reducing cul-de-sacs to a 30-foot radius and creating hammerheads, loop roads, and pervious islands in the cul-de-sac center.

Applicability
Alternative turnarounds can be applied in the design of residential, commercial, and mixed-use developments. Combined with alternative pavers, green parking, curb elimination, and other techniques, the total reduction to site impervious cover can be dramatic, reducing the amount of storm water runoff from the site. With proper designs, much of the remaining storm water can be treated on site.

Implementation
Sufficient turnaround area is a significant factor to consider in the design of cul-de-sacs. In particular, the types of vehicles entering into the cul-de-sac should be considered. Fire trucks, service vehicles, and school buses are often cited as examples for increased turning radii. However, research shows that some fire trucks are designed for smaller turning radii. In addition, many new larger service vehicles are designed using a tri-axle, and school buses usually do not enter individual cul-de-sacs.
Implementation of alternative turnarounds will also have to address local regulations and marketing issues. Communities may have specific design criteria for cul-de-sacs and other alternative turnarounds. Also, although cul-de-sacs are often featured as highly marketable, actual research on market preference is not widely available.

Limitations
Local regulations often dictate requirements for turnaround radii, and some of the alternatives may not be allowed by local codes. In addition, marketing perceptions may also dictate designs, particularly in residential areas. While changing local codes is no small effort, by initiating a local site planning roundtable, communities can change some of these regulations through a cluster ordinance or through a collective effort to review local codes to promote better site design.

Maintenance Considerations
If islands are constructed as part of a turnaround, these areas will need to be maintained. Kept as a natural area, the costs could be minimal. Bioretention areas will also require maintenance. The other options create less asphalt to repave, and maintenance will remain the same and cost less.

Effectiveness
In comparisons of several different turnaround options, hammerheads were found to create the least amount of impervious cover, as shown in Table 1.
Table 1. Impervious cover created by each turnaround option (Schueler, 1995)

Turnaround Option	Impervious Area (square feet)
40-foot radius	5,024
40-foot radius with island	4,397
30-foot radius	2,826
30-foot radius with island	2,512
Hammerhead	1,250

Costs
Since alternative turnarounds reduce the amount of impervious cover created, construction savings can be an incentive (asphalt costs $0.50â€“$1.00 per square foot in materials alone). Bioretention is estimated at $6.40 per cubic foot, and while it costs more than providing naturally vegetated areas, it can help reduce overall storm water management costs.

Alum Injection

Description

Alum injection is the addition of alum (an aluminum sulfate salt) solution to storm water, causing fine particles to flocculate (i.e., gather together to form larger particles) and settle out. Other pollutants also can be scavenged. Alum injection can help meet downstream pollutant concentration loads by reducing the concentrations of fine particles and soluble phosphorus. Alum treatment systems generally consist of a flow-weighted dosing system designed to fit inside a storm sewer manhole, remotely located storage tanks to provide the doser with alum, and a downstream pond which allows the alum, pollutants, and sediments to settle out (Kurz, 1998). When alum is injected into storm water it forms harmless precipitates, aluminum phosphate and aluminum hydroxide. These precipitates combine with heavy metals and phosphorus, causing them to be deposited into the sediments in a stable, inactive state (WEF, 1992). The collected mass of alum precipitates, pollutants, and sediments is commonly referred to as floc.

Applicability

The injection of liquid alum into storm sewers has been used to reduce the water quality impacts of storm water runoff to lakes and receiving waterbodies, particularly to reduce high phosphorus levels. Because of high installation and operation costs, alum injection is best applied in situations where a large volume of water is stored in one area, as in the case of combined sewer overflow (CSO) storage areas at wastewater treatment plants. Alum treatment can also be implemented as a pretreatment step to further reduce turbidity and total suspended solids (TSS) (Kurz, 1998).

Siting and Design Considerations

Alum injection systems need to incorporate several design features to properly apply alum and dispose of the floc formed during the process. Dosage rates, which range from 5 to 10 mg of Al per liter, are determined on a flow-weighted basis during storm events (Harper, 1996). Other chemicals, such as lime, may also be added during the process to enhance the pollutant settling. (Often, the pH is raised to between 8 and 11). The design needs to incorporate a doser system, as well as sufficient chemical storage in tanks to minimize the frequency with which they need to be refilled.

Disposal of the floc that settles in the downstream basin is critical, because of the concentration of dissolved chemicals, and also because bacteria and viruses remain viable in the floc layer (Kurz, 1998). In addition to the settling pond, a separate floc collection pump-out facility should be installed to further reduce the chance of resuspension and transport of floc to receiving waterbodies. The pump disposes the floc into the sanitary sewer system or onto nearby upland areas or sludge drying beds. A permit will be required to pump to the sanitary sewer, however. The quantity of sludge produced at a site can be as much as 0.5 percent of the volume of water treated (Gibb et al., 1991).

Limitations

While alum shows some potential as a storm water treatment practice, it has several limitations, including:

- Alum injection is an experimental practice, and little is known about its long-term performance.
- In addition to maintenance, alum injection requires ongoing operation, unlike most other post-construction storm water treatment practices.
- While alum injection can reduce pollutant loads, it cannot control flows or protect downstream channels from erosion.
- Chemicals added during the alum injection process may have negative impacts on downstream waters.
- The precipitates from the alum increase the solids that must be disposed of from the treatment.

Maintenance Considerations
Operation and maintenance for alum treatment is critical. Some typical items include:

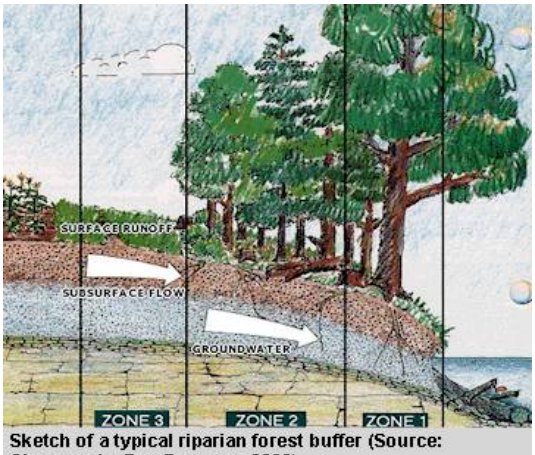
- There must be routine inspection and repair of equipment, including the doser and pump-out facility.
- A trained operator should be on-site to adjust the dosage of alum and other chemicals, and possibly to regulate flows through the basin.
- If floc is stored on-site in drying beds, it will need to be disposed of on a regular basis.
- The settling basin will need to be dredged periodically to dispose of accumulated floc.

Effectiveness
Limited performance data of alum injection is available in Table 1. One study (Harper and Herr, 1996) found high removal rates for TSS and fecal coliform bacteria. This study and another (Carr, 1998) showed mixed results on total phosphorus and ortho-phosphorus.
Table 1. Alum injection removal rates

Study	TSS	TP	Ortho-phosphorus	TN	Fecal Coliform Bacteria	Heavy Metals	Zinc	Ammonia
Harper and Herr, 1996	95-99	85-95	90-95	60-70	99	50-90	-	-
Carr, 1998	-	37	42	52.2	-	-	41	24.5

Cost Considerations
Alum injection is a relatively expensive practice. Construction costs for alum treatment systems range from $135,000 to $400,000; the cost depends on the watershed size and the number of outfall locations treated. Generally, alum treatment is applied to large drainage areas. In one study (Kurz, 1998), an alum treatment system was a successful storm water retrofit for a 460-acre urbanized watershed in downtown Tampa. Operation and maintenance costs, which include routine and chemical inspections, range from $6,500 to $25,000 per year (Harper and Herr, 1996).

Buffer Zones



Sketch of a typical riparian forest buffer (Source: Chesapeake Bay Program, 2000)

Description
An aquatic buffer is an area along a shoreline, wetland, or stream where development is restricted or prohibited. The primary function of aquatic buffers is to physically protect and separate a stream, lake, or wetland from future disturbance or encroachment. If properly designed, a buffer can provide storm water management and act as a right-of-way during floods, sustaining the integrity of stream ecosystems and habitats. Technically, aquatic buffers are one type of conservation area that function as an integral part of the aquatic ecosystem and can also function as part of an urban forest.
The three types of buffers are water pollution hazard setbacks, vegetated buffers, and engineered buffers.

Water pollution hazard setbacks are areas that separate a potential pollution hazard from a waterway. By providing setbacks from these areas in the form of a buffer, the potential for pollution can be reduced. Vegetated buffers are any number of natural areas that exist to divide land uses or provide landscape relief. Engineered buffers are areas specifically designed to treat storm water before it enters into a stream, lake, or wetland.

Applicability
Buffers can be applied to new development by establishing specific preservation areas and sustaining management through easements or community associations. For existing developed areas, an easement may be needed from adjoining landowners. A local ordinance can help set specific criteria for buffers to achieve storm water management goals.

In many regions of the country, the benefits of buffers are amplified if they are managed in a forested condition. In some settings, buffers can remove pollutants traveling in storm water or ground water. Shoreline and stream buffers situated in flat soils have been found to be effective in removing sediment, nutrients, and bacteria from storm water runoff and septic system effluent in a wide variety of rural and agricultural settings along the East Coast and with some limited capability in urban settings. Buffers can also provide wildlife habitat and recreation, and can be reestablished in urban areas as part of an urban forest.

Siting and Design Considerations
There are ten key criteria to consider when establishing a stream buffer:

- Minimum total buffer width
- Three-zone buffer system
- Mature forest as a vegetative target
- Conditions for buffer expansion or contraction
- Physical delineation requirements
- Conditions where buffer can be crossed
- Integrating storm water and storm water management within the buffer
- Buffer limit review
- Buffer education, inspection, and enforcement
- Buffer flexibility.

In general, a minimum base width of at least 100 feet is recommended to provide adequate stream protection. The three-zone buffer system, consisting of inner, middle, and outer zones, is an effective technique for establishing a buffer. The zones are distinguished by function, width, vegetative target, and allowable uses. The inner zone protects physical and ecological integrity and is a minimum of 25 feet plus wetland and critical habitats. The vegetative target consists of mature forest, and allowable uses are very restricted (flood controls, utility right-of-ways, footpaths, etc.).

The middle zone provides distance between upland development and the inner zone and is typically 50 to 100 feet, depending on stream order, slope, and 100-year floodplain. The vegetative target for this zone is managed forest, and usage is restricted to some recreational uses, some storm water BMPs, and bike paths. The outer zone functions to prevent encroachment and filter backyard runoff. The width is at least 25 feet and, while forest is encouraged, turfgrass can be a vegetative target. Uses for the outer zone are unrestricted and can include lawn, garden, compost, yard wastes, and most storm water BMPs.

For optimal storm water treatment, the following buffer designs are recommended. The buffer should be composed of three lateral zones: a storm water depression area that leads to a grass filter strip that in turn leads to a forested buffer. The storm water depression is designed to capture and store storm water during smaller storm events and bypass larger stormflows directly into a channel. The captured runoff within the storm water depression can then be spread across a grass filter designed for sheetflow conditions for the water quality storm. The grass filter then discharges into a wider forest buffer designed to have zero discharge of surface runoff to the stream (i.e., full infiltration of sheetflow).

Stream buffers must be highly engineered in order to satisfy these demanding hydrologic and hydraulic conditions. In particular, simple structures are needed to store, split, and spread surface runoff within the storm water depression area. Although past efforts to engineer urban stream buffers were plagued by hydraulic failures and maintenance problems, recent experience with similar bioretention areas has been much more positive (Claytor and Schueler, 1996). Consequently, it may be useful to consider elements of bioretention design for the first zone of an urban stream buffer (shallow ponding depths, partial underdrains, drop inlet bypass, etc).

Limitations

Only a handful of studies have measured the ability of stream buffers to remove pollutants from storm water. One limitation is that urban runoff concentrates rapidly on paved and hard-packed turf surfaces and often crosses the buffer as channel flow, effectively shortcutting through the buffer. To achieve optimal pollutant removal, the engineered buffer should be carefully designed with a storm water depression area, grass filter, and forested strip.

Maintenance Considerations

An effective buffer management plan should include establishment, management, and distinctions of allowable and unallowable uses in the buffer zones. Buffer boundaries should be well defined and visible before, during, and after construction. Without clear signs or markers defining the buffer, boundaries become invisible to local governments, contractors, and residents. Buffers designed to capture storm water runoff from urban areas will require more maintenance if the first zone is designated as a bioretention or other engineered depression area.

Effectiveness

The pollutant removal effectiveness of buffers depends on the design of the buffer; while water pollution hazard setbacks are designed to prevent possible contamination from neighboring land uses, they are not designed for pollutant removal during a storm. With vegetated buffers, some pollutant removal studies have shown that they range widely in effectiveness (Table 1). Proper design of buffers can help increase the pollutant removal from storm water runoff (Table 2).

Table 1: Pollutant removal rates in buffer zones

Reference	Buffer Vegetation	Buffer Width (meters)	Total % TSS Removal	Total % Phosphorous Removal	Total % Nitrogen Removal
Dillaha et al., 1989	Grass	4.6–9.1	63–78	57–74	50–67
Magette et al., 1987	Grass	4.6–9.2	72–86	41–53	17–51
Schwer and Clausen, 1989	Grass	26	89	78	76
Lowrance et al., 1983	Native hardwood forest	20–40	–	23	–
Doyle et al., 1977	Grass	1.5	–	8	57
Barker and Young, 1984	Grass	79	–	–	99
Lowrance et al., 1984	Forested	–	–	30–42	85
Overman and Schanze, 1985	Grass	–	81	39	67

Table 2: Factors that enhance/reduce buffer pollutant removal performance

Factors that Enhance Performance	Factors that Reduce Performance
Slopes less than 5%	Slopes greater than 5%
Contributing flow lengths <150 feet.	Overland flow paths over 300 feet
Water table close to surface	Ground water far below surface
Check dams/level spreaders	Contact times less than 5 minutes
Permeable but not sandy soils	Compacted soils
Growing season	Nongrowing season
Long length of buffer or swale	Buffers less than 10 feet
Organic matter, humus, or mulch layer	Snowmelt conditions, ice cover
Small runoff events	Runoff events >2 year event.
Entry runoff velocity less than 1.5 feet/sec	Entry runoff velocity more than 5 feet/sec
Swales that are routinely mowed	Sediment buildup at top of swale
Poorly drained soils, deep roots	Trees with shallow root systems
Dense grass cover, 6 inches tall	Tall grass, sparse vegetative cover

Cost Considerations

Several studies have documented the increase of property values in areas adjacent to buffers. At the same time, the real costs of instituting a buffer program for local government involve the extra staff and training time to conduct plan reviews, and to provide technical assistance, field delineation, construction, and ongoing buffer education programs. To implement a stream buffer program, a community will need to adopt an ordinance, develop technical criteria, and invest in additional staff resources and training. The adoption of a buffer program also requires an investment in training for the plan reviewer and the consultant alike. Manuals, workshops, seminars, and direct technical assistance are needed to explain the new requirements to all the players in the land development business. Lastly, buffers need to be maintained, and resources should include systematic inspection of the buffer network before and after construction and work to increase resident awareness about buffers.

One way to relieve some of the significant financial hardships for developers is to provide flexibility through buffer averaging. Buffer averaging allows developers to narrow the buffer width at some points if the average width of the buffer and the overall buffer area meet the minimum criteria. Variances can also be granted if the developer or landowner can demonstrate severe economic hardship or unique circumstances that make compliance with the buffer ordinance difficult.

Conservation Easements

Description

Conservation easements are voluntary agreements that allow an individual or group to set aside private property to limit the type or amount of development on their property. The conservation easement can cover all or a portion of a property and can either be permanent or last for a specified time. The easement is typically described in terms of the resource it is designed to protect (e.g., agricultural, forest, historic, or open space easements) and explains and mandates the restrictions on the uses of the particular property. Easements relieve property owners of the burden of managing these areas by shifting responsibility to a private organization (land trust) or government agency better equipped to handle maintenance and monitoring issues.

Conservation easements are thought to make a contribution to protecting water quality, mostly in an indirect way. Land set aside in a permanent conservation easement is land that will have a prescribed set of uses or activities, generally restricting future development.

The location of the land held in a conservation easement may also determine if it will provide water quality benefits. Property along stream corridors and shorelines can act as a vegetated buffer that may filter out pollutants from storm water runoff. The ability of a conservation easement to function as a stream buffer is related to the width of the easement and in what vegetated state the easement is maintained (see Buffer Zones fact sheet).

Applicability

Conservation easements are typically done to preserve agricultural lands and natural areas that are facing development pressure on the suburban-rural fringe. For rapidly urbanizing areas, conservation easements may be a way to preserve open space before land prices make the purchase of land containing important cultural and natural features impractical for governmental agencies with limited budgets. Conservation easements are not often used in ultra-urban areas, due to both the lack of available open space for purchase and the high cost of undeveloped land. In addition, private land trusts may limit the size and type of the land that they are willing to manage as conservation easements.

Implementation

Conservation easements are designed to assure that the land is preserved in its current state long after the original owners no longer control the property. By agreeing to give up or restrict the development rights for a parcel of land, a landowner can guarantee that their property will remain in a prescribed state for perpetuity while receiving tax benefits. Often, state agencies and private land trusts have specific qualifications for a property before they will enter into an easement agreement with land owners. Table 1 contains examples of criteria that are used by private land trusts to determine if a property is worth managing in a conservation easement.

Table 1: Typical criteria that land trusts use to determine feasibility of entering into conservation easement agreement

Criteria	Details
Natural resource value	Does the property provide a critical habitat or important environmental aspects worth preserving?
Uniqueness of the property	Does the property have unique traits worth preserving?
Size of land	Is the land large enough to have a natural resource or conservation value?
Financial considerations	Are funds available to meet all financial obligations?
Perpetuity	Is the conservation agreement a perpetual one?
Land trust's mission	Does the property align with the land trust's mission and the organization's specific criteria?

Conservation easements have been used in all parts of the country, and many private groups, both nationally and locally, exist to preserve natural lands and manage conservation easements. States also use conservation easements and land purchase programs to protect significant environmental features and tracts of open space. Maryland is one state that has been nationally recognized for its programs that provide funding for state and local parks and conservation areas.

The state is one of the first to use real estate transfer taxes to pay for land conservation programs. Several programs are funded through this transfer tax of one-half of one percent ($5 per thousand) of the purchase price of a home or land, or other state funding programs. Conservation programs include:

- *Program Open Space*. This program is responsible for acquiring 150,000 acres of open space for state parks and natural resource areas and more than 25,000 acres of local park land. Every county must create a Land Preservation and Recreation Plan that outlines acquisition and development goals in order to receive a portion of the 50 percent that is granted to local governments (MDNR, no date).
- *Maryland Environmental Trust*. This trust is a state-funded agency that helps citizen groups form and operate local land trusts and offers the land trusts technical assistance, training, grants for land protection projects and administrative expenses, and participation in the Maryland Land Trust Alliance (MDNR, 2001a).
- *Rural Legacy Program*. This program is a Smart Growth Initiative that redirects existing state funds into a focused and dedicated land preservation program specifically designed to limit the adverse impacts of sprawl on agricultural lands and natural resources. The program purchases conservation easements for large contiguous tracts of agricultural, forest, and natural areas subject to development pressure, and purchases fee interests in open space where public access and use is needed (MDNR, 2001b).

Regardless of whether a conservation easement is held by a government agency or a private land trust, certain management responsibilities must be addressed by the easement holder. The following is a list of some of these management duties:

- Ensure that the language of the easement is clear and enforceable.
- Develop maps, descriptions and baseline documentation of the property's characteristics.
- Monitor the use of the land on a regular basis.
- Provide information regarding the easement to new or prospective property owners.
- Establish a review and approval process for land activities stipulated in the easement.
- Enforce the restrictions of the easement through the legal system if necessary.
- Maintain property/easement-related records.

Limitations

A number of limitations exist for using conservation easements as a storm water management tool. One is that there is no hard evidence that conservation easements actually do protect water quality. Another is that conservation easements are often not an option in more urbanized areas, where the size, quality, and cost of land can restrict the use of easements. Easements might also not be held in perpetuity, which means that land could still face development pressure in the future. Easements also may not provide for the filtering of pollutants from concentrated flows. More information on the filtering potential of stream buffers can be found in the Buffer Zones fact sheet.

Maintenance Considerations

The responsibility for maintenance of property in a conservation easement depends on the individual agreement with a land trust or agency. While many organizations assume the responsibility for managing and monitoring a property, some land trusts leave maintenance responsibilities to the landowner and act only to monitor that the terms of the easement are met.

Effectiveness
The pollutant removal efficiency of a conservation area will depend on how much is conserved, the techniques used to conserve it, and the specific nature of the easement. Conservation easements are assumed to contribute water quality benefits, but no national studies proving this have been released.

Cost Considerations
Table 2 summarizes the costs of maintaining green spaces with different types of uses.
Table 2: Annual maintenance costs of different types of green space uses (Adapted from CWP, 1998)

Land Use	Approximate Annual Maintenance Costs
Natural open space Only minimum maintenance, trash/debris cleanup	$75/acre/year
Lawns Regular mowing	$270 to $240/acre/year
Passive recreation	$200/acre/year

Eliminating Curbs and Gutters

Developers can eliminate curbs and gutters to disconnect impervious surfaces and promote infiltration of storm water on vegetated areas (such as this grass-lined channel in a residential neighborhood)

Description
This better site design practice involves promoting the use of grass swales as an alternative to curbs and gutters along residential streets. Curbs and gutters are designed to quickly convey runoff from the street to the storm drain and, ultimately, to the local receiving water. Consequently, curbs and gutters provide little or no removal of storm water pollutants. Indeed, curbs often act as a pollutant trap where deposited pollutants are stored until they are washed out in the next storm. Many communities require curb and gutters as a standard element of their road sections, and discourage the use of grass swales. Revisions to current local road and drainage regulations are needed to promote greater use of grass swales along residential streets, in the appropriate setting. The storm water management and pollutant removal benefits of grass swales are documented in detail in the Grassed Swales fact sheet.

Applicability
The use of engineered swales in place of curbs and gutters should be encouraged in low- and medium-density residential zones where soils, slope and housing density permit. However, eliminating curbs and gutters is generally not feasible for streets with high traffic volume or extensive on-street parking demand (i.e., commercial and industrial roads), nor is it a viable option in arid and semi-arid climates where grass cannot grow without irrigation. Moreover, the use of grass swales may not be permitted by current local or state street and drainage standards.

Siting and Design Conditions
A series of site factors must be evaluated to determine whether a grass swale is a viable replacement for curbs and gutters at a particular site.

Contributing drainage area. Most individual swales cannot accept runoff from more than 5 acres of contributing drainage area, and typically serve 1–2 acres each.

Slope. Swales generally require a minimum slope of 1 percent and a maximum slope of 5 percent.

Soils. The effectiveness of swales is greatest when the underlying soils are permeable (hydrologic soil groups A and B). The swale may need more engineering if soils are less permeable.

Water Table. Swales should be avoided if the seasonally high water table is within 2 feet of the proposed bottom of the swale.

Development Density. The use of swales is often difficult when development density becomes more intense than four dwelling units per acre, simply because the number of driveway culverts increases to the point where the swale essentially becomes a broken-pipe system. Typically, grass swales are designed with a capacity to handle the peak flow rate from a 10-year storm, and fall below erosive velocities for a 2-year storm.

Limitations
A number of real and perceived limitations hinder the use of grass swales as an alternative to curb and gutters:

- *Snowplow operation can be more difficult without a defined road edge*. However, on the plus side, roadside swales increase snow storage at the road edge, and smaller snowplows may be adequate.

- *The pavement edge along the swale can experience more cracking and structural failure, increasing maintenance costs.* The potential for pavement failure at the road/grass interface can be alleviated by "hardening" the interface with grass pavers or geo-synthetics placed beneath the grass. Other options include placing a low-rising concrete strip along the pavement edge.

- *The shoulder and open channel will require more maintenance*. In reality, maintenance requirements for grass channels are generally comparable to those of curb and gutter systems. The major requirements involve turf mowing, debris removal, and periodic inspections.

- *Some grass swales can have standing water, which make them difficult to mow, and can cause nuisance problems such as odors, discoloration, and mosquitoes*. In reality, grass channels are not designed to retain water for any appreciable period of time, and the potential for snakes and other vermin can be minimized by frequent mowing.

Other concerns involve fears about utility installation and worries that the grass edge along the pavement will be torn up by traffic and parking. While utilities will need to be installed below the paved road surface instead of the right of way, most other concerns can frequently be alleviated through the careful design and integration of the open channels along the residential street. (Consult the Grassed Swales fact sheet for details on design variations that can reduce these problems.)

Maintenance Considerations
The major maintenance requirement for grass swales involves mowing during the growing season, a task usually performed by homeowners. In addition, sediment deposits may need to be removed from the bottom of the swale every ten years or so, and the swale may need to be tilled and re-seeded periodically. Occasionally, erosion of swale side slopes may need to be stabilized. The overall maintenance burden of grass swales is low in relation to other storm water practices, and is usually within the competence of the individual homeowner. The only major maintenance problem that might arise pertains to "problem" swales that have standing water and are too wet to mow. This particular problem is often alleviated by the installation of an underground storm drain system.

Effectiveness
Under the proper design conditions, grass swales can be effective in removing pollutants from urban storm water (Schueler, 1996). More information on the pollutant removal capability of various grass swale designs can be found in the Grassed Swales fact sheet.

Cost Considerations
Engineered swales are a much less expensive option for storm water conveyance than the curb and gutter systems they replace. Curbs and gutters and the associated underground storm sewers frequently cost as much as $36 per linear foot, which is roughly twice the cost of a grass swale (Schueler, 1995, and CWP, 1998). Consequently, when curbs and gutters can be eliminated, the cost savings can be considerable.

Green Parking

A green parking lot at the Orange Bowl in Miami, Florida (Source: Invisible Structures, no date)

Description
Green parking refers to several techniques applied together to reduce the contribution of parking lots to the total impervious cover in a lot. From a storm water perspective, application of green parking techniques in the right combination can dramatically reduce impervious cover and, consequently, the amount of storm water runoff. Green parking lot techniques include setting maximums for the number of parking lots created, minimizing the dimensions of parking lot spaces, utilizing alternative pavers in overflow parking areas, using bioretention areas to treat storm water, encouraging shared parking, and providing economic incentives for structured parking.

Applicability
All of the green parking techniques can be applied in new developments and some can be applied in redevelopment projects, depending on the extent and parameters of the project. In urban areas, application of some techniques, like encouraging shared parking and providing economic incentives for structured parking, can be very practical and necessary. Commercial areas can have excessively high parking ratios, and application of green parking techniques in various combinations can dramatically reduce the impervious cover of a site.

Implementation
Many parking lot designs result in far more spaces than actually required. This problem is exacerbated by a common practice of setting parking ratios to accommodate the highest hourly parking during the peak season. By determining average parking demand instead, a lower maximum number of parking spaces can be set to accommodate most of the demand.

Table 1 provides examples of conventional parking requirements and compares them to average parking demand.

Table 1: Conventional minimum parking ratios (Source: ITE, 1987; Smith, 1984; Wells, 1994)

Land Use	Parking Requirement		Actual Average Parking Demand
	Parking Ratio	Typical Range	
Single family homes	2 spaces per dwelling unit	1.5–2.5	1.11 spaces per dwelling unit
Shopping center	5 spaces per 1000 ft^2 GFA	4.0–6.5	3.97 per 1000 ft^2 GFA
Convenience store	3.3 spaces per 1000 ft^2 GFA	2.0–10.0	--
Industrial	1 space per 1000 ft^2 GFA	0.5–2.0	1.48 per 1000 ft^2 GFA
Medical/ dental office	5.7 spaces per 1000 ft^2 GFA	4.5–10.0	4.11 per 1000 ft^2 GFA
GFA = Gross floor area of a building without storage or utility spaces.			

Another green parking lot technique is to minimize the dimensions of the parking spaces. This can be accomplished by reducing both the length and width of the parking stall. Parking stall dimensions can be further reduced if compact spaces are provided. While the trend toward larger sport utility vehicles (SUVs) is often cited as a barrier to implementing stall minimization technique, stall width requirements in most local parking codes are much larger than the widest SUVs (CWP, 1998).

Utilizing alternative pavers is also an effective green parking technique. They can replace conventional asphalt or concrete in both new developments and redevelopment projects. Alternative pavers can range from medium to relatively high effectiveness in meeting storm water quality goals. The different types of alternative pavers include gravel, cobbles, wood mulch, brick, grass pavers, turf blocks, natural stone, pervious concrete, and porous asphalt. In general, alternate pavers require proper installation and more maintenance than conventional asphalt or concrete. For more specific information on alternate pavers, refer to the Alternative Pavers fact sheet.

Bioretention areas can effectively treat storm water leaving a parking lot. Storm water is directed into a shallow, landscaped area and temporarily detained. The runoff then filters down through the bed of the facility and is infiltrated into the subsurface or collected into an underdrain pipe for discharge into a stream or another storm water facility. Bioretention facilities can be attractively integrated into landscaped areas and can be maintained by commercial landscaping firms. For detailed design specifications of bioretention areas, refer to the Bioretention fact sheet.
Shared parking in mixed-use areas and structured parking also are green parking techniques that can further reduce the conversion of land to impervious cover. A shared parking arrangement could include usage of the same parking lot by an office space that experiences peak parking demand during the weekday with a church that experiences parking demands during the weekends and evenings. Costs may dictate the usage of structured parking, but building upward or downward can help minimize surface parking.

Limitations
Some limitations to applying green parking techniques include applicability, cost, and maintenance. For example, shared parking is only practical in mixed use areas, and structured parking may be limited by the cost of land versus construction. Alternative pavers are currently only recommended for overflow parking because of the considerable cost of maintenance. Bioretention areas increase construction costs.
The pressure to provide excessive parking spaces can come from fear of complaints as well as requirements of bank loans. These factors can pressure developers to construct more parking than necessary and present possible barriers to providing the greenest parking lot possible.

Effectiveness
Applied together, green parking techniques can effectively reduce the amount of impervious cover, help to protect local streams, result in storm water management cost savings, and visually enhance a site. Proper design of bioretention areas can help meet storm water management and landscaping requirements while keeping maintenance costs at a minimum.
Utilizing green parking lots can dramatically reduce the amount of impervious cover created. The level of the effectiveness depends on how much impervious cover is reduced as well as the combination of techniques utilized to provide the greenest parking lot. While the pollutant removal rates of bioretention areas have not been directly measured, their capability is considered comparable to a dry swale, which removes 91 percent of total suspended solids, 67 percent of total phosphorous, 92 percent of total nitrogen, and 80–90 percent of metals (Claytor and Schueler, 1996).

An excellent example of the multiple benefits of rethinking parking lot design is the Fort Bragg vehicle maintenance facility parking lot in North Carolina (NRDC, 1999). This redesign reduced impervious cover by 40 percent, increased parking by 20 percent, and saved $1.6 million (20 percent) on construction costs over the original, conventional design. Stormwater management

features, such as detention basins located within grassed islands and an onsite drainage system that took advantage of existing sandy soils, were incorporated into the parking lot design as well.

Cost Considerations

Setting maximums for parking spaces, minimizing stall dimensions, and encouraging shared parking can result in considerable construction cost savings. At the same time, implementing green parking techniques can also reduce storm water management costs.

Infrastructure Planning

Developers can design streets and pedestrian paths to maximize convenience and safety while at the same time minimizing impervious surface area (Source: The Rouse Company, no date)

Description

This practice requires changes in the regional growth planning process to contain sprawl development. Sprawl development is the expansion of low-density development into previously undeveloped land. The American Farmland Trust has estimated that the United States is losing about 50 acres an hour to suburban and exurban development (Longman, 1998). This sprawl development requires local governments to extend public services to new residential communities whose tax payments often do not cover the cost of providing those services. For example, in Prince William County, Virginia, officials have estimated that the costs of providing services to new residential homes exceeds what is brought in from taxes and other fees by $1,600 per home (Shear and Casey, 1996).

Infrastructure planning makes wise decisions to locate public services water, sewer, roads, schools, and emergency services in the suburban fringe and direct new growth into previously developed areas, discouraging low-density development. Generally, this is done by drawing a boundary or envelope around a community, beyond which major public infrastructure investments are discouraged or not subsidized. Meanwhile, economic and other incentives are provided within the boundary to encourage growth in existing neighborhoods. By encouraging housing growth in areas that are already provided with public services water, sewer, roads, schools, and emergency services communities not only save infrastructure development costs, but reduce the impacts of sprawl development on urban streams and water quality.

Sprawl development negatively impacts water quality in several ways. The most significant impact comes from the increase in impervious cover that is associated with sprawl growth. In addition to rooftop impervious area from new development, extension of road systems and additions of paved surface from driveways create an overall increase in imperviousness. This increase in the impervious cover level of an area directly influences local streams and water quality by increasing the volume of storm water runoff. These elevated runoff levels impact urban streams in several ways, including enlarging stream channels, increasing sediment and pollutant loads, degrading stream habitat, and reducing aquatic diversity (Schueler, 1995). Sprawl has been reported to generate 43 percent more runoff that contains three times greater sediment loads than traditional development (SCCCL, 1995).

Sprawl development influences water quality in other ways. This type of development typically occurs in areas not served by centralized sewer or water services. For example, over 80 percent of the land developed in the state of Maryland in the last decade has been outside the sewer and water "envelope." This requires new housing developments to use septic systems or another form of on-site wastewater disposal to treat household sewage. These on-site treatment systems can represent a significant source of nutrients and bacteria that affect both surface waters and groundwater. More information about septic systems is contained in the fact sheets in both the Illicit Discharge Detection and Elimination Category and the Pollution Prevention Category.

Applicability
Sprawl development occurs in all regions of the country and has recently become the subject of many new programs to counteract its impacts. These programs seldom focus on the water quality implications of sprawl growth, instead concentrating on economic and transportation issues. Even so, methods such as infrastructure planning can reduce the impact of new development. Promoting the infill and redevelopment of existing urban areas in combination with other better site design techniques (see the other fact sheets in this category) will decrease impervious cover levels and lessen the amount of pollution discharged to urban streams.

Siting and Design Conditions
Various techniques have been used to manage urban growth while conserving resources. Although none of these techniques specifically concentrates on infrastructure planning, each of the techniques recognizes that directing growth to areas that have been previously developed or promoting higher density development in areas where services exist prevents sprawl development and helps communities to mitigate the water quality impacts of economic growth. Among the techniques that have been used are:

- *Urban Growth Boundaries*. This planning tool establishes a dividing line that defines where a growth limit is to occur and where agricultural or rural land is to be preserved. Often, an urban services area is included in this boundary that creates a zone where public services will not be extended.

- *Infill/Community Redevelopment*. This practice encourages new development in unused or underutilized land in existing urban areas. Communities may offer tax breaks or other economic incentives to developers to promote the redevelopment of properties that are vacant or damaged.

The State of Maryland has been one of the states that has recently passed legislation to control growth. This "Smart Growth" legislation allows the State to direct its programs and funding to support locally-designated growth areas and protect rural and natural areas. The central component of this legislative package is the "Priority Funding Areas" legislation that limits most state infrastructure funding and economic development program monies to areas that local governments designate for growth and that meet guidelines for intended use, availability of plans for sewer and water systems, and permitted residential density (MOP, no date).
The other bills in the legislative package also support development of existing areas and preservation of undeveloped land. A brownfields program encourages revitalization of existing neighborhoods and industrial areas and establishes a brownfield revitalization incentive program that provides grants and low-interest loans to fund brownfield redevelopment. A new "Live Near Your Work" pilot program supports this effort by providing cash contributions to workers buying homes in certain older neighborhoods. The "Rural Legacy Program" spurs preservation of undeveloped land by providing financial resources for the protection of farm and forest lands from development and for the conservation of these essential rural resources from development.

Limitations
Intense development of existing areas can create a new set of challenges for storm water program managers. Storm water management solutions are often more difficult and complex in ultra-urban areas than in suburban areas. The lack of space for structural storm water controls and the high cost of available land where structural controls could be installed are just two problems that program managers will face in managing storm water in intensely developed areas. Infrastructure planning is often done on a regional scale and requires a cooperative effort between all the communities within a given region in order to be successful. Phase II program managers will need to develop lines of communication with other state and local agencies and community leaders to ensure that infrastructure plans direct growth to those areas that will have the least impacts on watersheds and water quality.

Effectiveness
The effectiveness of infrastructure planning at protecting water quality is currently unknown. Although studies exist detailing the economic benefits of infrastructure planning, how this translates to storm water pollutant reductions is difficult if not impossible to calculate. However, a relationship does exist between impervious cover levels and urban stream characteristics, and one can assume that tools such as infrastructure planning that help control imperviousness have a positive impact on water quality.
Compact development benefits program managers in numerous ways. One benefit is that compact development can preserve prime agricultural land and sensitive areas while reducing costly construction of new infrastructure (Pelley, 1997). Less new land developed translates into less need for new infrastructure and public services.

Cost Considerations
The economic benefits of reducing costly construction of new infrastructure and providing new services can be quite substantial. The following is a list of examples of the projected savings of limiting sprawl through managed growth (APA, no date):

- New Jersey's plan for managed growth will save the state $700 million in road costs, $562 million in sewer and water costs, $178 million in school costs, and up to $380 million in operating costs per year.

- Fifteen years of continued sprawl would cost Maryland $10 billion more than a more compact pattern of growth.

- A 1989 Florida study demonstrated that planned, concentrated growth would cost the taxpayer 50 percent to 75 percent less than continued sprawl.

- The Cities of Minneapolis-St. Paul will spend $3.1 billion by the year 2020 for new water and sewer services to accommodate sprawl.

- Since 1980 the City of Fresno, California, has added $56 million in yearly revenues but has added $123 million in service costs.

Other studies have found that planned development consumes about 45 percent less land and costs 25 percent less for roads, 15 percent less for utilities, 5 percent less for housing, and 2 percent less for other fiscal impacts (Burchell and Listokin, 1995, as cited in Pelley, 1997).
The control of sprawl development through legislation and "Smart Growth" programs is currently being implemented in a number of states and counties across the U.S. As these programs mature and begin to influence development patterns in urban areas, local governments should begin to see the positive impacts of condensed growth on the aquatic environment and water quality of local streams.

On-Lot Treatment

A rain barrel is used to collect rooftop runoff using a gutter/downspout system

Description
The term "on-lot treatment" refers to a series of practices that are designed to treat runoff from individual residential lots. The primary purpose of most on-lot practices is to manage rooftop runoff and, to a lesser extent, driveway and sidewalk runoff. Rooftop runoff, and particularly residential rooftop runoff, generally has low pollutant concentrations compared with other urban sources (Schueler, 1994b). The primary advantage of managing runoff from rooftops is to disconnect these impervious surfaces, reducing the effective impervious cover in a watershed. Many of the impacts of urbanization on the habitat and water quality of streams are related to the fundamental change in the hydrologic cycle caused by the increase of impervious cover in the landscape (Schueler, 1994a).

Although there are a wide variety of on-lot treatment options, they can all be classified into one of three categories: 1) practices that infiltrate rooftop runoff; 2) practices that divert runoff or soil moisture to a pervious area; and 3) practices that store runoff for later use. The best option depends on the goals of a community, the feasibility at a specific site, and the preferences of the homeowner.

The practice most often used to infiltrate rooftop runoff is the dry well. In this design, the storm drain is directed to an underground rock-filled trench that is similar in design to an infiltration trench (see Infiltration Trench fact sheet). French drains or Dutch drains can also be used for this purpose. In these designs, the relatively deep dry well is replaced with a long trench with a perforated pipe within the gravel bed to distribute flow throughout the length of the trench. Runoff can be diverted to a pervious area or to a treatment area using site grading, or channels and berms. Treatment options can include grassed swales, bioretention, or filter strips. The bioretention design can be simplified for an on-lot application by limiting the pre-treatment filter and in some cases eliminating the underdrain (see Bioretention fact sheet). Alternatively, rooftop runoff can simply be diverted to pervious lawn areas, as opposed to flowing directly to the street and thus to the storm drain system.

Practices that store rooftop runoff, such as cisterns and rain barrels, are the simplest in design of all of the on-lot treatment systems. Some of these practices are available commercially and can be applied in a wide variety of site conditions. Cisterns and rain barrels are particularly valuable in the arid southwest, where water is at a premium, rainfall is infrequent, and reuse for irrigation can save homeowners money.

Application
Some sort of on-lot treatment can be applied to almost all sites, with very few exceptions (e.g., very small lots or lots with no landscaping). Traditionally, on-site treatment of residential storm water runoff has been encouraged, but has not generally been an option to meet storm water requirements. There are currently at least two jurisdictions, however, who offer "credits" in exchange for the application of on-site storm water management practices. In Denver, Colorado, sites designed with methods to reduce "directly connected impervious cover," including disconnection of downspout runoff from the storm system, are permitted to use a lower site

impervious area when computing the required storage of storm water facilities (DUDFCD, 1992). Similarly, new regulations for Maryland allow designers to subtract each rooftop that is disconnected from the total site impervious cover when calculating required storage in storm water management practices (MDE, 2000).

Siting and Design Considerations

Although most residential lots can incorporate on-lot treatment, the best option for a site depends on site design constraints and the preferences of the homeowner. On-lot infiltration practices have the same restrictions regarding soils as other infiltration practices (see Infiltration Basin and Infiltration Trench fact sheets). If other design practices are used, such as bioretention or grassed swales, they need to meet the siting requirements of those practices (see Bioretention and Grassed Swale fact sheets). Of all of the practices, cisterns and rain barrels have the fewest site constraints. In order for the practice to be effective, however, homeowners need to have a use for the water stored in the practice, and the design must accommodate overflow and winter freezing conditions. These practices are best suited to an individual who has some active interest in gardening or landscaping.

Although these practices are simple compared with many other post construction storm water practices, the design needs to incorporate the same basic elements of any storm water practice. Pretreatment is important for all of these practices to ensure that they do not become clogged with leaf debris. Infiltration practices may be preceded by a settling tank or, at a minimum, a grate or filter in the downspout to trap leaves and other debris. Rain barrels and cisterns also often incorporate some sort of pretreatment, such as a mesh filter at the top of the barrel or cistern. Both infiltration practices and storage practices typically incorporate some type of bypass so that larger storms flow away from the house. In rain barrels or cisterns, this bypass may be a hose set at a high level of the practice and directed away from the practice and building foundation. These practices also include a hose set at the elevation of the bottom of the practice. The homeowner can use the practice to irrigate landscaping or for other uses by attaching this hose to a standard garden hose, and controlling flow with an adjustable valve. In infiltration practices the bypass may be an aboveground opening of the downspout. As on-lot practices, grassed swales and bioretention can be designed on-line. The design directs all flows to the management practice, but larger flows generally flow over the practice and are not treated.

One important design feature of infiltration practices is that the infiltration area must be located sufficiently far from the house's foundation to prevent undermining of the foundation or seepage into basements. The infiltration area should be separated from the house by at least 10 feet to prevent these problems.

Limitations

There are some limitations to the use of on-lot practices, including the following:

- These practices require some maintenance and require some effort on the part of the homeowner.
- For homeowners who do not enjoy landscaping, it may be difficult for them to find a use for water stored in a rain barrel or cistern, since the water is not potable.
- On small lots, some of these practices may be impractical.
- Even if applied to every home in a watershed, these practices would only treat a relatively small portion of the watershed imperviousness, which is largely composed of roads and parking areas (see Narrower Residential Streets and Green Parking fact sheets).

Maintenance Considerations

Bioretention areas, filter strips, and grassed swales require regular maintenance to ensure that the vegetation remains in good condition (see Bioretention; Grassed Filter Strip; and Grassed Swale fact sheets). Infiltration practices require regular removal of sediment and debris settled in the pretreatment area, and the media might need to be replaced if it becomes clogged (see

Infiltration Trench fact sheet). Rain barrels and cisterns require minimal maintenance, but the homeowner needs to ensure that the hose remains elevated during the winter to prevent freezing and cracking. In addition, the tank needs to be cleaned out approximately once per year.

Effectiveness

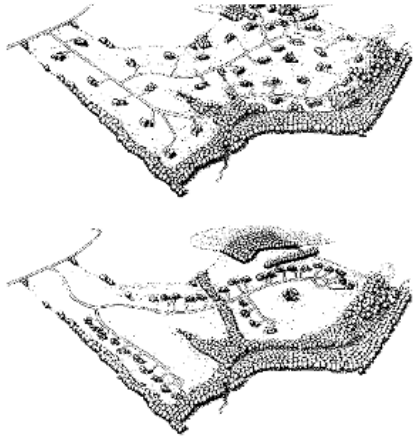
Although the practices used for on-lot applications can have relatively high pollutant removals (see Infiltration Trench; Bioretention; Grassed Filter Strip; and Grassed Swale fact sheets), it is not clear that these pollutant removal rates can be realized with the relatively low pollutant concentrations entering the practices. Some data suggest that, at least for storm water ponds, there may be an "irreducible concentration" below which no further pollutant removal can be achieved (Schueler, 1996). Another benefit of many on-lot practices is that they generally promote ground water recharge, either directly through infiltration or indirectly by applying or directing runoff to pervious areas.

Cost Considerations

On a cost per unit area treated, on-lot practices are relatively expensive compared with other storm water treatment options. It is difficult to make this comparison, however, because the cost burden of on-lot practices is born directly by homeowners. Typical costs are $100 for a rain barrel and $200 for a dry well or French drain. For many of these practices, homeowners can reduce costs by making their own on-lot practice rather than purchasing a commercial product.

Some treatment practices, such as rain barrels and on-lot bioretention, offer additional benefits to the homeowner that may offset the cost of applying the practice. Similarly, maintenance costs are essentially free, with the exception of replacement of a dry well system, which may require outside help.

Open Space Design



A site developed using open space design principles (bottom) maintains more undeveloped common space than the conventional development plan (top) (Source: Arendt, 1996)

Description
Open space design, also known as conservation development or cluster development, is a better site design technique that concentrates dwelling units in a compact area in one portion of the development site in exchange for providing open space and natural areas elsewhere on the site. The minimum lot sizes, setbacks and frontage distances for the residential zone are relaxed in order to create the open space at the site. Open space designs have many benefits in comparison to the conventional subdivisions that they replace: they can reduce impervious cover, storm water pollutants, construction costs, grading, and the loss of natural areas. However, many communities lack zoning ordinances to permit open space development, and even those that have enacted ordinances might need to revise them to achieve greater water quality and environmental benefits. The benefits of open space design can be amplified when it is combined with other better site design techniques such as narrow streets, open channels, and alternative turnarounds (see Narrower Residential Streets, Eliminating Curbs and Gutters, and Alternative Turnarounds).

Applicability
The codes and ordinances that govern residential development in many communities do not allow developers to build anything other than conventional subdivisions. Consequently, it may be necessary to enact a new ordinance or revise current development regulations to enable developers to pursue this design option. Model ordinances and regulations for open space design can be found on http://www.cwp.org EXIT disclaimer and in *Better Site Design: A Handbook for Changing Development Rules in Your Community* (CWP, 1998).

Open space design is widely applicable to most forms of residential development. The greatest storm water and pollutant reduction benefits typically occur when open space design is applied to residential zones that have larger lots (less than two dwelling units per acre). In these types of large lot zones, a great deal of natural or community open space can be created by shrinking lot sizes. However, open space design may not always be a viable option for high-density residential zones, redevelopment, or infill development, where lots are small to begin with and clustering will yield little open space. In rural areas, open space design may need to be adapted, especially in communities where shared septic fields are not currently allowed by public health authorities.

Open space design can be employed in nearly all geographic regions of the country, with the result of different types of open space being conserved (forest, prairie, farmland, chaparral, or desert).

Siting and Design Conditions
Several site planning techniques have been proposed for designing effective open space developments (Arendt, 1996, and DE DNREC, 1997). Often, a necessary first step is adoption of a local ordinance that allows open space design within conventional residential zones. Such ordinances specify more flexible and smaller lot sizes, setbacks, and frontage distances for the residential zone, as well as minimum requirements for open space and natural area conservation. Other key elements of effective open space ordinances include requirements for the consolidation and use of open space, as well as enforceable provisions for managing the open space on a common basis.

Limitations
A number of real and perceived barriers hinder wider acceptance of open space designs by developers, local governments, and the general public. For example, despite strong evidence to the contrary, some developers still feel that open space designs are less marketable than conventional residential subdivisions. In other cases, developers contend that the review process for open space design is more lengthy, costly, and potentially controversial than that required for conventional subdivisions, and thus, not worth the trouble.

Local governments may be concerned that homeowner associations lack the financial resources, liability insurance, or technical competence to maintain open space adequately. Finally, the general public is often suspicious of cluster or open space development proposals, feeling that they are a "Trojan Horse" for more intense development, traffic, and other local concerns. At the regional level, open space design policies and ordinances need to be carefully constructed and implemented so as not to lead to "leap-frogging," which is the creation of additional development in already built-up areas. An open space development that requires new infrastructure, such as roads, water and sewer lines, and commercial areas, can actually create more imperviousness at the regional level than it saves at the site level.

In reality, many of these misconceptions can be directly addressed through a clear open space ordinance and by providing training and incentives to the development and engineering community. The Natural Resources Defense Council presents several examples of successful conservation-oriented developments in *Stormwater Strategies: Community Responses to Runoff Pollution* (1999).

Maintenance Considerations
Once established, common open space and natural conservation areas must be managed by a responsible party able to maintain the areas in a natural state in perpetuity. Typically, the open space is protected by legally enforceable deed restrictions, conservation easements, and maintenance agreements. In most communities, the authority for managing open space falls to a homeowner or community association or a land trust. Annual maintenance tasks for open space managed as natural areas are almost non-existent, and the annual maintenance cost for managing an acre of natural area is less than $75 (CWP, 1998). It may be useful to develop a habitat plan for natural areas that may require periodic management actions.

Effectiveness
Recent redesign research indicates that open space design can provide impressive pollutant reduction benefits compared to the conventional subdivisions they replace. For example, the Center for Watershed Protection (1998) reported that nutrient export declined by 45 percent to 60 percent when two conventional subdivisions were redesigned as open space subdivisions. Other researchers have reported similar levels of pollutant reductions when conventional subdivisions were replaced by open space subdivisions (Maurer, 1996; DE DNREC, 1997; Dreher and Price, 1994; and SCCCL, 1995). In all cases, the reduction in pollutants was due primarily to the sharp drop in runoff caused by the lower impervious cover associated with open space subdivisions. In the redesign studies cited above, impervious cover declined by an average of 34 percent when open space designs were utilized.

Along with reduced imperviousness, open space designs provide a host of other environmental benefits lacking in most conventional designs. These developments reduce potential pressure to encroach on resource and buffer areas because enough open space is usually reserved to accommodate resource protection areas. As less land is cleared during the construction process, the potential for soil erosion is also greatly diminished. Perhaps most importantly, open space design reserves 25 to 50 percent of the development site in green space that would not otherwise be protected, preserving a greater range of landscapes and habitat "islands" that can support considerable diversity in mammals, songbirds, and other wildlife.

Cost Considerations
Open space developments can be significantly less expensive to build than conventional subdivisions. Most of the cost savings are due to savings in road building and storm water management conveyance costs. In fact, the use of open space design techniques at a residential development in Davis, California, provided an estimated infrastructure construction costs savings of $800 per home (Liptan and Brown, 1996). Other examples demonstrate infrastructure costs savings ranging from 11 to 66 percent. Table 1 lists some of the projected construction cost savings generated by the use of open space redesign at several residential sites.

Table 1. Projected construction cost savings for open space designs from redesign analyses

Residential Development	Construction Savings	Notes
Remlik Hall [1]	52%	Includes costs for engineering, road construction, and obtaining water and sewer permits
Duck Crossing [2]	12%	Includes roads, storm water management, and reforestation
Tharpe Knoll [3]	56%	Includes roads and storm water management
Chapel Run [3]	64%	Includes roads, storm water management, and reforestation
Pleasant Hill [3]	43%	Includes roads, storm water management, and reforestation
Rapahannock [2]	20%	Includes roads, storm water management, and reforestation
Buckingham Greene [3]	63%	Includes roads and storm water management
Canton, Ohio[4]	66%	Includes roads and storm water management

Sources: [1] Maurer, 1996; [2] CWP, 1998; [3] DE DNREC, 1997; [4] NAHB, 1986

While open space developments are frequently less expensive to build, developers find that these properties often command higher prices than homes in more conventional developments. Several regional studies estimate that residential properties in open space developments garner premiums that are 5 to 32 percent higher than conventional subdivisions and moreover, sell or lease at an increased rate. In Massachusetts, cluster developments were found to appreciate 12 percent faster than conventional subdivisions over a 20-year period (Lacey and Arendt, 1990). In Atlanta, Georgia, the presence of trees and natural areas measurably increased the residential property tax base (Anderson and Cordell, 1982).

In addition to being aesthetically pleasing, the reduced impervious cover and increased tree canopy associated with open space development reduce the size and cost of downstream storm water treatment facilities. The resulting cost savings can be considerable, as the cost to treat the quality and quantity of storm water from a single impervious acre can range from $2,000 to a staggering $50,000. The increased open space within a cluster development also provides a greater range of locations for more cost-effective storm water practices. Clearly, open space developments are valuable from an economic as well as an environmental standpoint.

Urban Forestry

Trees can be incorporated into urban landscapes for water quality benefits in addition to aesthetic and shade benefits (Source: Tree City USA, no date)

Description
Urban forestry is the study of trees and forests in and around towns and cities. Since trees absorb water, patches of forest and the trees that line streets can help provide some of the storm water management required in an urban setting. Urban forests also help break up a landscape of impervious cover, provide small but essential green spaces, and link walkways and trails.

Successful urban forestry requires a conservation plan for individual trees as well as forest areas larger than 10,000 feet^2.

A local forest or tree ordinance is one technique for achieving conservation, and when specific measures to protect and manage these areas are included, urban forests and trees can also help reduce storm water management needs in urban areas.

Applicability
From a stream preservation perspective, it is ideal to retain as much contiguous forest as possible. At the same time, this may not be an option in many urban areas. If forested areas are fragmented, it is ideal to retain the closest fragments together.

In rapidly urbanizing areas, where clearing and grading are important, tree preservation areas should be clearly marked. Delineating lines along a critical root zone (CRZ) rather than a straight line is essential to preserving trees and can help reduce homeowner complaints about tree root interference into sewer or septic lines.

Implementation
The concept of the CRZ is essential to a proper management plan. The CRZ is the area around a tree required for the tree's survival. Determined by the tree size and species, as well as soil conditions, for isolated specimen trees, the CRZ can be estimated as 1-1/2 feet of radial distance for every inch of tree diameter. In larger areas of trees, the CRZ of forests can be estimated at 1 foot of radial distance for every inch of tree diameter, or a minimum of 8 feet.
An urban forestry plan should include measures to establish, conserve, and/or reestablish preservation areas. A forest preservation ordinance is one way to set design standards outlining how a forest should be preserved and managed. The ordinance should outline some basic management techniques and should contain some essential elements. The following is a list of some typical elements of a forest conservation plan:

- A map and narrative description of the forest and the surrounding area that includes topography, soils, streams, current forested and unforested areas, tree lines, critical habitats, and 100-year flood plain.
- An assessment that establishes preservation, reforestation, and afforestation areas.
- A forest conservation map that outlines forest retention areas, reforestation, afforestation, protective devices, limits of disturbance, and stockpile areas.
- A schedule of any additional construction in and around the forest area.
- A specific management plan, including tree and forest protection measures.
- A reforestation and afforestation plan.

An ordinance can also be developed that addresses tree preservation at the site level both during construction and after construction is complete. This type of ordinance can be implemented on a smaller scale and can be integrated with a proposed development's erosion and sediment control and storm water pollution prevention plans, which many communities require of new developments.

American Forests, a non-profit organization dedicated to preserving and restoring forests in the United States, adopted an ecosystem restoration and maintenance agenda in 1999 to assist communities in planning and implementing tree and forest actions to restore and maintain healthy ecosystems and communities (American Forests, 2000). The agenda presents the organization's core values and policy goals as the basis for policy statements and as information to help community-based partners to prepare their own policy statements. Key policy goals include

- Increasing public and private sector investment in ecosystem restoration and maintenance activities
- Promoting an ecosystem workforce through training and apprenticeship programs and new job opportunities
- Building support for innovative monitoring systems to ensure collaborative learning and adaptive management
- Encouraging a "civic science" approach to ecosystem research that respects local knowledge, seeks community participation, and provides accessible information for communities.

Limitations
One of the biggest limitations to urban forestry is development pressure. Ordinances, conservation easements, and other techniques that are designed into a management program can help alleviate future development pressures. The size of the land may also limit the ability to protect individual trees. In these areas, a tree ordinance may be a more practical approach.
Forests may also harbor undesirable wildlife elements including insects and other pests. If forests border houses, this may be a concern for residents.

Maintenance Considerations
Maintenance considerations for urban forests may require fringe landscaping and trash pick-up. By using native vegetation and keeping the area as natural as possible, maintenance efforts can be minimized.

Effectiveness
There are numerous environmental and storm water benefits to urban forestry. These include the absorption of carbon dioxide by trees, reduction of temperature, and provision of habitat for urban wildlife. Urban forests can also act as natural storm water management areas by filtering particulate matter (pollutants, some nutrients, and sediment) and by absorption of water. Urban forestry also reduces noise levels, provides recreational benefits, and increases property values.
Urban forests and trees are known to have numerous environmental benefits, including pollutant removal. Trees can absorb water, pollutant gases, airborne particulates, sediment, nitrogen, phosphorous, and pesticides.

There are numerous economic benefits to urban forests, including proven increases in property values. In addition, by preserving trees and forests, clearing and grading as well as erosion and sediment costs are saved during construction. Maintenance costs are also minimized by keeping areas as natural as possible (Table 1).

Table 1: Annual maintenance costs of different types of green spaces (Adapted from Brown et al., 1998)

Land Use	Approximate Annual Maintenance Costs	Source
Natural Open Space: Only minimum maintenance, trash/debris cleanup	$75/acre/year	NPS, 1995
Lawns: Regular mowing	$270 to $240/acre/year	WHEC, 1992
Passive Recreation	$200/acre/year	NPS, 1995

Best Management Practice (BMP) Minimum Control Measure #5 – Post Construction Site Run-Off Control **Summary Table**		
BMP	Description	Implementation
5A Post Construction Best Management Practices	Development requirements that help reduce infiltration of pollutants into receiving waters.	Year 1
5B Ordinance	By Yr. 4, all development and redevelopment projects that fall into one of the following categories must meet the provisions of Attachment 4: • Single-family Hillside Residences • 100,000 Square Foot Commercial Developments • Automotive Repair Shops • Retail Gasoline Outlets • Restaurants • Home Subdivisions with 10 to 99 Housing Units • Home Subdivisions with 100 or More Housing Units • Parking Lots 50,000 square feet or more with 25 or more parking spaces and potentially exposed to stormwater runoff.	Year 3
5C Maintenance	By Yr. 4, all development projects with post construction storm water controls that were adopted in Yr. 3 .shall be inspected by the City Building and Public Works Departments.	Year 4

5A – Post Construction Best Management Practices (Proposed: FY 2005-2006)	
Description	Development requirements that help reduce infiltration of pollutants into receiving waters.
Justification	The use of Best Management Practices for post construction will help ensure long term reduction of pollutants into receiving waters.
Measurable Goal	Undertake the necessary research to compile a list of structural and non-structural BMP's for post-construction that best fit the City's goal of eliminating pollutants from receiving water bodies.
Implementation Schedule	Year 1: Research and develop recommended measures for structural and non-structural BMP's. Comply with one individual priority project category.
Progress Measurement	Sufficient research compiled to prepare draft of BMP Manual for post-construction.
Effective Measurement	City has compiled a list of BMP's that either have been successfully used in other communities and/or recommended by the RWQCB. Did City comply with one individual priority project category?

5A – Post Construction Best Management Practices (Implementation: FY 2005-2006)

General Summary: The following guides and manuals for Post-Construction Best Management Practices were reviewed by Public Works:

- Santa Clara Valley Urban Runoff Pollution Prevention Program: Developments Protecting Water Quality – A Guidebook of Site Design Examples http://www.basmaa.org/resources/files/SCVURPPP_Site_Design_Examples.pdf.
- Alameda Countywide Clean Water Program: Protecting Water Quality in Development Projects – A Guidebook of Post-Construction BMP Examples http://www.basmaa.org/resources/files/ACCWP_Site_Design_Guidebook_final.pdf.
- Protecting Water Quality in the North San Francisco Bay Area http://www.basmaa.org/resources/files/North%20Bay%20Guidebook.pdf.
- Bay Area Stormwater Management Agencies Associations (1999 Edition): Start at the Source – Design Guidance Manual for Stormwater Quality.
- EPA's Post Construction BMP per the following internet sites: http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm http://www.stormwaterauthority.org/bmp/post_contruction.aspx.

From these guides, manuals, and internet pages, a list of structural and non-structural BMP's was compiled for construction that best fit the City's goal for eliminating pollutants from receiving water bodies.

Minimum Control Measure #5 – Post Construction Site Run-Off Control

Status of Measurable Goals: The first year's goal was met. Several guides, manuals and successful methods of post construction BMPs have been sufficiently research and compiled. From this research information, we can prepare a draft BMP Manual for post construction.

Effectiveness: The following is compiled a list of structural and non-structural post construction BMPs that has been successfully used in other communities:

Post Construction BMPs			
Structural BMPs		Nonstructural BMPs	
BMP Type	Description	BMP Type	Description
Filtration	• Bioretention • Sand and Organic Filters	Site Design	• Alternative Pavers • Alternative Turnarounds • Alum Injection (flocculation) • Buffer Zones • Conservation Easements • Eliminating curb and gutters • Green Parking • Infrastructure Planning • On-Lot Treatment • Open Space Design • Urban Forestry
Infiltration	• Infiltration Basin • Porous Pavement		
Ponds	• Dry Extended detention ponds		
Runoff Pretreatment	• Catch Basin Insert • In-line Storage • Hydrodynamic Separators • Manufactured Product		
Vegetation Filtration	• Grassed Filter Strip • Grassed Swales		

Attachments 5A.1 are EPA's narratives of the listed Structural BMPs, and Attachments 5A.2 are EPA's narratives of the listed Nonstructural BMPs. Among the listed BMPs, the City of Morgan Hill already requires some design development measures that serve as post construction BMPs, such as:

- Detention ponds: Most subdivisions are required to have a detention pond, which only allows release of pre-development flow.

- Open Space: Most Subdivisions are required to have a percentage of the developed land to be Open Space.

A new post construction BMP which was recently required of all commercial site were the installation of catch basin filter inserts.

Proposed Modifications: None.

Ongoing Implementation

5A – Post Construction Best Management Practices (Year 2: FY 2006-2007)	
Description	Development requirements that help reduce infiltration of pollutants into receiving waters.
Justification	The use of Best Management Practices for post construction will help ensure long term reduction of pollutants into receiving waters.
Measurable Goal	Complete manual of BMP's and distribute to development and building community.
Implementation Schedule	Year 2: Prepare and adopt final draft of BMP manual for post-construction. Distribute manual to development and building community. Yrs 2-5: Comply with one additional priority project category per year.
Progress Measurement	BMP Manual completed and distributed to development and building community.
Effective Measurement	Were manuals delivered to known developers and builders? Did City comply with one additional priority project category?
*Modifications are noted by the <u>underlined text</u>.	

ATTACHMENT 5A.1

STRUCTURAL POST CONSTRUCTION BMPs

Bioretention

Bioretention areas can be used in parking areas to collect and treat storm water (Source: University of Maryland, 2000)

Description
Bioretention areas are landscaping features adapted to provide on-site treatment of storm water runoff. They are commonly located in parking lot islands or within small pockets of residential land uses. Surface runoff is directed into shallow, landscaped depressions. These depressions are designed to incorporate many of the pollutant removal mechanisms that operate in forested ecosystems. During storms, runoff ponds above the mulch and soil in the system. Runoff from larger storms is generally diverted past the facility to the storm drain system. The remaining runoff filters through the mulch and prepared soil mix. Typically, the filtered runoff is collected in a perforated underdrain and returned to the storm drain system.

Applicability
Bioretention systems are generally applied to small sites and in a highly urbanized setting. Bioretention can be applied in many climatological and geologic situations, with some minor design modifications.

Regional Applicability
Bioretention systems are applicable almost everywhere in the United States. In arid or cold climates, however, some minor design modifications may be needed.

Ultra-Urban Areas
Ultra-urban areas are densely developed urban areas in which little pervious surface exists. Bioretention facilities are ideally suited to many ultra-urban areas, such as parking lots. While they consume a fairly large amount of space (approximately 5 percent of the area that drains to them), they can be fit into existing parking lot islands or other landscaped areas.

Storm Water Hot Spots
Storm water hot spots are areas where land use or activities generate highly contaminated runoff, with concentrations of pollutants in excess of those typically found in storm water. A typical example is a gas station or convenience store parking lot. Bioretention areas can be used to treat storm water hot spots as long as an impermeable liner is used at the bottom of the filter bed.

Storm Water Retrofit
A storm water retrofit is a storm water management practice (usually structural) put into place after development has occurred, to improve water quality, protect downstream channels, reduce flooding, or meet other specific objectives. Bioretention can be used as a storm water retrofit, by modifying existing landscaped areas, or if a parking lot is being resurfaced. In highly urbanized areas, this is one of the few retrofit options that can be employed. However, it is very expensive to retrofit an entire watershed or subwatershed using storm water management practices designed to treat small sites.

Cold Water (Trout) Streams
Some species in cold water streams, notably trout, are extremely sensitive to changes in temperature. In order to protect these resources, designers should avoid treatment practices that

increase the temperature of the storm water runoff they treat. Bioretention is a good option in cold water streams because water ponds in them for only a short time, decreasing the potential for stream warming.

Siting and Design Considerations
In addition to the broad applicability concerns described above, designers need to consider conditions at the site level. In addition, they need to incorporate design features to improve the longevity and performance of the practice, while minimizing the maintenance burden.

Siting
Some considerations for selecting a storm water management practice are the drainage area the practice will need to treat, the slopes both at the location of the practice and the drainage area, soil and subsurface conditions, and the depth of the seasonably high ground water table. Bioretention can be applied on many sites, with its primary restriction being the need to apply the practice on small sites.

Drainage Area
Bioretention areas should usually be used on small sites (i.e., 5 acres or less). When used to treat larger areas, they tend to clog. In addition, it is difficult to convey flow from a large area to a bioretention area.

Slope
Bioretention areas are best applied to relatively shallow slopes (usually about 5 percent). However, sufficient slope is needed at the site to ensure that water that enters the bioretention area can be connected with the storm drain system. These storm water management practices are most often applied to parking lots or residential landscaped areas, which generally have shallow slopes.

Soils/Topography
Bioretention areas can be applied in almost any soils or topography, since runoff percolates through a man-made soil bed and is returned to the storm water system.

Ground Water
Bioretention should be separated somewhat from the ground water to ensure that the ground water table never intersects with the bed of the bioretention facility. This design consideration prevents possible ground water contamination.
Design Considerations
Specific designs may vary considerably, depending on site constraints or preferences of the designer or community. There are some features, however, that should be incorporated into most bioretention area designs. These design features can be divided into five basic categories: pretreatment, treatment, conveyance, maintenance reduction, and landscaping.

Pretreatment
Pretreatment refers to features of a management practice that cause coarse sediment particles and their associated pollutants to settle. Incorporating pretreatment helps to reduce the maintenance burden of bioretention and reduces the likelihood that the soil bed will clog over time. Several different mechanisms can be used to provide pretreatment in bioretention facilities. Often, runoff is directed to a grass channel or filter strip to filter out coarse materials before the runoff flows into the filter bed of the bioretention area. Other features may include a pea gravel diaphragm, which acts to spread flow evenly and drop out larger particles.

Treatment
Treatment design features help enhance the ability of a storm water management practice to remove pollutants. Several basic features should be incorporated into bioretention designs to enhance their pollutant removal. The bioretention system should be sized between 5 and 10 percent of the impervious area draining to it. The practice should be designed with a soil bed that

is a sand/soil matrix, with a mulch layer above the soil bed. The bioretention area should be designed to pond a small amount of water (6–9 inches) above the filter bed.

Conveyance
Conveyance of storm water runoff into and through a storm water practice is a critical component of any storm water management practice. Storm water should be conveyed to and from practices safely and to minimize erosion potential. Ideally, some storm water treatment can be achieved during conveyance to and from the practice.

Bioretention practices are designed with an underdrain system to collect filtered runoff at the bottom of the filter bed and direct it to the storm drain system. An underdrain is a perforated pipe system in a gravel bed, installed on the bottom of the filter bed. Designers should provide an overflow structure to convey flow from storms that are not treated by the bioretention facility to the storm drain.

Maintenance Reduction
In addition to regular maintenance activities needed to maintain the function of storm water practices, some design features can be incorporated to reduce the required maintenance of a practice. Designers should ensure that the bioretention area is easily accessible for maintenance.

Landscaping
Landscaping is critical to the function and aesthetic value of bioretention areas. It is preferable to plant the area with native vegetation, or plants that provide habitat value, where possible. Another important design feature is to select species that can withstand the hydrologic regime they will experience. At the bottom of the bioretention facility, plants that tolerate both wet and dry conditions are preferable. At the edges, which will remain primarily dry, upland species will be the most resilient. Finally, it is best to select a combination of trees, shrubs, and herbaceous materials.

Design Variations
One design alternative to the traditional bioretention practice is the use of a "partial exfiltration" system, used to promote ground water recharge. Other design modifications may make this practice more effective in arid or cold climates.

Partial Exfiltration
In one design variation of the bioretention system, the underdrain is only installed on part of the bottom of the bioretention system. This design alternative allows for some infiltration, with the underdrain acting as more of an overflow. This system can be applied only when the soils and other characteristics are appropriate for infiltration (see Infiltration Trench and Infiltration Basin).

Arid Climates
In arid climates, bioretention areas should be landscaped with drought-tolerant species.

Cold Climates
In cold climates, bioretention areas can be used as snow storage areas. If used for this purpose, or if used to treat runoff from a parking lot where salt is used as a deicer, the bioretention area should be planted with salt-tolerant, nonwoody plant species.

Limitations
Bioretention areas have a few limitations. Bioretention areas cannot be used to treat a large drainage area, limiting their usefulness for some sites. In addition, although the practice does not consume a large amount of space, incorporating bioretention into a parking lot design may reduce the number of parking spaces available. Finally, the construction cost of bioretention areas is relatively high compared with many other management practices (see Cost Considerations).

Maintenance Considerations
Bioretention requires frequent landscaping maintenance, including measures to ensure that the area is functioning properly, as well as maintenance of the landscaping on the practice. In many cases, bioretention areas initially require intense maintenance, but less maintenance is needed over time. In many cases, maintenance tasks can be completed by a landscaping contractor, who may already be hired at the site.
Table 1. Typical maintenance activities for bioretention areas (Source: ETA and Biohabitats, 1993)

Activity	Schedule
• Remulch void areas • Treat diseased trees and shrubs • Mow turf areas	As needed
• Water plants daily for 2 weeks	At project completion
• Inspect soil and repair eroded areas • Remove litter and debris	Monthly
• Remove and replace dead and diseased vegetation	Twice per year
• Add mulch • Replace tree stakes and wires	Once per year

Effectiveness
Structural storm water management practices can be used to achieve four broad resource protection goals. These include flood control, channel protection, ground water recharge, and pollutant removal. In general, bioretention areas can provide only pollutant removal.

Flood Control
Bioretention areas are not designed to provide flood control. These larger flows must be diverted to a detention pond that can provide flood peak reduction.

Channel Protection
Bioretention areas are generally not designed to provide channel protection because at the scale at which they are typically installed they are not able to infiltrate large volumes. (They are typically designed to treat and infiltrate the first inch of runoff and are bypassed by larger flows that can erode channels.) Channel protection must be provided by other means, such as ponds or other volume control practices.

Ground Water Recharge
Bioretention areas do not usually recharge the ground water, except in the case of the partial exfiltration design (see Design Variations).

Pollutant Removal

Little pollutant removal data have been collected on the pollutant removal effectiveness of bioretention areas. A field and laboratory analysis of bioretention facilities conducted by Davis et al. (1997), showed very high removal rates (roughly 95 percent for copper, 98 percent for phosphorus, 20 percent for nitrate, and 50 percent for total Kjeldhal nitrogen (TKN). Table 2 shows data from two other studies of field bioretention sites in Maryland.
Table 2. Pollutant removal effectiveness of two bioretention areas in Maryland (USEPA, 2000).

Pollutant	**Pollutant Removal**
Copper	43%–97%
Lead	70%–95%
Zinc	64%–95%
Phosphorus	65%–87%
TKN	52–67%
NH_4^+	92%
NO_3^-	15%–16%
Total nitrogen (TN)	49%
Calcium	27%

Assuming that bioretention systems behave similarly to swales, their removal rates are relatively high. The negative removal rate for bacteria may reflect sampling errors, such as failure to account for bacterial sources in the practice. Alternatively, these data may be the result of bacteria reproduction in the moist soils of swale systems.

There is considerable variability in the effectiveness of bioretention areas, and it is believed that properly designing and maintaining these areas may help to improve their performance. The siting and design criteria presented in this sheet reflect the best current information and experience to improve the performance of bioretention areas. A recent joint project of the American Society of Civil Engineers (ASCE) and the EPA Office of Water may help to isolate specific design features that can improve performance. The National Stormwater Best Management Practice (BMP) database is a compilation of storm water practices which includes both design information and performance data for various practices. As the database expands, inferences about the extent to which specific design criteria influence pollutant removal might be made.

Cost Considerations
Bioretention areas are relatively expensive. A recent study (Brown and Schueler, 1997) estimated the cost of a variety of storm water management practices. The study resulted in the following cost equation for bioretention areas, adjusting for inflation:
$C = 7.30\ V^{0.99}$
where:
C = Construction, design, and permitting cost ($); and
V = Volume of water treated by the facility (ft^3).
An important consideration when evaluating the costs of bioretention is that this practice replaces an area that most likely would have been landscaped. Thus, the true cost of the practice is less than the construction cost reported. Similarly, maintenance activities conducted on bioretention

areas are not very different from maintenance of a landscaped area. The land consumed by bioretention areas is relatively high compared with other practices (about 5 percent of the drainage area). Again, this area should not necessarily be considered lost, since the practice may only be slightly larger than a traditional landscaped area. Finally, bioretention areas can improve upon existing landscaping and can therefore be an aesthetic benefit.

Sand and Organic Filters

Description

Sand filters are usually two-chambered storm water practices; the first is a settling chamber, and the second is a filter bed filled with sand or another filtering media. As storm water flows into the first chamber, large particles settle out, and then finer particles and other pollutants are removed as storm water flows through the filtering medium. There are several modifications of the basic sand filter design, including the surface sand filter, underground sand filter, perimeter sand filter, organic media filter, and Multi-Chamber Treatment Train. All of these filtering practices operate on the same basic principle. Modifications to the traditional surface sand filter were made primarily to fit sand filters into more challenging design sites (e.g., underground and perimeter filters) or to improve pollutant removal (e.g., organic media filter).

Applicability

Sand filters can be applied in most regions of the country and on most types of sites. Some restrictions at the site level, however, might restrict the use of sand filters as a storm water management practice (see Siting and Design Considerations).

Regional Applicability

Although sand filters can be used in both cold and arid climates, some design modifications might be necessary (See Siting and Design Considerations).

Ultra-Urban Areas

Ultra-urban areas are densely developed urban areas in which little pervious surface is present. Sand filters in general are good options in these areas because they consume little space. Underground and perimeter sand filters in particular are well suited to the ultra-urban setting because they consume no surface space.

Storm Water Hot Spots

Storm water hot spots are areas where land use or activities generate highly contaminated runoff, with concentrations of pollutants in excess of those typically found in storm water. These areas include commercial nurseries, auto recycle facilities, commercial parking lots, fueling stations, storage areas, industrial rooftops, marinas, outdoor container storage of liquids, outdoor loading/unloading facilities, public works storage areas, hazardous materials generators (if containers are exposed to rainfall), vehicle service and maintenance areas, and vehicle and equipment washing/steam cleaning facilities. Sand filters are an excellent option to treat runoff from storm water hot spots because storm water treated by sand filters has no interaction with, and thus no potential to contaminate, the groundwater.

Storm Water Retrofit

A storm water retrofit is a storm water management practice (usually structural) put into place after development has occurred to improve water quality, protect downstream channels, reduce flooding, or meet other specific objectives. Sand filters are a good option to achieve water quality goals in retrofit studies where space is limited because they consume very little surface space and have few site restrictions. It is important to note, however, that sand filters cannot treat a very large drainage area. Using small-site BMPs in a retrofit may be the only option for a retrofit study in a highly urbanized area, but it is expensive to treat the drainage area of an entire watershed using many small-site practices, as opposed to one larger facility such as a pond.

Cold Water (Trout) Streams

Some species in cold water streams, notably trout, are extremely sensitive to changes in temperature. To protect these resources, designers should avoid treatment practices that increase the temperature of the storm water runoff they treat. Sand filters can be a good treatment option for cold water streams. In some storm water treatment practices, particularly wet ponds, runoff is warmed by the sun as it resides in the permanent pool. Surface sand filters are

typically not designed with a permanent pool, although there is ponding in the sedimentation chamber and above the sand filter. Designers may consider shortening the detention time in cold water watersheds. Underground and perimeter sand filter designs have little potential for warming because these practices are not exposed to the sun.

Siting and Design Considerations
In addition to the broad applicability issues described above, designers need to consider conditions at the site level and need to incorporate design features to improve the longevity and performance of the practice, while minimizing the maintenance burden.

Siting Considerations
Some considerations when selecting a storm water management practice are the drainage area the practice will need to treat, the slopes both at the location of the practice and draining to it, soil and subsurface conditions, and the depth of the seasonably high ground water table. Although sand filters are relatively versatile, some site restrictions such as available head might limit their use.

Drainage Area
Sand filters are best applied on relatively small sites (up to 10 acres for surface sand filters and closer to 2 acres for perimeter or underground filters [MDE, 2000]). Filters have been used on larger drainage areas, of up to 100 acres, but these systems can clog when they treat larger drainage areas unless adequate measures are provided to prevent clogging, such as a larger sedimentation chamber or more intensive regular maintenance.

Slope
Sand filters can be used on sites with slopes up to about 6 percent. It is challenging to use most sand filters in very flat terrain because they require a significant amount of elevation drop, or head (about 5 to 8 feet), to allow flow through the system. One exception is the perimeter sand filter, which can be applied with as little as 2 feet of head.

Soils/Topography
When sand filters are designed as a stand-alone practice, they can be used on almost any soil because they can be designed so that storm water never infiltrates into the soil or interacts with the ground water. Alternatively, sand filters can be designed as pretreatment for an infiltration practice, where soils do play a role.

Ground Water
Designers should provide at least 2 feet of separation between the bottom of the filter and the seasonally high ground water table. This design feature prevents both structural damage to the filter and possibly, though unlikely, ground water contamination.

Design Considerations
Specific designs may vary considerably, depending on site constraints or preferences of the designer or community. Some features, however, should be incorporated into most designs. These design features can be divided into five basic categories: pretreatment, treatment, conveyance, maintenance reduction, and landscaping.

Pretreatment
Pretreatment is a critical component of any storm water management practice. In sand filters, pretreatment is achieved in the sedimentation chamber that precedes the filter bed. In this chamber, the coarsest particles settle out and thus do not reach the filter bed. Pretreatment reduces the maintenance burden of sand filters by reducing the potential of these sediments to clog the filter. Designers should provide at least 25 percent of the water quality volume in a dry or wet sedimentation chamber as pretreatment to the filter system. The water quality volume is the amount of runoff that will be treated for pollutant removal in the practice. Typical water quality

volumes are the runoff from a 1-inch storm or Â½ inch of runoff over the entire drainage area to the practice.
The area of the sedimentation chamber may be determined based on the Camp-Hazen equation, as adapted by the Washington State Department of Ecology (Washington State DOE, 1992). This equation can be expressed as:
$A_s = (Q_o/W)\ln(1-E)$
where:
A_s = surface area (ft^2);
Q_o = discharge rate from basin (water quality volume/detention time);
W = particle settling velocity (ft/s);

[CWP (1996) used a settling of 0.0004 ft/s for drainage areas greater than 75% impervious and 0.0033 ft/s for drainage areas less than or equal to 75% impervious to account for the finer particles that erode from pervious surfaces.]

E = removal efficiency fraction (usually assumed to be about 0.9(90%)).
Using the simplifying assumption of a 24-hour detention time, CWP (1996) reduced the above equation to
$A_s = 0.066WTV$ (>75%)
$A_s = 0.0081WTV$ (< or = 75%)
where
WTV = water quality volume (ft^3), or the volume of storm water to be treated by the practice.

Treatment
Treatment design features help enhance the ability of a storm water management practice to remove pollutants. In filtering systems, designers should provide at least 75 percent of the water quality volume in the practice (including both the sand chamber and the sediment chamber). In sand filters, designers should select a medium sand as the filtering medium.
The filter bed should be sized using Darcy's Law, which relates the velocity of fluids to the hydraulic head and the coefficient of permeability of a medium. The resulting equation, as derived by the city of Austin, Texas, (1996), is
$AF = WTV\ d/[k\ t\ (h+d)]$
where
AF = area of the filter bed (ft^2);
d = depth of the filter bed (ft; usually about 1.5 feet, depending on the design);
k = coefficient of permeability of the filtering medium (ft/day);
t = time for the water quality volume to filter through the system (days; usually assumed to be 1.67 days); and
h = average water height above the sand bed (ft; assumed to be one-half of the maximum head).
Typical values for k, as assembled by CWP (1996), are shown in Table 1.
Table 1: Coefficient of permeability values for storm water filtering practices (CWP, 1996)

Filter Medium	Coefficient of Permeability (ft/day)
Sand	3.5
Peat/Sand	2.75
Compost	8.7

Conveyance
Conveyance of storm water runoff into and through a storm water practice is a critical component of any storm water management practice. Storm water should be conveyed to and from practices safely and in a manner that minimizes erosion potential. Ideally, some storm water treatment can be achieved during conveyance to and from the practice.

Typically, filtering practices are designed as "off-line" systems, meaning that they have the smaller water quality volume diverted to them only during larger storms, using a flow splitter, which is a structure that bypasses larger flows to the storm drain system or to a stabilized

channel. One exception is the perimeter filter; in this design, all flows enter the system, but larger flows overflow to an outlet chamber and are not treated by the practice.
All filtering practices, with the exception of exfilter designs (see Design Variations) are designed with an under drain below the filtering bed. An under drain is a perforated pipe system in a gravel bed, installed on the bottom of filtering practices and used to collect and remove filtered runoff.

Maintenance Reduction
In addition to regular maintenance activities needed to maintain the function of storm water practices, some design features can be incorporated to ease the maintenance burden of each practice. Designers should provide maintenance access to filtering systems. In underground sand filters, confined space rules defined by the Occupational Safety and Health Administration (OSHA) need to be addressed.

Landscaping
Landscaping can add to both the aesthetic value and the treatment ability of storm water practices. In sand filters, little landscaping is generally used on the practice, although surface sand filters and organic media filters may be designed with a grass cover on the surface of the filter. In all filters, designers need to ensure that the contributing drainage has dense vegetation to reduce sediment loads to the practice.

Design Variations
As mentioned earlier in this fact sheet, there are five basic storm water filter designs--surface sand filter, underground filter, perimeter filter (also known as the "Delaware" filter), organic media filter, and Multi-Chamber Treatment Train. Other design variations can incorporate design features to recharge ground water or to meet the design challenges of cold or arid climates.

Surface Sand Filter
The surface sand filter is the original sand filter design. In this practice both the filter bed and the sediment chamber are aboveground. The surface sand filter is designed as an off-line practice, where only the water quality volume is directed to the filter. The surface sand filter is the least expensive filter option and has been the most widely used.

Underground Sand Filter
The underground sand filter is a modification of the surface sand filter, where all of the filter components are underground. Like the surface sand filter, this practice is an off-line system that receives only the smaller water quality events. Underground sand filters are expensive to construct but consume very little space. They are well suited to highly urbanized areas.

Perimeter Sand Filter
The perimeter sand filter also includes the basic design elements of a sediment chamber and a filter bed. In this design, however, flow enters the system through grates, usually at the edge of a parking lot. The perimeter sand filter is the only filtering option that is on-line, with all flows entering the system but larger events bypassing treatment by entering an overflow chamber. One major advantage to the perimeter sand filter design is that it requires little hydraulic head and thus is a good option in areas of low relief.

Organic Media Filter
Organic media filters are essentially the same as surface filters, with the sand medium replaced with or supplemented by another medium. Two examples are the peat/sand filter (Galli, 1990) and the compost filter system (CSF, 1996). The assumption is that these systems will have enhanced pollutant removal for many compounds because of the increased cation exchange capacity achieved by increasing the organic matter.

Multi-Chamber Treatment Train

The Multi-Chamber Treatment Train (Robertson et al., 1995) is essentially a "deluxe sand filter." This underground system consists of three chambers. Storm water enters into the first chamber, where screening occurs, trapping large sediments and releasing highly volatile materials. The second chamber provides settling of fine sediments and further removal of volatile compounds and also floatable hydrocarbons through the use of fine bubble diffusers and sorbent pads. The final chamber provides filtration by using a sand and peat mixed medium for reduction of the remaining pollutants. The top of the filter is covered by a filter fabric that evenly distributes the water volume and prevents channelization. Although this practice can achieve very high pollutant removal rates, it might be prohibitively expensive in many areas and has been implemented only on an experimental basis.

Exfiltration/Partial Exfiltration

In exfilter designs, all or part of the under drain system is replaced with an open bottom that allows infiltration to the ground water. When the under drain is present, it is used as an overflow device in case the filter becomes clogged. These designs are best applied in the same soils where infiltration practices are used.

Regional Variations

Arid Climates

Filters have not been widely used in arid climates. In these climates, however, it is probably necessary to increase storage in the sediment chamber to account for high sediment loads. Designers should consider increasing the volume of the sediment chamber to up to 40 percent of the water quality volume.

Cold Climates

In cold climates, filters can be used, but surface or perimeter filters will not be effective during the winter months, and unintended consequences might result from a frozen filter bed. Using alternative conveyance measures such as a weir system between the sediment chamber and filter bed may avoid freezing associated with the traditional standpipe. Where possible, the filter bed should be below the frost line. Some filters, such as the peat/sand filter, should be shut down during the winter. These media will become completely impervious during freezing conditions. Using a larger under drain system to encourage rapid draining during the winter months may prevent freezing of the filter bed. Finally, the sediment chamber should be larger in cold climates to account for road sanding (up to 40 percent of the water quality volume).

Limitations

Sand filters can be used in unique conditions where many other storm water management practices are inappropriate, such as in karst (i.e., limestone) topography or in highly urbanized settings. There are several limitations to these practices, however. Sand filters cannot control floods and generally are not designed to protect stream channels from erosion or to recharge the ground water. In addition, sand filters require frequent maintenance, and underground and perimeter versions of these practices are easily forgotten because they are out of sight. Perhaps one of the greatest limitations to sand filters is that they cannot be used to treat large drainage areas. Finally, surface sand filters are generally not aesthetically pleasing management practices. Underground and perimeter sand filters are not visible, and thus do not add or detract from the aesthetic value of a site.

Maintenance Considerations
Intense and frequent maintenance and inspection practices are needed for filter systems. Table 2 outlines some of these requirements.
Table 2: Typical maintenance/inspection activities for filtration systems (Adapted from WMI, 1997; CWP, 1997)

Activity	Schedule
• Ensure that contributing area, filtering practice, inlets, and outlets are clear of debris. • Ensure that the contributing area is stabilized and mowed, with clippings removed. • Check to ensure that the filter surface is not clogging (also after moderate and major storms). • Ensure that activities in the drainage area minimize oil/grease and sediment entry to the system. • If a permanent pool is present, ensure that the chamber does not leak and that normal pool level is retained.	Monthly
• Replace sorbent pillows (Multi-Chamber Treatment Train only).	Biannual
• Check to see that the filter bed is clean of sediments, and the sediment chamber is no more than one-half full of sediment. Remove sediment if necessary. • Make sure that there is no evidence of deterioration, sailing, or cracking of concrete. • Inspect grates (if used). • Inspect inlets, outlets, and overflow spillway to ensure good condition and no evidence of erosion. • Repair or replace any damaged structural parts. • Stabilize any eroded areas. • Ensure that flow is not bypassing the facility. • Ensure that no noticeable odors are detected outside the facility.	Annual

Effectiveness
Structural storm water management practices can be used to achieve four broad resource protection goals: flood control, channel protection, ground water recharge, and pollutant removal. Filtering practices are for the most part adapted only to provide pollutant removal.

Ground Water Recharge
In exfilter designs, some ground water recharge can be provided; however, none of the other sand filter designs can provide recharge.

Pollutant Removal
Sand filters are effective storm water management practices for pollutant removal. Removal rates for all sand filters and organic filters are presented in Table 3. With the exception of nitrates, which appear to be exported from filtering systems, they perform relatively well at removing pollutants. The export of nitrates from filters may be caused by mineralization of organic nitrogen in the filter bed. Table 3 shows typical removal efficiencies for sand filters.
Table 3: Sand filter removal efficiencies (percent)

	Sand Filters (Schueler, 1997)	Peat/Sand Filter (Curran, 1996)	Compost Filter System		Multi-Chamber Treatment Train		
			Stewart, 1992	Leif, 1999	Pitt et al., 1997	Pitt, 1996	Greb et al., 1998
TSS	87	66	95	85	85	83	98
TP	51	51	41	4	80	-	84
TN	44	47	-	-	-	-	-
Nitrate	-13	22	-34	-95	-	14	-
Metals	34-80	26-75	61-88	44-75	65-90	91-100	83-89
Bacteria	55	-	-	-	-	-	-

From the few studies available, it is difficult to determine if organic filters necessarily have higher removal efficiencies than sand filters. The Multi-Chamber Treatment Train appears to have high pollutant removal for some constituents, although these data are based on only a handful of studies. The siting and design criteria presented in this fact sheet reflect the best current information and experience to improve the performance of sand filters. A recent joint project of the American Society of Civil Engineers (ASCE) and the U.S. EPA Office of Water may help to isolate specific design features that can improve performance. The National Stormwater Best Management Practice (BMP) database is a compilation of storm water practices that includes both design information and performance data for various practices. As the database expands, inferences about the extent to which specific design criteria influence pollutant removal may be made.

Cost Considerations

There are few consistent data on the cost of sand filters, largely because, with the exception of Austin, Texas, Alexandria, Virginia, and Washington, D.C., they have not been widely used. Furthermore, filters have such varied designs that it is difficult to assign a cost to filters in general. A study by Brown and Schueler (1997) was unable to find a statistically valid relationship between the volume of water treated in a filter and the cost of the practice, but typical total cost of installation ranged between $2.50 and $7.50 per cubic foot of storm water treated, with an average cost of about $5 per cubic foot. (This estimate includes approximately 25 percent contingency costs beyond the construction costs reported). The cost per impervious acre treated varies considerably depending on the region and design used (see Table 4). It is important to note that, although underground and perimeter sand filters can be more expensive than surface sand filters, they consume no surface space, making them a relatively cost-effective practice in ultra-urban areas where land is at a premium.

Table 4: Construction costs for various sand filters (Source: Schueler, 1994)

Region (Design)	Cost/Impervious Acre
Delaware (Perimeter)	$10,000
Alexandria, VA (Perimeter)	$23,500
Austin, TX (<2 acres) (Surface)	$16,000
Austin, TX (>5 acres) (Surface)	$3,400
Washington, DC (underground)	$14,000
Denver, CO	$30,000â€“$50,000
Multi-Chamber Treatment Train	$40,000â€“$80,000

Infiltration Basin

Infiltration basins are designed to collect storm water from impervious areas and provide pollutant removal benefits through detention and filtration

Description
An infiltration basin is a shallow impoundment which is designed to infiltrate storm water into the ground water. This practice is believed to have a high pollutant removal efficiency and can also help recharge the ground water, thus restoring low flows to stream systems. Infiltration basins can be challenging to apply on many sites, however, because of soils requirements. In addition, some studies have shown relatively high failure rates compared with other management practices.

Applicability
Infiltration basins have select applications. Their use is often sharply restricted by concerns over ground water contamination, soils, and clogging at the site.

Regional Applicability
Infiltration basins can be utilized in most regions of the country, with some design modifications in cold and arid climates. In regions of karst (i.e., limestone) topography, these storm water management practices may not be applied due to concerns of sink hole formation and ground water contamination.

Ultra-Urban Areas
Ultra-urban areas are densely developed urban areas in which little pervious surface exists. In these areas, few storm water practices can be easily applied due to space limitations. Infiltration basins can rarely be applied in the ultra-urban environment.
Two features that can restrict their use are the potential of infiltrated water to interfere with existing infrastructure, and the relatively poor infiltration capacity of most urban soils. In addition, while they consume only the space of the infiltration basin site itself, they need a continuous, relatively flat area. Thus, it is more difficult to fit them into small unusable areas on a site.

Storm Water Hot Spots
A storm water hot spot is an area where land use or activities generate highly contaminated runoff, with concentrations of pollutants in excess of those typically found in storm water. Infiltration basins should never receive runoff from storm water hot spots, unless the storm water has already been treated by another practice. This caution is due to potential ground water contamination.

Storm Water Retrofit
A storm water retrofit is a storm water practice (usually structural) put into place after development has occurred, to improve water quality, protect downstream channels, reduce flooding, or meet other specific objectives. Infiltration basins have limited applications as a storm water retrofit. Their use is restricted by three factors. First, infiltration basins should be used to treat small sites (less than 5 acres). Practices that are applied to small sites, such as infiltration basins, are generally a high-cost retrofit option in terms of construction cost and the maintenance burden associated with the large number of practices needed to retrofit a watershed. Second, it is often difficult to find areas where soils are appropriate for infiltration in an already urban or suburban environment. Finally, infiltration basins are best applied to small sites, yet need a flat, relatively continuous area. It is often difficult to find sites with this type of area available.
Cold Water (Trout) Streams

Infiltration basins are an excellent option for cold water streams because they encourage infiltration of storm water and maintain dry weather flow. Because storm water travels underground to the stream, it has little opportunity to increase in temperature.

Siting and Design Considerations

When designing infiltration basins, designers need to carefully consider both the restrictions on the site and design features to improve the long-term performance of the practice.

Siting Considerations

Infiltration practices need to be located extremely carefully. In particular, designers need to ensure that the soils on the site are appropriate for infiltration, and that designs minimize the potential for ground water contamination and long-term maintenance problems.

Drainage Area

Infiltration basins have historically been used as regional facilities, serving for both quantity and quality control. In some regions of the country, this practice is feasible, particularly if the soils are particularly sandy. In most areas, however, infiltration basins experience high rates of failure when used in this manner. In general, the practice is best applied to relatively small drainage areas (i.e., less than 10 acres).

Slope

The bottom of infiltration basins needs to be completely flat to allow infiltration throughout the entire basin bottom.

Soils/Topography

Soils and topography are strongly limiting factors when locating infiltration practices. Soils must be significantly permeable to ensure that the practice can infiltrate quickly enough to reduce the potential for clogging, and soils that infiltrate too rapidly may not provide sufficient treatment, creating the potential for ground water contamination. The infiltration rate should range between 0.5 and 3 inches per hour. In addition, the soils should have no greater than 20 percent clay content, and less than 40 percent silt/clay content (MDE, 2000). Finally, infiltration basins may not be used in regions of karst topography, due to the potential for sinkhole formation or ground water contamination.

Ground Water

Designers always need to provide significant separation distance (2 to 5 feet) from the bottom of the infiltration basin and the seasonally high ground water table, to reduce the risk of contamination. Infiltration practices should also be separated from drinking water wells.

Design Considerations

Specific designs may vary considerably, depending on site constraints or preferences of the designer or community. There are some features, however, that should be incorporated into most infiltration basin designs. These design features can be divided into five basic categories: pretreatment, treatment, conveyance, maintenance reduction, and landscaping.

Pretreatment

Pretreatment refers to design features that provide settling of large particles before runoff reaches a management practice, easing the long-term maintenance burden. Pretreatment is important for all structural management practices, but it is particularly important for infiltration practices. In order to ensure that pretreatment mechanisms are effective, designers should incorporate "multiple pretreatment," using practices such as grassed swales, sediment basins, and vegetated filter strips in series.

Treatment

Treatment design features enhance the pollutant removal of a practice. For infiltration practices, designers need to stabilize upland soils to ensure that the basin does not become clogged with sediment. In addition, the facility needs to be sized so that the volume of water to be treated infiltrates through the bottom in a given amount of time. Because infiltration basins are designed in this manner, infiltration basins designed on less permeable soils should be significantly larger than those designed on more permeable soils.

Conveyance

Storm water needs to be conveyed through storm water management practices safely and in a way that minimizes erosion. Designers need to be particularly careful in ensuring that channels leading to an infiltration practice are designed to minimize erosion. In general, infiltration basins should be designed to treat only small storms (i.e., only for water quality). Thus, these practices should be designed "off-line," using a flow separator to divert only small flows to the practice.

Maintenance Reduction

In addition to regular maintenance activities, designers also need to incorporate features into the design to ensure that the maintenance burden of a practice is reduced. These features can make regular maintenance activities easier or reduce the need to perform maintenance. In infiltration basins, designers need to provide access to the basin for regular maintenance activities. Where possible, a means to drain the basin, such as an underdrain, should be provided in case the bottom becomes clogged. This feature allows the basin to be drained and accessed for maintenance in the event that the water has ponded in the basin bottom or the soil is saturated.

Landscaping

Landscaping can enhance the aesthetic value of storm water practices or improve their function. In infiltration basins, the most important purpose of vegetation is to reduce the tendency of the practice to clog. Upland drainage needs to be properly stabilized with a thick layer of vegetation, particularly immediately following construction. In addition, providing a thick turf at the basin bottom helps encourage infiltration and prevent the formation of rills in the basin bottom.

Design Variations

Some modifications may be needed to ensure the performance of infiltration basins in arid and cold climates.

Arid or Semi-Arid Climates

In arid regions, infiltration practices are often highly recommended because of the need to recharge the ground water. In arid regions, designers need to emphasize pretreatment even more strongly to ensure that the practice does not clog, because of the high sediment concentrations associated with storm water runoff in areas such as the Southwest. In addition, the basin bottom may be planted with drought-tolerant species and/or covered with an alternative material such as sand or gravel.

Cold Climates

In extremely cold climates (i.e., regions that experience permafrost), infiltration basins may be an infeasible option. In most cold climates, infiltration basins can be a feasible practice, but there are some challenges to its use. First, the practice may become inoperable during some portions of the year when the surface of the basin becomes frozen. Other design features also may be incorporated to deal with the challenges of cold climates. One such challenge is the volume of runoff associated with the spring snowmelt event. The capacity of the infiltration basin might be increased to account for snowmelt volume.

Another option is the use of a seasonably operated facility (Oberts, 1994). A seasonally operated infiltration/detention basin combines several techniques to improve the performance of infiltration practices in cold climates. Two features, the underdrain system and level control valves, are useful

in cold climates. These features are used as follows: At the beginning of the winter season, the level control valve is opened and the soil is drained. As the snow begins to melt in the spring, the underdrain and the level control valves are closed. The snowmelt is infiltrated until the capacity of the soil is reached. Then, the facility acts as a detention facility, providing storage for particles to settle.

Other design features can help to minimize problems associated with winter conditions, particularly concerns that chlorides from road salting may contaminate ground water. The basin may be disconnected during the winter to ensure that chlorides do not enter the ground water in areas where this is a problem, or if the basin is used to treat roadside runoff. Designers may also want to reconsider application of infiltration practices on parking lots or roads where deicing is used, unless it is confirmed that the practice will not cause elevated chloride levels in the ground water. If the basin is used for snow storage, or to treat roadside or parking lot runoff, the basin bottom should be planted with salt-tolerant vegetation.

Limitations

Although infiltration basins can be useful practices, they have several limitations. Infiltration basins are not generally aesthetic practices, particularly if they clog. If they clog, the soils become saturated, and the practice can be a source of mosquitoes. In addition, these practices are challenging to apply because of concerns over ground water contamination and sufficient soil infiltration. Finally, maintenance of infiltration practices can be burdensome, and they have a relatively high rate of failure.

Maintenance Considerations

Regular maintenance is critical to the successful operation of infiltration basins (see Table 1). Historically, infiltration basins have had a poor track record. In one study conducted in Prince George's County, Maryland (Galli, 1992), all of the infiltration basins investigated clogged within 2 years. This trend may not be the same in soils with high infiltration rates, however. A study of 23 infiltration basins in the Pacific Northwest showed better long-term performance in an area with highly permeable soils (Hilding, 1996). In this study, few of the infiltration basins had failed after 10 years.

Table 1. Typical maintenance activities for infiltration basins (Source: Modified from WMI, 1997)

Activity	Schedule
• Inspect facility for signs of wetness or damage to structures • Note eroded areas. • If dead or dying grass on the bottom is observed, check to ensure that water percolates 2–3 days following storms. • Note signs of petroleum hydrocarbon contamination and handle properly.	Semi-annual inspection
• Mow and remove litter and debris. • Stabilize of eroded banks. • Repair undercut and eroded areas at inflow and outflow structures.	Standard maintenance (as needed)
• Disc or otherwise aerate bottom. • Dethatch basin bottom.	Annual maintenance
• Scrape bottom and remove sediment. Restore original cross-section and infiltration rate. • Seed or sod to restore ground cover.	5-year maintenance

Effectiveness
Structural management practices can be used to achieve four broad resource protection goals. These include flood control, channel protection, ground water recharge, and pollutant removal. Infiltration basins can provide ground water recharge and pollutant removal.

Ground Water Recharge
Infiltration basins recharge the ground water because runoff is treated for water quality by filtering through the soil and discharging to ground water.

Pollutant Removal
Very little data are available regarding the pollutant removal associated with infiltration basins. It is generally assumed that they have very high pollutant removal because none of the storm water entering the practice remains on the surface. Schueler (1987) estimated pollutant removal for infiltration basins based on data from land disposal of wastewater. The average pollutant removal, assuming the infiltration basin is sized to treat the runoff from a 1-inch storm, is:

TSS 75%
Phosphorous 60–70%
Nitrogen 55–60%
Metals 85–90%
Bacteria 90%

These removal efficiencies assume that the infiltration basin is well designed and maintained. The information in the Siting and Design Considerations and Maintenance Considerations sections represent the best available information on how to properly design these practices. The design references below also provide additional information.

Cost Considerations
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^3 (adjusted for inflation) of storage for a 0.25-acre basin (SWRPC, 1991). Infiltration basins typically consume about 2 to 3 percent of the site draining to them, which is relatively small. Maintenance costs are estimated at 5 to 10 percent 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 (see Maintenance Considerations). Thus, it may be necessary to replace the basin after a relatively short period of time.

Porous Pavement

A porous pavement parking lot (Source: Invisible Structures, no date)

Description
Porous pavement is a permeable pavement surface with an underlying stone reservoir to temporarily store surface runoff before it infiltrates into the subsoil. This porous surface replaces traditional pavement, allowing parking lot storm water to infiltrate directly and receive water quality treatment. There are a few porous pavement options, including porous asphalt, pervious concrete, and grass pavers. Porous asphalt and pervious concrete appear to be the same as traditional pavement from the surface, but are manufactured without "fine" materials, and incorporate void spaces to allow infiltration. Grass pavers are concrete interlocking blocks or synthetic fibrous gridded systems with open areas designed to allow grass to grow within the void areas. Other alternative paving surfaces can help reduce the runoff from paved areas but do not incorporate the stone trench for temporary storage below the pavement. While porous pavement has the potential to be a highly effective treatment practice, maintenance has been a concern in past applications of the practice.

Application
The ideal application for porous pavement is to treat low-traffic or overflow parking areas. Porous pavement may also have some application on highways, where it is currently used as a surface material to reduce hydroplaning.

Regional Applicability
Porous pavement can be applied in most regions of the country, but the practice has unique challenges in cold climates. Porous pavement cannot be used where sand is applied to the pavement surface because the sand will clog the surface of the material. Care also needs to be taken when applying salt to a porous pavement surface as chlorides from road salt may migrate into the ground water. For block pavers, plowing may be challenging because the edge of the snow plow blade can catch the edge of the blocks, damaging the surface. This difficulty does not imply that it is impossible to use porous pavement in cold climates. Another concern in cold climates is that infiltrating runoff below pavement may cause frost heave, although design modifications can reduce this risk. Porous pavement has been used successfully in Norway (Stenmark, 1995), incorporating design features to reduce frost heave. Furthermore, some experience suggests that snow melts faster on a porous surface because of rapid drainage below the snow surface (Cahill Associates, 1993).

Ultra-Urban Areas
Ultra-urban areas are densely developed urban areas in which little pervious surface exists. Porous pavements are a good option in these areas because they consume no space. They are not ideal for high-traffic areas, however, because of the potential for failure due to clogging (Galli, 1992).

Storm Water Hot Spots
Storm water hot spots are areas where land use or activities generate highly contaminated runoff, with concentrations of pollutants in excess of those typically found in storm water. These areas include commercial nurseries, auto recycle facilities, commercial parking lots, fueling stations, storage areas, industrial rooftops, marinas, outdoor container storage of liquids, outdoor

loading/unloading facilities, public works storage areas, hazardous materials generators (if containers are exposed to rainfall), vehicle service and maintenance areas, and vehicle and equipment washing/steam cleaning facilities. Since porous pavement is an infiltration practice, it should not be applied on storm water hot spots due to the potential for ground water contamination.

Storm Water Retrofit
A storm water retrofit is a storm water management practice (usually structural) put into place after development has occurred, to improve water quality, protect downstream channels, reduce flooding, or meet other specific objectives. Since porous pavement can only be applied to relatively small sites, using porous pavement as a primary tool for watershed retrofitting would be expensive. The best application of porous pavement for retrofits is on individual sites where a parking lot is being resurfaced.

Cold Water (Trout) Streams
Porous pavement can help to reduce the increased temperature commonly associated with increased impervious cover. Storm water ponds on the surface of conventional pavement, and is subsequently heated by the sun and hot pavement surface. By rapidly infiltrating rainfall, porous pavement reduces the time that storm water is exposed to the sun and heat.

Siting and Design Considerations
Siting Considerations
Porous pavement has the same siting considerations as other infiltration practices. The site needs to meet the following criteria:

- Soils need to have a permeability between 0.5 and 3.0 inches per hour.
- The bottom of the stone reservoir should be completely flat so that infiltrated runoff will be able to infiltrate through the entire surface.
- Porous pavement should be sited at least 2 to 5 feet above the seasonally high ground water table, and at least 100 feet away from drinking water wells.
- Porous pavement should be sited on low-traffic or overflow parking areas, which are not sanded for snow removal.

Design Considerations
Some basic features should be incorporated into all porous pavement practices. These design features can be divided into five basic categories: pretreatment, treatment, conveyance, maintenance reduction, and landscaping.

1. *Pretreatment*. In porous pavement designs, the pavement itself acts as pretreatment to the stone reservoir below. Because the surface serves this purpose, frequent maintenance of the surface is critical to prevent clogging. Another pretreatment item can be the incorporation of a fine gravel layer above the coarse gravel treatment reservoir. Both of these pretreatment measures are marginal, which is one reason that these systems have a high failure rate.

2. *Treatment*. The stone reservoir below the pavement surface should be composed of layers of small stone directly below the pavement surface, and the stone bed below the permeable surface should be sized to attenuate storm flows for the storm event to be treated. Typically, porous pavement is sized to treat a small event, such as a water quality storm (i.e., the storm that will be treated for pollutant removal), which can range from 0.5 to 1.5 inches. As in infiltration trenches, water can be stored only in the void spaces of the stone reservoir.

3. *Conveyance*. Water is conveyed to the stone reservoir through the surface of the pavement and infiltrates into the ground through the bottom of this stone reservoir. A

geosynthetic liner and sand layer should be placed below the stone reservoir to prevent preferential flow paths and to maintain a flat bottom. Designs also need some method to convey larger storms to the storm drain system. One option is to use storm drain inlets set slightly above the elevation of the pavement. This would allow for some ponding above the surface, but would bypass flows that are too large to be treated by the system or when the surface clogs.

4. *Maintenance Reduction*. One nonstructural component that can help ensure proper maintenance of porous pavement is the use of a carefully worded maintenance agreement that provides specific guidance, including how to conduct routine maintenance and how the surface should be repaved. Ideally, signs should be posted on the site identifying porous pavement areas.

   One design option incorporates an "overflow edge," which is a trench surrounding the edge of the pavement. The trench connects to the stone reservoir below the surface of the pavement. Although this feature does not in itself reduce maintenance requirements, it acts as a backup in case the surface clogs. If the surface clogs, storm water will flow over the surface and into the trench, where some infiltration and treatment will occur.

5. *Landscaping*. For porous pavement, the most important landscaping feature is a fully stabilized upland drainage. Reducing sediment loads entering the pavement can help to prevent clogging.

Design Variations
In one design variation, the stone reservoir below the filter can also treat runoff from other sources such as rooftop runoff. In this design, pipes are connected to the stone reservoir to direct flow throughout the bottom of the storage reservoir (Cahill Associates, 1993; Schueler, 1987). If used to treat off-site runoff, porous pavement should incorporate pretreatment, as with all structural management practices.

Regional Adaptations
In cold climates, the base of the stone reservoir should be below the frost line. This modification will help to reduce the risk of frost heave.

Limitations
In addition to the relatively strict siting requirements of porous pavement, a major limitation to the practice is the poor success rate it has experienced in the field. Several studies indicate that, with proper maintenance, porous pavement can retain its permeability (e.g., Goforth et al., 1983; Gburek and Urban, 1980; Hossain and Scofield, 1991). When porous pavement has been implemented in communities, however, the failure rate has been as high as 75 percent over 2 years (Galli, 1992).

Maintenance Considerations
Porous pavement requires extensive maintenance compared with other practices. In addition to owners not being aware of porous pavement on a site, not performing these maintenance activities is the chief reason for failure of this practice. Typical requirements are shown in Table 1.
Table 1. Typical maintenance activities for porous pavement (Source: WMI, 1997)

Activity	Schedule
• Avoid sealing or repaving with non-porous materials.	N/A
• Ensure that paving area is clean of debris. • Ensure that paving dewaters between storms. • Ensure that the area is clean of sediments.	Monthly
• Mow upland and adjacent areas, and seed bare areas. • Vacuum sweep frequently to keep the surface free of sediment.	As needed (typically three to four times per year).
• Inspect the surface for deterioration or spalling.	Annual

Effectiveness
Porous pavement can be used to provide ground water recharge and to reduce pollutants in storm water runoff. Some data suggest that as much as 70 to 80 percent of annual rainfall will go toward ground water recharge (Gburek and Urban, 1980). These data will vary depending on design characteristics and underlying soils. Two studies have been conducted on the long-term pollutant removal of porous pavement, both in the Washington, DC, area. They suggest high pollutant removal, although it is difficult to extrapolate these results to all applications of the practice. The results of the studies are presented in Table 2.
Table 2. Effectiveness of porous pavement pollutant removal (Schueler, 1987)

	Pollutant Removal (%)				
Study	**TSS**	**TP**	**TN**	**COD**	**Metals**
Prince William, VA	82	65	80	-	-
Rockville, MD	95	65	85	82	98–99

Cost Considerations
Porous pavement is significantly more expensive than traditional asphalt. While traditional asphalt is approximately \$0.50 to \$1.00 per ft^2, porous pavement can range from \$2 to \$3 per ft^2, depending on the design (CWP, 1998; Schueler, 1987). Subtracting the cost of traditional pavement, this amounts to approximately \$45,000 and \$100,000 per impervious acre treated, which would be quite expensive. In addition, the cost of vacuum sweeping may be substantial if a community does not already perform vacuum sweeping operations. Finally, the practice life may be very short because the risk of clogging is high.

Dry Extended Detention Pond

A dry extended detention pond is designed to temporarily detain runoff during storm events

Description
Dry extended detention ponds (a.k.a. dry ponds, extended detention basins, detention ponds, extended detention ponds) are basins whose outlets have been designed to detain the storm water runoff from a water quality design storm for some minimum time (e.g., 24 hours) to allow particles and associated pollutants to settle. Unlike wet ponds, these facilities do not have a large permanent pool. However, they are often designed with small pools at the inlet and outlet of the basin. They can also be used to provide flood control by including additional flood detention storage.

Applicability
Dry extended detention ponds are among the most widely applicable storm water management practices. Although they have limited applicability in highly urbanized settings, they have few other restrictions.

Regional Applicability
Dry extended detention ponds can be applied in all regions of the United States. Some minor design modifications might be needed, however, in cold or arid climates or in regions with karst (i.e. limestone) topography.

Ultra-Urban Areas
Ultra-urban areas are densely developed urban areas in which little pervious surface is present. It is difficult to use dry extended detention ponds in the ultra-urban environment because of the land area each pond consumes. They can, however, be used in an ultra-urban environment if a relatively large area is available downstream of the pond.

Storm Water Hot Spots
Storm water hot spots are areas where land use or activities generate highly contaminated runoff, with concentrations of pollutants in excess of those typically found in storm water. Dry extended detention ponds can accept runoff from storm water hot spots, but they need significant separation from ground water if they will be used for this purpose.

Storm Water Retrofit
A storm water retrofit is a storm water management practice (usually structural) put into place after development has occurred to improve water quality, protect downstream channels, reduce flooding, or meet other specific objectives. Dry extended detention ponds are very useful storm water retrofits, and they have two primary applications as a retrofit design. In many communities in the past, detention basins have been designed for flood control. It is possible to modify these facilities to incorporate features that encourage water quality control and/or channel protection. It is also possible to construct new dry ponds in open areas of a watershed to capture existing drainage.

Cold Water (Trout) Streams
A study in Prince George's County, Maryland, found that storm water management practices can increase stream temperatures (Galli, 1990). Overall, dry extended detention ponds increased temperature by about 5°F. In cold water streams, dry ponds should be designed to detain storm water for a relatively short time (i.e., less than 12 hours) to minimize the amount of warming that occurs in the practice.

Siting and Design Considerations

Siting Considerations
Although dry extended detention ponds can be applied rather broadly, designers need to ensure that they are feasible at the site in question. This section provides basic guidelines for siting dry extended detention ponds.

Drainage Area
In general, dry extended detention ponds should be used on sites with a minimum area of 10 acres. On smaller sites, it can be challenging to provide channel or water quality control because the orifice diameter at the outlet needed to control relatively small storms becomes very small and thus prone to clogging. In addition, it is generally more cost-effective to control larger drainage areas due to the economies of scale (see Cost Considerations).

Slope
Dry extended detention basins can be used on sites with slopes up to about 15 percent. The local slope needs to be relatively flat, however, to maintain reasonably flat side slopes in the practice. There is no minimum slope requirement, but there does need to be enough elevation drop from the pond inlet to the pond outlet to ensure that flow can move through the system.

Soils / Topography
Extended detention basins can be used with almost all soils and geology, with minor design adjustments for regions of karst topography or in rapidly percolating soils such as sand. In these areas, extended detention ponds should be designed with an impermeable liner to prevent ground water contamination or sinkhole formation.

Ground Water
Except for the case of hot spot runoff, the only consideration regarding ground water is that the base of the extended detention facility should not intersect the ground water table. A permanently wet bottom may become a mosquito breeding ground. Research in Southwest Florida (Santana et al., 1994) demonstrated that intermittently flooded systems, such as dry extended detention ponds, produce more mosquitoes than other pond systems, particularly when the facilities remained wet for more than 3 days following heavy rainfall.

Design Considerations
Specific designs may vary considerably, depending on site constraints or preferences of the designer or community. Some features, however, should be incorporated into most dry extended detention pond designs. These design features can be divided into five basic categories: pretreatment, treatment, conveyance, maintenance reduction, and landscaping.

Pretreatment
Pretreatment incorporates design features that help to settle out coarse sediment particles. By removing these particles from runoff before they reach the large permanent pool, the maintenance burden of the pond is reduced. In ponds, pretreatment is achieved with a sediment forebay, which is a small pool (typically about 10 percent of the volume of water to be treated for pollutant removal).

Treatment
Treatment design features help enhance the ability of a storm water management practice to remove pollutants. Designing dry ponds with a high length-to-width ratio (i.e., at least 1.5:1) and incorporating other design features to maximize the flow path effectively increases the detention time in the system by eliminating the potential of flow to short-circuit the pond. Designing ponds with relatively flat side slopes can also help to lengthen the effective flow path. Finally, the pond should be sized to detain the volume of runoff to be treated for between 12 and 48 hours.

Conveyance
Conveyance of storm water runoff into and through a storm water management practice is a critical component of any such practice. Storm water should be conveyed to and from practices safely in a manner that minimizes erosion potential. The outfall of pond systems should always be stabilized to prevent scour. To convey low flows through the system, designers should provide a pilot channel. A pilot channel is a surface channel that should be used to convey low flows through the pond. In addition, an emergency spillway should be provided to safely convey large flood events. To help mitigate warming at the outlet channel, designers should provide shade around the channel at the pond outlet.

Maintenance Reduction
In addition to regular maintenance activities needed to maintain the function of storm water practices, some design features can be incorporated to ease the maintenance burden of each practice. In dry extended detention ponds, a "micropool" at the outlet can prevent resuspension of sediment and outlet clogging. A good design includes maintenance access to the forebay and micropool.

Another design feature that can reduce maintenance needs is a non-clogging outlet. Typical examples include a reverse-slope pipe or a weir outlet with a trash rack. A reverse slope pipe draws from below the permanent pool extending in a reverse angle up to the riser and determines the water elevation of the micropool. Because these outlets draw water from below the level of the permanent pool, they are less likely to be clogged by floating debris.

Landscaping
Designers should maintain a vegetated buffer around the pond and should select plants within the extended detention zone (i.e., the portion of the pond up to the elevation where storm water is detained) that can withstand both wet and dry periods. The side slopes of dry ponds should be relatively flat to reduce safety risks.
Design Variations

Dry Detention Ponds
Dry detention ponds are similar in design to extended detention ponds, except that they do not incorporate features to improve water quality. In particular, these practices do not detain storm water from small-flow events. Therefore, detention ponds provide almost no pollutant removal. However, dry ponds can help to meet flood control, and sometimes channel protection, objectives in a watershed.

Tank Storage
Another variation of the dry detention pond design is the use of tank storage. In these designs, storm water runoff is conveyed to large storage tanks or vaults underground. This practice is most often used in the ultra-urban environment, on small sites where no other opportunity is available to provide flood control. Tank storage is provided on small areas because providing underground storage for a large drainage area would generally be cost-prohibitive. Because the drainage area contributing to tank storage is typically small, the outlet diameter needed to reduce the flow from very small storms would very small. A very small outlet diameter, along with the underground location of the tanks, creates the potential for debris being caught in the outlet and resulting maintenance problems. Since it is necessary to control small runoff events (such as the runoff from a 1-inch storm) to improve water quality, it is generally infeasible to use tank storage for water quality and generally impractical to use it to protect stream channels.
Regional Variations

Arid or Semi-Arid Climates
In arid and semi-arid regions, some modifications might be needed to conserve scarce water resources. Any landscaping plans should prescribe drought-tolerant vegetation wherever possible. In addition, the wet forebay can be replaced with an alternative dry pretreatment, such as a detention cell. One opportunity in regions with a distinct wet and dry season, as in many arid

regions, is to use regional extended detention ponds as a recreation area such as a ball field during the dry season.

Cold Climates

In cold climates, some additional design features can help to treat the spring snowmelt. One such modification is to increase the volume available for detention to help treat this relatively large runoff event. In some cases, dry facilities may be an option as a snow storage facility to promote some treatment of plowed snow. If a pond is used to treat road runoff or is used for snow storage, landscaping should incorporate salt-tolerant species. Finally, sediment might need to be removed from the forebay more frequently than in warmer climates (see Maintenance Considerations for guidelines) to account for sediment deposited as a result of road sanding.

Limitations

Although dry extended detention ponds are widely applicable, they have some limitations that might make other storm water management options preferable:

- Dry extended detention ponds have only moderate pollutant removal when compared to other structural storm water practices, and they are ineffective at removing soluble pollutants (See Effectiveness).
- Dry extended detention ponds may become a nuisance due to mosquito breeding.
- Habitat destruction may occur during construction if the practice is designed in-stream or within the stream buffer.
- Although wet ponds can increase property values, dry ponds can actually detract from the value of a home (see Cost Considerations).

Dry extended detention ponds on their own only provide peak flow reduction and do little to control overall runoff volume, which could result in adverse downstream impacts.

Maintenance Considerations

In addition to incorporating features into the pond design to minimize maintenance, some regular maintenance and inspection practices are needed. Table 1 outlines some of these practices.

Table 1. Typical maintenance activities for dry ponds (Source: Modified from WMI, 1997)

Activity	Schedule
• Note erosion of pond banks or bottom	Semiannual inspection
• Inspect for damage to the embankment • Monitor for sediment accumulation in the facility and forebay • Examine to ensure that inlet and outlet devices are free of debris and operational	Annual inspection
• Repair undercut or eroded areas • Mow side slopes • Manage pesticide and nutrients • Remove litter and debris	Standard maintenance
• Seed or sod to restore dead or damaged ground cover	Annual maintenance (as needed)
• Remove sediment from the forebay	5- to 7-year maintenance

• Monitor sediment accumulations, and remove sediment when the pond volume has been reduced by 25 percent	25- to 50-year maintenance

Effectiveness
Structural management practices can be used to achieve four broad resource protection goals: flood control, channel protection, ground water recharge, and pollutant removal. Dry extended detention basins can provide flood control and channel protection, as well as some pollutant removal.

Flood Control
One objective of storm water management practices can be to reduce the flood hazard associated with large storm events by reducing the peak flow associated with these storms. Dry extended detention basins can easily be designed for flood control, and this is actually the primary purpose of most extended detention ponds.

Channel Protection
One result of urbanization is the geomorphic changes that occur in response to modified hydrology. Traditionally, dry extended detention basins have provided control of the 2-year storm (i.e., the storm that occurs, on average, once every 2 years) for channel protection. It appears that this control has been relatively ineffective, and recent research suggests that control of a smaller storm might be more appropriate (MacRae, 1996). Slightly modifying the design of dry extended detention basins to reduce the flow of smaller storm events might make them effective tools in reducing downstream erosion.

Pollutant Removal
Dry extended detention basins provide moderate pollutant removal, provided that the design features described in the Siting and Design Considerations section are incorporated. Although they can be effective at removing some pollutants through settling, they are less effective at removing soluble pollutants because of the absence of a permanent pool. A few studies are available on the effectiveness of dry extended detention ponds. Typical removal rates, as reported by Schueler (1997), are as follows:
Total suspended solids: 61%
Total phosphorus: 19%
Total nitrogen: 31%
Nitrate nitrogen: 9%
Metals: 26%–54%
There is considerable variability in the effectiveness of ponds, and it is believed that properly designing and maintaining ponds may help to improve their performance. The siting and design criteria presented in this sheet reflect the best current information and experience to improve the performance of wet ponds. A recent joint project of the American Society of Civil Engineers (ASCE) and the USEPA Office of Water might help to isolate specific design features that can improve performance. The National Storm Water Best Management Practice (BMP) database is a compilation of storm water practices that includes both design information and performance data for various practices. As the database expands, inferences about the extent to which specific design criteria influence pollutant removal may be made. For more information on this database, access the BMP database web page at http://www.bmpdatabase.org EXIT disclaimer ➤.

Cost Considerations
Dry extended detention ponds are the least expensive storm water management practice, on the basis of cost per unit area treated. The construction costs associated with these facilities range considerably. One recent study evaluated the cost of all pond systems (Brown and Schueler, 1997). Adjusting for inflation, the cost of dry extended detention ponds can be estimated with the equation

$C = 12.4V^{0.760}$
where:
C = Construction, design, and permitting cost, and
V = Volume needed to control the 10-year storm (ft^3).
Using this equation, typical construction costs are
$ 41,600 for a 1 acre-foot pond
$ 239,000 for a 10 acre-foot pond
$ 1,380,000 for a 100 acre-foot pond

Interestingly, these costs are generally slightly higher than the cost of wet ponds on a cost per total volume basis. Dry extended detention ponds are generally less expensive on a given site, however, because they are usually smaller than a wet pond design for the same site.
Ponds do not consume a large area compared to the total area treated (typically 2 to 3 percent of the contributing drainage area). It is important to note, however, that each pond is generally large. Other practices, such as filters or swales, may be "squeezed in" on relatively unusable land, but ponds need a relatively large continuous area.

For ponds, the annual cost of routine maintenance is typically estimated at about 3 to 5 percent of the construction cost. Alternatively, a community can estimate the cost of the maintenance activities outlined in the maintenance section. Finally, ponds are long-lived facilities (typically longer than 20 years). Thus, the initial investment into pond systems can be spread over a relatively long time period.

Another economic concern associated with dry ponds is that they might detract slightly from the value of adjacent properties. One study found that dry ponds can actually detract from the perceived value of homes adjacent to a dry pond by between 3 and 10 percent (Emmerling-Dinovo, 1995).

Catch Basins/Catch Basin Insert

A worker inserts a catch basin insert for oil and grease, trash, debris, and sediment removal from storm water as it enters the storm drainage system (Source: AbTech Industries, 2001)

Description

A catch basin (a.k.a. storm drain inlet, curb inlet) is an inlet to the storm drain system that typically includes a grate or curb inlet and a sump to capture sediment, debris, and associated pollutants. They are also used in combined sewer overflow (CSO) watersheds to capture floatables and settle some solids. Catch basins act as pretreatment for other treatment practices by capturing large sediments. The performance of catch basins at removing sediment and other pollutants depends on the design of the catch basin (e.g., the size of the sump) and maintenance procedures to retain the storage available in the sump to capture sediment.

Catch basin efficiency can be improved using inserts, which can be designed to remove oil and grease, trash, debris, and sediment. Some inserts are designed to drop directly into existing catch basins, while others may require extensive retrofit construction.

Applicability

Catch basins are used in drainage systems throughout the United States. However, many catch basins are not ideally designed for sediment and pollutant capture. Ideal application of catch basins is as pretreatment to another storm water management practice. Retrofitting existing catch basins may help to improve their performance substantially. A simple retrofit option is to ensure that all catch basins have a hooded outlet to prevent floatable materials, such as trash and debris, from entering the storm drain system. Catch basin inserts for both new development and retrofits at existing sites may be preferred when available land is limited, as in urbanized areas.

Limitations

Catch basins have three major limitations, including:

- Even ideally designed catch basins cannot remove pollutants as well as structural storm water management practices, such as wet ponds, sand filters, and storm water wetlands.
- Unless frequently maintained, catch basins can become a source of pollutants through re-suspension.
- Catch basins cannot effectively remove soluble pollutants or fine particles.

Siting and Design Considerations

The performance of catch basins is related to the volume in the sump (i.e., the storage in the catch basin below the outlet). Lager et al. (1997) described an "optimal" catch basin sizing criterion, which relates all catch basin dimensions to the diameter of the outlet pipe (D):

- The diameter of the catch basin should be equal to 4D.
- The sump depth should be at least 4D. This depth should be increased if cleaning is infrequent or if the area draining to the catch basin has high sediment loads.
- The top of the outlet pipe should be 1.5 D from the bottom of the inlet to the catch basin.

Catch basins can also be sized to accommodate the volume of sediment that enters the system. Pitt et al. (1997) propose a sizing criterion based on the concentration of sediment in storm water runoff. The catch basin is sized, with a factor of safety, to accommodate the annual sediment load

in the catch basin sump. This method is preferable where high sediment loads are anticipated, and where the optimal design described above is suspected to provide little treatment.
The basic design should also incorporate a hooded outlet to prevent floatable materials and trash from entering the storm drain system. Adding a screen to the top of the catch basin would not likely improve the performance of catch basins for pollutant removal, but would help capture trash entering the catch basin (Pitt et al., 1997).

Several varieties of catch basin inserts exist for filtering runoff. There are two basic catch basin insert varieties. One insert option consists of a series of trays, with the top tray serving as an initial sediment trap, and the underlying trays composed of media filters. Another option uses filter fabric to remove pollutants from storm water runoff. Yet another option is a plastic box that fits directly into the catch basin. The box construction is the filtering medium. Hydrocarbons are removed as the storm water passes through the box while trash, rubbish, and sediment remain in the box itself as storm water exits. These devices have a very small volume, compared to the volume of the catch basin sump, and would typically require very frequent sediment removal. Bench test studies found that a variety of options showed little removal of total suspended solids, partially due to scouring from relatively small (6-month) storm events (ICBIC, 1995).
One design adaptation of the standard catch basin is to incorporate infiltration through the catch basin bottom. Two challenges are associated with this design. The first is potential ground water impacts, and the second is potential clogging, preventing infiltration. Infiltrating catch basins should not be used in commercial or industrial areas, because of possible ground water contamination. While it is difficult to prevent clogging at the bottom of the catch basin, it might be possible to incorporate some pretreatment into the design.

Maintenance Considerations
Typical maintenance of catch basins includes trash removal if a screen or other debris capturing device is used, and removal of sediment using a vactor truck. Operators need to be properly trained in catch basin maintenance. Maintenance should include keeping a log of the amount of sediment collected and the date of removal. Some cities have incorporated the use of GIS systems to track sediment collection and to optimize future catch basin cleaning efforts.
One study (Pitt, 1985) concluded that catch basins can capture sediments up to approximately 60 percent of the sump volume. When sediment fills greater than 60 percent of their volume, catch basins reach steady state. Storm flows can then resuspend sediments trapped in the catch basin, and will bypass treatment. Frequent clean-out can retain the volume in the catch basin sump available for treatment of storm water flows.

At a minimum, catch basins should be cleaned once or twice per year (Aronson et al., 1993). Two studies suggest that increasing the frequency of maintenance can improve the performance of catch basins, particularly in industrial or commercial areas. One study of 60 catch basins in Alameda County, California, found that increasing the maintenance frequency from once per year to twice per year could increase the total sediment removed by catch basins on an annual basis (Mineart and Singh, 1994). Annual sediment removed per inlet was 54 pounds for annual cleaning, 70 pounds for semi-annual and quarterly cleaning, and 160 pounds for monthly cleaning. For catch basins draining industrial uses, monthly cleaning increased total annual sediment collected to six times the amount collected by annual cleaning (180 pounds versus 30 pounds). These results suggest that, at least for industrial uses, more frequent cleaning of catch basins may improve efficiency. However, the cost of increased operation and maintenance costs needs to be weighed against the improved pollutant removal.

In some regions, it may be difficult to find environmentally acceptable disposal methods for collected sediments. The sediments may not always be land-filled, land-applied, or introduced into the sanitary sewer system due to hazardous waste, pretreatment, or ground water regulations. This is particularly true when catch basins drain runoff from hot spot areas.

Effectiveness

What is known about the effectiveness of catch basins is limited to a few studies. Table 1 outlines the results of some of these studies.

Table 1. Pollutant removal of catch basins (percent).

Study	Notes	TSS[a]	COD[a]	BOD[a]	TN[a]	TP[a]	Metals
Pitt et al., 1997	–	32	–		–	–	–
Aronson et al., 1983	Only very small storms were monitored in this study.	60–97	10–56	54–88	–	–	–
Mineart and Singh, 1994	Annual load reduction estimated based on concentrations and mass of catch basin sediment.	–	–	–	–	–	For Copper: 3–4% (Annual cleaning) 15% (Monthly cleaning)

[a] TSS=total suspended solids; COD=chemical oxygen demand; BOD=biological oxygen demand; TN=total nitrogen; TP=total phosphorus

Cost Considerations

A typical pre-cast catch basin costs between $2,000 and $3,000. The true pollutant removal cost associated with catch basins, however, is the long-term maintenance cost. A vactor truck, the most common method of catch basin cleaning, costs between $125,000 and $150,000. This initial cost may be high for smaller Phase II communities. However, it may be possible to share a vactor truck with another community. Typical vactor trucks can store between 10 and 15 cubic yards of material, which is enough storage for three to five catch basins with the "optimal" design and an 18-inch inflow pipe. Assuming semi-annual cleaning, and that the vactor truck could be filled and material disposed of twice in one day, one truck would be sufficient to clean between 750 and 1,000 catch basins. Another maintenance cost is the staff time needed to operate the truck. Depending on the regulations within a community, disposal costs of the sediment captured in catch basins may be significant.

Retrofit catch basin inserts range from as little as $400 for a "drop-in" type to as much as $10,000 or more for more elaborate designs.

Hydrodynamic Separators

Picture courtesy of Vortechnics, Inc.

DESCRIPTION

Hydrodynamic separators are flow-through structures with a settling or separation unit to remove sediments and other pollutants that are widely used in storm water treatment. No outside power source is required, because the physics of the flowing water allows the sediments to efficiently separate. Variations of hydrodynamic systems have been designed to meet specific needs to remove particulates, which can be settled, or floatables, which can be captured, rather than solids with poor settle-ability or dissolved pollutants. Some systems have supplemental features to reduce the velocity of the flow entering the system. This increases the efficiency of the unit by allowing more sediments to settle out.

Source: EPA

APPLICABILITY

This technology may be used by itself or in conjunction with other storm water BMPs as part of an overall storm water control strategy. Hydrodynamic separators come in a wide range of shapes and sizes. This makes hydrodynamic separators ideal for areas where land availability is limited. Also, because they can be placed in almost any specific location in a collection system, hydrodynamic separators are ideal for use in potential storm water “hotspots”-- such as gas station islands.

The need for hydrodynamic separators is growing as a result of the incerased desire to utilize every square foot of developable land.

Source: EPA

SITING & DESIGN CONSIDERATIONS

Sizing hydrodynamic separators is usually based on a certain set of treatment objectives; i.e., treating a water quality design flow. In order to prevent washout of a flow-based system, the system is typically designed with an external bypass although some systems have a flow through capability. When the peak flow exceeds the water quality flow by a factor of 5 or more, an off-line configuration is usually a cost effective solution. Upstream diversion structures can be used to bypass higher flows around the device. Using structural BMPs that can be placed underground and are design to withstand site specific soil, groundwater and traffic loading conditions provide valuable savings in land area compared to conventional volume-based stormwater treatment practices such as ponds, wetlands, and swales.

Source: Vortechnics, Inc.

LIMITATIONS

The use of hydrodynamic separators as wet weather treatment options may be limited by the variability of net solids removal. While some data suggest excellent removal rates, these rates often depend on site-specific conditions, as well as other contributing factors. Pollutants such as nutrients, which adhere to fine particulates or are dissolved, will not be significantly removed by the unit. Site constraints, including the availability of suitable land, appropriate soil depth, and stable soil to support the unit structurally, may also limit the applicability of the hydrodynamic separator. The slope of the site or collection system may necessitate the use of an underground unit, which can result in an extensive excavation.

Source: EPA

MAINTENANCE

Hydrodynamic separators do not have any moving parts, and are consequently not maintenance intensive. However, maintaining the system properly is very important in ensuring that it is operating as efficiently as possible. Proper maintenance involves frequent inspections throughout the first year of installation. When the unit has reached capacity, it must be cleaned out. This may be performed with a sump vac or vacuum truck, depending on which unit is used. In general, hydrodynamic separators require a minimal amount of maintenance, but lack of attention will lower their overall efficiency.

EFFECTIVENESS

Hydrodynamic separators are designed primarily for removing floatable and material settleable solids. The reported removal rates of sediments, floatables, and oil and grease differ depending on the vendor.

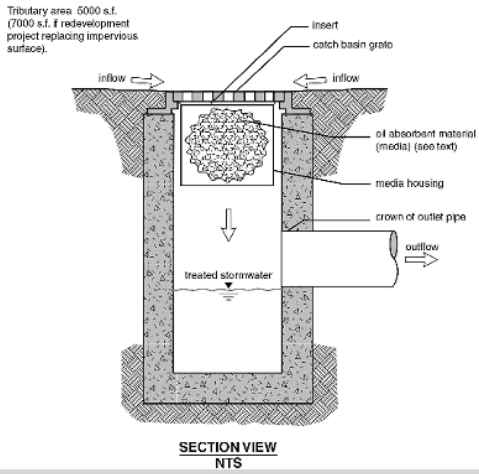
COST CONSIDERATIONS

The capital costs for hydrodynamic separators depend on site-specific conditions. These costs are based on several factors including the amount of runoff required to be treated and the amount of land available. Capitol costs typically range from $5,000 to $75,000 per pre-cast system.

Total costs for hydrodynamic separators often include predesign costs, capital costs, installation costs, and operation and maintenance (O&M) costs. The predesign and installation costs depend upon the complexity of the treatment site. O&M costs vary based on the company contracted to clean out the unit, and may depend on travel distances and cleaning frequency. These costs generally are low (maximum of $1,000 a year) and vary from year to year.

Source: Vortechnics, Inc.

Manufactured Products for Storm Water Inlets



The typical design of a catch basin insert is a set of filters that are specifically chosen to address the pollutants expected at that site (Source: King County, Washington, 2000)

Description

A variety of products for storm water inlets known as swirl separators, or hydrodynamic structures, have been widely applied in recent years. Swirl separators are modifications of the traditional oil-grit separator and include an internal component that creates a swirling motion as storm water flows through a cylindrical chamber. The concept behind these designs is that sediments settle out as storm water moves in this swirling path. Additional compartments or chambers are sometimes present to trap oil and other floatables. There are several different types of proprietary separators, each of which incorporates slightly different design variations, such as off-line application. Another common manufactured product is the catch basin insert. These products are discussed briefly in the Catch Basin fact sheet.

Applicability

Swirl separators are best installed on highly impervious sites. Because little data are available on their performance, and independently conducted studies suggest marginal pollutant removal, swirl separators should not be used as a stand-alone practice for new development. The best application of these products is as pretreatment to another storm water device, or in a retrofit situation where space is limited.

Limitations

Limitations to swirl separators include:

- Very little data are available on the performance of these practices, and independent studies suggest only moderate pollutant removal. In particular, these practices are ineffective at removing fine particles and soluble pollutants.
    - The practice has a high maintenance burden (i.e., frequent cleanout).
    - Swirl concentrators are restricted to small and highly impervious sites.

Siting and Design Considerations

The specific design of swirl concentrators is specified by product literature available from each manufacturer. For the most part, swirl concentrators are a rate-based design. That is, they are sized based on the peak flow of a specific storm event. This design contrasts with most other storm water management practices, which are sized based on capturing and storing or treating a specific volume. Sizing based on flow rate allows the practice to provide treatment within a much smaller area than other storm water management practices.

Maintenance Considerations

Swirl concentrators require frequent maintenance (typically quarterly). Maintenance is performed using a vactor truck, as is used for catch basins (see Catch Basin). In some regions, it may be difficult to find environmentally acceptable disposal methods. The sediments may not always be land-filled, land-applied, or introduced into the sanitary sewer system due to hazardous waste, pretreatment, or groundwater regulations. This is particularly true when catch basins drain runoff from hot spot areas.

Effectiveness

While manufacturers' literature typically reports removal rates for swirl separator design, there is actually very little independent data to evaluate the effectiveness of these products. Two studies investigated one of these products. Both studies reported moderate pollutant removal. While the product outperforms oil/grit separators, which have virtually no pollutant removal (Schueler, 1997), the removal rates are not substantially different from the standard catch basin. One long-term advantage of these products over catch basins is that, if they incorporate an off-line design, trapped sediment will not become resuspended. Data from two studies are presented below. Both of these studies are summarized in a Claytor (1999).

Table 1. Effectiveness of manufactured products for storm water inlets

Study	Greb et al., 1998	Labatiuk et al., 1997
Notes	Investigated 45 precipitation events over a 9-month period. Percent removal rates reflect overall efficiency, accounting for pollutants in bypassed flows.	Data represent the mean percent removal rate for four storm events.
TSS[a]	21	51.5
TDS[a]	-21	-
TP[a]	17	-
DP[a]	17	-
Pb[a]	24	51.2
Zn[a]	17	39.1
Cu[a]	-	21.5
PAH[a]	32	-
NO_2+NO_3[a]	5	-

[a] TSS=total suspended solids; TDS=total dissolved solids; TP=total phosphorus; DP=dissolved phosphorus; Pb=lead; Zn=zinc; Cu=copper; PAH=polynuclear aromatic hydrocarbons; NO_2+NO_3=nitrite+nitrate-nitrogen

Cost Considerations

A typical swirl separator costs between $5,000 and $35,000, or between $5,000 and $10,000 per impervious acre. This cost is within the range of some sand filters, which also treat highly urbanized runoff (see Sand Filters). Swirl separators consume very little land, making them attractive in highly urbanized areas.

The maintenance of these practices is relatively expensive. Swirl concentrators typically require quarterly maintenance, and a vactor truck, the most common method of cleaning these practices, costs between $125,000 and $150,000. This initial cost may be high for smaller Phase II communities. However, it may be possible to share a vactor truck with another community. Depending on the rules within a community, disposal costs of the sediment captured in swirl separators may be significant.

Grassed Filter Strip

Description

Grassed filter strips (vegetated filter strips, filter strips, and grassed filters) are vegetated surfaces that are designed to treat sheet flow from adjacent surfaces. Filter strips function by slowing runoff velocities and filtering out sediment and other pollutants, and by providing some infiltration into underlying soils. Filter strips were originally used as an agricultural treatment practice, and have more recently evolved into an urban practice. With proper design and maintenance, filter strips can provide relatively high pollutant removal. One challenge associated with filter strips, however, is that it is difficult to maintain sheet flow, so the practice may be "short circuited" by concentrated flows, receiving little or no treatment.

Applicability

Filter strips are applicable in most regions, but are restricted in some situations because they consume a large amount of space relative to other practices. Filter strips are best suited to treating runoff from roads and highways, roof downspouts, very small parking lots, and pervious surfaces. They are also ideal components of the "outer zone" of a stream buffer (see Buffer Zones fact sheet), or as pretreatment to a structural practice. This recommendation is consistent with recommendations in the agricultural setting that filter strips are most effective when combined with another practice (Magette et al., 1989). In fact, the most recent storm water manual for Maryland does not consider the filter strip as a treatment practice, but does offer storm water volume reductions in exchange for using filter strips to treat some of a site.

Regional Applicability

Filter strips can be applied in most regions of the country. In arid areas, however, the cost of irrigating the grass on the practice will most likely outweigh its water quality benefits.

Ultra-Urban Areas

Ultra-urban areas are densely developed urban areas in which little pervious surface exists. Filter strips are impractical in ultra-urban areas because they consume a large amount of space.

Storm Water Hot Spots

Storm water hot spots are areas where land use or activities generate highly contaminated runoff, with concentrations of pollutants in excess of those typically found in storm water. A typical example is a gas station. Filter strips should not receive hot spot runoff, because the practice encourages infiltration. In addition, it is questionable whether this practice can reliably remove pollutants, so it should definitely not be used as the sole treatment of hot spot runoff.

Storm Water Retrofit

A storm water retrofit is a storm water management practice (usually structural), put into place after development has occurred, to improve water quality, protect downstream channels, reduce flooding, or meet other specific objectives. Filter strips are generally a poor retrofit option because they consume a relatively large amount of space and cannot treat large drainage areas.

Cold Water (Trout) Streams

Some cold water species, such as trout, are sensitive to changes in temperature. While some treatment practices, such as wet ponds (see Wet Ponds fact sheet), can warm storm water substantially, filter strips do not warm pond water on the surface for long periods of time and are not expected to increase storm water temperatures. Thus, these practices are good for protection of cold-water streams.

Siting and Design Considerations

Siting Considerations

In addition to the restrictions and modifications to adapting filter strips to different regions and land uses, designers need to ensure that this management practice is feasible at the site in question. The following section provides basic guidelines for siting filter strips.

Drainage Area

Typically, filter strips are used to treat very small drainage areas. The limiting design factor, however, is not the drainage area the practice treats but the length of flow leading to it. As storm water runoff flows over the ground's surface, it changes from sheet flow to concentrated flow. Rather than moving uniformly over the surface, the concentrated flow forms rivulets which are slightly deeper and cover less area than the sheet flow. When flow concentrates, it moves too rapidly to be effectively treated by a grassed filter strip. As a rule, flow concentrates within a maximum of 75 feet for impervious surfaces, and 150 feet for pervious surfaces (CWP, 1996). Using this rule, a filter strip can treat one acre of impervious surface per 580-foot length.

Slope

Filter strips should be designed on slopes between 2 and 6 percent. Greater slopes than this would encourage the formation of concentrated flow. Except in the case of very sandy or gravelly soil, runoff would pond on the surface on slopes flatter than 2 percent, creating potential mosquito breeding habitat.

Soils /Topography

Filter strips should not be used on soils with a high clay content, because they require some infiltration for proper treatment. Very poor soils that cannot sustain a grass cover crop are also a limiting factor.

Ground Water

Filter strips should be separated from the ground water by between 2 and 4 ft to prevent contamination and to ensure that the filter strip does not remain wet between storms.

Design Considerations

Filter strips appear to be a minimal design practice because they are basically no more than a grassed slope. However, some design features are critical to ensure that the filter strip provides some minimum amount of water quality treatment.

- A pea gravel diaphragm should be used at the top of the slope. The pea gravel diaphragm (a small trench running along the top of the filter strip) serves two purposes. First, it acts as a pretreatment device, settling out sediment particles before they reach the practice. Second, it acts as a level spreader, maintaining sheet flow as runoff flows over the filter strip.
- The filter strip should be designed with a pervious berm of sand and gravel at the toe of the slope. This feature provides an area for shallow ponding at the bottom of the filter strip. Runoff ponds behind the berm and gradually flows through outlet pipes in the berm. The volume ponded behind the berm should be equal to the water quality volume. The water quality volume is the amount of runoff that will be treated for pollutant removal in the practice. Typical water quality volumes are the runoff from a 1-inch storm or ½-inch of runoff over the entire drainage area to the practice.
- The filter strip should be at least 25 feet long to provide water quality treatment.
- Designers should choose a grass that can withstand relatively high velocity flows and both wet and dry periods.
- Both the top and toe of the slope should be as flat as possible to encourage sheet flow and prevent erosion.

Regional Variations
In cold climates, filter strips provide a convenient area for snow storage and treatment. If used for this purpose, vegetation in the filter strip should be salt-tolerant, (e.g., creeping bentgrass), and a maintenance schedule should include the removal of sand built up at the bottom of the slope. In arid or semi-arid climates, designers should specify drought-tolerant grasses (e.g., buffalo grass) to minimize irrigation requirements.

Limitations
Filter strips have several limitations related to their performance and space consumption:

- The practice has not been shown to achieve high pollutant removal.
- Filter strips require a large amount of space, typically equal to the impervious area they treat, making them often infeasible in urban environments where land prices are high.
- If improperly designed, filter strips can become a mosquito breeding ground.
- Proper design requires a great deal of finesse, and slight problems in the design, such as improper grading, can render the practice ineffective in terms of pollutant removal.

Maintenance Considerations
Filter strips require similar maintenance to other vegetative practices (see Grassed Swales fact sheet). These maintenance needs are outlined below. Maintenance is very important for filter strips, particularly in terms of ensuring that flow does not short circuit the practice.
Table 1. Typical maintenance activities for grassed filter strips (Source: CWP, 1996)

Activity	Schedule
• Inspect pea gravel diaphragm for clogging and remove built-up sediment. • Inspect vegetation for rills and gullies and correct. Seed or sod bare areas. • Inspect to ensure that grass has established. If not, replace with an alternative species.	Annual inspection (semi-annual the first year)
• Mow grass to maintain a 3–4 inch height	Regular (frequent)
• Remove sediment build-up within the bottom when it has accumulated to 25% of the original capacity.	Regular (infrequent)

Effectiveness
Structural storm water management practices can be used to achieve four broad resource protection goals. These include flood control, channel protection, ground water recharge, and pollutant removal. The first two goals, flood control and channel protection, require that a storm water practice be able to reduce the peak flows of relatively large storm events (at least 1- to 2-year storms for channel protection and at least 10- to 50-year storms for flood control). Filter strips do not have the capacity to detain these events, but can be designed with a bypass system that routes these flows around the practice entirely.
Filter strips can provide a small amount of ground water recharge as runoff flows over the vegetated surface and ponds at the toe of the slope. In addition, it is believed that filter strips can provide modest pollutant removal. Studies from agricultural settings suggest that a 15-foot-wide grass buffer can achieve a 50 percent removal rate of nitrogen, phosphorus, and sediment, and that a 100-foot buffer can reach closer to 70 percent removal of these constituents (Desbonette et al., 1994). It is unclear how these results can be translated to the urban environment, however.

The characteristics of the incoming flows are radically different both in terms of pollutant concentration and the peak flows associated with similar storm events. To date, only one study (Yu et al., 1992) has investigated the effectiveness of a grassed filter strip to treat runoff from a large parking lot. The study found that the pollutant removal varied depending on the length of flow in the filter strip. The narrower (75-foot) filter strip had moderate removal for some pollutants and actually appeared to export lead, phosphorus, and nutrients (See Table 2).

Table 2. Pollutant removal of an urban vegetated filter strip (Source: Yu et al., 1993)

	Pollutant Removal (%)	
	75-Ft Filter Strip	150-Ft Filter Strip
Total suspended solids	54	84
Nitrate+nitrite	-27	20
Total phosphorus	-25	40
Extractable lead	-16	50
Extractable zinc	47	55

Cost Considerations

Little data are available on the actual construction costs of filter strips. One rough estimate can be the cost of seed or sod, which is approximately 30Â¢ per ft^2 for seed or 70Â¢ per ft^2 for sod. This amounts to between $13,000 and $30,000 per acre for a filter strip, or the same amount per impervious acre treated. This cost is relatively high compared with other treatment practices. However, the grassed area used as a filter strip may have been seeded or sodded even if it were not used for treatment. In these cases, the only additional costs are the design, which is minimal, and the installation of a berm and gravel diaphragm. Typical maintenance costs are about $350/acre/year (adapted from SWRPC, 1991). This cost is relatively inexpensive and, again, might overlap with regular landscape maintenance costs.

The true cost of filter strips is the land they consume, which is higher than for any other treatment practice. In some situations this land is available as wasted space beyond back yards or adjacent to roadsides, but this practice is cost-prohibitive when land prices are high and land could be used for other purposes.

Grassed Swales

Grassed swales can be used along roadsides and parking lots to collect and treat storm water runoff

Description

The term swale (a.k.a. grassed channel, dry swale, wet swale, biofilter) refers to a series of vegetated, open channel management practices designed specifically to treat and attenuate storm water runoff for a specified water quality volume. As storm water runoff flows through these channels, it is treated through filtering by the vegetation in the channel, filtering through a subsoil matrix, and/or infiltration into the underlying soils. Variations of the grassed swale include the grassed channel, dry swale, and wet swale. The specific design features and methods of treatment differ in each of these designs, but all are improvements on the traditional drainage ditch. These designs incorporate modified geometry and other features for use of the swale as a treatment and conveyance practice.

Applicability

Grassed swales can be applied in most situations with some restrictions. Swales are very well suited for treating highway or residential road runoff because they are linear practices.

Regional Applicability

Grassed swales can be applied in most regions of the country. In arid and semi-arid climates, however, the value of these practices needs to be weighed against the water needed to irrigate them.

Ultra-Urban Areas

Ultra-urban areas are densely developed urban areas in which little pervious surface exists. Grassed swales are generally not well suited to ultra-urban areas because they require a relatively large area of pervious surfaces.

Storm Water Hot Spots

Storm water hot spots are areas where land use or activities generate highly contaminated runoff, with concentrations of pollutants in excess of those typically found in storm water. A typical example is a gas station or convenience store. With the exception of the dry swale design (see Design Variations), hot spot runoff should not be directed toward grassed channels. These practices either infiltrate storm water or intersect the ground water, making use of the practices for hot spot runoff a threat to ground water quality.

Storm Water Retrofit

A storm water retrofit is a storm water management practice (usually structural) put into place after development has occurred, to improve water quality, protect downstream channels, reduce flooding, or meet other specific objectives. One retrofit opportunity using grassed swales modifies existing drainage ditches. Ditches have traditionally been designed only to convey storm water away from roads. In some cases, it may be possible to incorporate features to enhance pollutant removal or infiltration such as check dams (i.e., small dams along the ditch that trap sediment, slow runoff, and reduce the longitudinal slope). Since grassed swales cannot treat a large area, using this practice to retrofit an entire watershed would be expensive because of the number of practices needed to manage runoff from a significant amount of the watershed's land area.

Cold Water (Trout) Streams
Grassed channels are a good treatment option within watersheds that drain to cold water streams. These practices do not pond water for a long period of time and often induce infiltration. As a result, standing water will not typically be subjected to warming by the sun in these practices.

Siting and Design Considerations
In addition to the broad applicability concerns described above, designers need to consider conditions at the site level. In addition, they need to incorporate design features to improve the longevity and performance of the practice, while minimizing the maintenance burden.

Siting Considerations
In addition to considering the restrictions and adaptations of grassed swales to different regions and land uses, designers need to ensure that this management practice is feasible at the site in question because some site conditions (i.e., steep slopes, highly impermeable soils) might restrict the effectiveness of grassed channels.

Drainage Area
Grassed swales should generally treat small drainage areas of less than 5 acres. If the practices are used to treat larger areas, the flows and volumes through the swale become too large to design the practice to treat storm water runoff through infiltration and filtering.

Slope
Grassed swales should be used on sites with relatively flat slopes of less than 4 percent slope; 1 to 2 percent slope is recommended. Runoff velocities within the channel become too high on steeper slopes. This can cause erosion and does not allow for infiltration or filtering in the swale.

Soils / Topography
Grassed swales can be used on most soils, with some restrictions on the most impermeable soils. In the dry swale (see Design Variations) a fabricated soil bed replaces on-site soils in order to ensure that runoff is filtered as it travels through the soils of the swale.

Ground Water
The depth to ground water depends on the type of swale used. In the dry swale and grassed channel options, designers should separate the bottom of the swale from the ground water by at least 2 ft to prevent a moist swale bottom, or contamination of the ground water. In the wet swale option, treatment is enhanced by a wet pool in the practice, which is maintained by intersecting the ground water.

Design Considerations
Although there are different design variations of the grassed swale (see Design Variations), there are some design considerations common to all three. One overriding similarity is the cross-sectional geometry of all three options. Swales should generally have a trapezoidal or parabolic cross section with relatively flat side slopes (flatter than 3:1). Designing the channel with flat side slopes maximizes the wetted perimeter. The wetted perimeter is the length along the edge of the swale cross section where runoff flowing through the swale is in contact with the vegetated sides and bottom of the swale. Increasing the wetted perimeter slows runoff velocities and provides more contact with vegetation to encourage filtering and infiltration. Another advantage to flat side slopes is that runoff entering the grassed swale from the side receives some pretreatment along the side slope. The flat bottom of all three should be between 2â€“8 ft wide. The minimum width ensures a minimum filtering surface for water quality treatment, and the maximum width prevents braiding, the formation of small channels within the swale bottom.
Another similarity among all three designs is the type of pretreatment needed. In all three design options, a small forebay should be used at the front of the swale to trap incoming sediments. A pea gravel diaphragm, a small trench filled with river run gravel, should be used as pretreatment for runoff entering the sides of the swale.

Two other features designed to enhance the treatment ability of grassed swales are a flat longitudinal slope (generally between 1 percent and 2 percent) and a dense vegetative cover in the channel. The flat slope helps to reduce the velocity of flow in the channel. The dense vegetation also helps reduce velocities, protect the channel from erosion, and act as a filter to treat storm water runoff. During construction, it is important to stabilize the channel before the turf has been established, either with a temporary grass cover or with the use of natural or synthetic erosion control products.

In addition to treating runoff for water quality, grassed swales need to convey larger storms safely. Typical designs allow the runoff from the 2-year storm (i.e., the storm that occurs, on average, once every two years) to flow through the swale without causing erosion. Swales should also have the capacity to pass larger storms (typically a 10-year storm) safely.

Design Variations
The following discussion identifies three different variations of open channel practices, including the grassed channel, the dry swale, and the wet swale.

Grassed Channel
Of the three grassed swale designs, grassed channels are the most similar to a conventional drainage ditch, with the major differences being flatter side slopes and longitudinal slopes, and a slower design velocity for water quality treatment of small storm events. Of all of the grassed swale options, grassed channels are the least expensive but also provide the least reliable pollutant removal. The best application of a grassed channel is as pretreatment to other structural storm water practices.

One major difference between the grassed channel and most of the other structural practices is the method used to size the practice. Most storm water management water quality practices are sized by volume. This method sets the volume available in the practice equal to the water quality volume, or the volume of water to be treated in the practice. The grassed channel, on the other hand, is a flow-rate-based design. Based on the peak flow from the water quality storm (this varies from region to region, but a typical value is the 1-inch storm), the channel should be designed so that runoff takes, on average, 10 minutes to flow from the top to the bottom of the channel. A procedure for this design can be found in *Design of Storm Water Filtering Systems* (CWP, 1996).

Dry Swales
Dry swales are similar in design to bioretention areas (see Bioretention fact sheet). These designs incorporate a fabricated soil bed into their design. The existing soil is replaced with a sand/soil mix that meets minimum permeability requirements. An underdrain system is used under the soil bed. This system is a gravel layer that encases a perforated pipe. Storm water treated in the soil bed flows through the bottom into the underdrain, which conveys this treated storm water to the storm drain system. Dry swales are a relatively new design, but studies of swales with a native soil similar to the man-made soil bed of dry swales suggest high pollutant removal.

Wet Swales
Wet swales intersect the ground water and behave almost like a linear wetland cell (see Storm Water Wetland fact sheet). This design variation incorporates a shallow permanent pool and wetland vegetation to provide storm water treatment. This design also has potentially high pollutant removal. One disadvantage to the wet swale is that it cannot be used in residential or commercial settings because the shallow standing water in the swale is often viewed as a potential nuisance by homeowners and also breeds mosquitos.

Regional Variations

Cold Climates
In cold or snowy climates, swales may serve a dual purpose by acting as both a snow storage/treatment and a storm water management practice. This dual purpose is particularly relevant when swales are used to treat road runoff. If used for this purpose, swales should incorporate salt-tolerant vegetation, such as creeping bentgrass.

Arid Climates
In arid or semi-arid climates, swales should be designed with drought-tolerant vegetation, such as buffalo grass. As pointed out in the Applicability section, the value of vegetated practices for water quality needs to be weighed against the cost of water needed to maintain them in arid and semi-arid regions.

Limitations
Grassed swales have some limitations, including the following:

- Grassed swales cannot treat a very large drainage area.
- Wet swales may become a nuisance due to mosquito breeding.
- If designed improperly (e.g., if proper slope is not achieved), grassed channels will have very little pollutant removal.
- A thick vegetative cover is needed for these practices to function properly.

Maintenance Considerations
Maintenance of grassed swales mostly involves maintenance of the grass or wetland plant cover. Typical maintenance activities are included in Table 1.
Table 1. Typical maintenance activities for grassed swales (Source: Adapted from CWP, 1996)

Activity	Schedule
• Inspect pea gravel diaphragm for clogging and correct the problem. • Inspect grass along side slopes for erosion and formation of rills or gullies and correct. • Remove trash and debris accumulated in the inflow forebay. • Inspect and correct erosion problems in the sand/soil bed of dry swales. • Based on inspection, plant an alternative grass species if the original grass cover has not been successfully established. • Replant wetland species (for wet swale) if not sufficiently established.	Annual (semi-annual the first year)
• Rototill or cultivate the surface of the sand/soil bed of dry swales if the swale does not draw down within 48 hours. • Remove sediment build-up within the bottom of the swale once it has accumulated to 25 percent of the original design volume.	As needed (infrequent)
• Mow grass to maintain a height of 3â€“4 inches	As needed (frequent seasonally)

Effectiveness
Structural storm water management practices can be used to achieve four broad resource protection goals. These include flood control, channel protection, ground water recharge, and pollutant removal. Grassed swales can be used to meet ground water recharge and pollutant removal goals.

Ground Water Recharge
Grassed channels and dry swales can provide some ground water recharge as infiltration is achieved within the practice. Wet swales, however, generally do not contribute to ground water recharge. Infiltration is impeded by the accumulation of debris on the bottom of the swale.

Pollutant Removal
Few studies are available regarding the effectiveness of grassed channels. In fact, only 9 studies have been conducted on all grassed channels designed for water quality (Table 2). The data suggest relatively high removal rates for some pollutants, but negative removals for some bacteria, and fair performance for phosphorous. One study of available performance data (Schueler, 1997) estimates the removal rates for grassed channels as:
Total Suspended Solids: 81%
Total Phosphorous: 29%
Nitrate Nitrogen: 38%
Metals: 14% to 55%
Bacteria: -50%
Table 2. Grassed swale pollutant removal efficiency data

Removal Efficiencies (% Removal)							
Study	**TSS**	**TP**	**TN**	**NO_3**	**Metals**	**Bacteria**	**Type**
Goldberg 1993	67.8	4.5	-	31.4	42–62	-100	grassed channel
Seattle Metro and Washington Department of Ecology 1992	60	45	-	-25	2–16	-25	grassed channel
Seattle Metro and Washington Department of Ecology, 1992	83	29	-	-25	46–73	-25	grassed channel
Wang et al., 1981	80	-	-	-	70–80	-	dry swale
Dorman et al., 1989	98	18	-	45	37–81	-	dry swale
Harper, 1988	87	83	84	80	88–90	-	dry swale
Kercher et al., 1983	99	99	99	99	99	-	dry swale
Harper, 1988.	81	17	40	52	37–69	-	wet swale
Koon, 1995	67	39	-	9	-35 to 6	-	wet swale
Occoquan Watershed Monitoring Lab, 1983	-100	-100	-100	-	-100	-	drainage channel
Yousef et al., 1985	-	8	13	11	14–29	-	drainage channel
Occoquan Watershed	-50	-9.1	-	-	-100	-	drainage

Monitoring Lab, 1983			18.2				channel
Yousef et al., 1985	-	-19.5	8	2	41–90	-	drainage channel
Occoquan Watershed Monitoring Lab, 1983	31	-23	36.5	-	-100 to 33	-	drainage channel
Welborn and Veenhuis, 1987	0	-25	-25	-25	0	-	drainage channel
Yu et al., 1993	68	60	-	-	74	-	drainage channel
Dorman et al., 1989	65	41	-	11	14-55	-	drainage channel
Pitt and McLean, 1986	0	-	0	-	0	0	drainage channel
Oakland, 1983	33	-25	-	-	20–58	0	drainage channel
Dorman et al., 1989	-85	12	-	-100	14–88	-	drainage channel

While it is difficult to distinguish between different designs based on the small amount of available data, grassed channels generally have poorer removal rates than wet and dry swales, although wet swales appear to export soluble phosphorous (Harper, 1988; Koon, 1995). It is not clear why swales export bacteria. One explanation is that bacteria thrive in the warm swale soils. Another is that studies have not accounted for some sources of bacteria, such as local residents walking dogs within the grassed swale area.

Cost Considerations

Little data are available to estimate the difference in cost between various swale designs. One study (SWRPC, 1991) estimated the construction cost of grassed channels at approximately \$0.25 per ft^2. This price does not include design costs or contingencies. Brown and Schueler (1997) estimate these costs at approximately 32 percent of construction costs for most storm water management practices. For swales, however, these costs would probably be significantly higher since the construction costs are so low compared with other practices. A more realistic estimate would be a total cost of approximately \$0.50 per ft^2, which compares favorably with other storm water management practices.

Minimum Control Measure #6 – Pollution Prevention/Good Housekeeping

Introduction

The Pollution Prevention/Good Housekeeping minimum control measure requires the City to examine and subsequently alter the actions of its own forces to help ensure a reduction in the amount and type of pollution that: (1) collects on streets, parking lots, open spaces, and storage and vehicle maintenance areas and is discharged into local waterways; and (2) results from actions such as environmentally damaging land development and flood management practices or poor maintenance of storm sewer systems.

While this measure is meant primarily to improve or protect receiving water quality by altering municipal or facility operations, it also can result in a cost savings for the City, since proper and timely maintenance of storm sewer systems can help avoid repair costs from damage caused by age and neglect.

Best Management Practice (BMP)
Minimum Control Measure #6 – Pollution Prevention/Good Housekeeping
Summary Table

BMP	Description	Implementation
6A Operations and Maintenance Program	Operation and maintenance practices should be consistent with practices required of the entire community under this Storm Water Plan.	Year 1
6B Training	Grounds maintenance and landscaping crews should be trained to understand the effects of maintenance activities, including the use of fertilizer, on storm water quality.	Year 1
6C Street Cleaning	Street cleaning to remove leaf litter from residential streets in the Fall is effective in diverting materials from drainage channels and creeks. Litter removal is conducted in public rights-of-way and other public property as needed.	Year 1
6D Storm Water Pollution Prevention Plan	City Corporation Yard to operate under a Storm Water Pollution Prevention Plan	Year 2
6E Program for Cleaning Storm Drain Facilities	Establish a program for regular cleaning of storm drain facilities. Best if accomplished prior to rainy season.	Year 2
6F Water Utility Discharge Pollution Prevention Plan	Non-storm water discharges to be handled with Water Utility Pollution Prevention Plan.	Year 4

6A – Operations and Maintenance Program (Proposed: FY 2005-2006)	
Description	Operation and maintenance practices should be consistent with practices required of the entire community under this Storm Water Plan.
Justification	A comprehensive operations and maintenance program for the City's corporation yard and City street and storm drain facilities will provide for the reduction and elimination (where possible) of direct pollutant introduction into the storm sewer system.
Measurable Goal	In Years 1-5, annually review street sweeping schedule and routes to ensure entire City is swept. Annually inspect sweeping equipment to ensure proper operation.
Implementation Schedule	Yrs. 1-5: Review street sweeping schedules to confirm that street sweeping is performed regularly in all areas. Inspect street sweeping equipment annually
Progress Measurement	Review of street sweeping schedule is completed and documented. Annual inspection of equipment is completed and documented.
Effective Measurement	All City streets are swept on schedule. Street sweeping as a practice reduces the amount of litter and debris that can enter the storm drain system.

6A – Operations and Maintenance Program (Implementation: FY 2005-2006)

General Summary: South Valley Disposal & Recycling, Inc. (408-842-3358) provides bi-weekly street sweeping service in the City of Morgan Hill.

- Attachment 6A.1 is the City's Street Sweeping Terms with South Valley Disposal.
- Street sweeping occurs the day after recycling pick-up. Attachment 6A.2 is the A and B schedules for recycling (sweeping) for 2005. Attachment 6A.3 is the sweeping maps which indicate (in yellow) which streets are swept each day of the week. Attachment 6A.4 is the street sweeping reports of the 'tons' of waste picked up each sweeping day.
- Residents are required to move cars from the street the night before street sweeping.
- Street sweeping does not include private parking lots, rural streets without curb and gutters, and private streets.

Status of Measurable Goals: Based on Attachment 6A.3 a majority of public streets are swept on a bi-weekly basis. Per Attachment 6A.1, South Valley Disposal's condition and maintenance of the sweeping equipment 'must be in excellent working condition capable of removing litter, leaves and debris throughout the life of the Agreement' which ensures proper sweeping operations.

Effectiveness: Attachment 6A.4 shows that between 1-3 tons of waste is swept up on each day of street sweeping. This is a significant reduction of waste which could enter the storm drain system from urban runoff. However, it was noted that the sweeper only sweeps the outside curb and gutters. Post inspections of streets show that debris around median curbs is not swept.

Proposed Modifications: Additional sweeping around the median curbs shall be required; staff shall contact with South Valley Disposal to resolve this issue. If a resolution can not be met with South Valley Disposal, then an additional street cleaning procedures will be incorporated into control measure 6C.

Ongoing Implementation:

6A – Operations and Maintenance Program (Year 2: FY 2006-2007)	
Description	Operation and maintenance practices should be consistent with practices required of the entire community under this Storm Water Plan.
Justification	A comprehensive operations and maintenance program for the City's corporation yard and City street and storm drain facilities will provide for the reduction and elimination (where possible) of direct pollutant introduction into the storm sewer system.
Measurable Goal	In Years 1-5, annually review street sweeping schedule and routes to ensure entire City is swept. Annually inspect sweeping equipment to ensure proper operation.
Implementation Schedule	Yrs. 1-5: Review street sweeping schedules to confirm that street sweeping is performed regularly in all areas. Inspect street sweeping equipment annually
Progress Measurement	Review of street sweeping schedule is completed and documented. Annual inspection of equipment is completed and documented.
Effective Measurement	All City streets are swept on schedule. Street sweeping as a practice reduces the amount of litter and debris that can enter the storm drain system.
*Modifications are noted by the <u>underlined text</u>.	

ATTACHMENT 6A.1

2005 RECYCLING SCHEDULE "A"

JANUARY 2005						
S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

FEBRUARY 2005						
S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28					

MARCH 2005						
S	M	T	W	T	F	S
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6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

APRIL 2004						
S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

MAY 2005						
S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

JUNE 2005						
S	M	T	W	T	F	S
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5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

JULY 2005						
S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

AUGUST 2005						
S	M	T	W	T	F	S
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7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

SEPTEMBER 2005						
S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

OCTOBER 2005						
S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

NOVEMBER 2005						
S	M	T	W	T	F	S
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6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

DECEMBER 2005						
S	M	T	W	T	F	S
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11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

Please remember to follow these guidelines:

- *Have containers out by 6 a.m. on your service day.*
- *If your street is swept, move your car by 7 a.m. the day after your recycling service day. Streets with Friday service are swept on Monday.*
- *There will be no service interruptions or changes during the holidays in 2005.*
- *Flatten and bundle cardboard boxes for pick up. Flattened boxes must be smaller that 3 ft. by 3 ft. in dimension. If you have large amounts of clean cardboard, you may bring it to the San Martin Transfer Station at no charge.*

***Please Note - your recycling collection occurs during blocked week marked in RED, on the same day as your garbage day.**

2005
RECYCLING SCHEDULE "B"

JANUARY 2005

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
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16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

FEBRUARY 2005

S	M	T	W	T	F	S
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13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28					

MARCH 2005

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

APRIL 2005

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17	18	19	20	21	22	23
24	25	26	27	28	29	30

MAY 2005

S	M	T	W	T	F	S
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15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

JUNE 2005

S	M	T	W	T	F	S
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5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

JULY 2005

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

AUGUST 2005

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

SEPTEMBER 2005

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

OCTOBER 2005

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

NOVEMBER 2005

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

DECEMBER 2005

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

Please remember to follow these guidelines:

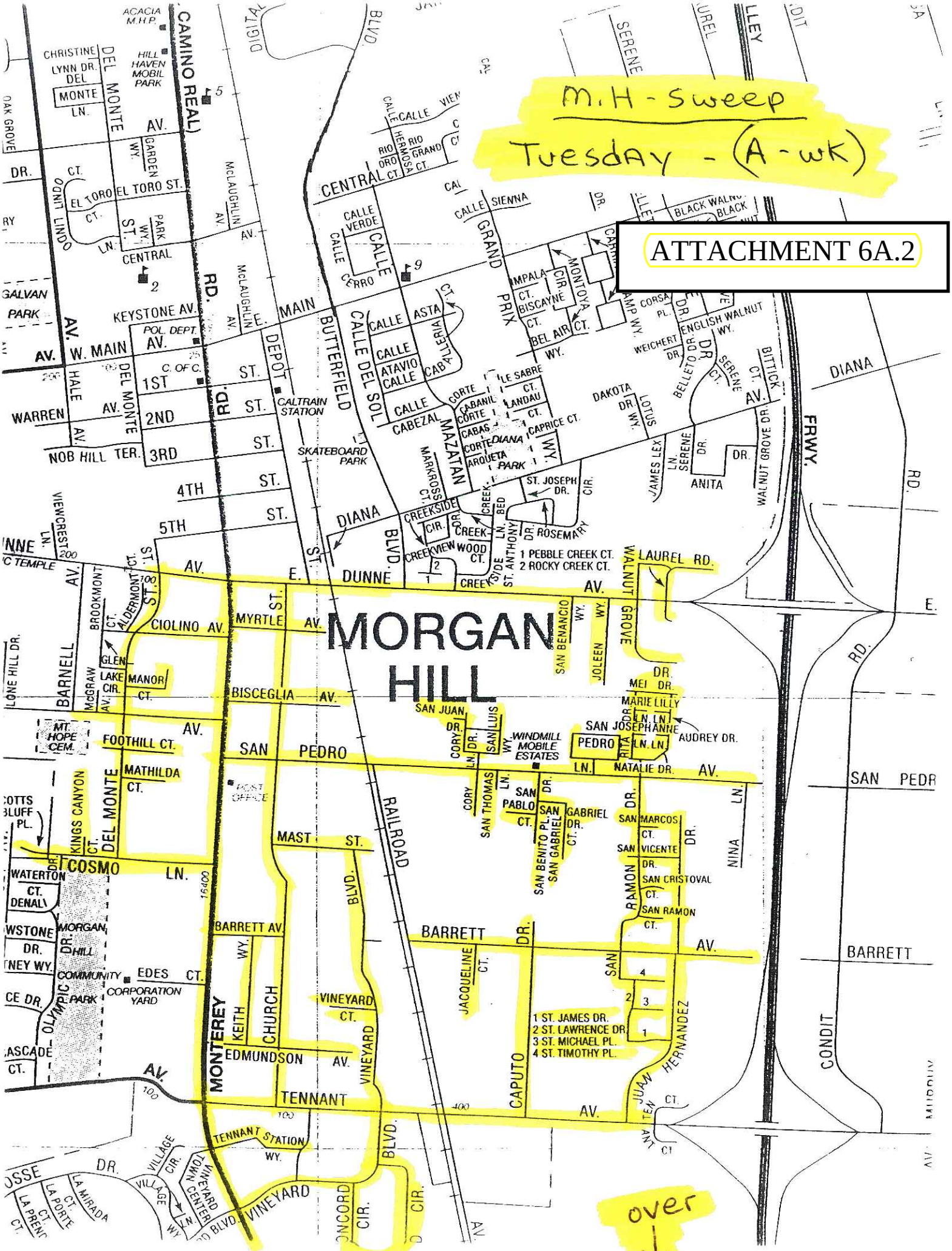
- *Have containers out by 6 a.m. on your service day.*
- *If your street is swept, move your car by 7 a.m. the day after your recycling service day. Streets with Friday service are swept on Monday.*
- *There will be no service interruptions or changes during the holidays in 2005.*
- *Flatten and bundle cardboard boxes for pick up. Flattened boxes must be smaller that 3 ft. by 3 ft. in dimension. If you have large amounts of clean cardboard, you may bring it to the San Martin Transfer Station at no charge.*

***Please Note - your recycling collection occurs during blocked week marked in RED, on the same day as your garbage day.**

M.H - Sweep

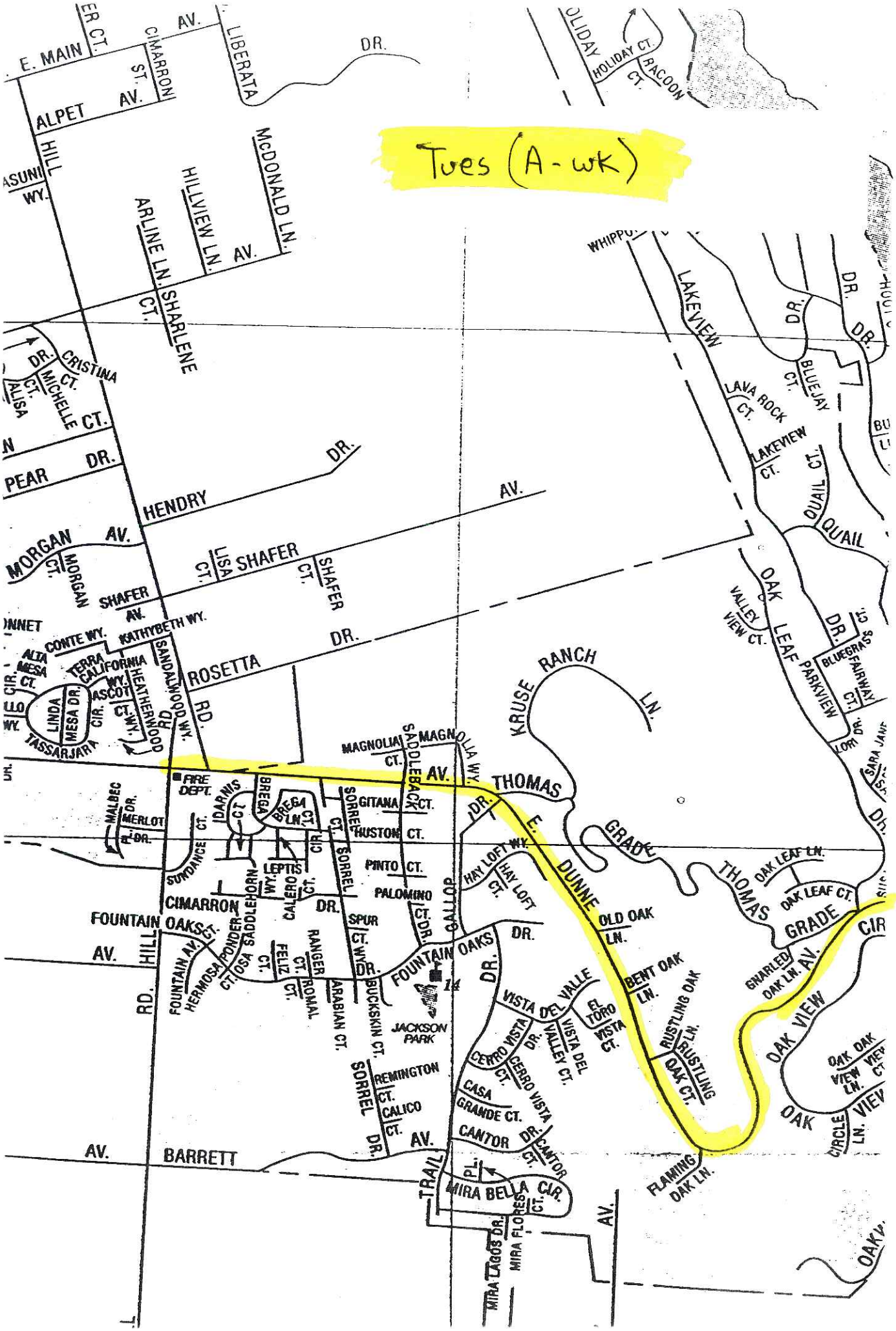
Tuesday - (A-wk)

ATTACHMENT 6A.2

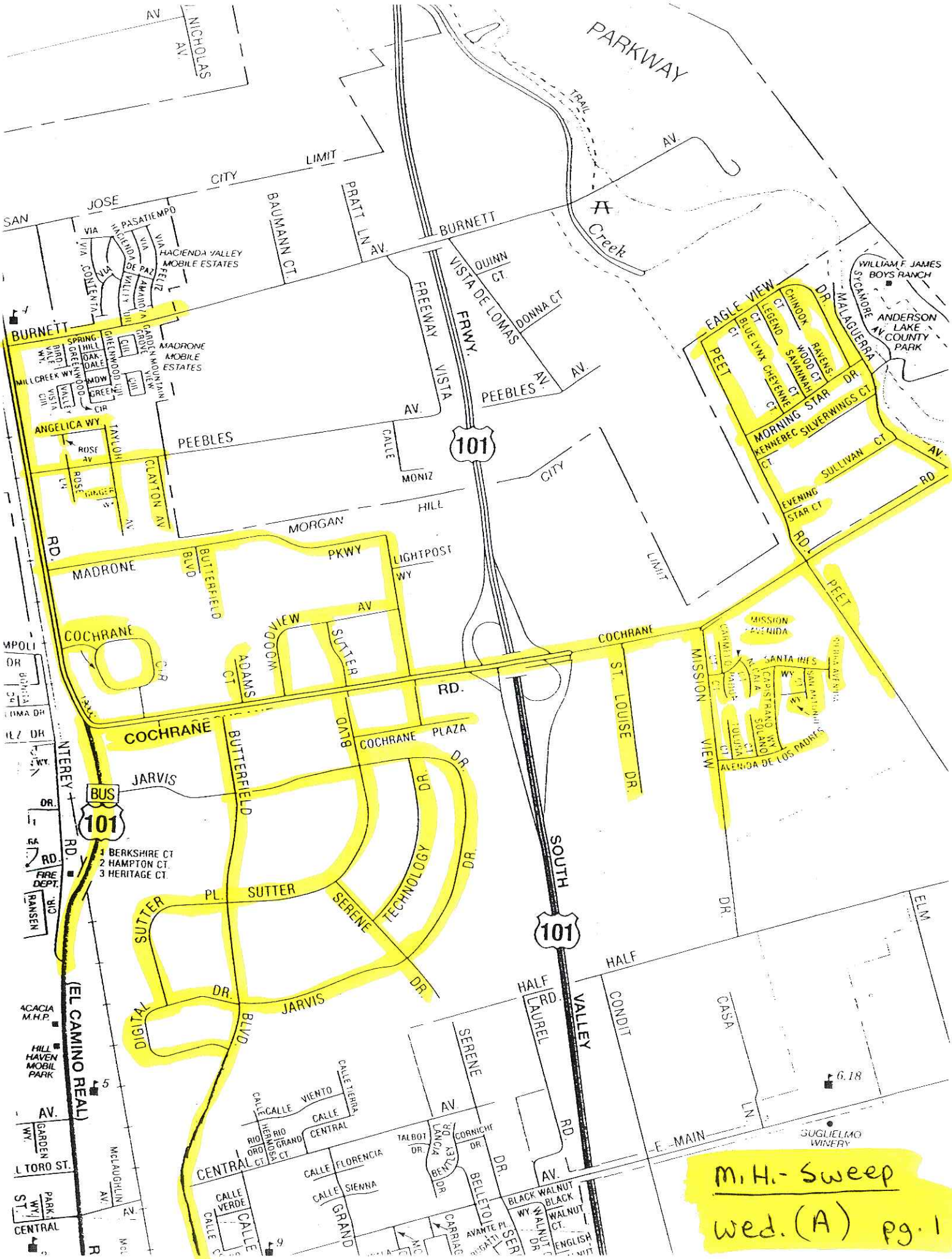


over

Tues (A-wk)



E. MAIN
AV.
CIMARRON ST.
LIBERATA
DR.
ALPET AV.
HILL
McDONALD LN.
HILLVIEW LN.
ARLINE LN.
SHARLENE CT.
CRISTINA CT.
MICHELLE CT.
ALISA CT.
PEAR DR.
HENDRY DR.
MORGAN AV.
MORGAN CT.
SHAFER AV.
LISA CT.
SHAFER CT.
KATHYBETH WY.
CONTE WY.
ALTA MESA CT.
TERRA CALIFORNIA WY.
ASCOT CT.
HEATHERWOOD WY.
SANDALWOOD WY.
ROSETTA DR.
LINDA MESA DR.
TASSARJARA
FIRE DEPT.
MALBEC DR.
MERLOT DR.
SUNDANCE CT.
DARNIS CT.
BREGA CT.
BREGA LN.
LEPTIS WY.
CALERO CT.
SADDLEHORN
CIMARRON DR.
FOUNTAIN OAKS CT.
FOUNTAIN AV.
HERMOSA CT.
PONDER CT.
OSA CT.
FELIZ CT.
RANGER CT.
ROMAL CT.
ARABIAN CT.
SORREL CT.
SORREL WY.
SPUR CT.
BUCKSKIN CT.
MAGNOLIA CT.
SADDLEBACK AV.
MAGNOLIA WY.
GITANA CT.
HUSTON CT.
PINTO CT.
PALOMINO CT.
GALLOP DR.
FOUNTAIN OAKS DR.
JACKSON PARK
14
REMINGTON CT.
CALICO CT.
SORREL DR.
BARRETT AV.
TRAIL
MIRA BELLA CIR.
MIRA LAGOS DR.
MIRA FLORES CT.
KRUSE RANCH LN.
THOMAS GRADE
E. DUNNE
HAY LOFT WY.
HAY LOFT CT.
OLD OAK LN.
BENT OAK LN.
RUSTLING OAK LN.
RUSTLING OAK CT.
VISTA DEL VALLE
EL TORO VISTA CT.
VISTA DEL VALLEY CT.
CERRO VISTA DR.
CERRO VISTA CT.
CASA GRANDE CT.
CANTOR DR.
CANTOR CT.
FLAMING OAK LN.
OAK LEAF LN.
OAK LEAF CT.
GNARLED OAK LN.
OAK VIEW AV.
OAK VIEW LN.
OAK VIEW CT.
OAK VIEW CIR.
OAK CIRCLE LN.
LAKEVIEW DR.
LAVA ROCK CT.
BLUEJAY CT.
LAKEVIEW CT.
QUAIL CT.
QUAIL
OAK LEAF DR.
VALLEY VIEW CT.
PARKVIEW DR.
BLUEGRASS CT.
FAIRWAY CT.
HOLIDAY CT.
RACOON CT.



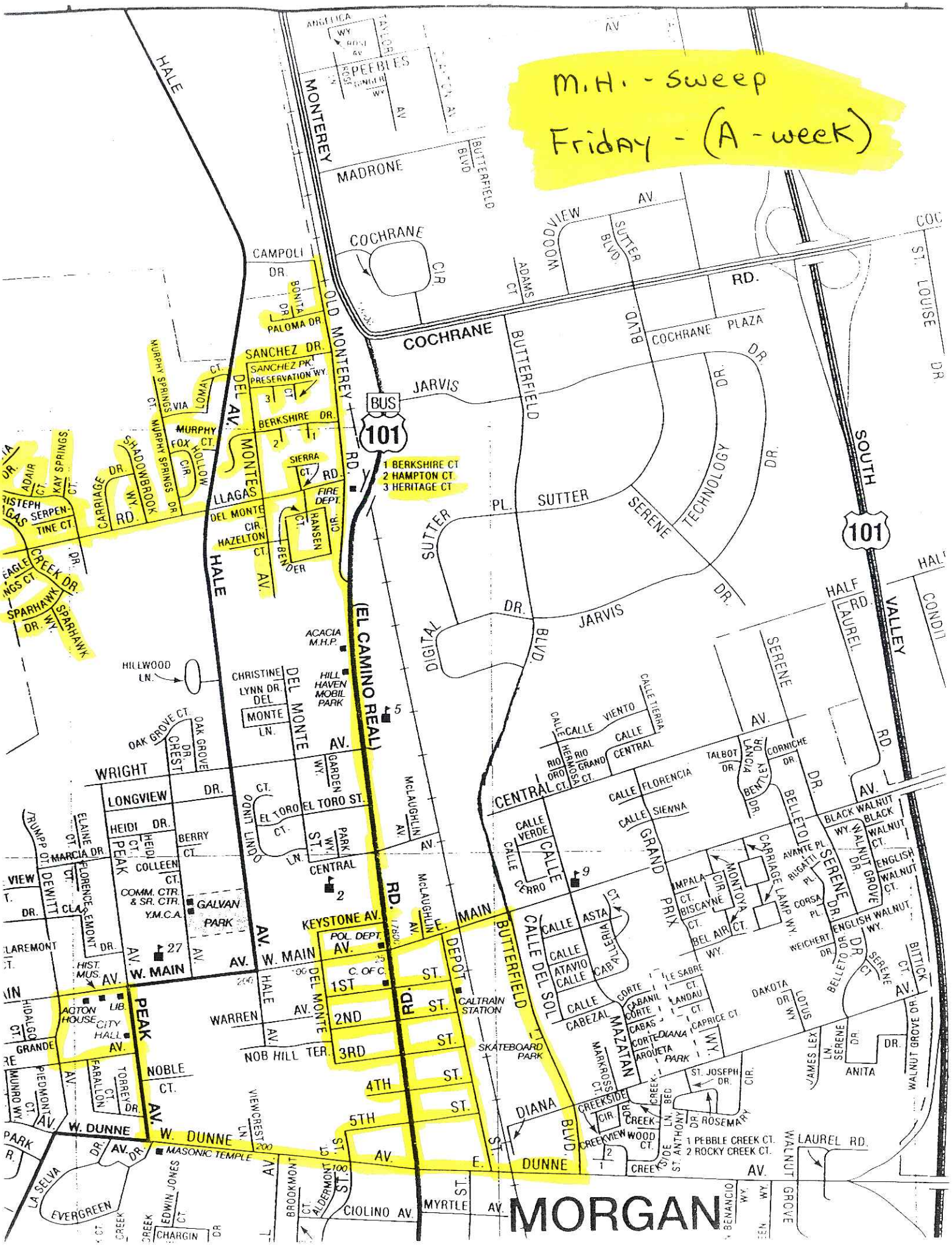
M.H.- Sweep

Wed. (A) pg. 1

M.H. Sweep
Wed. (A) pg. 2

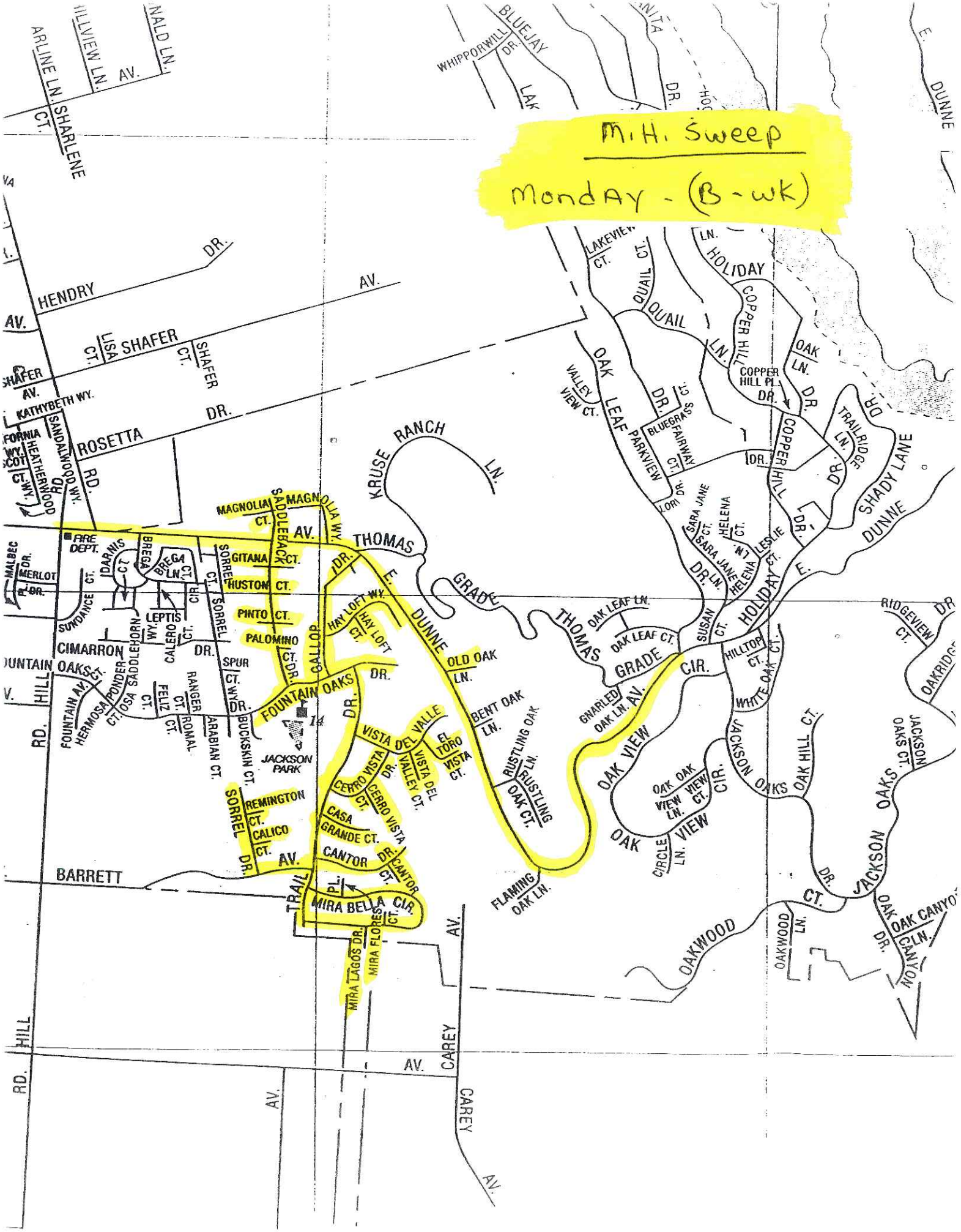
MONTEREY
EDMUNDSON AV
TENNANT
TENNANT STATION WY
CAPITO AV
CONCORD BLVD
CONCORD CIR
VINEYARD
VINEYARD BLVD
VILLAGE CIR
VILLAGE LN
LA CROSSE DR
LA MIRADA
LA PORTE CT
LA PRENDA CT
LA ESCUELA CT
LA DESCANSA CT
EL PAJARO CT
LA MESA CT
LA SIERRA
LA JOLLA CT
LA MAR CT
LA HONDA SUR
LA VIA AZUL CT
LA AGUA CT
PARADISE PARK
BELLA CT
LA TIERRA CT
VIA CASTANA CT
LA GRANGE DR
LA TIERRA
CASTANA
ENCINO DR
LA ENCINO DR
LA BAREE
CALLE LA MAR DR
LA PALMA
LAS COCHES CT
LA PAZ CT
LA CANADA CT
VIA NAVONA
LA VELA CT
VIA LARGO DR
LA JOLLA DR
VIA NARETTO
CALLE SUENO
CALIFORNIA DEPARTMENT OF FORESTRY HEADQUARTERS
FISHER
MAPLE
ROBLE
SANTIAGO PL
SAN SEBASTIAN PL
WEICHERT PARK
CORDOVA CT
CASTILLE
BARCELONA PL
SIERRA CT
MORENA CT
VIA DEL
LA ROCCA DR
ALAMEDA DR
VIA SORRENTO CT
15:200
OLIVE
JOHN WILSON WY
(EL CAMINO REAL)
POLLARD AV
CAMPO BELLO CT
VIA CORFINIO CT
LA ROCCA CT
LA ALAMO
PRATOLA
MONTICELLO WY
YOSEMITE WY
VENETIAN WY
LASSEN WY
AUBURN WY
TAHOE WY
BONNER CT
EXCALIBUR DR
SKIP AWAY CT
PRANCER CT
WHITE CLOUD DR
DARK STAR CT
DANCER
SWORD
MENDOCINO
BLACK PRINCE CT
NATIVE DANCER
COUNT FLEET CT
STARSWEPT LN
SEYMOUR
AMBERWOOD LN
COUNTRY LN
E. MIDDLE
CROWINER AV
SANTA TERESA
DANNY BOY CT
NUT TREE LN
SUMMER VINEWOOD
CHERRY LN
FOREST GROVE DR
WALNUT
HARVEST PINE LN
AUTUMN LN
MELODY LN
LEISURE
W. MIDDLE
GALLANT FOX WY
SILVER CLOUD CT
GREY GHOST CT
BADGER PASS RD
SECRETARIAT CT
WOODLAND ESTATES M.H.P.
PARK
MULBERRY CT
SPRING LN
CHESTNUT CT
CREEKSIDE DR
DEWEY DR
ST. ATHERTON
EASY ST
CREEKSIDE CT
BROOK-VIEW CT
DE ANZA CT
SUNNYBROOK CT
SHADOWLANE CT
ATHERTON CIR
ATHERTON WY
SILVEIRA PARK CT
SUNSHINE GATE
W. SAN MARTIN LN
BLVD
WATER AV
CALIFORNIA
BUS
M.H.-Sweep
Thurs. ("A")

M.H. - Sweep
Friday - (A-week)



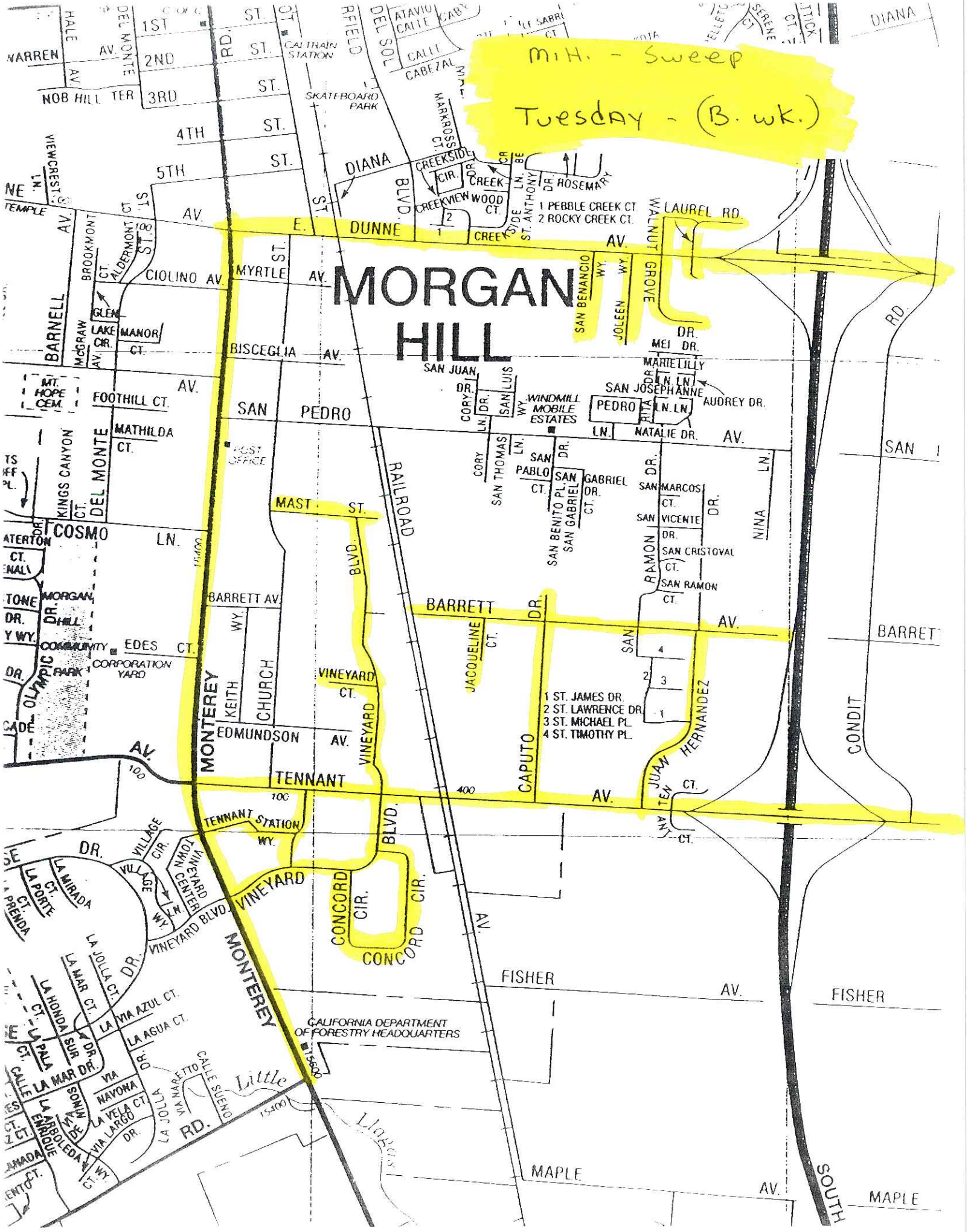
M.H. Sweep

Monday - (B-wk)

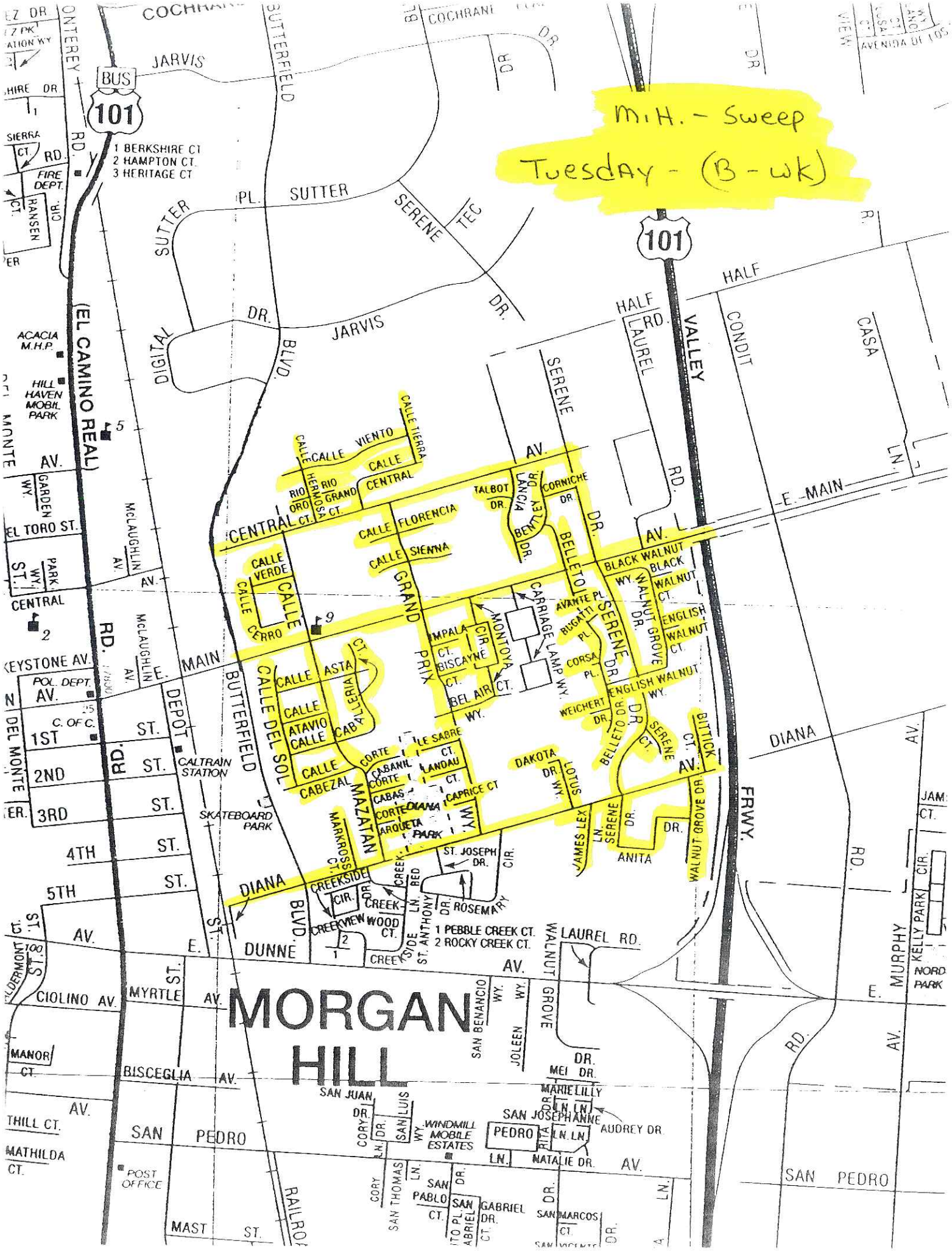


Mth. - Sweep

Tuesday - (B. wk.)

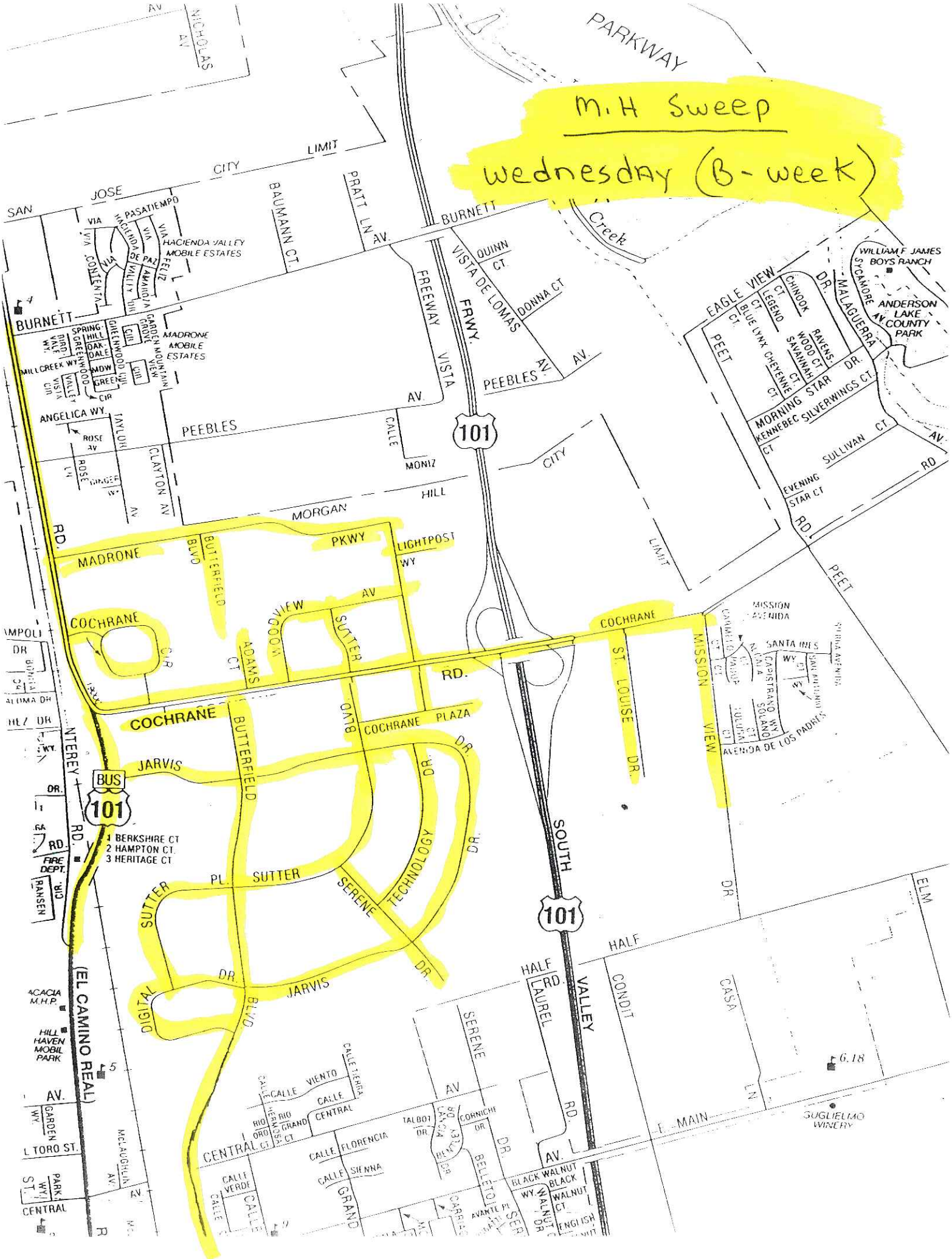


M.H. - Sweep
Tuesday - (B-wk)



M.H Sweep

wednesday (B-week)

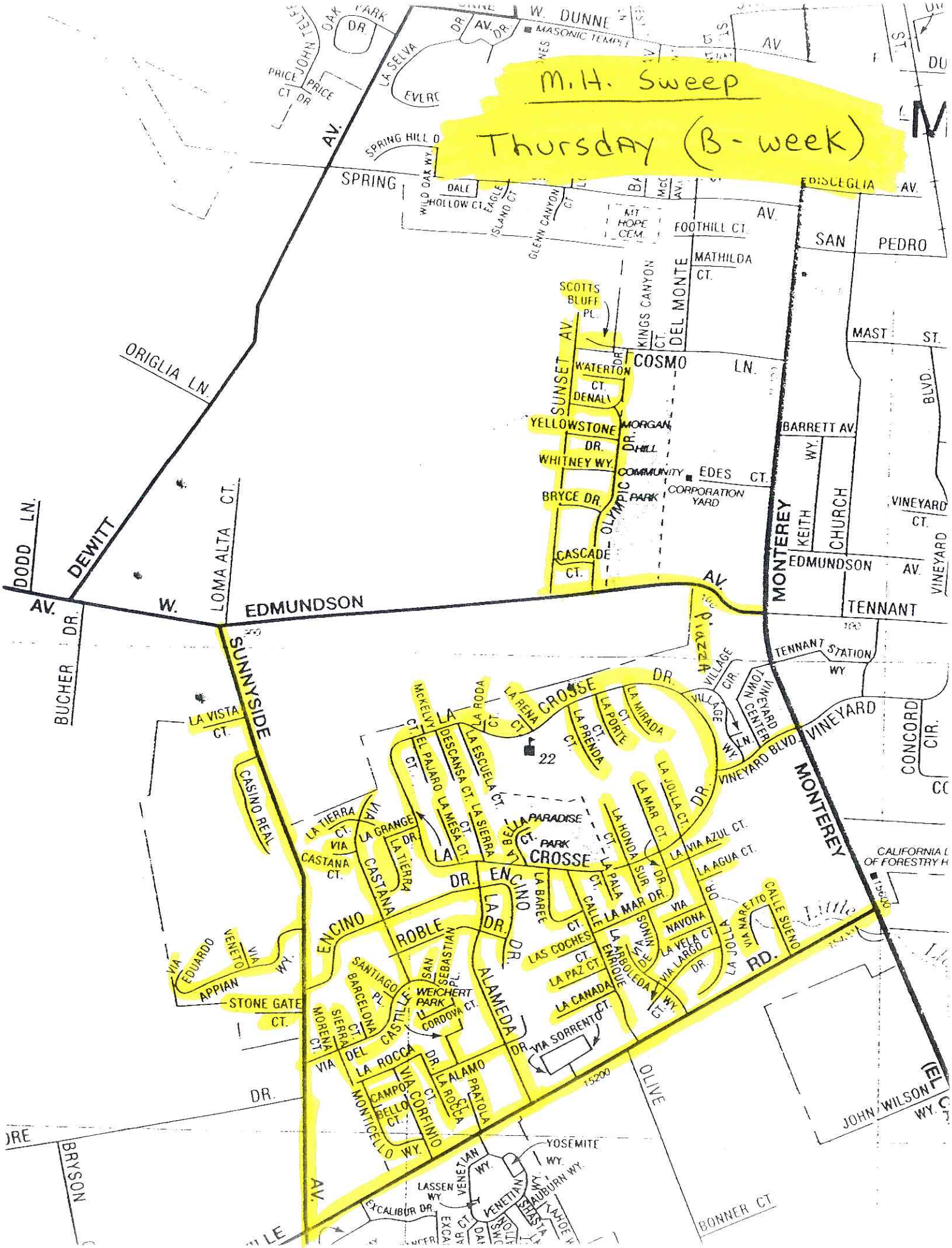


M.H Sweep

Wednesday (B-week)

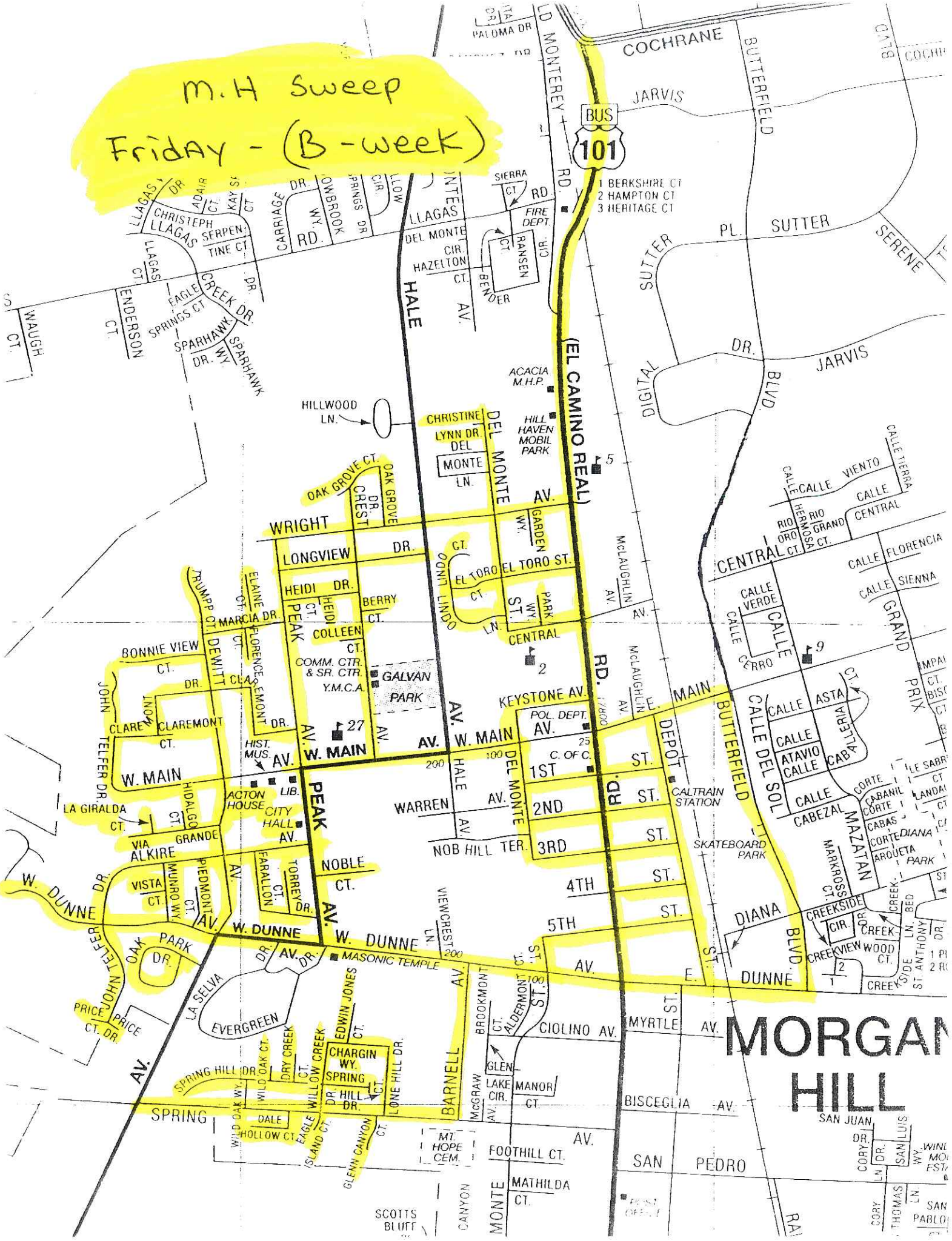
M.H. Sweep

Thursday (B-week)



M.H Sweep

Friday - (B-week)



People • Service • Environment

SOUTH VALLEY DISPOSAL & RECYCLING, INC.

PUBLIC WORKS
JUL 1 1 2005
CITY OF MORGAN HILL

ATTACHMENT 6A.3

FAX TRANSMISSION COVER SHEET

TO: Marie Struve

COMPANY: City of Morgan Hill

FAX #: 779-6282

FROM: Steve

DATE: ~~[illegible]~~ 7-11-05

SUBJECT: ~~[illegible]~~ June 05 Street Sweeping

PAGES (INCLUDING COVER): 2

NOTES:

PLEASE CALL 408/842-3358 IF TRANSMISSION IS NOT CLEAR. RETURN FAX: 408/846-1385.

160 [illegible] PASS HWY • GILROY, CA 95020-9579 • TELEPHONE (408) [illegible] • FAX (408) 842-5664

Proud to be Employee Owned

Morgan Hill Street Sweeping

Week	Date	Day	Curb Miles	Tons Picked Up
A	06/01/05	Wed	45	1.89
A	06/02/05	Thu	43	1.66
A	06/03/05	Fri	46	2.40
	06/04/05	Sat	0	0.00
	06/05/05	Sun	0	0.00
B	06/06/05	Mon	0	0.00
B	06/07/05	Tue	45	2.40
B	06/08/05	Wed	43	2.29
B	06/09/05	Thu	45	2.68
B	06/10/05	Fri	47	3.43
	06/11/05	Sat	0	0.00
	06/12/05	Sun	0	0.00
A	06/13/05	Mon	45	2.64
A	06/14/05	Tue	46	2.29
A	06/15/05	Wed	44	2.02
A	06/16/05	Thu	43	1.94
A	06/17/05	Fri	46	2.62
	06/18/05	Sat	0	0.00
	06/19/05	Sun	0	0.00
B	06/20/05	Mon	0	0.00
B	06/21/05	Tue	45	1.64
B	06/22/05	Wed	43	2.00
B	06/23/05	Thu	45	3.08
B	06/24/05	Fri	47	2.18
	06/25/05	Sat	0	0.00
	06/26/05	Sun	0	0.00
A	06/27/05	Mon	43	2.30
A	06/28/05	Tue	45	1.98
A	06/29/05	Wed	44	2.80
A	06/30/05	Thu	44	2.40

PUBLIC WORKS
AUG 0 8 2005
CITY OF MORGAN HILL

People • Service • Environment
SOUTH VALLEY DISPOSAL & RECYCLING, INC.

FAX TRANSMISSION COVER SHEET

TO: Marie Steuve

COMPANY: City of Morgan Hill

FAX #: 779-6282

FROM: Steve

DATE: 8/8/05

SUBJECT: July 2005 Sweeping

PAGES (INCLUDING COVER): 2

NOTES:

PLEASE CALL 408/842-3358 IF TRANSMISSION IS NOT CLEAR. RETURN FAX: 408/846-1385.

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Proud To Be Employee Owned

PRINTED ON RECYCLED PAPER

Morgan Hill Street Sweeping

Week	Date	Day	Curb Miles	Tons Picked Up
A	07/01/05	Fri	46	2.88
	07/02/05	Sat	0	0.00
	07/03/05	Sun	0	0.00
B	07/04/05	Mon	0	0.00
B	07/05/05	Tue	45	0.00
B	07/06/05	Wed	44	2.68
B	07/07/05	Thu	45	2.48
B	07/08/05	Fri	46	2.90
	07/09/05	Sat	0	0.00
	07/10/05	Sun	0	0.00
A	07/11/05	Mon	45	2.20
A	07/12/05	Tue	46	2.03
A	07/13/05	Wed	44	3.10
A	07/14/05	Thu	44	2.04
A	07/15/05	Fri	46	2.88
	07/16/05	Sat	0	0.00
	07/17/05	Sun	0	0.00
B	07/18/05	Mon	0	0.00
B	07/19/05	Tue	44	1.76
B	07/20/05	Wed	44	2.40
B	07/21/05	Thu	45	2.10
B	07/22/05	Fri	47	2.51
	07/23/05	Sat	0	0.00
	07/24/05	Sun	0	0.00
A	07/25/05	Mon	45	2.42
A	07/26/05	Tue	45	2.16
A	07/27/05	Wed	43	3.44
A	07/28/05	Thu	44	2.08
A	07/29/05	Fri	46	2.64
	07/30/05	Sat	0	0.00
	07/31/05	Sun	0	0.00

People • Service • Environment
SOUTH VALLEY DISPOSAL & RECYCLING, INC.

PUBLIC WORKS
SEP 01 2005
CITY OF MORGAN HILL

FAX TRANSMISSION COVER SHEET

TO: Marie Struve

COMPANY: City of Morgan Hill

FAX #: 778-6282

FROM: Steve

DATE: 9/1/05

SUBJECT: Aug 05 Street Sweeping

PAGES (INCLUDING COVER): 2

NOTES:

PLEASE CALL 408/842-3358 IF TRANSMISSION IS NOT CLEAR. RETURN FAX: 408/846-1385.

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Proud To Be Employee Owned

Morgan Hill Street Sweeping

Week	Date	Day	Curb Miles	Tons Picked Up
B	08/01/05	Mon	0	0.00
B	08/02/05	Tue	44	2.28
B	08/03/05	Wed	45	2.22
B	08/04/05	Thu	45	2.01
B	08/05/05	Fri	47	2.69
	08/06/05	Sat	0	0.00
	08/07/05	Sun	0	0.00
A	08/08/05	Mon	44	2.43
A	08/09/05	Tue	45	2.28
A	08/10/05	Wed	46	2.03
A	08/11/05	Thu	44	2.40
A	08/12/05	Fri	46	3.24
	08/13/05	Sat	0	0.00
	08/14/05	Sun	0	0.00
B	08/15/05	Mon	0	0.00
B	08/16/05	Tue	43	1.39
B	08/17/05	Wed	44	1.54
B	08/18/05	Thu	45	1.68
B	08/19/05	Fri	46	2.20
	08/20/05	Sat	0	0.00
	08/21/05	Sun	0	0.00
A	08/22/05	Mon	46	1.77
A	08/23/05	Tue	44	2.03
A	08/24/05	Wed	46	2.63
A	08/25/05	Thu	44	1.49
A	08/26/05	Fri	45	2.12
	08/27/05	Sat	0	0.00
	08/28/05	Sun	0	0.00
B	08/29/05	Mon	0	0.00
B	08/30/05	Tue	45	1.68
B	08/31/05	Wed	44	2.30

People • Service • Environment
SOUTH VALLEY DISPOSAL & RECYCLING, INC.

OCT 0 5 2005
MORGAN

FAX TRANSMISSION COVER SHEET

TO: Monie

COMPANY: city of Morgan Hill

FAX #: 779-6282

FROM: Steve

DATE: 10/4/05

SUBJECT: Sept. 2005 Sweeping

PAGES (INCLUDING COVER): 2

NOTES:

PLEASE CALL 408/842-3358 IF TRANSMISSION IS NOT CLEAR. RETURN FAX: 408/846-1385.

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Proud To Be Employee Owned

PRINTED ON RECYCLED PAPER

Morgan Hill Street Sweeping

Week	Date	Day	Curb Miles	Tons Picked Up
B	09/01/05	Thu	45	1.89
B	09/02/05	Fri	46	2.15
	09/03/05	Sat	0	0.00
	09/04/05	Sun	0	0.00
A	09/05/05	Mon	45	2.09
A	09/06/05	Tue	44	2.13
A	09/07/05	Wed	46	2.24
A	09/08/05	Thu	44	1.74
A	09/09/05	Fri	47	2.58
	09/10/05	Sat	0	0.00
	09/11/05	Sun	0	0.00
B	09/12/05	Mon	0	0.00
B	09/13/05	Tue	44	2.15
B	09/14/05	Wed	45	1.67
B	09/15/05	Thu	44	2.04
B	09/16/05	Fri	47	2.13
	09/17/05	Sat	0	0.00
	09/18/05	Sun	0	0.00
A	09/19/05	Mon	46	2.20
A	09/20/05	Tue	45	1.96
A	09/21/05	Wed	45	1.99
A	09/22/05	Thu	46	1.09
A	09/23/05	Fri	46	2.33
	09/24/05	Sat	0	0.00
	09/25/05	Sun	0	0.00
B	09/26/05	Mon	0	0.00
B	09/27/05	Tue	45	2.02
B	09/28/05	Wed	45	1.46
B	09/29/05	Thu	44	1.98
B	09/30/05	Fri	47	2.39
Totals				

Sept-05

People • Service • Environment
SOUTH VALLEY DISPOSAL & RECYCLING, INC.

PUBLIC WORKS
NOV 04 2005
CITY OF MORGAN HILL

FAX TRANSMISSION COVER SHEET

TO: Marie Struve

COMPANY: City of Morgan Hill

FAX #: 779-6282

FROM: Steve

DATE: 11/4/05

SUBJECT: OCT 05 / Street Sweeping

PAGES (INCLUDING COVER): 2

NOTES:

PLEASE CALL 408/842-3358 IF TRANSMISSION IS NOT CLEAR. RETURN FAX: 408/846-1385.

1351 PACHECO PASS HWY • GILROY, CA 95020-9579 • TELEPHONE (408) 842-3358 • FAX (408) 842-5664
Proud To Be Employee Owned

Morgan Hill Street Sweeping

Week	Date	Day	Curb Miles	Tons Picked Up
	10/01/05	Sat	0	0.00
	10/02/05	Sun	0	0.00
A	10/03/05	Mon	45	2.60
A	10/04/05	Tue	44	2.94
A	10/05/05	Wed	46	1.70
A	10/06/05	Thu	44	1.34
A	10/07/05	Fri	48	2.06
	10/08/05	Sat	0	0.00
	10/09/05	Sun	0	0.00
B	10/10/05	Mon	0	0.00
B	10/11/05	Tue	45	2.48
B	10/12/05	Wed	46	1.84
B	10/13/05	Thu	45	1.94
B	10/14/05	Fri	48	2.56
	10/15/05	Sat	0	0.00
	10/16/05	Sun	0	0.00
A	10/17/05	Mon	45	2.48
A	10/18/05	Tue	46	2.32
A	10/19/05	Wed	46	2.40
A	10/20/05	Thu	45	1.57
A	10/21/05	Fri	47	2.42
	10/22/05	Sat	0	0.00
	10/23/05	Sun	0	0.00
B	10/24/05	Mon	0	0.00
B	10/25/05	Tue	45	1.98
B	10/26/05	Wed	45	2.12
B	10/27/05	Thu	47	1.42
B	10/28/05	Fri	47	2.43
	10/29/05	Sat	0	0.00
	10/30/05	Sun	0	0.00
A	10/31/05	Mon	46	2.86

Oct-05

People • Service • Environment
SOUTH VALLEY DISPOSAL & RECYCLING, INC.

PUBLIC WORKS
DEC 0 8 2005
CITY OF MORGAN HILL

FAX TRANSMISSION COVER SHEET

TO: Monie Steuve

COMPANY: City of Morgan Hill

FAX: 779-6282

FROM: Steve Lucchetti

DATE: 12/8/05

SUBJECT: NOV 2005 Street Sweeping

PAGES (INCLUDING COVER): 2

NOTE:

PLEASE CALL 408/842-3358 IF TRANSMISSION IS NOT CLEAR. RETURN FAX: 408/846-1385.

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Proud To Be Employee Owned

Morgan Hill Street Sweeping

Week	Date	Day	Curb Miles	Tons Picked Up
	11/01/05	Tue	45	2.00
	11/02/05	Wed	45	1.87
	11/03/05	Thu	47	3.01
	11/04/05	Fri	46	3.06
	11/05/05	Sat	0	0.00
	11/06/05	Sun	0	0.00
	11/07/05	Mon	0	0.00
	11/08/05	Tue	44	2.13
	11/09/05	Wed	45	2.54
	11/10/05	Thu	46	2.43
	11/11/05	Fri	47	2.03
	11/12/05	Sat	0	0.00
	11/13/05	Sun	0	0.00
	11/14/05	Mon	46	2.88
	11/15/05	Tue	44	5.01
	11/16/05	Wed	45	2.76
	11/17/05	Thu	46	2.42
	11/18/05	Fri	46	2.22
	11/19/05	Sat	0	0.00
	11/20/05	Sun	0	0.00
	11/21/05	Mon	0	0.00
	11/22/05	Tue	44	2.24
	11/23/05	Wed	45	2.40
	11/24/05	Thu	45	1.88
	11/25/05	Fri	46	2.34
	11/26/05	Sat	0	0.00
	11/27/05	Sun	0	0.00
	11/28/05	Mon	47	2.48
	11/29/05	Tue	45	3.40
	11/30/05	Wed	45	2.50

Nov-05

People • Service • Environment
SOUTH VALLEY DISPOSAL & RECYCLING, INC.

PUBLIC WORKS
JAN 11 2006
CITY OF MORGAN HILL

FAX TRANSMISSION COVER SHEET

TO: Morie Struve

COMPANY: City of Morgan Hill

FAX: 779-6282

FROM: Steve

DATE: 1-11-06

SUBJECT: Dec 2005 ~~[illegible]~~ Street Sweeping

PAGES (INCLUDING COVER): 2

NOTES:

PLEASE CALL 408/842-3358 IF TRANSMISSION IS NOT CLEAR. RETURN FAX: 408/846-1385.

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Morgan Hill Street Sweeping

W ek	Date	Day	Curb Miles	Tons Picked Up
	12/01/05	Thu	44	2.40
	12/02/05	Fri	46	2.04
	12/03/05	Sat	0	0.00
	12/04/05	Sun	0	0.00
	12/05/05	Mon	0	0.00
	12/06/05	Tue	45	2.15
	12/07/05	Wed	45	2.38
	12/08/05	Thu	46	1.53
	12/09/05	Fri	47	2.40
	12/10/05	Sat	0	0.00
	12/11/05	Sun	0	0.00
	12/12/05	Mon	46	2.00
	12/13/05	Tue	45	2.42
	12/14/05	Wed	45	1.98
	12/15/05	Thu	46	2.48
	12/16/05	Fri	45	2.00
	12/17/05	Sat	0	0.00
	12/18/05	Sun	0	0.00
	12/19/05	Mon	0	0.00
	12/20/05	Tue	45	2.40
	12/21/05	Wed	46	1.98
	12/22/05	Thu	47	2.84
	12/23/05	Fri	48	3.20
	12/24/05	Sat	0	0.00
	12/25/05	Sun	0	0.00
	12/26/05	Mon	46	2.40
	12/27/05	Tue	44	2.48
	12/28/05	Wed	46	1.98
	12/29/05	Thu	45	2.64
	12/30/05	Fri	47	3.00
	12/31/05	Sat	0	0.00

People • Service • Environment
SOUTH VALLEY DISPOSAL & RECYCLING, INC.

PUBLICWORKS
FEB 0 2 2006
CITY OF MORGAN HILL

FAX TRANSMISSION COVER SHEET

TO: Marie Struve

COMPANY: City of Morgan Hill

FAX: 779-6282

FROM: Steve

DATE: 2/2/06

SUBJECT: JAN, 2006 Street Sweeping

PAGES (INCLUDING COVER): 2

NOTES:

PLEASE CALL 408/842-3358 IF TRANSMISSION IS NOT CLEAR. RETURN FAX: 408/846-1385.

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Street Sweeping
Miles and Tonnage

Week	Date	Day	Curb Miles	Tons Picked Up
	01/01/06	Sun	0	0.00
B	01/02/06	Mon	0	0.00
B	01/03/06	Tue	45	3.31
B	01/04/06	Wed	47	1.84
B	01/05/06	Thu	45	2.40
B	01/06/06	Fri	47	3.32
	01/07/06	Sat	0	0.00
	01/08/06	Sun	0	0.00
A	01/09/06	Mon	47	2.08
A	01/10/06	Tue	45	3.29
A	01/11/06	Wed	44	1.67
A	01/12/06	Thu	46	1.87
A	01/13/06	Fri	46	3.12
	01/14/06	Sat	0	0.00
	01/15/06	Sun	0	0.00
B	01/16/06	Mon	0	0.00
B	01/17/06	Tue	45	2.63
B	01/18/06	Wed	46	1.75
B	01/19/06	Thu	45	2.63
B	01/20/06	Fri	47	3.33
	01/21/06	Sat	0	0.00
	01/22/06	Sun	0	0.00
A	01/23/06	Mon	46	1.98
A	01/24/06	Tue	47	4.07
A	01/25/06	Wed	46	3.20
A	01/26/06	Thu	47	2.50
A	01/27/06	Fri	45	1.74
	01/28/06	Sat	0	0.00
	01/29/06	Sun	0	0.00
B	01/30/06	Mon	0	0.00
B	01/31/06	Tue	46	2.80

People • Service • Environment
SOUTH VALLEY DISPOSAL & RECYCLING, INC.

PUBLIC WORKS
MAR 0 3 2006
CITY OF MORGAN HILL

FAX TRANSMISSION COVER SHEET

TO: Marie Struve

COMPANY: City of Morgan Hill

FAX: 779-6282

FROM: Steve

DATE: 3/3/06

SUBJECT: Feb. 2006 Street Sweeping

PAGES (INCLUDING COVER): 2

NOTES:

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Morgan Hill Street Sweeping

Week	Date	Day	Curb Miles	Tons Picked Up
B	02/01/06	Wed	45	2.00
B	02/02/06	Thu	47	2.44
B	02/03/06	Fri	47	3.47
	02/04/06	Sat	0	0.00
	02/05/06	Sun	0	0.00
A	02/06/06	Mon	47	3.47
A	02/07/06	Tue	45	2.44
A	02/08/06	Wed	45	2.94
A	02/09/06	Thu	46	2.42
A	02/10/06	Fri	47	2.59
	02/11/06	Sat	0	0.00
	02/12/06	Sun	0	0.00
B	02/13/06	Mon	0	0.00
B	02/14/06	Tue	46	4.29
B	02/15/06	Wed	44	2.78
B	02/16/06	Thu	46	2.41
B	02/17/06	Fri	48	5.19
	02/18/06	Sat	0	0.00
	02/19/06	Sun	0	0.00
A	02/20/06	Mon	46	2.10
A	02/21/06	Tue	46	3.39
A	02/22/06	Wed	45	2.25
A	02/23/06	Thu	46	2.52
A	02/24/06	Fri	48	2.28
	02/25/06	Sat	0	0.00
	02/26/06	Sun	0	0.00
B	02/27/06	Mon	0	0.00
B	02/28/06	Tue	47	1.79

People • Service • Environment
SOUTH VALLEY DISPOSAL & RECYCLING, INC.

PUBLIC WORKS
APR 10 2006
CITY OF MORGAN HILL

FAX TRANSMISSION COVER SHEET

TO: Morie Struve

COMPANY: City of Morgan Hill

FAX: 779-6282

FROM: Steve

DATE: 4-10-06

SUBJECT: MARCH 2006 Street Sweeping

PAGES (INCLUDING COVER): 2

NOTES:

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Morgan Hill Street Sweeping

Week	Date	Day	Curb Miles	Tons Picked Up
B	03/01/06	Wed	45	4.35
B	03/02/06	Thu	46	2.46
B	03/03/06	Fri	48	1.96
	03/04/06	Sat	0	0.00
	03/05/06	Sun	0	0.00
A	03/06/06	Mon	46	2.48
A	03/07/06	Tue	45	1.46
A	03/08/06	Wed	47	2.28
A	03/09/06	Thu	46	4.49
A	03/10/06	Fri	48	2.38
	03/11/06	Sat	0	0.00
	03/12/06	Sun	0	0.00
B	03/13/06	Mon	0	0.00
B	03/14/06	Tue	46	1.74
B	03/15/06	Wed	46	1.51
B	03/16/06	Thu	48	1.45
B	03/17/06	Fri	47	2.06
	03/18/06	Sat	0	0.00
	03/19/06	Sun	0	0.00
A	03/20/06	Mon	47	2.24
A	03/21/06	Tue	47	2.00
A	03/22/06	Wed	46	2.94
A	03/23/06	Thu	47	2.17
A	03/24/06	Fri	49	3.19
	03/25/06	Sat	0	0.00
	03/26/06	Sun	0	0.00
B	03/27/06	Mon	0	0.00
B	03/28/06	Tue	45	2.58
B	03/29/06	Wed	48	2.71
B	03/30/06	Thu	47	2.06
B	03/31/06	Fri	47	2.92

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SOUTH VALLEY DISPOSAL & RECYCLING, INC.

PUBLIC WORKS
JUN 06 2006
CITY OF MORGAN HILL

FAX TRANSMISSION COVER SHEET

TO: Morie Struve

COMPANY: City of Morgan Hill

FAX: 779-6282

FROM: Steve

DATE: 6/6/06

SUBJECT: May 2006 Street Sweeping

PAGES (INCLUDING COVER): 2

NOTES:

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Morgan Hill Street Sweeping

Week	Date	Day	Curb Miles	Tons Picked Up
A	05/01/06	Mon	47	2.04
A	05/02/06	Tue	46	3.26
A	05/03/06	Wed	46	2.62
A	05/04/06	Thu	47	1.34
A	05/05/06	Fri	48	2.88
	05/06/06	Sat	0	0.00
	05/07/06	Sun	0	0.00
B	05/08/06	Mon	0	0.00
B	05/09/06	Tue	45	3.03
B	05/10/06	Wed	45	2.26
B	05/11/06	Thu	48	2.67
B	05/12/06	Fri	47	2.97
	05/13/06	Sat	0	0.00
	05/14/06	Sun	0	0.00
A	05/15/06	Mon	47	3.45
A	05/16/06	Tue	46	3.64
A	05/17/06	Wed	46	2.94
A	05/18/06	Thu	47	2.09
A	05/19/06	Fri	48	2.32
	05/20/06	Sat	0	0.00
	05/21/06	Sun	0	0.00
B	05/22/06	Mon	0	0.00
B	05/23/06	Tue	44	2.93
B	05/24/06	Wed	45	3.57
B	05/25/06	Thu	47	2.63
B	05/26/06	Fri	49	2.40
	05/27/06	Sat	0	0.00
	05/28/06	Sun	0	0.00
A	05/29/06	Mon	46	2.80
A	05/30/06	Tue	48	3.30
A	05/31/06	Wed	46	2.64

People • Service • Environment
SOUTH VALLEY DISPOSAL & RECYCLING, INC.

PUBLIC WORKS
JUL 11 2006
CITY OF MORGAN HILL

FAX TRANSMISSION COVER SHEET

TO: Morie Struve

COMPANY: City of Morgan Hill

FAX #: 779-6282

FROM: Steve

DATE: 7-11-06

SUBJECT: June 2006 Street Sweeping

PAGES (INCLUDING COVER): 2

NOTES:

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Morgan Hill Street Sweeping

Week	Date	Day	Curb Miles	Tons Picked Up
A	06/01/06	Thu	46	1.89
A	06/02/06	Fri	48	2.99
	06/03/06	Sat	0	0.00
	06/04/06	Sun	0	0.00
B	06/05/06	Mon	0	0.00
B	06/06/06	Tue	46	3.03
B	06/07/06	Wed	44	2.25
B	06/08/06	Thu	46	2.18
B	06/09/06	Fri	48	3.26
	06/10/06	Sat	0	0.00
	06/11/06	Sun	0	0.00
A	06/12/06	Mon	48	2.10
A	06/13/06	Tue	46	3.19
A	06/14/06	Wed	45	1.86
A	06/15/06	Thu	46	1.94
A	06/16/06	Fri	49	2.22
	06/17/06	Sat	0	0.00
	06/18/06	Sun	0	0.00
B	06/19/06	Mon	0	0.00
B	06/20/06	Tue	46	2.20
B	06/21/06	Wed	43	2.44
B	06/22/06	Thu	46	1.50
B	06/23/06	Fri	48	2.86
	06/24/06	Sat	0	0.00
	06/25/06	Sun	0	0.00
A	06/26/06	Mon	48	2.64
A	06/27/06	Tue	46	2.40
A	06/28/06	Wed	45	2.46
A	06/29/06	Thu	46	1.86
A	06/30/06	Fri	49	2.85

ATTACHMENT 6A.4

CITY OF MORGAN HILL

DEPARTMENT OF PUBLIC WORKS

SPECIAL PROVISIONS

STREET SWEEPING

SECTION 1

DEFINITIONS AND TERMS

1-1 City - City of Morgan Hill, California.

1-2 Contractor - The person, corporation or partnership performing street sweeping services under Agreement with the City.

1-3 Curb Mile - Curb mile shall be defined as the distance the sweeping machine travels with an effective sweeping width of eight (8) feet from the curb face along an improved street.

1-4 Street Debris - All loose, inert, dry waste material including refuse, dirt, sand, glass, metal fragments and typical street litter (i.e. cans, bottles, leaves). Street debris does not include waste materials in the catch basins of storm sewers.

1-5 Sweeping Path - Specified paved surface distance from curb line or pavement edge in which Scheduled Service is to be performed.

1-6 Scheduled Service - Sweeping frequency as defined in the Agreement documents which must be performed on the schedule set forth in the Agreement documents.

SECTION 2

SCOPE OF WORK

2-1 Scope of Work - The work under these provisions shall consist of the items contained in the Proposal, including all the supervision, vehicles, labor, materials, tools, equipment and all other items necessary to complete said work in accordance with the Agreement documents.

SECTION 3

SWEEPING SERVICES

3-1 Scheduled Service - The Contractor will furnish scheduled sweeping service for those streets designated by City as required in the Agreement. All designated streets require sweeping along the curb and gutter, and some streets also require sweeping along the median curb.

3-2 Days and Hours of Operation - Scheduled service shall be Monday through Friday only. Areas shall be swept between 4:00 A.M. and 6:00 P.M. with the following specifications: Arterials and major thoroughfares, i.e., those streets receiving weekly service, shall not be swept between the hours of 7:00 A.M. - 9:00 A.M. nor 4:00 P.M. - 6:00 P.M.; and residential streets, i.e., those streets receiving biweekly service, shall not be swept before 7:00 A.M..

Sweeping shall be scheduled to maximize the area of street being swept by minimizing interference by parked vehicles. Sweeping shall be scheduled and done in such a way as to minimize noise complaints. The Deputy Director of Public Works may require revisions in the hours and/or manner of operation as necessary to maximize sweeping coverage, to minimize noise complaints, or to coincide with City staff working hours.

3-3 Holidays - There will be no sweeping on the following observed holidays: New Year's Day and Christmas Day.

3-4 Sweeping Routes - Sweeping routes shall be established by the Contractor. Contractor to provide a description of how they plan to meet the sweeping routine schedule subject to the approval of the Deputy Director of Public Works. Contractor shall submit a map designating the service days to the City for their approval. It is understood that if vehicles are parked on the streets when services are being performed by the Contractor, then Contractor's operations will be impeded and Contractor will be required to bypass said parked vehicles. In such events, the rates charged by Contractor shall not be reduced.

3-5 Hand-Sweeping/Vacuuming - Contractor shall remove all visible debris along curbs, especially in corners and around "porkchop" islands once a month.

3-6 Weather - In the event of heavy rain or other severe weather conditions, the scheduled sweeping service may be suspended. The decision to sweep will be made by the City after consultation with the Contractor.

3-7 Water - Contractor shall obtain a construction water meter from the City of Morgan Hill for the water necessary in the sweeping operation. The deposit service charge fee on the water meter and the cost of the water used shall be borne by the City.

The proper volume and pressure of water shall be supplied by the sweeper at all times to adequately control dust during the sweeping operation.

3-8 Traffic Counters - The Contractor is cautioned that at various times and locations, the City will temporarily install portable traffic counters which utilize a hose placed in the roadway. When an area with a counter is swept, care should be taken to avoid the counter hose.

3-9 Speed - The Contractor shall operate the sweepers between four and six miles per hour when sweeping, unless it can be proven, to the satisfaction of the Deputy Director of Public Works, the sweeper can operate at a higher

speed and still operate efficiently.

3-10 Call Backs - Whenever, in the opinion of the Deputy Director of Public Works, a section of street is inadequately swept, the Contractor shall re-sweep the section in question during the next street sweeping service day.

SECTION 4

EQUIPMENT

4-1 Equipment - The equipment used to complete the sweeping required by this Agreement is subject to the approval of the Deputy Director of Public Works and must conform to the following:

4-1.01 Proof of Ownership - The Contractor must have proof of ownership or a signed lease for the duration of the Agreement for each sweeping machine used in the performance of this Agreement.

4-1.02 Registration - Sweeping machines must be properly registered and insured in accordance with California State Motor Vehicle Laws.

4-1.03 Safety Regulations - Sweeping machines must conform to all federal, state and local safety regulations and be properly licensed through the State of California.

4-1.04 Condition of Equipment - All sweeping machines must not be over ten years old at the time of bid and for the duration of the Agreement, unless approved by the Deputy Director of Public Works.

Machines must be in excellent working condition capable of removing litter, leaves and debris throughout the life of the Agreement. The outside body must be free from dents and large scratches, and paint must be well maintained.

Machines must be equipped with dual gutter brooms not shorter than seven (7) inches and main broom not shorter than eight (8) inches capable of sweeping at minimum an eight-foot path, or vacuum sweep if approved by the Deputy Director of Public Works.

The use of a steel plate on the sweeper wheel to prevent tire scuffing against the curb will not be permitted.

4-2 Maintenance of Equipment - All required maintenance, parts and fuel are part of the Agreement and furnished by the Contractor, and all major mechanical problems must be corrected at the Contractor's yard. A sufficient supply of spare brooms and other parts must be kept on hand to ensure the timely and continuous fulfillment of this Agreement.

4-3 Breakdown of Equipment - At all times the Contractor shall properly maintain a minimum of two (2) sweeping machines, both as to condition and appearance, for the use on the work under this Agreement. In case of breakdown by the main sweeper, immediate service within one hour by a second sweeper is required to complete the daily schedule. If down for more than one hour, a penalty will be assessed at the rate of Fifty Dollars ($50.00) per hour for each hour above and beyond one hour.

4-4 Storage of Equipment - The Contractor must provide his own storage for equipment such as sweepers, brooms, tires, gas, oil and other required parts and materials. The City will not provide storage for any Contractor equipment.

SECTION 5

COMMUNICATIONS AND REPORTS

5-1 Office - The Contractor shall maintain an office or such other facility through which he/she can be contacted and from which he/she can maintain radio or pager contact with sweeping vehicles. It shall be equipped with sufficient telephones and shall have a responsible person in charge from 8:00 a.m. to 5:00 p.m., Monday through Friday. The Contractor shall also provide a 24-hour emergency contact telephone number.

5-2 Complaints - Complaints regarding the street sweeping operations, which the Deputy Director of Public Works considers justifiable and the responsibility of the Contractor, will be referred to the Contractor for immediate attention. Within two (2) days, the Contractor shall submit to the Deputy Director of Public Works a report of the action taken on each complaint.

5-3 Reports - Contractor shall submit a monthly report of curb miles swept. Reports to the City shall be submitted at the end of each month on forms provided by the City.

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6B – Training (Proposed: FY 2005-2006)	
Description	Grounds maintenance and landscaping crews should be trained to understand the effects of maintenance activities, including the use of fertilizer, on storm water quality.
Justification	Proper training of City grounds and maintenance crews is essential to ensure proper practices and proper use of fertilizers, pesticides and herbicides. Crews should be trained to understand how their practices affect storm water quality.
Measurable Goal	Training should be held once per year for all grounds maintenance and landscaping staff. Training should address effects on water quality from landscaping and maintenance activities.
Implementation Schedule	Year 1: Provide training to all City maintenance staff on the proper handling and clean up of maintenance materials. Parks maintenance and landscaping crews will be educated on the proper and efficient use of fertilizers and pest controls. Sewer employees will receive training on maintenance and cleaning activities to be performed during overflows.
Progress Measurement	Number and percentage of grounds maintenance staff trained annually.
Effective Measurement	After receiving training, staff given written quiz to evaluate effectiveness of training.

6B – Training (Implementation: FY 2005-2006)

General Summary: The control measure was not implemented.

Status of Measurable Goals: This year's measurable goal was not met; staff was not available to dedicate time to this control measure.

Effectiveness: Not applicable.

Proposed Modifications: Public Works is working with the Santa Clara Valley Water District (SCVWD) under their Safe Creeks Grant program to pay for a consultant to implement this control measure. Attachment 3E.1 is the request for proposal from SCVWD and the City's proposal for various funding of SWMP's control measures, with item 3 being the funding request for this control measure. The City will supplement this program with its own resources to help with implementation.

Ongoing Implementation

6B – Training (Year 2: FY 2006-2007)	
Description	Grounds maintenance and landscaping crews should be trained to understand the effects of maintenance activities, including the use of fertilizer, on storm water quality.
Justification	Proper training of City grounds and maintenance crews is essential to ensure proper practices and proper use of fertilizers, pesticides and herbicides. Crews should be trained to understand how their practices affect storm water quality.
Measurable Goal	Training should be held once per year for all grounds maintenance and landscaping staff. Training should address effects on water quality from landscaping and maintenance activities.
Implementation Schedule	Year 2: Provide training to all City maintenance staff on the proper handling and clean up of maintenance materials. Parks maintenance and landscaping crews will be educated on the proper and efficient use of fertilizers and pest controls. Sewer employees will receive training on maintenance and cleaning activities to be performed during overflows.
Progress Measurement	Number and percentage of grounds maintenance staff trained annually.
Effective Measurement	After receiving training, staff given written quiz to evaluate effectiveness of training.
*Modifications are noted by the underlined text.	

6C – Street Cleaning (Proposed: FY 2005-2006)	
Description	Street cleaning to remove leaf litter from residential streets in the Fall is effective in diverting materials from drainage channels and creeks. Litter removal is conducted in public rights-of-way and other public property as needed.
Justification	Street cleaning is effective in diverting materials from drainage channels and creeks.
Measurable Goal	Street cleaning over and above the regular street sweeping program to be completed once in the Fall for all residential streets in the City.
Implementation Schedule	Year 1: Provide street cleaning in the Fall and on an as needed basis.
Progress Measurement	Street cleaning performed and documented.
Effective Measurement	Number of residential streets cleaned as a percentage of total streets.

6C – Street Cleaning (Implementation: FY 2005-2006)

General Summary: Per control measure 6A, street sweeping year round is performed by City contractor, South Valley Disposal. In addition on an as needed basis, Public Works maintenance staff removes litter in the public right-of-way and other public property. During the fall season, public street storm drain inlets are inspected for debris build up within the inlet box; drain inlets are cleared of debris via a vacuum and properly disposed (Note: storm drain inlet maintenance is year 2 control measure that will be further developed as part of section 6E).

Status of Measurable Goals: This year's measurable goal was met. Street cleaning over the regular street sweeping program occurred.

Effectiveness: About 80 percent of public residential streets are cleaned per Attachment 6A.3 and 6A.4. Additional litter removal as needed and maintenance of drain inlet boxes further reduces unwanted discharges to local Creeks.

Proposed Modifications: None.

Ongoing Implementation

6C – Street Cleaning (Year 2: FY 2006-2007)	
Description	Street cleaning to remove leaf litter from residential streets in the Fall is effective in diverting materials from drainage channels and creeks. Litter removal is conducted in public rights-of-way and other public property as needed.
Justification	Street cleaning is effective in diverting materials from drainage channels and creeks.
Measurable Goal	Street cleaning over and above the regular street sweeping program to be completed once in the Fall for all residential streets in the City.
Implementation Schedule	Year 2: Provide street cleaning in the Fall and on an as needed basis.
Progress Measurement	Street cleaning performed and documented.
Effective Measurement	Number of residential streets cleaned as a percentage of total streets.
*Modifications are noted by the underlined text.	

6D – Storm Water Pollution Prevention Plan (Year 1: FY 2005-2006 – not scheduled)	
6D – Storm Water Pollution Prevention Plan (Year 2: FY 2006-2007)	
Description	City Corporation Yard to operate under a Storm Water Pollution Prevention Plan
Justification	A SWPPP for the City's corporation yard will provide for the reduction and elimination (where possible) of direct pollutant introduction into adjacent storm water system.
Measurable Goal	Develop and implement a Storm Water Pollution Prevention Plan for the City's corporation yard. This plan will cover street maintenance operations such as pavement repair and street grinding.
Implementation Schedule	Year 2: Develop and implement a SWPPP for the City's corporation yard and street operations.
Progress Measurement	SWPPP prepared and implemented.
Effective Measurement	Are BMP's from SWPPP in place and maintained?

6E – Program for Cleaning Storm Drain Facilities (Year 1: FY 2005-2006 – not scheduled)	
6E – Program for Cleaning Storm Drain Facilities (Year 2: FY 2006-2007)	
Description	Establish a program for regular cleaning of storm drain facilities. Best if accomplished prior to rainy season.
Justification	An annual program for cleaning City storm drain facilities will provide for the reduction and elimination (where possible) of direct pollutant introduction into the storm sewer system.
Measurable Goal	Develop and implement a schedule of cleaning out of major storm drain facilities in City jurisdiction annually. Cleaning of storm drain facilities should lead up to rainy season.
Implementation Schedule	Year 2: Develop and implement schedule for cleaning of storm drain facilities.
Progress Measurement	Schedule is developed. Major storm drain facilities, such as inlets, pipe structures, culverts, outfalls, and basins are cleaned of trash and debris annually.
Effective Measurement	Document cleaning at all sites and amount of trash and debris removed.