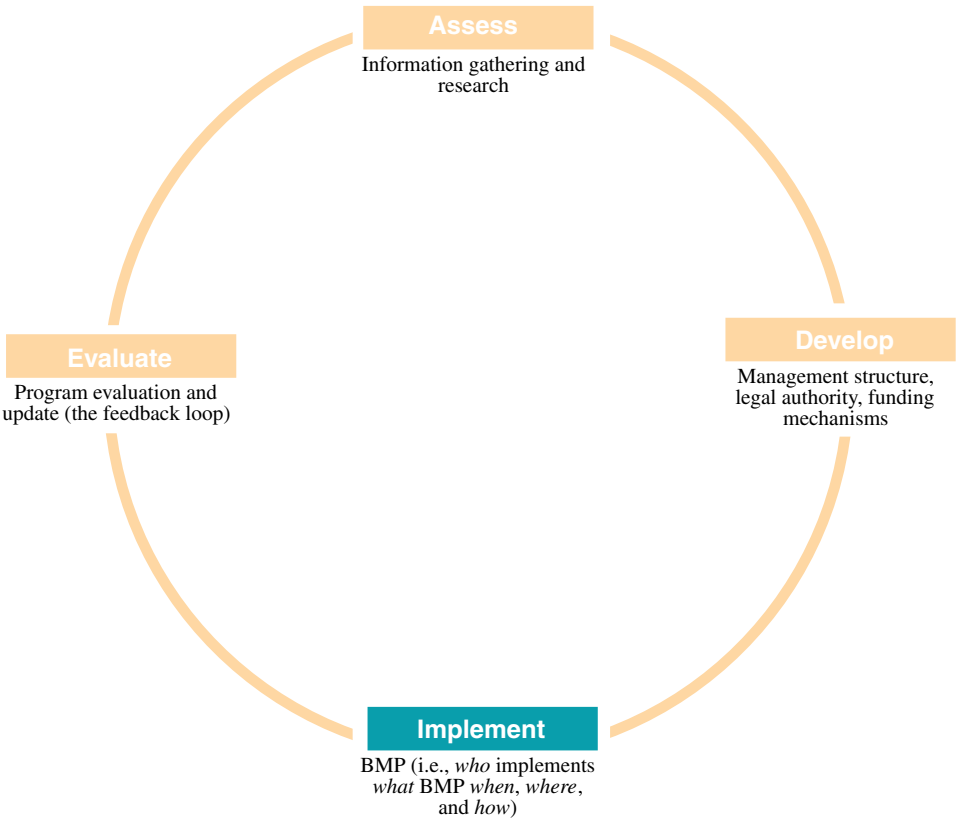
4 Implementation of Urban Runoff Program



Once you have identified a lead department or entity to develop your URP, conducted an assessment of your municipality, and researched other regional and local programs that you can work with to improve urban runoff in your municipality or region, you are ready to start developing and implementing elements of your URP.

The URP consists of several control programs. Each control program consists of a series of actions that the municipality and its citizens and businesses can undertake to address specific sources of urban runoff pollution. The following table summarizes these program elements and the pollutant sources they address.

Elements of an Urban Runoff Program

Program Element	Urban Runoff Pollutant Source
Public Involvement/Participation (Section 4.1)**	
Public Education and Outreach Program (Section 4.2)**	Improper dumping of pollutants by residents and businesses; conduct of everyday activities that result in pollution
Illicit Connection/Discharge Detection and Elimination Program (Section 4.3)**	Illegal dumping of pollutants and inappropriate physical connections to the storm drains
Municipal Operations Pollution Prevention Program (Section 4.4)**	Publicly owned facilities (streets, sidewalks, public parking lots, corporation yards, landscaped areas, etc.)
Construction Site Runoff Control Program (Section 4.5)**	Construction sites (sediment and other pollutants)
New Development/Redevelopment Runoff Control Program (Section 4.6)**	Proposed new and redevelopment project sites (where urban runoff problems can be avoided through planning)
Commercial Facilities Runoff Control Program (Section 4.7)	Commercial facilities
Industrial Facilities Runoff Control Program (Section 4.8)	Industrial facilities

** Minimum requirements of NPDES Phase II regulations.

The first six program elements in the above table are specified in NPDES Phase II regulations as minimum URP requirements. Sections 4.1 through 4.6 in this guide outline a model control program for each of these minimum NPDES requirements. The regulations do not require control programs for commercial and industrial facilities (they suggest relying on public education and outreach to control pollut-

ants from these sources); however, since commercial and industrial facilities are often sources of concern for most urban areas, model control programs for these sources are also included (Sections 4.7 and 4.8) to help you develop focused programs, if necessary. Likewise, Phase II relies on residential sources. Changes in residential practices can have a great impact on reducing pollutants in urban runoff.

A robust URP may require additional controls to those found in Sections 4.1 through 4.8. In fact, improved water quality within your community may require community-specific solutions not present in this document. Do not feel constrained or limited by the control programs presented herein. As presented in the control programs that follow, any number of appropriate URP permutations are possible depending upon your unique circumstances. Nonetheless, your URP development will likely take one of three general approaches:

- ✓ You may choose to limit your program to the six minimum control programs required by NPDES Phase II regulations with uniform emphasis on all six control programs (the presumptive approach, see Section 2.2).
- ✓ Alternately, you may choose to conduct a thorough municipal assessment and focus your effort and budget on those control programs that address activities and pollutants of special concern within your jurisdiction.
- ✓ Or you may kick off your URP by implementing the six minimum program elements and make efforts to incorporate community-specific control measures as your program matures.

4.1 Model Public Involvement/Participation Program

The success of your URP depends upon securing support from your elected officials, citizens, business groups, and municipal staff even before you begin to institute changes.

To secure this support, you need to implement a public involvement/participation program that not only informs these audiences of the urban runoff concerns, but also asks them to participate in the URP's development.

The NPDES Phase II regulations also require that the owner or operator of a small municipal separate storm sewer system include a public involvement and participation program throughout the development and implementation of its URP to ensure that the public accepts and owns the program.

Objectives

The objectives should be to:

- ✓ Raise public awareness about urban runoff pollution through involvement in the municipal URP.
- ✓ Involve the public in the development and implementation process to secure "buy in" and generate public support for municipal water quality protection efforts.

The following information outlines the types of activities that a municipality can undertake to achieve public participation in its URP.

Public Presentations

Public presentations are an important element of your public involvement program. The first audiences for the presentation should be City Councils and municipal staff who will be involved in later implementation. Support for the program must first be achieved within the organization or implementation will not be successful. Elected officials are instrumental in conveying a water quality ethic to the community and municipal staff actually implement the plan. The presentation should then be taken to everyone open to listening, including among others neighborhood and business associations, commercial property owners, and local service clubs.

The foremost objectives of this presentation are to convince your community that a problem exists and that they should fix that problem. You need to acheive buy-in from your citizens and elected officials so that not only are they willing to support your program but also to pay for it. Funding is a challenge that must be faced and unless it is addressed the program cannot proceed. This second empha-

sis of the public presentation incorporates your overall financing strategy and addresses current financial needs.

Use photos and slides to inform your audience about the problem

As a first step, develop a "stock presentation" that basically informs the public of the need for an URP. Begin the presentation with a description of the problem, including a list of the water quality contaminants of concern, highlighting any that are of specific concern in your community, as well as drainage system deficiencies. A table of capital replacement and improvement projects along with their estimated costs for implementation is a good way to communicate the problem of funding deficiencies in your community.

The presentation should go on to include possible solutions to the problems, including URP implementation, which addresses the water quality concerns, and a financing strategy for that program that addresses both water quality and conveyance system solutions. This portion of the presentation may also go into the regulatory background for the water quality efforts being proposed with a brief history of the CNPCP and NPDES Phase II programs. It may be helpful to provide a list of other local jurisdictions to be affected by the programs so that the audience understands the mandates are statewide as well as nationwide. See Appendix 1A for a list of affected jurisdictions in California. A detailed breakdown of the six minimum MURP or NPDES Phase II required elements should include your specific plans for addressing each of those elements. To address funding, a chart or table should be created that breaks down the existing funding sources for urban runoff projects, programs, and operations and maintenance; shortfalls in funding; and your financing strategy for addressing those shortfalls. Include a list or table of any additional resource requirements that will be necessary to implement the URP.

This presentation should be easily adaptable to various audiences and interest groups. Your job in tailoring the presentation to each audience is to assess which facts to present and to add pictures of a local flavor to your presentation. Pictures of rusted corrugated metal pipes, outfalls that have visual water quality problems such as excessive trash, and other "problem areas" are essential in conveying the urgency of the URP. In this case a picture really is worth a thousand words.

The public information campaign will be both time and cost-consuming from the outset. Most municipalities do not have existing financing mechanisms for URPs, so staff time and other resources need financing through other means until a new mechanism is in place. A sample presentation outline is presented in Appendix 4A.

Involvement of Stakeholder Groups

Groups that should be involved in developing the URP include industrial and commercial representatives such as the chamber of commerce, for their input on developing specific URP elements. Meetings should be held with these groups to include their input on developing elements that directly affect the way that they perform their business activities. Commercial and Industrial Runoff Control Programs use BMPs as the cornerstone of their requirements. Representatives should be invited to become involved in developing those requirements so that they become somewhat "self-governed."

The establishment of a Program Advisory Committee could provide a forum for citizen involvement. This forum was used by some NPDES Phase I URPs during program development and implementation. A Program Advisory Committee includes interested citizens, representatives from local environmental groups, and commercial and industrial representatives among others. By opening the committee to any interested participant, additional input and support can be generated for the URP.

Program Implementation

In its URP planning process, the municipality should identify the department to lead this program, as well as any supporting departments. If the municipality has a department already conducting outreach efforts, that department should be used in the public involvement process as well. This coordination provides cost savings and ensures continuity of the methods used to get information out to the public. The City of Monterey did not have a public outreach person or department when this process began, so developing the entire program remained the responsibility of the Public Works Department.

The municipality should establish a timeline for developing the public involvement and participation program. Make sure that resources are available to fund this portion of the program until a funding mechanism is secured.

Program Evaluation and Documentation

Establish Measurable Goals

Your URP should include measurable goals for control programs. Goals should be set at the beginning of the planning process and may include:

- ✓ Conducting presentations to the City Council/Board of Supervisors in the URP's first year
- ✓ Holding public meetings to involve restaurant and auto service industries in the BMP development process within the URP's first 18 months
- ✓ Attending neighborhood meetings throughout the municipality to involve the residential community in the development of the illicit discharge detection and elimination program within the URP's first 2 years

4.2 Model Public Education and Outreach Program

Residential areas constitute the majority of land use in most municipalities. It is important for your URP to reduce discharge of pollutants from these sources. Education and outreach have been found to be the best methods to reach the residents of a community.

The NPDES Phase II regulations also require that the owner or operator of small municipal separate storm sewer systems implement a public education/outreach (PE/O) program to distribute educational materials to the community about the impacts of nonstorm water discharges on water bodies and steps the individuals and households can take to control urban runoff pollution.

"Public education" refers to curriculum-based programs (e.g., school programs), while "public outreach" pertains to methods that disseminate information (e.g., volunteer programs, advertising, displays at public facilities).

Objectives of the Program

The objectives should be to:

- ✓ Understand public perceptions and attitudes towards the problem of urban runoff.
- ✓ Get the message out and raise public awareness about urban runoff pollution and its impact on the community's water resources.
- ✓ Educate the community about specific pollutant sources and on what they can do to reduce urban runoff pollution (alternative pollution prevention solutions).
- ✓ Foster participation through community-based projects or volunteer activities focused on pollution prevention.

For purposes of developing public education and outreach that addresses specific sources, the community can be considered as composed of several sectors or audiences, namely (1) the residential community, (2) the commercial/ business sector, (3) the industrial sector, (4) the development community, (5) the construction sector, and (6) the government (city council, etc.). This section of the MURP guide addresses education and outreach to the public at large and the residential community. The outreach programs for commercial, industrial, and construction sectors, and the development community are addressed in other sections of the guide. Public involvement is discussed in Section 4.1.

Elements of a Public Education/Outreach Program

The municipality should consider the following steps in developing its PE/O program:

- ✓ Contact other municipal, regional/county organizations that conduct public education about other programs in your community. Most communities have recycling, hazardous waste disposal, water conservation, and other such programs in place. Determine if the urban runoff PE/O program can be conducted in cooperation with these entities.
- ✓ Contact other URPs in California to use materials already developed or to be developed, to reduce costs, and to be consistent. See framework summary in Appendix 4B for details.
- ✓ More and more municipalities are forming consortiums with neighboring municipalities to maximize resources.

Increase Public Awareness about Urban Runoff Pollution

Implement a program that increases the awareness in the community about urban runoff pollution and discourages nonstorm water discharges into storm drains. Note that this PE/O program supports MURP's Illicit Connections/Discharge Program (Section 4.3). The following tasks are recommended:

- ✓ Develop materials to get the message out that
  - The storm drain does not lead to a wastewater treatment plant but to the stream, creek, bay, or ocean.
  - Discharges into storm drains result in impacts to wildlife, water quality, health, and eventually the quality of life in the community.
  - Teach the vocabulary related to urban runoff issues. Samples of these outreach materials are included in Appendix 4C.
- ✓ Identify a mechanism appropriate for your municipality for distribution of these outreach materials and establish a frequency of distribution for these materials. Distribution methods may include direct mail, billing statements, television (public cable access), internet, handouts, or radio. Contact other existing local/regional environmental programs to find out about distribution methods that these programs are using and the frequency at which they are sending their messages out.
- ✓ Timing can be critical. If planning a big event, time it with the first rains of winter, Earth Day, or Spring Cleaning so it will have a greater impact.
- ✓ Establish a "Hotline" number that residents can call to inform about illegal dumping incidents or spills and can receive information or recycling, and waste disposal alternatives.

Develop Outreach Programs that Target the Residential Sector of Your Community

Develop a PE/O program that targets specific residential sources in the community. The following steps are recommended:

- ✓ Depending on resources, a municipality can annually prioritize the specific residential sources it will target. Most Phase I municipalities have targeted the following sources:

- Automotive maintenance and washing
- General home maintenance, including building repair, painting, and remodeling, and disposal of swimming pool and spa water
- Landscape maintenance, irrigation, weed and pest control, fertilization, yard debris, and pet waste disposal

✓ The residential outreach program should first target home auto maintenance activities; followed by landscape maintenance, weed and pest control, and painting, the most common residential pollutant sources in any community. If your municipality contains a large number of homes with swimming pools, you may consider that another target source.

✓ Prepare outreach materials for these targeted residential sources. BMPs that address these major residential pollutant sources are presented in BMPs for Residential Sources (Appendix 4E). Examples of effective printed outreach materials are presented in Appendix 4C and in Appendix 4D, Educational Tools and Resources for Public Education Program. Additional brochures, flyers, and handouts can be obtained by contacting the Phase I URPs or statewide storm water organizations.

✓ Identify a mechanism for distribution of these outreach materials and establish a frequency of distribution for these materials. A list of distribution centers is presented in Appendix 4D. Distribution methods include public counters, billing inserts, schools, and libraries.

✓ Note that if your community contains certain ethnic or socioeconomic groups, it may be necessary not only to translate these materials into other languages, but you may also need to consider alternate distribution mechanisms. Contact the Sacramento Storm Water Management Program or the Los Angeles County Urban Runoff Management Program for more information on outreach to socioeconomic and ethnic groups; both programs have conducted extensive studies on this subject. Also, refer to the 2-page summary in Appendix 4B for ideas to reach targeted audiences.

Develop An Outreach Program that Targets Children in the Community

Studies have shown that one of the most effective ways of educating the community is through children's programs because children carry the messages home. Contact and develop with your local Office of Education materials and a curriculum aimed at urban runoff. Inform children about urban runoff concerns using the following techniques:

✓ School Assembly Program (presentations)
✓ Teacher Workshops (using "WET" curriculum)
✓ Activity Packages (games, laboratory experiments)
✓ Enviroscape Model (three-dimensional watershed model)
✓ Science Fairs (promote an urban runoff award)

An effective way to get the message out is through outreach presentations at School Assemblies. School Assembly Programs reach a large number of students relative

to the amount of money and effort spent, especially if the event is coordinated as a countywide event. In a two week countywide tour of the educational show "Canopy" in San Mateo County in 1997, 24 schools participated and over 8,000 students attended the interactive assembly program.

Several theater companies specialize in school assembly programs presenting shows on natural sciences and stormwater pollution. The highly regarded Los Angeles-based theater company *Will and Company*, has created and tours two educational assembly programs "Canopy" and "WaterCycles" focused on stormwater pollution. Both programs have been well received in Los Angeles County elementary schools and are a continuous part of their stormwater education program.

The assembly program presents an excellent opportunity to send outreach materials and resource guides to teachers and schools. Materials sent prior to the event may be used by teachers to prepare for the event, increase interest, and compliment state-approved science curricula. An example of a resource guide and program assessment for teachers, and assembly program information are included in Appendix 4F.

Activity Packages can be created and distributed to schools, afterschool programs, youth camps and to organizations which conduct environmental outreach. CD roms with educational games can be created and distributed to school computer labs. CH2M Hill's computer program Eco-Masters is just one of the many water-related educational computer programs available. See Appendix 4D for a list of resources.

The Enviroscape model is an interactive model of a city scape which identifies multiple pollution sources and demonstrates their routes to our waterways. Participants may "pollute" the scape with cocoa, indicating soil from a construction site, powdered drink mix, indicating industrial pollution, etc. and then watch as the rains from a spray bottle send their pollution down streets, into streams, and eventually into the principle water body. It is portable and can be used at events or classroom presentations. In order to increase participation while demonstrating with large groups, it is recommended that the presenter call upon individuals to help set up, "pollute" and "rain". For information on ordering this, see Appendix 4D. This model has educated over 6,000 children and adults in Monterey and Santa Cruz.

The Enviroscape model has proven to be an effective tool

An effective way of promoting urban runoff issues, especially to secondary school students and the community, is by sponsoring and promoting a Storm Water or Water Quality Award at the Science Fair. Some steps required include:

- ✓ Coordinate with the Office of Education
- ✓ Conduct promotional presentations in science classrooms to plant the seed of interest
- ✓ Create a committee of at least three to attend the science fair and select finalists
- ✓ Interview the selected candidates
- ✓ Choose the award recipient
- ✓ Present the award at the awards ceremony

A science fair is a fun event which can create interest in urban runoff issues as parents and friends view the different displays and through publicity received by the award.

Since school outreach costs can add up, try to obtain local sponsors to pay for printing of materials and other associated program costs.

Public Involvement Through Volunteer Activities

Storm drain stenciling is an effective way to get the community involved

Three of the most effective volunteer participation efforts include a storm drain stenciling program, a citizen water quality monitoring program, and a volunteer education program. All three of these efforts enlist the support of volunteers from the community to participate and later to become leaders in educating others.

Volunteers are invaluable for creating support for the URP, spreading the word about urban runoff issues, creating a sense of community ownership and getting important tasks accomplished. A long-term commitment from volunteers is essential, as training is a time-consuming and costly effort. Often it is actually more costly to use volunteers to accomplish certain tasks than it is to do them in-house, but the other benefits that come from using volunteers far outweigh the costs. You need to develop a press release on urban runoff pollution to recruit volunteers for public involvement and participation activities. Earth Day and Coastal Cleanup Day are national celebrations that may be good days to gain attention as well as during large storm events. Useful volunteer activities are summarized below. For further details on these, see Appendix 4B.

- ✓ **Storm Drain Stenciling.** The easiest activity to get volunteers involved in is a storm drain stenciling program, which can be a short- or long-term project at

the volunteers' discretion. One aspect of a solid URP is to have all catch basins and drainage inlets in a municipality marked so that the public understands that materials going down those drains flow directly to your local receiving water. Stencils often say: "No Dumping - Flows to Bay (Creek/River/Lake)." The plastic or paper stencils can be ordered from a number of companies and can be customized to include the name of the receiving water or remain generic. Some municipalities have started using a thermoplastic label instead of painted stencils, which must be applied by in-house personnel or a contractor. These thermoplastic labels last much longer than painted stencils, which have a life of approximately 3 years, but keep in mind that volunteer forces are always available to repaint. Also, the cost of thermoplastic is high and the machine can do a few stencils at a time.

Storm drain stenciling can be done as a weekend volunteer activity centered around certain events such as Earth Day or Coastal Cleanup Day, or it can be a long-term project given to local groups such as the Boy Scouts, business groups, or Surf Rider or other nonprofit groups. City staff person must supervise the event. Training for this activity takes about half an hour and a group of three people can stencil between 8 and 10 storm drains per hour. See Appendix 4B for specific instructions and storm drain stencil samples. Adapt the design and message to your needs and situation. Time must be put in before to buy all the supplies and have the kits assembled.

✓ **Water Quality Monitoring.** Water quality monitoring takes a long-term commitment from volunteers because of the time involved in training. Monitoring training can take anywhere from a few hours to a full day depending on previous experience. Note that training should emphasize proper protocol. A directory of volunteer monitoring programs is available for California including a number of nonprofit organizations that run those programs. Nonprofit organizations can be enlisted to either run a program for your municipality or to be used as support for your training programs. More detailed information on monitoring programs is presented in Section 5.2 of this document. Appendix 4G contains information on how to obtain available monitoring manuals.

Volunteers can be trained to assist with water quality monitoring

✓ **Volunteer Educators.** A number of activities can be implemented by volunteers who have been trained for specific audiences. Volunteer educators can be used to present educational materials to local businesses and school groups. You may choose to educate volunteers who have already spent time in other municipal urban runoff volunteer programs for this task. Due to the potential for the URP to be politically sensitive for certain types of businesses, make

sure that volunteers are aware of business concerns and that they educate rather than creating tension between local government and the business community. Volunteer educators can be used to hand out educational materials at fairs, festivals, farmer's markets, and other public events.

- ✓ **Other Volunteer Programs.** The programs described in detail above are ideas that have been used by the Cities of Monterey and Santa Cruz in their URPs in collaboration with the Monterey Bay National Marine Sanctuary. These activities have been proven to involve large groups with a limited amount of resources. Other programs that could be used for public involvement purposes, some of which were used in Phase I municipalities, include creek restoration activities, such as Adopt-A-Creek/Watershed Program, or Kids in the Creek (trash pickup program).

Other Outreach Activities

Point-of-Sale Program for used oil is another useful activity

This MURP guide recommends the activities listed above as the core elements of a municipality's PE/O program, which is not to suggest that other outreach activities should not be undertaken. If the municipality has the resources and establishes the need to conduct other PE/O activities, some other effective PE/O programs include outreach to community groups, youth groups and business organizations. A point-of-sale program can be effective with respect to improper disposal of used oil. Table 4-1 presents a matrix that shows the types of outreach activities that can be undertaken to reach specific audiences in any municipality.

Other Sources of Information

Several Phase I URPs are good sources of information about PE/O programs. In addition, a Public Information/Public Participation Committee of the State Storm Water Quality Task Force meets on a regular basis at locations in northern and southern California. Contact the Committee (LA County Public Works (818) 458-5947 or Riverside County (909) 275-1111) to find out about the current status of PE/O programs. In 1993, the Committee prepared a report entitled *A Program Development Guide for Storm Water Public Education in California*, which provides a good overview of elements of PE/O programs for urban runoff. A list of educational tools and resources for public education is included in Appendix 4D.

Program Implementation

The following guidelines should be used to set up this program.

Table 4.1. Types of Outreach by Audiences

ACTIVITY/TASK	AUDIENCES										
	Residents	Socioeconomic Group	Children	Business	Industry	Construction/New Development	Community Groups	Media (PSAs)	Municipal Personel	Officals/Regulators	Allied Organizations
COMMUNITY OUTREACH											
Stormwater Information Hotline*	●	●	●	●	●	●	●	●	●	●	●
Interactive Model*	●	●	●				●			●	●
Fact Sheets*	●	●	●			●	●	●		●	●
Display Exhibit*	●	●	●	●			●			●	●
Tip Sheets	●	●						●			
Utility Inserts	●	●									
Door Hangers	●	●									
Direct Mail Campaign	●	●									
Newsletter	●						●				
Promotional Items	●		●					●			
Educational Video	●	●	●	●	●		●	●	●	●	
Interested Parties Database	●	●	●	●	●		●	●	●	●	
Computer Game/Quiz	●	●	●				●				
Community Grant Program	●	●	●				●				
Storm Drian Stenciling Program	●	●	●	●	●	●	●	●	●	●	●
VIP Breakfast and Tour				●	●			●		●	
Amateur Photo Contest	●			●			●	●			
Speakers Bureau: Community Group Focus							●				
Volunteer Program	●						●	●			
Best (No) Pest Gadening Contest	●			●			●				
Special Community Events	●	●					●	●			
Celebrity Spokespersons	●	●									
CHILDERN'S OUTREACH											
School Assembly Program		●	●								
Kid's Activity Packages			●					●			
Coloring Books			●								
Restaurant Table Mats			●	●							
Children's Television Club			●					●			
Teacher Training/Workshops			●								
Science Fairs/Projects		●	●								
Calanders			●								
Field Trips			●								
Adopt a Watershed/Creek			●	●							
BUSINESS OUTREACH											
COMMERCIAL SECTION OUTREACH				●				●			
Business Incentives Program				●							
Public/Private Partnerships		●		●							
Speakers Bureau: Commercial Sector Focus		●		●							
Educational Workshops for Targeted Businesses											
Point-of-Purchase Campaigns											

Based on Sacramento Stormwater Management Program

Table 4-1 (continued). Types of Outreach by Audiences

ACTIVITY/TASK	AUDIENCES										
	Residents	Socioeconomic Group	Children	Business	Industry	Construction/New Development	Community Groups	Media (PSAs)	Municipal Personel	Officals/Regulators	Allied Organizations
BUSINESS OUTREACH CON'T											
b. Automotive Fluids	●	●		●				●			
c. Home Improvement Products	●			●			●	●			
Sponsorship of Program Elements				●							
INDUSTRIAL SECTOR OUTREACH											
Educational Workshops for Targeted Industries					●						
Industrial Employee Education					●						
Recognition Program					●			●		●	●
Sponsorship of Program Elements					●						
CONSTRUCTION/NEW DEVELOPMENT OUTREACH						●					
Grading/Erosion Control Workshops						●					
Contractor-Focused Workshops						●					
Tailgate Training	●					●	●				
Outreach to Residents of New Developments						●					
Sponsorship of Program Elements						●					
MEDIA RELATIONS											
Media Sponsorship/Partnership								●			
Press Kits	●	●						●			
Pre-Written Articles	●	●					●	●			
Media Interviews/Briefings	●	●						●			
ADVERTISING											
Television (Cable Public Access)	●	●	●	●					●		
Radio	●	●	●	●					●		
Billboards	●	●		●					●		
Print	●	●	●	●	●	●	●	●	●	●	
MULTI-CULTURAL COMMUNITY OUTREACH											
Multi-Lingual Bulletins		●									
Community Leader Outreach		●									
Speakers Bureau: Multi-Ethnic Community Focus		●									
Multi-Cultural Radio PSA's		●						●			
Multi-Cultural Community Events		●									
OUTREACH TO POLITICAL OFFICALS/REGULATORS											
City Council Presentations										●	
Presentations to Regulators										●	
OUTREACH TO MUNICIPAL PERSONNEL											
Educational Workshops for Municipal Personal									●		
COORDINATION WITH ALLIED ORGANIZATIONS											
Coordinate with NPDES Permittees											●
Coordinate with Regional Organizations											●
Coordinate with Other Stormwater Programs											●

Based on Sacramento Stormwater Management Program

Identify Responsible Departments and Personnel Requirements

In its URP, the municipality should identify the department to be responsible for the implementation of the PE/O program, and the personnel to assist in the program. If the municipality has a department already conducting outreach for other environmental programs, consider assigning this task to that department. Significant cost savings, as well as reducing the potential for sending conflicting messages out to your community, can be achieved through coordination with other environmental or adjacent URPs. In several Phase I municipalities, the task of managing public outreach was assigned to a Public Works Department staff person, in others a specific staff position was created. Also, see "How to Begin" section in Appendix 4B for an educator to begin the program.

Establish Timetable for Implementation

The municipality should establish a timetable for setting up the initial program. This timetable should clearly indicate the activities it will undertake each year, depending on the resources (personnel and funding) available to the municipality to implement the program.

Based on the experience of Phase I municipalities, it is recommended that for the first 4 to 5 years, the emphasis of the PE/O program should be on getting the basic message out. The municipality may commence outreach with respect to targeted residential sources or children's outreach programs in years 2 or 3 of the program, but the basic message on runoff pollution should be continued for at least 5 years.

Program Evaluation And Documentation

Establish Measurable Goals

Your URP should include measurable goals for BMPs or control programs. These goals are useful in checking progress of efforts made each year in reducing pollutants to the maximum extent practicable. The municipality may consider some of the following goals for inclusion in its program:

- ✓ Label storm drain inlets within first two years of the program.
- ✓ Distribute outreach materials on *getting the message out* to 100 percent of homes in the first/second year of the program.
- ✓ Distribute outreach materials on targeted residential sources to 100 percent of homes in the third year of program.

Documentation and Annual Reporting

The municipality should develop forms for record keeping and reporting on this program in an annual report. Information that should be reported includes progress made relative to the measurable goals. Sample forms that can be used by the municipality are provided in Appendix 4H.

4.3 Model Illicit Connection/Discharge Detection and Elimination Program

An illicit connection is defined as "a point source discharge of pollutants to separate storm drain system which is not composed entirely of storm water and not authorized by an NPDES permit." Inspections of urban storm drain systems in many areas have shown that a high percentage of industrial and commercial establishments (such as auto shops and restaurants) have improper or illicit plumbing or connections to the storm drain system. Illicit discharges of sanitary wastes through illicit connections can cause high bacterial counts in receiving water and dangers to public health. Because the storm drain and sanitary sewer systems develop cracks and leaks with age, and because these lines are often in close proximity, problems of infiltration from one system to the other are also common.

Improperly disposed materials make their way to the receiving waters via storm drains

Improperly disposed of pollutants are also problematic. While some pollutants are knowingly dumped into storm drain inlets and streams, a multitude of contaminants are inadvertently carried by runoff into storm drain systems — during accidental spills on urban streets, sidewalks, and other exposed areas; for example, pollutants are carried to the storm drains by water used to clean up the spill. Materials disposed of improperly include used oil, household toxic wastes, radiator fluid, washdown water from restaurants and gas stations, and litter such as fast-food packaging, cans, and disposable cups.

To address these sources, your URP should include an illicit connection and discharge detection and elimination program (hereinafter illicit connection/discharge program), and such a program is also one of the six minimum requirements in NPDES Phase II regulations.

Objectives of the Program

Your objectives in developing this program should be to:

- ✓ Control illicit discharges by conducting methodical field surveys/investigations of the storm drain system to identify and eliminate existing improper physical connections.
- ✓ Prevent improper disposal of wastes through a program that combines public education with provision of alternative disposal options and incentives.
- ✓ Contain and clean up accidental spills using proper methods of cleanup and disposal.

The information that follows outlines the specific actions or tasks that a municipality will need to undertake to establish and implement an illicit connection/discharge program that addresses all three of these objectives. Although illicit physical connections can also occur in the course of new development, procedures that can be used to prevent these in new development are addressed in Section 4.6.

Elements of the Illicit Connection/Discharge Program

Figure 4-1 shows an implementation approach for this program, and illustrates the sequence of actions that should be involved in (1) conducting a field inspection program to detect and eliminate improper connections and discharges and (2) responding to illicit disposal and spills. In addition, you need to take certain preparatory steps such as establishing permissible discharges and enforcement procedures.

Establish Permissible Discharges

Your municipality needs to establish a policy specifying the flows or discharges that it will allow to be discharged to the storm drain system and those that it will control via its illicit connection/discharge program.

NPDES Phase II regulations note that the illicit connection/discharge program would need to eliminate certain types of nonstorm water discharges if found to be significant contributors of pollutants. The regulations list the following types of discharges as those nonstorm water discharges that the municipality should examine to determine if they are a significant source and then either ban their discharge or require implementation of controls — *water line flushing, landscape irrigation, diverted stream flows, rising ground waters, uncontaminated ground water infiltration to separate storm sewers, uncontaminated pumped ground water, discharges from potable water sources, foundation drains, air conditioning condensation, irrigation water, water from crawl space pumps, footing drains, lawn watering, individual residential car washing, flows from riparian habitats and wetlands, dechlorinated swimming pool discharges, and street wash water*.

Table 4-2 presents how several of these nonstorm water discharges have been handled by Phase I municipalities. You can use this information to help you determine which nonstorm water discharges to allow to be discharged unconditionally, which to ban, or which require implementing controls. If you are preparing an ordinance focused on the URP (or amending an existing ordinance), you should list the permissible and nonpermissible discharges in your urban runoff ordinance. Once these discharges are defined, communicate this information to both city personnel and the citizens and businesses within your jurisdiction.

Establish Enforcement Procedures

Most URPs generally emphasize education and cooperation as their preferred methods for enforcement, and you may also elect to use these methods to implement

Figure 4-1. Implementation Approach

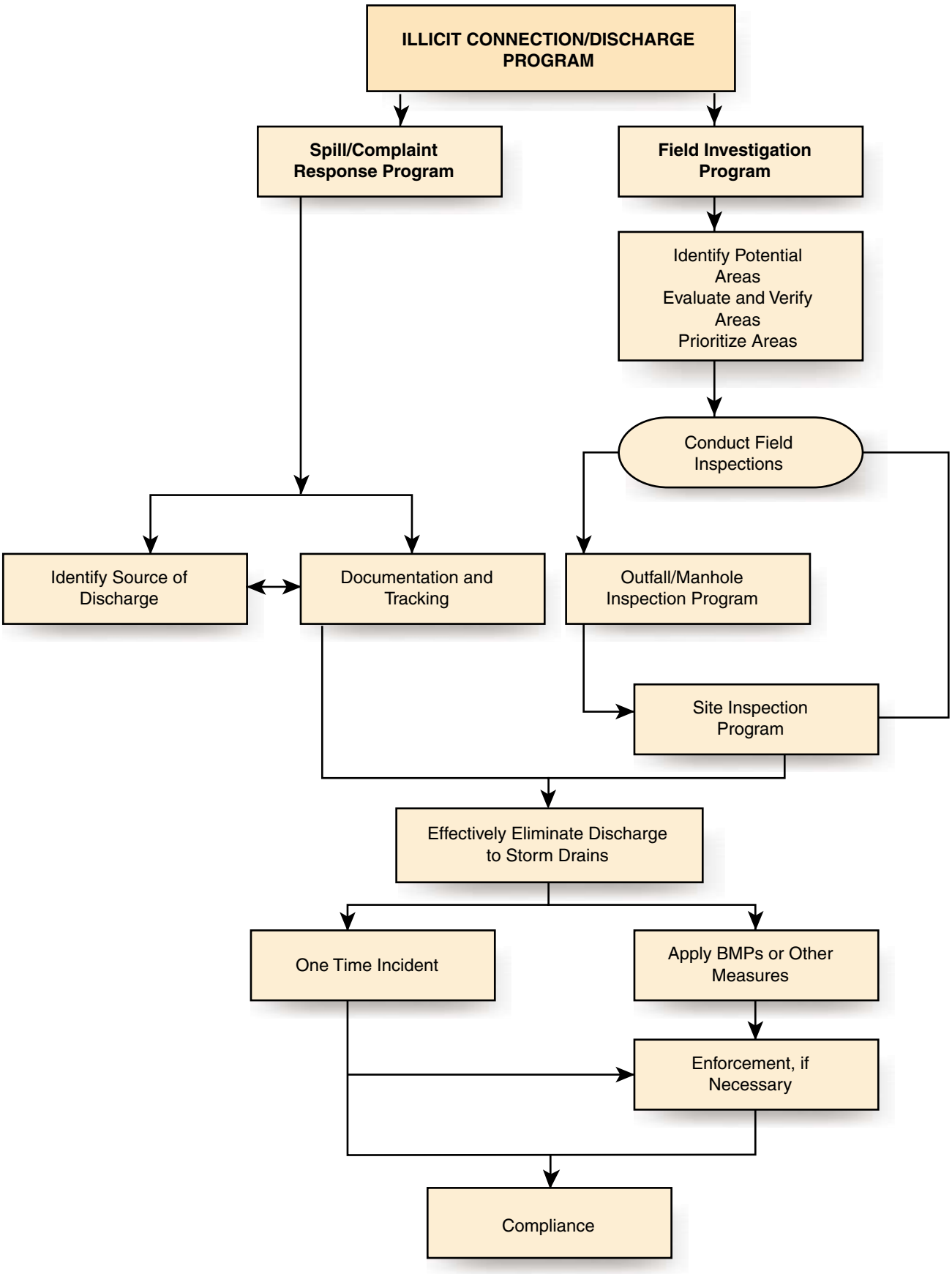


Table 4-2. Nonstorm Water Discharges

Type of Discharge	When is the Discharge to the Storm Sewer Permissible?	Preferred Disposal Options				Note
		Storm Drain	Sanitary Sewer	Recycle/ Reuse	Hazardous Waste or Other Disposal	
1. Residential lawn irrigation	Always[a]	●				
2. Dumping of oil, anti-freeze, paint, cleaning fluids	Never			●	●	1
3. Residential car washing	Always, but not recommended[a]	●				2
4. Commercial car wash	Never		●	●		
5. Industrial dischargers (excluding cooling water)	Never		●	●	● when above pretreatment limits	3
6. Swimming pool water	Only when dechlorinated[a]	●		●		4
7. Water line flushing	Always[a] [b]	●		●		
8. Fire fighting flows	Emergency only[c]	●			● when heavily contaminated	
9. Potable water sources	Always[a]	●		●		
10. Uncontaminated foundation drains	Always[a]	●		●		
11. Contaminated foundation drains	Never		●	●		
12. Pumped groundwater for cleanup operations	Only if in compliance with NPDES permit	NPDES permit required		●		
13. Cooling water	Never unless no chemicals added and has NPDES permit	Permit required	●	●		5
14. Roof drains	Always except when contaminated or drains industrial area	●				
15. Air conditioner condensate	Always[a]	●		●		
16. Washwaters from commercial/ industrial facilities	Never		●			6
17. Uncontaminated groundwater infiltration	Always[a]	●		●		
18. Contaminated groundwater infiltration	Only if in compliance with NPDES permit	NPDES permit required		●		

Developed by Woodward-Clyde and provided courtesy of the Santa Clara Valley Nonpoint Source Pollution Control Program

Table Notes continue on following page

Table 4-2 (continued). Nonstorm Water Discharges

Table Notes:

(a) Discharges are considered conditionally exempt by RWQCB, unless they are identified by either a permittee or the executive officer as being a significant source of pollutants to receiving waters. If identified as a significant pollutant source, appropriate BMPs must be developed and implemented under the storm water management plan to minimize the adverse impacts of these sources.

(b) Exempt when superchlorinated or chemically cleaned; then discharge goes to sanitary sewer.

(c) Granted a discharge exemption by RWQCB.

1. The illegal dumping program should concentrate on eliminating the dumping of oil, anti-freeze, and other pollutants in industrial and commercial areas. The public education program will concentrate on eliminating dumping in residential areas.

2. It would be impracticable to prevent individuals from washing their cars and the illegal dumping program should not devote resources in this area. Minimize the environmental effects of car washing by washing on permeable surfaces (gravels, lawns, etc.).

3. All industrial discharges to storm drains should not be permitted. If discharge appears contaminated, then record as an illicit connection or illegal dumping.

4. Chlorinated swimming pool water should not be discharged to the storm sewer. Some sewer districts do not allow swimming pool water to the sanitary sewer. In these cases the water will have to be dechlorinated before discharging to the storm sewer. Filter back washwater is not allowed in the storm sewer and must go the sanitary sewer. Public education program needed.

5. Cooling water should always have a NPDES permit to discharge. Recycle is checked as a preferred disposal option. Where practicable, industries should be encouraged to either construct cooling ponds so the water is reusable or possibly find other uses on site for the water.

6. Washwaters from commercial and industrial facilities include runoff from vehicle and equipment washing, steam cleaning, and cleaning of areas used for industrial or commercial activities. Due to the wide range of washwaters from commercial facilities, disposal options should be evaluated on a facility-specific basis.

7. Since all discharges are not acceptable to sanitary sewer agencies, the municipality should coordinate with the sewer agency.

your illicit connection/discharge program. However in some circumstances, penalties may be needed to achieve compliance. Given the fairly long lead time involved in establishing enforcement procedures, it is recommended that the municipality initiate this process early.

The municipality must decide what approach to enforcement to take and what penalties it is willing to impose on violators. Violations detected through an illicit connection/discharge program fall under two categories: (1) illicit physical connections into the storm drain system and (2) illicit dumping and discharges. A phased approach to enforcement is suggested below that includes issuance of a warning as a first step, followed (if compliance does not occur) by administrative action or legal action. The municipality can use this in its original or a revised form.

- ✓ **Warning.** Could be a verbal notice or a written informational letter to the owner/operator. A time frame to correct the identified problem should be specified based on the severity or complexity of the problem.
- ✓ **Administrative Action.** Similar to a warning except a more formal notice and a structured process, including a Notice of Violation, Cease and Desist Order, Order to Abate, Notice to Clean, or any other similar notification outlined in the municipality's storm water ordinance that identifies a problem,

requires correction or abatement but does not assess fines. A time frame to correct the identified problem should be specified based on the severity or complexity of the problem.

- ✓ **Administrative Action with Fine and/or Cost Recovery.** Same as above with the addition that fine(s) are assessed administratively and/or the municipality's abatement costs are recovered.
- ✓ **Legal Action.** Includes any actions taken by the municipality that brings the facility into the court system (e.g., citation, court action, etc.)

This enforcement protocol is based on the assumption that the municipality escalates the level of enforcement until compliance is achieved. Also this approach does not prevent the municipality from skipping certain steps for more serious problems. The municipality's department heading the URP should consult with the municipality's legal counsel in this regard.

Establish a Field Investigation Program

Ideally, an illicit connection/discharge program should aim at detecting and eliminating all existing illicit connections (improper plumbing) in a municipality, as well as eliminating improper disposal of pollutants into the storm drain system. Several procedures can be used to detect improper connections or trace discharges to their origins:

- ✓ Television camera inspection
- ✓ Outfall/manhole inspection program
- ✓ Site inspection program

The most effective way to conduct a citywide investigation is to utilize a **television camera inspection** of the storm drain system. Some communities have done so as part of their storm drain improvement/retrofit programs and have detected connections that otherwise would have gone undetected. This method is expensive, and some pipeline television cameras have been found to suffer damage when used in storm drains due to the rough nature of interior storm drain surfaces.

Most municipalities have utilized outfall/manhole inspection programs and site inspections to detect illicit connections as well as illicit discharges. The **outfall/manhole inspection program** (called the field screening program in Phase I regulations) utilizes the "belowground" approach, which involves tracking dry-weather flows from the outfalls or manholes to their source. The **site inspection program** utilizes the "aboveground" approach, which involves conducting inspections at or near potential sources such as businesses that are known, from observation in the municipality or from other URPs, to result in illicit discharges. The municipality should utilize both methods because both have been shown to be effective and complementary.

Since illicit connections are the main source of bacteria and pathogens in urban runoff, a systematic survey of the city's entire storm drain system to check for

illicit connections is very valuable and recommended, especially for those municipalities (such as coastal towns/cities) where storm drain outfalls discharge into coastal waters used for swimming. However, since high cost is involved in a citywide survey, another alternative is to prioritize source areas or geographical areas that should be investigated first for illicit connections and dumping. Studies based on outfall monitoring and sampling have shown that the largest numbers of improper discharges emanate from industrial and commercial areas and from the older sections of communities. In fact URPs developed under Phase I permitting have generally focused their illicit connection/discharge elimination programs on these types of land-use areas.

Outfall/Manhole Inspection Program

An outfall/manhole inspection program generally include the following steps:

- ✓ **Identify and prioritize areas where illicit connections/discharges are most likely to occur.** A municipality can identify and prioritize areas to focus its program in several different ways. Depending on the geography of the municipality, its size, and the number of outfalls, it can conduct a field investigation of all storm system outfalls during the dry season to check for dry-weather flows. This investigation helps point out those outfalls that are of concern and those that are not (note that, because such discharges tend to be intermittent, this investigation may need to be repeated a few times before certain outfalls can be dismissed).

Dry-weather flows are indicators of improper connections and discharges

In the event that a dry-weather investigation of all outfalls is not possible, the municipality may rely on land-use information and the storm drain system mapping (as described in Section 2.2 of this guide) to determine potential areas of illicit connections and discharges. Using the storm drain map of the city, the municipality should mark out outfalls that are associated with industrial/commercial areas of the city and/or the older sections of the city, identify the areas that drain to these outfalls, and note the businesses located within these marked areas.

- ✓ **Establish a program of checking specific manholes and outfalls periodically for dry-weather flows.** Once the municipality has confirmed its focus on certain areas, it should prepare maps showing which manholes and outfalls to check periodically and establish a timetable or frequency. The municipality should develop forms for use by inspectors during field inspections. Sample inspection forms are presented in Appendix 4I.

- ✓ **Track flows back to potential dischargers and conduct aboveground inspections.** As a next step, field inspections of the targeted outfalls and manholes should be conducted to (1) verify whether the correct outfalls and manholes have been included in the field inspection program and (2) check for signs of improper discharges. Signs of an illicit connection or discharge can include:
  - Abnormal water flows during the dry season
  - Unusual flows in subdrains used for dewatering
  - Pungent odors
  - Discoloration or oily substances in the water, or stains and waste residue in ditches, channels, or drain boxes

  If during inspections, any of these signs are observed, the inspector should (1) record the flow data and take photographs and (2) begin storm drain investigations by tracing the flow upstream using storm drain maps and by inspecting upgradient manholes. Sampling and testing of water at the manhole or outfall where it is first detected is generally not considered necessary if the water appears to be "clear" but, if deemed appropriate, can be performed using field kits or taking grab samples for analysis in a lab. If tracking a discharge through visual inspection of upgradient manholes is not possible, alternate techniques that can be used include zinc chloride smoke testing, fluorometric dye testing, physical inspection testing (of pipes greater than 39 inches), or television camera inspection.

- ✓ **Once the origin of flow is established, require illicit discharger to eliminate the discharge.** Once the suspected origin of the flow is determined, the inspector should inspect the source to see if it is a case of improper dumping or if it is an improper physical connection. Once confirmed, the inspector should instruct the owner/operator of the property to rectify the situation. The inspector should provide the operator/owner information on alternative disposal options (from Table 4-2). The operator/owner should also be informed at this time that, should the discharge continue, enforcement procedures will be implemented.

Site Inspection Program

As noted above, the municipality may elect to simultaneously conduct inspections of establishments that it feels could either have illicit connections or could be improperly discharging pollutants into the storm drain system. If the municipality chooses to use this approach, it must develop inspection forms and train inspectors on how to detect illicit connections and discharges through systematic site inspections of facilities. Many communities under Phase I have included this under their Industrial Discharge Control Programs or assigned this activity to the City's wastewater department to be handled in parallel with the pretreatment program.

Establish Illicit Discharge Complaint/Spill Response Program

Citizens when properly educated and informed, can assist the municipality in its task of eliminating illicit discharges. Public education and involvement focused on elimination of illicit disposal and spill control is described in Section 4.3 of this guide, and includes the establishment of a "hotline" for citizens to call in incidents of illicit discharges and spills.

Program Implementation

The following guidelines should be used to set up this program.

Identify Department Responsible and Personnel Requirements

As a first step, identify the department to implement this program. Most Phase I communities with publicly owned treatment works (POTWs) have assigned this program to their wastewater department, because POTW staff are trained to conduct inspections, work with underground sewers that are typically at the same locations as the storm drains, and have the equipment for sampling as well as pipeline television cameras. Also in the event that they discover illicit discharges, they can readily inform the discharger about the alternatives available for disposal, i.e., whether that discharge can go to the sanitary sewer system or whether that discharge must be contained, placed in drums or other containers, and hauled elsewhere for disposal. In the event that a municipality does not have a POTW, it can consider contracting with the regional POTW for this service (which has been done in some areas), or assign this program to the Hazmat or Fire Department.

Personnel requirements include minimum 3-person teams for outfall/manhole inspections (for safety reasons) and staff for record-keeping and program coordination. Larger staff teams are required for zinc chloride smoke and fluorometric dye testing or television camera inspection.

Establish Timetable for Implementation

The municipality should establish a timetable for implementation of the program. This timetable should clearly indicate the activities to undertake each year.

Most Phase I municipalities typically spent the first year identifying the priority areas, conducting field inspections of outfalls and manholes to rule out areas that did not require inspection and monitoring under this program, and training its personnel in important aspects of the illicit connection/discharge program. Some municipalities have then proceeded to check the entire city for illicit connections, while others have focused on the older and/or industrial and commercial areas and have found at the end of about 2 years that further investigations of illicit connec-

tions are not necessary. The latter group of municipalities have after that point focused their efforts on elimination of illegal discharges through visual monitoring by municipal personnel.

Train Personnel in Inspections

The following types of training are necessary:

- ✓ Procedural training (outfall/manhole inspections, sampling, record keeping, etc.)
- ✓ Occupational Safety and Health Administration (OSHA)-required Health and Safety training
- ✓ OSHA Confined Space Entry training

Program Evaluation And Documentation

Establish Measurable Goals

Your URP should include measurable goals for BMPs or control programs. These goals are useful for checking progress made each year as well as demonstrating the efforts made to reduce pollutants to the maximum extent possible. The municipality may consider some of the following goals for inclusion in its program;

- ✓ Establish percent total area of the city that will be checked each year for illicit connections, with the ultimate objective of checking the entire city or all areas of concern.
- ✓ For areas in the city known for dumping, establish a goal to conduct inspections at a fixed frequency.
- ✓ Establish a goal to eliminate documented or confirmed illicit connections within a specified period of time.
- ✓ Establish a goal to reduce incidents of illicit discharges by 25, 50, and 100 percent by certain years.

Documentation and Annual Reporting

The municipality should also develop forms or a format for reporting on this program in an annual report. Information that should be reported includes progress made relative to the measurable goals; the number of cases of illicit connections detected, eliminated, or status towards elimination; and the number of cases of illicit discharges detected, investigated and actions taken to rectify the problem. Sample forms are included in Appendix 4I.

Sources of Additional Information

Additional information on this program can be found in the following publications:

U.S. Environmental Protection Agency (EPA). 1992. Manual of Practice - Identification of Illicit Connections. EPA 833/R-90-100.

U.S. Environmental Protection Agency (EPA). 1993. Investigation of Inappropriate Pollutant Entries into Storm Drainage Systems - A User's Guide. EPA 600/R-92-238.

City of Stockton. Municipal Storm Water Discharge Management Program.

Storm Water Quality Task Force. 1993. California Storm Water Best Management Practice Handbook - Municipal. Available from BPS Reprographic Services, 1700 Jefferson Street, Oakland. (510) 287-5485.

4.4 Model Municipal Operations Pollution Prevention Program

Significant amounts of urban pollutants are associated with street and road surfaces resulting from pavement and vehicle wear, atmospheric deposition, and littering. Hydrocarbons, copper, and other heavy metals are deposited on roads from clutch and brake wear, vehicle exhaust, and leaking motor fluids. Road surfaces abrade and add particulates to the runoff. Litter and trash are pollutants in urban runoff. In areas that have snow, deicing materials can add pollutants to the runoff. Similarly, public sidewalks, plazas, parking lots, parks, and corporation yards are some of the other areas from where pollutants are swept into storm drains by runoff.

To address these sources, your URP needs to include a control program focused on municipal operations. NPDES Phase II regulations also require the owner or operator (of a regulated, small municipal separate storm sewer system) to develop and implement a cost-effective operation and maintenance program with the ultimate goal of preventing and reducing pollutant runoff from municipal operations. Municipal operations of concern include parks and open-space maintenance, fleet maintenance, planning, building oversight, and storm water system maintenance.

Under such a program, the operator is encouraged to develop BMPs for maintenance activities; schedules and inspection procedures for structural storm water controls; controls for reducing discharge of pollutants from streets, roads, municipal parking lots, storage and maintenance yards, and waste stations; procedures for disposal of wastes removed from the system; and ways to ensure that new flood management projects assess impacts on water quality.

Objective of the Program

The objective of this program should be to:

- ✓ Identify, develop, and implement BMPs/good housekeeping procedures to address urban runoff pollution associated with municipal operations.

The information that follows outlines the specific actions or tasks that a community will need to undertake to meet these objectives. It should be noted that this section focuses only on best management practices that the municipality can incorporate into its municipal functions and operations. Many of the pollutants in urban areas can be controlled through education and outreach of the residents and businesses. These strategies are discussed in the Public Education and Outreach Program (Section 4.2) of this guide.

Elements of a Municipal Operations Control Program

Street Sweeping and Cleaning

Most municipalities conduct street sweeping for aesthetic, safety, and public health reasons and, therefore, have a street-sweeping program in place. Several improvements can be made to the municipality's street-sweeping program to achieve better pollutant reduction in runoff from streets:

- ✓ Increase street-sweeping frequency in areas most prone to litter and dust/dirt accumulation.
- ✓ Time street sweeping to improve pollutant removal efficiency (sweeping before the onset of wet weather).
- ✓ Replace aging and ineffective street sweepers with technologically advanced equipment that is able to pick up finer particulates.
- ✓ Improve signage and dissemination of street sweeping schedules to ensure that curbs are cleared before sweeping takes place (i.e., parked vehicles are removed).

If the municipality uses contract sweeping, make sure the contractor maintains the equipment, and the operator provides feedback on key issues.

Good housekeeping practices that can be incorporated into the municipality's street sweeping program are listed in Appendix 4J, BMPs/Good Housekeeping Practices for Municipal Operations. A municipality can use this guidance to develop its improved street-sweeping program. Appendix 4K presents an evaluation of available street sweepers for the municipality's use if it decides to replace street-sweeping equipment.

Sidewalks, Plazas, and Municipal Parking Lot Cleaning

Like streets, the pollutants on sidewalks, plazas, and parking lots are associated with litter and vehicle use. Good housekeeping practices that can be incorporated into the municipality's existing cleanup program for these areas are listed in Appendix 4J.

Medians and Other Municipal Landscaped Areas

The primary pollutants of concern from medians and other landscaped areas, including municipal golf courses, are sediment from erosion, nutrients from fertilizer use and organic matter (grass clippings and leaves), and heavy metals and toxic organics from pesticide/herbicide use. Fertilizers applied in excessive amounts could run off with irrigation. Pesticides used in parks and around structures could run off into storm drains and streams. Litter and illegal dumping are also problems in parks. Good housekeeping practices that will help reduce urban runoff pollution can be incorporated into the municipality's existing maintenance program for medians, landscaped areas, and parks (see Appendix 4J). For additional

information pertaining to golf courses (municipal and privately owned), refer to *Environmental Principles for Golf Courses in the United States*, developed by the Center for Resource Management, and *Environmental/Design Guidelines for Standard Development Requirements for Golf Courses*, prepared by the Santa Clara County Planning Office.

In most municipalities, these maintenance functions are performed by the Department of Parks and Recreation and by Streets Maintenance Divisions, although a recent study shows that pesticide use decisions are made by several other departments including utilities, real estate, and maintenance managers of the city hall or community center. Training should include everyone in your municipality who makes these types of decisions.

Storm Drain Inlet/Catch Basin and Line Cleaning

Implement a program to clean storm drain inlets before the onset of rains

A variety of urban pollutants can be carried into and accumulate in storm drain facilities. Often the season's first heavy storm flushes out large amounts of pollutants into the receiving waters resulting in adverse effects on aquatic life and water quality. Many municipalities clean out storm drain inlets and catch basins before the onset of the wet season mainly to ensure that storm water can flow into the inlets and flooding of streets and adjacent properties is avoided or at least minimized. A storm drain inspection and cleaning program can be effective in reducing pollutants discharged to receiving waters.

Appendix 4J lists good housekeeping practices that the municipality should incorporate in its storm drain system maintenance program for water quality protection. This table only lists practices associated with the cleaning of these facilities. Note that illicit connections are another major source of pollutants in storm drains and are addressed in the illicit connection/discharge program (Section 4.3).

Corporation Yard and Other Municipal Operation Areas

Due to the nature of activities conducted at corporation yards and other municipal operation areas, pollutants could be released into runoff.

To address these sources, the municipality should:

- ✓ Examine existing conditions at its corporation yard, transit yard, fueling station(s), or other such areas to determine the need for improving the opera-

tion and maintenance of existing controls, and also providing additional controls. Table 4-3 lists typical urban runoff pollutant sources at corporation yards and similar facilities.

- ✓ If potential pollutant sources are noted, either implement practices to address each source or a plan to address all sources at the site.
- ✓ Given the diverse sources of pollutants from such sites, possibly elect to develop and implement a site-specific Storm Water Pollution Prevention Plan (SWPPP). A generic SWPPP is presented in Appendix 4L to assist the municipality in preparing a SWPPP.
- ✓ Alternately, select and implement controls listed in BMPs for Vehicle Service Facilities (Appendix 4W) at its corporation yard and other similar facilities.

Table 4-3. Typical Sources/Activities at Corporation Yards that Contribute to Urban Runoff Pollution

Source/Activity	Urban Runoff Concern
Vehicle Washing, Equipment Cleaning, and Auto Steam Cleaning	Discharge of washwaters to storm drain
Changing Auto Fluids	Spills of fluids, especially in outdoor and uncovered areas
Parked Vehicles and Equipment	Fuel leaks and drips in outdoor areas
Vehicle Fueling	Fuel spills during fueling in outdoor/uncovered areas
Outdoor Waste/Materials Storage	Release/spill of stored materials in uncovered areas with no secondary containment
Illicit Connections	Floor drains from work areas and covered areas discharging to storm drains
Handling of Materials from Street Sweeping	Release of dust, sediments, dirt, and other trash during unloading/cleaning of sweeping equipment
Unpaved/Uncompacted Surfaces	Release of dust and sediment due to vehicle movement across such surfaces

Municipal Swimming Pools, Fountains, Lakes, and Other Water Bodies

Chemical algaecides can result in pollution of urban waters

The primary pollutant of concern in municipal (and privately owned) swimming pool water is chlorine or chloramine used as a disinfectant. This water, if discharged to the storm drain system, will be toxic to aquatic life. In lakes, lagoons, and fountains, the pollutants of concern are chemical algaecides that are

added to control algae mainly for aesthetic reasons (visual and odor). BMPs that can be implemented to control this form of pollution are listed in Appendix 4J.

Repair and Maintenance of City Surfaces (Streets, Roads, Sidewalks, etc.)

Activities to repair and replace pavement surfaces can lead to urban runoff pollution. Pollutants of concern are broken-up asphalt and concrete debris, saw-cutting slurry of concrete and asphalt concrete, concrete truck washout, sediment, fuel, oil and other fluids from construction equipment. Urban runoff pollution can also result from other municipal activities that include removing graffiti and building cleaning (e.g., power washing, sand blasting). BMPs to control pollution of runoff from these activities are listed in Appendix 4J.

Most municipalities contract out street repair and paving. Therefore, these measures should be included in the municipality's standard contract for such services and in the specifications of the individual paving/repair project. Training should be held for any city maintenance personnel involved with this type of work. Some minor repair work (typically patching of pot holes) is conducted by the municipality's maintenance personnel; therefore, these measures should also be explained to the municipality's maintenance crews through a training program.

Structural Retrofit of Storm Drain Facilities

Most of the control measures discussed in the sections above are BMPs and good housekeeping procedures to prevent pollutants from being released into receiving waters. If you are undertaking improvements to your storm drain facilities for other reasons (such as flood control), you should utilize this opportunity to incorporate structural controls where appropriate. Before implementing structural controls, the municipality should:

- ✓ Examine its storm drain facilities and identify the need to retrofit. One way to do so is through field observation of inlets and catch basins in problem areas. Inspect to see where certain types of pollutants are commonly observed in the inlets and sumps. Pollutants can generally be classified in terms of (1) trash and litter, (2) oil and grease, and (3) dirt and sediment. Track these inlets for a number of months and if a pattern to the accumulation of these pollutants develops, consider retrofitting.
- ✓ Once these locations and the type of pollutant typically seen have been identified, check with other municipalities or the NPDES permit authority about available retrofit devices to identify types that address the pollutant.
- ✓ Examine existing conditions at such locations. Factors to consider include area available to construct the device, existing drainage system, characteristics, hydrology, land ownership, access for maintenance, etc.
- ✓ If construction is feasible, install the device in a few test locations and monitor success before using it at other potential locations in the municipality.

Program Implementation

The following guidelines should be used to set up this program.

Identify Responsible Departments and Personnel Requirements

Many of the good housekeeping practices for municipal operations are improvements to existing municipal activities/functions; therefore, the departments currently responsible for those activities could continue in those roles. If no municipal program exists for storm drain system inspection and cleaning (note that most municipalities clean storm drains only as needed), then identify a department and assign this task to it. Table 4-4 lists the manner in which many of the NPDES Phase I California municipalities have assigned BMP implementation for municipal operations, which can be used by the municipality to assign roles/functions.

The responsible department should:

- ✓ Examine the BMP list of its area of responsibility in Appendix 4J and select the practices to implement.
- ✓ Incorporate the selected BMPs into the municipality's standard operating procedures for that activity/area of responsibility, and appropriately document so that all involved employees then consistently implement the BMPs.

Establish Timetable for Implementation

The municipality should establish a timetable for implementation of the program. This timetable should clearly indicate the activities to undertake each year, depending on the resources (personnel and funding) available to the municipality to implement the improvements. For instance, in the first year the municipality may only increase the frequency of street sweeping and increase the enforcement of its

Table 4-4. Elements of Municipal Operations Program by Responsible Department

Element/Activity	Responsible Department
Street Sweeping and Cleaning	Public Works Street Maintenance
Sidewalks, Plazas, and Municipal Parking Lot Cleaning	Public Works Street Maintenance; Parks and Recreation
Medians, Other Landscaped Areas, and Golf Courses	Public Works; Parks and Recreation
Storm Drain Inlet/Catch Basin Cleaning	Public Works; Street and Sewer Maintenance
Corporation Yard and Other Municipal Operations Areas	Public Works; Fleet Maintenance
Swimming Pools, Fountains, Lakes, and Other Water Bodies	Parks and Recreation; Community Services
Repair and Maintenance of City Surfaces	Public Works Construction Division; Street Maintenance
Structural Retrofit of Storm Drain Facilities	Public Works Design/Construction Divisions

parking restrictions program. It may decide to replace street-sweeping equipment at a later date or closer to the end of the useful life of its existing equipment. Specific guidance on the schedule cannot be provided in this guide because conditions in each municipality will differ.

Train Personnel

The following types of training are useful for the success of this program:

- ✓ Training of street-sweeping equipment operators
- ✓ Training of street maintenance crews (tree trimming, median work)
- ✓ Training of park maintenance crews
- ✓ Training of municipality's construction crews (minor street repair)

Program Evaluation And Documentation

Establish Measurable Goals

Your URP should include measurable goals for BMPs or control programs. These goals would be useful for checking progress made each year as well as demonstrating the efforts made to reduce pollutants to the maximum extent possible. The municipality may consider some of the following goals for inclusion in its program:

- ✓ Establish percent of streets to be swept and at what frequency under the municipality's street-sweeping program.
- ✓ Establish percent of streets to be swept prior to the first major storm of the wet-weather season (or before October 1 of each year).
- ✓ Establish goal of inspecting and, where necessary, cleaning all catch basins and storm drain inlets once before the onset of the wet season (before October 1 of each year).

Documentation and Annual Reporting

The municipality should develop forms for record keeping and reporting on this program in an annual report. Information that should be reported includes progress made relative to the measurable goals. Sample forms that can be used by the municipality are provided in Appendix 4M.

Sources of Additional Information

Additional information about environmental guidelines for golf courses can be found in the following publications:

The Center for Resource Management. 1996. Environmental Principles for Golf Courses in the United States.

Santa Clara County Planning Office. 1996. Environmental/Design Guidelines and Standard Development Requirements for Golf Courses. July 23.

4.5 Model Construction Site Runoff Control Program

Erosion is the primary source of pollution at most construction sites

In the absence of proper management, construction sites can release significant amounts of sediment into storm water and eventually into the municipality's storm drain system. Activities conducted at construction sites (storage and handling of construction materials, hazardous materials storage and handling, and fueling, use, and cleanup of vehicles and equipment) can also release other pollutants to the storm drain system. An increase in compaction and impervious surfaces at construction sites can cause an increase in volume of surface runoff and increase peak flows which can cause erosion and other changes in stream hydrology and morphology.

Objective of the Program

The objective of this program should be to:

- ✓ Develop a control program to reduce the potential for discharge of pollutants into urban runoff from construction sites.

The following information outlines the specific actions or tasks that a municipality will need to undertake to develop a construction site discharge control program. Note that long-term post-construction controls for new development/redevelopment projects are discussed in Section 4.6.

All construction sites (regardless of location) that are 5 or more acres in size are covered by Phase I NPDES Construction Site General Permits. NPDES Phase II regulations discuss the use of a General Permit to control discharges from sites that are greater than 1 but less than 5 acres. The exact form of this permit process (whether similar to a Phase I General Permit or not) is unknown at this time. This guide assumes that all sites greater than 1 acre will be subject to the General Permit requirements of the RWQCBs. The control program that follows describes the actions a municipality should take to control discharge of pollutants from sites that are greater than 1 acre, and also from sites that are less than 1 acre, so that construction activities within the municipality do not result in urban runoff impacts.

Elements of a Construction Site Runoff Control Program

Review and Revise Existing Grading Ordinance

As a first step, if you do not have a grading ordinance, consider adopting a construction site control ordinance. If you have a grading ordinance, review and revise it to address the following guiding principles:

- ✓ Use of good site planning
- ✓ Minimization of soil movement
- ✓ Capture of sediment to the greatest extent possible
- ✓ Good housekeeping practices
- ✓ Minimization of impacts of postconstruction storm water discharges.

Since the grading ordinance is the basis of the municipality's grading permit, it is essential that it includes provisions consistent with these five guiding principles. The grading ordinance carries out the General Plan/LCP policies that you have put in place to protect water quality.

Most grading ordinances address minimization of soil movement and capturing of sediments. In some municipalities that have flooding problems, the grading ordinance may contain a requirement that site storm water discharge volumes and peak flows should not exceed preconstruction levels. Generally, the other three principles, i.e., site planning, good housekeeping practices, and minimization of postconstruction storm water discharges, are typically not addressed in grading ordinances. The municipality's construction site ordinance should note that the municipality requires all construction projects to implement BMPs that address the five guiding principles. To assist the municipality in revising its grading ordinance, a model construction site ordinance that incorporates the five guiding principles is attached to this guide (Appendix 4N).

Prepare Construction Community Outreach/Information Materials

The municipality should provide materials to the development/construction community to consider when they are planning their projects or filing for permits. These informational materials should focus on the five guiding principles and should include practical, cost-effective measures that can be incorporated into the project to reduce the potential for urban runoff impacts.

The following materials are recommended for development and use in the construction site permit process:

- ✓ A handout/brochure that explains the construction site permit process for sites 1 acre and greater, and for sites less than 1 acre (See sample brochure for construction sites 5 acres or more in Appendix 4O)

- ✓ A handout explaining the five guiding principles for controlling runoff from construction sites: construction site planning, minimization of soil movement, capturing of sediment, good housekeeping practices, and minimization of postconstruction discharges.

Storm drain inlets can be protected using sandbags and filter fabric over the inlet

- ✓ A handout on good housekeeping practices for all construction sites regardless of size
- ✓ A handout on BMPs for small (less than 1 acre) sites, including the following:
  - Information on good housekeeping practices
  - Information on storm drain protection (to control construction site pollutants from entering storm drains)

BMPs for construction sites, organized by the five guiding principles, are listed in Appendix 4P, BMPs for Construction Sites. Existing documents that provide detailed information on these BMPs are cited in that guidance.

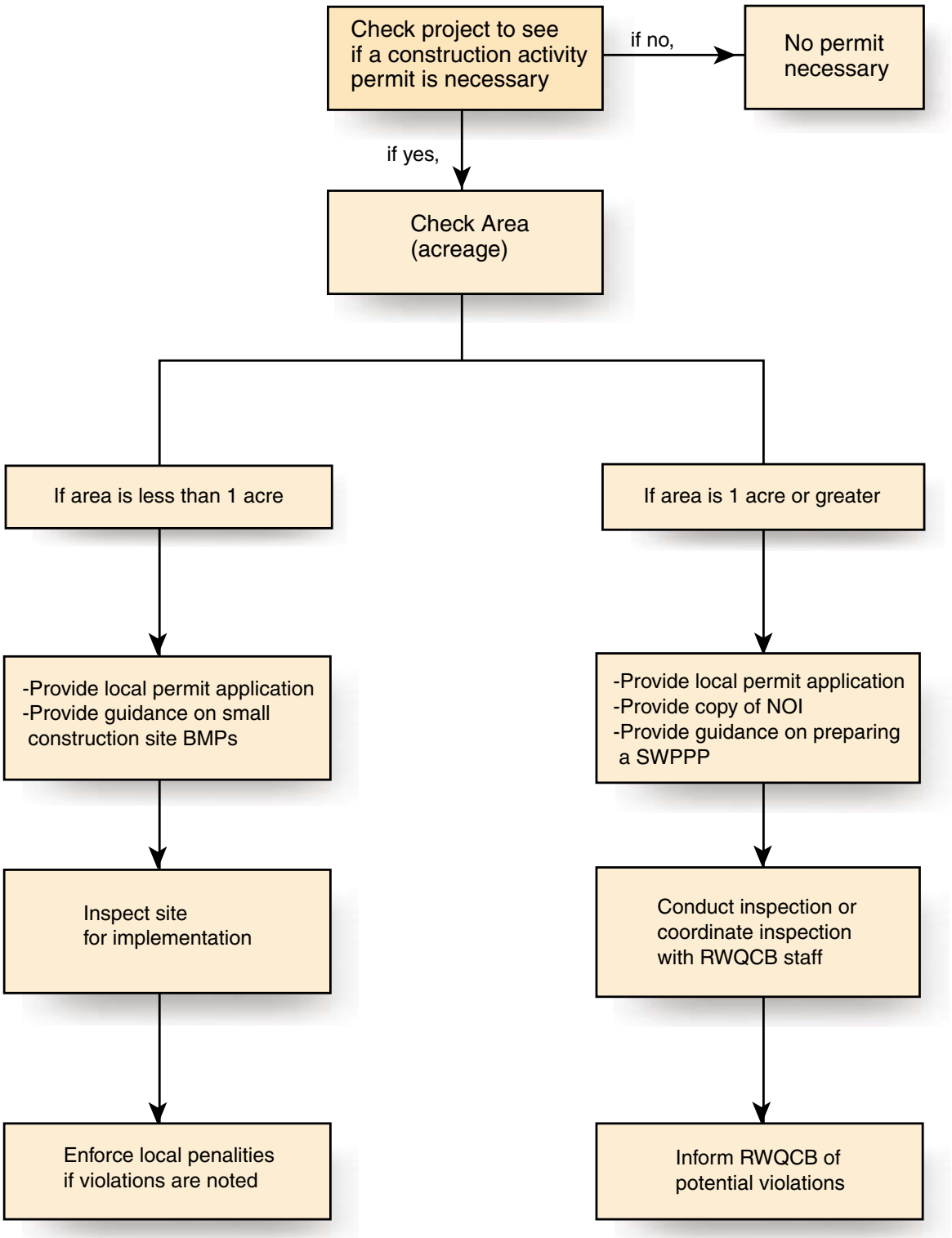
Review and Revise Plan Review Process

The municipality's project review process needs to be revised to ensure it addresses urban runoff issues. Figure 4-2 shows the steps involved in a review process.

- ✓ As a first step, check if the size of the project is less or more than 1 acre. Projects less than 1 acre will continue to be subject to the current permit processes, or appropriate local state and/or federal authorities (this may include the California Coastal Commission, Department of Fish and Game, U.S. Army Corps of Engineers, or others). Those projects 1 acre or more will need to be covered by a general permit for construction activity storm water discharges from the SWRCB/RWQCB in addition to existing permit processes.

Construction site controls can include silt fences, hay bale barriers, and erosion control blankets

Figure 4-2. Construction Project Review Process



Sites 1 Acre or More in Size

- ✓ For sites 1 acre or greater, inform applicants of the various permits. Specifically, provide information about the NPDES permit requirements, including the NOI filing process and the need to develop a construction site SWPPP. Keep blank copies of the NOI form at the Public Works/Community Development department counters. Inform applicants that the requirements of both permits are the same, i.e, a SWPPP is needed for both permits.
- ✓ Provide applicants with guidance on preparing a construction site SWPPP (this guidance is included in Appendix 4Q and a Model Construction Site SWPPP is presented in Appendix 4R). Also provide applicants with brochures and materials on BMPs for construction sites. Coordinate site inspections with the RWQCB staff. Develop standard operating procedures and checklists to assist inspectors in conducting inspections.
- ✓ Leave enforcement authority unchanged, i.e., the RWQCB to enforce per its permit process in case violations are noted during inspections.

Sites Less than 1 Acre

- ✓ Inform the applicant of the local permit process, and provide brochures and materials on BMPs for construction sites.
- ✓ Conduct site inspections during and after construction. Use municipality's standard operating procedures and checklist for inspections.
- ✓ Enforce if violations are noted.

Program Implementation

The following guidelines should be used to set up this program.

Identify Responsible Departments and Personnel Requirements

Since the issuance of grading permits in most municipalities is the responsibility of Public Works or Community Development departments, the construction site runoff control program should be assigned to them.

Personnel needed to implement this program include plan review staff trained to inform the applicant about the permitting process and to review site plans, and site inspectors to inspect sites for the implementation and maintenance of BMPs during and after construction.

Establish Timetable for Implementation

The municipality should establish a timetable for implementation of the program. This timetable should clearly indicate the activities to undertake each year, depending on the resources (personnel and funding) available to the municipality to implement the program.

Train Personnel

The following types of training are important for the success of this program.

- ✓ Training of plan check staff
- ✓ Training of site inspectors
- ✓ Training of developer/contractor staff
- ✓ Training of municipal personnel (i.e., construction division) for city projects

Program Evaluation and Documentation

Establish Measurable Goals

Your URP should include measurable goals for BMPs or control programs. These goals would be useful for checking progress made each year as well as demonstrating the efforts made to reduce pollutants to the maximum extent possible. The municipality may consider some of the following goals for inclusion in its construction site control program:

- ✓ Achieve 100 percent compliance with local and SWRCB's construction site runoff control programs (all construction projects are covered by either a current, up-to-date SWPPP or controls to reduce storm water pollution).
- ✓ Achieve zero complaints from the public regarding hydrological and water quality impacts from construction sites.
- ✓ Achieve full compliance with inspection checklists (i.e., inspection checklists show that all construction sites are implementing BMPs and meeting permit requirements).

Documentation and Annual Reporting

The municipality should develop forms for record keeping and reporting on this program in an annual report. Information that should be reported should include progress made relative to the measurable goals. Forms that can be used by the municipality are provided in Appendix 4S.

Challenges encountered by Phase I Programs in Implementing Construction Site Control Programs

- ✓ **Lack of support of municipal staff from managers**
- ✓ **Communications/coordination among municipal staff and departments**
- ✓ **Communications/coordination among local agencies and regional board staff**
- ✓ **Improper application, installation, and maintenance of BMPs**
- ✓ **Outreach to small developers and contractors**

4.6 Model New Development/Redevelopment Runoff Control Program

Primarily two concerns are associated with new development and significant redevelopment. As communities are progressively built out, impervious surfaces replace natural topography, and storm water peak flows and volume increase, resulting in changes to stream morphology. Secondly, new urban areas add to the urban runoff pollutant loads by creating new sources. Numerous studies show that controlling pollutants after they have entered the storm drain system is far more difficult and expensive than preventing or reducing the discharge at the source. If areas of the municipality proposed for new development or redevelopment are planned, designed, and constructed in a manner that is sensitive to issues of quantity and quality of urban runoff, then future pollutant loads from these areas will be reduced.

The NPDES Phase II regulations also require that the owners or operators of small municipal separate storm sewer systems develop, implement, and enforce a program to address storm water runoff from new development and redevelopment projects. The program should use site-specific and cost-effective structural and nonstructural BMPs as appropriate. The program should ensure adequate long-term operation and maintenance of BMPs through inspection and enforcement programs. CZARA and NPDES Phase II regulations recommend that municipalities utilize BMPs that attempt to maintain predevelopment runoff conditions, including water quality and quantity.

Objective of the Program

The objective of this program should be to:

- ✓ Reduce the potential for discharge of pollutants into urban runoff from new development and redevelopment areas using a strategy that combines reducing/eliminating sources of pollutants, managing site runoff volumes and flow rates such that they are similar to preconstruction levels, and treating runoff as appropriate.

The following information outlines the specific actions or tasks that a municipality will need to undertake to develop this program.

Elements of a New Development/Redevelopment Urban Runoff Control Program

New development/redevelopment urban runoff issues can be addressed at various levels: at the municipal/regional/watershed level or at the individual project level. Land-use planning at the municipal level can control the amount of impervious surfaces or pollutant sources added to a community. This can be accomplished by acquiring land and placing a conservation easement on it or developing it into

public parks or open space, designing the community to reduce reliance on vehicles, or avoiding areas susceptible to erosion and sediment loss through zoning restrictions. Those types of regional/municipality-level measures and controls are not the focus of this MURP guide, rather this guide focuses on project-level controls.

A program to control flow and water quality from new development/redevelopment projects may include a variety of elements that are intended to form an integrated program: general plan/LCP policies, ordinances, development review procedures, outreach, and BMP selection.

Adopt Policies/Ordinance Related to Impervious Area Reduction, Pollutant Source Control, and Treatment Controls

A new development/redevelopment urban runoff control program involves adoption of policies through General Plan/LCP amendment, or an ordinance for requiring new development/redevelopment to address urban runoff quantity and quality issues during project planning and implementation, or a combination of the two. Regardless of whether the preferred option is General Plan/LCP amendments or an ordinance, the adopted document should clearly state that the municipality may require a new development or a redevelopment project to:

- ✓ Minimize impervious area
- ✓ Control pollutants by eliminating or reducing potential new sources
- ✓ Install treatment controls, as appropriate to the site
- ✓ Participate in the funding of regional/municipality-level BMPs in accordance with a regional/municipality-level plan

Note that a municipality may choose to do both, i.e., amend the General Plan/LCP as well as adopt an ordinance for this purpose.

Conduct Outreach and Prepare Informational/Outreach Materials for the Development Community

Urban runoff controls that address runoff quantity include minimization of impervious surfaces, maximization of infiltration, and on-site storm water detention. Urban runoff controls that address urban runoff quality require design changes that eliminate potential pollutant sources and structural controls to detain, retain, and/or treat urban runoff from a site. These postconstruction controls can impose costs on new development/redevelopment, and many controls generally impose maintenance costs and requirements (controls do not work if they are not maintained). Structural control measures require ongoing inspection and maintenance and the municipality must provide or ensure that those important elements of a BMP are addressed during the development review and approval process. As a result, before a municipality develops and adopts a new development/redevelopment urban

runoff control program, it should work with the development community (e.g., developers and construction contractors) to arrive at postconstruction controls that are cost-effective, feasible in the local setting, and can be maintained.

Grassy areas can be included in parking lot design to filter runoff

Potential postconstruction controls are listed in Post-Construction Controls for New Development/Redevelopment (Appendix 4T). Postconstruction controls can be classified into three types: **site planning measures** that avoid or reduce disturbance of sensitive areas and limit addition of impervious surfaces, **pollution prevention/source control measures** that reduce or eliminate potential future sources of pollutants, and **treatment control measures** that treat polluted runoff from new development/redevelopment sites. The guidance presents the pros and cons associated with these controls, and provides suggestions that the municipality may use in selecting postconstruction controls for implementation. This guidance may be used in discussions with the development community and to prepare handouts and informational materials for developers/applicants.

Revise Development Review Procedures

The permitting process provides the municipality the opportunity to review a new development or redevelopment project during its planning stage and to direct its design and development in regards to urban runoff issues.

Projects in California communities require approvals from the local jurisdiction in which they are proposed. Approvals fall into two groups: discretionary and administrative/ministerial. Discretionary approvals typically include subdivision or tentative map approval, use permit, conditional use permit, or design review. Administrative or ministerial permits generally include building, grading, well, and septic system permits. Discretionary approvals trigger CEQA compliance whereas (ministerial) permits are categorically exempt under CEQA. Both private and public projects are handled in a similar manner in most communities.

Almost all projects except minor infill development require discretionary approval from the local jurisdiction. This discretionary approval process is commonly the design review process, although other discretionary approvals such as a use permit or a subdivision map approval may also be triggered depending on the characteristics of the project.

Small improvement projects that conform with the site zoning requirements and include either a new single-family unit or minor modifications to an existing single-family unit or a single structure typically do not need a discretionary approval, but will in all cases need a ministerial permit – a building or a grading permit.

Given this manner of project approval in most California communities the municipality is recommended to consider revisions to its development review process for both types of projects, projects that are subject to discretionary approval and projects that require only ministerial permits, to ensure that all opportunities for improving the quality of urban runoff are addressed. Figure 4-3 shows the manner in which urban runoff concerns can be addressed by refining the municipality's permit process.

Changes to the Discretionary Approval Process

In general, this process applies to larger developments. Typically when parcels are large more opportunities exist to reduce or control pollutants in urban runoff from such developments. The following changes can be made to the approval process to protect urban runoff quality:

- ✓ If there is a pre-application meeting, the municipal permitting staff (often planning/public works counter staff) should inform the applicant of the municipality's General Plan/LCP policies/ordinance requirements regarding runoff quantity and quality, and provide guidance on potential design measures and postconstruction controls available for the type of project proposed by the applicant. Note that some Phase I municipalities have chosen to impose standard conditions on all new businesses. A sample from the City of Pittsburg is included in Appendix 4U.

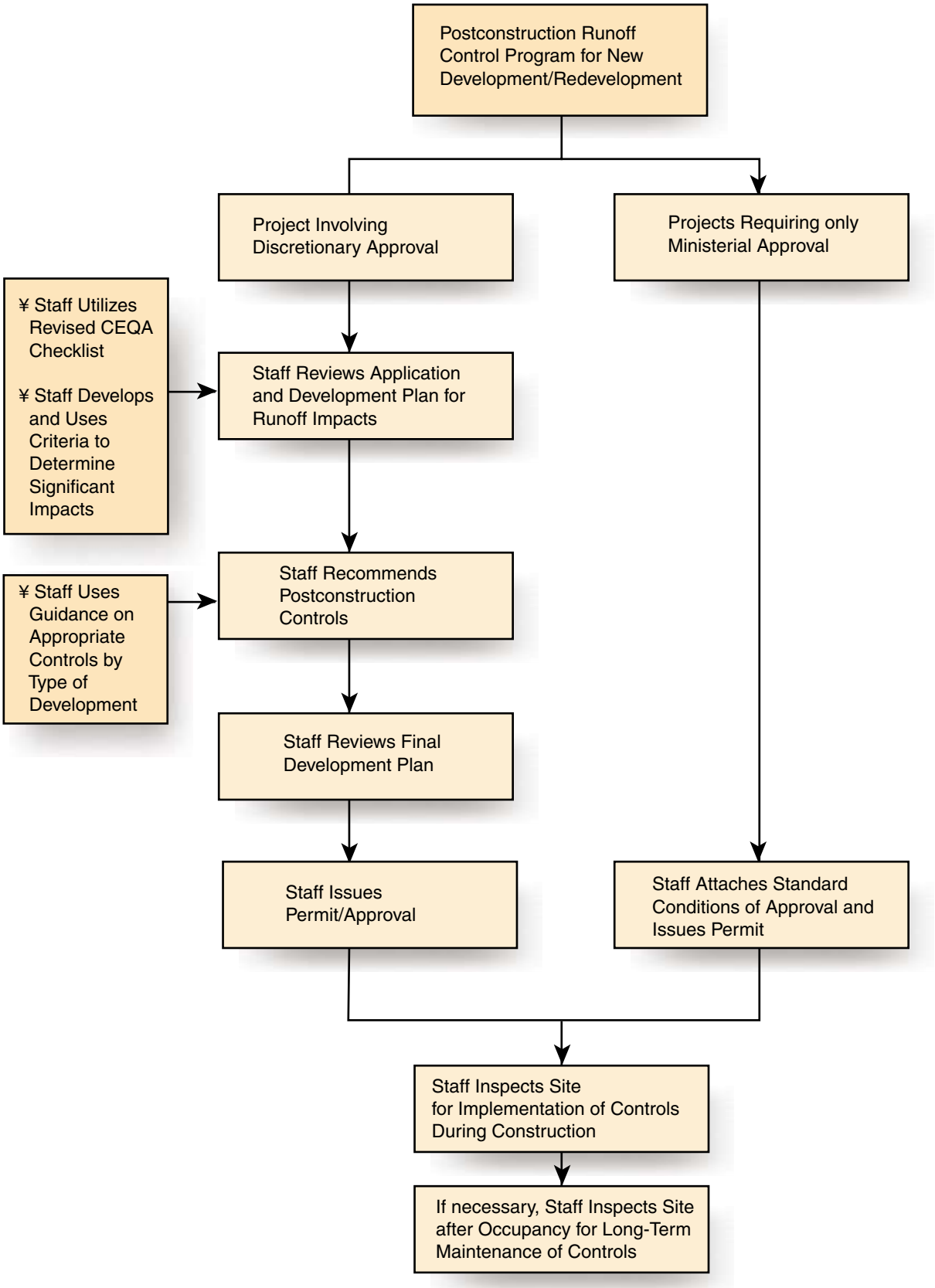
- ✓ Once an application is received, the staff should review the application for urban runoff issues. The staff should use a revised CEQA checklist to examine the project's potential to affect urban runoff quantity and quality (See Section 2.4 of this guide for CEQA checklist revisions). Note that for staff to review applications, the municipality should develop criteria to use in determining if controls are necessary for a project. The municipality also needs to provide training to its staff that reviews applications for discretionary approvals.

Train permitting staff to review plans for urban runoff issues

- ✓ If impacts are considered likely and the applicant has included postconstruction controls in the development plan, the staff should review them for appropriateness and adequacy. The municipality should develop guidance that the staff can use to evaluate adequacy of proposed controls.

  If appropriate postconstruction controls are not proposed by the applicant, the staff should inform the applicant of the municipality's requirements and pro-

Figure 4-3. Revised Project Approval Process



vide guidance on potential controls or design changes. The municipality should develop guidance for staff to use in selecting and recommending site-specific changes and controls. Some of this information is in Appendix 4T, which the municipality may want to tailor to its own needs.

In some instances, on-site controls may not be possible. For such developments, the municipality should consider contribution by the developer towards the development of regional controls (such as detention basins or constructed wetlands).

- ✓ The municipality's Public Works/Engineering Department should be consulted during the review because many postconstruction runoff controls are engineered structures that are best reviewed by the city engineers to evaluate their impact on the downstream drainage system. In fact the municipality may consider a project review process (if it does not already do so) that routes all discretionary applications to key municipal departments for review and comment. If this practice is instituted, the Public Works/Engineering Department could be assigned the responsibility of reviewing proposed project design for postconstruction runoff controls to address urban runoff issues.

- ✓ As a final step, the municipal staff should review the final development plan for adequacy of postconstruction runoff controls. The plan must address the design, operation, and maintenance of these controls.

Changes to the Ministerial / Administrative Permit Process

As noted above, minor improvement projects not subject to the discretionary approval process nonetheless need an ministerial permit (building or grading permits). Note that most projects that fall in this category are minor improvement projects where inclusion of postconstruction runoff controls are generally difficult. Therefore a simple, standardized list of BMPs for such sites should be developed by the municipality and attached as conditions of approval to the building permit. Such a list is provided in Appendix 4T.

Inspection Program

All communities have existing inspection programs that involve inspection of a completed project by municipal building inspectors.

- ✓ List postconstruction runoff controls in the inspection checklist so that inspectors can make sure the urban runoff controls were implemented.
- ✓ Inspectors should also check the completed project to make sure no improper connections are made to the storm drain system that could discharge nonstorm water into the storm drain.

Long-Term Maintenance and Monitoring Program

One of the main problems with many new development runoff controls is the long-term operation and maintenance of postconstruction controls. The problem has many aspects:

- ✓ Most of the postconstruction runoff controls require maintenance and fail when maintenance is inadequate.
- ✓ Often the project is built by one entity and then occupied/owned by another entity. Ownership may change several times, and the maintenance procedures and responsibilities may not be passed down to subsequent owners.
- ✓ Occupants/owners may not wish to take on maintenance responsibilities or costs.
- ✓ Occupants/owners may be ignorant of the maintenance needs.

NPDES Phase II regulations note that if postconstruction runoff controls are recommended for new development/redevelopment, the municipality should put a mechanism in place to ensure that the controls are maintained in the long run.

This issue is still being examined in Phase I municipalities and at the state level. The municipality should track the progress made on this issue through its RWQCB. However, some guidance on this issue is provided below:

- ✓ At the time of the discretionary approvals issuance, the municipality should require the applicant to provide a clear explanation of who is to maintain the controls, the frequency at which the maintenance is to be conducted, and who is liable if maintenance is not done.
- ✓ To address the issue of the responsible party in the long run, the municipality may use some of the following ideas:
  - For projects involving multi-family residential units, a Planned Unit Development, or a master plan development, the maintenance of the controls can be ensured through covenants, conditions, and restrictions adopted for the development. Inform the developer that this requirement must be conveyed to the Home Owners Association/property owner when the project is handed over.
  - For commercial/industrial developments, the maintenance aspects can be ensured through conditions in lease agreements. Inform the developer that the lease agreements must note the maintenance requirements for postconstruction runoff controls at the site.
  - The most problematic developments are single-family residential developments where homes or lots are sold by the developer to individuals and maintenance functions cannot be assigned to any one entity. In such instances, the municipality may consider taking upon itself the maintenance of postconstruction runoff controls, and charging the property owners for the service provided through a user fee or an assessment (based on an assessment district).

- ✓ The municipality must also establish or expand any existing inspection programs to check whether the postconstruction runoff controls are being maintained. For industrial/commercial facilities, this inspection could be combined with the illicit connection/discharge program. For large residential developments, this inspection task could be assigned to the local flood control agency or department. Note that a municipality has the authority to place a lien on the property if it discovers that the postconstruction runoff controls are not being properly maintained.
- ✓ For public projects, maintenance of postconstruction runoff controls can be ensured by (1) establishing a maintenance and monitoring plan for each municipal project, (2) assigning the task to the department responsible for the general maintenance of the site, and (3) providing adequate funding.

Program Implementation

The following guidelines should be used to set up this program.

Identify Responsible Departments and Personnel Requirements

The department identified to handle this control program varies with the municipality. In some communities a specific department handles permitting. In other communities, planning department staff covers the counter for application filing for all projects, and if it is determined that the project does not need a discretionary approval, forwards the applicant to the building/public works counter for administrative/ministerial permits. Normally, inspections of the completed private projects are conducted by the building inspectors, and inspections of completed public projects are conducted by public works inspectors.

In its URP, the municipality should clearly identify the department to lead the implementation of this program. Also given that multiple departments may be involved in the project review and implementation, the municipality should convene regular meetings of staff from the relevant departments to seek feedback to improve the permit process and to ensure that all involved clearly understand their responsibilities under the URP.

Establish Timetable for Implementation

The municipality should establish a timetable for setting up the initial program. This timetable should clearly indicate the activities to undertake each year, depending on the resources (personnel and funding) available to the municipality to implement the improvements.

Train Personnel

The following types of training are important for the success of this program.

- ✓ Outreach and education of the development community
- ✓ Training of staff responsible for plan review and permit issuance
- ✓ Training of inspection staff

Program Evaluation and Documentation

Establish Measurable Goals

Your URP should include measurable goals for BMPs. These goals would be useful for checking progress made each year as well as demonstrating the efforts made to reduce pollutants to the maximum extent practicable. The municipality may consider some of the following goals for inclusion in its program:

- ✓ Include some postconstruction controls to address urban runoff concerns for all new development/redevelopment projects approved in the next fiscal year.
- ✓ Check all completed projects for implementation of structural runoff controls.
- ✓ Inspect all structural controls annually to ensure that maintenance is performed.

Documentation and Annual Reporting

The municipality should develop forms for record keeping and reporting on this program in an annual report. Information that should be reported includes progress made relative to the measurable goals. Forms that can be used by the municipality are provided in Appendix 4V.

Challenges encountered by Phase I Programs in Implementing New Development Runoff Control Programs

- ✓ **Local agency standards/specifications preclude implementation of many potential storm water quality controls**
- ✓ **Conflict between storm water quality controls and other agencies requirements**
- ✓ **Effectiveness/cost/maintenance of treatment controls**
- ✓ **Lack of communication/coordination among municipal staff/departments**
- ✓ **Outreach to land-use decision makers**

4.7 Model Commercial Facilities Runoff Control Program (Optional Program)

Activities conducted at commercial facilities can contribute pollutants to urban runoff. Potentially significant sources of pollutants common to many commercial facilities are litter and improper disposal of wastes; outdoor waste and material storage areas; illicit connections; and parking lots that not only discharge auto-related pollutants to runoff but also, due to their impervious nature, increase the volume and rate of runoff.

Ten types of industrial/commercial activities are regulated under the Phase I general permit program. This program requires these industries to file a NOI to be covered by the General NPDES permit, prepare and implement a SWPPP, and establish a monitoring program for storm water discharges (see Section 4.8 of this guide). The NPDES Phase II regulations do not require small municipalities to regulate commercial or industrial facilities. The regulations note that the local permitting authority (RWQCB) has the discretion to regulate other industries or commercial facilities if some of the nonregulated facilities are considered a significant pollutant source in a particular watershed.

Some of the unregulated commercial facilities include gas stations

Some of the unregulated commercial facilities include gas stations, other vehicle service and repair shops, golf courses, restaurants, fast-foot establishments, lumber and building material stores, farm machinery and supplies, etc.

Objective of the Program

The objective of this program is to:

- ✓ Develop a program based on outreach and education to reduce the potential for discharge of pollutants into urban runoff from unregulated commercial facilities.

Specific tasks that a municipality may undertake to develop this program follow.

Elements of a Commercial Facilities Runoff Control Program

The municipality should consider the following steps in developing its urban runoff control program for commercial facilities.

Adopt Policies/Ordinance

Although MURP's emphasis is on voluntary implementation of BMPs by all types of businesses, it is in the municipality's interest to include in its Urban Runoff Ordinance a section that allows it to require BMP implementation by commercial facilities. The legal authority provided by the Ordinance can be used to visit commercial facilities, assist them in BMP implementation, and help them eliminate nonstorm water discharges and illicit connections. Note that the NPDES Phase II regulations do not require adoption of an ordinance to control commercial sources, although it would serve as one approach to implementing management measures that address commercial source with "enforceable authorities" as may be identified in the NCPCP.

Identify Commercial Facilities to be Targeted for Outreach

Outdoor storage areas at commercial facilities can be a source of urban runoff pollution

Every municipality has different types and concentrations of commercial businesses. Coastal and other resort towns and cities likely have numerous restaurants, fast-food establishments, hotels, motels, and gas stations. More rural communities may have a concentration of businesses that deal in farm and garden machinery rental and repair, farm supplies, lumber and building materials, agricultural chemicals, and small unregulated animal feedlots. The municipality should first identify the business sectors to target each year. The municipality is recommended to limit itself to one to two sectors each year, and once outreach to those sectors is complete, select the next sectors to target. (The businesses selected as target businesses for the next year should be taken before the City Council for public hearing during the Public Works Director's annual report to the Council on the URP.) Once business sectors for the next year are identified, obtain lists of the establishments in each targeted group. The municipal license department, Dunn and Bradstreet (commerical database provider), and local yellow pages are some sources from where these lists can be obtained. Table 4-5 below shows the commerical businesses that are potential pollutant sources and those that typically are not.

Develop an Outreach Program

The following steps are typical for establishing an outreach program:

- ✓ **Contact local Chamber of Commerce and other local business organization** and discuss the program; specifically the commercial facilities to target

Table 4-5. Common Commercial Businesses in Urban Areas

Commercial Businesses of Concern	Commercial Businesses Not of Concern
■ Automotive Repair Shops	■ Dry Cleaners
■ Gas Stations	■ Photo Development Stores
■ Restaurants and Fast-Food Chains	■ Copier Centers
■ Feed and Grain Stores	■ Furniture Stores
■ Home and Garden Stores	■ Hair Salons
■ Mobile Cleaners	■ Veterinary Clinics
	■ Paint Stores
	■ Pottery Studios

Note: Most commercial businesses do not have significant outdoors activities that could release pollutants to storm drains; the only common outdoor source are dumpsters and outdoor storage areas.

the types of BMPs recommended for implementation, and the municipality's approach (including periodic visits to the facilities by municipal staff to check on progress, and any incentive programs that the municipality may choose to put in place). Use feedback from the business community to identify BMPs and to develop a program acceptable to the business community and therefore a better chance of success.

✓ **Establish an Incentive Program.** Several Phase I communities have established Green Business programs that provide recognition to responsible businesses through green business stickers, or features on the business in the municipality's monthly/quarterly newsletter or other mailings. Note that a Green Business sticker can be issued only if the business is complying with all environmental laws and not just the URP. The effort to confirm that can be significant, and could impose a higher cost on the municipality's URP.

Work with your Chamber of Commerce to identify BMPs that will not place a big burden on businesses

A good incentive program is being implemented by the City of Palo Alto. Contact that city's URP for information on the incentives.

✓ **Prepare Outreach Materials For Targeted Businesses.** BMPs that address three types of common commercial facilities in most communities are presented in *BMPs for Vehicle Service Facilities, Food Service Facilities, and Shopping Centers* (Appendices 4W through 4Y). The municipality can use these materials to develop outreach materials. Alternately, brochures and handouts prepared by Phase I municipalities can be obtained by contacting the Phase I programs.

- ✓ **Establish a Mechanism for Distribution of Outreach Materials,** which is specific to the municipality but could be through the Chamber of Commerce, direct mailings, distribution during permit/license application/renewal process, or distribution by municipal staff at public counters.
- ✓ **Establish a Frequency of Distribution** for follow-up mailings that describe how the program is doing.

Conduct Site Visits

Visit targeted businesses periodically to check on the status of BMP implementation. Use existing inspection programs and expand them to include urban runoff concerns.

- ✓ During these site visits (and through outreach materials) inform businesses that the first objective of the visit is to check how the BMPs are being implemented and to suggest improvements where possible; the second objective is to use the information gathered during the visit as a basis of awarding the business recognition under the Incentive Program (should the municipality choose to establish such a program). Inform businesses of the municipality's program for addressing urban runoff, and actions needed by the business.
- ✓ The municipality should decide how frequently to conduct site visits.
- ✓ The municipality should develop BMP checklist forms that inspectors/municipal staff can effectively use during site visits.

The City of Monterey adapted this model commercial facilities runoff control program to its local conditions and needs. The City decided that it would target a few selected businesses each year and included a provision in its Urban Runoff Ordinance that would allow the Public Works Director to identify target businesses for the upcoming fiscal years and a provision that would allow the City to adopt a BMP series for the targeted business sector. The BMP series would contain high-, medium-, and low-priority BMPs for the targeted business sector, with implementation of high-priority BMPs required by a certain date. The City plans to meet with the targeted sector and discuss the BMPs and their implementation schedule. It proposes to achieve BMP implementation through consultation and cooperation with the affected businesses (voluntary implementation of high-priority BMPs by a certain date). If businesses do not cooperate, the City would enforce the compliance procedures per its new urban runoff ordinance.

Program for Mobile Cleaners

Washwaters are some of the commonly observed non-storm water discharges to storm drains in urban areas. Mobile cleaners (surface cleaners who steam clean or pressure wash sidewalks, plazas, parking lots, driveways and building exteriors; janitorial service providers; window cleaners; carpet cleaners; and auto detailers) have been identified as a significant source of non-storm water discharges. Your

municipality likely has a number of businesses that provide these services. If you determine that washwaters are a significant problem in your community, you will need to develop a program that targets these types of businesses. A good program based on cooperation and education has been developed and used in the San Francisco Bay Area to address this source. That program is presented in Appendix 4Z. A list of BMPs to control discharges from mobile cleaning activities developed by the Cleaning Equipment Trade Association and endorsed by the San Francisco Bay Area RWQCB is also presented in Appendix 4Z. For more information on this sources and BMPs, contact the Bay Area Stormwater Management Agencies Association.

Program Implementation

The following guidelines should be used to set up this program.

Identify Responsible Departments and Personnel Requirements

A municipality's URP should clearly identify the department to lead this effort and the personnel to be involved in the program.

Establish Timetable for Implementation

The municipality should create a timetable that indicates the activities by year. The activity level varies depending on the resources (personnel and funding) available to implement the program.

Train Personnel

The following types of training are key to the success of this program:

- ✓ Outreach and education of the business community on the program and BMPs
- ✓ Training of inspection staff

Program Evaluation and Documentation

Establish Measurable Goals

Your URP should include measurable goals for BMPs or control programs. These goals would be useful for checking progress made each year as well as demonstrating the efforts made to reduce pollutants to the maximum extent practicable. The municipality may consider some of the following goals for inclusion in this effort.

- ✓ Some level of outreach/education (mailing, telephone contact, workshop, etc.) to all businesses (100 percent) in the targeted sector in the first year of this optional program.
- ✓ Site visits to all businesses (100 percent) in the targeted sector at least once in the second year of this optional program.

Documentation and Annual Reporting

The municipality should develop forms for record keeping and reporting on this program in an annual report, i.e., progress made relative to the measurable goals. Forms that can be used by the municipality are provided in Appendix 4AA.

4.8 Model Industrial Facilities Runoff Control Program (Optional Program)

Several activities at industrial facilities could release pollutants to the storm drain system, including industrial processes that are conducted outdoors, storage of materials, loading and unloading, etc.

The NPDES Phase II regulations do not identify industrial activities or facilities as specific pollutant sources that must be addressed through a focused control program. This is because selected industrial activities (based on Standard Industrial Classifications [SICs]) are regulated by the SWRCB and RWQCB under the Phase I General Permit program. This permitting program requires 10 types of industries to file a NOI to be covered by the General Industrial Activities Storm Water Permit (General Industrial Permit), and to prepare and implement a SWPPP and a storm water monitoring program. The 10 industrial categories are:

- ✓ Heavy manufacturing facilities
- ✓ Manufacturing facilities if materials are exposed to storm water
- ✓ Active and inactive mining and oil and gas facilities
- ✓ Recycling facilities
- ✓ Transportation facilities
- ✓ Facilities subject to the requirements of 40 CFR subchapter N
- ✓ Hazardous waste treatment, storage, or disposal facilities
- ✓ Landfill, land application sites, and open dumps
- ✓ Steam electric generating facilities
- ✓ Wastewater treatment plants with design flows greater than 1 million gallons per day

For specific information on the industries in each of the categories above, see Appendix 4BB.

Similar to Phase I regulations, the NPDES Phase II regulations note that if it is determined that a nondesignated industrial unit has the potential to cause an adverse impact on water quality, it may be designated for a NPDES permit. With respect to the unregulated industries, the regulations encourage the control of storm water discharges through self-initiated, voluntary BMPs (note that the unregulated industries are largely commercial businesses and are addressed under the commercial facilities control program [Section 4.7] of this guide). This approach would be consistent with implementation of management measures identified in the CNPCP.

The Concern

A municipality may choose not to establish a runoff control program for industries for two reasons. Firstly, the General Industrial Permit process administered by the

state is expected to address potential industrial sources, and secondly the municipality may not contain a large enough industrial sector to justify the establishment of an industrial facilities control program. However, if your municipality contains a large number of industrial facilities that have the SICs listed in Appendix 4BB, you may wish to develop a local control program for industries because:

- ✓ Several compliance problems have been noted with respect to industries regulated under the General Permit process. Many facilities have not filed a NOI or an individual permit application either because they are unaware of the requirement, or the assigned SIC does not accurately reflect the activities at the site that may impact water quality, or because they do not see repercussions from not filing due to lack of enforcement. Other industries have filed the NOI but not developed or implemented a SWPPP because of ignorance or lack of enforcement.
- ✓ Many industries are small and do not have the resources to track and comply with environmental regulations, and the municipality may wish to assist these industries by providing information and education.
- ✓ Many industries that have complied with the requirements are considered by regulatory agencies as being placed in unfair business practice compared with industries that have not complied.

Objective of the Program

Your objective should, therefore, be to:

- ✓ Develop a program to assist industrial facilities subject to the General Permit in complying with permit requirements.
- ✓ Make the playing field even for all affected industries in your municipality.

The following information outlines the specific actions or tasks that a municipality needs to undertake to meet this objective.

Elements of a Local Industrial Facilities Runoff Control Program

The following steps are involved in developing and implementing a runoff control program for industries.

Develop A Municipal Database of Industries

As a first step, develop a comprehensive list of industries in your community. Use Dunn and Bradstreet to develop this list, or contact your fire department, planning department, or wastewater treatment plant, which likely have their own lists.

Assign/Identify SIC Codes

If SICs are not already identified for the industrial facilities on the list, identify the codes using the *Standard Industrial Classification Manual* developed by the U.S. Office of Management and Budget (1997).

Obtain a List of NOI Filers from the RWQCB and Compare with Municipal List of Industrial Facilities

Obtain from the RWQCB a list of industries in your municipality that have filed NOIs. Compare with the municipal list of industrial facilities to check if all regulated facilities have filed NOIs. If discrepancies are noted, inform both the RWQCB and the industrial facility owners/operators.

Interview nonfilers to check for correctness of SICs. Since industrial facilities assign the SIC to themselves, the use of the wrong code may be responsible for the facility not being designated for a General Industrial permit.

Research in the Santa Clara Valley showed that many industrial facilities may not have filed for a permit because their SIC is not among the listed codes or does not accurately represent the activities conducted at the site (particularly an issue at large, more complex facilities).

Develop and Implement a Site Visit Program for All Regulated Industries

Within 1 year of setting up the municipality's industrial facilities runoff control program, conduct site visits at all regulated industrial sites. Coordinate with or assign the task to the municipality's or county's hazmat program or the wastewater treatment plant's pretreatment program (both programs involve inspections of industrial facilities). This site visit should focus on the following actions:

- ✓ Check to see if a SWPPP is in place and is being implemented. If no SWPPP is available and/or is not being implemented, inform owner/operator of potential violation and the need to rectify the situation.
- ✓ Provide guidance on appropriate BMPs for industrial sites. See Appendix 4CC, BMPs for Industrial Storm Water Pollution Control, developed by the Santa Clara Valley Urban Runoff Control Program (previously called Santa Clara Valley Nonpoint Source Pollution Control Program) and the *California Storm Water Best Management Practice Handbook - Industrial/Commercial* prepared by the Storm Water Quality Task Force.
- ✓ Develop and internal policy on whether the municipality should inform the RWQCB immediately or allow the operator/owner time to rectify the violation. If the owner/operator fails to bring the facility into compliance, inform the RWQCB.

- ✓ Use the first year's site visits to prioritize industries for follow-up site visits. For industries considered to be significant/critical sources, the municipality can establish a follow-up visit frequency of once a year or once every 2 years. For those considered noncritical sources, the municipality may establish lower frequencies for follow-up visits, or merely visit in response to complaints.

  The industrial composition of every municipality differs; therefore, the municipality is the best judge to determine the industries to classify as critical sources. However, some guidance can be obtained from a study conducted in 1997 for Los Angeles County. This study took into account factors such as presence of pollutant sources, the number of units in a given SIC code, etc., to rank the industrial groups as shown in Table 4-6. The municipality should evaluate its industries following the methodology used for the study. An appropriate list should be generated, following Table 4-6, by adding or deleting industries as appropriate.

Prepare General Information Materials for New Industries

If your municipality is anticipating significant industrial growth, prepare informational materials and maintain them at the permit counters for new facilities. This material should inform new industries of the General Industrial Permit process, and the municipality's own program for industrial facilities.

Program Implementation

The following guidelines should be used to set up this program.

Identify Responsible Department and Personnel Requirements

The municipality should identify the department to assigned this program to. In Phase I municipalities, this program has been assigned to the Fire/Hazmat department or to the wastewater department because these departments typically conduct inspections of industrial facilities.

Establish Timetable for Implementation

The municipality should establish a timetable for implementation of the program. This timetable should clearly indicate the activities it would undertake each year. A suggested timeline is completion of the municipal list of industries and cross-checking with the NOI list in the first year and commencing site visits of all regulated industries or the more critical sources in the second year.

Table 4-6. Results of Ranking of Candidate Critical Sources in Los Angeles County

Ranking Based on Pollution Potential	Industrial Category	SIC
1	Wholesale Trade (scrap, auto dismantling)	50
2	Automotive Repair/Parking	75*
3	Fabricated Metal Products	34
4	Motor Freight	42
5	Chemical Manufacturing	28
6	Automotive Dealers/Gas Stations	55*
7	Primary Metals Products	33
8	Electric/Gas/Sanitary	49*
9	Air Transportation	45
10	Rubbers/Miscellaneous Plastics	30
11	Local/Suburban Transit	41
12	Railroad Transportation	40
13	Oil & Gas Extraction	13
14	Lumber/Wood Products	24
15	Machinery Manufacturing	35
16	Transportation Equipment	37
17	Stone, Clay, Glass, Concrete	32
18	Leather/Leather Products	31
19	Miscellaneous Manufacturing	39
20	Food & Kindred Products (except restaurants)	20
21	Petroleum Refining	29
22	Mining of Nonmetallic Minerals	14
23	Printing & Publishing	27
24	Electric/Electronic	36
25	Paper & Allied Products	26
26	Furniture & Fixtures	25
27	Personal Services (laundries)	72*
28	Instruments	38
29	Textile Mills Products	22
30	Apparel	23

Source: Los Angeles County Department of Public Works. 1997. Critical Source Selection and Monitoring Report.

Notes:

(1) The LA County study did not distinguish between industries (critical sources) subject to General Permit requirements and industries that are exempt. * indicates exempt industries.

(2) Although the LA County study used two-digit SIC codes and the General Permit utilizes four-digit SIC codes, the information is useful because in general all industrial units in a two-digit class such as SIC 50 would be a concern.

Training

The following types of training are necessary:

- ✓ Training of municipal staff (hazmat/pretreatment inspectors) in urban runoff issues.

Program Evaluation and Documentation

Establish Measurable Goals

Your URP should include measurable goals for BMPs or control programs. These goals would be useful for checking progress made each year as well as demonstrating the efforts made to reduce pollutants to the maximum extent possible. The municipality may consider goals similar to those presented below for inclusion in its program:

- ✓ Identify critical industries (names and addresses) by end of the first year of program.
- ✓ Prepare general information on appropriate BMPs for critical industries by the second year of program.
- ✓ Train staff by end of second year of program.
- ✓ Conduct site visits at 50% of regulated industries in the third year of the program.
- ✓ Conduct site visits at 75% of regulated industries in the fourth year of the program, and all sites by the fifth year.

Documentation and Annual Reporting

The municipality should develop checklists for use by inspectors during site visits. Sample checklists are presented in Appendix 4DD. It should also develop forms or a format for reporting on this program in an annual report. Information that should be reported includes progress made relative to the measurable goals.

Sources of Additional Information

Storm Water Quality Task Force. 1993. California Storm Water Best Management Practice Handbook - Industrial/Commercial. Available from BPS Reprogrpahic Services, 1500 Jefferson Street, Oakland (510) 287-5485.