

Chapter 9

RECOMMENDATIONS AND IMPLEMENTATION PLAN

As is the case with cities throughout the country, Denver is faced with complex regulatory requirements with regard to water quality. Denver's Phase I CDPS permit specifies stringent requirements with which it must comply or face significant penalties. Fortunately, Denver already has many sound water quality requirements in place in the form of policies and regulations. This chapter provides a summary of recommendations for future water quality protection efforts, along with a proposed implementation plan for these recommendations.

RECOMMENDATIONS

1. All new and redevelopment projects must address water quality in their development plans, complying with the stormwater policies and design criteria specified in the *Urban Storm Drainage Criteria Manual, Volumes 1-3* (UDFCD 1999, 2001) and in Denver's CDPS permit. Particularly critical is the four-step BMP planning process that requires:
 - ▶ Implementing stormwater runoff reduction practices.
 - ▶ Providing treatment of the Water Quality Capture Volume.
 - ▶ Implementing streambank and channel stabilization techniques for any drainageways within or adjacent to a project site.
 - ▶ Providing additional treatment for pollution "hot spots."
2. Under Denver's CDPS permit, adverse impacts to receiving waters posed by urban stormwater discharges must be minimized to the "maximum extent practicable." Examples of these adverse impacts can include increased pollutant loading, increased runoff rates and volumes, channel instability, modification of aquatic habitat and increased sediment loading, both during and after construction. It is essential to recognize that, despite the best efforts to control stormwater runoff, there will be some change in receiving water characteristics due to development; therefore, a "zero impact" policy is not realistic or attainable. As a result, Denver advocates management of stormwater through the implementation of BMPs designed in accordance with the guidelines established by UDFCD (UDFCD 1999, 2001), as summarized in #1, above.
3. Denver will continue to advocate the use of multiple BMPs, including non-structural measures, source controls, and structural BMPs, to reduce stormwater pollution. Whenever practicable, combining BMPs in series can be very effective in reducing stormwater pollution.
4. The stormwater quality BMP implementation guidelines provided in Chapter 6 of this Plan will be shared with developers and city staff alike to promote better integration of water quality into site designs, including more substantial use of runoff reduction techniques.

Recommendations

5. Denver will work to ensure that water quality is addressed in the very beginning of the site development process so that stormwater quality BMPs are better and more cost effectively integrated into site designs. Various Denver departments (e.g., Public Works, Planning, Parks, Environmental Health) must work together with a shared vision of stormwater quality management to accomplish this goal.
6. Urban stormwater management must be an integral part of site design and take into consideration multiple objectives. As stated in the *Urban Storm Drainage Criteria Manual, Volume 1* (UDFCD 2001), the many competing demands placed on space and resources require that stormwater management strategies take into account water quality enhancement, groundwater recharge, recreation, wildlife habitat, wetland protection, protection of landmarks/amenities, control of erosion and sediment deposition, and creation of open space. In addition, the appearance of BMPs is particularly important; Denver will expect to receive site development plans that feature attractive BMPs that will be viewed as assets by the community. Denver will encourage multi-purpose usage of BMPs; however, compatibility among uses must be demonstrated (e.g., compatibility between recreational areas and detention areas).
7. Planning for water quality must proceed hand-in-hand with drainage planning for quantity (rate and volume). In urban areas, these two planning efforts are inseparable. When these issues are addressed together and early in the site planning process, more efficient, economical and attractive land uses generally result.
8. Denver will continue to review BMP designs for public safety and maintenance accessibility, maintainability, documentation of maintenance requirements and schedule, and assured long-term funding for maintenance. Proper maintenance is fundamental to public safety and long-term effectiveness of stormwater BMPs; therefore, Denver will take these steps to promote better long-term maintenance of BMPs:
 - ▶ Require inclusion of a simple BMP maintenance plan as part of Denver's Stormwater Quality Control Plan submittal requirements.
 - ▶ Require a legally binding description of BMP maintenance requirements and arrangements as part of development plan approval.
 - ▶ Clearly identify BMP maintenance requirements in forthcoming updates to Denver's *Storm Drainage Criteria Manual*.
 - ▶ Prepare easy-to-understand maintenance guidance documents and brochures for both public and private facility owners. These documents will be based on maintenance recommendations of UDFCD and the guidelines provided in Chapter 6 of this Plan.
9. The same stormwater quality management expectations and practices that apply to projects in the private sector also apply to projects that are the responsibility of Denver, such as buildings, parks, streets, utilities, etc. When Denver is preparing plans for any such

projects or managing, maintaining and/or upgrading existing facilities, potential adverse stormwater quality effects must be evaluated and suitably mitigated.

10. Denver will continue to actively participate in regional water quality management efforts such as those being conducted by South Platte Cooperative for Urban River Evaluation (CURE), the Cherry Creek Basin Stewardship Partners, and the Barr Lake-Milton Reservoir Watershed Group. These on-going efforts emphasize the importance of Denver partnering with neighboring communities to tackle difficult water quality issues. Denver must also stay abreast of forthcoming regulatory changes that affect management of the many lakes and streams within its boundaries.
11. Denver’s stormwater management strategies must be consistent with the principles, criteria, and priorities in its multiple planning and technical criteria documents, as described in Chapter 4.
12. Denver will work to remove obstacles to innovative stormwater management approaches by reviewing regulations and codes and, where practical, modifying requirements that conflict with the principles of this Plan. For example, such conflicts may arise with regard to parking lot and curb and gutter design requirements relative to some Low Impact Development approaches.
13. Denver will continue to promote managing and treating stormwater quality using aboveground facilities, rather than in subsurface, “vault-type” treatment devices. Nevertheless, Denver recognizes that there are some cases where the use of such facilities is necessary due to extreme space constraints in smaller redevelopment sites, such as those located in the downtown area.
14. Denver will evaluate the feasibility of collaborating with UDFCD, a university, other local governments, and other organizations to pilot-test innovative BMPs. Denver will continue to actively partner with UDFCD to develop design guidance for “new” BMPs for the Denver area.
15. Denver will continue to educate the public on stormwater quality issues. Additional opportunities for Denver’s existing public education program include:
 - ▶ Provide additional educational brochures and water pollution prevention resources on the Denver web site. For example, as discussed in Chapter 5, many of the national case studies provide extensive web resources.
 - ▶ Develop pollution prevention programs for specific industries that require further attention and/or partner with entities providing existing programs. For example, the City of Boulder’s Partners for a Clean Environment (PACE) program targets and provides educational information to specific industry segments including auto repair, auto body, green building, dental offices, dry cleaning, landscaping, manufacturing, printing, restaurant, and retail sectors. The City of Portland has a similar program. As an alternative to independently developing such programs,

Denver can partner with professional organizations and industry groups to support their efforts in this type of training.

- ▶ Educate developers and Denver staff on the benefits of land management strategies such as open space/natural areas preservation and/or restoration, riparian buffer zone protection, Smart Growth, Green Development, and Low Impact Development strategies.
 - ▶ Continue educational campaigns on specific measures to minimize pollution at its source. These efforts will include a multi-faceted approach directed to the public, Denver staff and elected officials, and neighboring communities.
16. Based on an initial reconnaissance level evaluation (as described in Chapter 8), there are promising opportunities for regional water quality BMPs, including large retention basins and wetlands, that could reduce impacts to downstream receiving waters. Methods to finance the development and maintenance of these facilities are urgently needed. In addition, Denver will proceed with more detailed citywide planning to identify and prioritize regional BMP alternatives. As a part of any regional facility evaluation, it will be important to clearly define under what circumstances a developer can have their requirement for onsite water quality treatment waived (e.g., paying a fee-in-lieu-of treatment) due to regional treatment facilities.
17. Closely related to regional water quality facilities is the need to conduct a watershed-by-watershed evaluation of current stream and lake conditions, including steps that are necessary to improve the status quo. The purpose of such an evaluation is to identify watershed-specific goals, priorities, data gaps and practicable mitigation measures that could be developed to strategically improve conditions. It is logical to focus initially on 303(d)-listed streams (i.e., those that are considered by to be “impaired” for one or more pollutants) and to work closely with existing efforts such as those of South Platte CURE, the Barr-Milton Watershed Group, and Denver Public Works and Environmental Health.
18. Denver will continue to monitor approaches used throughout the country related to stormwater and watershed management. Lessons learned from case studies evaluated in this Plan will be kept in mind during decision-making and planning for Denver. Examples of common themes from communities with advanced stormwater programs include:
- ▶ Comprehensive approaches are being used to address drainage, flooding, erosion, aquatic life, native habitat, and water quality in an integrated manner.
 - ▶ Watershed-based approaches are being used for planning and problem solving.
 - ▶ Geographic Information System (GIS) tools are being used effectively to prioritize stormwater improvements and to more effectively communicate to citizens, staff, and developers.
 - ▶ Storm runoff volume reduction practices are being used in many of these communities. These practices include a variety of runoff reduction techniques

such as grass buffers and swales, green roofs, and other landscape-based approaches.

- ▶ The importance of sound long-term maintenance of BMPs is widely recognized, as is the need to provide public safety at drainage facilities.
- ▶ Strong public education and outreach campaigns in combination with extensive web sites are substantive components of these programs. Education is being aggressively used as a key strategy to improve runoff quality.
- ▶ Significant financial investments, often measured in millions of dollars, have been required for many communities to conduct their stormwater quality planning efforts. These communities recognize that comparable future expenditures will be required to implement their plans, and are implementing suitable methods of financing.

19. Because the water quality challenges facing Denver will require significant funding, new and potentially innovative financing strategies that capitalize on public/private partnerships will be investigated.

Although this Plan provides a solid framework and foundation for effective stormwater quality management in Denver, a follow-up implementation plan and schedule are needed to ensure that the principles and practices set forth in this Plan are implemented throughout Denver. An initial Implementation Plan is outlined in the following section.

IMPLEMENTATION PLAN

As a result of extensive review of this Plan by both the Denver Advisory Committee and an Outside Review Committee, the need for an implementation plan identifying how the recommendations of this Plan would be implemented was identified as a top priority. In Exhibit 9.1, recommendations from this Plan have been tabulated along with identification of responsible party, timeframe, and level of financial investment by Denver. This implementation plan can be considered a “road map” for Denver to manage stormwater quality in the future. It is anticipated that this initial framework will be revised periodically.

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EXHIBIT 9.1 IMPLEMENTATION PLAN FOR DENVER WATER QUALITY MANAGEMENT PLAN ACTION ITEMS				
ACTION ITEM	DESCRIPTION	TIMEFRAME	LEAD DEPARTMENT	APPROXIMATE FUNDING LEVEL
1. Update Denver's <i>Storm Drainage Criteria Manual</i> to reflect the policies and guidelines of this Plan.	Integrate the policies and strategies identified in this Plan into the Denver <i>Storm Drainage Criteria Manual</i> . Representative topics include integration of water quality/quantity management, BMP maintenance, consideration of regional facilities, and policies regarding multiple use facilities and new BMPs.	2005	Public Works Engineering Division	\$80-100,000 (Contract)
2. Update Denver's <i>Stormwater Quality Control Plans, An Information Guide</i> to reflect the policies of this Plan with specific emphasis on maintenance plans for BMPs.	Currently, the Information Guide has no requirements for long-term maintenance plans for BMPs. The guide should be expanded to require the developer to clearly outline maintenance requirements for the facility.	2005	Public Works: Engineering and Wastewater Management	\$15-30,000 (Contract)
3. Update or expand Denver's Easement and Indemnity Agreement to provide specific language regarding maintenance of BMPs.	Denver's current agreement should be revised to provide specific legally binding provisions with regard to BMP maintenance in accordance with the recommendations of Chapter 6 and Appendix D. Alternatively, a separate agreement can be developed focusing solely on maintenance.	2005	Public Works and City Attorney's Office	To Be Determined
4. Update Denver's web site to enable easier public access to stormwater and water-quality-related information.	Currently, Denver's web site provides only limited information to the public on stormwater quality and water quality management. The web site could be updated to contain more information already developed by Denver and to consolidate drainage and water-quality-related planning documents.	2005	Public Works and Communications Department	To Be Determined

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5. Increase interdepartmental awareness of the policies and strategies in this Plan.	This can be accomplished by two avenues: 1) presenting the information to related departments such as Community Planning and Development and Parks and Recreation through PowerPoint presentations; and/or 2) developing a condensed, full-color, graphically appealing version of the document for broader distribution. These presentations would emphasize the importance of planning for stormwater management early in the development review process and the necessity of these policies applying to Denver's internal projects.	2005	Public Works Wastewater Management Division	To Be Determined
6.1 Evaluate regional BMP facility opportunities in more detail with regard to cost and practicality.	This Plan identifies multiple potential opportunities for regional BMPs; however, it was beyond to the scope of this document to systematically evaluate these in detail. Regional facilities have significant potential for stormwater quality management, but require detailed and thorough planning and financial arrangements to be effective.	2005-2006	Public Works Wastewater Management Division and Community Planning and Development	\$50-100,000 (Contract)
6.2 Evaluate and develop acceptable funding strategies for regional BMPs, including the feasibility of public-private partnerships.	In the event that regional facilities are deemed feasible for various locations in Denver, Denver needs to have a policy and financing strategy in place for these facilities. Basic research of how other communities have financed these facilities would be beneficial, followed by adaptation of these strategies to fit Denver. An example is the "fee-in-lieu-of" approach.		Public Works Wastewater Management Division and Community Planning and Development	To Be Determined

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7. Conduct watershed-by-watershed assessments to better characterize the water quality issues facing Denver for the purpose of tailoring specific mitigation strategies to actual watershed issues.	Building upon and integrating with efforts already underway by regional watershed groups, Denver’s Department of Environmental Health, Public Works Wastewater Management Division, the Joint Stormwater Task Force, Urban Drainage and Flood Control District and others, inventory available instream biological, chemical and physical data to better target watershed priorities and solutions. A considerable database already exists, but would benefit from integration into a GIS-based system. This type of assessment would form the basis of developing specific watershed goals where none have been developed, and promote better understanding in areas where goals have already been developed. This task should interface with Task 6.1 relating to identification of regional facilities. A three-phase program is envisioned that 1) inventories available information; 2) develops targeted strategies to address specific watershed concerns and/or fills data gaps; and 3) implements recommended strategies.	2005-Phase 1 2006-Phase 2 2007-Phase 3 (and into the future)	Public Works Wastewater Management Division and Environmental Health Coordination with existing watershed groups and Urban Drainage and Flood Control District will be essential.	To Be Determined
8. Continue to educate the general public and specific industry groups on stormwater quality issues.	This is an on-going program under Denver’s stormwater permit and the Wastewater Management Division. It is important that these activities continue and that Denver integrate with independent industry training programs where appropriate (e.g., builders).	On-going	Public Works Wastewater Management Division	On-going Denver Program

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9. Pilot testing of innovative BMPs.	This Plan describes several innovative stormwater quality management strategies including green roofs, porous landscape detention, Low Impact Development strategies and others. Denver should partner with Urban Drainage and Flood Control District in pilot tests of these BMPs, as the opportunity arises.		Public Works Wastewater Management Division and Urban Drainage and Flood Control District	Variable
10. Provide additional education on BMP maintenance requirements to private owners of stormwater BMPs.	Given the many BMPs already in place in Denver, owners of privately owned facilities would benefit from easy-to-understand guidance regarding maintenance of BMPs. A brochure or short manual based on the maintenance guidelines in the Plan could be distributed to facilitate improved BMP maintenance. For example, a brochure could be developed for the Clear Choices for Clean Water series through the Joint Task Force with the reader directed to Denver's web site for more detailed guidance.	2005	Public Works Wastewater Management Division and Joint Stormwater Task Force	To Be Determined
11. Implement recommendations of comprehensive utility review.	A URS-led team of consultants will complete a four-report comprehensive utility review. Report 1 will be a utility assessment program and definition study. Report 2 will be a utility management, administration and organizational study. Report 3 will be a cost of service study, and Report 4 will be an integrated waste management feasibility study.	2005	Public Works Wastewater Management Division	To Be Determined