FINAL

City of Colorado Springs

Stormwater Needs Assessment

Prepared for:

CITY OF COLORADO SPRINGS

October 11, 2013

Submitted by

CH2MHILL®

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Stormwater Needs Assessment

Final Report

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Executive Summary

The purpose of this Stormwater Needs Assessment (Assessment) is to review, assess, and validate as appropriate the projects in the City of Colorado Springs (City) Stormwater Needs Master Project List (MPL). The MPL is a subset of the Stormwater Needs Assessment List developed by the Pikes Peak Regional Stormwater Task Force. The MPL includes 282 projects with a total cost of $688 million (2012 dollars).

This Assessment includes the following activities:

- Review the MPL.
- Review the City's Geographic Information System database and the source documents that were used to develop the MPL.
- Review project site conditions through field visits and/or aerial photos for projects that were identified prior to 2009.
- Classify projects based on the extent of available information for each project, which corresponds to the ability to thoroughly validate a project's need, scope, and associated costs.
- Assess each project's benefit to the community by scoring each against an objective set of criteria established by project stakeholders.
- Prioritize the validated projects into High, Medium, and Low Priority categories based on the urgency of addressing the stormwater need as judged by the evaluation team.
- Update project costs by escalating the Base Construction Costs (where known) to 2013 dollars and adding cost adjustment factors to account for Other Construction Costs, Other Projects Costs, Construction Difficulty, and an Overall Contingency based on the level of analysis conducted to date.

The Assessment found that 44 of the 282 projects had been constructed, were duplicated in the MPL, or no longer existed. Another 9 projects were unable to be validated due to the lack of sufficient data to support the need for the project described in the MPL. One project was removed from further consideration because it did not address a specific project location but instead called for a general replacement of all corrugated metal pipe (CMP) throughout the City as the material reaches the end of its useful life.

The remaining 228 projects are included in the Validated Project List (VPL). The 228 projects became 239 projects, as 11 projects were split into 22 projects to distinguish High Priority elements of each of the 11 projects from the Medium Priority elements. Of the 239 projects included in the VPL, 165 were identified as Class A projects for which there was sufficient source document information and/or a site visit confirmation to allow for project validation and updating of the project cost presented in the MPL. The remaining 74 projects in the VPL were identified as Class B projects for which the available supporting source documents were either limited or non-existent and therefore judged to be insufficient for confirming the basis for the project cost cited in the MPL. Thus, project costs for Class B projects could neither be confirmed nor updated.

The 239 projects in the VPL were prioritized into High, Medium, and Low Priority categories based on the urgency of addressing the stormwater need. The ratings are based on review of the source documents, aerial photos, and field visits when applicable. A total of 44 projects were assigned a High Priority classification, 175 projects were evaluated as Medium Priority, with the remaining 20 classified as Low Priority.

The 239 projects in the VPL were further assessed to determine the community benefit of each project by measuring each project against a set of criteria established by project stakeholders. A workshop was held with City staff, County staff, and members of the Regional Stormwater Task Force to determine the evaluation criteria to be used in benefit scoring and to assign relative weighting to each evaluation criterion.

Benefit scores were determined using the source documents supporting each project and incorporating the observations made during site visits and/or a review of aerial photos. The results can be used to characterize the benefit to the City presented by each project and assist in the eventual development of a Capital Improvement Plan (CIP).

Project costs provided in the MPL were reviewed and updated where possible. The ability to update project costs depended on the level of detail supporting the project cost cited in the MPL. Only the 165 Class A project costs could be updated based on the available project information. The 74 projects designated as Class B had insufficient information to allow confirmation and updating of the MPL cost. Therefore, the MPL cost for Class B projects was retained as the best available information.

Table ES-1 summarizes the number of projects and costs by priority and classification. The 34 High Priority Class A projects have an updated project cost total of $138 million (2013 dollars). The total updated cost of all 165 Class A projects in the VPL is $362 million (2013 dollars). Also shown in Table ES-1, for informational purposes, is the City's MPL cost total for the Class B projects. As discussed, Class B project costs are unconfirmable within the scope of this Assessment and are included in Table ES-1 as the best available information.

TABLE ES-1
Summary of the VPL by Priority and Classification

Priority Level	Total # of Projects	Class A Projects		Class B Projects	
		# of Projects	Updated Project Cost (2013 dollars)	# of Projects	Unrevised MPL Cost (2012 dollars)
High	44	34	$137,649,000	10	$24,057,000
Medium	175	117	$206,702,000	58	$103,737,000
Low	20	14	$17,179,000	6	$45,461,000
Total	**239**	**165**	**$361,530,000**	**74**	**$173,255,000**
Combined Total			**$534,785,000**		

Costs associated with the following items are not included in the updated costs: City/program management, procurement, legal, financial, or land acquisition.

Project Overview

The purpose of this Stormwater Needs Assessment (Assessment) is to provide an independent assessment of the projects identified in the City of Colorado Springs (City) Stormwater Needs Master Project List (MPL) to validate the current backlog of stormwater capital needs within the City. This Assessment includes the following steps:

- **Project Validation –** Evaluate the need for each project in the MPL.
- **Project Classification –** Classify each project based on the completeness of available information.
- **Project Prioritization –** Prioritize the validated projects into High, Medium, and Low Priority categories based on the urgency of addressing the stormwater need.
- **Project Benefits –** Assess the benefit to the community of the validated projects using an objective set of criteria established by project stakeholders that reflect the goals and objectives set by the City.
- **Cost Updates –** Update the costs provided in the MPL by identifying the base construction cost presented in the source document for each project (where available), escalating costs to 2013 dollars, and adding factors for typical construction items and associated project costs (e.g., construction management, engineering, geotechnical surveys, design survey, public involvement, environmental mitigation, etc.). Costs for land acquisition (right-of-way, easement), legal and procurement support, financing, and overall program management are not included.

This Assessment relied on available sources of information. In many cases, only limited data or decades-old planning studies were available. To augment the available written information, site visits were conducted for many projects to document the observable stormwater needs. The City's Geographic Information System (GIS) database was used in the evaluation process, as well as aerial photography obtained from the City and public sources.

The result of this Assessment is a Validated Project List (VPL) that can be used to document the existing backlog of stormwater capital needs within the City that were evaluated in this Assessment. The VPL also presents updated project costs for those projects where sufficient detail was available. The original MPL cost is included for those projects where there was insufficient detail and supporting data to validate and update the MPL cost.

The following activities are beyond the scope of this Assessment:

- Investigation or identification of additional stormwater needs not already included in the MPL, including those associated with the recent wildfire burn areas (Waldo Canyon and Black Forest) and the abnormally high rainfall/runoff events that occurred in September 2013.
- Revisions to project solutions proposed in the source documents based on changes to City criteria or current federal, state, or local regulations.
- Hydrologic or hydraulic analyses.
- Engineering analysis, design, or redesign of project solutions.
- Validation of construction quantities presented in source documents and/or determination of new construction quantities for cost updates.

Stormwater History

Master Project List Development

The task of identifying stormwater capital needs began most recently in 2012 when City staff compiled projects from previous CIP lists, Drainage Basin Planning Studies (DBPS), and other sources, some of which date back to the mid-1970s. A volunteer Pikes Peak Regional Stormwater Task Force then provided input on regional project needs, and the list was updated. Projects identified through citizens' requests were also added to the list. The regional Stormwater Needs Assessment List was then screened to include only projects within the City limits, which resulted in the City's MPL of 282 projects that provides the starting point for this Assessment. The total cost presented in the City's MPL for the 282 projects is $688 million.

Recent Wildfires

Devastating wildfires in 2012 and 2013 west and north of the City burned more than 32,000 acres and have resulted in increased stormwater runoff, flash flooding, erosion, and debris deposition. The City and other local governments have responded to these events in a variety of ways. Special appropriations, state and federal grants, and interagency collaboration have resulted in additional funding for stormwater projects in the past 2 years.

The scope of this Assessment is to evaluate the MPL provided by the City, which does not include stormwater needs resulting from the two wildfires. It is noted that additional needs and projects due to the wildfires will undoubtedly be identified and prioritized in the near future. For example, stormwater infrastructure may now have undersized hydraulic capacity due to changes in post-burn flood flow rates, additional safety measures may be required, and additional studies and engineering are needed that are beyond the scope of this Assessment.

Stormwater Capital Project Funding History

General Funding

For many years, the City has funded stormwater capital projects and maintenance through General Fund appropriation, and funding was established annually through the City's budgeting process. Some projects were constructed as an element of other infrastructure projects, such as when drainage features are built concurrently with adjacent roadways.

Springs Community Improvements Program

In 1998, City voters approved the Springs Community Improvements Program (SCIP), the City's first program to dedicate funds for stormwater, among other capital projects. The original SCIP was funded through retention of almost $7 million from the 1997 Taxpayer Bill of Rights refund. A second SCIP was funded in 1999 through $88 million in municipal bonds.

The two SCIP programs were in place through 2004; during this time, 7 stormwater projects were constructed at a cost of nearly $20 million. The largest stormwater project included improvements to Fountain Creek from its confluence with Monument Creek west to 21st Street.

City of Colorado Springs Stormwater Enterprise

The City Council established a Stormwater Enterprise (SWENT) in 2006 as a stand-alone enterprise in the Public Works Department. SWENT was funded through a fee that was assessed and collected by the City based on the area of impervious surface on each property. SWENT lasted only 3 years, from 2007 to 2009, and the program generated $46 million in fees during its existence. As a result of a citywide election in 2009,

SWENT was dissolved in early 2010, and the collection of funds dedicated to stormwater management and capital funding ceased.

During its existence, SWENT prepared a 5-year CIP list of 26 projects with a 2009 budget estimate of $82.8 million. While the number of projects and the overall CIP amount are significantly less than what is included in the City's MPL, the SWENT CIP was originally developed to address what were considered High Priority projects at the time to effectively use the nearly $8 million annual capital improvement budget.

In contrast, the 282 projects included in the City's MPL are the unprioritized listing of backlogged stormwater needs that have been compiled from many sources. The MPL contains many of the projects listed in the SWENT CIP, but those projects have estimated costs that have been updated by City staff based on a number of factors. For example, some of the SWENT projects have been the subject of recent engineering studies that evaluated several of the City's major streams, such as Fountain Creek, Cottonwood Creek, Sand Creek, and Templeton Gap Floodway. These studies have redefined the stormwater needs of those waterways and have created new, updated lists of projects to address those needs, some with significantly different cost estimates than those originally identified in the SWENT CIP.

Project Validation

Master Project List

The MPL consists of 282 projects in a Microsoft Excel spreadsheet, as presented in Appendix A. The MPL includes projects with estimated costs greater than $25,000. Projects with costs below this amount were considered by the City to be maintenance-related needs and are not included in the MPL. The MPL serves as the base document or starting point for this Assessment.

The scope of this Assessment does not include investigation or identification of additional stormwater needs not already included in the MPL.

Source Documents and GIS Data

CH2M HILL coordinated with the City to identify, collect, and review information used to compile the MPL. The MPL was developed using the following primary source documents:

- 2010 DRAFT Cottonwood Creek Drainage Basin Planning Study
- 2010 DRAFT Sand Creek Channel Improvements
- 2010 DRAFT Sand Creek Channel Stabilization, East Platte Avenue to Constitution Avenue
- 2010 PPRTA Field Assessment
- 2006-2010 City of Colorado Springs CIP and Needs Assessment
- 2009 Cottonwood Design Report
- 2009 Fountain Creek Stabilization and Restoration Plan
- 2009 Monument Creek at Talamine Alternatives Analysis
- 2009 South Douglas Creek Study
- 2009 SWENT Five-Year Plan
- 1996 Sand Creek Drainage Basin Planning Study
- 1993 Shooks Run Drainage Basin Planning Study
- 1993 Spring Creek Drainage Basin Planning Study
- 1991 Bear Creek Drainage Basin Planning Study
- 1984 Southwest Area Drainage Basin Planning Study
- 1975 Westside Drainage Basin Planning Study
- SWENT Database (box of hard-copy files provided by the City)
- Other miscellaneous sources

Table 1 summarizes the distribution of the MPL projects based on the type of primary source document for the projects. Additional supporting documentation included project spreadsheets, project files, and GIS data layers. Some project files, generally associated with the SWENT database, included a field assessment form, aerial image, photos, and/or conceptual improvement layouts. Most of the projects with a City project file included a cost estimate with construction quantities, unit costs, and escalation factors.

TABLE 1
Source Document Categories for the MPL

Type of Primary Source Document	Number of Projects in the MPL
Drainage Basin Planning Studies (DBPS)	112
Other Engineering Reports/Studies	32
SWENT Database	46
Capital Improvement Plan Lists	78
Other Miscellaneous Sources	14
TOTAL	**282**

The source documents were reviewed to determine the basis for inclusion of each project in the MPL, with particular attention paid to how recently the project was identified, the level of detail developed for the project, the benefits expected from the project, and the estimated cost of the project.

Relevant data from the City's GIS database was collected, including the following data layers: project locations, watershed boundaries, grid system, aerial photography, stormwater infrastructure (ponds, inlets, pipes, and channels), parcels, Federal Emergency Management Agency (FEMA) floodplains, and wildfire burn areas. Appendix E contains a GIS project overview map.

Project Types

The MPL includes five different categories of projects, as summarized in Table 2.

TABLE 2
Summary of the MPL Project Categories

Category	# of Projects	MPL Cost (2012 dollars)	% of Total Amount
Channel/Grade Control	121	$406,806,000	59%
Culvert	15	$15,735,000	2%
Curb and Gutter	3	$254,000	1%
Storage	14	$14,286,000	2%
Storm Drain	129	$250,825,000	36%
TOTAL	**282**	**$687,906,000**	**100%**

Project Validation Process

To validate the projects in the MPL, projects were further reviewed by conducting site visits and/or reviewing aerial photography. Projects that were developed within the last 5 years (2009 to 2013), that are supported by technical reports and studies prepared by engineering consultants and that have adequate project definition in those reports, were assumed to not require further project validation.

Site visits were conducted during August 2013 on projects located within public property or that were clearly visible from areas with public access. The time constraints of this Assessment did not allow for obtaining access to private properties. Photographs were taken during the site visits using global positioning satellite-enabled cameras. During the site visits, projects were evaluated to determine the existing

conditions of the project area, confirm the project need, and note factors that would influence the benefit score or cost of the project.

Projects that could not be accessed due to their location on private property or that could be adequately assessed based on aerial photography were reviewed using the City's GIS aerial photography and/or web-based aerial photography. The aerial photography was used to determine if the proposed improvements were already constructed, in whole or in part.

Based on the project validation process, the MPL was screened to identify projects that were already constructed, were duplicated with another project in the MPL, or did not exist. Project CS-055 does not exist because the Shooks Run channel has been re-aligned and no longer runs through the identified project area. This screening process resulted in the identification of 44 projects that did not require additional analysis and were removed from further consideration in this Assessment. These projects are listed in Appendix B. The results of this screening process are summarized in Table 3.

TABLE 3
Summary of Projects Removed through the Screening Process

Category	# of Projects
Constructed Projects	31
Duplicate Projects	12
Does not Exist	1
TOTAL	**44**

Additional information for each project is included in the appendices, as follows:

- **Appendix A** is the original MPL provided by the City.
- **Appendix B** identifies projects that were not carried forward to the VPL for prioritization and cost updating.
- **Appendix C** is the VPL developed as a result of this Assessment.
- **Appendix D** includes the benefit scoring methodology.
- **Appendix E** includes a GIS overview map of the MPL project locations.
- **Appendix F** includes a GIS map book showing the MPL projects organized per the City's GIS grid system.
- **Appendix G** includes a Project Summary Form that summarizes the primary information for each project in the VPL.
- **Appendix H** includes an aerial image of each project site and two representative photos for each project, when available, in the VPL.
- **Appendix I** contains photos taken during project site visits.

Appendix E is included at the end of this report; all appendices are included in the attached DVD.

Project Classification

The extent of information provided in the source documents for each project varied widely. To convey the completeness of available information from source documents and the corresponding ability to validate projects, projects were assigned a classification category ranging from Class A (more complete available information) to Class C (little or no available information). A summary of the classification methodology is shown in Table 4. It is noted that the project classification (Class A, B, or C) is a function of the evaluation team's ability to fully validate a project based on the extent of available information. Table 4 also shows a Class D category, which is explained below.

TABLE 4
Project Classification Methodology

Project Classification	Project Need Validated	Project Scope Defined & Reasonable	Project Cost Basis Defined & Reasonable	Project Validated? Cost Validated?	Comment
A	Yes	Yes	Yes	Yes	Typically includes projects with detailed information from source data, such as from a DBPS or other engineering study.
B	Yes	No	No	Project – Yes Cost – No	Limited source data. Field inspection and/or other data confirm that there is a stormwater need; however, the scope of work and the cost cannot be confirmed. Typically from the 2006-2010 CIP.
C	No	No	No	No	Very little available information. Could not confirm that there is a valid project need.
D	No	No	No	No	Replacement of aging capital stormwater infrastructure. Not considered in this Assessment.

Class A projects are those for which a need could be validated, a reasonable scope was defined in the source document, and the basis for estimating costs was well defined and reasonable. If one or more of those elements was missing, a lower classification was assigned. Projects based on source documents prepared by engineering companies, such as a DBPS, typically contained sufficient information that resulted in a Class A rating. Projects based solely on their inclusion in the City's previous CIP lists, with no other supporting data, resulted in a Class B or Class C classification. In general, the 78 CIP projects included in the CIP lists had little supporting data, and most of these projects were categorized as Class B projects.

Class C projects are projects that could not be validated as representing a current project need. In some cases, the vagueness of the problem and solution, combined with the lack of supporting documentation, led to an inability to validate the project. Class C projects were therefore eliminated from this Assessment but were identified for future consideration by the City to confirm the need, scope, and cost of those potential projects.

Class D was assigned to a single project in the MPL, CS-028. Project CS-028 was identified as replacement of all corrugated metal pipe (CMP) within the City limits and had an MPL cost of $134 million (2012 dollars). It was determined through discussions with City staff that the need for this project was not based on a condition assessment of all, or even a portion, of the City's CMP. Rather, it was included in the MPL in recognition that replacement of all CMP storm drain pipe will eventually be required. Replacement of capital infrastructure due to normal aging and deterioration is a long-term need that impacts more than just CMP. There are many other types of capital infrastructure that will also need replacement as the infrastructure

reaches the end of its useful lifespan. For the purpose of this Assessment, the general replacement of capital infrastructure that has reached the end of its normal service life is not considered unless a specific localized project was identified. Therefore, Project CS-028 was assigned its own class category, Class D, and was removed from further consideration in this Assessment. Table 5 summarizes the assigned classification categories for the 238 MPL projects that remained following the screening process previously described.

TABLE 5
Summary of Projects by Classification

Project Classification	# of Projects
A	154
B	74
C	9
D	1
TOTAL	**238**

Based on the results of the screening and classification processes, a VPL was generated and advanced into the prioritization process that followed. The 238 projects that remained following the screening process were further reduced by the identification of Class C and Class D projects. Nine Class C projects and the one Class D project described above were removed from further consideration in this Assessment; these projects are identified for future evaluation by the City. Table 6 summarizes the revisions to the MPL that resulted in the advancement of 228 projects onto the VPL.

Appendix C presents a listing of the VPL projects arranged by Project ID.

TABLE 6
Project Validation and Classification Summary

Project Classification/Status	# of Projects
A	154
B	74
Subtotal of Projects Included in the VPL	**228**
C	9
D	1
Constructed Projects	31
Duplicate Projects	12
Does not Exist	1
Subtotal of MPL Projects Removed from this Assessment	**54**
MPL TOTAL	**282**

Project Prioritization

The 228 projects in the VPL were prioritized into High, Medium, and Low Priority categories based on the urgency of addressing the stormwater need. The ratings are based on the engineering judgment of the consultant evaluation team through the review of the source documents, aerial photography, and field visits when applicable. Guidance used in determining the priority category is summarized in Table 7.

TABLE 7
Project Prioritization Methodology

Priority	Description	Examples
High	Critical to Important need. Public health or safety issue evident and/or significant risk to infrastructure.	Projects determined to be high priority in recent source documents by engineering consulting firms, exposed bridge piers, exposed sanitary sewer, failed culvert under roadway, recurring flooding, severe ongoing channel erosion.
Medium	Valid but less urgent. No life/safety concerns or imminent failure of infrastructure.	Single house with street flooding (not structure flooding), upsizing infrastructure.
Low	Improvements recommended but near-term attention not required.	Minor channel erosion, nuisance drainage that doesn't cause damage.

The VPL includes 11 large channel improvement projects, each of which were split in this Assessment into a High Priority project and a Medium Priority project. Each of the 11 High Priority projects are designated by the project ID followed by an "a" (e.g., CS-###a), and each of the Medium Priority projects are designated by the project ID followed by a "b" (e.g., CS-###b).

Splitting 11 projects into 22 projects increases the total number of validated projects in the VPL from 228 to 239, as shown in Table 8. Table 8 summarizes the distribution of VPL projects by their priority, and Table 9 summarizes the distribution of VPL projects by both priority and classification. The priority category for each of the 239 projects in the VPL is included in Appendix C.

The High Priority projects were identified as such based on the source documents, previous engineering studies, site visits, discussions with the City, and engineering judgment. The priority of projects is subject to future change based on various factors, such as flooding, wildfires, erosion, infrastructure concerns, and related items. The City will adjust the prioritization when and if needed in the future.

TABLE 8
VPL Summary by Priority

Category	# of Projects	Percent of Validated Projects
High	44	18%
Medium	175	74%
Low	20	8%
TOTAL	**239**	**100%**

TABLE 9

VPL Summary by Priority and Classification

Urgency Category	Classification		Total
	A	B	
	# of Projects	# of Projects	
High	34	10	44
Medium	117	58	175
Low	14	6	20
Total	**165**	**74**	**239**

The photos below illustrate some of the High Priority projects included in the VPL.

1. Sand Creek at Galley Road (CS-259) March 2013

2. Sand Creek at Galley Road (CS-259) August 2013

3. Shooks Run at Patty Jewett GC (CS-380)

4. Shooks Run at Uintah Street (CS-326)

5. Rockrimmon Channel (CS-015)

6. Rockrimmon Channel (CS-015)

7. South Douglas Creek (CS-016)

Project Benefits

The 239 projects in the VPL were further assessed to determine the community benefit of each project by measuring each project against a set of criteria established by project stakeholders. A workshop was held with City staff, County staff, and members of the Regional Stormwater Task Force to determine the evaluation criteria to be used in benefit scoring and to assign relative weighting to each evaluation criterion. Relative weighting factors were assigned through a method called forced ranking. The workshop resulted in the benefit scoring guidelines shown in Table 10.

TABLE 10
Benefit Scoring Methodology

Evaluation Criteria for Benefit Scoring	Criteria Description	Relative Weighting
Health, Safety and Community Benefit	Flooding and/or unstable conditions threatening residences and businesses	40%
System Reliability	Pre-emptive repairs to protect City's infrastructure	30%
Legal/Regulatory	Meet legal mandates, regulatory compliance, IGAs, and other similar commitments or goals	20%
Environmental Sustainability	Reduce erosion, provide sediment control, improve water quality, or other environmental benefits	10%

Performance measures were developed for each evaluation criterion to guide the assignment of benefit scores, as included in Appendix D. The performance measures considered the type of project (channel, storm drain, storage, etc.), and the assignment of points were based on the measure's contribution to meeting the criterion.

The benefit scoring methodology is applied to each project to generate an overall weighted benefit score. Benefit scores were determined using the source documents supporting each project and incorporated the observations made during site visits and/or review of aerial photography. Benefit scores are not used in the classification or prioritization of projects; rather, the benefit score provides additional perspective with regard to each project's benefit to the community.

Figure 1 graphically illustrates the range of benefit scores for the 44 High Priority projects identified in the VPL. The benefit scores for the High Priority projects range from 21 to 63, with an average benefit score of 42. Appendix C includes the total weighted benefit score for each of the 239 validated projects.

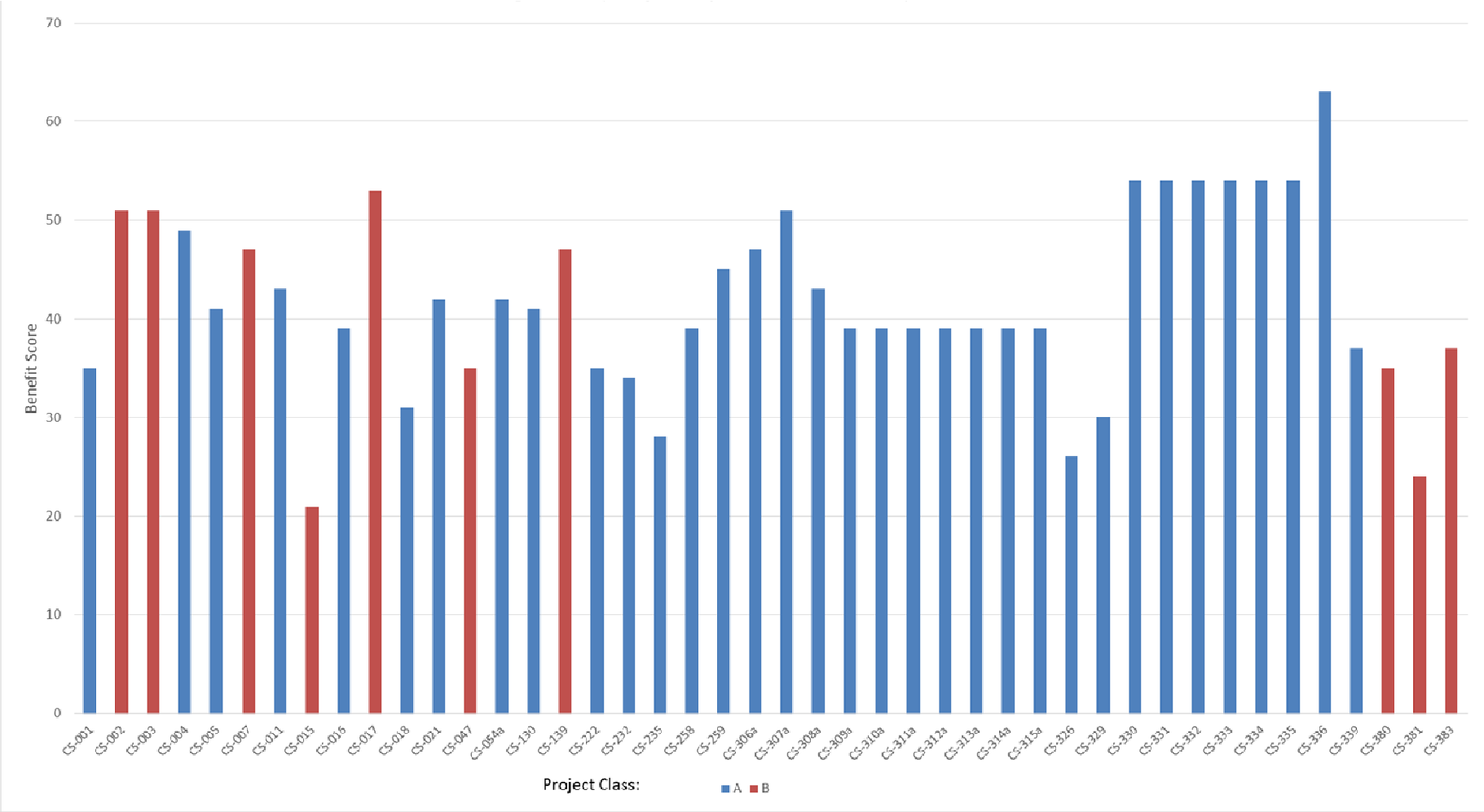

Figure 1: Range of Benefit Scores

Cost Updating

MPL Original Costs

The City's MPL that was provided as the starting point for this Assessment includes an estimated cost for each project. The total cost for the 282 projects in the MPL is $688 million (see Table 2). The individual project costs included in the MPL were developed by City staff from a number of sources, including:

- Engineering studies and reports
- Drainage Basin Planning Studies
- City staff estimates developed in a Microsoft Excel spreadsheet
- City CIP project lists

Depending on the nature of the source document's cost and the year in which it was developed, the following considerations were included in the MPL project cost:

- An escalation to 2012 dollars
- Adjustment factors for other construction and project costs not included in the base cost estimate

Depending on the source of the project cost estimate, escalation to 2012 dollars was performed by the City using different methodologies. Costs derived from DBPS were escalated using the City's Drainage Basin Fee Adjustment table, while costs derived from most other sources were escalated using the *Engineering News-Record* Construction Cost Index (ENR CCI).

Cost Updating Process

Methodology by Project Classification

During this Assessment, project costs provided in the MPL were reviewed and updated where possible. The ability to update project costs depended on the level of detail supporting the MPL estimated cost. Only the 165 Class A projects had project costs that could be validated based on the available project information. The 74 projects designated as Class B had insufficient information to allow confirmation and updating of the MPL cost.

Validation of construction quantities presented in source documents, determination of new construction quantities for cost updates, and development of new project cost estimates were outside the scope of this Assessment.

Class A project costs were updated as follows:

- Obtained the Base Construction Cost (earthwork, rock, structures, etc.) from the source document. If a source document did not indicate if Other Construction Costs or Other Project Costs were included in the stated cost value, it was assumed that the cost represented only the Base Construction Cost.
- Reduced the Base Construction Cost as appropriate based on the percent of the project that was judged to have already been constructed as a result of site visit observations or aerial photo review.
- Adjusted Base Construction Costs to July 2013 dollars using the ENR CCI. The adjustment factor varies for each source document depending on the year the Base Construction Cost was estimated in the source document.
- Added a factor of 21 percent for Other Construction Costs to the Base Construction Cost, per industry standards, to develop the Total Construction Cost. The escalation factor includes the following:
  - Mobilization (5 percent)
  - Clearing and grubbing (3 percent)

  - Remove / relocate / abandon existing features (0.75 percent)
  - Construction surveying / potholing (1.5 percent)
  - Traffic control (1.25 percent)
  - Water control and dewatering (4 percent)
  - Sediment and erosion control (3.5 percent)
  - Quality control / materials testing (2 percent)

- For projects that were identified as being more difficult to construct (i.e., more costly) based on site conditions, an adjustment factor of 10 percent was added to the Base Construction Cost. This resulted in the 2013 Total Construction Cost.
- Added a Construction Contingency factor based on the level of detail of the source document. Based on the conceptual level of detail associated with the source documents, an industry standard Construction Contingency factor of 30 percent was applied to the 2013 Total Construction Cost.
- Added a factor of 27 percent for Other Project Costs to the 2013 Total Construction Cost, per industry standards. This factor includes the following:
  - Design services and management (11 percent)
  - Design survey (2 percent)
  - Geotechnical data collection (2 percent)
  - Stakeholder / public involvement (1.5 percent)
  - Environmental mitigation (2.5 percent)
  - Design services during construction (1.5 percent)
  - Construction management services (6.5 percent)

Costs associated with the following items are not included in the updated costs: City/program management, procurement, legal, financial, or land acquisition.

As stated, for Class B projects, there was insufficient project knowledge and cost detail in the source documents to allow confirmation and updating of the MPL costs. Thus, the MPL costs are unconfirmable for the purposes of this Assessment, and no updated cost is provided. In some of the tables that follow, the City's MPL cost for the Class B projects is shown to provide context simply as the best available information.

City Projects with a Detailed Cost Estimate

The MPL included some projects that have Microsoft Excel cost spreadsheets that include quantities and unit costs as the basis for the cost estimate. Generally, these are found for projects that are identified as being sourced from the SWENT database. For these projects, the unit costs were reviewed and updated as appropriate using recent construction bid data from the Urban Drainage and Flood Control District and the Colorado Department of Transportation. For unique or special items included in the City's cost spreadsheet, where the standard unit costs don't apply, it is assumed that the City's costs for those items were reasonable and were used without change.

Revised Total Project Costs

Table 11 summarizes the updated project cost (2013 dollars) for the 165 Class A projects appearing in the VPL. Class B project costs are not updated for reasons previously described and are included in Table 11 simply as the best available information.

TABLE 11
Validated Project List – Summary of Project Costs

Priority	Class A Projects		Class B Projects		Total # of Projects	Total Cost
	# of Projects	2013 Updated Cost	# of Projects	Unconfirmable MPL Cost		
High	34	$137,649,000	10	$24,057,000	44	$161,706,000
Medium	117	$206,702,000	58	$103,737,000	175	$310,439,000
Low	14	$17,179,000	6	$45,461,000	20	$62,640,000
Total	**165**	**$361,530,000**	**74**	**$173,255,000**	**239**	**$534,785,000**

As shown in Table 11, based on this Assessment, the total updated cost for the VPL Class A projects is $361,530,000 (2013 dollars). This cost does not include any additional expenses associated with City management, procurement, legal, financial, or land acquisition.

The 165 Class A projects included in the MPL had an original MPL cost of $299 million, as compared to this Assessment's updated cost of $362 million. The reasons for the difference include:

- The Base Construction Cost used in this Assessment for some projects may be different from what was used to develop the MPL project costs.
- Escalation methodology.
- Escalation to July 2013 dollars rather than 2012.
- Adjustment factors for Other Construction Costs, Other Project Costs, Construction Difficulty, and Construction Contingency.

A summary list of the High Priority projects is included in Table 13. The full list of High, Medium, and Low Priority projects that comprise the VPL is included in Appendix C.

Summary of Results

This Assessment resulted in the following major findings:

- A total of 44 projects were found to be either constructed (31), duplicates of other projects (12), or non-existent (1), and were removed from the MPL.
- Based on the level of detail in the source documents, 9 Class C projects could not be validated and were removed from this Assessment and identified for further consideration by the City.
- One Class D project was removed from further consideration as it represents an example of aging infrastructure needs that are beyond the scope of this Assessment.
- A total of 228 projects from the MPL were advanced to the VPL. The 228 projects became 239 projects, as 11 projects were split into 22 projects to distinguish High Priority elements of each project from the Medium Priority elements.
- The VPL includes 165 Class A projects with an updated cost of $361,530,000 (2013 dollars).
- The VPL includes 74 Class B projects with validated need, but the available source document information lacks sufficient detail to confirm and update the costs. Class B project costs are characterized by this Assessment as being unconfirmable.

Table 12 summarizes the number of projects in the VPL (see Appendix C) and their updated costs for Class A projects. Also shown, for informational purposes, is the City's MPL cost total for the Class B projects. As discussed, Class B project costs are unconfirmable and are included in Table 12 simply as the best available information.

TABLE 12
Summary of VPL Costs

Project Class	# of Validated Projects	Total Updated Cost (2013 dollars)	Total Unconfirmable MPL Cost (2012 dollars)
Class A	165	$362 million	
Class B	74		$173 million
TOTAL	**239**	**$535 million**	

TABLE 13

Summary of High Priority Projects

Project ID	Name	Project Class	CLASS A PROJECTS										CLASS B PROJECTS
			Base Construction Cost			2013 Escalated Base Construction Cost	Other Construction Costs (21%)	Adjustment for Difficult Construction (10%)	2013 Total Construction Cost	Other Project Costs (27%)	Construction Contingency (30%)	2013 Total Updated Cost (Rounded)	Unconfirmable MPL Cost (2012 dollars)
			Amount	Year	2013 Escalation Factor								
CS-001	19th St Detention Pond	A	$201,751	2012	1.0262	$207,040	$43,478	$0	$250,518	$67,640	$75,155	$393,000	
CS-004	Cottonwood Creek - Academy to Union	A	$2,790,000	2010	1.0856	$3,028,762	$636,040	$0	$3,664,802	$989,497	$1,099,441	$5,754,000	
CS-005	Cottonwood Creek - Monument Creek to Academy	A	$6,156,830	2009	1.1146	$6,862,315	$1,441,086	$0	$8,303,401	$2,241,918	$2,491,020	$13,036,000	
CS-011	Monument Creek at Talamine	A	$827,500	2009	1.1146	$922,320	$193,687	$0	$1,116,007	$301,322	$334,802	$1,752,000	
CS-016	S. Douglas Creek Critical Repairs	A	$1,068,995	2009	1.1146	$1,191,487	$250,212	$0	$1,441,699	$389,259	$432,510	$2,263,000	
CS-018	Sand Creek Downstream of Platte	A	$1,550,000	2013	1.0000	$1,550,000	$325,500	$0	$1,875,500	$506,385	$562,650	$2,945,000	
CS-021	Templeton Gap Floodway	A	$5,018,730	2009	1.1146	$5,593,805	$1,174,699	$0	$6,768,504	$1,827,496	$2,030,551	$10,627,000	
CS-054a	Shooks Run - Bijou St. Culvert and Channel Stabilization - High Priority Project	A	$2,420,939	1993	1.8334	$4,438,543	$932,094	$537,064	$5,907,701	$1,595,079	$1,772,310	$9,275,000	
CS-130	Hancock Expressway Channel East of Astrozon	A	$33,750	2013	1.0000	$33,750	$7,088	$4,084	$44,921	$12,129	$13,476	$71,000	
CS-222	Rockrimmon Channel at Rockrimmon/Pro Rodeo Int.	A	$50,000	2012	1.0262	$51,311	$10,775	$0	$62,086	$16,763	$18,626	$97,000	
CS-232	Park Vista Culvert and Channel Improvements	A	$3,219,173	2003	1.4269	$4,593,597	$964,655	$0	$5,558,253	$1,500,728	$1,667,476	$8,726,000	
CS-235	Halleys Court Storm Drain Replacement	A	$55,430	2012	1.0262	$56,883	$11,945	$0	$68,828	$18,584	$20,649	$108,000	
CS-258	Sand Creek - Platte Ave. to Galley Rd., 270+00 to 300+00 Channel Stabilization	A	$1,237,810	2010	1.0856	$1,343,739	$282,185	$0	$1,625,924	$439,000	$487,777	$2,552,000	
CS-259	Sand Creek - Galley Rd. to Palmer Park, 300+00 to 345+00 Channel Stabilization	A	$3,150,299	2010	1.0856	$3,419,895	$718,178	$0	$4,138,073	$1,117,280	$1,241,422	$6,497,000	
☆ CS-306a	Fountain Creek – W. Cimarron St. to Drake Power Plant – High Priority Reach 1 Projects	A	$247,435	2011	1.0531	$260,584	$54,723	$0	$315,307	$85,133	$94,592	$495,000	
☆ CS-307a	Fountain Creek N end of Drake Power Plant to S end of Drake Power Plant – High Priority Reach 2 Projects	A	$165,122	2011	1.0531	$173,897	$36,518	$0	$210,415	$56,812	$63,125	$330,000	
☆ CS-308a	Fountain Creek - Drake Power Plant to S. Tejon St. - High Priority Reach 3 Projects	A	$429,133	2011	1.0531	$451,938	$94,907	$0	$546,845	$147,648	$164,054	$859,000	
☆ CS-309a	Fountain Creek - S. Tejon St. to Shooks Run - High Priority Reach 4 Projects	A	$172,800	2011	1.0531	$181,983	$38,216	$0	$220,199	$59,454	$66,060	$346,000	
CS-310a	Fountain Creek – Shooks Run to Fountain Mutual Canal – High Priority Reach 5 Projects	A	$2,200,900	2011	1.0531	$2,317,861	$486,751	$0	$2,804,611	$757,245	$841,383	$4,403,000	
☆ CS-311a	Fountain Creek - Fountain Mutual Canal to US 24 Bypass - High Priority Reach 7 Projects	A	$4,669,622	2011	1.0531	$4,917,776	$1,032,733	$0	$5,950,509	$1,606,637	$1,785,153	$9,342,000	
☆ CS-312a	Fountain Creek – U.S. 24 Bypass to Spring Creek - High Priority Reach 9 Projects	A	$364,600	2011	1.0531	$383,976	$80,635	$0	$464,611	$125,445	$139,383	$729,000	
CS-313a	Fountain Creek – Spring Creek to Mobile Home Park – High Priority Reach 8 Projects	A	$1,019,000	2011	1.0531	$1,073,152	$225,362	$0	$1,298,514	$350,599	$389,554	$2,039,000	
CS-314a	Fountain Creek - Mobile Home Park to N end El Pomar Sports Park - High Priority Reach 9 Projects	A	$316,800	2011	1.0531	$333,635	$70,063	$0	$403,699	$108,999	$121,110	$634,000	

☆ Indicates project with potential cost sharing partner

TABLE 13

Summary of High Priority Projects

Project ID	Name	Project Class	CLASS A PROJECTS										CLASS B PROJECTS
			Base Construction Cost										
			Amount	Year	2013 Escalation Factor	2013 Escalated Base Construction Cost	Other Construction Costs (21%)	Adjustment for Difficult Construction (10%)	2013 Total Construction Cost	Other Project Costs (27%)	Construction Contingency (30%)	2013 Total Updated Cost (Rounded)	Unconfirmable MPL Cost (2012 dollars)
☆ CS-315a	Fountain Creek - Along El Pomar Sports Park	A	$190,933	2011	1.0531	$201,080	$42,227	$0	$243,306	$65,693	$72,992	$382,000	
CS-326	Shooks Run - Cache La Poudre St. to Patty Jewett Golf Course	A	$9,010,000	1993	1.8334	$16,518,910	$3,468,971	$1,998,788	$21,986,669	$5,936,401	$6,596,001	$34,519,000	
CS-329	Shooks Run - Patty Jewett Golf Course	A	$790,000	1993	1.8334	$1,448,384	$304,161	$0	$1,752,544	$473,187	$525,763	$2,751,000	
CS-330	Fairfax Tributary Detention Pond - Research Parkway at Powers	A	$190,000	2010	1.0856	$206,260	$190,000	$0	$249,574	$67,385	$74,872	$392,000	
CS-331	Austin Bluffs Detention Pond - Upstream of Research	A	$360,000	2010	1.0856	$390,808	$82,070	$0	$472,878	$127,677	$141,863	$742,000	
CS-332	Cottonwood Creek Detention Pond - Bridle Pass Dr.	A	$760,000	2010	1.0856	$825,039	$173,258	$0	$998,297	$269,540	$299,489	$1,567,000	
CS-333	Rangewood Detention Pond at Dublin Blvd.	A	$320,000	2010	1.0856	$347,385	$72,951	$0	$420,336	$113,491	$126,101	$660,000	
CS-334	Cottonwood Creek Detention Pond - Cottonwood Park (west side)	A	$1,800,000	2010	1.0856	$1,954,040	$410,348	$0	$2,364,389	$638,385	$709,317	$3,712,000	
CS-335	South Pine Creek Detention Pond - Lexington at Bordeaux	A	$220,000	2010	1.0856	$238,827	$50,154	$0	$288,981	$78,025	$86,694	$453,000	
CS-336	Cottonwood Creek - Austin Bluffs to Powers	A	$3,680,000	2010	1.0856	$3,994,927	$838,935	$0	$4,833,861	$1,305,143	$1,450,158	$7,589,000	
CS-339	Gold Medal Pt. Channel	A	$780,000	2010	1.0856	$846,751	$177,818	$0	$1,024,568	$276,633	$307,371	$1,609,000	
	Class A Project Subtotal (34 Projects)		**$55,467,552**			**$70,360,660**	**$14,922,423**	**$2,539,936**	**$87,676,330**	**$23,672,612**	**$26,302,900**	**$137,649,000**	
CS-002	31st Street Drainage Way, Phase 1	B											$8,910,000
CS-003	31st Street Drainage Way, Phase 2	B											$5,530,000
CS-007	Dry Creek Channel	B											$1,352,000
CS-015	Rockrimmon Channel	B											$3,720,000
CS-017	N. Douglas Creek between I-25 and Monument Creek	B											$930,000
CS-047	Pine Creek Channel Outfall into Monument Creek	B											$2,796,000
CS-139	Monument Creek Mobile Home Park	B											$468,000
CS-380	Patty Jewett Golf Course - Concrete Ditch Failure	B											$62,000
CS-381	Little Shooks Run - Pipe Arch	B											$39,000
CS-383	Shooks Run Bank Stabilization, 1522 N. Custer	B											$250,000
	Class B Project Subtotal (10 Projects)												**$24,057,000**
	HIGH PRIORITY CLASS A and CLASS B TOTAL (44 Projects)											**$161,706,000**	

☆ Indicates project with potential cost sharing partner

This Assessment reviewed the City's MPL to validate each listed project's need, scope, and cost. The Assessment did not identify nor validate stormwater capital needs not in the MPL, including any new project needs resulting from 2012 and 2013 wildfires or the high-runoff events of 2013.

Projects were classified as Class A, B, C, or D based on the completeness of the available source documentation. Class A and Class B projects were placed in the VPL. VPL projects were then prioritized into High, Medium, and Low categories based on the urgency of addressing the stormwater need. A benefit score was given to each project to represent the general benefit the project would provide to the community. The cost for each Class A project was validated by using the best available data escalated to 2013 dollars and adjusted to account for additional construction and project costs. Class B projects had insufficient back-up information to verify the cost basis and were not updated.

This VPL represents only one component of the overall stormwater needs within the City. Other stormwater-related components include:

- Master Planning and Floodplain Management
- Operations and Maintenance
- Design and Construction
  - Capital Improvements (per this Assessment)
  - Capital Replacements (e.g., replacement of aging infrastructure)
- Water Quality and Regulatory Compliance
- Land Development Coordination and Review

As noted in this Assessment, the completeness and age of the source documents varied greatly. Thus, the next step for each project will also vary. For Class A projects that are confirmed and validated and that derive from recent engineering studies, the next step will typically be engineering design and construction. For Class A projects that derive from older DBPS and Class B projects that are confirmed and validated but lack detailed information, the next step will typically be further engineering analysis and/or alternatives development followed by design and construction. The selection of which projects move forward first will be a decision by the City based on numerous factors, including the project's priority, cost, benefit, level of analysis or design completed to date, and available funding.

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The attached DVDs contain the following information:

DVD 1 of 2

- City of Colorado Springs Stormwater Needs Assessment, Final Report, October 11, 2013
- Appendix A: City of Colorado Springs Master Project List (MPL)
- Appendix B: Class C, Class D, and Removed Projects
- Appendix C: Validated Project List (VPL)
- Appendix D: Benefit Scoring Methodology
- Appendix E: MPL Project Locations by Priority (full-size map)
- Appendix F: MPL GIS Map Book
- Appendix G: VPL Project Summary Forms
- Appendix H: VPL Project Photo Sheets

DVD 2 of 2

- Appendix I: Additional Photos

Appendix E

Project Overview Map:
MPL Project Locations by Priority (full-size map)