



BOARD OF SUPERVISORS AGENDA ITEM REPORT

Requested Board Meeting Date: December 15, 2015

Title: Design Standards for Stormwater Detention and Retention Manual

Introduction/Background:

This Manual is an update of the Stormwater Detention/Retention Manual (Manual) that was adopted in 1987.

Discussion:

This Manual provides standards and specifications for the implementation of Chapter 16.48 of the Floodplain and Erosion Hazard Management Ordinance (Ordinance) regarding the detention and retention system. The Ordinance requires adoption of the Manual by the Flood Control District Board of Directors.

Conclusion:

The Manual modifies the requirement that new development provide retention of stormwater runoff to require that the retention occurs in shallow stormwater harvesting basins rather than in deep retention ponds. These basins could be used for planting landscape vegetation in order to provide shade for pedestrians, cars or buildings, traffic calming, screening in bufferyards, etc. The Manual also introduces the concept of Low Impact Development practices, provides guidance for the inspection and maintenance of detention and retention basins, and provides standard details of these types of improvements.

Recommendation:

The Regional Flood Control District (District) recommends approval of this Manual for use by the District and the public in designing detention and retention for new commercial and subdivision development.

Fiscal Impact:

N/A

Board of Supervisor District:

1 2 3 4 5 All

Department: Regional Flood Control District Telephone: 724-4600

Department Director Signature/Date: *J. Shook* 11/17/15

Deputy County Administrator Signature/Date: *John H. Smith* 11/30/15

County Administrator Signature/Date: *C. Dunkelbaun* 12/1/15



Board of Supervisors Memorandum

December 15, 2015

**Design Standards for Stormwater Detention Retention Manual
Adoption by the Regional Flood Control District Board of Directors**

Background

The Regional Flood Control District (RFCD) Design Standards for Stormwater Detention and Retention Manual was last updated nearly 30 years ago. During that period of time, the RFCD, in cooperation with various stakeholders, gained a great deal of knowledge and experience in properly addressing the challenges of designing new and existing development with adequate protection from flooding threats.

Furthermore, harvesting stormwater for landscaping and riparian area preservation has become a topic of significance, as the Pima County area has expanded its population and area of land development, and is a key water supply sustainability practice.

Revision Process

As indicated in the attached November 17, 2015 memorandum from the RFCD Director and Chief Engineer, (Attachment 1) the revision process began in the latter part of 2012. Due to the extent of the technical standards addressed in the manual, a phased approach to implementing changes was used. The initial detention basin construction standards were updated in June 2013, and the balance of the manual became effective in September 2014. However, in an effort to assure that changes resulted in the desired improvements in design and construction standards, a lengthy testing period was conducted with the changes to the manual.

RFCD utilized an aggressive and inclusive stakeholder engagement process, and the November 23, 2015 RFCD memorandum identifies 27 input opportunities beginning with the May 2012 first draft of the manual completed by RFCD staff (Attachment 2). During the course of these numerous interactions between RFCD staff and various stakeholders, modifications and adjustments were made and further testing conducted.

While the regulated community that is most knowledgeable about the application of the stormwater detention and retention standards is generally satisfied with the current version of the manual, an area that continues to raise questions is the "First Flush" retention requirement. The Metropolitan Pima Alliance has indicated that an additional period of beta testing for this element of the standards would be beneficial to assure the latest revisions are workable and manageable by those engaged in applying these standards. Therefore, an

The Honorable Chair and Members, Pima County Board of Supervisors

Re:

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additional recommendation for further beta testing of this threshold requirement is proposed in the adoption of the manual.

Recommendation

I recommend the Regional Flood Control District Board of Directors adopt the revised Design Standards for Stormwater Retention and Detention Manual with the condition that the "Requirements for First Flush Retention" undergo an additional six months of beta testing and, if necessary, further adjustments be made at the end of that testing period.

Respectfully submitted,



C.H. Huckelberry
County Administrator

CHH/lab - December 1, 2015

Attachments

c: John Bernal, Deputy County Administrator for Public Works
Suzanne Shields, Director, Regional Flood Control District

ATTACHMENT 1

DATE: November 17, 2015

TO: C. H. Huckelberry
County Administrator

FROM: Suzanne Shields, P.E.
Director

SUBJECT: Design Standards for Stormwater Detention and Retention Manual – Adoption by the Flood Control District Board of Directors

BACKGROUND

In the latter part of 2012, the Regional Flood Control District (District) began a substantive update of the Pima County/City of Tucson Stormwater Detention/Retention Manual (Manual). The reasoning behind this undertaking was the need to reduce the frequency and volume of stormwater runoff from new development, which is a frequent complaint from downstream neighbors, reduce the contribution of pollutants from urbanized areas to address state and federal environmental regulations, and to provide a mechanism to direct runoff to landscaped areas, bufferyards and riparian areas in a way that provides some flood control benefit.

Harvesting stormwater for landscaped and riparian areas is in keeping with one of the outcomes of the City/County Water & Wastewater Infrastructure Supply and Planning Study which provided direction to departments to identify approaches to make stormwater more of an asset on the water supply ledger as opposed to considering it a nuisance.

In addition, the Manual had not been updated for nearly 30 years. The update remains consistent with the Floodplain and Erosion Hazard Management Ordinance and its update over the last 30 years.

The process for updating the Manual included considerable stakeholder input with review and comment by Southern Arizona Homebuilders Association (SAHBA), Metropolitan Pima Alliance (MPA), Pima Association of Governments, the Flood Control District Advisory Committee, Town of Marana, City of Tucson, the Pima County Department of Transportation and the Development Services Department as well as numerous private entities, water resource and sustainability groups and consulting firms who are familiar with implementation of this Manual.

REVISIONS TO MANUAL

Some of the substantive changes to the Manual included:

1. Replacing the threshold retention requirement with a first-flush retention requirement (retaining the first 0.5 inch of rainfall);
2. Introducing the use of integrated site planning and other Low Impact Development practices;
3. Updating and augmenting specific design standards for the construction of detention and retention basins;
4. Developing inspection and maintenance protocols to ensure efficacy of these basins over time; and

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5. Developing hydrologic and hydraulic analysis methodology to ensure consistent application of these modeling techniques and to quantify the flood control benefit of stormwater harvesting.

REVISION PROCESS

Due to the significant changes that are being proposed in the Manual, the District decided to phase implementation in order to beta test the Manual prior to adoption. Chapter 4 of the Manual, pertaining to detention basin construction standards, became effective in June 2013 and the rest of the Manual became effective in September 2014. A lengthy testing period was required due to the relatively slow pace of development within unincorporated Pima County.

As a result of the beta testing and after numerous discussions with stakeholders, additional changes were made which make the Manual more effective while providing additional flexibility for the development community. These changes can be summarized as:

- 1) Exempting some projects from the retention requirement. After meeting with representatives from SAHBA and MPA, as well as with some of their individual members, the applicability of the first flush retention was modified to exempt the following projects:
 - a. Low density residential subdivisions with a development density of 1.2 residence per acre or less (equivalent to CR-1 Zone), unless required by rezoning;
 - b. Developments that have been platted or received any construction authorization prior to the adoption of this Manual; and
 - c. Individual blocks within a previously approved Block Plat when an alternative method of stormwater retention has already been constructed or planned for the Block Plat.
- 2) Adding greater flexibility in allowing stormwater harvesting basins on individual lots to meet the first flush retention requirement. The initial version of the Manual prohibited the use of on-lot stormwater harvesting basins to meet the first flush retention requirement due to the uncertainty regarding the basins being filled in by property owners over time. The final version includes two notable exceptions:
 - a. It allows on-lot stormwater harvesting for residences that are also permitted through the Green Building Program,
 - b. For mass-graded lots, it allows for the placement of basins in drainage easements that are in the front yard adjacent to the right-of way in order to provide shade for pedestrian areas. This is compatible with the proposed revisions to the Subdivision and Development Street Standards, which will include this concept in the Manual and standard details.

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- 3) Accommodating additional retention volume within a detention basin. In response to a concern by SAHBA regarding the additional area needed for the shallow water harvesting, the District modified the maximum retention depth from 9" to 18" when an engineered basin bottom is constructed and when terraces are provided as a riparian mitigation area.

ADDITIONAL SUPPORT AND GUIDANCE

In order to facilitate the use of Low Impact Development practices by the development community, neighborhood associations, community groups and general public, the District has prepared two additional guidance documents, which can be found on the District's website:

- 1) The [Low Impact Development and Green Infrastructure Guidance Manual](#) is intended as technical guidance for professionals on the use of neighborhood-scale low impact development practices within Pima County, the City of Tucson and similar areas in the desert southwest. As part of Phase II of the City/County Water and Wastewater Study, an evaluation of the best approach for using rainwater and stormwater as a supplemental water source concluded that capture and use at the lot and neighborhood scale results in the best opportunities.
- 2) The [LID/GI Case Studies](#) guide reflects design solutions that embrace the evolving paradigm for sustainable design: Low Impact Development (LID) and Green Infrastructure (GI) practices. The case studies show local projects that use LID/GI practices. The case studies can be used to help groups, professionals or individuals learn more about the value of LID/GI development, what worked, and lessons learned.

RECOMMENDATION

The District recommends completing the revision process by submitting the Manual for Board adoption on December 15, 2015.

SS/tj

Attachments

c: John Bernal, Deputy County Administrator – Public Works
Bill Zimmerman, Deputy Director – Regional Flood Control District
Eric Shepp, P.E., Deputy Director – Regional Flood Control District

ATTACHMENT 2

DATE: November 23, 2015

TO: C. H. Huckelberry
County Administrator

FROM:  FOR
Suzanne Shields, P.E.
Director

SUBJECT: Proposed Design Standards for the Stormwater Detention and Retention Manual – Stakeholder Engagement

The Regional Flood Control District (District) began the process of revising the Stormwater Detention and Retention Manual (Manual) over five years ago with the first draft version available for public comment in May 2012. Throughout the following two years, the District engaged numerous stakeholders to review, comment, and improve the first draft. The most intensive and substantive review and discussion occurred with the District's Flood Control District Advisory Committee (FCDAC) and the Southern Arizona Home Builders Association (SAHBA). Their efforts throughout this process have been greatly appreciated and much of the language in the Manual can be attributed to their diligent review of both the format and substance. Additional comments were received by other stakeholders as well as substantive input from the Pima Association of Governments (PAG) and from water resources professionals regarding Multiple Benefits and Multiple Uses of Low Impact Development (LID) practices in Chapter 6. Approximately 35 meetings were held to discuss, debate, and refine the Manual prior to the beta testing period which began September 1, 2014.

During the beta testing period, 23 projects were reviewed and approved using the standards and methodology in the Manual. The implementation of the Manual during the year of beta testing identified a few issues that required revisions. Some of the revisions were minor such as typos and inconsistent language and others were more substantive including issues of applicability and administration. Even though administrative issues surfaced, the application of the new standards was very straightforward and were effective at providing opportunities for site planning which addressed both landscaping and flood control requirements.

After a full year of implementation, the District requested feedback from stakeholders regarding their concerns. An additional eight meetings were held including considerable correspondence via telephone and email. The following issues were brought up and (with the exception of one issue) modifications were made to the Manual.

- 1) The Applicability of the Manual to Large Lot Subdivisions – The Manual was modified to exempt subdivisions with a development density of 1.2 RAC or less. The District accepted the stakeholders' recommendation.
- 2) The Applicability to Master Planned Developments and Previously Approved Projects – The Manual was modified to exempt master planned developments where retention was already planned and to exempt projects that had already received construction authorization. The District accepted the stakeholders' recommendation with minor changes.
- 3) Design Concepts Allowing for Increased Retention Depth. The Manual was modified to allow for an increase in ponding depth to 18" from 9" within a detention basin when certain conditions are met. The District developed this new design concept, based on stakeholder recommendations.

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- 4) Waiver Process – The Manual was modified to clarify how alternative designs can be approved. The District accepted the stakeholders' recommendations.
- 5) Underground Retention – The Manual does not allow for underground retention of stormwater due to issues of safety and long-term effectiveness and maintenance. The District did not modify the Manual.

No additional issues were brought up by the stakeholders.

In addition to the beta testing, and in order to facilitate a smooth transition, the District has offered and continues to offer training opportunities to consultants, developers, and associations regarding use of the PC-LID spreadsheet, which incorporates the stormwater harvesting flood attenuation methodology. The District has also developed two additional guidance documents that provide assistance for site planning and the use of LID practices, which are available on the District's website.

Further, throughout the process, an ongoing dialogue occurred among the Ad Hoc LID Working Group who incidentally sponsored the workshop which you addressed in April of this year. This group includes members from the Pima County Department of Transportation, the Watershed Management Group, PAG, the University of Arizona Water Resources Research Center, the University of Arizona Department of Planning and Landscape Architecture and private consultants. This group continually provided feedback and outreach to many sectors of the community.

Below is a synopsis of the stakeholders' involvement as well as some specific milestones in the development and use of the Manual:

- May 2012: The first draft of the Manual was completed by District staff. The District requested an initial review by consultants and jurisdictions experienced in detention basin design. This draft introduced the concept of LID and provided the standards and specifications for detention and retention basins. All chapters except chapters 3 and 6 were drafted and available for review.
- June 2012: The first version of Chapter 3 that describes the methodology to assign a flood control benefit for decentralized stormwater harvesting was completed. The Manual was presented to the FCDAC for initial review.
- September 2012: After revisions due to comments by the FCDAC and consultants, a first draft of the Manual was posted for stakeholder review.
- September – December 2012: Four meetings were held with the FCDAC with an ongoing discussion regarding the standards and specifications for detention retention basins.
- January 2013: A presentation was given to the FCDAC regarding the stormwater harvesting methodology (Chapter 3).

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- February – July 2013: The FCDAC continued to review the methodology and construction standards FCDAC (6 meetings). The FCDAC recommended interim use of detention basin construction standards at the July meeting.
- February – July 2013: Reviewed the Manual with the SAHBA Technical Committee (6 meetings).
- August 2013: A Technical Policy authorizing the use of new detention construction standards was signed by the Chief Engineer (Chapter 4).
- September– December 2013: The District completed a line-by-line review with the FCDAC Technical Committee (5 meetings), and line-by-line review with the SAHBA Technical Committee (3 meetings).
- December 2013: The FCDAC approved the draft Manual, except Chapter 6 regarding LID practices.
- January 2014: The District held a meeting with the Metropolitan Pima Alliance (MPA) to discuss the Manual. The MPA indicated they will rely on the SAHBA Technical Committee to perform substantive review.
- February 2014 – May 2014: The District held meetings with Pima County departments, water resources professionals, and PAG (4 meetings).
- June 2014: The Multiple Use and Multiple Benefits of LID practices (Chapter 6) was completed and approved by the FCDAC.
- September 2014: Technical Policy Tech-007 was authorized by the Chief Engineer allowing the use of the Manual for beta testing.
- May 6, 2015: A presentation was given to consultants and jurisdictions regarding the stormwater harvesting flood attenuation methodology.
- September 1, 2015: Discussions began with stakeholders regarding the submittal of the Manual to the Pima County Board of Supervisors (Board) in October or November. SAHBA requested a meeting to discuss issues observed during beta testing. A meeting was scheduled for September 24, 2015.
- September 17, 2015: A meeting was held with internal Pima County stakeholders to discuss the compatibility of the Manual with Subdivision and Development Street Standards.
- September 24, 2015: Discussion with SAHBA results in three issues related to retention basin depth, applicability to large lot subdivisions and lack of a waiver process.

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- September 30, 2015: A meeting was held with other stakeholders to discuss SAHBA's requested changes.
- October 5, 2015: The District responded to comments and modified the Manual.
- October 16, 2015: SAHBA requested that the District delay submittal to the Board for a few weeks in order to get one last round of concerns submitted. The District agreed to delay the submittal to the Board until December 1, 2015 and requested a list of concerns from the members.
- October 2, 2015: The District gave a presentation and discussed the changes with the FCDAC.
- October 27, 2015: The District gave a presentation and discussed the changes with the MPA members. Additional comments were received regarding the applicability of the Manual for master planned communities.
- October 29, 2015: The District requested additional comments from SAHBA.
- November 6, 2015: The District held a meeting with SAHBA and the MPA to discuss the latest issues. Two additional comments were provided regarding master planned development and underground retention and two questions.
- November 13, 2015: The District responded to comments, answered questions and modified the Manual.
- November 16, 2015: The District gave a presentation and discussed the changes with SAHBA. No new issues were brought to our attention.

Please let me know if you have any questions.

SS/tj

c: John Bernal, Deputy County Administrator – Public Works
Bill Zimmerman, Deputy Director – Regional Flood Control District
Eric Shepp, P.E., Deputy Director – Regional Flood Control District